Region of Peel
Public Works & Transportation

July 2012

Highway 50 & Mayfield Road
Class Environmental Assessment
Final Environmental Study Report

Volume 1: Environmental Study Report to Appendix E.2

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HDR | iTRANS

EXECUTIVE SUMMARY

The Region of Peel (Region) retained HDR to carry out a Municipal Class Environmental Assessment (Class EA) Study for potential roadway improvements to Highway 50 from Castlemore Road / Rutherford Road to Mayfield Road / Albion-Vaughan Road, as well as Mayfield Road from Highway 50 to Coleraine Drive. The study has been carried out as a Schedule C project in compliance with the Municipal Engineers Association (MEA) document *Municipal Class Environmental Assessment Act* (October 2000 as amended in 2007), which is approved under the Ontario Environmental Assessment Act. This Class Environmental Assessment provides the detailed assessment to define the solution and design of improvements within the study area.

Problems

In the Highway 50 and Mayfield Road study corridor there is a high level of congestion with existing traffic. The volumes are forecast to increase greatly in the coming years due to planned developments, and additional road capacity is needed to serve new development planned in the immediate area along with general traffic growth, by 2031.

Currently, only the automobile is accommodated in the study area. There is a lack of sidewalks and bicycle facilities along the corridors. There is no infrastructure (e.g. bus shelter / pads, priority measures) to support transit service. With the area becoming an employment centre in the future multiple means of getting to and from work will be required to balance travel demand and encourage alternative modes.

There are known storm water drainage problems along the corridor, particularly at the intersection of Mayfield Road and Highway 50.

Opportunities

The redevelopment of the roads in the study corridor will provide many opportunities to improve the transportation network in the area. The main element will be the addition of traffic capacity to the area network on top of improvements to the layout and design of the corridor.

Potential opportunities for improvement include providing pedestrian and bicycle facilities along the corridors as well as protecting for transit priority measures to improve the reliability of transit service. The drainage problems that exist today will also have the opportunity to be solved in the process. There is also an opportunity to introduce improved streetscaping areas along the corridor creating a more attractive environment.

Preferred Alternative Planning Solution

The Preferred Alternative Planning Solution is to:

- widen Highway 50 (between Mayfield Road and Castlemore Road) to 6 lanes;
- widen Mayfield Road (between Highway 50 and Coleraine Road) to 4 lanes;
- provide for sidewalks and multi-use trails along the corridors;
- support Travel Demand Management (e.g. carpool options, transit usage); and
- provide for transit priority measures.

Preferred Design Concept

Based on the evaluation of alternative design concepts for the typical cross-sections, the Preferred Alternative Cross-Section is to provide a full urban cross-section, including curb and gutter, along both the Highway 50 and Mayfield Road corridors. Since this area is designated to become entirely urbanized in the future, an urban cross-section would be consistent with these plans. Cyclists and pedestrians will be accommodated behind the curb and as such, are protected from traffic.

Based on the evaluation of alternative design concepts for the Highway 50 corridor, the Preferred Design Concept is to widen Highway 50 from 4 to 6 lanes to the east and west sides while providing a slight easterly shift of alignment in the vicinity of Shiloh Cemetery.

Based on the evaluation of alternative design concepts for the Mayfield Road corridor, the Preferred Design Concept is to widen Mayfield Road from 2 to 4 lanes to the north and south sides minimizing impacts to properties with a southerly shift of alignment in the vicinity of Pillsworth Road. The Preferred Design Concept for Mayfield Road provides a roundabout at Pillsworth Road.

Summary of Public Consultation Process

In accordance with the Municipal Class EA process, the Region conducted a comprehensive public consultation program, with the following components:

- **Property Owners Mailing List** – Approximately 140 members of the public on the mailing list were sent letters and notices at study commencement, prior to each of the public meetings and at study completion.

- **Stakeholder Mailing List –** Members of the stakeholder mailing list were sent letters and notices at study commencement, prior to each of the public meetings and at study completion.

- **Public Information Centres (PIC)** – Two PICs were held in the vicinity of the study area. Both PICs consisted of a public open house with display panels.

- **Newspaper Advertisements** – A newspaper advertisement was placed in the *Brampton Guardian, Caledon Enterprise* and the *Vaughan Citizen* to announce the Commencement of the Study, each round of PICs, and the Completion of the Study.

Recommended Design Concept

The Highway 50 recommended design proposes:

1. Widening about the centre-line between Mayfield Road and Castlemore Road to a 6 lane configuration.
2. A full urban cross-section to be implemented as development proceeds.
3. An easterly shift to avoid impacts to Shiloh Cemetery.
4. A 3.0m multi-use trail along the west side.
5. A 1.5m sidewalk along the east side (for future consideration).
6. External roadside ditches along the corridor to intercept existing drainage from farm fields.

The Mayfield Road recommended design proposes:

1. Widening about the centre-line between Highway 50 and Coleraine Road to a 4 lane configuration.
2. A roundabout at the Mayfield Road and Pillsworth Road intersection.
3. A full urban cross-section to be implemented as development proceeds.
4. A southerly shift to reduce impacts on four existing residential properties.
5. A 3.0m multi-use trail along the south side.
6. A 1.5m sidewalk along the north side.
7. External roadside ditches along the corridor to intercept existing drainage from farm fields.

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1. INTRODUCTION

1.1 Study Purpose

The Region of Peel (Region) retained HDR to carry out a Municipal Class Environmental Assessment (Class EA) Study for potential roadway improvements to Highway 50 from Castlemore Road / Rutherford Road to Mayfield Road / Albion-Vaughan Road, as well as Mayfield Road from Highway 50 to Coleraine Drive. The study has been carried out as a Schedule C project in compliance with the Municipal Engineers Association (MEA) document *Municipal Class Environmental Assessment Act* (October 2000 as amended in 2007), which is approved under the Ontario Environmental Assessment Act. This Class Environmental Assessment provides the detailed assessment to define the solution and design of improvements within the study area.

The Region of Peel (Region) has a fast growing population along with a growing employment sector. Both Highway 50 and Mayfield Road are subject to traffic growth pressures as a result of residential, business and industrial development in the general area, as well as traffic passing through. The northeast corner of the City of Brampton where this study takes place is slated to become the next big growth area for industrial activity, as well as residential development at the southern part of the area. The Town of Bolton, just north of the study area, is also growing rapidly in terms of commercial and industrial employment areas. Highway 427 is being extended further north into York Region and is planned to end at Major Mackenzie Drive. This will result in substantial increases to northbound traffic into this area.

Currently, this section of Highway 50 is a five lane road with two through lanes of traffic in each direction and a centre two way turning lane, with the exception of some intersections which have tapered left and / or right turn lanes in addition to the centre lane. Mayfield Road is a two lane road with left and / or right turn lanes at the Coleraine Drive and Highway 50 intersection.

Highway 50 is the main north-south arterial near the Peel-York municipal boundary moving commuter and truck traffic between north-western Toronto, north-eastern Mississauga, and south-eastern Brampton up to the Caledon, Simcoe and Dufferin areas.

This study has determined that road capacity improvements are recommended within the study area. The major objectives of this study were to:

- Conduct a detailed transportation and traffic study / analysis along the Highway 50 and Mayfield Road corridors (within the study limits) to confirm the need, timing and appropriate configuration of the preferred alternative.
- Complete phases 1 to 4 of the Municipal Class EA process with participation from the public and/or potentially affected parties early in and throughout the process and with comprehensive planning.
- Provide satisfactory consideration to a reasonable range of alternatives.

- Consider the effects on all aspects of environment and systematic evaluation of alternatives.
- Develop preliminary preferred design(s) of recommended alternative.

1.2 Study Area

The study area includes Highway 50 from Castlemore Road / Rutherford Road to Mayfield Road / Albion-Vaughan Road and Mayfield Road from Highway 50 to Coleraine Drive. The study area is illustrated in **Exhibit 1-1**.

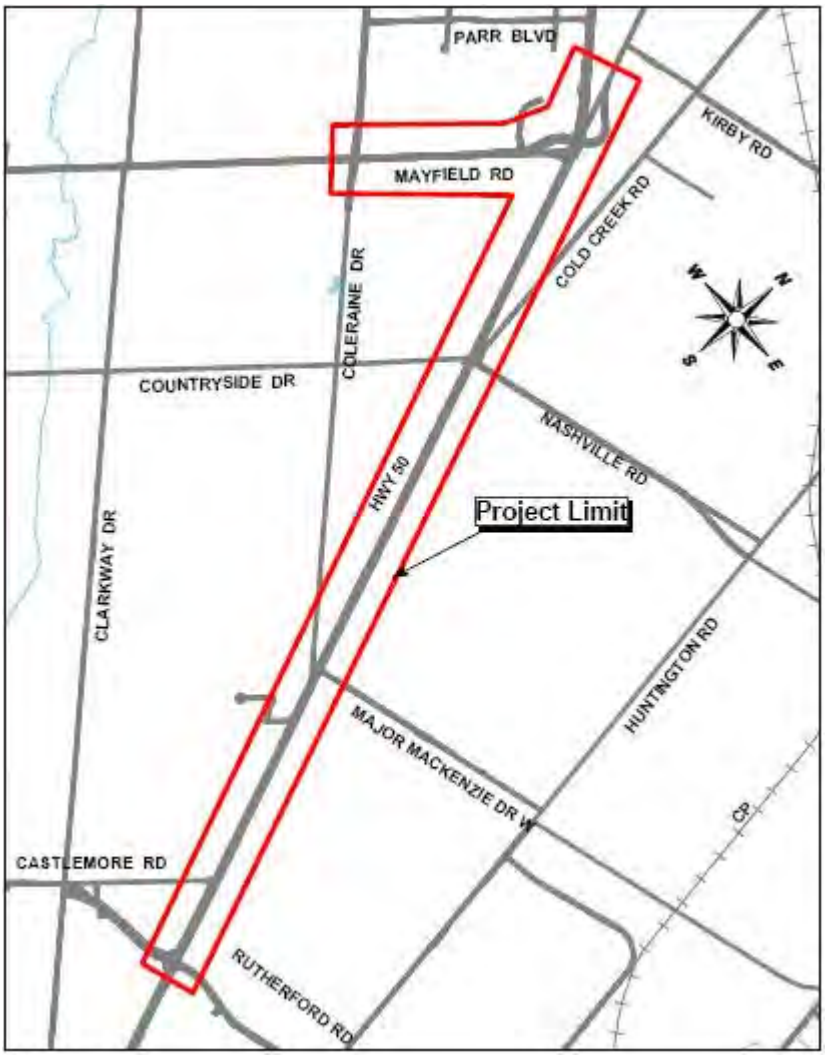


Exhibit 1-1: Highway 50 and Mayfield Road EA Study Area

1.3 Class Environmental Assessment Process

1.3.1 Municipal Class EA Process

The *Ontario Environmental Assessment Act* requires Ontario municipalities to complete an EA when undertaking capital works projects. The purpose of the *Ontario Environmental Assessment Act* (EA Act) is to provide for:

> *"…the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment."*

"Environment" is applied in a broad sense and includes the natural, social, cultural, built and economic environments. It is defined in the EA Act as:

- Air, land or water
- Plant and animal life, including human life
- The social, economic 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 human activities
- Any part or combination of the foregoing and the interrelationships between any two or more of them

The municipality can avoid expensive, and sometimes controversial, remedial action once the project has been completed by eliminating or reducing effects on the environment. In the long term, environmental assessment provides decision makers with the kind of information they need to approve projects that are suitable with a healthy, sustainable environment for both present and future generations.

The EA process is a planning tool used to identify the possible adverse effects of proposed infrastructure projects on the environment (**Exhibit 1-2**). Municipalities in Ontario have the benefit of using the Municipal Engineers Association's Class EA process for certain municipal road, water and wastewater projects.

This study has been carried out in accordance with the planning and design process for a Schedule C project as outlined in the Municipal Engineers Association (MEA) document *Municipal Class Environmental Assessment* document (June 2000, as amended in October 2007).

Projects in the Class EA are classified according to schedules:

- **Schedule A:**
  - Generally includes normal or emergency operational and maintenance activities.
  - The environmental effects of these activities are usually minimal and, therefore, these projects are pre-approved.

- **Schedule A+:**
  - In 2007, MEA introduced Schedule A+. These projects are pre-approved; however the public is to be advised prior to project implementation.
- **Schedule B:**
  - Generally includes improvements and minor expansions to existing facilities.
  - There is the potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.
- **Schedule C:**
  - Generally includes the construction of new facilities and major expansions to existing facilities.
  - These projects proceed through the environmental assessment planning process outlined in the Class EA.

The Highway 50 and Mayfield Road Class EA was conducted in compliance with Schedule C of the Municipal Class EA. The process is characterized by a five phase planning and design process illustrated in **Exhibit 1-2** and described below:

- **Phase 1** – Identify the problem (deficiency) or opportunity.
- **Phase 2** – Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input.
- **Phase 3** – Examine alternative methods of implementing the preferred solution, based on the existing environment, public and review agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects.
- **Phase 4** – Document in an Environmental Study Report (ESR) a summary of the rationale, and the planning, design, and consultation process of the project. Place ESR on public record for a minimum 30 calendar days for review, and notify completion of the ESR and provision for Part II Order request.
- **Phase 5**, which involves detailed design, preparation of contract drawings and tender documents, construction, operation, and monitoring, is not part of this study.

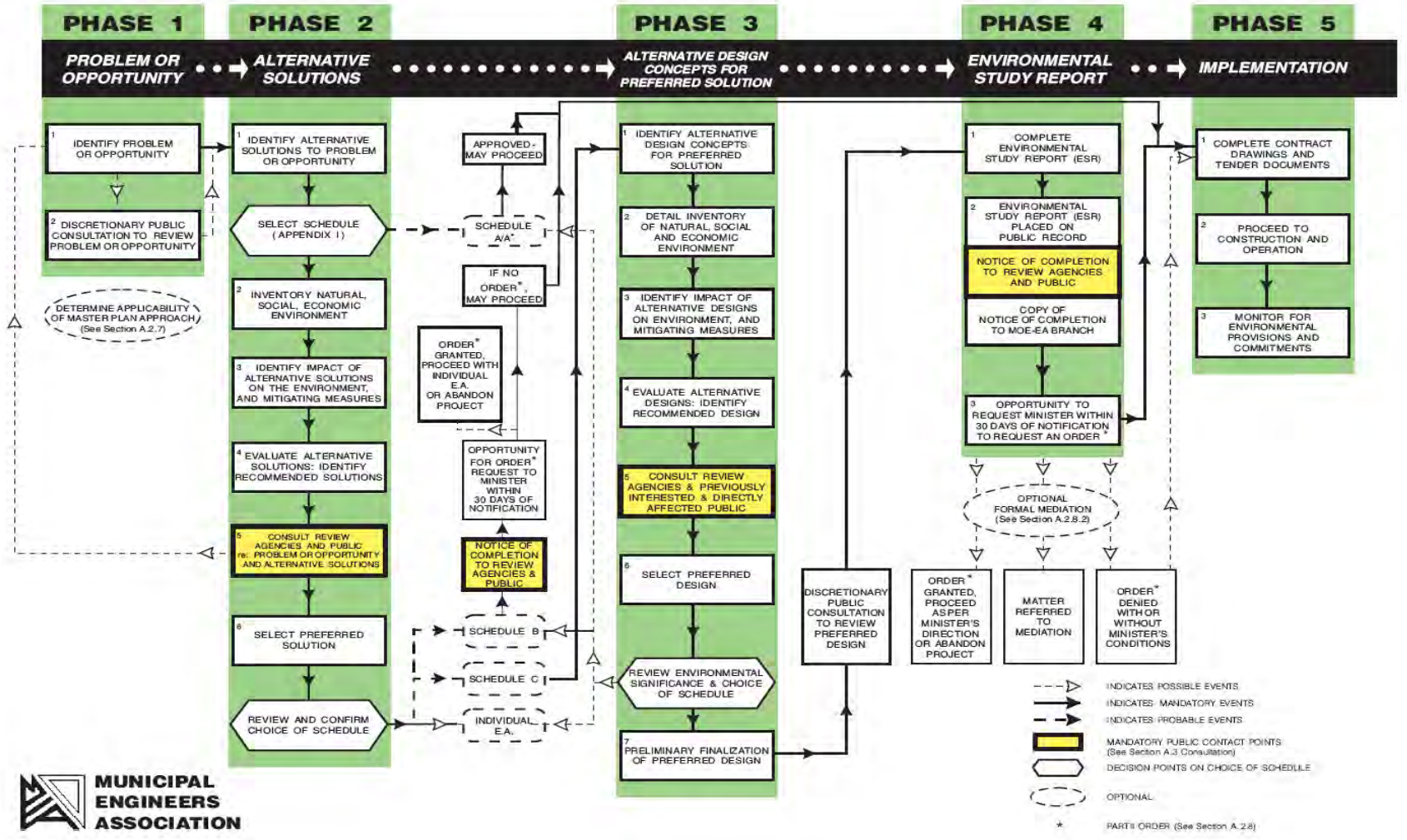


Exhibit 1-2: Municipal Class Environmental Assessment Flowchart

The Environmental Study Report (ESR) provides information on the background to the study, the problem statement, alternative solutions, alternative designs, and the public consultation process. The recommended design is included in **Appendix A**.

After the ESR is finalized, it is filed and placed on public record for 30-calendar days for review by the public and review agencies. At the time the report is filed, a Notice of Completion of the Environmental Study Report will be advertised, to advise the public and other stakeholders where the Environmental Study Report may be seen and reviewed, and how to submit public comments. The Notice will also advise the public and other stakeholders of their right to request a Part II Order, and how and when such a request must be submitted.

The ESR for Highway 50 and Mayfield Road has been placed on the public record at the following locations:

Peel Region Clerk's Office 10 Peel Centre Dr. Suites A and B Brampton, ON L6T 4B9		**York Region Clerk's Office** 17250 Yonge Street, 4th Floor Newmarket, ON L3Y 6Z1
Town of Caledon Clerk's Office 6311 Old Church Road Caledon, ON L7C 1J6	**City of Brampton Clerk's Office** 2 Wellington St West Brampton, ON L6Y 4R2	**City of Vaughan Clerk's Office** Level 100 - 2141 Major Mackenzie Dr Vaughan, ON L6A 1T1
Town of Caledon Library Albion-Bolton Branch 150 Queen Street South Bolton, ON L7E 1E3	**City of Brampton Library** Northeast Interim Site 55 Mountainash Rd, Unit 24, Brampton, ON L6R 1W4	**City of Vaughan Library** Kleinburg Branch 10341 Islington Avenue Kleinburg, ON L0J 1C0

The review period is between July 30, 2012 and September 7, 2012. Provided no Part II order requests are received, the Region of Peel will proceed to detailed design and construction.

1.3.1.1 Part II Order

Under the Environmental Assessment Act, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment to require the proponent (the Region of Peel) to comply with Part II of the Environmental Assessment Act before proceeding with the proposed undertaking. Part II of the Act addresses Individual Environmental Assessments. The request for a Part II order must also be copied to the proponent at the same time it is submitted to the Minister. Written requests for a Part II order must be submitted to the Minister within the 30-calendar day review period after the proponent has filed the Environmental Study Report and has issued the Notice of Completion of the Environmental Study Report.

If concerns regarding this project cannot be resolved in discussion with the Region of Peel, a person or party may request that the Minister of Environment make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order).

All Part II Order requests are reviewed by the Environmental Assessment and Approvals

Branch (EAAB). Staff consults with the requester(s), the proponent and any other agency or group potentially affected by the Minister s decision. Information is summarized by staff and a recommendation is made to the Minister who is ultimately responsible for a decision. Evaluation criteria for requests include the purpose of the Environmental Assessment Act, factors suggesting that the proposed undertaking differs from other undertakings in the class to which the Class EA applies, the significance of these factors and differences, the nature of concerns raised by the requester(s), and the benefits of carrying out an Individual EA. Staff also evaluate the applicability and effectiveness of other legislation and decision-making processes to address the concerns of the requester(s).

Timelines for the Ministry's review or the Minister's decision on a request typically range from 30 to 66 days, depending on the Class EA document. The Minister has four options for a decision on a Part II Order request:

- Deny the request;
- Deny the request with conditions;
- Refer to mediation; and
- Grant the request and require the proponent to undergo an Individual EA.

1.3.2 Canadian Environmental Assessment Act (CEAA)

The Canadian Environmental Assessment Act (CEAA) and its regulations are the legislative basis for the federal practice of environmental assessments. The Act:

- Ensures that projects are carefully reviewed before federal authorities take action in connection with them so that projects do not cause significant adverse environmental effects;
- Ensures that there is an opportunity for public participation in the environmental assessment process;
- Encourages federal authorities to take actions that promote sustainable development;
- Promotes cooperation and coordinated action between federal and provincial governments on environmental assessments;
- Promotes communication and cooperation between federal authorities and Aboriginal peoples; and
- Ensures that development in Canada or on federal lands does not cause significant adverse environmental effects in areas surrounding the project.

These regulations help to put the Act's procedures into effect and to clarify under what circumstances an environmental assessment is required.

A Federal Environmental Assessment is triggered under subsection 5(1) of CEAA, where a Federal Authority:

- Is the proponent of the project.
- Makes or authorizes payments or provides a guarantee for a loan or any other form of financial assistance to the proponent.
- Has the administration of federal lands and sells, leases or otherwise disposes of those lands or any interests in those lands, or transfers the administration and control of those lands or interests.

- Issues a permit or license, grants an approval identified on the Law List Regulations for the purpose of enabling the project to be carried out.

The study team monitored for CEAA triggers throughout the course of the study. Based on consultation with TRCA during the EA study, this project has provided sufficient mitigation for any potential impacts and will not require authorization under the Fisheries Act from Fisheries Oceans Canada (DFO). However, this will be formalized through an application for Letter of Advice (LOA) to TRCA during detailed design.

1.4 Study Organization

A consultant team led by HDR | iTRANS carried out the Environmental Assessment Study, on behalf of the Region of Peel. The member of the Region of Peel Team, Project Team and consultant team are detailed below:

Region of Peel Team

- Solmaz Zia
- Richard Sparham
- Sean Ballaro
- Bob Nieuwenhuysen
- Joe Avsec
- Imre Tot
- Tony Bosco
- Liz Brock
- Kathy Cater
- Eric Chan
- William Toy
- Hashim Hamdani
- Olek Garbos
- Mina Zare
- Ryan Gulyas
- Sabrina Khan
- Sean Nix

Project Team

- York Region – Edward Chiu
- City of Brampton – Compton Bobb
- City of Vaughan – Colin Cassar
- Town of Caledon – Kant Chawla

Consultant Team

- HDR | iTRANS – Stephen Keen and Nathalie Baudais
- LGL Limited – Katherine Mitchell
- ASI Archaeology – Lisa Merritt
- ASI Built and Cultural Heritage – Lindsay Propert
- SS Wilson – Tarek Zayed
- Exp (formerly TROW) – Jim Farquharson

1.5 Study Schedule

The study was initiated in November 2009. Key dates were as follows:

Study Commencement	Advertisement	November 4 and 11, 2009 (Brampton Guardian and Caledon Enterprise); and November 5 and 12, 2009 (Vaughan Citizen)	Advertised in Brampton Guardian, Caledon Enterprise and Vaughan Citizen
	Mail Out	November 10, 2009	Mailed to residents fronting or backing onto Highway 50 and Mayfield Road, First Nations and agencies.
Public Information Centre #1	Advertisement	May 19, 2010 and June 2, 2010	Advertised in Brampton Guardian, Caledon Enterprise and Vaughan Citizen
	Mail Out	May 19, 2010	Mailed to residents fronting or backing onto Highway 50 and Mayfield Road, First Nations and agencies.
	Public Information Centre 1	June 3, 2010	To obtain public input after reviewing the problem being addressed, background information, the alternative solutions being considered, and identifying a preliminary preferred alternative solution.
Public Information Centre #2	Advertisement	April 15 and 22, 2011 (Brampton Guardian); April 19 and 26, 2011 (Caledon Enterprise); and April 17 and 24, 2011 (Vaughan Citizen).	Advertised in Brampton Guardian, Caledon Enterprise and Vaughan Citizen
	Mail Out	April 19, 2011	Mailed to residents fronting or backing onto Highway 50 and Mayfield Road, First Nations and agencies.
	Public Information Centre 2	April 27, 2011	To present design alternatives and preliminary preferred design.
Study Completion	Advertisement	July 20 and July 25, 2012 (Brampton Guardian); July 19 and July 24, 2012 (Caledon Enterprise); and July 22 and July 26, 2012 (Vaughan Citizen).	Advertised in Brampton Guardian, Caledon Enterprise and Vaughan Citizen
	Mail Out	July 16, 2012	Mailed to residents fronting or backing onto Highway 50 and Mayfield Road, First Nations and agencies.

1.6 Agency Participation

The following list of agencies was contacted for information or comments throughout the duration of the project. The opportunity for these agencies to participate in the project was provided through the distribution of study commencement notices and announcements of two formal Public Information Centres (PICs). Some of the agencies were also included in the Project Team, as outlined in Section 1.4.

Federal Departments:

- Fisheries and Oceans Canada
- Transport Canada
- Indian and Northern Affairs Canada
- Environment Canada

Provincial Ministries:

- Ministry of Environment
- Ministry of Natural Resources
- Ministry of Citizenship, Culture & Recreation
- Ministry of Tourism and Recreation
- Ministry of Municipal Affairs and Housing
- Ministry of Transportation
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Aboriginal Affairs

Agencies and Authorities:

- Toronto Region Conservation Authority
- Peel Region District School Board
- Dufferin-Peel Catholic District School Board
- Ontario Provincial Police
- Ontario Realty Corporation
- GO Transit
- Metrolinx

Utilities:

- Ontario Power Generation
- Bell Canada
- AT&T
- Telus Communications
- Enbridge Consumers Gas
- Hydro One Brampton
- Enersource Hydro
- Rogers Cable

Local Municipalities:

- City of Vaughan
- Town of Caledon
- York Region
- Peel Region
- Peel Region Police Department
- Peel Region Health
- Peel Region Paramedic Services
- City of Brampton
- Brampton, Fire Department
- Brampton, Emergency Services
- Brampton, Transit
- Brampton, Board of Trade
- Brampton, Environmental Community Advisory Panel

The project team also met individually with the following agencies:

Sharon Lingertat	TRCA	November 22, 2010 to discuss the watercourses and drainage design.
Robert Evangelista	Brampton Hydro	December 8, 2010 to discuss hydro facilities in the corridors and Brampton Hydro requirements for relocations.

The agency correspondence tracking list, list of members, correspondences with agencies and minutes of meetings are provided in **Appendix B**.

1.7 Summary of Public Consultation Process

In accordance with the Municipal Class EA process, the Region conducted a comprehensive public consultation program, with the following components:

- **Property Owners Mailing List** – This consisted of all residents fronting or backing onto Highway 50 and Mayfield Road, in addition to others who wrote, telephoned, emailed, or filled in comment sheets during the study. Approximately 140 members of the public on the mailing list were sent letters and notices at study commencement, prior to each of the public meetings and at study completion. Opportunities for public input were provided throughout the process. Public input was gathered through public meetings, telephone inquiries, letters, email and faxes.

- **Stakeholder Mailing List –** This consisted of the following members:
  - Trout Unlimited
  - Caledon Countryside Alliance
  - Delta Urban
  - Gold Park Group
  - CanDevCon Limited
  - The Humber Watershed Alliance
  - St. Patrick's Cemetery Committee
  - CanAm
  - Weston Consulting Group

  Members of the stakeholder mailing list were sent letters and notices at study commencement, prior to each of the public meetings and at study completion. Opportunities for stakeholder input were provided throughout the process. Stakeholder input was gathered through public meetings, telephone inquiries, letters, email and faxes.

- **2 Public Information Centres (PIC)** – These meetings were held in the vicinity of the study area. The first PIC was held on June 3, 2010 at Calderstone Public School. The second PIC was held on April 27, 2011 at St. Patrick Separate School. Both PICs consisted of a public open house with display panels. The meetings were staffed by the consultant team and City staff.

  Attendees were asked to sign-in when they entered the public information centres. They were provided with a comment form to provide them with another opportunity to give input to the study, or ask questions. The consultant team recorded issues raised by the public during and

after each meeting. Additional details pertaining to the first and second public information centres and PIC materials are provided in **Section 4.3** and **Section 5.4** of the ESR and **Appendix C.2 and C.3**.

- **Newspaper Advertisements** and Portable Changeable Message Signs – A newspaper advertisement was placed in the *Brampton Guardian, Caledon Enterprise* and the *Vaughan Citizen* to announce the Commencement of the Study. An advertisement was also placed in the paper prior to each public meeting, with information on the date, time, and location of the meeting. The public was invited to attend and provide input. The Notice of Commencement advertisements were placed on the November 4 and 11, 2008 editions of the *Brampton Guardian* and *Caledon Enterprise* and the November 5 and 12, 2008 editions of the *Vaughan Citizen*. Advertisements for the Public Meetings were placed in the May 19, 2010 and June 2, 2010 editions of the *Brampton Guardian, Caledon Enterprise* and the *Vaughan Citizen* for PIC#1 and in the April 15 and 22, 2011 editions of the *Brampton Guardian*; April 19 and 26, 2011 editions of the *Caledon Enterprise* and April 17 and 24, 2011 editions of the *Vaughan Citizen* for PIC #2. Portable changeable message signs were placed on Highway 50 and Mayfield Road for one week prior to each PIC, outlining the date, time and location of the PIC. The Notice of Completion advertisements will be placed in the spring of 2012 in the *Brampton Guardian, Caledon Enterprise* and the *Vaughan Citizen*. Copies of the notices are included in **Appendix C.1**.

- **Region's and Consultant Email Address** – Through the newspaper advertisements, the public were invited to send comments by email to both the Region of Peel, York Region and consultant team project managers.

Further details on the public consultation process are documented in other sections of this report.

1.8 Correspondence with First Nations

A list of First Nations who may have an interest in the study area was prepared at the project initiation. Each party of the list of First Nations was contacted for information or comments. The opportunity for the First Nations to participate in the project was provided through the distribution of notice of study commencement, invitation to participate through announcement of two formal Public Information Centres (PICs) and through the distribution of notice of study completion.

The following is the list of the First Nations contacted:

- Curve Lake First Nation
- Kawartha Nishnawbe First Nation
- Mississaugas of Scugog Island First Nation
- Six Nations of the Grand River Territory
- Mississaugas of the New Credit First Nation
- Association of Iroquois and Allied Indians
- Union of Ontario Indians Nipissing First Nation
- Indian and Northern Affairs Canada

- Ministry of Aboriginal Affairs
- Chiefs of Ontario Office

Correspondence with First Nations is included in **Appendix D**.

2. EXISTING CONDITIONS

This chapter of the report provides details of the existing study area characteristics including traffic and transit operations, socio-economic, utilities, natural environment conditions, archaeology, built and cultural heritage, geotechnical investigation and pavement, hydrogeological, groundwater, site contamination assessment and culvert inspection.

2.1 Traffic

As a part of the EA process, a traffic operational analysis was conducted in order to determine the need for roadway widening. The traffic analysis was completed using count data obtained from the Region.

2.1.1 Intersection Operations

Analysis of the intersections were conducted using Synchro 6, Build 614, which employs methodology from the *Highway Capacity Manual (HCM 2000)* published by the Transportation Research Board National Research Council. Synchro 6 can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

For a definition of delay and level of service see the full traffic report.

2.1.2 Existing Road Network

The existing road network includes Highway 50 between Mayfield Road / Albion-Vaughan Road and Castlemore Road / Rutherford Road, and Mayfield Road between Highway 50 and Coleraine Drive. The nature of the street network is outlined as follows:

Highway 50 Highway 50 is a five lane major north-south rural arterial which straddles the border between Peel and York Regions, and connects Toronto to Brampton and Caledon. The speed limit is 80 km/h. The configuration is two northbound lanes, two southbound lanes and a two-way-left-turn-lane in the centre. There are no sidewalks or bike lanes along Highway 50.

Mayfield Road Mayfield Road is a two lane east-west rural arterial that lies on the border between the City of Brampton to the south and Caledon to the north. The speed limit is 80 km/h. The configuration is one lane eastbound and one lane westbound. There are no sidewalks or bike lanes along Mayfield Road.

2.1.3 Existing Traffic Volumes

Existing and historic traffic data was obtained from the Region of Peel. **Table 2-1** summarizes the source and date of the traffic data used in the report.

Table 2-1: Traffic Data Source and Date

Intersection	Weekday AM / PM Peak Hour		Intersection Control	
	Source	Date	Signalized	Unsignalized
Mayfield Road / Coleraine Drive	Ontario Traffic Inc.	November 27, 2007	X	
Highway 50 / Mayfield Road / Albion Vaughan Road	MG8 ENG	September 16, 2009	X	
Highway 50 / Countryside Drive / Nashville Road	MG8 ENG	May 16, 2006	X	
Highway 50 / Coleraine Drive / Major Mackenzie Drive	Ontario Traffic Inc.	November 8, 2007	X	
Highway 50 / Cadetta Road	MG8 ENG	June 9, 2009		X
Highway 50 / Old Castlemore Road	MG8 ENG	June 9, 2009		X
Highway 50 / Castlemore Road	Ontario Traffic Inc.	May 16, 2006	X	

2.1.4 Existing Traffic Operations 2009

Intersection operations for the analysis peak periods were assessed at the study intersections under the existing conditions in order to establish a base condition. The traffic data consisted of three counts conducted in 2009 and four counts grown to 2009 levels. The results of the signalized intersection analysis are summarized in **Table 2-2** and the results of the unsignalized intersections are summarized in **Table 2-3**. The results are based upon current signal timings as provided by the Region. The detailed Synchro output is included in **Appendix E.1**.

Table 2-2: Signalized Intersection Operation – 2009 Existing Traffic

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
Mayfield Road / Albion-Vaughan Road and Highway 50	Overall	**F**	**593.6**	C	33.4
	Eastbound Left	**F**	**2556.7**	**F**	**145.5**
	Eastbound Through	**F**	**105.7**	C	26.9
	Eastbound Right	C	25.3	A	8.3
	Westbound Left	**F**	**1716.7**	D	54.8
	Westbound Through	D	54.8	C	27.9
	Westbound Right	B	14.9	B	14.2
	Northbound Left	**F**	**161.8**	C	29.3
	Northbound Through	B	19	B	16.8
	Northbound Right	A	3.3	A	3.8
	Southbound Left	B	19	B	13.1
	Southbound Through	**F**	**246.2**	B	13.5
	Southbound Right	A	10	A	2
Countryside Drive / Nashville Road and Highway 50	Overall	C	29.3	E	57.7
	Eastbound Left-Through-Right	D	38.2	C	32.1
	Westbound Left-Through	D	44.7	D	36.9
	Westbound Right	A	6.5	E	72.1
	Northbound Left	C	32.9	B	11.5
	Northbound Through-Right	A	9.3	D	44
	Southbound Left	**F**	**119.5**	**F**	**379.5**
	Southbound Through	C	24.7	B	10.4
	Southbound Right	A	5.7	A	3.5
Coleraine Drive and Highway 50	Overall	B	17.5	A	6.9
	Eastbound Left-Through-Right	C	33.1	B	11
	Westbound Left-Through-Right	B	14.6	B	18.6
	Northbound Left	D	38	A	5.8
	Northbound Through-Right	A	7	A	6.7
	Southbound Left	A	7.4	B	15.5
	Southbound Through-Right	B	20	A	4.7
Coleraine Drive and Mayfield Road	Overall	B	18.1	B	18.3
	Eastbound Left	C	20.4	B	17.9
	Eastbound Through-Right	B	16.6	B	17.4
	Westbound Left	C	22.5	C	20.4
	Westbound Through-Right	C	26.1	C	26.4

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
	Northbound Left	A	9.3	B	11.5
	Northbound Through-Right	A	5.6	B	10.3
	Southbound Left	A	9.6	B	11.5
	Southbound Through-Right	A	8	A	3.9
Castlemore Road / Rutherford Road and Highway 50	Overall	E	70.3	**F**	**113.1**
	Eastbound Left	C	32.3	C	32.7
	Eastbound Through-Right	**F**	**85.4**	D	48.6
	Westbound Left	E	59.6	E	78.9
	Westbound Through	**F**	**144.8**	**F**	**299.5**
	Westbound Right	A	8.8	B	11
	Northbound Left	E	78.4	C	23.4
	Northbound Through	C	33	**F**	**101.4**
	Northbound Right	A	5.2	A	5.7
	Southbound Left	D	44	**F**	**131.7**
	Southbound Through	E	63.6	B	19.2
	Southbound Right	A	6.3	A	8.2

Note: 1. LOS – level of service; 2. Bolded LOS and delays in charts indicate a serious operational issue.

For the base year, 2009 all signalized intersections, except for two, have a level of service of E or better with acceptable levels of delay:

- The intersection of Mayfield Road / Albion-Vaughan Road and Highway 50 has a LOS of "F" and an average delay of 594 seconds during the AM period.
- The intersection of Castlemore Road / Rutherford Road and Highway 50 has an LOS of "F" and an average delay of 113 seconds during the PM period.

Table 2-3: Unsignalized Intersection Operation – 2009 Existing Traffic

Intersection	Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
Cadetta Road and Highway 50	Eastbound Left-Right	**F**	**Err**	**F**	**57.6**
	Northbound Left	**F**	**123.7**	C	15.5
Highway 50 / Old Castlemore Road	Eastbound Left-Right	A	0	**F**	**776.7**
	Northbound Left	**F**	**51.7**	B	13.8

Note: 1. LOS – level of service; 2. Bolded LOS and delays in charts indicate a serious operational issue.

Both unsignalized intersections of the study area fail in at least one of the weekday periods for the base year of 2009.

- The intersection of Cadetta Road and Highway 50 has an LOS of "F" for critical movements in both time periods and an extremely high delay for the AM period, resulting in the Err value shown in **Table 2-3**.
- The intersection of Countryside Drive / Nashville Road and Highway 50 has an LOS of "F" for one of its critical movements in the AM and the other in the PM. The critical movement that fails in the PM has an average delay of 777 seconds.

2.2 Existing Transit Operations

Currently transit service in the area is limited. GO Transit operates bus Route 38 on Highway 50 between Caledon and Malton GO station. This route has a total of six southbound and seven northbound runs a day. Also, Penetang Midland Coach Lines Ltd and Greyhound bus lines operate service off peak once a day between Brampton and Toronto that has stops along Highway 50 in this study area. With development in the area vary sparse at the moment, Brampton Transit does not operate a bus route on or near this study area.

2.3 Socio-Economic

The Highway 50 and Mayfield Road EA study corridor is located in the northeast corner of the City of Brampton. The Mayfield Road section of the corridor sits on the municipal border between Brampton and Caledon, and the Highway 50 section of the corridor sits on the regional border between the Region of Peel and York Region. The land uses on the Caledon side of Mayfield Road are primarily industrial, as are the York Region lands along Highway 50. Both of these areas are sparsely populated and mainly have residences attached to agricultural land uses. The Brampton land uses bordering on the corridor are primarily agricultural except for the areas around Cadetta Road, and the intersection of Highway 50 and Coleraine Drive.

The entire study area is part of the SP-47 Secondary Plan area and is designated mainly to become an industrial park in the future. The industrial / commercial land use with the greatest effect on corridor traffic at the moment is the Fast Freight, and Sears Intermodal operations that share a single train yard immediately east of Highway 50 and north of Castlemore Road / Rutherford Road. This is the largest generator of truck traffic in the area. There is also a large amount of through truck traffic to and from southern parts of Peel Region and the City of Toronto. Residential developments are rapidly filling out the areas south of this study area and with those new neighbourhoods and the number of work places to be built in the corridor, pressure for transit facilities and alternative forms of transportation will increase with time. Balancing the needs of the various land uses, within the three municipalities located in two Regions, is a very important element of this environmental assessment.

2.4 Utilities

There are no Hydro One Transmission Facilities located within the study area. This was confirmed by Hydro One Networks Inc. in June 2010.

Hydro One Telecom has underground fiber optic cable between Rutherford Road and Old Castlemore Road on the East side of Highway 50, then crossing to Old Castlemore Road on the south side of the road.

Bell has buried services running along the north side of Mayfield Road and along the east side of Highway 50.

York Region Water / Wastewater Services have a proposed 1.8m CPP feeder main along the south side of Rutherford Road which crosses Highway 50 at the intersection of Castlemore Road / Rutherford Road and Highway 50.

Enbridge has buried plant in numerous locations throughout the study area, including:

- Servicing in the vicinity of the Highway 50 / Major MacKenzie Drive intersection;
- Gas line running along the east side of Highway 50, south of Major MacKenzie Drive;
- Gas line running along the south side of Mayfield Road / Albion-Vaughan Road throughout the study area; and
- Gas line running along the north side of Mayfield Road between Pillsworth Road and Highway 50.

There is also a proposed Enbridge gas main on the east side of Highway 50, north of the intersection with Major MacKenzie /Coleraine Drive.

There are no existing Telus or Allstream services in the study area.

Correspondence with the Utility Agencies and the existing utility plans are included in **Appendix F**.

2.5 Natural Environment

Details of the following summaries, including charts and exhibits, are contained in the ***Natural Heritage Report*** in **Appendix E.2**.

2.5.1 Physiography and Soils

The study area is located within the Peel Plain physiographic region, which extends through the central portions of the Regions of Halton, Peel and York and ranges in elevation from 150 m to 230 m above sea level. The Peel Plain is a level to undulating tract of clay soils with imperfect drainage, through which the Credit, Humber, Don and Rouge Rivers have carved deep valleys. The study area is entirely comprised of Peel clay soils. Areas with Peel clay soils have a gently sloping topography with slight potential for erosion. Internal drainage and runoff is low, except when slopes are steep enough to increase external drainage.

2.5.2 Aquatic Habitats and Communities

The study area is located in the Humber River watershed (Main Humber River subwatershed, Rainbow Creek and Robinson Creek secondary subwatersheds; TRCA 2008). The watercourses within the study limits are tributaries of Robinson Creek and / or Rainbow Creek. The watercourses in the study area are considered to be small riverine warmwater habitat, and are managed for darter species (OMNR & TRCA 2005). These watercourses fall under the jurisdiction of the Toronto and Region Conservation Authority (TRCA) and the Ministry of Natural Resources (MNR) Aurora District.

A survey of aquatic habitat was conducted on November 10, 2009 to characterize the aquatic habitat within the study area. Habitat conditions were noted in the field and representative photographs were taken. A total of 18 crossings were investigated within the study limits and the locations of these crossings are presented in the full report.

Most of the crossings within the study area consisted of swales through agricultural fields or of roadside ditches with no permanent flows. The majority of features drained from west to east across Highway 50 or from north to south across Mayfield Road. The TRCA considers all but two of the 18 aquatic features within the study area to be watercourses. Of these, only three constitute direct fish habitat and contain permanent flows (these are located at the Highway 50 / Mayfield Road intersection). All 13 others are only indirect fish habitat and are intermittent or ephemeral. Most watercourses within the study area drain to known Redside Dace habitat (in Robinson and Rainbow Creeks).

2.5.2.1 Species at Risk

No aquatic species at risk are known to inhabit the watercourses within this study area. However, all watercourses / drainage features located within the study area (with the exception of Site 1-crossing Highway 50 just north of Old Castlemore Road) convey flows to Redside Dace habitat downstream. As a result, the TRCA will likely require that a portion of these watercourses / drainage features be managed as coldwater habitat. Redside Dace are ranked as Endangered both provincially and federally. This species is regulated as ‘Endangered’ under the Ontario *Endangered Species Act*, 2007. Federally, Redside Dace is designated as ‘Endangered’ by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and is regulated as ‘Special Concern’ (Schedule 3) under the federal *Species at Risk Act*.

2.5.3 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. A field investigation of the vegetation communities was conducted on November 9, 2009. The vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee et al. 1998). A plant list and a description of the general structure of vegetation were obtained during the field surveys of the study area. Plant species status reviewed for Ontario (Oldham 2009), and for the Region of Peel and the Region of York

(Varga 2000). Vascular plant nomenclature follows Newmaster et al. (1998) with a few exceptions that have been updated to Newmaster et al. (2005).

A total of seven different Ecological Land Classification (ELC) community types have been identified within the study limits during LGL's vegetation survey. These communities include cultural meadow (CUM1-1a to f), and cultural plantation (CUP3). These vegetation communities are considered widespread and common in Ontario and secure globally. There are several areas that are not identified by the ELC such as Manicured (M) areas which include mown lawns, gardens and planted trees. All vegetation communities identified within the study area are delineated and further described in the ***Natural Heritage Report*** in **Appendix E.2**.

2.5.3.1 Flora

A total of 80 vascular plant species have been recorded within the study area. Two of these plants could only be identified to genus and are not included in the following calculations. 33 (42%) plant species identified are native to Ontario and 45 (58%) plant species are considered introduced and non-native to Ontario. A working vascular plant checklist is presented in the full report contained in **Appendix E.2.**

2.5.3.2 Species at Risk

No plant species that are regulated under the Ontario *Endangered Species Act* or the federal *Species at Risk Act* were encountered during the vegetation survey. There are uncommon and rare species of plant found within the study area. None of the species are provincial plant species of concern (S1 to S3). All of these species have populations that are considered secure and apparently secure provincially (S4 and S5).

Many of the trees listed considered uncommon have been planted, especially those that occur in the cultural meadows. Six plants are listed in **Table 2-4** and these are mostly planted as part of the restoration around stormwater ponds, including the stormwater pond (CUM1-1b) at the northwest corner of Highway 50 and Mayfield Road. Other species such as tall wormwood (Artemisia campestris ssp. caudata) grow well in sandy substrates where there is some form of disturbance. White spruce (Picea glauca), red pine (Pinus resinosa) and common juniper (Juniperus communis) were most often found in planted rows of trees especially at the northeast corner of Highway 50 and Mayfield Road, around residential homes and in the cultural plantation (CUP3) at the far northeast limit of the study area, adjacent to Albion-Vaughan Road and Kirby Road.

Table 2-4: Significant Plant Species Identified within the Study Area

Scientific Name	Common Name	Vegetation Community	Status*		
			TRCA	Peel Region	York Region
Picea glauca	white spruce	CUM1-1 (a and c), CUP3	L3	R3	
Pinus resinosa	red pine	CUM1-1c, CUP3	L1	R1	
Juniperus communis	common juniper	CUM1-1 (c and e)	L3		
Physocarpus opulifolius	ninebark	CUM1-1 (a and c)	L3	R1	
Artemisia campestris ssp. caudata	tall wormwood	CUM1-1 (c and f)	L2	R1	
Elymus canadensis	nodding wild rye	CUM1-1b	L3	E	R1

*Definitions of plant status in this table are provided in the LGL Natural Heritage Report – Existing Conditions.

2.5.4 Tree Inventory and Species

A certified Arborist conducted an inventory of tree resources located within the study area along Mayfield Road from Coleraine Drive to Highway 50 and along Highway 50 from 330 meters north of Mayfield Road to Rutherford Road on November 10 and 11, 2009. Trees within and 10 meters outside of the existing right-of-way were examined. For trees located on private property that could not be accessed, measurements and their locations were estimated from the edge of the right-of-way.

The following information was gathered during the tree inventory: species, diameter at breast height (DBH), and tree condition. Tree condition was determined using standardized methods of assessing tree condition, tree form, and trunk and twig condition. Tree locations were captures using a Lawrence IFinder GPS and the information was translated for geographical information system (GIS) mapping. All living trees that had a diameter at breast height greater than 10 cm were recorded. The location of these trees is presented and a list of the trees located within the study area is included in the ***Natural Heritage Report*** in **Appendix E.2**.

A total of 576 trees consisting of 24 species were examined along the study area road rights-of-way. The majority of the trees observed were planted in the south-eastern portion of the study area adjacent to the Sears distribution centre between the property fence and the right of way. These plantings consisted of Austrian pine (Pinus nigra), blue spruce (Picea pungens), fir (Abies sp.), red oak (Quercus rubra), silver / freeman maple (Acer saccharinum), little leaf linden (Tilia cordata) and black walnut (Juglans nigra). The remainder of the trees were scattered through the study area and were concentrated near residential and commercial properties. Very few trees greater than 10 cm were found along the agricultural lands along Mayfield Drive and Highway 50.

The majority of the trees within the study area are located at or near the fence lines between the right-of-way and the adjacent properties. Trees ranged in size from 9 cm to 64 cm diameter at

breast height with the average measuring at 17 cm. Tree conditions ranged from poor to good. Since field investigations were undertaken late in the season, the trees did not have leaves and crown vigour was based on visible concentrations of buds. The majority of the deciduous trees along Highway 50 exhibited signs of stress with epicormic growth along the trunk and in the crown and some of the conifers were defoliating on the side of the tree adjacent to the road. This is likely due to snow removal and salt spray in the winter. Nests were found within a few of the planted conifers adjacent to the Sears distribution centre. These trees are providing an ecological function for wildlife and are a sensitive feature in landscape.

2.5.4.1 Species at Risk

None of the tree species observed within the study area is considered rare, threatened or endangered regionally or provincially, or is regulated under the Ontario *Endangered Species Act* or federally under the *Species at Risk Act*.

2.5.5 Wildlife and Wildlife Habitat

Field investigations along Highway 50 were conducted within and directly adjacent to the study area rights-of-way on November 10, 2009 to document wildlife and wildlife habitat and to characterize the nature, extent and significance of animal usage within the project limits. Direct observations, calls, tracks, scats and runways were used to record wildlife present within the study area. Prior to field investigations, secondary source data from the Ministry of Natural Resources (MNR) was reviewed to screen for wildlife species presence or absence and to screen for species at risk.

2.5.5.1 Wildlife Habitat

Wildlife and wildlife habitat was found to be distributed across the entire study area, however areas with more natural or productive habitat for wildlife were documented. Aquatic and associated riparian habitats such as storm ponds, watercourses, and swales provided some of the strongest natural heritage features within the lands examined. However, extensive land development and general habitat degradation has resulted in the environments described above largely supporting wildlife species considered urban or tolerant of human presence and disturbance.

2.5.5.2 Fauna

16 species of wildlife (11 birds, 4 mammals, and 1 herpetofauna species) could be verified in the study area based on field observations and the majority of these recordings came from visual and auditory identification of bird, mammal, and herpetofauna species. However, by comparing the natural heritage features found in the study area with secondary source information that describes wildlife previously recorded within this region, the potential number of wildlife species for the area is 50 species.

Bird species were found to be distributed across the entire study area. Despite species diversity being low within the study area, a number of priority species for conservation such as Field Sparrow (Spizella pusilla) and Northern Mockingbird (Mimus polyglottos) were documented. Mammal species documented represent an assemblage that readily utilizes human influenced landscapes. All watercourse crossing structures (CSP or concrete box) were utilized as corridors by resident mammal species. Herpetofauna abundance and distribution has likely been diminished throughout the study area, due to the magnitude of habitat fragmentation and degradation.

A summary table of wildlife documented in the study area during field investigations and through secondary source information is presented in the **Appendix E.2**.

2.5.5.3 Species at Risk

Background information indicated that of the 50 wildlife species recorded within the study area;. 25 species of bird recorded are regulated under the *Migratory Birds Convention Act* (MBCA) while three species are regulated under the *Fish and Wildlife Conservation Act* (FWCA). Ten bird species found within the study area are recommended by Bird Studies Canada as priority species for conservation. Nine of the twelve species of mammal recorded are regulated under the FWCA.

During field investigations, suitable habitat for Bobolink (Dolichonyx oryzivorus) was identified, as this species typically nests in agricultural fields. Recently, Bobolink has been added to the Species at Risk in Ontario List, and is now regulated as “Threatened” under the Ontario *Endangered Species Act*.

One species, the Northern Harrier (*Circus cyaneus*), is considered to be of regional concern by the Toronto and Region Conservation Authority. However, it is likely that the Northern Harrier was using lands within and adjacent to the study area as a fall migration stop-over (staging) point. Based on the highly disturbed environment, it is unlikely that this species breeds within the study area.

2.5.5.4 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources (OMNR), Toronto and Region Conservation Authority (TRCA) and the Regional Municipalities of Peel and York. A review of the OMNR Natural Heritage Information Centre (NHIC 2009) and data provided by the TRCA indicates that there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Significant/Sensitive Areas (ESAs) on lands within 120 m of the study area. Several areas within the study area are identified as ‘Existing’ or ‘Potential’ Natural Cover as part of the TRCA Targeted Terrestrial Natural Heritage System Strategy.

2.6 Archaeology

The Stage 1 archaeological assessment determined that ten archaeological sites have been registered within 1 km of the study corridor. A review of the geography and local nineteenth century land use of the study corridor suggested that it has potential for the identification of Aboriginal and Euro-Canadian archaeological sites. Details are contained in the ***Stage 1 Archaeological Assessment Report*** in **Appendix E.3**.

The Ministry of Tourism and Culture's (MTC) *Draft Standards and Guidelines for Consultant Archaeologists* lists characteristics that indicate where archaeological resources are most likely to be found. Archaeological potential is confirmed when one or more features of archaeological potential are present. Per Section 1.3.1 of the MTC's 2009 *Draft Standards and Guidelines for Consultant Archaeologists*, the study corridor meets four of the criteria used for determining archaeological potential:

1. Previously identified archaeological sites (i.e. AkGw-299, AkGw-300, AkGw-301)
2. Water source: primary secondary, or past water source (i.e. West Humber River tributaries)
3. Early historical transportation route (i.e. Highway 50, Mayfield Road)
4. Early historic settlement features (i.e. orchard, homestead, cemetery)

These criteria characterize the study corridor as having potential for the identification of Aboriginal and Euro-Canadian archaeological sites.

Based on the results of the property inspection, it was determined that the existing Highway 50 and Mayfield Road ROW has been subjected to significant past disturbance and therefore has no archaeological potential; however, some of the lands immediately adjacent the existing ROW are deemed to have archaeological potential.

In light of these results, ASI makes the following three recommendations:

- The existing ROW does not retain archaeological site potential due to previous ground disturbances. Additional archaeological assessment is therefore not required along this portion of the study corridor.
- If construction extends beyond the disturbed ROW, a Stage 2 assessment is recommended on any lands along the study corridor where there is potential for archaeological sites, in accordance with Ministry of Tourism and Culture's 2009 *Draft Standards and Guidelines for Consultant Archaeologists*. (The Stage 2 archaeological assessment will be undertaken as part of the EA and will be discussed in detail in **Section 7.4.1.1**).
- Prior to any land-disturbing activities adjacent to Shiloh Cemetery, a Stage 3 archaeological assessment will be conducted. This work will be done in accordance with the Ministry of Tourism and Culture's *Draft Standards and Guidelines for Consultant Archaeologists* (2009), in order to confirm the presence or absence of unmarked graves within the ROW. This work will involve the removal of the topsoil with a Gradall followed by the shovel shining of the exposed surfaces and subsequent inspection for grave shafts. (A Stage 3 archaeological assessment was completed as part of the EA and is discussed in **Section 7.4.1.2**).

2.7 Built Heritage Resources and Cultural Heritage Landscapes

The Cultural Heritage Assessment revealed that the study corridor features a historically surveyed thoroughfare in an agricultural area that dates back to the early nineteenth century. The field review confirmed that this area retains a number of nineteenth century and early twentieth century cultural heritage resources.

The following provides a summary of field review and data collection findings:

- A total of nine cultural heritage resources identified in the study corridor were previously identified on municipal heritage registers: five resources were previously identified by the City of Brampton (CHL 2, CHL 3, CHL 5, CHL 7 and CHL 9); two resources were previously identified by the Town of Caledon (BHR 1, CHL 1); and two resources were previously identified by the City of Vaughan (CHL 6 and CHL 10);
- There is an intention to designate CHL 3, the Shiloh Cemetery, under the Ontario Heritage Act;
- A total of five additional resources were identified during field review (BHR 2 – BHR 4, CHL 4, CHL 8);
- Of the total identified cultural heritage resources, three are farmhouses (BHR 1, BHR 3, BHR 4), one is a barn (BHR 2), one is a pioneer cemetery (CHL 3), and nine are farm complexes (CHL 1, CHL 2, CHL 4 – CHL 10);
- Identified cultural heritage resources are historically, architecturally, and contextually associated with nineteenth century and early twentieth century land use patterns and agricultural processes, features which are generally becoming rare in the City of Brampton.

Details of the ***Cultural Heritage Assessment Report*** are included in **Appendix E.4**.

2.8 Hydrogeological

Based on the findings of the Hydrogeological Investigation conducted by TROW (**Appendix E.5**) the following conclusions and recommendations for Highway 50 road improvement have been provided.

Based on water well records obtained by Trow Associates from the Ministry of Environment water well database, 85 wells are present within a 500 metre radius of the Site. Nineteen of these wells are situated within 50 metres from Hwy 50 and Mayfield Roads. Three of the nineteen wells are relatively shallow (less than 10 metres) and are located approximately 40 m to 50 m away from the roadway. No dewatering effects on these shallow wells are therefore anticipated.

The dominant soil formation encountered in the project area is stiff to hard silt till with isolated sand layers. The dominant rock type found in the area is shale. The entire culvert alignment will be constructed in the saturated zone within the water table. The estimated dewatering rates for a 50m section of culvert are between 60 cubic metres per day and 75 cubic metres per day. Higher dewatering rates can be expected during the initial period due to transient hydraulic conditions.

The actual dewatering rate will depend on the geological formation encountered below the water table.

Since the estimated dewatering rate is greater than 50 cubic metres per day, a PTTW will be required for dewatering activities. For the purpose of the PTTW application, the anticipated daily groundwater seepage 60 to 75 cubic metres per day was used to account for uncertainties on formation hydraulic properties and surface water inflow from precipitation. Discharged water from dewatering activities can be disposed into the Peel Region sanitary sewer system, provided that the discharged water is treated to reduce the TSS and chloride concentrations to a level required by the Region of Peel Sewer By-Law #90-90. Some dewatering effect can be expected on the wells located within the predicted dewatering zone of influence.

2.9 Geotechnical Investigation & Pavement

The Geotechnical Investigation was conducted in February 2010. The Geotechnical Investigation included drilling 18 boreholes at about 500m spacing, through the existing paved road surface:

- 11 boreholes along Highway 50 were drilled from 5.0m to 6.6m below the existing road surface;
- 3 boreholes along Mayfield Road were drilled from 4.9m to 6.6m below the existing road surface; and
- 4 boreholes at the intersection of Highway 50 and Mayfield Road, located close to the ends of the two box culverts across the roadways, to depths of 7.8m to 9.6m below the existing road surface.

The boreholes found considerable differences in the composition of the existing pavement. The existing asphaltic concrete is generally in fair condition, and ranges from 90mm to 430mm thick on Mayfield Road, and from 130mm to 300mm on Highway 50. Overall, structural capacity of the existing pavement structure along Highway 50 appears to be higher than that of Mayfield Road, based on calculated Granular Base Equivalency and Structural Number.

Although a variety of subgrade soils were encountered, the pavement should be designed for the subgrade soils in the upper 1.2m of the road, which in most boreholes consisted of clayey silt to sandy silt fill. The existing fill materials should perform satisfactorily, and native soils should provide adequate support for culverts or storm sewers.

Based on the design AADT to 2031, upgrading or reconstruction of the existing pavements will be required. Various methods of upgrading the existing pavement structure to the required capacity may be used, including overlaying, in-situ recycling, and complete reconstruction. Recommendations for each method are provided in **Appendix E.6**, for consideration during the preliminary design.

Further details on methodology and results are contained in the ***Geotechnical Investigation Report*** in **Appendix E.6.**

2.10 Groundwater

Groundwater condition at the site was assessed by observing the water levels in the open boreholes during the fieldwork. Shortly after drilling, groundwater was detected in four of the open boreholes, ranging in dept from 4.3m to 6.1m below existing grades (approximate elevations of 200.5m to 212.8m). The observed groundwater levels may not represent the true groundwater conditions at the site, due to the short period of observation and the low permeabilities of some of the site soils, and potential surface water infiltration.

Groundwater monitoring wells were installed for longer term monitoring in 8 boreholes throughout the study area. It should be noted that in accordance with O.Reg. 903m all of the monitoring wells / piezometers installed for this investigation will have to be decommissioned once they are not longer required. This responsibility rests with the property owner. It is recommended that this be done utilizing the services of a licensed well driller.

Further details on methodology and results are contained in the ***Geotechnical Investigation Report*** in **Appendix E.6**.

2.11 Site Contamination Assessment

A site reconnaissance and available public record search was conducted for the subject property to assess potential sources of contamination adjacent to the Site. Potential sources of contamination identified on the adjacent properties are listed in **Table 2-5**.

Table 2-5: Potential Sources of Contamination

Municipal Address	Description of Activities	Associated Risk
9301 Highway 50	A gasoline service station (Petro Canada) was located on the northeast corner of Highway 50 and Castlemore Road.	Moderate – this southeast adjacent property is located within 50m of the subject property and may have adversely impacted the subsurface conditions of the south end of the Site. However, the Site is located down-gradient in terms of the inferred groundwater flow of the area.
7491 Nashville Road	A gasoline service station (Esso) was located on the southeast corner of Highway 50 and Nashville Road.	Moderate to High – this east adjacent property is located within 50m of the subject property and may have adversely impacted the subsurface conditions of the Site.

Aerial photographs were obtained, dated 1951, 1974, and 1980, to review the development and land use history of the site. Based on these aerial images, the site and general area were primarily under agricultural land use historically. No apparent sources of contamination were identified from the aerial images.

Available volumes of the Polk Suburban Toronto City Directory, from 1985 to 2001, were reviewed to establish occupancy history of the site and adjacent properties. This review confirmed that a gasoline service station was located adjacent to the site at 7491 Nashville Road and is likely the existing gasoline service station (Esso) on the southeast corner of Highway 50 and Nashville Road. According to the Directories, this potential source of contamination has existed at this location since the mid-1980s. No other obvious sources of contamination were identified from the Directories.

Eight samples were retrieved from the 18 drilled boreholes, and sent to an environmental laboratory for testing of selected inorganic parameters per MOE guidelines. Soils at the site were found to be classified as predominantly medium to fine textured.

The test results meet the limits specified in the MOE document for industrial / commercial land use except for the following:

- Sodium Absorption Ratio (SAR) is higher than the permissible value of 12 for four of the eight samples tested. Values ranged from 1.6 to 35.0, indicating wide variability over the site. The average is approximately 15.7, which is marginally greater than the applicable limit of 12.
- Electrical Conductivity (EC) was found to exceed the permissible limit of 1.4 mS/cm on seven of the samples tested. Values ranged from 1.2 to 4.7 mS/cm, with an average of approximately 2.8mS/cm, which is twice the applicable limit of 1.4 mS/cm.

Electrical Conductivity and Sodium Absorption Ratio are not health related parameters, and do not trigger a need for mitigation. However, they do affect the growth of certain plant species.

Therefore, excess site soils may be suitable for use on like sites (public roadways) requiring fill. Alternatively, excess soils may be taken to any land based sites being developed for industrial/commercial/community uses, subject to the acceptance by the receiving site authorities, and for placement more than 2m below the final grade. The excavated soils can also be disposed of at appropriately licensed landfill sites, subject to further testing that may be required by the landfill operator.

Further details are contained in **Section 4 Site Contamination Assessment** in the ***Geotechnical Investigation Report*** in **Appendix E.6.**

2.12 Culvert Inspection

According to Peel Region records, there are 18 pipe culverts and two concrete box culverts along Highway 50, and 15 pipe culverts along Mayfield Road. During the thorough field review, three of the culverts along Mayfield Road were not found and must have been removed.

Inspection of the culverts was conducted in accordance with the Ontario Structures Inspection Manual (OSIM), and the results and photographs taken are contained in the ***Geotechnical Investigation Report*** in **Appendix E.6.**

In summary:

- Most of the culverts are in generally good condition
- Minor rehabilitation is expected for 9 of the CSP culverts along and under Highway 50
- Minor rehabilitation is expected for 3 of the CSP culverts along and under Mayfield Road
- Replacement is expected for 2 of the CSP culverts along Mayfield Road
- Major rehabilitation is expected for one CSP culvert under Highway 50 (Peel Region Structure No. 2971)

2.13 Drainage and Stormwater Management

The existing Highway 50 and Mayfield Road drainage system consists primarily of open roadside ditches, cross culverts and local storm sewer systems that convey runoff into the receiving watercourses. All watercourses within the Study Area are part of the Humber River watershed, which is under the jurisdiction of the TRCA.

There are a total of 19 transverse crossing culverts including 4 intersection culverts. There exists an additional 40 entrance culverts within the study limits.

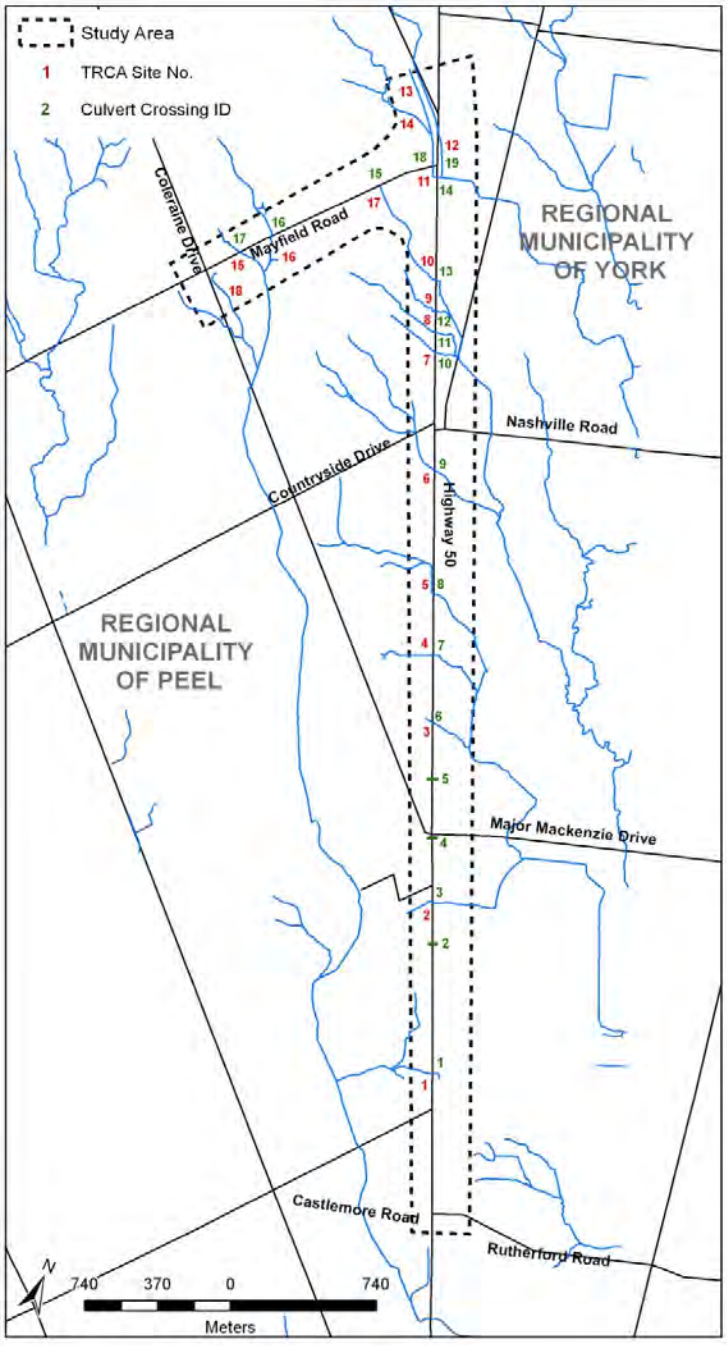


Exhibit 2-1: Watercourse/Culvert Crossing Locations

The existing drainage conditions for Highway 50 and Mayfield Road are summarized below in **Table 2-6** and **Table 2-7** respectively.

Table 2-6: Summary of Existing Drainage Conditions for Highway 50

Location and Roadway Drainage Limits	Particulars
Culvert#1 Hwy 50 Sta. (7+104) Station 6+870 to Station 7+830	▪ NBL drainage drains southerly via open ditches; outlets to a 750 mm diameter CSP cross culvert. ▪ The 750 mm diameter CSP culvert also conveys external flows from east of Highway 50. ▪ The hydraulic assessment of the culvert shows that under the 50 year design storm, the 750 mm diameter CSP culvert does not meet the 1.0 m. freeboard requirement; Solution would be to upgrade the culvert to meet the hydraulic criteria, or reduce subcatchment area by diverting flows.
Culvert#2 Hwy 50 Sta. (7+810) Station 7+830 to Station 8+000	▪ SBL drainage drains southerly via open ditches; outlets to an 800 mm diameter CSP cross culvert. ▪ The 800 mm diameter CSP culvert also conveys external flows from west of Highway 50. ▪ The 800 mm diameter CSP culvert should be flushed / cleaned and the ends should be re-shaped.
Culvert#3 Hwy 50 Sta. (7+980) Station 8+000 to Station 8+360	▪ SBL drainage from station 8+360 drains southerly via open ditches; outlets to a 600mm diameter CSP culvert and then into an 800 mm diameter CSP cross culvert. ▪ The 800 mm diameter CSP culvert also conveys external flows from west of Highway 50. ▪ The 800 mm diameter CSP culvert appears in good condition; however, the culvert should be flushed / cleaned.
Culvert#4 Hwy 50 Sta. (8+333) Station 8+360 to Station 8+900	▪ SBL drainage from station 8+900 drains southerly via open ditches and a series of smaller CSP entrance culverts; outlets to a 1.3 x 1.85 m box culvt. ▪ The 1.3 x 1.85 m box culvert also conveys external flows from west and east of Highway 50. ▪ The 1.3 x 1.85 m box culvert appears in good condition; however, the culvert should be flushed / cleaned.
Culvert#5 Hwy 50 Sta. (8+632) Station 8+900 to Station 8+810	▪ NBL drainage from station 8+810 drains southerly via open ditches; outlets to an 800 mm CSP cross culvert. ▪ The 800 mm CSP culvert also conveys external flows from east of Highway 50. ▪ The 800mm CSP culvert appears in good condition; however, the culvert should be flushed / cleaned.
Culvert#6 Hwy 50 Sta. (8+895) Station 8+900 to Station 9+270	▪ SBL drainage from station 9+270 drains southerly via open ditches; outlets to a 1.0m CSP cross culvert. ▪ The 1.0m CSP culvert also conveys external flows from west of Hwy 50. ▪ The 1.0m CSP culvert appears in good condition, however, the culvert should be flushed / cleaned.
Culvert#7 Hwy 50 Sta. (9+249) Station 9+270 to Station 9+580	▪ SBL drainage from station 9+580 drains southerly via open ditches; outlets to a 0.8 x 1.85 m box culvert. ▪ The 0.8 x 1.85m box culvert also conveys external flows from west of Highway 50. ▪ The 0.8 x 1.85m box culvert appears in good condition; however, the culvert should be flushed / cleaned.

Location and Roadway Drainage Limits	Particulars
Culvert#8 Hwy 50 Sta. (9+562) Station 9+580 to Station 10+200	▪ SBL drainage from 10+200 drains southerly via open ditches; outlets to 0.8 x 1.85 m box culvert. ▪ The 0.8 x 1.85 m box culvert also conveys external flows from west of Highway 50. ▪ The hydraulic assessment of the culvert shows that under the 50 year design storm, the 0.8 x 1.85 m box culvert marginally fails to meet the 1.0 m freeboard requirement; Solution would be to upgrade the culvert to meet the hydraulic criteria, reduce subcatchment area by diverting flows or accept the marginal freeboard deficiency. ▪ The box culvert appears in good condition; however, the culvert should be flushed / cleaned.
Culvert#9 Hwy 50 Sta. (10+197) Station 10+200 to Station 10+630	▪ SBL drainage from 10+630 drains southerly via open ditches; outlets to twin 1.35 m diameter CSP culvert. ▪ The twin 1.35m diameter CSP culvert also conveys external flows from west of Highway 50. ▪ The twin 1.35 m CSP culvert appears in good condition.
Culvert#10 Hwy 50 Sta. (10+798) Station 10+630 to Station 10+900	▪ SBL drainage from station 10+900 drains southerly via open ditches; outlets to a twin 700 mm diameter CSP culvert located at station 10+825. ▪ The twin 700 mm CSP culvert also conveys external flows from west of Highway 50. ▪ The ends of the 700 mm twin CSP culvert is severely rusted and have eroded away. ▪ The hydraulic assessment of the culverts show that under the 50 year design storm, the twin 700 mm diameter CSP culvert does not meet the 1.0 m freeboard requirement; Solution would be to upgrade the culvert to meet the hydraulic criteria, or reduce subcatchment area by diverting flows.
Culvert#11 Hwy 50 Sta. (10+905) Station 10+900 to Station 11+040	▪ SBL drainage from station 11+030 drains southerly via open ditches; outletting to a twin 600 mm diameter CSP culvert located at stn 10+930. ▪ The twin 600 mm CSP culvert also conveys external flows from west of Highway 50. ▪ The ends of the 600 mm twin CSP culvert is severely rusted and have eroded away. ▪ The hydraulic assessment of the culverts show that under the 50yr design storm, the twin 600 mm diameter CSP culvert does not meet the 1.0m freeboard requirement; Solution would be to remove the culvert and replace with a larger size, or reduce subcatchment area by diverting flows.
Culvert#12 Hwy 50 Sta. (11+012) Station 11+040 to Station 11+200	▪ SBL drainage from station 11+200 drains southerly via open ditches; outlets to a twin 700 mm diameter CSP culvert located at station 11+030. ▪ The twin 700 mm CSP culvert also conveys external flows from west of Highway 50. ▪ The twin 700 mm CSP culvert appears in good condition, however, the culvert should be flushed / cleaned.
Culvert#13 Hwy 50 Sta. (11+132) Station 11+200 to Station 11+635	▪ SBL drainage from station 11+635 drains southerly via open ditches; outlets to a twin 0.9 x 1.4 m elliptical CSP culvert located at station 11+200. ▪ The twin 0.9 x 1.4 m elliptical CSP culvert also conveys external flows from west of Highway 50.

Location and Roadway Drainage Limits	Particulars
	▪ The twin 0.9 x 1.4 m elliptical CSP culvert appears in good condition; however, the culvert should be flushed / cleaned.
Culvert#14 Hwy 50 Sta. (11+832)	▪ An existing 1.5 x 3.5 m box culvert conveys flows from both the road and external upstream areas. ▪ The 1.5 x 3.5 m box culvert appears to be in good condition.

Table 2-7: Summary of Existing Drainage Conditions for Mayfield Road

Location	Particulars
Culvert#15 Mayfield Rd. Sta. (20+218)	▪ EBL drainage drains westerly via open ditches; outlets through a 900 mm CSP located at a central location. ▪ Under the 50 year design storm, the CSP culvert fails to meet the 1.0 m freeboard requirement; Solution would be to replace the culvert with a larger one, or by providing a relief culvert adjacent to the existing culvert.
Culvert#16 Mayfield Rd. Sta. (20+367)	▪ EBL drainage drains westerly via open ditches; outlets through a 1200 mm CSP located at a central location. ▪ Under the 50 year design storm, the CSP culvert fails to meet the 1.0 m freeboard requirement; Solution would be to replace the culvert with a larger one, or by providing a relief culvert adjacent to the existing culvert.
Culvert#17 Mayfield Rd. Sta. (20+984)	▪ EBL drainage drains westerly via open ditches; outlets through a 1200 mm CSP located at a central location at station 20+982. ▪ Under the 50 year design storm, the CSP culvert fails to meet the 1.0 m freeboard requirement; Solution would be to replace the culvert with a larger one, or by providing a relief culvert adjacent to the existing culvert.
Culvert#18 Mayfield Rd. Sta. (21+340)	▪ An existing 1.25 x 2.5 m box culvert conveys flows from both the road and external upstream areas. ▪ Under the 50 year design storm the box culvert fails to meet the 1.0 m freeboard requirement.
Culvert#19 Mayfield Rd. Sta. (21+387)	▪ An existing 1.5 x 4.5 m box culvert conveys flows from both the road and external upstream areas and provides a 1.15 m freeboard for the 50 year design storm.

The complete ***Drainage and Stormwater Management Report*** is included in **Appendix E.7**.

2.14 Noise

For the purposes of this study, fifteen (15) receptor locations (denoted R1 to R15) are selected to represent the residential areas along Highway 50 and Mayfield Road within the study area.

Table 2-8 lists the predicted existing ambient sound levels at the Outdoor Living Areas (OLA's) of the selected receptor locations R1 to R15. The predicted existing ambient sound levels are in the range of Leq (16h) 51 to 71 dBA.

Table 2-8: Predicted Existing Ambient Sound Levels

Receptor	Description of Receptor Location	Existing Sound Levels (Year 2009) dBA
R1	House west of Highway 50 approx. 600m north of old Castlefield Road	66.1
R2	House at north-west corner of Coleraine Drive and Highway 50	71.0
R3	House east of Highway 50, approx. 780m north of Major Mackenzie Drive	64.0
R4	House west of Highway 50, approx. 865m north of Coleraine Drive	66.8
R5	House east of Highway 50, approx. 1230m north of Major Mackenzie Drive	62.8
R6	House west Highway 50, approx. 200m north of Countryside Drive	58.8
R7	House east of Highway 50, approx. 880m north of Nashville Road	62.6
R8	House west of Highway 50, approx. 270m south of Mayfield Road	68.7
R9	House east of Highway 50, approx. 330m south of Albion Vaughan Road	64.4
R10	House east of Highway 50, approx. 210m south of Albion Vaughan Road	63.9
R11	House north of Mayfield Road, approx 200m west of Pillsworth Road	57.3
R12	House north of Mayfield Road, approx 290m west of Pillsworth Road	59.6
R13	House north of Mayfield Road, approx 330m west of Pillsworth Road	57.1
R14	House north of Mayfield Road, approx 110m east of Coleraine Drive	59.4
R15	House at north-east of Mayfield Road and Coleraine Drive	57.6

All the future project sound levels are predicted to have excesses over the existing ambient sound levels in the range of 2 to 3 dBA. Such excesses are considered to be acoustically insignificant and are mainly attributed to the forecasted increase in the Highway 50 and Mayfield Road future traffic volumes over the existing conditions, as well as to the proposed shifting of Highway 50 alignment at some locations within the study area. According to the MOE/MTO Noise Protocol

and the Region of Peel guidelines, since the predicted future project sound level excesses do not exceed 5 dBA, consideration of noise control measures is not warranted.

The existing and future predicted sound level at the receptors located east of Highway 50 will exceed Leq 60 dBA. According to York Region Policy, these receptors will warrant investigation of the feasibility of noise mitigation measures. A sound barrier is investigated at these receptors and found to be not feasible due to barrier height and sound level reduction limitations imposed by York Region Policy. Therefore no noise mitigation measures are recommended.

Based on the findings of this study and if the widening of Highway 50 and Mayfield Road are to take place, no noise mitigation measures need to be considered for all the residences within the study area. The complete ***Noise Study*** can be found in **Appendix E.8**.

3. TRANSPORTATION PROBLEMS AND OPPORTUNITIES

3.1 Area Studies

In order to determine the traffic needs of the study area a number of previous studies have been consulted including:

- Brampton Transportation and Transit Master Plan (TTMP) Update (2009)
- Peel-Highway 427 Extension Area Transportation Master Plan (TMP) (2009)
- York Region Transportation Master Plan (TMP) (2009)
- Caledon Transportation Needs Study Update (2009)
- Western Vaughan Transportation Improvements Individual Environmental Assessment (on-going).

The common findings of the various Master Plans are summarized in this section grouped by subject matter.

3.1.1 Roads

The various Master Planning EA projects reviewed have all resulted in the recommendation for Highway 50 to be widened to six lanes by 2031 in order to accommodate future traffic growth. Similarly, Mayfield Road is identified as needing four lanes by 2031.

As part of the recommended plan, the Brampton TTMP[1] identified Highway 50 as needing a six lane cross section by 2014, and Mayfield Road is identified as needing four lanes by 2014, east of Coleraine Drive and four lanes by 2031, to the Coleraine Drive realignment and westerly.

The Peel-427 Extension Area TMP was undertaken to assess future roadway requirements and evaluate alternatives to serve the Highway 427 transportation corridor. A variety of options were considered including connections from the extension to Mayfield Road, Countryside Drive / Nashville Road, and Major Mackenzie. These options included various alignments as well as with, and without, the widening of local arterials. The option chosen in the end was a Major Mackenzie connection as well as a new arterial extension of Major Mackenzie northwest up to Mayfield Road, and the widening of a number of major arterials. This will draw a large volume of east-west traffic through the study area, connecting the end of Highway 427 to Brampton and north western parts of Peel Region. This large flow must cross Highway 50 to do so.

The Western Vaughan EA includes a comprehensive list of measures for improving the transportation network. Relevant to this project, the road widening aspects of the plan includes the section of Highway 50 between Castlemore Road / Rutherford Road and Major Mackenzie Road. Major Mackenzie Drive, Rutherford Road, and Highway 7, all of which connect to or are contained within the Highway 50 and Mayfield Road EA, are recommended for widening.

[1] Page 94, Brampton TTMP: Sustainable Update 2009. HDR | iTRANS, (2009).

3.1.2 Transit

The carpool lot built in June 2010 at the corner of Highway 50 and Mayfield Road / Albion-Vaughan Road contains facilities for GO buses to stop and pick up passengers as well as spaces for those GO transit passengers to park. A GO station is planned in Bolton which will likely have the effect of increasing local transit usage. GO Transit would like to see transit priority measures in place through the corridor including queue jump and signal priority measures.

According to the Brampton TTMP, transit is an integral part of satisfying future transportation needs in the City of Brampton. Alongside making an environment safe for and inviting to pedestrians, the TTMP aims to make transit first priority for moving people around the city. Increasing the modal share of transit is a desired outcome. *"TTMP policies promote an integrated and efficient transportation system to support a vibrant economy and high quality of life. Proposed transit nodes and corridors will be supported with higher density land use and a compact urban form supportive of sustainable travel through walking, cycling, and transit."*[2] The City of Brampton has indicated that both Mayfield Road and Highway 50 are required to have transit priority measures and transit facilities at all intersections and transit priority measures are required to aid the entry and exit of busses into the new carpool lots transit facilities.

The York Region TMP includes Transit Oriented Development as an essential part of increasing the use of transit. Highway 50 is directly connected to roadways that are defined as important for the Regional Centres and Corridors plan and will accommodate transit. Highway 50 is also shown to be a potential transit priority corridor in the TMP. While specific transit related recommendations concerning Highway 50 and Mayfield Road are absent from the Master Plans; each outlines a desire to promote the use of transit and increase transit modal share.

It is clear that neither Highway 50 nor Mayfield Road is foreseen as rapid transit corridors. In order to improve the attractiveness of public transit, service can be made more reliable through the implementation of bus priority. As such additions to the roadway may well cause the need for a larger property envelope, appropriate protection for transit priority measures were considered in this study. A summary of the recommendations for transit priority measures is provided in Section 6.4.6. The current position of York Region is that no YRT services will run along Highway 50 or Mayfield Road in the near future, though in the long run a service may utilize part of Highway 50. York Region recommends transit priority measures in general as essential to transit service.

The Caledon Transportation Needs Study Update highlights the importance of increasing transit coverage for the area in the following statement: *"Supporting the development of improved inter-regional public transit services and investigating opportunities for local transit services in Bolton in the short term and in Mayfield West in the longer term. GO Transit has recently*

[2] Page 71, Brampton TTMP: Sustainable Update 2009. HDR | iTRANS, (2009).

improved services and will be studying future GO Rail service. The need for and feasibility of local transit service requires further investigation."[3]

The Western Vaughan EA also suggests the addition of new transit services operated by GO Transit to Highway 50.

3.1.3 Active Transportation

Peel Regional Council approved the Peel Region's first Active Transportation Plan (February 2012). The Plan provides a framework for how the Region will increase the share of trips by walking and cycling, linking with transit, and creating a pedestrian and cycling friendly environment. The Plan sets out policies that direct the practices of the Region to support more walking and cycling; recommends active transportation improvements to the existing cycling and pedestrian networks, and recommends strategies/programs to shift travel behaviour.

The Peel Active Transportation Study identifies a sidewalk on one side and a multi-use pathway on the other side of Highway 50 within the study area. The Peel Active Transportation Study identifies a sidewalk on one side and a multi-use pathway on the other side of Mayfield Road within the study area.

The Peel Region Long Range Transportation Plan encourages the use of transportation demand management, including the following objectives[4]:

1. Maximize the capacity of the transportation system by utilizing transportation demand, supply and transit strategies.
2. Reduce auto dependency by promoting sustainable modes of transportation (e.g. public transit, carpooling, vanpooling, bicycling and walking).
3. Support and encourage higher use of public transit to achieve an increase in transit modal share within the region.

The York Region TMP also encourages transportation demand management including the use of active transportation and alternative forms like transit. The following three points about the implementation of active transportation in York Region were made in the report[5]:

1. Encourage the study and implementation of local municipal pedestrian and cycling master plans
2. Promote and support local bike-sharing programs as demonstration projects
3. Partner with Metrolinx and other to implement Regional bike-sharing programs

The York Region TMP suggests reviewing requirements for regional roads to see sidewalks constructed on both sides of the road. Another measure mentioned is designing sidewalks to

[3]Exec Summary, Caledon Transportation Needs Study Update. Paradigm Transportation Solutions Ltd (2009)
[4] Chapter 3, Peel Region Long Range Transportation Plan. Region of Peel (September 2005).
[5]Page 90, York Region Transportation Master Plan Update. York Region (2009).

connect directly to bus stops along these streets. These measures make a street pedestrian friendly.

The Brampton TTMP has identified that "Active transportation is a key component of a sustainable transportation system. Whether it be walking or cycling to work, for leisure, exercise, or to access public transportation, the proper infrastructure must be in place before people will consider active modes of transportation." The types of active transportation facilities that the City of Brampton has, or is planning to install, are accounted for in the following excerpt[6]:

> *The routing plan, revised in 2006, proposes 510 kilometres of trails utilizing three classes of pathways, including:*
> 1. *Class I – Three metre wide multi-use trail; Boulevard trails alongside roads (i.e. Bovaird Drive) – 211 kilometres; Valleyland trails through parkland areas – 168 kilometres*
> 2. *Class II – Bike Lanes – 71 kilometres*
> 3. *Class III – Sign Routes – 60 kilometres*
>
> *To date, the City has approximately 83 kilometres of trails, 17 kilometres of Class I boulevard trails and 65 kilometres of Class I valleyland trails. The Works and Transportation department installed Brampton's first Class II bike lane on Birchbank Drive in southern Bramalea in 2005*

The City of Brampton has requested a 3m multiuse trail on the west side of Highway 50 and south side of Mayfield Road. Accordingly, a trail will be accommodated in the development of design options in Phase 3 of this study.

3.1.4 GTA West Corridor Environmental Assessment

The purpose of the GTA West Corridor study is to examine long-term transportation problems and opportunities to the year 2031 and consider alternative solutions to provide better linkages between Urban Growth Centres in the GTA West Corridor Preliminary Study Area, including Downtown Guelph, Downtown Milton, Brampton City Centre and Vaughan Corporate Centre, as identified in the Growth Plan.

In response to input received on the draft GTA West Corridor Transportation Development Strategy, the ministry has decided to carry out additional analysis and consultation to further examine the recommendations in the Halton area. The additional work will be carried out over the Fall and Winter and is expected to be completed by Spring 2012.

The preliminary study area for the GTA West Corridor is shown in **Exhibit 3-1**. Highway 50 and Mayfield Road are within the study area for the GTA West Corridor EA.

[6] Page 35, Brampton TTMP: Sustainable Update 2009. HDR | iTRANS, (2009).

The Highway 50 / Mayfield Road Class EA analysis did not assume that the GTA West facility would be in place in the 2031 Horizon years because of its unknown status.

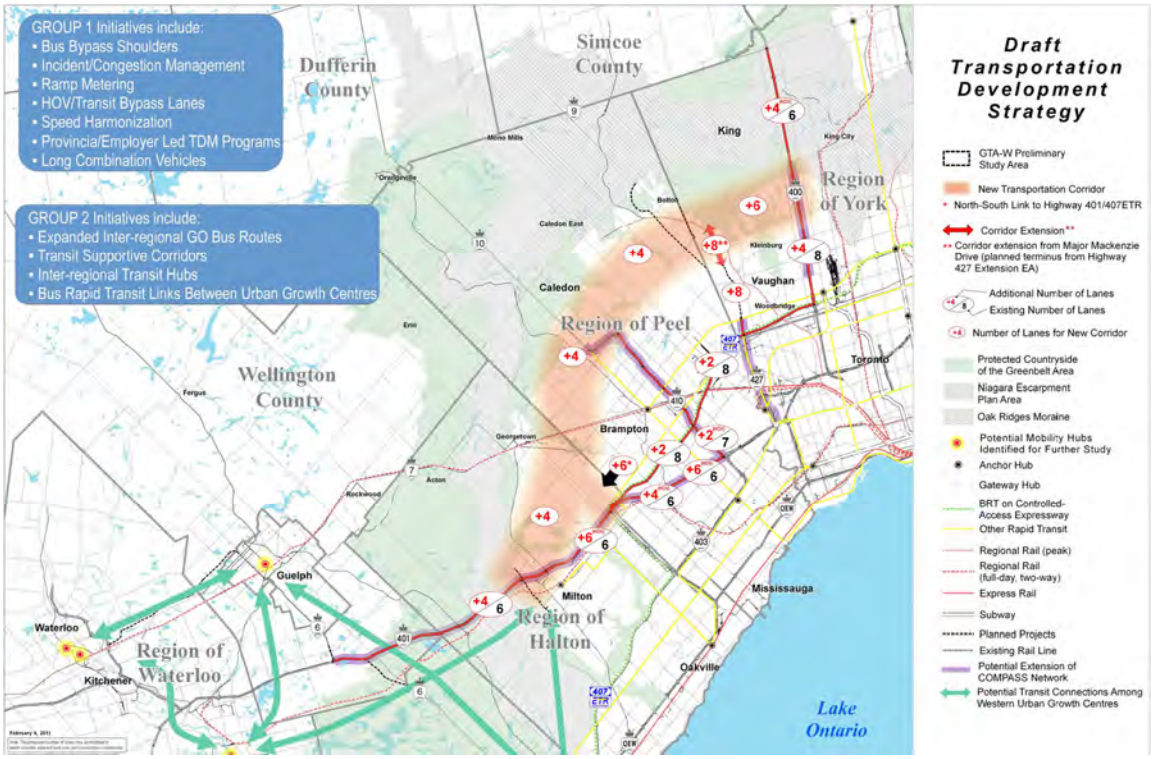


Exhibit 3-1: Key Map of Preliminary Study Area for GTA West Corridor EA

Source: http://www.gta-west.com/pdf/2-2011/Chapter%205.pdf

3.2 Future Traffic Analysis

This section deals with determining the future functional requirements for Highway 50 and Mayfield Road.

An operational assessment of the study area road network was conducted for the years 2021 and 2031 using forecasts derived from the Region of Peel's EMME/2 model and traffic count information. The 2021 assessment is contained in the Highway 50 & Mayfield Road Widening Justification Memorandum in **Appendix E.1.**

Travel demand forecasting was developed with the assistance of the City of Brampton EMME/2 model used for its 2009 Transportation and Transit Master Plan (TTMP). The model simulates PM peak hour auto demand and PM peak period transit demand. Assumed road and transit networks are as per the 2009 TTMP Update. The model is based on the "GTA Simplified Model" developed by Peter Dalton for the City of Brampton. This particular version of the model was developed based on 2006 Transportation Tomorrow Survey travel patters and was calibrated

to City-wide screenlines. No extra detail was required to be added to the model for the purposes of the Highway 50 and Mayfield Road EA, and thus the TTMP model was utilized “as is”.

AM traffic was created using the accepted practice of reversing the turning movements from PM and multiplying by a factor of 0.9 to get a flow and volume of traffic for the AM.

The assessment was made for two scenarios – one scenario where four lanes of through traffic are maintained on Highway 50 and Mayfield Road is widened to four lanes; and one where six lanes of through traffic are provided on Highway 50 and Mayfield is widened to four lanes. **Exhibit 3-2** and **Exhibit 3-3** illustrate the network configurations for Scenario 1 and Scenario 2, respectively, for the year 2031. For both of these scenarios, traffic is made to reflect growth of population and employment in the Region as well as study area. Signal timings were designed and optimized for the future scenarios. The detailed Synchro output is included in **Appendix E.1**.

For both Scenarios, assumptions were made about the required turning storage lengths needed for each intersection. The assumptions remain the same in both scenarios in order to accurately test the effects of an extra lane in each direction on Highway 50.

Note that the unsignalized intersections of Cadetta Road and Highway 50, and Old Castlemore Road and Highway 50 will remain unsignalized in the future street network and as such, were removed from analysis in all future horizons.

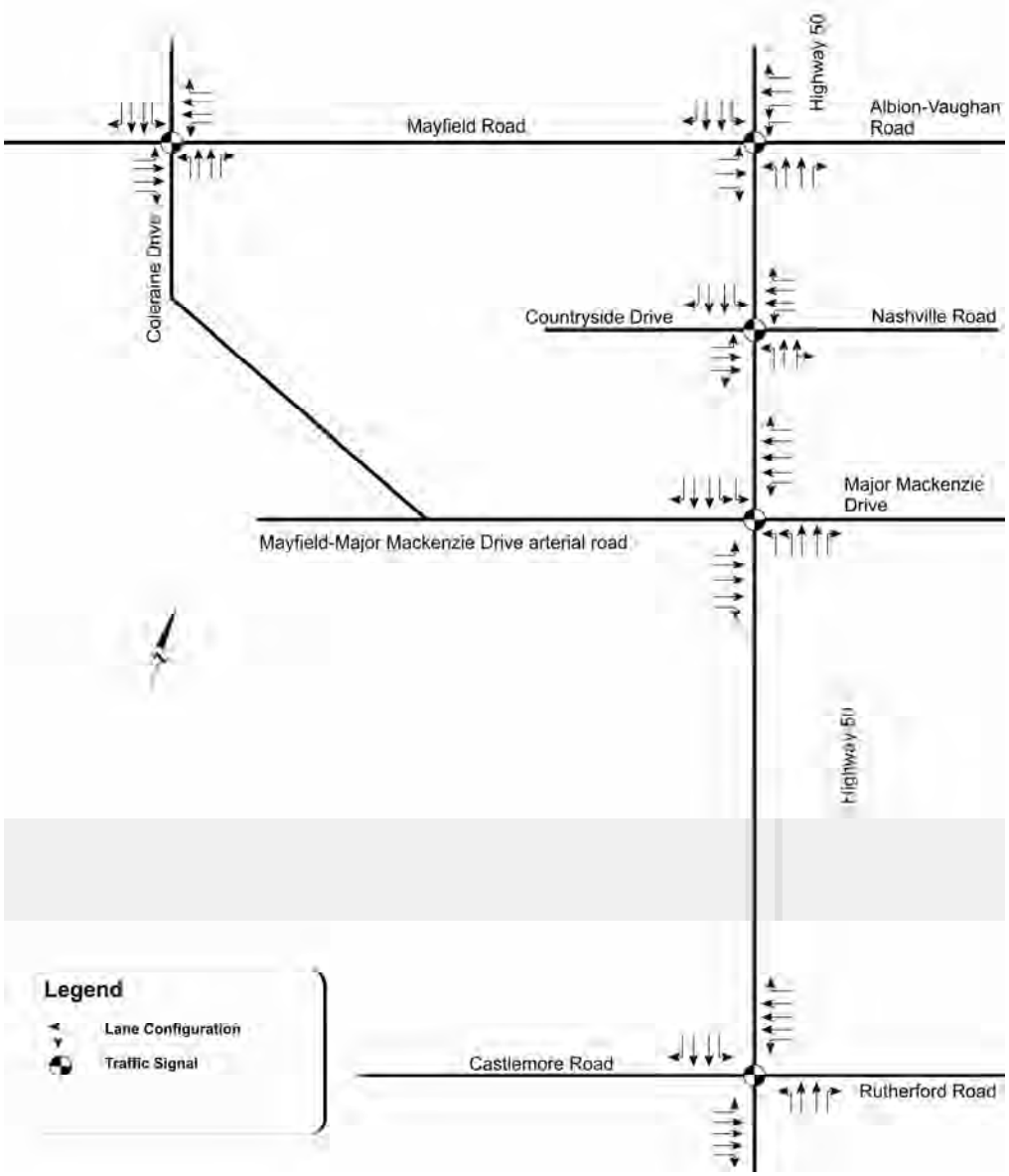


Exhibit 3-2: Scenario 1: Future Lane Configurations-Four Lane Option

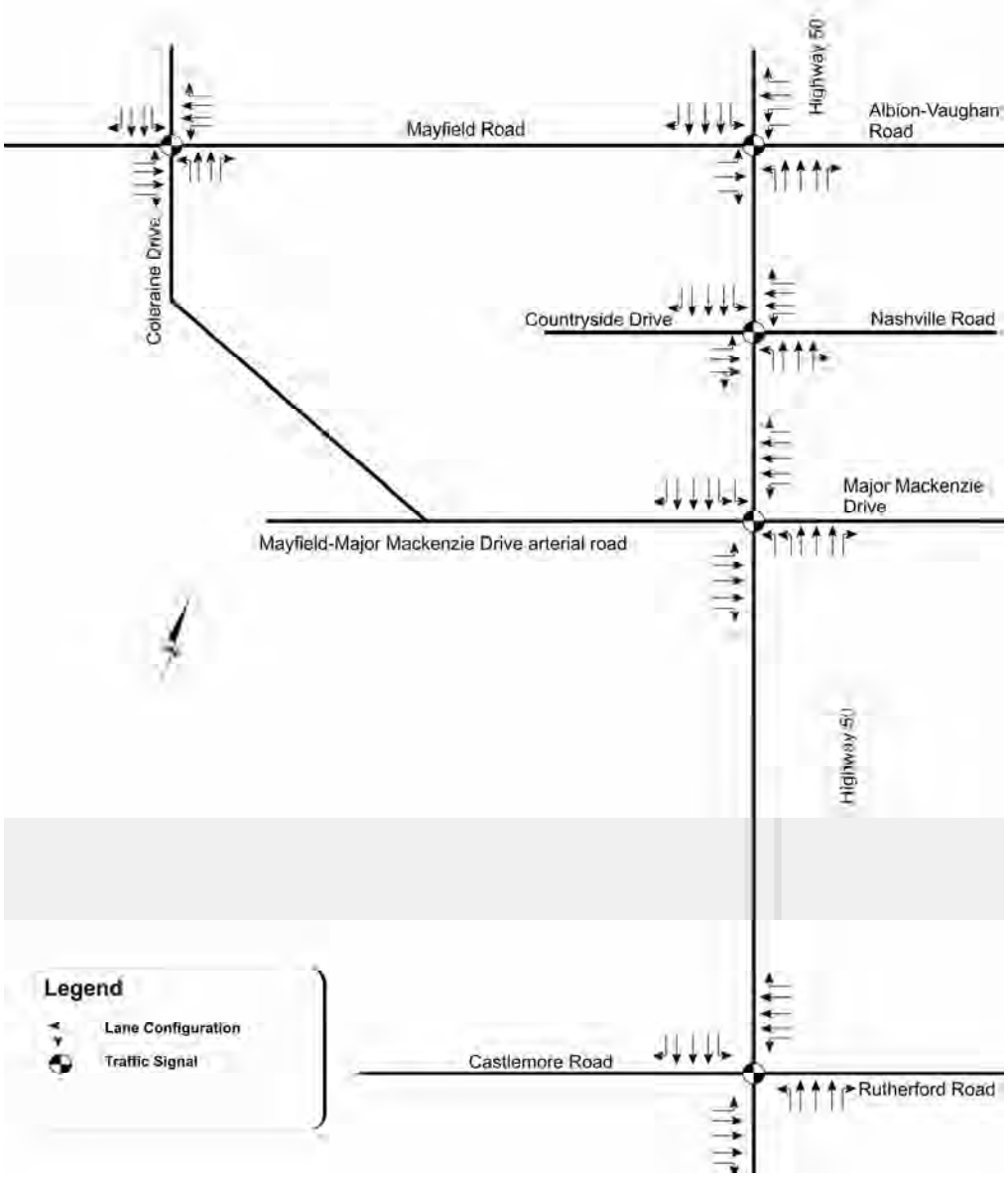


Exhibit 3-3: Scenario 2: Future Lane Configurations-Six Lane Option

3.2.1 2031 Scenario 1: 4 Lanes on Highway 50

Table 3-1: 2031 Scenario 1: 4 Lanes on Highway 50

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
Mayfield Road/Albion-Vaughan Road and Highway 50	Overall	D	40.4	E	63.6
	Eastbound Left	E	78.6	E	79.5
	Eastbound Through	E	70.6	**F**	**113.3**
	Eastbound Right	D	43.8	B	12
	Westbound Left	E	70	**F**	**107.9**
	Westbound Through	E	67	E	77.8
	Westbound Right	A	9.5	C	22.9
	Northbound Left	B	17.2	**F**	81.3
	Northbound Through	C	20	E	79.9
	Northbound Right	A	3.1	B	15.2
	Southbound Left	B	13.9	D	35.9
	Southbound Through	D	43.2	D	44.1
	Southbound Right	A	3.6	A	4.8
Countryside Drive / Nashville Road and Highway 50	Overall	C	32.2	E	59.3
	Eastbound Left	D	35.2	D	36.3
	Eastbound Through-Right	D	51.9	C	30.1
	Westbound Left	D	35.8	D	43.8
	Westbound Through	D	43.9	D	48.3
	Westbound Right	B	11.4	B	12.9
	Northbound Left	C	23.2	E	74
	Northbound Through-Right	C	25.9	**F**	80.4
	Southbound Left	E	71.2	E	72.1
	Southbound Through	C	28.5	D	44
	Southbound Right	A	8.4	B	11.5
Major Mackenzie Drive and Highway 50	Overall	**F**	87.9	**F**	**109.1**
	Eastbound Left	C	32.5	C	24.9
	Eastbound Through	**F**	87	D	49.5
	Eastbound Right	C	31.2	C	13.7
	Westbound Left	**F**	**131.7**	E	41.8
	Westbound Through	C	32	**F**	**139.1**

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
	Westbound Right	**F**	**117.2**	E	57.9
	Northbound Left	**F**	**125.3**	E	71.3
	Northbound Through	**F**	**105.4**	**F**	**173.1**
	Northbound Right	B	10.5	C	16.6
	Southbound Left	**F**	**133**	**F**	**247.4**
	Southbound Through	**F**	**100.6**	D	60
	Southbound Right	B	10.5	B	6.4
Coleraine Drive and Mayfield Road	Overall	D	44.1	C	32.7
	Eastbound Left	E	58.7	D	49.6
	Eastbound Through	C	23.8	C	30.1
	Eastbound Right	A	6.5	B	13.3
	Westbound Left	B	17.5	C	23
	Westbound Through	E	63.1	D	52.8
	Westbound Right	B	16.9	B	15.8
	Northbound Left	C	22.3	B	15
	Northbound Through	C	29.1	D	37
	Northbound Right	B	19	B	11
	Southbound Left	C	22.3	D	35.1
	Southbound Through	D	51.1	C	21.5
	Southbound Right	B	14.8	B	14
Castlemore Road / Rutherford Road and Highway 50	Overall	**F**	93.3	**F**	**158.3**
	Eastbound Left	D	51.2	D	45.5
	Eastbound Through	**F**	**166.6**	D	46.5
	Eastbound Right	A	9	B	17.7
	Westbound Left	**F**	**92.5**	E	67.3
	Westbound Through	D	48.8	**F**	**222.1**
	Westbound Right	B	10.4	A	6.4
	Northbound Left	B	14.7	D	50.9
	Northbound Through	D	50.7	**F**	**256.6**
	Northbound Right	A	4.7	A	5.6
	Southbound Left	**F**	84	E	61.3
	Southbound Through	**F**	95.7	**F**	84.6
	Southbound Right	A	6.1	B	13.2

Note: 1. LOS – level of service; 2. Bolded LOS and delays in charts indicate a serious operational issue.

Results show that under 2031 traffic conditions with four through lanes for Highway 50.

- The intersection of Mayfield Road / Albion-Vaughan Road and Highway 50 is expected to operate with an overall level of service of "E" during the weekday PM peak hour. The individual movements at the intersection that are expected to have a poor LOS for this scenario are the EB through, WB left and NB left in the PM.
- The intersection of Major Mackenzie Drive and Highway 50 is expected to operate with an overall level of service of "F" during the weekday AM and PM peak hours. Many movements for traffic in all directions at this intersection are expected to have a poor LOS with large average delays.
- The intersection of Castlemore Road / Rutherford Road and Highway 50 is expected to operate with an overall level of service of "F" during the weekday AM and PM peak hours. The individual movements at the intersection expected to have a poor LOS and large delays are EB through, WB and SB left in the AM, and the WB, NB and SB through in the PM.
- The other two intersections operate at acceptable levels of service with delays that are not excessive.

3.2.2 2031 Scenario 2: 6 Lanes on Highway 50

Table 3-2: 2031 Scenario 2: 6 Lanes on Highway 50

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
Mayfield Road / Albion-Vaughan Road and Highway 50	Overall	C	30.8	D	43.5
	Eastbound Left	C	32	D	43
	Eastbound Through	D	51.3	E	60.8
	Eastbound Right	C	32.3	B	10.1
	Westbound Left	D	50.2	**F**	**105.2**
	Westbound Through	D	43	D	54.4
	Westbound Right	A	7.3	C	20.6
	Northbound Left	C	23	E	57
	Northbound Through	C	23.6	D	36.5
	Northbound Right	A	4.3	C	20.7
	Southbound Left	C	20.3	D	38.7
	Southbound Through	D	35.7	D	43.5
	Southbound Right	A	4.8	A	6.6
Countryside Drive / Nashville Road and Highway 50	Overall	C	24.8	C	29.2
	Eastbound Left	C	30.4	D	36
	Eastbound Through-Right	D	35.2	C	29.6
	Westbound Left	C	31.3	D	42.9
	Westbound Through	D	37.7	D	46.4
	Westbound Right	A	9.1	A	9.2
	Northbound Left	C	22.9	D	46
	Northbound Through-Right	C	25.7	C	25.8
	Southbound Left	D	37.9	D	40.8

Intersection	Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
		LOS	Avg. Delay	LOS	Avg. Delay
	Southbound Through	B	20	C	27.5
	Southbound Right	A	9.8	B	13.3
Major Mackenzie Drive and Highway 50	Overall	E	61.6	E	78.2
	Eastbound Left	C	22.5	C	23
	Eastbound Through	D	46.9	D	42.8
	Eastbound Right	A	5.1	A	7.9
	Westbound Left	**F**	**101.7**	D	40.7
	Westbound Through	C	25.1	**F**	**104.4**
	Westbound Right	E	68.5	C	32.9
	Northbound Left	**F**	**105.5**	E	56.8
	Northbound Through	E	73.3	**F**	**111.8**
	Northbound Right	B	12.8	C	23.5
	Southbound Left	**F**	87.8	**F**	**171.3**
	Southbound Through	E	79.3	D	47.1
	Southbound Right	B	13	A	8.8
Coleraine Drive and Mayfield Road	Overall	D	44	C	32.7
	Eastbound Left	E	58	D	49.6
	Eastbound Through	C	23.8	C	30.1
	Eastbound Right	A	6.5	B	13.3
	Westbound Left	B	17.5	C	23
	Westbound Through	E	63.1	D	52.8
	Westbound Right	B	16.9	B	15.8
	Northbound Left	C	22.3	B	15
	Northbound Through	C	29.1	D	37
	Northbound Right	B	19	B	11
	Southbound Left	C	22.3	D	35.1
	Southbound Through	D	51.1	C	21.5
	Southbound Right	B	14.8	B	14
Castlemore Road / Rutherford Road and Highway 50	Overall	D	47.6	**F**	**88.9**
	Eastbound Left	D	37.9	D	38.2
	Eastbound Through	**F**	**71.7**	D	44
	Eastbound Right	A	5.8	B	19
	Westbound Left	E	68	D	51.5
	Westbound Through	D	42.3	**F**	**126.5**
	Westbound Right	A	9.3	A	5.2
	Northbound Left	B	19	D	44.3
	Northbound Through	D	44	**F**	**132.1**
	Northbound Right	A	7.7	A	6.1
	Southbound Left	D	47.2	E	60.6
	Southbound Through	D	40.1	D	43.9
	Southbound Right	A	5.1	B	19.1

Note: 1. LOS – level of service; 2. Bolded LOS and delays in charts indicate a serious operational issue.

According to the results of Synchro analysis, with 2031 traffic conditions including six through lanes for Highway 50:

- The intersection of Mayfield Road / Albion-Vaughan Road and Highway 50 is expected to operate with an overall level of service of "D" during the weekday AM and PM peak hours
- The intersection of Countryside Drive / Nashville Road and Highway 50 is expected to operate with an overall level of service of "C" or better during the weekday AM and PM peak hours.
- The intersection of Coleraine Drive and Mayfield Road remains unchanged and is expected to operate with an overall level of service of "D" and "C" during the weekday AM and PM peak hours, respectively.
- Two intersections experience poor levels of service and major delays in 2031 in spite of proposed measures for the corridor. Under 2031 traffic conditions with six through lanes for Highway 50, the intersection of Major Mackenzie Drive and Highway 50 is expected to operate with overall level of service "E" during the weekday AM and PM peak hours. The individual movements at the intersection that are expected to experience delay are: WB, NB and SB left for the AM, and WB and NB through, and SB left in the PM.
- The intersection of Castlemore Road / Rutherford Road and Highway 50 is expected to operate with overall level of service "D" and "F" during the weekday AM and PM peak hours, respectively. The individual movements at the intersection expected to have poor LOS and large delays are EB through in the AM, and WB and NB through in the PM.

3.3 Safety Analysis

The Region of Peel provided a total of three years of collision data, in summary table form, from January 2005 to December 2007 along Highway 50 between Mayfield Road and Castlemore Road and along Mayfield Road between Highway 50 and Coleraine Road. During this time, a total of 165 collisions were recorded for the seven intersections and six mid block sections within the study area. 134 of these collisions occurred at the intersections in the study area. All collision locations were identified by the nearest intersection or mid block section. All intersections in the study area being analyzed have recorded collisions.

The existing posted speed limits for the roads are as follows:

- Highway 50 – 80 km/h
- Mayfield Road – 60 and 80 km/h
- Castlemore Road / Rutherford Road – 80 km/h
- Coleraine Drive, Countryside Drive, Major Mackenzie Drive, Old Castlemore Road, Cadetta Road – 70 km/h

The complete ***Safety and Collisions Assessment*** is included in **Appendix E.1**.

3.3.1 Intersection Collision Characteristics

The impact type and level of severity of all collisions recorded at intersections during the 3 year period are detailed in this section. Initial impact type is summarized in **Table 3-3.** Rear end

collisions (33%) and angle collisions (22%) were the most prevalent collision-types recorded, followed by turning movement (15%) and approaching collisions (13%). This collision pattern is generally expected at signalized intersections which make up five of the seven intersections in the study area.

Table 3-3: Summary by Initial Impact

Impact Type	Frequency	Percentage
Angle	30	23%
Approaching	18	13%
Other	2	1%
Rear End	44	34%
Sideswipe	11	8%
SMV Other	6	4%
Turning Movement	20	15%
Unknown	3	2%
TOTAL	**134**	**100%**

Table 3-4 summarizes the severity of collisions according to the intersection where the collisions were located.

Property Damage Only (PDO) collisions were the most common collision severity type at or near intersections, accounting for 75% of the recorded collisions. This was followed by non fatal injury collisions at 20%. Three fatal collisions (2%) were also recorded at or near intersections.

Table 3-4: Intersection Collisions

Intersection	Severity of Collisions					
	Unknown	Non Reportable	PDO	Injury	Fatal	TOTAL
Castlemore Rd / Rutherford Rd @ Hwy 50	0	0	28	6	0	**34**
Old Castlemore Rd @ Hwy 50	0	0	2	1	0	**3**
Cadetta Rd @ Hwy 50	0	0	2	1	0	**3**
Coleraine Dr @ Hwy 50	1	0	14	5	2	**22**
Countryside Dr @ Hwy 50	0	2	19	3	0	**24**
Mayfield Rd @ Hwy 50	0	0	28	9	1	**38**
Coleraine Dr @ Mayfield Rd	0	0	8	2	0	**10**
Total per Type	**1**	**2**	**101**	**27**	**3**	**134**

3.3.2 Mid-block Collisions

Midblock collisions do not account for a large proportion of the collisions in the study area. **Table 3-5** summarizes the collision data by mid block location and severity of the impact.

All of the recorded collisions on mid block sections were classified under PDO, Non-Fatal Injury and Fatal. There were 24 PDO collisions, six non-fatal injury collisions and one fatal collision. The one fatal collision occurred along the Mayfield Road segment between Highway 50 and Coleraine Drive. The mid block sections with the highest number of collisions were along Mayfield Road between Highway 50 and Coleraine Drive, and along Highway 50 between Castlemore and Old Castlemore Road. A total of nine collisions were recorded on each of these two sections, accounting for 58% of all mid block collisions.

Table 3-5: Mid Block Collisions

Mid Block	Severity of Collisions					
	Unknown	**Non Reportable**	**PDO**	**Non-Fatal Injury**	**Fatal**	**TOTAL**
From Castlemore Rd / Rutherford Road to Old Castlemore Rd / Sears Entrance	0	0	8	1	0	**9**
From Sears Entrance to Cadetta Rd	0	0	1	0	0	**1**
From Cadetta Rd to Coleraine Dr	0	0	2	0	0	**2**
From Coleraine Dr to Countryside Dr	0	0	3	1	0	**4**
From Countryside Dr to Mayfield Rd	0	0	3	3	0	**6**
From Highway 50 to Coleraine Drive on Mayfield Rd	0	0	7	1	1	**9**
Total by Type	**0**	**0**	**24**	**6**	**1**	**31**

Table 3-6 summarizes the total number of collisions on mid block sections during the study period by impact type.

Overall, Approaching collisions (32%) and Rear-End collisions (23%) were the most prevalent types of collision recorded on mid-block sections, followed by Sideswipe collisions (16%)

Table 3-6: Mid Block Summary by Initial Impact

Impact Type	Frequency	Percentage
Angle	3	10%
Approaching	10	32%
Rear End	7	23%
Sideswipe	5	16%
SMV Other	4	13%
SMV Unattended Vehicle	1	3%
Turning Movement	1	3%
Total	**31**	**100%**

3.3.3 Fatal Collisions

A total of four fatal collisions were recorded in the study area during the selected time period of 2005 to 2007. Three of these collisions happened at intersections and one of them happened on a mid block section of road. Two collisions occurred at the intersection of Coleraine Drive and Highway 50 – one angle collision and one rear end collision. One collision with unknown type and direction details occurred at the intersection of Highway 50 and Mayfield Road. The fourth collision was a mid block single motor vehicle collision on Mayfield Road between Coleraine Drive and Highway 50.

3.3.4 Collision Summary

There were a total of 134 collisions at intersections and 31 on mid block sections in this study area along Highway 50 and Mayfield Road. The most common impact types appear to be rear end, angle and approaching collisions. The most common severity level is property damage only and there was only four recorded fatal collision in the time period. The intersections of Castlemore Road and Highway 50, and Mayfield Road and Highway 50, are the locations with the highest volume of collisions in the study area.

It should be noted that as a result of the serious collisions occurring at the intersection of Highway 50 / Coleraine Drive, the Regions of Peel / York subsequently modified the intersection, including the addition of signals and approach realignment in 2009, which should help to improve safety performance.

3.3.5 Potential Safety Measures

The following are potential measures that can be put in place to lower the number of collisions occurring within the study area. Included with each measure is a CRF – crash reduction factor – which indicates the potential levels of collision reduction coming from the measure expressed as a percentage.

- Improving pavement surface at intersection – grooving or micro-surfacing. This has a crash reduction factor of between 35% and 54% for rear end collisions.

- Flattening horizontal curves leading up to intersections. This has a crash reduction factor of between 24% and 73% for rear end collisions, and 64% to 67% for head on collisions.
- Install double left turn lanes. This has a crash reduction factor of between 20% and 47% for angle collisions that cause injury or death, and 8% to 71% for property damage only angle collisions.
- Install / maintain Two-Way-Left-Turn-Lane in the centre of the street. This has a crash reduction factor of 32% to 38% for mid-block rear end collisions. Also there is a crash reduction factor of 64% to 67% for approaching collisions.
- Increase number of traffic lanes. This measure has a crash reduction factor of between 38% and 53% for approaching collisions.

3.4 Air Quality Analysis

Network emissions are a measure of the direct environmental impact of a transportation facility. Emissions are reported in SimTraffic as Carbon Monoxide (CO), Nitrogen Oxides (NOx), and Hydrocarbons (HC). In SimTraffic, the emission data is calculated based on vehicle's fuel consumption (vehicle's speed and acceleration) to determine the emissions for each time period. The simplified calculation multiplies fuel consumption based rates from an unpublished letter to the Federal Highway Administration from the Oak Ridge National Labs.

All emissions are combined to display the total emissions for each time period to show the impact of widening Highway 50 and Mayfield Road within the study area. It should be noted that there are no emission outputs available for trucks and busses. SimTraffic assumes trucks and busses emit exhaust at three times the rate of cars.

Table 3-7: Air Quality Analysis

Year	Total Emissions (g)			
	AM		PM	
	Do Nothing	Widening	Do Nothing	Widening
2021	307,038	301,886	320,906	294,061
2031	335,000	316,401	357,121	342,284

The analysis (average of three, one-hour SimTraffic model runs) shows that the widening of Highway 50 and Mayfield Road will have fewer emissions than the current configuration.

3.5 Problems and Opportunities Statements

3.5.1 Problems

In the Highway 50 and Mayfield Road study corridor there is a high level of congestion with existing traffic. The volumes are forecast to increase greatly in the coming years due to planned developments, and additional road capacity is needed to serve new development planned in the immediate area along with general traffic growth, by 2031.

Currently, only the automobile is accommodated in the study area. There is a lack of sidewalks and bicycle facilities along the corridors. There is no infrastructure (e.g. bus shelter / pads, priority measures) to support transit service. With the area becoming an employment centre in the future multiple means of getting to and from work will be required to balance travel demand and encourage alternative modes.

There are known storm water drainage problems along the corridor, particularly at the intersection of Mayfield Road and Highway 50.

3.5.2 Opportunities

The redevelopment of the roads in the study corridor will provide many opportunities to improve the transportation network in the area. The main element will be the addition of traffic capacity to the area network on top of improvements to the layout and design of the corridor.

Potential opportunities for improvement include providing pedestrian and bicycle facilities along the corridors as well as protecting for transit priority measures to improve the reliability of transit service. The drainage problems that exist today will also have the opportunity to be solved in the process. There is also an opportunity to introduce improved streetscaping areas along the corridor creating a more attractive environment.

4. ALTERNATIVE PLANNING SOLUTIONS

The Class Environmental Assessment process requires the examination of all reasonable alternatives, including alternatives to the undertaking, referred to as alternative planning solutions, to address the problem. A formal evaluation methodology is used to ensure that the process is traceable and reproducible, and that the process takes into account technical, as well as economic, social and environmental issues. This section of the report provides a discussion of the development and evaluation of the alternative planning solutions.

This section introduces the proposed alternative planning solutions considered, discusses the evaluation methodology used, and presents the formal evaluation of each alternative and the recommended alternative.

4.1 Development of Alternative Planning Solutions

Alternative planning solutions have been identified as different means of addressing the problem. As described in **Section 3.5**, improvements are required to address current and future transportation capacity deficiencies along the Highway 50 and Mayfield Road corridors. The advantages and disadvantages of each planning alternative were identified and evaluated for the corridor, to determine the best functional solution to the problem. The findings of this evaluation process are described in the following sections.

4.1.1 Identification of Alternative Planning Solutions

The following alternative planning solutions were considered:

- **Alternative 1: Do Nothing (Base Case) –** This alternative was included in the assessment to provide a benchmark against which the other alternatives could be compared. This alternative represents a continuation of existing conditions and would involve no changes or improvements to the existing transportation network. This option provides a baseline for comparison purposes with the following alternatives.
- **Alternative 2: Widen Highway 50 and Mayfield Road –** This alternative consists strictly of the street network alterations that have been tested using Synchro 6. The widening of Mayfield Road to four lanes and Highway 50 to six lanes through the length of the study corridor. This alternative includes all intersection improvements required to ensure the widened roads perform at desired levels of service, including turn lanes, channelization, approach alignment and signal timing alterations.
- **Alternative 3: Widen or Extend Other Roads Beyond What is Indicated in Master Plan Studies –** This alternative avoids changes to Highway 50 or Mayfield Road but instead extends the surrounding network to connect with the future Highway 427 extension and widen selected roads in order to increase capacity. This is expected to divert vehicular demand away from the sections of Highway 50 and Mayfield Road being studied.
- **Alternative 4: Active Transportation - Improve Pedestrian and Bicycle Facilities –** This alternative puts a focus on active transportation facilities. Addition of pedestrian sidewalks

and walkways, as well as bicycle paths to the area would provide alternative ways for people to reach future land uses rather than relying on motorized transportation. The aim of this alternative would be to absorb some of the future traffic demands to attempt to shift the modal split and reduce vehicular demand.

- **Alternative 5: Transportation Demand Management (TDM) and Transit –** This alternative focuses on improving infrastructure and service of transit in the area, as well as employing transportation demand management strategies. Transportation Demand Management (TDM) is a system of reducing demand for travel on the given network by limiting single occupancy vehicles, diversifying methods by which people get to where they want to go including transit and active transportation, and attempting to lower the number of travellers / commuters who want to move during peak demand periods. Transit is an integral part of TDM and this alternative would add facilities and introduce new routes and services to the area.

4.2 Evaluation of Alternative Planning Solutions

The alternative planning solutions were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, environmental impacts, and the list of criteria established for the study.

4.2.1 Alternative Planning Solutions Evaluation Criteria

Below in **Table 4-1** is the evaluation criteria for the alternative planning solutions generated for this environmental assessment. These will be used to rate and rank the alternative planning solutions in terms of their relative performance in addressing the identified problems and opportunities.

Table 4-1: Evaluation Criteria

Factor	Criteria
Land Use and Social-Economic	▪ Business Impacts ▪ Noise Impacts ▪ Archaeological/ Cultural Heritage Resources
City Building	▪ Supports OP and Secondary Plan Objectives ▪ Conformity to Transportation Master Plans (Brampton TTMP, York TTMP and Hwy 427 Extension studies) ▪ Streetscaping
Transportation	▪ Corridor Capacity and Level of Service ▪ Traffic Safety within the study area ▪ Accommodation for Pedestrians and Cyclists within the study corridors ▪ Accommodation of Truck Traffic ▪ Accommodation of Transit Service

Factor	Criteria
	▪ Accessible Transportation ▪ Transportation Network Considerations
Natural Environment	▪ Erosion and Landforms ▪ Storm Water Management / Drainage ▪ Vegetation and Wildlife ▪ Aquatic Species and Habitat ▪ Air Quality ▪ Sustainability
Implementation	▪ Construction feasibility ▪ Staging opportunities
Costs	▪ Utility Relocation ▪ Capital Costs ▪ Property Acquisition

4.2.2 Evaluation of Alternative Planning Solutions

The alternative planning solutions were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, environmental impacts, and the list of criteria provided above. The evaluation was completed with input from the project team, agencies, and the public.

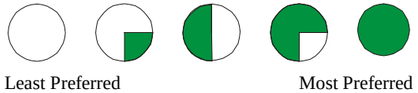
Following the evaluation, a recommendation was made on which Alternative Planning Solutions would be carried forward to the next phase as part of the preferred solution. **Table 4-2** contains the evaluation of the alternative planning solutions, and a summary of the impacts and recommendations for the Study Area.

Table 4-2: Evaluation of Alternative Planning Solutions

Evaluation Criteria	Alternative 1: Do Nothing / Base Case	Alternative 2: Widen Highway 50 and Mayfield Road	Alternative 3: Widen or Extend Other Roads Beyond What Is Indicated In Master Plan Studies	Alternative 4: Active Transportation - Improve pedestrian and bicycle facilities	Alternative 5: Transportation Demand Management (TDM) and Transit
Land Use and Social-Economic	▪ No improvement (proceed with planned improvements).	▪ Improved access for businesses and properties in the area	▪ No improvement, proceed with other planned improvements.	▪ Improved access for employees and properties in the area	▪ No improvement to the immediate area.
					
City Building	▪ No improvement beyond what is approved in Master Plan Studies ▪ No improvement to streetscape	▪ Supports growth in Caledon, Brampton and Vaughan ▪ Follows municipal Official Plans, Secondary Plans and several EA Master Plans ▪ Provides opportunity to improve streetscape	▪ Does not fully support growth in the area ▪ Does not conform with municipal OPs, Secondary Plans and several EA Master Plans ▪ No improvement to streetscape	▪ Partially supports growth in the area ▪ Follows municipal Official Plans, Secondary Plans and several EA Master Plans ▪ No improvement to streetscape	▪ Partially supports growth in the area ▪ Follows municipal Official Plans, Secondary Plans and several EA Master Plans ▪ No improvement to streetscape
					
Transportation	▪ No improvement beyond what is approved in Master Plan Studies ▪ No improvement to streetscape	▪ Alleviates congestion on Highway 50 and Mayfield Road as well as other roads that would otherwise have to take the extra load ▪ Provides a cycling route in the boulevard and improved pedestrian facilities ▪ Protects for transit priority measures	▪ Major widening of parallel roads (e.g., Coleraine Road, Countryside, etc.) and extension of Hwy. 427 are already identified as needing widening in order to satisfy future travel demands in the area along with Mayfield Road and Highway 50 ▪ A new route would inflict serious environmental impact ▪ Does not improve pedestrian and cycling facilities in the corridor	▪ Provides a cycling route in the boulevard ▪ Improves pedestrian facilities ▪ Does not improve road capacity or transit facilities in the study area	▪ Insignificant improvements to traffic operations in the immediate area ▪ Does not improve active transportation facilities in the study area
					
Natural Environment	▪ No change from what currently exists.	▪ Potential impacts to existing vegetation and the West Robinson Creek ▪ Opportunity to improve green-space and for landscaping in boulevards	▪ Potential impacts to existing vegetation and various creeks	▪ Minor impacts to existing vegetation and the West Robinson Creek ▪ Potential for reduction in vehicle emissions	▪ Potential for reduction in vehicle emissions
					
Implementation	▪ No implementation is required.	▪ Coordination with property owners and utility agencies is required	▪ Coordination with property owners and utility agencies is required	▪ Coordination with property owners and utility agencies is required	▪ Policy already being pursued by the Region
					

Evaluation Criteria	Alternative 1: Do Nothing / Base Case	Alternative 2: Widen Highway 50 and Mayfield Road	Alternative 3: Widen or Extend Other Roads Beyond What Is Indicated In Master Plan Studies	Alternative 4: Active Transportation - Improve pedestrian and bicycle facilities	Alternative 5: Transportation Demand Management (TDM) and Transit
Costs	▪ There will be no additional implementation costs for this alternative from what presently planned. 	▪ Major construction costs related to construction of a new road 	▪ Major construction costs related to construction of a new road(s) 	▪ Minor cost 	▪ Increased transit costs 
overall	This option does not address any of the identified problems or opportunities.  Least Preferred	This option addresses key problems and opportunities (e.g. road capacity, and SWM/drainage).  Most Preferred	This option does not address any of the identified problems or opportunities. 	This option addresses key problems and opportunities (e.g. pedestrian and cycling facilities). 	This option addresses a key opportunity (i.e. improved transit reliability). 

Legend:



Least Preferred Most Preferred

SUMMARY: The preferred option is a combination of Alternatives 2, 4 and 5.

4.3 Agency Consultation

The agency consultation during the Problem and Opportunity Statements and Alternative Planning Solutions phases are summarized in this section of the report. Additional public consultation materials are provided in **Appendix C**.

The PIC 1 notice was published in the Brampton Guardian, Caledon Enterprise and Vaughan Citizen in late May and was also mailed out on May 19, 2010 to conservation authorities, Federal and Provincial agencies, First Nations, businesses and utility companies.

4.3.1 Toronto and Region Conservation Authority

The Toronto and Region Conservation Authority (TRCA) could not attend the PIC but requested a copy of the meeting materials. Correspondences with the TRCA are provided in **Appendix B.2**.

4.3.2 School Boards

The Peel District School Board and the Dufferin-Peel Catholic District School Board had no comments during this phase of the study but they requested to be kept informed of the progress. Correspondences with the school boards are provided in **Appendix B.2**.

4.4 Public Consultation

The public consultation process during the Problem and Opportunity Statements and Alternative Planning Solutions phases are summarized in this section of the report. Additional public consultation materials are provided in **Appendix C**.

4.4.1 Public Information Centre 1

The first Public Information Centre (PIC 1) for the Highway 50 and Mayfield Road Environmental Assessment was held on Thursday, June 3, 2010 at the Calderstone Public School (160 Calderstone Road) in Brampton. The purpose of PIC 1 was to provide background information on the study, including the alternative planning solutions being considered. Representatives from Peel Region, City of Brampton and York Region were present at the PIC to answer questions and discuss the next steps in the Study. The format was an informal open house session from 6:30 pm to 8:30 pm, where panels were available for public viewing.

The following representatives from the Region of Peel, City of Brampton, York Region and HDR | iTRANS were in attendance at the PIC.

Region of Peel

- Solmaz Zia, Project Manager
- Imre Tot

	▪ Bob Nieuwenhuysen
HDR | iTRANS	▪ Stephen Keen, Consultant Project Manager ▪ Barry McLaughlin, Consultant Project Coordinator
City of Brampton	▪ Carla Stewart
York Region	▪ Christopher Scott ▪ Edward Chui

The PIC notice was published in the Brampton Guardian, Caledon Enterprise and Vaughan Citizen in late May; it was also mailed out on May 19, 2010 to approximately 124 residents, land owners and business owners in the study area. In addition, conservation authorities, Federal and Provincial agencies, First Nations, businesses and utility companies were also notified by letter and/or email. This resulted in the mailing of 100 notices to agencies. A copy of the notices and the materials presented at the PIC has been provided in **Appendix C**. Approximately 25 members of the public attended the PIC.

4.4.2 Public Comments

Area landowners who attended the meeting enquired about the increased right-of-way requirements and what land would be required. Some landowners who own property on the north side of Mayfield Road wanted the right-of-way to curve south around their properties to potentially reduce the property requirements for the widened right-of-way.

Three comment sheets were received. One comment sheet with comments related to the need to take property on Mayfield Road as well as a request to repave the area due to heavy truck use damaging pavement. One comment sheet with questions about: the inclusion of turning lanes, how many new traffic signals will go up, how much right-of-way is required for the widening, and why the Highway 427 extension is not carried further north. A third comment sheet mentions the need for a centre turn lane to be included in the widening of Highway 50 to facilitate farm equipment to make turns into the lots along the corridor.

Most of the issues raised have been addressed as part of this EA; the other comments, such as the Highway 427 extension are beyond the scope of this study. The project team's responses to the public comments are included in the PIC 1 summary, in **Appendix C.2**. Since there were no outstanding issues to be addressed as part of this EA, it was recommended that the Region proceed with the preferred solution and continue with Phase 3 of the Class EA process.

4.5 Preferred Alternative Planning Solution

The Preferred Alternative Planning Solution is to:

- widen Highway 50 (between Mayfield Road and Castlemore Road) to 6 lanes;
- widen Mayfield Road (between Highway 50 and Coleraine Road) to 4 lanes;

- provide for sidewalks and multi-use trails along the corridors;
- support Travel Demand Management (e.g. carpool options, transit usage); and
- provide for transit priority measures.

5. ALTERNATIVE DESIGN CONCEPTS

The Class Environmental Assessment process also requires the examination of alternative methods of implementing the preferred planning solution by considering alternative design concepts. This section of the report provides a discussion on the development and evaluation of the alternative design concepts.

5.1 Development of Alternative Design Concepts

Highway 50 generally consists of a 5-lane rural cross-section with gravel shoulders and a two-way centre left turning lane. Mayfield Road is a 2-lane rural cross-section with gravel shoulders. Both roads have ditching on either side.

Highway 50 and Mayfield Road are boundary roads between adjoining municipalities. Highway 50 is the boundary between the City of Brampton / Region of Peel and the City of Vaughan / Region of York. Mayfield Road is the boundary between the City of Brampton and Town of Caledon.

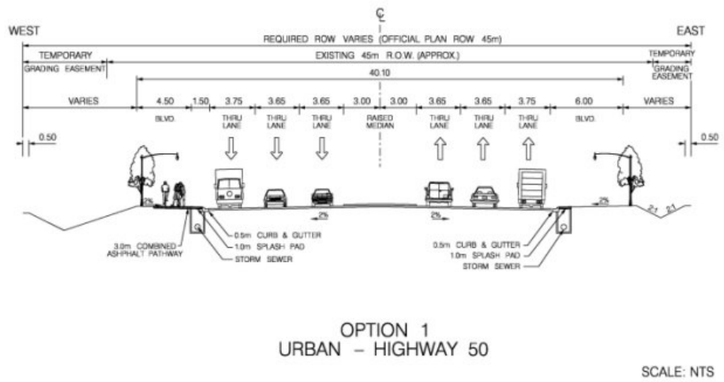
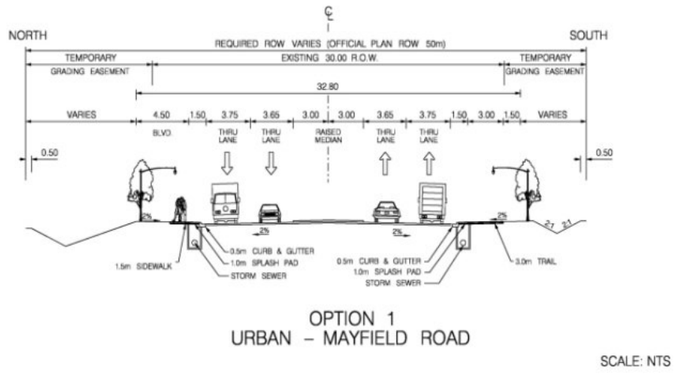
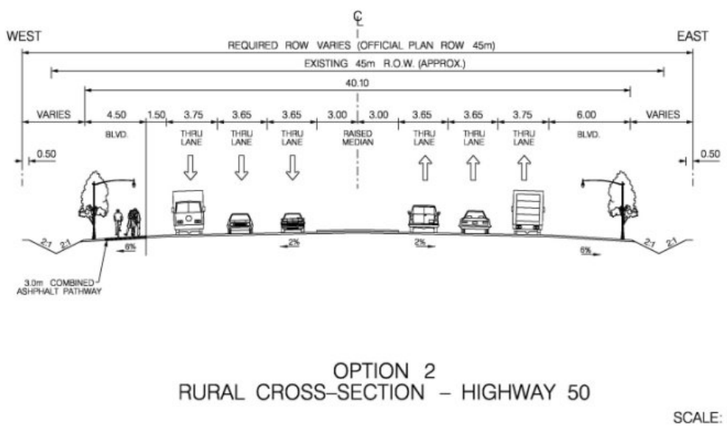
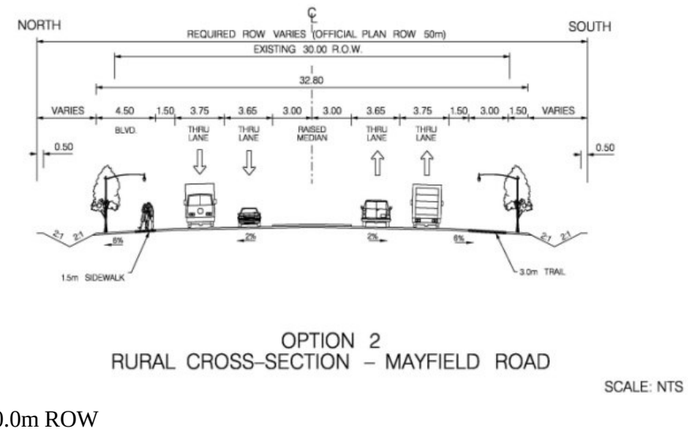
Options that maintained the centreline of the roadway on the municipal boundary were developed, unless a significant impact had to be avoided.

5.1.1 Identification of Alternative Cross-Sections

Two options were considered for the cross-sections of Highway 50 and Mayfield Road:

- Typical Full Urban Cross-Section (curb and gutter); and
- Typical Rural Cross-Section (shoulders and ditches).

Table 5-1: Typical Cross-Sections Alternatives

	HIGHWAY 50	MAYFIELD ROAD
OPTION 1 **FULL URBAN CROSS-SECTION**	 45.0m ROW 3.65m through lanes 3.75m curb lanes 6.0m raised median (centre two-way left turn lane midblock) 3.0m combined asphalt pathway	 50.0m ROW 3.65m through lanes 3.75m curb lanes 6.0m raised median (centre two-way left turn lane midblock) 3.0m combined asphalt pathway
OPTION 2 **RURAL CROSS-SECTION**	 45.0m ROW 3.65m through lanes 3.75m curb lanes 6.0m raised median (centre two-way left turn lane midblock) 6.0m boulevard	 50.0m ROW 3.65m through lanes 3.75m curb lanes 6.0m raised median (centre two-way left turn lane midblock) 6.0m boulevard

5.1.2 Identification of Highway 50 Alternative Alignments

Three options were considered for the widening of Highway 50 to accommodate turning lanes:

1. **Widen about the Centreline –** Widening Highway 50 on both the east and west sides of the existing centreline to accommodate 6 travel lanes (3 per direction).
2. **Widen to the East** – Widening Highway 50 all to the east of the existing centreline to accommodate 6 travel lanes (3 per direction).
3. **Widen to the West –** Widening Highway 50 all to the west of the existing centreline to accommodate 6 travel lanes (3 per direction).

Our preferred approach is to develop the widening about the centreline, unless constraints dictate otherwise. This approach generally:

- minimizes property impacts on both sides of the corridor;
- allows existing alignments to be maintained;
- has less impacts on utilities (i.e. less need for relocations);
- less impacts on individual properties;
- less impacts on existing and future developments;
- tends to cost less than a widening to the east or west; and
- maintains the existing municipal boundary along Highway 50 between Peel Region (City of Brampton) and York Region (City of Vaughan) in its current location.

Along Highway 50, there is a significant constraint at the Shiloh Cemetery (heritage); and as such, a shift to the east was developed and evaluated.

5.1.3 Identification of Mayfield Road Alternative Alignments

Three options were considered for the widening of Mayfield Road to accommodate turning lanes or development of the roundabout:

1. **Widen about the Centreline** – Widening Mayfield Road on both the north and south sides of the existing centreline to accommodate 4 travel lanes (2 per direction).
2. **Widen to the North** – Widening Mayfield Road all to the north of the existing centreline to accommodate 4 travel lanes (2 per direction).
3. **Widen to the South** – Widening Mayfield Road all to the south of the existing centreline to accommodate 4 travel lanes (2 per direction).

Our preferred approach is to develop the widening about the centreline, unless constraints dictate otherwise. This approach generally:

- minimizes property impacts on both sides of the corridor;
- allows existing alignments to be maintained;
- has less impacts on utilities (i.e. less need for entire relocations);
- has less major property impacts (spreads the property impact);
- less impacts on existing and future developments;
- tends to cost less than a widening to the east or west; and

- maintains the road at the existing municipal boundary between the City of Brampton and Town of Caledon.

Along Mayfield Road near Pillsworth Road, property impacts were a concern, and as such, a shift to the south was developed and evaluated. The traffic controls at Pillsworth Road were also assessed and a roundabout was developed and evaluated.

5.2 Evaluation of Alternative Design Concepts

The alternative design concepts were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, environmental impacts, and the list of criteria established for the study.

5.2.1 Alternative Design Concepts Evaluation Criteria

Evaluation of the alternative design concepts involved formulation of evaluation criteria, and a methodology to evaluate these criteria. The evaluation criteria were developed based on transportation impacts, and impacts to the natural, social, economic and cultural environments. The evaluation criteria are listed in **Table 5-2**.

Table 5-2: Alternative Design Concepts Evaluation Criteria

Factor	Criteria
Land Use and Social-Economic	▪ Business Impacts ▪ Noise Impacts ▪ Archaeological/ Cultural Heritage Resources
City Building	▪ Supports OP and Secondary Plan Objectives ▪ Conformity to Transportation Master Plans (Brampton TTMP, York TTMP and Hwy 427 Extension studies) ▪ Streetscaping
Transportation	▪ Corridor Capacity and Level of Service ▪ Traffic Safety within the study area ▪ Accommodation for Pedestrians and Cyclists within the study corridors ▪ Accommodation of Truck Traffic ▪ Accommodation of Transit Service ▪ Accessible Transportation ▪ Transportation Network Considerations
Natural Environment	▪ Erosion and Landforms ▪ Storm Water Management / Drainage ▪ Vegetation and Wildlife ▪ Aquatic Species and Habitat ▪ Air Quality

Factor	Criteria
	▪ Sustainability
Implementation	▪ Construction feasibility ▪ Staging opportunities
Costs	▪ Utility Relocation ▪ Capital Costs ▪ Property Acquisition

5.2.2 Evaluation of Alternative Design Concepts

The alternative design concepts were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, environmental impacts, and the list of criteria provided above. The evaluation was completed with input from the project team, agencies, and the public.

A detailed assessment of the alternative design concepts for the cross-sections was completed based on the criteria and is included in **Table 5-3**.

A detailed assessment of the alternative designs concepts for the Highway 50 corridor was completed based on the criteria and is included in **Table 5-4**.

A detailed assessment of the alternative design concepts was completed for the Mayfield Road corridor based on the criteria and is included in **Table 5-5**.

Table 5-3: Evaluation of Alternative Design Concepts for the Cross-Sections

Legend:

Least Preferred Most Preferred

FACTOR	**Option 1** **FULL URBAN CROSS-SECTION** Involves curb and gutter along both sides of Highway 50 and Mayfield Road	**Option 2** **RURAL CROSS-SECTION** Involves shoulders and ditches along both sides of Highway 50 and Mayfield Road
LAND USE AND SOCIAL-ECONOMIC		
Archaeological Resources Impacts	Minor potential to impact archaeological resources.	Moderate potential to impact archaeological resources.
CITY BUILDING		
Supports OP and Secondary Plan Objectives, Conformity to TMPs, Streetscaping	Supports growth, follows OPs and Secondary Plans, conforms to TMPs and provides opportunity to improve streetscape.	Supports growth, follows OPs and Secondary Plans, conforms to TMPS.
TRANSPORTATION SERVICE		
Traffic Safety within the Study Area	Cyclists and pedestrians separated from traffic by curb.	No physical separation between cyclists, pedestrians and traffic.
Accommodation for Pedestrians and Cyclists within the Study Corridors	Cyclists and pedestrians to be accommodated by a combined pathway in the boulevard on the west side of Highway 50 and south side of Mayfield Road and sidewalk on the north side of Mayfield Road.	Cyclists and pedestrians to be accommodated within the boulevard of Highway 50 and Mayfield Road; separation from traffic is provided by pavement markings.
Transportation Network Considerations	As development progresses, many of the network arterial roads would have an urban cross-section and this would be consistent with that network.	As development progresses, many of the network arterial roads would have an urban cross-section and this would be inconsistent with that network.
NATURAL ENVIRONMENT		
Stormwater/Drainage	Water quality treatment is by oil/grit separators only	Water quality treatment is by roadside ditch. Reduces the rate of stormwater runoff.
Vegetation	Potential impacts to vegetative communities; however these are considered widespread and common in Ontario.	Potential impacts to vegetative communities; however these are considered widespread and common in Ontario. Larger impacts expected than Option 1; however, the impacts would be temporary caused by grading.
COSTS		
Capital Costs	High capital costs for road improvements.	Medium capital costs for road improvements.
Property Acquisition	Minimal property requirement (requires development to proceed first).	Significant property requirements.
		

FACTOR	Option 1 **FULL URBAN CROSS-SECTION** Involves curb and gutter along both sides of Highway 50 and Mayfield Road	Option 2 **RURAL CROSS-SECTION** Involves shoulders and ditches along both sides of Highway 50 and Mayfield Road
RECOMMENDATION	This area is designated to become entirely urbanized in the future and an urban cross-section would be consistent with these plans. Cyclists and pedestrians are accommodated behind the curb and as such, are protected from traffic. Water quality treatment is by oil/grit separators only. This cross-section is preferred. **Recommended**	A rural cross-section is suitable in rural areas. Since this area is planned to become fully developed, a rural cross-section would be inconsistent. Cyclists and pedestrians are not protected from traffic by a physical barrier (pavement markings only). Water treatment is by roadside ditches. **Not Recommended**

Impacts on the following criteria are equal and therefore have been removed from the list.

Land Use and Social-Economic
- Business Impacts
- Noise Impacts

Transportation Service
- Corridor Capacity and Level of Service
- Accommodation of Truck Traffic
- Accommodation of Transit Service

Natural Environment
- Wildlife
- Aquatic Species and Habitat
- Air Quality
- Sustainability

Implementation
- Construction feasibility
- Staging opportunities

Costs
- Utility Relocation

Table 5-4: Evaluation of Alternative Design Concepts for the Highway 50 Corridor

Legend:

Least Preferred Most Preferred

FACTOR	Option 1 **WIDEN EQUALLY ON BOTH SIDES BASED ON CENTRELINE** Involves widening Highway 50 on both the east and west sides of the existing centreline to accommodate 6 travel lanes (3 per direction)		Option 2 **WIDEN EQUALLY ON BOTH SIDES WITH EASTERLY SHIFT IN VICINITY OF CEMETERY** Involves widening Highway 50 on both the east and west sides of the existing centreline to accommodate 6 travel lanes (3 per direction) while providing a slight easterly shift in the vicinity of the Shiloh cemetery.	
LAND USE AND SOCIAL-ECONOMIC				
Archaeological Resources Impacts	Potential to impact archaeological resources, Shiloh heritage cemetery.		Potential to impact archaeological resources; however, avoids impacts to the Shiloh heritage cemetery.	
Cultural Heritage Resources Impacts	No direct impacts to any identified cultural heritage resources are expected.	Indirect impacts through encroachment to the following resources: CHL 2 (11970 Highway 50), CHL 3 (Shiloh Cemetery), BHR 3(11133 Highway 50), BHR 4 (10951 Highway 50), and CHL 5 (10980 Highway 50) including direct impacts to the Shiloh Cemetery.	Direct impacts to BHR 4 (10951 Highway 50) are expected through removal of the house.	Indirect impacts through encroachment to the following resources: CHL 2 (11970 Highway 50), CHL 3 (Shiloh Cemetery), BHR 3 (11133 Highway 50) and CHL 5 (10980 Highway 50). Avoids direct impact on the Shiloh cemetery.
NATURAL ENVIRONMENT				
Vegetation	The Highway 50 corridor is comprised of cultural meadow and cultural plantation vegetation communities that contain a high proportion of non-native, disturbance tolerant plant species. In order to widen Highway 50, portions of these vegetation communities adjacent to the roadway will be displaced. A number of planted trees located along the Highway 50 corridor may also be impacted by the grading area proposed. A number of TRCA species of concern are present within the study area, but are planted within manicured areas. Overall, these impacts can be addressed through appropriate environmental mitigation measures to reduce vegetation removals, protect existing trees and the use of native species to replace removals.		Generally, the impacts will be similar to Option 1. There would be a slightly greater impact to vegetation communities on the east side of Highway 50.	
Aquatic Species and Habitat	Culvert extensions to existing watercourses and indirect fish habitat – no Harmful Alteration Destruction Disruptions (HADDs), but function must be maintained		Culvert extensions same as Option 1, but grading shift to downstream (east) sides may slightly alter more of the watercourses. However increases on east side may be offset by decreases on west side. No HADDs, but function must be maintained.	
COSTS				
Property Acquisition	Requires less property on the east side of Highway 50.		Requires more property on the east side of Highway 50, in the vicinity of the cemetery.	

RECOMMENDATION		
	Meets objectives of the Problem Statement since capacity and operations will be significantly improved over existing conditions; however involves potential grading impacts to the Shiloh Cemetery which would require compliance with the Cemeteries Act. **Not Recommended**	Meets objectives of the Problem Statement since capacity and operations will be significantly improved over existing conditions. This alternative avoids impacts to the Shiloh cemetery; however, results in the removal of the house opposite (BHR 4). **Recommended**

NOTE: Travel Demand Management initiatives (transit, walking, biking) and Operational Improvements (signal timing/phasing, speed) are recommended in conjunction with widening.

Impacts on the following are equal and therefore have been removed from the list.

Land Use and Social-Economic
- Business Impacts
- Noise Impacts

City Building
- Supports OP and Secondary Plan Objectives
- Streetscaping

Transportation Service
- Corridor Capacity and Level of Service
- Traffic Safety within the Study Area
- Accommodation for Pedestrians and Cyclists within the Study Corridors
- Accommodation of Truck Traffic
- Accommodation of Transit Service / Accessible Transportation
- Transportation Network Considerations

Natural Environment
- Stormwater/Drainage
- Wildlife
- Air Quality
- Sustainability

Implementation
- Construction feasibility
- Staging opportunities

Costs
- Utility Relocation
- Capital Costs

Table 5-5: Evaluation of Alternative Design Concepts for the Mayfield Road Corridor

Legend:

Least Preferred Most Preferred

FACTOR	Option 1 **WIDEN EQUALLY ON BOTH SIDES BASED ON CENTRELINE** Involves widening Mayfield Road on both the north and south sides of the existing centreline to accommodate 4 travel lanes (2 per direction)	Option 2 **WIDEN EQUALLY ON BOTH SIDES WITH SOUTHERLY SHIFT IN VICINITY OF PILLSWORTH ROAD & A SIGNALIZED INTERSECTION AT PILLSWORTH** Involves widening Mayfield Road on both the north and south sides of the existing centreline to accommodate 4 travel lanes (2 per direction) while providing a slight southerly shift in the vicinity of Pillsworth Road	Option 3 **WIDEN EQUALLY ON BOTH SIDES WITH SOUTHERLY SHIFT IN VICINITY OF PILLSWORTH ROAD AND ROUNDABOUT AT PILLSWORTH ROAD** Involves widening Mayfield Road on both the north and south sides of the existing centreline to accommodate 4 travel lanes (2 per direction) while providing a roundabout at Pillsworth Road and a slight southerly shift in the vicinity of Pillsworth Road.
TRANSPORTATION SERVICE			
Corridor Capacity and Level of Service	Alleviates congestion on Mayfield Road due to one additional lane per direction as well as on other roads in the area that would otherwise have to take the extra load.	Alleviates congestion on Mayfield Road due to one additional lane per direction as well as on other roads in the area that would otherwise have to take the extra load.	Alleviates congestion on Mayfield Road due to one additional lane per direction as well as on other roads in the area that would otherwise have to take the extra load. A roundabout would reduce the amount of vehicle delay and provides opportunity for making u-turns.
Traffic Safety within the Study Area	Potential improvement in safety performance due to the installation of double westbound left turn lanes at Highway 50, maintenance of two-Way-Left-Turn-Lane in the centre of the street and an increase in the number of traffic lanes. Additional lanes for pedestrians to cross.	Potential improvement in safety performance due to the installation of double westbound left turn lanes at Highway 50, maintenance of two-Way-Left-Turn-Lane in the centre of the street and an increase in the number of traffic lanes. Additional lanes for pedestrians to cross. Improved visibility through the Pillsworth intersection	Potential improvement in safety performance due to the installation of double westbound left turn lanes at Highway 50, maintenance of two-Way-Left-Turn-Lane in the centre of the street and an increase in the number of traffic lanes. Additional lanes for pedestrians to cross. Roundabouts lower operational speeds, provide fewer vehicle-vehicle conflict points, eliminate potential right angle collisions and it is anticipated that fewer fatal collisions will occur based on the anticipated lower approach speeds.
Accommodation for Pedestrians and Cyclists within the Study Corridors	Cyclists and pedestrians to be accommodated by combined pathway in the boulevard on the south side of Mayfield Road and sidewalk on the north side of Mayfield Road.	Cyclists and pedestrians to be accommodated by combined pathway in the boulevard on the south side of Mayfield Road and sidewalk on the north side of Mayfield Road.	Cyclists and pedestrians to be accommodated by combined pathway in the boulevard on the south side of Mayfield Road and sidewalk on the north side of Mayfield Road. Splitter islands are provided in the design to create a midpoint refuge area so that pedestrians and cyclists are only dealing with crossing one direction (2 lanes) of traffic flow at a time with fewer conflict points. Crossing distance is shorter and vehicle speeds are slower. Additional technologies would be required to accommodate for visually impaired persons crossing roundabouts. Specific training and education would be necessary.
NATURAL ENVIRONMENT			
Air Quality	Negligible impact in air quality due to larger volumes of vehicles idling at intersections but improved traffic flow resulting in less delay.	Negligible impact in air quality due to larger volumes of vehicles idling at intersections but improved traffic flow resulting in less delay.	Negligible impact in air quality due to larger volumes of vehicles idling at intersections but improved traffic flow resulting in less delay.; however at the intersection with Pillsworth Road, roundabouts generally have reduced vehicle emissions due to less stopping activity, hence more environmentally friendly.

RECOMMENDATION			
	Meets objectives of the Problem Statement since capacity and operations will be significantly improved over existing conditions. There will be grading and property impacts to 4 residential properties near Pillsworth Road. **Not Recommended**	Meets objectives of the Problem Statement since capacity and operations will be significantly improved over existing conditions. Minimizes impacts to 4 residential properties near Pillsworth Road; however, provides status quo with signalized intersection at Pillsworth Road. **Not Recommended**	Meets objectives of the Problem Statement since capacity and operations will be significantly improved over existing conditions. Minimizes impacts to 4 residential properties near Pillsworth Road. Provides additional safety features through reduced speed and delay to the corridor due to the roundabout at Pillsworth Road. **Recommended**

NOTE: Travel Demand Management initiatives (transit, walking, biking) and Operational Improvements (signal timing/phasing, speed) are recommended in conjunction with widening.

Impacts on the following are equal and therefore have been removed from the list.

Land Use and Social-Economic
- Business Impacts
- Noise Impacts
- Archaeological Resources Impacts
- Cultural Heritage Resources Impacts

City Building
- Supports OP and Secondary Plan Objectives
- Streetscaping

Transportation Service
- Accommodation of Truck Traffic
- Accommodation of Transit Service /Accessible Transportation
- Transportation Network Considerations

Natural Environment
- Stormwater/Drainage
- Vegetation
- Wildlife
- Aquatic Species and Habitat
- Sustainability

Implementation
- Construction feasibility
- Staging opportunities

Costs
- Utility Relocation
- Capital Costs
- Property Acquisition

5.3 Agency Consultation

The agency consultation during the Alternative Design Concepts phase is summarized in this section of the report. Additional public consultation materials are provided in **Appendix C**.

The PIC2 notice was published in the Brampton Guardian, Caledon Enterprise and Vaughan Citizen in late May and was also mailed out on April 18, 2011 to conservation authorities, Federal and Provincial agencies, First Nations, businesses and utility companies.

5.3.1 Toronto and Region Conservation Authority

The Toronto and Region Conservation Authority (TRCA) was consulted throughout the study. Correspondences with the TRCA are provided in **Appendix B.2**.

A meeting was held with the TRCA in November of 2010 to discuss the preliminary stormwater management plan and drainage alternatives. TRCA requested that Oil Grit Separator (OGS) be located at each of the culvert crossings regardless of fish passage and that a treatment train should also be considered to enhance treatment opportunities. The project team reviewed several treatment options and determined that oil grit separators and enhanced grassed swales were considered to be feasible for the Highway 50 widening project until development proceeded.

Several documents were provided to the TRCA for their review and comment throughout the study, including:

- PIC materials;
- Stormwater management reports;
- Natural heritage reports; and
- Draft Environmental Study Report.

The study team has been working closely with the TRCA to respond to their comments and concerns. One example of the team's responsiveness to the TRCA concerns, include the addition of a Bobolink investigation during the EA study (rather than detailed design) due to comments provided by the TRCA on the PIC#2 materials.

5.3.2 Transport Canada

Transport Canada was contacted to determine whether any of the watercourse crossings in the study would be subject to the *Navigable Waters Protection Act*. Transport Canada officials determined that the provisions of the *Navigable Waters Protection Act* do not apply to this project. Correspondences with Transport Canada are provided in **Appendix B.2**.

5.3.3 Ministry of Tourism and Culture

The Ministry of Tourism and Culture responded to the notification of PIC2 with a request for copies of the archaeology assessments and built heritage/cultural heritage landscapes assessments. The draft Stage 1 Archaeological Assessment and Built Heritage Resources and Cultural Heritage Landscapes Assessment were provided to the Ministry of Tourism and Culture. The Stage 3 Archaeological Assessment, Shiloh Cemetery Investigation, has been forwarded to the Ministry of Tourism and Culture. The Stage 2 Archaeological Assessments and the Heritage Impact Assessments will be forwarded to the Ministry of Tourism and Culture once the reports have been finalized, expected completion of these reports is Summer 2012. Correspondences with the Ministry of Tourism and Culture are provided in **Appendix B.2**.

5.3.4 Ministry of Natural Resources

The project team contacted the Ministry of Natural Resources (MNR) to obtain data regarding potential Species at Risk in the study area. The MNR had records of both Bobolink and Butternut in the study area. As such, the project team undertook a detailed bobolink investigation and tree inventory and presented the findings to MNR.

The Ministry of Natural Resources staff reviewed our project information and determined that the activities associated with the project, as currently proposed, will not adversely effect Bobolink provided the following conditions are implemented:

1) All works will be conducted outside of the breeding season for Bobolink
2) All disturbed areas will be restored immediately after construction is complete

If these conditions are implemented, the activity would not be prohibited under Section 9 (species protection) or Section 10 (habitat protection) of the *Endangered Species Act, 2007*. Failure to carry out these projects as described above could result in contravention of the *Endangered Species Act 2007*. Correspondence with MNR is included in **Appendix B.2**.

5.3.5 Ontario Realty Corporation

Ontario Realty Corporation (ORC) contacted the project team after the notice of PIC 2 to be removed from the mailing list since their records indicate that there are no ORC-managed properties within our study area. Correspondence with ORC is included in **Appendix B.2**.

5.3.6 Ministry of Aboriginal Affairs

The Ministry of Aboriginal Affairs (MAA) contacted the project team after the notification of PIC 2. They provided contact names for First Nations who may have existing or asserted rights or claims in the area. The MAA also recommended that several departments of Indian and Northern Affairs Canada be contacted. Correspondence with MAA is included in **Appendix B.2**.

5.3.7 Indian and Northern Affairs Canada

The project team contacted the following departments of Indian and Northern Affairs Canada (INAC) as recommended by the Ministry of Aboriginal Affairs (refer to **Section 5.3.6**):

- Assessment and Historical Research;
- Litigation Management and Resolutions Branch; and
- Specific Claims Branch.

INAC responded to the inquiry by providing detailed information for First Nations who may have treaties, claims, or other interests in our study area. Most of the First Nations outlined in their report had already been notified of the project; however, the following contacts were added to the project circulation list:

- Chippewas of Georgina Island First Nation;
- Chippewas of Mnjikaning (Rama);
- Metis Nation of Ontario Head Office; and
- Metis National Council.

5.4 Public Consultation

The public consultation process during the Alternative Design Concepts phase is summarized in this section of the report. Additional public consultation materials are provided in **Appendix C**.

5.4.1 Public Information Centre #2

The second Public Information Centre (PIC 2) for the Highway 50 and Mayfield Road EA study was held on Wednesday, April 27, 2011 at the St. Patrick's Separate School (11948 The Gore Road) in Brampton. The purpose of PIC 2 was to provide information on the alternative designs being considered, evaluation of the alternative designs and identification of a preliminary recommended alternative design, as well as the potential impacts and mitigation measures of the preliminary recommended alternative design. Representatives from Peel Region and York Region were present at the PIC to answer questions and discuss the next steps in the Study. The format was an informal open house session from 6:00 pm to 8:00 pm, where panels, background reports and plans of the design alternatives were available for public viewing.

The following representatives from the Region of Peel, York Region and HDR | iTRANS were in attendance at the PIC.

Region of Peel

- Richard Sparham, Project Manager
- Hitesh Topiwala
- Imre Tot

	▪ Ryan Gulyas
York Region	▪ Edward Chui
HDR | iTRANS	▪ Stephen Keen, Consultant Project Manager ▪ Nathalie Baudais, Consultant Project Coordinator ▪ Mustafa Ismatyar

The PIC notice was published in the *Brampton Guardian*, *Caledon Enterprise* and *Vaughan Citizen* in early April; it was also mailed out on April 18, 2011 to approximately 135 residents, land owners and business owners in the study area. In addition, conservation authorities, Federal and Provincial agencies, First Nations, businesses and utility companies were notified by letter and/or email. This resulted in the mailing of over 100 notices to agencies. A copy of the notices and the materials presented at the PIC has been provided in **Appendix C**. Approximately 35 members of the public attended the PIC.

5.4.2 Public Comments

The consultant team compiled comments and questions received from the public either at PIC 2 or via returned comments sheets and emails. Four comment sheets, two emails and one phone call were received. Key public comments included the following:

Access to the Mayfield Road / Highway 50 carpool lot must accommodate a GO Bus.
Designs at Highway 50 / Mayfield Road should allow for a bus only entrance loop / exit to the carpool lot.
Concerns regarding the development along Highway 50 and Mayfield Road, particularly just south of the GO parking lot.
There are too many traffic lights on Highway 50 to qualify it as a “highway”. As it is, there are plans to have other roads intersecting with Highway 50 in the study area. This would make merges very difficult when crossing six lanes.
The proposed intersection of the Highway 427 and Highway 50 is restricted in options due to the existing CP Rail yard and the opposing gas station.
The mapping of watersheds does not relate to the surrounding lands because areas shown as habitat or watersheds are currently worked or farmed areas.
Concerns regarding heavy truck traffic using Albion-Vaughan Road to get to Highway 50. The road is a bypass at the moment for cars. Where are all those trucks coming from?
Concerns regarding speeds. 80 km/h is too fast and the road is not built for that kind of speed.
Concerns over the amount of property required for the Mayfield Road widening.

5.5 Preferred Design Concept

Based on the evaluation of alternative design concepts for the typical cross-sections, the Preferred Alternative Cross-Section is to provide a full urban cross-section, including curb and gutter, along both the Highway 50 and Mayfield Road corridors. Since this area is designated to become entirely urbanized in the future, an urban cross-section would be

consistent with these plans. Cyclists and pedestrians will be accommodated behind the curb and as such, are protected from traffic.

Based on the evaluation of alternative design concepts for the Highway 50 corridor, the Preferred Design Concept is to widen Highway 50 from 4 to 6 lanes to the east and west sides while providing a slight easterly shift of alignment in the vicinity of Shiloh Cemetery.

Based on the evaluation of alternative design concepts for the Mayfield Road corridor, the Preferred Design Concept is to widen Mayfield Road from 2 to 4 lanes to the north and south sides minimizing impacts to properties with a southerly shift of alignment in the vicinity of Pillsworth Road. The Preferred Design Concept for Mayfield Road provides a roundabout at Pillsworth Road.

6. PROJECT DESCRIPTION (PREFERRED DESIGN)

This section of the report describes the engineering features of the preferred design for Highway 50 and Mayfield Road.

6.1 Recommended Design Concept

The Highway 50 recommended design proposes:
1. Widening about the centre-line between Mayfield Road and Castlemore Road to a 6 lane configuration.
2. A full urban cross-section to be implemented as development proceeds.
3. An easterly shift to avoid impacts to Shiloh Cemetery.
4. A 3.0m multi-use trail along the west side.
5. A 1.5m sidewalk along the east side (for future consideration).
6. External roadside ditches along the corridor to intercept existing drainage from farm fields.

The Mayfield Road recommended design proposes:
1. Widening about the centre-line between Highway 50 and Coleraine Road to a 4 lane configuration.
2. A roundabout at the Mayfield Road and Pillsworth Road intersection.
3. A full urban cross-section to be implemented as development proceeds.
4. A southerly shift to reduce impacts on four existing residential properties.
5. A 3.0m multi-use trail along the south side.
6. A 1.5m sidewalk along the north side.
7. External roadside ditches along the corridor to intercept existing drainage from farm fields.

6.2 Implementation

Reconstruction and widening of Mayfield Road to 4 lanes is currently scheduled for construction in 2017. Reconstruction and widening of Highway 50 to 6 lanes is currently scheduled for construction in 2017.

6.3 Design Criteria

The design of Highway 50 and Mayfield Road should reflect accepted engineering practice as identified in the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC) and Peel Region design standards and practices. The following principals are derived from these references:

- Design speed that reflects the role and function of the roadway (TAC 1.3.4.3)

- Consistency of design and design speed (TAC 1.2.3.7)
- A design speed that accommodates most drivers (TAC 1.2.3.3)
- Consistency with Region transit, pedestrian and cycling plans

Highway 50 and Mayfield Road are defined as arterial roads. As arterial roads, design speeds are typically between 60 and 100 kph with posted speeds of 50 to 90 kph (TAC). Posted speeds are typically 10 to 20 kph below the design speed. Higher posted speeds are commonly consistent with higher volumes. The design criteria for Highway 50 are listed in **Table 6-1** and the design criteria for Mayfield Road are listed in **Table 6-2**.

Table 6-1: Highway 50 Design Criteria

Classification – Urban Arterial Undivided	
Minimum Right of Way	Additional widening for intersection and grade
Posted Speed	80 km/h
Design Speed	90 km/h
Maximum Grade Minimum Grade Vertical Curves	6% 0.5% desirable (0.3 if 0.5 not feasible) k = 50 crest, 40 sag (headlight control) Length of vertical curve in m, not to be less than the design speed in km/h
Minimum Lane Widths Through Lane Curb Lane Left Turn Lane Right Turn Lane Median	 3.65m 3.75m 3.5 m min. (adjacent to median) 3.5m 6.0 m (centre turn lane)
Minimum Shoulder Width	3.0 m (1.2m paved, 1.3m gravel, and 0.5m rounding)
Intersection Angle	90 +/- 7 degrees
Minimum Median at Intersections	2.0m (curb to curb)
Minimum Stopping Sight Distance	160m
Sidewalk	1.5m (east side) Trail 3m (west side)
Minimum Intersection Radius	15m
Minimum Sight Triangles arterial to collector arterial to arterial gateway option	 15m x 15m 15m x 15m 30m x 30m

Table 6-2: Mayfield Road Design Criteria

	EXISTING CONDITIONS	**URBAN ARTERIAL UNDIVIDED Controlled Access**
Design Classification:	**Built up areas:** Posted Speed 60 km/hr **Rural areas:** Posted Speed 80 km/hr	**Built up areas:** UAU 80, Design Speed 70 km/hr, Posted Speed 60 km/hr
Cross Section:	**Road Platform:** 2 paved lanes with gravel shoulders and turn lanes at intersections. Drainage by means of ditches with some minor storm sewers in built up areas.	
Maximum Gradient:		6.0%
Minimum Gradient:	----------	0.5% desirable (0.3 if 0.5 not possible)
Minimum Stopping Sight Distance:	----------	UAU80: 113m UAU90: 131m
Equivalent Minimum "K" Factor:	----------	UAU80: 24 UAU90: 32 Length of vertical curve in m, not to be less than the design speed in km/h
Minimum Radius of Horizontal Curvature:	320m @ 60kmh posted (i.e. east of Airport Road)	UAU80: 280m UAU90: 375m
Super elevation:	----------	Maximum (e max) = 4%
Lane Widths	Generally 3.75m through lanes	Curb lane: 3.75m Through lanes: 3.65m Turn Lanes: 3.5m Median: 6m
Sidewalk Width	N/A	1.5 metres
Bike Trail Width	N/A	3.0 metres

6.4 Roadway Design Elements

6.4.1 Horizontal Alignment

The horizontal alignment of Highway 50 and Mayfield Road will generally be consistent with the existing horizontal alignments.

However, to minimize impacts to Shiloh Cemetery along the Highway 50 corridor an easterly shift to the centerline was recommended. To minimize the number of properties impacted along the Mayfield Road corridor a southerly shift in the centerline was recommended in the vicinity of Pillsworth Road.

The proposed horizontal alignments are shown on the design plates provided in **Appendix A**.

6.4.2 Vertical Alignment

The vertical alignment of Highway 50 requires significant changes to accommodate the drainage requirements along the corridor. The vertical profile included in the preliminary design resulted in large amounts of cut and fill and therefore is considered the worst case scenario for property impacts. The vertical profile of Highway 50 will need to be rationalized prior to or during detailed design, particularly in light of the potential phasing of the project. Phasing should also consider appropriate break points where the profile is unchanged.

The vertical alignment of Mayfield Road will generally be consistent with its existing vertical alignment. However, to accommodate the roundabout at Pillsworth Road a shift in the vertical alignment was required.

Preliminary proposed vertical alignments are shown on the design plates provided in **Appendix A**. Rationalization during detailed design will be required to consider:

- clearance for culverts (existing and reconstructed/extended);
- culvert protection to reduce clearance;
- phasing of the project;
- reconstruction of the pavement versus an overlay; and
- maintenance of a 0.5% minimum vertical grade.

In the preliminary profile, some sections were unable to achieve the minimum 0.5% grade – the lowest being around 0.3%. A trade-off between road reconstruction (additional cost), culvert clearance and minimum grade will have to be examined.

6.4.3 Typical Cross-Section

Typical cross-sections were developed for the Highway 50 corridor and include the following:

- Three general purpose through lanes northbound and southbound; the inner lanes at 3.65m, and curb lanes at 3.75m.
- A 6.0m raised centre median (centre two-way left turn lane midblock).
- A 1.5m sidewalk on the east side (for future consideration).
- A 3.0m combined asphalt pathway on the west side.
- A right-of-way width of 45m.

Typical cross-sections were developed for the Mayfield Road corridor and include the following:

- Two general purpose through lanes eastbound and westbound; the inner lanes at 3.65m, and curb lanes at 3.75m.
- A 6.0m raised centre median (centre two-way left turn lane midblock).
- A 1.5m sidewalk on the north side.
- A 3.0m combined asphalt pathway on the south side.
- A right-of-way width of 50m.

Typical cross-sections are included in **Appendix A.2**.

6.4.4 Existing Intersections

6.4.4.1 Coleraine Drive and Mayfield Road

This intersection is shown to work reasonably well in 2031 with 4 through lanes on Mayfield Road. This intersection is being reviewed under a separate EA. Although no further refinements were made as part of this EA, that study proposes a right turn lane for in the west-northbound direction.

6.4.4.2 Pillsworth Road and Mayfield Road

This intersection is proposed to have a south leg added to provide access to the carpool lot. A roundabout is proposed for this intersection. The south leg would be partially constructed and closed off with a jersey barrier prior to expansion of the car pool lot in that area. The preliminary design for the roundabout assumes a 50 m inscribed circle diameter, with a truck apron sufficient to accommodate a WB20 truck turning template, the basic circulating width has been designed to accommodate a bus. Because of an excepted imbalance of traffic volumes, there are 2 lanes on the roundabout in the east west direction and only 1 lane in the north-south direction.

Speed reduction was not considered to be a significant factor in the initial design of this roundabout as Mayfield Road is posted at 60km/h and there are frequent intersections along this section of roadway (a Simpson Road connection to be added soon). Deflection angles are within the recommended range according to FHWA/UK design guidelines.

6.4.4.3 Mayfield Road / Albion-Vaughan Road and Highway 50

This intersection has a provision for westbound dual left turns on Albion-Vaughan Road. Exclusive left turn lanes are provided for the eastbound, southbound and northbound left turns. Exclusive channelized right turn lanes are provided at this intersection in each direction. In order to negate potential stream impacts on the east side, the third northbound lane becomes the exclusive northbound right turn lane.

6.4.4.4 Countryside Drive / Nashville Road and Highway 50

This intersection is shown to work well in 2031 with 6 through lanes on Highway 50. Exclusive left turn lanes and exclusive channelized right turn lanes are provided at this intersection in each direction.

Due to the proximity of the Cold Creek Road / Nashville Road intersection to the intersection of Nashville Road and Highway 50, the City of Vaughan will reevaluate the alignment of Cold Creek Road or will remove access to Nashville Road from Cold Creek Road prior to the construction of the Highway 50 road widening.

6.4.4.5 Coleraine Drive / Major MacKenzie Drive and Highway 50

There is provision for northbound and southbound double left turns and six through lanes on Highway 50 at this intersection. Exclusive eastbound and westbound left turn lanes are provided. Exclusive channelized right turn lanes are provided at this intersection in each direction.

For the purposes of this study, the design of this intersection accommodates the existing cross-section of Major MacKenzie Drive. However, the widening of Major MacKenzie Drive to six lanes is planned in the future but not currently programmed. The preliminary design for the ultimate configuration of this intersection is shown in **Exhibit 6-1**.

The ultimate configuration of this intersection will be confirmed during the future environmental assessments for the Major MacKenzie Drive widening and/or the new arterial road link between Mayfield Road and Major MacKenzie Drive.

6.4.4.6 Cadetta Road and Highway 50

Provision for a northbound left turn lane has been provided for this intersection. This intersection will remain as a full access stop controlled T-intersection.

The southwest corner of this intersection will accommodate a new three-leg entrance into a new Satellite Works and Transportation yard for the City of Brampton.

6.4.4.7 Old Castlemore Road and Highway 50

Provision for a northbound left turn lane has been provided for this intersection. This intersection will remain as a full access stop controlled T-intersection.

6.4.4.8 Castlemore Road / Rutherford Road and Highway 50

Exclusive left turn lanes and exclusive channelized right turn lanes are provided at this intersection in each direction. The preliminary design of this intersection was completed under a separate EA which has already been completed.

10410

APPROXIMATE LOCATION OF FUTURE MAJOR MACKENZIE DRIVE R.O.W.

EXISTING DRIVEWAY TO BE RELOCATED

R=130m

R=35m

40X30

BC

COLERAINE DRIVE

6.00

3.75 3.65 3.65 3.50 3.65 3.65 3.75

10461

10462

ACCESS RESTRICT
RIGHT IN RIGHT OUT

80m TAPER

R=15m

COMBINED PATHWAY

3.50 60m PARALLEL LANE

3.75
3.65
3.65
3.50
3.50

45.0 R.O.W.

54.0 PROPOSED ROW

8+400

8+500

220m PARALLEL (60m STORAGE + 160m DECELERATION)

HWY 50

R=3500m

8+200

8+300

226m PARALLEL (66m STORAGE + 160m DECELERATION)

3.50
3.50
3.65
3.65
3.75

3.50 60m PARALLEL

POTENTIAL 1.5m SIDEWALK LOCATION

3.50 50m BUS BAY

POTENTIAL 1.5m

80m TAPER

R=35m

35X35

R=130m

MAJOR MACKENZIE DRIVE

APPROXIMATE LOCATION OF FUTURE MAJOR MACKENZIE DRIVE R.O.W.

MAJOR ALLOWANCE

R=130m

R=35m

35X35

60m TAPER

EXISTING DRIVEWAY TO BE RELOCATED

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

KEY PLAN (N.T.S.)

10m 0 10 20 30m
HORIZONTAL SCALE

Region of Peel
Working for you

HWY 50

(FROM MAYFIELD ROAD TO RUTHERFORD ROAD)

Ultimate Configuration for the Highway 50 / Coleraine Drive / Major MacKenzie Drive Intersection

CAD Area	Area Z-8	Project No.	09-4390
Checked by	Drawn by	Plan No.	Exhibit 6-1
Date MARCH 2011	Sheet 1 of 1		

6.4.5 Future Intersections

Approval of proposed accesses/ intersections along Highway 50 and Mayfield Road will be evaluated using the Region of Peel current Controlled Access By-Law 59-77, as amended with a minimum spacing of 450 meters apart and sound engineering judgment.

The number of possible new collector roads proposed as part of the developments on both sides of Highway 50 should be discussed between Peel and York Regions, City of Brampton and City of Vaughan. Transit facilities need to be accommodated at the new intersections which could result in additional ROW.

6.4.5.1 Simpson Road and Mayfield Road

A new intersection with the extension of Simpson Road is proposed along Mayfield Road. The accommodation of this intersection will be addressed in the Simpson Road Completion Environmental Assessment being undertaken by the Town of Caledon.

6.4.6 Bus Bays

As part of the transit priority measures for the project, bus bays and queue jump lanes have been provided throughout the Highway 50 corridor where feasible. The design of the queue jump lanes is coordinated with the provision of the exclusive channelized right turn lanes. The bus bay design accommodates a length of 50m and a width of 3.5m.

Farside bus bays have been provided in the northbound and southbound directions at:

- Countryside Drive/Nashville Road and Highway 50
- Coleraine Drive/ Major MacKenzie Drive and Highway 50
- Castlemore Road/Rutherford Road and Highway 50

The design accommodates the Bus Bay Dimensions for a standard 12.2m (40') bus and the preliminary design used the City of Brampton standard bus bay drawing No. 261.

6.4.7 Traffic Control Signals

Highway 50 is a major corridor carrying large volumes of through traffic and is not meant for direct access.

The following intersections are signalized in the study corridors:

- Coleraine Drive and Mayfield Road
- Mayfield Road/Albion-Vaughan Road and Highway 50
- Countryside Drive/Nashville Road and Highway 50
- Coleraine Drive/Major Mackenzie Drive and Highway 50
- Castlemore Road/Rutherford Road & Highway 50

No additional traffic signals are proposed in the Highway 50 or Mayfield Road corridors.

Although traffic control signals are not proposed at any new locations in the study corridors, it would appear that two additional signalized intersections could be accommodated along this stretch of Highway 50, as discussed in the ***Hwy 50 Mayfield Road Widening Justification*** in **Appendix E.1**. Unsignalized driveways would not be advisable in such a major arterial; rather access would be achieved from collector roads connecting into Highway 50.

6.4.8 Street Lighting

Street lighting will utilize standard street light design, as per the Peel Region, City of Brampton and York Region, City of Vaughan standards throughout the corridor. The need for and type of illumination within the sections of the study corridor is to be confirmed during detailed design. The relocation of existing illumination is required and needs to be addressed during detailed design. The lighting will consider a human-scaled lighting element to enhance the pedestrian realm.

6.4.9 Gateway Features

Allowances for two gateway features are included at the intersection of Mayfield Road / Albion-Vaughan Road and Highway 50 (northeast and southeast quadrants). The gateway features would incorporate signage and landscape elements.

Property will be required from the adjacent landowners to accommodate the gateway features. The Town of Caledon may make alternate arrangements with the Coffey Car Dealership to establish the gateway feature on Dealership lands while still retaining access to maintain the gateway feature.

Since the proposed gateway into Caledon/Bolton is also adjacent to the City of Vaughan, the City of Vaughan and York Region should also be included in the design phases of the proposed Gateway.

Landscape plans are to be provided by a qualified OALA Landscape Architect during detailed design and will be designed in accordance with the most current approved Region of Peel's *Streetscape Tool Box*.

6.4.10 Streetscaping

Landscape plans are to be provided by a qualified OALA Landscape Architect during detailed design and will be designed in accordance with the most current approved Region of Peel's *Streetscape Tool Box*.

6.4.11 Pavement Structure Design

Although there are some variations for different segments of Highway 50, the pavement design will be based on 48.9 million ESAL. The pavement for Mayfield Road will be designed for traffic of 15.7 million ESAL.

Using the AASHTO pavement design method with an estimated subgrade resilient modulus of 35 MPa for the existing subgrade, pavement structures with structural numbers of 164 and 142 mm are recommended for Highway 50 and Mayfield Road, respectively. Since the average structural numbers of the existing pavement structures in Highway 50 and Mayfield Road are approximately 103 and 77 mm respectively, upgrading or reconstruction of the existing pavements will be required.

Overlaying
The existing pavements could be strengthened by providing an overlay as shown in **Table 6-3**. Before overlaying, the top 50 mm of the existing asphaltic concrete should be shaved to remove the majority of the pavement cracks. Any major cracks remaining in the asphaltic concrete should be grouted and sealed and a tack coat applied before overlaying.

Table 6-3: Overlaying

Location	Shaving	Hot Mix Overlay (After Shaving)		Grade Raise
		HL-3	HL-8	
Mayfield Road	50 mm	50 mm	50+55+55 mm	155 mm
Highway 50	50 mm	50 mm	50+55+55 mm	155 mm

The asphalt grade should be PG 64-28.

Reconstruction
It should be noted that the pavement structures in **Table 6-4** are the minimum required for the anticipated traffic and is suitable for dry inorganic clayey subgrades. Any organic fills must be sub-excavated to 1.2 m below the finished pavement grades. The heaviest loading on the subgrades may be during construction. If construction is carried out when the subgrades are in a wet condition, as in late Fall or early Spring, it may be necessary to increase the thickness of the subbase materials to avoid overstressing of the subgrade soils. Alternatively, it may be necessary to reduce the weight of the trucks by using half loads.

Table 6-4: New Pavement Structures

Pavement Components	Mayfield Road	Highway 50	Degree of Compaction
HDBC	40 mm	50 mm	92-97.5 % MRD*
HDBC	50+55 mm	70+75 mm	91-97.5 % MRD
Granular ‘A’ base	150 mm	150 mm	100 % SPMDD*
Granular ‘B’ Type 2	500 mm	600 mm	100 % SPMDD
Total Thickness	795 mm	945 mm	

* denotes Maximum Relative Density; ** denotes Standard Proctor Maximum Dry Density

Overlay versus reconstruction for the corridors will be established during detailed design during the rationalization of the vertical profile. As there is a need to raise the pavement to provide positive drainage, some areas will require complete reconstruction while others will suit an overlay.

The complete ***Geotechnical Report*** can be found in **Appendix E.6**.

6.4.12 Culverts and Structures

Under the future condition scenario, to accommodate the road widening along Highway 50 and Mayfield Road, culvert extensions were required at each culvert crossing location. The existing and proposed culvert sizing are included in **Table 6-5**.

For the design storm event (50 year), the future culvert freeboard from edge of pavement elevations are less than 1.0 m for Culverts 3, 8, 10 and 11 on Highway 50, and Culverts 15, 16 and 17 on Mayfield Road. The freeboard from edge of pavement elevations is more than 1.0m for all remaining culverts.

Although not all culverts satisfy the 1.0m freeboard criteria, it is not considered necessary to replace these culverts, as most culverts provide more than 0.5 m freeboard. The exceptions include Culverts 10 and 11 which require replacement due to structural deficiencies and Culvert 16 which has a freeboard of only 0.2 m. Culverts 1 and 2 will be abandoned or removed since drainage to these culverts will now be collected by new storm sewers.

Through discussions held with Toronto Region Conservation Authority, it was agreed that roadway widening at the Highway 50 and Mayfield Road intersection should be concentrated on the west side of the right-of-way, to avoid potential disruption of aquatic habitat along the Robinson Creek tributary which parallels Highway 50 on the east side of the roadway. At Albion-Vaughan Road, the existing 4.5m x 1.5m box culvert needs to be extended to accommodate the intersection improvements.

Consequently, the tributary on the west side of Highway 50 requires the enclosure of the watercourse within the reach between Highway 50 and Mayfield Road. This can be achieved by linking the existing box culverts at Highway 50 and Mayfield Road with a similar size box culvert section.

On the “west” tributary, the enclosure of a part of the watercourse results in a single, 149 metre long culvert from the east side of Highway 50 to upstream of Mayfield Road.

Table 6-5: Existing and Proposed Culvert Sizing

Highway 50											
				Existing Conditions				Future Conditions			
Culvert ID	TRCA ID	Station	Stream	Type	Diameter (m)	Dimensions (m)	Length (m)	Type	Diameter (m)	Dimensions (m)	Length (m)
1	1	7+104	West Rainbow	CSP	0.75	-	31.93	Culvert 1 to be removed and replaced with storm sewer.			
2	-	7+810	East Rainbow	CSP	0.80	-	31.96	Culvert 2 to be removed and replaced with storm sewer.			
3	2	7+980	East Rainbow	CSP	0.80	-	40.69	CSP	0.80	n/a	48.19
4	-	8+333	East Rainbow	Conc. Box	n/a	1.3 x 1.85	39.23	Conc. Box	n/a	1.3 x 1.85	46.73
5	-	8+632	East Rainbow	CSP	0.80	-	33.81	CSP	0.80	n/a	41.31
6	3	8+895	East Rainbow	CSP	1.00	-	34.02	CSP	1.00	n/a	41.52
7	4	9+249	East Rainbow	Conc. Box	n/a	0.8 x 1.85	37.91	Conc. Box	n/a	0.8 x 1.85	45.41
8	5	9+562	East Rainbow	Conc. Box	n/a	0.8 x 1.85	35.90	Conc. Box	n/a	0.8 x 1.85	43.40
9	6	10+197	West Robinson	twin CSP	1.35	-	42.54	twin CSP	1.35	n/a	50.04
10	7	10+798	West Robinson	twin CSP	0.70	-	32.35	Twin Alum.	0.75	n/a	39.85
11	8	10+905	West Robinson	twin CSP	0.60	-	30.71	Twin Alum.	0.68	n/a	38.21
12	9	11+012	West Robinson	twin CSP	0.70	-	33.97	twin CSP	0.70	n/a	41.47
13	10	11+132	West Robinson	twin CSP oval	n/a	0.9 x 1.4	62.15	twin CSP oval	n/a	0.9 x 1.4	69.65
14	11	11+832	West Robinson	Conc. Box	n/a	1.5 x 3.5	56.86	Conc. Box	n/a	1.5 x 3.5	149.00
Mayfield Road											
				Existing Conditions				Future Conditions			
15	17	20+218	West Robinson	CSP	0.90	-	24.81	CSP	0.90	n/a	32.31
16	16	20+367	West Robinson	CSP	1.20	-	18.44	Twin Alum.	1.00	n/a	25.94
17	15	20+984	West Robinson	CSP	1.20	-	27.17	CSP	1.20	n/a	34.67
18	11	21+340	West Rainbow	Conc. Box	n/a	1.25 x 2.5	41.87	Conc. Box	n/a	1.25 x 2.5	Culvert 18 is combined with Culvert 14 as one single length culvert (refer to Culvert 14 above)
19	12	21+387	West Rainbow	Conc. Box	n/a	1.5 x 4.5	38.87	Conc. Box	n/a	1.5 x 4.5	72.00

6.5 Drainage and Stormwater Management

The complete ***Drainage and Stormwater Management Report*** is included in **Appendix E.7**.

A summary of the study recommendations is provided below:

1. The preliminary stormwater management plan addresses the potential impacts that widening Regional Road 50 and Mayfield Road may have on the receiving surface water features. The proposed stormwater management plan is designed to prevent impacts from the future six lane roadway configuration. The plan maximizes the use of available technologies and opportunities taking into consideration the site constraints, thus to achieving the highest degree of control possible.
2. Some sections of Highway 50 contain very mild longitudinal gradients. In addition, several existing culvert crossings that convey external drainage across Highway 50 and Mayfield Road are very shallow (i.e. close to the existing surface grade). The combination of these two factors will require mild storm sewer gradients which may affect the size of the storm sewer pipes. To minimize the storm sewer sizes, a dual-line storm sewer collection is proposed throughout the project limits. The proposed sewer configuration will also minimize traffic staging and detouring requirements during the sewer construction phase.
3. Storm sewers will be provided for conveyance of all pavement areas. Storm sewers shall be sized to convey the 10 year design storm as per Region of Peel requirements. Major system (overland) flows will be conveyed along the road surface within the roadway right-of-way in a safe manner.
4. A total of three (3) transverse culverts will need to be replaced either due to physical deterioration or lack of hydraulic capacity. These include the following:
    - Culvert crossing 10 (Station 10+798) New twin 750 mm diameter culverts
    - Culvert Crossing 11 (Station 10+905) New twin 675 mm diameter culverts
    - Culvert Crossing 16 (Station 20+367) New twin 1000 mm diameter culverts

    The TRCA *Watercourse Crossing Design and Submission Requirements* (September 2007) will need to be followed for culvert replacements.

    Existing transverse culvert crossings need to be extended to accommodate the roadway widening. The TRCA *Watercourse Crossing Design and Submission Requirements* (September 2007) will need to be followed for culvert extensions.
5. Flooding conditions at the Highway 50 and Mayfield Road intersection will be improved as a result of the vertical profile adjustment on Mayfield Road.
6. Ditches will be provided on the west side of the Highway 50 right-of-way to collect external drainage from adjacent lands and convey the flow to the respective transverse culvert crossings.

7. Wherever feasible, stormwater treatment will be provided at storm sewer outlets. Storm water quality treatment is to be provided by oil-grit separators. A total of 24 OGS units are proposed throughout the study corridor.

   Where possible and depending on the timing of development of lands west of Highway 50 and south of Mayfield Road, opportunities to integrate Highway 50 and Mayfield Road drainage with storm drainage systems from adjacent developments should be pursued. Provisions for future storm connections from Highway 50 and Mayfield Road to future storm systems within the future development lands should also be considered during detailed design.

8. Erosion and sediment control measures should be implemented and monitored through the construction period in accordance with the TRCA *Erosion and Sediment Control Guideline for Urban Construction* (2006). Construction activity should be conducted during periods that are least likely to result in in-stream impacts to fish habitat.

Based on discussions with the TRCA, some items will need to be finalized during detailed design, including:

- Drainage catchments to be verified/adjusted based on more detailed topographic information and/or mapping.
- Hydrologic analysis to be updated/revised for culverts 15 to 17 and the remainder of the culverts at Highway 50 during detailed design if changes in land use have occurred.
- Further assessment of crossing 16 should be undertaken, including morphology, to determine the type/size of crossing required at this location.
- Calculations for the sizing of the OGS units should be completed.

6.6 Utilities

As noted in the existing conditions, several utilities are located within the study area. These include Hydro One Brampton, Hydro One Telecom, York Region Water / Wastewater Services, Enbridge and Bell.

Utility relocation will be a critical component to the detailed design and construction of the roadway improvements. This section only provides a summary of areas of potential conflict on each utility. The existing plans received from the utility agencies are included in **Appendix F**. Formal definition of impacts on utilities will be determined during detailed design.

Hydro One Telecom has underground fiber optic cable between Rutherford Road and Old Castlemore Road on the East side of Highway 50, then crossing to Old Castlemore Road on the south side of the road.

Bell has buried services running along the north side of Mayfield Road and along the east side of Highway 50.

Enbridge has buried plant in numerous locations throughout the study area, including:
- Servicing in the vicinity of the Highway 50 / Major MacKenzie Drive intersection;
- Gas line running along the east side of Highway 50, south of Major MacKenzie Drive;
- Gas line running along the south side of Mayfield Road / Albion-Vaughan Road throughout the study area; and
- Gas line running along the north side of Mayfield Road between Pillsworth Road and Highway 50.

The proposed York Region Water / Wastewater Services 1.8m CPP feeder which crosses Highway 50 at the intersection of Castlemore Road / Rutherford Road and Highway 50 and the proposed Enbridge gas main on the east side of Highway 50, north of the intersection with Major MacKenzie /Coleraine Drive will also need to be considered during detailed design.

A meeting was held with Hydro One Brampton on December 8, 2010 to determine their requirements for relocation. Minutes of the meeting are included in **Appendix B**. Hydro One Brampton requirements include:
- A 5 m clear zone behind the poles.
- Cross-section shows 2.25 m of ROW available resulting in a potential 2.75 aerial easement. This easement is usually obtained in the City's requirement for a 4.5 m buffer strip in front of any future development.
- Illumination brackets need to be 0.15 m below the neutral line i.e. no more than 7.45 m above ground.
- May require a permanent easement for cable supports for the poles.
- For the tight cross-section adjacent to the watercourse at Mayfield Road, the pole could be placed behind the proposed barrier which would then need a 4m space behind the barrier to accommodate both the sidewalk and pole.

Utility relocations will have to be coordinated with streetscape elements (planters, furniture, lighting) to ensure that the implementation of those important elements is not impeded. Above ground utility installations such as control boxes, and hydro vaults should be located off of corners and in less conspicuous locations to reduce their visual impacts.

All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary.

6.7 Property Requirements

The preliminary design was prepared with the goal of minimizing property impacts. Alignment shifts were made to minimize the number of properties impacted throughout the corridor.

6.7.1 Property Requirements

Property requirements, grading easements and drainage easements have been identified for this project at the following locations:

No.	Street Address	Pin Number	Parcel Number	Property Acquisition	Grading Easement	Drainage Easement
1		142120064		231.7		1317.9
2		142120040		117.5		1712.4
3		142130053				706.6
4		142120054				502.6
5		142130056		124.4		2475.9
6	2 Cadetta Road	142130073				276.8
7		142130072				734.8
8		142130071				84.0
9		142130071	43R-8696			510.4
10	10410 Regional Road 50	142130074		127.5		761.6
11		142130059	43R-23443	120.2		745.8
13	10461 Regional Road 50	142130129	43R-3951	207.4		457.2
14	10462 Regional Road 50	142130267	43R-27520	154.7		1305.3
15	10562 Regional Road 50	142130127		23.5		1735.9
16		142130125				1589.5
17	700 Regional Road 50	142130124		115.1		321.9
18		142130123		1673.6		5476.8
19		142130120		290.0		2332.8
20		142130119		55.9		1017.0
21	980 Regional Road 50	142130118		866.6		1215.4
22		142130117		1160.4		
23		142130110	43R-10313	552.8		1076.9
25		142130109		212.7		1028.6
26		142130107				1142.2
27		142130106				461.2
28	Regional Road 50	142130104	43R-16385	1026.6		3027.5
29	Mayfield	142130104	43R-16385	573.0		
30		142130105				

No.	Street Address	Pin Number	Parcel Number	Property Acquisition	Grading Easement	Drainage Easement
31		142130103	43R-13909	257.24		447.2
33		142130102	43R-16374	2361.362		482.0
34		142130101	43R-13333	470.033		137.0
35		142130269		5614.0		1756.4
36		143500524	43R-12845	7.0		6.7
37		143500644	43R-32648	787.0		
38		143500642	43R-32648	767.2		
39		143500518	43R-30567	411.6		293.8
40	8576 Mayfield Road	143500079		1049.1		589.0
41	8602 Mayfield Road	143500080		1131.5		634.9
42	8664 Mayfield Road	143500081	43R-14623	822.6		434.1
43		143500082		769.4		439.8
44	8746 Mayfield Road	143500083		831.3		452.9
45	8751 Mayfield Road	143500084	43R-2003	246.6		
46	8774 Mayfield Road	143500085	43R-2953	213.2		
47	8782 Mayfield Road	143500086	43R-2953	180.1		
50		143500648	43R-31997	255.5	167.3	
51		33200176	65R-21261		7134.1	
52		33200181	65R-21469	81.6	1751.2	
53		33200179	65R-21469	27.2	665.6	
54	Hydro Easement		65R-21469	52.5	154.2	
55		33200180	65R-21469	220.1	757.6	
56	Pine Valley Automotive	33210061		237.5		693.7
57		33210059	64R-6952	249.1		1207.7
59		33210049	64R-7929			1688.1
61		33210048	6949-(p 5001-1)			945.8
62		33210047				1267.4
63		33210046				1396.3
64		33210045				1366.8
65		33210044	65R-7989	196.8		2660.4
66		33210043	65R-7989	73.4		511.0
68		33210042		289.5		681.1
69		33210016	65R-29142	1631.0		2967.5
70		33210015		531.8		545.0
71	10951 Clarkway Drive	33210014		2475.9		1511.1
74	11065 Regional Road	33210012		293.5		366.0

No.	Street Address	Pin Number	Parcel Number	Property Acquisition	Grading Easement	Drainage Easement
	50					
75		33210076	65R-19710	113.6		1868.2
76	11133 Regional Road 50	33210011	EXP PLAN 532102 P-5001-48			321.7
77		33210185	EXP PLAN 2850 P-2106			667.4
78	11221 Regional Road 50	33210184	EXP PLAN 532115 P-5001-52			454.0
79		33210008	7004 P-5001-8			503.5
80		33210007	EXP PLAN 654830 P-501-80	48.3		
81	Toyota Car Dealer	33210195				778.4
82		33210089				52.8
83		33219985				694.0
84		33210086				135.2
85		142130118	EXP PLAN 924601 P-2804-37			56.0
86		142130075				544.2
87		33210061				43.0
88		33210060				85.7
89		33200180				167.3

6.7.1.1 Drainage Easements

As listed in **Section 6.7.1**, several drainage easements are required for the widening of Highway 50 and Mayfield Road. These drainage easements are intended to be temporary easements to allow for the collection of drainage from the properties (fields) adjacent to the study corridors and collect that drainage into temporary ditches. As the land develops, and becomes more urbanized, it will be up to the land owners to accommodate for the appropriate drainage and stormwater treatments for their respective properties, likely a series of SWM ponds, at which time the ditches will likely disappear and the easements will no longer be required.

6.7.2 Driveway Access

To accommodate the recommended design for Highway 50 and Mayfield Road, a number of driveways will be impacted as follows:

Property	PIN#	Location	Proposed Impact	Rationale
Sears	N/A	7+150	Median break provides opening for full moves access.	
SLH Transport	N/A	7+575	Median break provides opening for full moves access. Northbound and southbound left turn lanes are provided.	
Fastfrate	033200181	7+720	Median extends across the driveway, restricting access to right-in/right-out.	Due to the proximity of the entrance to the SLH Transport access and proposed Satellite Works Yard access, the median for both the northbound and southbound left turn lanes extends past the Fastfrate entrance. It is advisable to restrict the access.
Satellite Works Yard	N/A	7+800	New entrance provided. Median break provides opening for left turns into the proposed satellite works yard.	
	033200179	8+160	Median extends across the driveway, restricting access to right-in/right-out.	The northbound left turn lane for the Coleraine Drive intersection extends south of the driveway. Due to safety considerations, it is advisable to restrict the movements of the driveway to ensure proper use of the northbound left turn lane for Coleraine Drive.
	142130267	8+460	Driveway to be relocated	For safety and operations reasons, it is not advisable to have a driveway access into the southbound exclusive right turn lane.
Pine Valley Automotive Services	033210059	8+475	Median break provides opening for full moves access.	
	142130267 142130265	8+550	Median extends across the driveway, restricting access to right-in/right-out.	Due to the proximity of the entrance to the Major MacKenzie / Highway 50 intersection, it is advisable to restrict the access to improve the operations of the intersection.
	033210058	8+600	Median extends across the driveway, restricting access to right-in/right-	It is advisable to restrict the movements of the driveway to ensure proper use of the

Property	PIN#	Location	Proposed Impact	Rationale
			out.	southbound left turn lane at Major MacKenzie Drive.
	143500081	20+420	Driveway to be closed	Potential Simpson Road connection to be provided in the vicinity of this location.
	143500082	20+490	Driveway to be closed	Due to the proximity of the entrance to the future intersection with Simpson Road, it is advisable to close this access.
Best Choice Express Access	033210006	21+420	Driveway to be relocated 75m to the east and median extends across the driveway, restricting access to right-in/right-out.	For safety and operations reasons, it is not advisable to have a driveway access into the northbound exclusive right turn receiving lane; therefore the driveway was shifted further east.
Tank Truck Transport Inc.	033210006	21+520	Median break provides opening for full moves access.	

6.8 Preliminary Cost Estimate

The preliminary estimated construction costs for the recommended improvements have been separated into five sections and are summarized below:

- Albion-Vaughan Road is approximately $950,400;
- Highway 50, north of Mayfield Road is approximately $1,173,917;
- Highway 50, south of Mayfield Road is approximately $25,369,347;
- Intersection of Highway 50 and Mayfield Road is approximately $1,063,937; and
- Mayfield Road is approximately $7,328,983.

The property acquisition costs are estimated to be as follows:

Road	Value
Mayfield Road	2,505,078.93
Highway 50	5,494,921.07

Municipality	Value
Vaughan	3,198,320.36
Brampton	3,213,710.02
Caledon	1,587,969.63

* The two properties that have both Highway 50 and Mayfield Road frontages have had all area associated with them applied to the Highway 50 Land Value since only a total area per property was given.

** A per acre rate for the project can not be extrapolated from these numbers since more than one rate has been applied.

The cost estimate assumed $300,000 per km for utility relocation costs.

Details of the cost estimates are provided in **Appendix G**.

6.9 Construction Staging

The Highway 50 corridor is a key north-south route through Peel and York Region. The Mayfield Road corridor is an important east-west route through Peel Region. As such, the construction staging must focus on minimizing traffic disruption. It is the objective to maintain existing traffic on Highway 50 and Mayfield Road, minimize impacts on side streets and accesses, and minimize the duration of construction. However, the nature of the required pavement rehabilitation is such that traffic disruption and delays cannot entirely be avoided.

To minimize the impacts of construction operations, the following measures are to be applied:

- Two lane operations (one per direction) for Highway 50 will only be permitted during off-peak periods. This will include adequate signage, trained flagmen on site to direct traffic, and established procedures are followed. Four-lane traffic will be restored during the AM and PM peak periods and at the end of each workday.
- During peak periods, work can be carried out provided the four lanes of traffic are safely accommodated having regard for all safety regulations and practices.
- Access to properties will be maintained at all times. Where reconstruction of individual driveways is necessary, the work will be undertaken to minimize impacts on the affected property. Properties having more than one driveway will have only one driveway reconstructed at a time. Individual driveways will be constructed one half at a time. Where any narrow driveways will not permit access to be retained, the work will be undertaken within a single working day at a time arranged with the affected owner or tenant.
- Provide all signage, barriers, pavement markings, delineations, together with experienced flagmen (whenever necessary), to safeguard the interests of pedestrians, motorists and construction workers.

Construction staging and detour plans are to be confirmed and prepared at detailed design.

6.10 Design and Construction Considerations

The reconstruction of Highway 50 and Mayfield Road should be staged to the extent possible so as to maintain local traffic within the study area. Any necessary interruptions to traffic should be kept brief and to a minimum.

Property owners, and tenants, and customers may experience interruption to their property access during construction. To reduce this impact, all property owners should be notified prior to construction and in advance of work related to their access.

Construction of the improvements has the potential to result in noise and dust. Construction noise is however temporary noise and depends on the type of work required. The impact of construction noise depends on the type of equipment used, number of pieces of equipment, time and duration of operation, and the proximity to noise sensitive receivers in question. Construction noise should be kept to a minimum through the use of well maintained equipment with appropriate noise controls and the application of dust suppressants as necessary. Further information on the mitigation for noise control measures is included in **Section 7.3.2.1**.

7. ENVIRONMENTAL EFFECTS AND MITIGATION

Inherent in the consideration of potential changes to existing conditions associated with a road widening project, is the significance of any impacts and the extent to which these impacts may be mitigated. Significance is related to importance in a local, regional, provincial or national context, and importance, relative to other identified sensitive areas and issues. This section examines the anticipated environmental effects and mitigation measures for the relevant components of the natural, socio-economic and cultural environments for the preferred design alternative. A summary of the anticipated impacts and proposed mitigation measures is included in **Table 7-1**. Additional details are included in the following sections.

Table 7-1: Summary of Anticipated Impacts and Proposed Mitigation

Factor	Anticipated Impacts	Proposed Mitigation
Soils	Soil disturbance during construction may result in erosion and sedimentation.	An erosion and sediment control plan will be prepared and implemented before construction and maintained during construction operations. The ESC plan will require TRCA approval as part of the permitting process during detailed design.
Fish and Aquatic Habitat	Potential for the harmful alteration, disruption or destruction (HADD) of fish habitat.	Environmental protection measures will be implemented to avoid impacts to fish habitat. A timing restriction will be applied to construction at or near watercourses. No aquatic species at risk are known to inhabit the watercourses; however, all watercourses within the study area convey flows to Redside Dace habitat downstream. As such, MNR Provincial Policy will be followed.
	Potential for erosion and sedimentation into watercourses.	Erosion and sediment controls will be implemented before and during construction to prevent erosion of sediments into watercourses. The ESC plan will require TRCA approval as part of the permitting process during detailed design.
Vegetation and Vegetation Communities	Removal of cultural meadow vegetation communities throughout the study area.	The cultural meadow vegetation communities are highly disturbed and contain a high proportion of non-native species. The removal of these portions of cultural meadow habitat will not be significant.
	Removal of planted trees along the study area to accommodate the improvements.	Trees will be planted to compensate for the removal of existing trees along the Highway 50 and Mayfield Road corridors. Where possible, efforts should be made to avoid impacts to species considered rare or uncommon by the TRCA. Transplanting, where feasible, should be undertaken for these species.

		Trees that are in front of residences or businesses that may be impacted by the widening will have tree protection fencing installed throughout the duration of the project, or have replacement trees planted subject to negotiation with the land owners.
Wildlife and Wildlife Communities	Potential for removal of and disturbance to wildlife habitat.	The vegetation communities impacted contain agricultural and urbanized areas with low habitat structure/diversity and limited habitat potential. Widening and improvements to Highway 50 and Mayfield Road will have limited effect on wildlife and habitat utilized by wildlife. To meet the requirements of the Migratory Birds Convention Act, no vegetation removals will occur during the nesting season. With several exceptions, this includes the period from April 1 to July 31. If vegetation clearing is required during this period, a bird nest survey will be carried out by a qualified avian biologist prior to construction. The activities associated with the project will not adversely effect Bobolink provided the following conditions are implemented: 1. All works will be conducted outside of the breeding season for Bobolink. 2. All disturbed areas will be restored immediately after construction is complete.
Noise	An increase in noise levels at OLA's of more than 5 dBA.	Most of the residential properties are not eligible for noise mitigation since they are not reverse frontage or side flanking. For the lots that are eligible, a sound level reduction of 5 dBA or more is not be feasible and therefore sound walls are not recommended.
Archaeology	Potential impacts in the vicinity of Shiloh Cemetery.	Ensure that the cemetery is protected from construction activities related to the road widening. A Stage 3 assessment at the Shiloh cemetery lands was undertaken in October 2011. A Gradall was used to excavate a trench in the ROW along the cemetery property boundary to search for burial shafts. No burial shafts were detected and no features of archaeological interest were observed.
	Potential impacts to lands with archaeological potential.	A Stage 2 assessment is currently underway, in accordance with Ministry of Tourism and Culture's 2009 Draft Standards and Guidelines for Consultant Archaeologists, to assess areas with archaeological potential beyond the disturbed ROW. Mitigation measures identified by the assessment will be carried forward to detailed design.

Built and Cultural Heritage	Direct impacts to BHR 4, farmhouse located at 10951 Highway 50are expected through removal of the farmhouse.	Road improvement activities will be suitably planned to avoid impacts to identified cultural heritage resources. A heritage impact assessment by a qualified heritage consultant was undertaken to identify specific direct impacts of the undertaking to built heritage resources and to develop appropriate mitigation measures. Upon consultation with the City of Vaughan Heritage Department, the farmhouse has been approved for demolition; however, the Archaeological Clearance has not been received from the Ministry yet, therefore Archaeological Clearance is still pending.
	Potential for indirect impacts to CHL5 at 10980 Highway 50 through encroachment. Based on proximity of the resource to the expanded road right-of-way, the long term viability of the resource may be negatively impacted due to the potential for increased ambient noise and restricted vehicular access to/from the property.	A heritage impact assessment by a qualified heritage consultant was undertaken to identify specific indirect impacts of the undertaking to cultural heritage resources and to develop appropriate mitigation measures, which include: 1. A vegetative screening and noise reduction plan will be developed. 2. Vegetative screening will be sympathetic to the resource and retain the rural character of the property. 3. Existing fence lines along property boundaries, the remnant apple tree, and remnant coniferous tree line on the north side of driveway, will be maintained where technically feasible. 4. Existing vehicular access to the property from Highway 50 will be maintained. The property should comply with the 'City of Brampton Guidelines for Securing Vacant Built Heritage Resource' and all applicable by-laws.
Water Quality	Potential for impacts to water quality.	A total of twenty-four (24) oil-grit separators are proposed for installation throughout the project limits to provide the necessary Enhanced Level protection required to meet water quality control criteria. The sizing of the OGS units will be undertaken during detailed design. It is anticipated that ultimately, runoff from the Highway 50/Mayfield Road corridor will be treated through a combination of future stormwater management facilities within the Secondary Plan 47 area as well as Oil-grit Separator systems within the Highway 50/Mayfield Road drainage systems.
Land Acquisition	Potential for acquisition of property.	Property will be required for the recommended design. Affected property owners will be contacted.
Construction	Inconvenience during	Impacts will be temporary in nature. The Region will

Detours	construction	mitigate impacts as much as possible during detailed design and construction, through construction staging plans and traffic management plans.
Utility	Relocation of / impacts on existing utilities	Existing overhead and underground utilities will require relocation. Formal definition of impacts will be determined during detailed design.

7.1 Natural Environment

The complete Natural Heritage Report is included in **Appendix E.2**.

7.1.1 Physiography and Soils

The soils found within the study area are classified predominantly as Peel clay. Peel clay is characterized as having imperfect drainage. Soil disturbance within the Highway 50 and Mayfield Road rights-of-way will be limited to the already disturbed areas adjacent to existing land uses. Impacts resulting from any excavating or cut and fill operations will be temporary in nature. Erosion and sedimentation mitigation measures will be implemented prior to and during the construction phase. These control measures will include:

- limiting the geographical extent and duration that soils are exposed to the elements;
- implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 577 Construction Specification for Temporary Erosion and Sediment Control Measures and TRCA Erosion and Sediment Control Guidelines for Urban Construction including: silt fence placed along the margins of areas of soil disturbance; applying conventional seed and mulch and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long term slope stabilization; and,
- managing surface water outside of work areas to prevent water from coming in contact with exposed soils.

Monitoring of these erosion and sedimentation control measures during and after construction will be implemented to ensure their effectiveness. These environmental measures will greatly reduce/minimize adverse environmental impacts.

Erosion and sediment control measures will be implemented and monitored through the construction period. Construction activity will be conducted during periods that are least likely to result in in-stream impacts to fish habitat.

Detailed erosion and sediment control plans will be required as part of the detailed design component for all phases of the construction. The erosion and sediment control plans will be subject to review and approval by the various external agencies involved in the project. These would include the Region of Peel, Region of York and Toronto and Region Conservation Authority.

During construction, disturbances to watercourse riparian vegetation will be minimized. If riparian vegetation is removed or disturbed, erosion and sediment control measures such as silt fences, rock flow check dams and sedimentation ponds will be utilized to provide a maximum protection of local and downstream aquatic resources. These measures will be maintained during construction and until disturbed areas have been stabilized with seed and mulch. Additionally, topsoil will not be stockpiled close to the watercourses, and water will not be withdrawn from these sensitive streams for construction purposes.

The site engineer and contractor will be responsible for delineating work areas, and ensuring that erosion and sediment control measures are functional. In addition, the engineer will ensure that provisions related to fisheries and watercourse protection is met and that fish habitat compensation measures are implemented in accordance with the terms and conditions of the Fisheries Act Authorization.

7.1.2 Fisheries and Aquatic Ecosystems

Two of the watercourses within the project limits support direct fish habitat (at Sites 11, 12 and 13), two are not fish habitat (Sites 14 and 18) while the remainder constitute indirect fish habitat only. Because the majority of the watercourses at the crossing locations constitute some form of fish habitat, the proposed culvert and channel works discussed above have the potential to result in a harmful alteration, disruption or destruction (HADD) of fish habitat due to the following effects:

- temporary disruption of site-specific habitat;
- changes to water quality and quantity;
- changes in water temperature; and,
- barriers to fish passage.

The TRCA has a Level 3 agreement with the Department of Fisheries and Oceans (DFO), which establishes a streamlined approach to addressing issues pertaining to the federal Fisheries Act. Conservation Authorities with a Level 3 Agreement determine whether the proposal has a potential for a HADD of fish habitat. TRCA staff will work with the proponent to suggest ways to mitigate the HADD, and if mitigatable, write Letters of Advice on behalf of DFO. If the TRCA determines that the HADD cannot be mitigated, then they will provide a skeleton of a Letter of Intent and a DFO application in order for the proponent to prepare a compensation package. Note that only the DFO through the Minister of Fisheries and Oceans can authorize compensation regarding a HADD pursuant to Section 35(2) of the federal Fisheries Act.

7.1.2.1 Temporary Disruption of Site-Specific Habitat

The culvert extensions at all locations, except for Sites 11, 14 and 18, the channel works at Sites 5, 12 and 13, and the enclosure of the small reach of watercourse at Site 11 have the potential to result in the temporary disruption of localized fish habitat. In order to minimize

HADD potential, the extensions will be as short as possible. All culvert extensions will be constructed in-the-dry using temporary flow bypass systems and pea gravel bag cofferdams to isolate the work areas.

The channel realignments at Sites 5, 12 and 13 will also be undertaken in-the-dry. The watercourse at Site 5 is intermittent and work can be done in the dry during a period when the channel is not conveying flow. Flows in the watercourse at Sites 11 and 13 are small, and isolation of flows can be achieved through damming (with pea gravel bags) and pumping (to ensure water continues to reach downstream habitats). Pea gravel bag cofferdams (with plastic sheeting) will be used to isolate the existing channel from the work areas at Site 12. Flows in this watercourse are larger and will need to be maintained either through pumping or via flumes. Once constructed, the water will be allowed to flow through new channel sections and culvert extensions as the cofferdams are removed. It should be noted that the short (40 m) section of channel at Site 11 is being altered to reduce/minimize impacts to the larger reach of better quality habitat associated with the section of watercourse at Site 12 downstream of Albion-Vaughan Road. Because of the widening of the road platform at this intersection, impacts to Site 12 could not be avoided. All realigned channels will have characteristics similar to what exists currently. With the channel at Site 12, higher quality habitat can be created. Currently there is a monoculture of dense cattail growth throughout most of this reach and the area that does not contain cattails is featureless. Also, much debris currently resides within this channel. Habitat features can be added to the new channel (riffles, pools) with coarse substrates and, potentially, a larger variety of native emergent and submerged vegetation can be planted to add diversity while providing shade and instream cover. Bank vegetation can also be planted along the banks to aid in the shading of the channel and to provide a buffer between the road and the watercourse. All debris currently within the channel will be removed.

The works at Sites 11, 12 and 13 have the potential to strand fish when unwatering occurs. As such, qualified fisheries biologists will be on site during these operations to capture and release (in good condition) all fish stranded by the flow diversions.

To reduce the potential for a harmful alternation of fish habitat, the following environmental protection measures will be implemented:

- an in-water construction timing restriction will be implemented to protect spawning fish, incubating eggs and fry emergence; based on the fish communities present and information provided by the TRCA no in-water work should be permitted from April 1 to June 30; since MNR continues to revise, and update watercourse classifications based on new data, MNR will be consulted to confirm the watercourse classifications, and the applicable timing windows for both in-water and near water works, including all intermittent tributaries during detailed design.
- work areas will be delineated with construction fencing to minimize the area of disturbance;
- appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse;

- where cofferdams are to be employed, unwatering effluent will be treated prior to discharge to receiving watercourse;
- cofferdams will be constructed using pea gravel bags to isolate the work area and maintain flow;
- fish isolated by construction activities will be captured and safely released to the watercourse;
- good housekeeping practices related to materials storage/stockpiling, equipment fuelling/ maintenance, etc. will be implemented during construction; and,
- disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation.

These environmental protection measures will greatly reduce the potential adverse effects to fish and fish habitat resulting from construction activities.

7.1.2.2 Temporary Change to Water Quality

The construction associated with the proposed works has the potential to alter water quality through on-site erosion of exposed materials and the subsequent impairment of downstream water quality with sediments and road-related contaminants.

Standard erosion and sediment controls (silt fencing, straw bale flow checks, etc.) will be employed to prevent the sediments from reaching the watercourses from exposed soils associated with the construction activities upslope from the streams. Exposed areas will be planted/seeded as soon as possible after construction works have been completed to reduce erosion potential.

7.1.2.3 Changes in Water Temperature

The thermal regime of a receiving watercourse may be altered by storm water runoff or removal of riparian vegetation that shades the watercourse. In the summer, runoff can become superheated through contact with paved surfaces, which, when discharged to a receiving watercourse can result in thermal shock, thereby injuring or killing aquatic organisms. Coldwater or coolwater streams are usually considered more sensitive to changes in water temperature than warmwater streams.

Shading of the stream channel at Site 12 can provide some thermal benefits by planting vegetation along the channel. The watercourses at all other crossings are generally open and devoid of woody vegetation. It is expected that temperatures will not increase as a result of the proposed works.

7.1.2.4 Barriers to Fish Passage

No barriers to fish passage will result from this project. Flow will be maintained throughout the construction works and fish passage interruptions will be minimized through proper site

management and planning (e.g., having all materials on-site prior to commencement of passage disruptions).

7.1.2.5 TRCA Regulation Limit

The Toronto and Region Conservation Authority (TRCA) administers Ontario Regulation 166/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Permits under O. Reg. 166/06 will be required for the areas that are located within the Regulation Limits.

7.1.3 Vegetation and Vegetation Communities

The improvements along Highway 50 from Castlemore Road to north of Mayfield Road, and Mayfield Road from Highway 50 to Coleraine Drive will result in impacts related to the displacement of or disturbance to vegetation and vegetation communities.

7.1.3.1 Disturbance/Displacement of Vegetation and Vegetation Communities

Clearing of vegetation will be required to accommodate widening along Highway 50 and along the Mayfield Road corridor. Culturally influenced vegetation communities will be impacted by the proposed changes and these include cultural meadows (CUM1-1a to CUM1-1f), several edges of agricultural fields, and several areas of manicured lawn that include trees planted within these manicured areas located along the front of several homes, agricultural fields and businesses.

Table 7-2 provides a breakdown of vegetation removals required to accommodate the changes along Highway 50 and Mayfield Road. A total of 10.53 ha of cultural meadow will be impacted by the improvements.

Table 7-2: Impacts to Vegetation Communities Identified Within the Study Area

Vegetation Community	Area (ha)
Agricultural Field (Ag)	0.09
Mineral Cultural Meadow (CUM1-1a)	0.47
Mineral Cultural Meadow (CUM1-1b)	0.32
Mineral Cultural Meadow (CUM1-1c)	1.78
Mineral Cultural Meadow (CUM1-1c/M)	0.48
Mineral Cultural Meadow (CUM1-1d)	1.46
Mineral Cultural Meadow (CUM1-1e)	2.44
Mineral Cultural Meadow (CUM1-1f)	3.58
Manicured (M)	1.94

A review of the preliminary design of the preferred alternative indicates that the overall impacts resulting from the displacement of portions of the vegetation areas and communities as presented in **Table 7-2** are considered to be minor, and in areas where TRCA species of concern (also noted as rare in Peel and/or York Region) will be impacted, mitigation recommendations include transplanting those species into other suitable areas prior to construction.

Cultural Meadow (CUM1-1a to CUM1-1f)
There are numerous areas of cultural meadow that will be impacted due to the expansion of Highway 50 and Mayfield Road. Overall, these vegetation communities are dominated by non-native plant species that are well adapted to persist in areas that are regularly disturbed.

Manicured Areas
Three Manicured areas (M), where large expanses of grass are mown and plants/shrubs/trees are planted, were identified within the study area. These areas are generally associated with the front of existing residential lots, and an old small cemetery located on the west side of Highway 50.

It is unlikely that any planted trees in manicured areas will be impacted as a result of improvements along Highway 50 or Mayfield Road. However, any grading changes that exceed -/+ 0.5 m could negatively impact root systems of those trees located adjacent to graded areas. Where planted trees are removed or negatively impacted as a result of grading, and the remaining landscaped area still provides enough space for tree planting, trees will be planted as part of compensation to provide a natural screen between those residential lots and Highway 50 or Mayfield Road. Compensation for tree removals will comply with TRCA replacement ratio requirement of 3:1.

7.1.3.2 Displacement of Rare, Threatened or Endangered Vegetation or Significant Vegetation Communities

No plant species regulated under the Ontario Endangered Species Act or the Canada Species at Risk Act were noted during field investigations.

There are six plant species identified as TRCA species of concern. White spruce (Picea glauca) and red pine (Pinus resinosa) are identified as L3 and L1 TRCA plant species of concern, respectively. These trees are located in CUM1-1a and CUM1-1c and are not expected to be impacted as a result of improvements along Highway 50 or Mayfield Road as long as grading changes are less than -/+ 0.5 m (cut or fill). Grading changes that exceed -/+ 0.5 m could negatively impact root systems of those trees located adjacent to graded areas.

It is likely that there will be some impacts to the following plant species: common juniper (Juniperus communis), ninebark (Physocarpus opulifolius), and tall wormwood (Artemisia campestris ssp. caudata) identified in CUM1-1a, CUM1-1c, CUM1-1e and CUM1-1f. Common juniper and ninebark are identified as L3 TRCA plant species of concern and tall

wormwood is identified by the TRCA as L2; provincially these plants are ranked as secure to apparently secure. These plants will be flagged in the field and transplanted into protected areas prior to construction or appropriate native seed or seedling stock will be used when replanting manicured buffers adjacent to the new cleared ROW.

Nodding wild rye (Elymus Canadensis) is located in CUM1-1b and is identified as an L3 TRCA plant species of concern. This grass was planted or seeded in as part of a previous channel realignment on the northwest corner of Highway 50 and Mayfield Road. No impacts to this grass species are expected as a result of the proposed improvements to Highway 50 or Mayfield Road.

7.1.4 Tree Resources

The preliminary design will involve the widening of Highway 50 from Castlemore Road to just north of Mayfield Road and along Mayfield Road from Highway 50 west to Coleraine Drive. There are approximately 162 trees anticipated to be removed to as a result of the proposed improvements. **Table 7-3** presents a list of tree species and number of individuals expected to be removed to accommodate construction and grading. These trees are located in naturalized areas along property lines or have been planted as part of landscaping within yards or fencerows. Trees identified for removal range in size from 5 to 59 cm diameter at breast height (dbh), with an average around 22 cm. Forty seven percent of the trees are less than 20 cm dbh and thirty six percent of the trees measure between 31 and 40 cm dbh. The more mature trees are located within front yards. Additional trees located near the intersection of Coleraine Drive and Highway 50, not surveyed during the field investigation, will also require removal for road improvements.

Prior to construction, tree protection barriers or fences will be placed around groups of trees that will be preserved to reduce potential for damage. Protection fencing is recommended near the residential properties along Mayfield Road. Any trees that are damaged during construction will be replaced with a tree of similar or native species.

Trees that are removed as a result of widening of Highway 50 will be replaced with trees native to Ontario and salt-tolerant, if planting is to occur within the right-of-way. Compensation for tree removals will comply with TRCA replacement ratio requirement of 3:1. Tree species for these roads will be chosen in consultation with forestry staff of Peel and York Region and local municipalities who have experience with these road conditions. Small form trees will be planted under energized power lines. In the locations where street trees will be planted, soil enhancement will be provided. Good soil will contribute significantly to tree survival in these conditions.

Table 7-3: Trees to be Impacted by the Proposed Improvements

Common Name	Scientific Name	Status	No. of Trees to be removed
Manitoba Maple	Acer negundo	Native	2
Norway Maple	Acer platanoides	Non-native	6
Silver Maple	Acer sacharinum	Native	4
White Ash	Fraxinus americana	Native	1
Red Ash	Fraxinus pennsylvanica	Native	37
Red Cedar	Juniperus communis	Native	3
Crab Apple	Malus baccata	Non-native	1
Apple	Malus pumila	Non-native	3
White Mulberry	Morus alba	Non-native	1
White Spruce	Picea glauca	Native	1
Blue Spruce	Picea pungens	Non-native	2
Scott Pine	Pinus sylvestris	Non-native	81
Hybrid Willow	Salix x rubens	Non-native	6
Linden	Tilia cordata	Non-native	6
White Elm	Ulmus americana	Native	6
Siberian elm	Ulmus pumila	Non-native	2
		TOTAL	**162**

7.1.5 Wildlife and Wildlife Habitat

Improvements and widening of Highway 50 and Mayfield Road have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to these improvements could include:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts; and,
- disturbance to wildlife from noise, light and visual intrusion.

7.1.5.1 Displacement of Wildlife and Wildlife Habitat

Highway 50 and Mayfield Road improvements and widening will be undertaken within and extending beyond the existing ROW. The areas potentially impacted by the works described above consist almost entirely of agricultural and urbanized areas of previously modified/disturbed terrestrial wildlife habitat with low habitat structure/diversity and limited habitat potential. Natural heritage features within the study area were limited to small fragmented areas of cultural meadow, abandoned agricultural lands, and planted trees. Consequently, widening and improvements to Highway 50 and Mayfield Road will have limited effect on wildlife and habitat utilized by wildlife.

Numerous bird species located within the project limits are listed under the Migratory Birds Convention Act (MBCA). The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. Migratory insectivorous and non-game birds are protected year-round and migratory game birds are protected from March 10 to September 1. No permits are issued for the destruction of migratory birds or their nests incidental to some other undertaking or activity and project works or activities are not specifically prohibited under the Act. To meet the requirements of the MBCA, no vegetation removals will occur during the nesting season. With several exceptions, this includes the period from April 1 to July 31. If vegetation clearing is required during this period, a bird nest survey will be carried out by a qualified avian biologist prior to construction. If active nests are found, a site-specific mitigation plan will be prepared in consultation with the Canadian Wildlife Service. No nests of migratory bird species were identified within any culverts or bridges located within the study area.

7.1.5.2 Barrier Effects on Wildlife Passage

No new migratory barriers to wildlife will be created as a result of widening and improvements to Highway 50 and Mayfield Road. The existing barrier posed by Highway 50 and Mayfield Road will be greater due to proposed widening. However, given the urban nature of the study area, the improvements will have no significant impact on wildlife passage.

7.1.5.3 Wildlife/Vehicle Conflicts

Improvements and widening of Highway 50 and Mayfield Road will increase the width of the travelled surface resulting in an increased risk of mortality for wildlife that elect to cross the road. Highway 50 and Mayfield Road currently poses a potential barrier to wildlife movement. While the increase in width of Highway 50 and Mayfield Road increases exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above existing conditions is considered minor.

7.1.5.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In urban settings, such as the study area, wildlife has become acclimatized to urban conditions and only those fauna that are tolerant of human activities remain. Given that wildlife are acclimatized to the presence of Highway 50 and Mayfield Road in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the proposed widening, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects.

7.1.5.5 Displacement of Rare, Threatened or Endangered Wildlife or Significant Wildlife Habitat

During field investigations, suitable habitat for Bobolink (Dolichonyx oryzivorus) was identified, as this species typically nests in agricultural fields. Recently, Bobolink has been added to the Species at Risk in Ontario List, and is now regulated as "Threatened" under the Ontario Endangered Species Act.

Surveys for Bobolink were conducted along Highway 50 and along Mayfield Road, within the study area, on three dates within the breeding bird window: May 31, June 12, and June 26, 2011. Observations were made during the early to mid-morning hours (approximately 0600 to 1000 h), when Bobolinks are more readily detectable because they typically are more active and sing more frequently.

Bobolinks were found during each of the three surveys: 3 adult males at one location on May 31, 10 adult males scattered at five locations on June 12, and 6 adult males/1 adult female distributed at three locations on June 26, 2011. The locations where the Bobolinks were observed (Site Numbers A to F) are described in the ***Bobolink Memorandum*** included in **Appendix E.9**.

The impact zone within which Bobolinks may be affected includes the actual area of road widening, and potentially also a larger area of temporary disturbance associated with construction activities. Bobolinks were observed adjacent to Highway 50 only at Site F, along the east side of Highway 50 south of Mayfield Road. All other sites where Bobolink were observed were well outside the road widening zone (>100 m). The zone of potential temporary disturbance is not known but is expected to be in the order of a few tens of metres. The size of the disturbance zone would vary with the time of year, and the location and extent of construction activities. For example, there would be no or minimal disturbance effects if construction activities were conducted outside of the Bobolink nesting period.

In this study area, Bobolink were observed in field habitats altered by man — agricultural and fallow fields. The locations of these habitats vary from year to year as farmers rotate their crops. Consequently, it is difficult to predict where Bobolinks may nest within the study area in future years, and thus where impacts may occur. Bobolinks will move to suitable habitat, if necessary.

Based on the results of the 2011 field surveys, potential impacts associated with the proposed road improvements to Highway 50 and Mayfield Road, to nesting Bobolinks, would occur only at Site F. The extent of potential impacts to nesting Bobolinks at that site would depend on the location of construction activities and road widening there, and to what extent those overlap with Bobolink nesting territories.

There may also be impacts to Bobolink nesting habitat associated with the proposed road improvements. However, given the narrow width of road widening, the potential loss of

nesting habitat is expected to be very small and not biologically significant. The loss of habitat associated with the road improvements will be irrelevant in comparison to the future development that is likely to occur along Highway 50 following road improvements.

No other rare, threatened or endangered wildlife or significant wildlife habitat was documented within the study area.

Ministry of Natural Resources
The Ministry of Natural Resources staff reviewed our project information and determined that the activities associated with the project, as currently proposed, will not adversely effect Bobolink provided the following conditions are implemented:

1. All works will be conducted outside of the breeding season for Bobolink
2. All disturbed areas will be restored immediately after construction is complete

If these conditions are implemented, the activity would not be prohibited under Section 9 (species protection) or Section 10 (habitat protection)] of the *Endangered Species Act, 2007*. Failure to carry out these projects as described above could result in contravention of the *Endangered Species Act 2007*. Correspondence with MNR is included in **Appendix B.2**.

7.1.6 Designated Natural Areas

There are no Provincially Significant Wetlands, Areas of Natural and Scientific Interest, Environmentally Significant/Sensitive Areas or other Natural Areas within the study area.

7.1.7 Monitoring

To ensure that erosion and sediment controls are installed prior to and maintained during construction, an Erosion and Sediment Control (ESC) Plan will be prepared in accordance with the TRCA *Erosion and Sediment Control Guideline for Urban Construction* (2006). The ESC Plan will provide details regarding the inspection, maintenance (e.g. need for repair), and documentation procedures during all stage of construction. An environmental inspector will monitor the site during construction to ensure that construction fencing, tree protection barriers and erosion and sedimentation control measures are installed correctly and are functional.

7.2 Drainage and Stormwater Management Plan

7.2.1 Potential Groundwater Impacts

7.2.1.1 Seepage Rates for Open-Cut Trenches

As part of the hydrogeological investigation conducted by Trow Associates, estimates of seepage rates were determined to identify the expected volume of dewatering that will be required for the installation of culverts and other sub-surface infrastructure using open-cut

construction practices. The average hydraulic conductivity (K) of the different soil formations was found to be 6.25 x 10^{-7} m/s. This K value was used to estimate dewatering rates. Based on a 50 metre long excavation, the estimated groundwater seepage into the excavation is estimated to be 45 m^3/day.

7.2.1.2 Dewatering Impacts

Based on water well records obtained by Trow Associates from the Ministry of Environment water well database, 85 wells are present within a 500 metre radius of the Site. Nineteen of these wells are situated within 50 metres from Hwy 50 and Mayfield Roads. Three of the nineteen wells are relatively shallow (less than 10 metres) and are located approximately 40 m to 50 m away from the roadway. No dewatering effects on these shallow wells are therefore anticipated.

Due to the presence of a considerable number of water wells in the area, a groundwater monitoring program prior to, during and after construction dewatering is recommended to determine any dewatering related impacts on the water wells.

7.2.1.3 Permit to Take Water

The dewatering rate required for a 50 metre long section of the proposed culvert/sewer installation was estimated to be approximately 45 m^3/day. In terms of the requirements for a Permit to Take water Application (PTTW), Trow Associates suggests increasing the dewatering rate by 50% to account for the uncertainties on the hydraulic properties of the geologic formations and increased seepage rates under the transient hydraulic conditions. The anticipated dewatering rate is expected to be between 60 m^3/day and 75 m^3/day.

A PTTW from the MOE is required if groundwater dewatering exceeds 50 m^3/day. Alternatively, the construction methodology could be modified to trench less than 25m sections at a time to reduce the dewatering rate.

7.2.2 Erosion and Sediment Control Measures

Erosion and sediment control measures will be implemented and monitored in accordance with the TRCA *Erosion and Sediment Control Guideline for Urban Construction* (2006). Construction activity will be conducted during periods that are least likely to result in in-stream impacts to fish habitat.

Detailed erosion and sediment control plans will be required as part of the detailed design component for all phases of the construction. The erosion and sediment control plans will be subject to review and approval by the various external agencies involved in the project. These would include the Region of Peel, Region of York and Toronto and Region Conservation Authority.

During construction, disturbances to watercourse riparian vegetation will be minimized. If riparian vegetation is removed or disturbed, erosion and sediment control measures such as silt fences, rock flow check dams and sedimentation ponds will be utilized to provide a maximum protection of local and downstream aquatic resources. These measures will be maintained during construction and until disturbed areas have been stabilized with seed and mulch. Additionally, topsoil will not be stockpiled close to the watercourses, and water will not be withdrawn from these sensitive streams for construction purposes.

The site engineer and contractor will be responsible for delineating work areas, and ensuring that erosion and sediment control measures are functional. In addition, the engineer will ensure that provisions related to fisheries and watercourse protection is met and that fish habitat compensation measures are implemented in accordance with the terms and conditions of the Fisheries Act Authorization.

7.3 Socio-Economic Environment

7.3.1 Gateway Features

Allowances for two gateway features are included at the intersection of Mayfield Road and Highway 50 (northeast and southeast quadrants). Property will be required from the adjacent landowners to accommodate the gateway features. The Town of Caledon may make alternate arrangements with the Coffey Car Dealership to establish the gateway feature on Dealership lands while still retaining access to maintain the gateway feature.

7.3.2 Noise Level

The study dealt with the existing ambient sound levels as well as with the future project sound levels associated with the highway/road improvements and their noise impacts on the selected receptors within the study area. The future project sound levels are based on traffic data which include similar parameters to that of the ambient data plus the forecasted increase/change in the traffic volumes as a result of the proposed undertaking. The future project sound levels are predicted to be in the ranges of Leq (16h) 60 dBA to 73 dBA.

All the future project sound levels are predicted to have excesses over the existing ambient sound levels in the range of 2 to 3 dBA. Such excesses are considered to be acoustically insignificant and are mainly attributed to the forecasted increase in the Highway 50 and Mayfield Road future traffic volumes over the existing conditions, as well as to the proposed shifting of Highway 50 alignment at some locations within the study area. According to the MOE/MTO Noise Protocol and the Region of Peel guidelines, since the predicted future project sound level excesses do not exceed 5 dBA, consideration of noise control measures is not warranted.

The existing and future predicted sound level at the receptors located east of Highway 50 will exceed Leq 60 dBA. According to York Region Policy, these receptors will warrant

investigation of the feasibility of noise mitigation measures. A sound barrier is investigated at these receptors and found to be not feasible due to barrier height and sound level reduction limitations imposed by York Region Policy. Therefore no noise mitigation measures are recommended.

Based on the findings of this study and if the widening of Highway 50 and Mayfield Road are to take place, no noise mitigation measures need to be considered for all the residences within the study area.

7.3.2.1 Noise Controls During Construction

In addition to the noise emitted by the operation of vehicles on the proposed undertaking, noise during the construction phase is an issue that should also be addressed.

Unlike operational noise, construction noise is temporary in nature depending on the type of work required and its location relative to the noise-sensitive receptors.

The significance of the construction noise impact depends on the number of pieces of equipment, their types, time of operation and their proximity to the receptors in question.

The following is a brief outline of the procedures to be followed in handling construction noise during the Detailed Design and Construction phases:

- Noise sensitive areas will be identified. These include the residential locations shown in ***Noise Study*** in **Appendix E.8**.
- Applicable local municipal noise control by-laws will be identified and obeyed. The by-laws include those enacted under the authority of the Municipal Act, the Environmental Protection Act or any other Provincial Legislation. Where timing constraints or any other provisions of the municipal by-law may cause hardship to the proponent, an explanation of this will be outlined in a submission to the MOE and an exemption from such by-law will be sought directly from the area municipality in question.
- "General noise control measures" (not sound level criteria) will be referred to or placed into the contract documents.
- Should the municipality receive any complaint from the public, the municipality staff will verify that the "general noise control measures" agreed to, are in effect. The municipality will investigate any noise concerns, warn the contractor of any problems and enforce its contract.
- If the "general noise control measures" are complied with, but the public still complain about noise, the municipality will require the contractor to comply with the MOE sound level criteria for construction equipment contained in the MOE's Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.
- In selecting the appropriate construction noise control and mitigation, measures, the municipality will give consideration to the technical, administrative, and economic feasibility of the various alternatives.

The above noted procedures are based on the construction noise provisions included in Section 8 of the MOE/MTO Noise Protocol.

7.3.2.2 Future Development and Re-Development Plans

It is recommended that future development and re-development proposals for planning of new residential developments along Highway 50 and Mayfield Road be examined for their noise compatibility. The Provincial and Municipal guidelines will, therefore, be consulted concerning implementation of any required noise control measures at the municipal planning levels.

Noise mitigation for new developments along the Highway 50 and Mayfield Road corridors within the study area will be provided by the developers of these developments as part of their planning agreements to the Town of Caledon, City of Brampton, Peel Region and York Region.

7.4 Built and Cultural Heritage Environment

7.4.1 Archaeological Assessment

The Stage 1 archaeological assessment has been conducted to assist with the Highway 50 and Mayfield Road Class EA. The assessment determined that ten archaeological sites have been registered within 1 km of the study corridor and five of these are located within 300 m of the corridor. A review of the geography and local nineteenth century land use of the study corridor suggests that it has potential for the identification of Aboriginal and Euro-Canadian archaeological sites.

Based on the results of the property inspection, it was determined that the study corridor has been subject to extensive and deep land alterations. However, minimal disturbance has occurred beyond the disturbed ROW.

In light of these results, ASI makes the following recommendations:

- The existing ROW does not retain archaeological site potential due to previous ground disturbances. Additional archaeological assessment is therefore not required along this portion of the study corridor;
- If construction extends beyond the disturbed ROW, a Stage 2 assessment is recommended on any lands along the study corridor where there is potential for archaeological sites, in accordance with Ministry of Tourism and Culture's ***Standards and Guidelines for Consultant Archaeologists*** (MTC 2011); and
- Prior to any land-disturbing activities adjacent to Shiloh Cemetery, a Stage 3 archaeological assessment will be conducted. This work will be done in accordance with the Ministry of Tourism and Culture's ***Standards and Guidelines for Consultant Archaeologists*** (MTC 2011), in order to confirm the presence or absence of unmarked

graves within the ROW. This work will involve the removal of the topsoil with a Gradall followed by the shovel shining of the exposed surfaces and subsequent inspection for grave shafts.

Compliance with the following legislation is also required:

- This report is submitted to the Minister of Culture as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, RSO 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological license, and that the archaeological fieldwork and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario;
- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act; and
- The Cemeteries Act requires that any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Consumer Services.

7.4.1.1 Stage 2 Archaeological Assessment

A Stage 2 Archaeological Assessment is underway for lands in the study corridor where there is potential for archaeological sites and where construction will extend beyond the disturbed ROW, in accordance with Ministry of Tourism and Culture's *Standards and Guidelines for Consultant Archaeologists* (MTC 2011). The findings of the Stage 2 Archaeological Assessment will supplement this Environmental Study Report and will be forwarded to MOE once completed.

7.4.1.2 Stage 3 Archaeological Assessment

A Stage 3 site-specific archaeological assessment (Cemetery Investigation) was undertaken in the Regional right-of-way adjacent to the Shiloh Primitive Methodist Cemetery. The cemetery is located on the west side of Highway 50 between Mayfield Road and Countryside Drive. The purpose of the investigation was to confirm the presence or absence of burials beyond the cemetery boundaries in the public right-of-way. The investigation was conducted in October 2011. A Gradall was used to excavate a trench in the right-of-way along the cemetery property. In spite of careful observation, no burial shafts were detected and no features of archaeological interest were observed.

In light of these results, the following recommendations are made:

1. All lands in the public Highway 50 right-of-way in front of the Shiloh Primitive Methodist Cemetery have no further cultural heritage value or interest and Stage 4 mitigation of impacts is not required for the project area; and

2. If lands are acquired beyond the public right-of-way along Highway 50, in front of Shiloh Cemetery, these lands will be subject to a Stage 1-Background Study and Property Inspection, Stage 2 Property Assessment, and possible a Stage 3 Site-specific (Cemetery Investigation) following the Ministry of Tourism and Culture's 2011 *Standards and Guidelines for Consultant Archaeologists*.

7.4.2 Built and Cultural Heritage Features

Road improvements along Highway 50 and Mayfield Road may have a variety of impacts upon built heritage resources and cultural heritage landscapes. Impacts can include: direct impacts that result in the loss of resources through demolition, or the displacement of resources through relocation; and indirect impacts that result in the disruption of resources by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting. Potential impacts on identified cultural heritage resources were identified based on the proximity of a resource to the proposed undertaking.

Based on the results of background research and data collection, field survey, and analysis of potential impacts of the undertaking, the following recommendations have been developed.

1. Road improvement activities should be suitably planned to avoid impacts to identified cultural heritage resources.
2. BHR 4: Direct impacts to this cultural heritage resource are expected through removal of the farmhouse. A heritage impact assessment by a qualified heritage consultant is recommended.
3. CHL 3: Ensure that the cemetery is protected from construction activities related to the road widening.
4. CHL 5: The proposed work will impact the cultural heritage resource through encroachment. Based on proximity of the resource to the expanded road right-of-way, the long term viability of the resource may be negatively impacted due to the potential for increased ambient noise and restricted vehicular access to/from the property. A heritage impact assessment by a qualified heritage consultant is recommended.

7.4.2.1 Heritage Impact Assessment for 10951 Highway 50

A Heritage Impact Statement (HIA) was undertaken for the property at 10951 Highway. The subject property is located in the northeast part of the City of Vaughan and includes a nineteenth-century frame dwelling, an outbuilding, and a rural landscape.

Based on the results of archival research, a field review, and heritage evaluation, the property at 10951 Highway 50 in the City of Vaughan was determined to retain cultural heritage value following application of Regulation 9/06 of the *Ontario Heritage Act*. Its heritage significance revolves around its design, associative, and contextual-related values. Given that the subject property was determined to retain cultural heritage significance, the preservation/retention of the resource on site is recommended.

The one-and-a-half storey frame farmhouse at 10951 Highway 50 is expected to be directly impacted through displacement by the proposed Highway 50 road improvements. As a result, the following recommendations have been made based on the determined heritage values of the resource and in consideration of overall impacts to the property:

1. If technically feasible, retain the farmhouse in situ by altering the proposed design, such as through minimization of lane widths.
2. To ensure that the structure does not succumb to vandalism, premature decay, and/or arson, the following measures should be undertaken immediately to mitigate negative impacts given that the structure is vacant:
   a) Prepare a condition assessment of the building. A structural engineer can be consulted in this regard to assess any required repairs that need to be undertaken to stabilize the building in the short and long term;
   b) Based on the results of the condition assessment, stabilize identified components of the building;
   c) Examine the interior of the building for evidence of animals and/or insects. If detected, seal off access to the structure and exterminate if necessary;
   d) Protect the exterior from moisture penetration. As such, roofing materials, foundation, and window treatments should be examined by a qualified contractor in this regard;
   e) All main floor windows and entrance ways should be boarded up and securely locked;
   f) Exterior doors should be reinforced with full, non-removal locking mechanisms;
   g) Heritage Impact Assessment
   h) 10951 Highway 50, City of Vaughan, Ontario Page iii
   i) Ensure that adequate ventilation to the interior is maintained. A mechanical engineer should be consulted to ensure that a suitable interior climate is achieved; and
   j) It is recommended that the property be visited on a frequent basis. Volunteers, including heritage stakeholders, may be consulted in this regard.

3. Relocate the subject resource within its existing lot in a manner that makes limited to minimal changes to its heritage character. Such a mitigation strategy would include documentation of the building in advance of relocation, and development of a relocation plan which would lay out the actions required and responsibilities of stakeholders in order to relocate and re-use the resource. Where this is not feasible, consideration should be given to relocating the resource to an appropriate nearby lot.
4. If it is determined that the subject resource will not be relocated and adaptively re-used, landscape features and building remnants should be retained where possible, and a commemoration strategy developed, to evidence historic uses and contextual values, recognizing the role that land and place play in expressing the heritage significance of this resource.
5. Should relocation of the resource not be feasible, and where demolition activities are anticipated, full documentation of the resource and a salvage plan should be implemented. Demolition and salvage activities should be monitored by a qualified professional for documenting any additional features uncovered during the demolition

process. Additionally, if any old documents are found during the course of demolition, such as old newspapers, land deeds, letters, photographs, et cetera, these should be filed with the City of Vaughan.

Based on consultation with the City of Vaughan Heritage Department, the farmhouse is approved for demolition; however, the Archaeological Clearance has not been received from the Ministry yet, therefore Archaeological Clearance is still pending. The *Heritage Impact Assessment Report* is included in **Appendix E.11**.

7.4.2.2 Heritage Impact Assessment for 10980 Highway 50

A Heritage Impact Statement (HIA) of the property at 10980 Highway 50 was undertaken as part of the study. The subject property is located in the northeast part of the City of Brampton and includes a farmhouse, a barn, outbuildings, and a rural landscape.

The property at 10980 Highway 50 is located in the northeast part of the City of Brampton, on the west side of Highway 50, south of Countryside Drive. The 9.9 acre property consists of a farmhouse, which fronts on to Highway 50, a large barn, outbuildings, and an agricultural landscape featuring fields, fence lines, tree lines, and circulation routes. All buildings on the property are currently vacant. The subject parcel is nearly rectangular in shape, made irregular by the small square property parcel cut from the northeast corner, and which is the former site of a church. The property is bounded by Highway 50 to the east, Countryside Drive to the north, and fields to the south and west.

Based on the results of archival research, a field review, and heritage evaluation, the property at 10980 Highway 50 in the City of Brampton was determined to retain significant cultural heritage value following application of Regulation 9/06 of the Ontario Heritage Act. Its heritage significance revolves around its design, associative, and contextual-related values. Given that the subject property was determined to retain cultural heritage significance, the preservation/retention of the resource on site is recommended.

The property at 10980 Highway 50 in the City of Brampton is expected to be indirectly impacted by the proposed road widening through encroachment. As a result, the following recommendations have been made based on the determined heritage values of the resource and in consideration of overall impacts to the property:

1. Develop a vegetative screening and noise reduction plan to minimize visual and ambient noise to ensure the long-term viability of the residential heritage resources.
2. Vegetative screening will be sympathetic to the resource, retain the rural character of the property, maintain remnant visual, physical and functional associations with its agricultural roots, and ensure the long-term viability of the residential heritage resources.
3. Maintain existing fence lines along property boundaries, the remnant apple tree, and remnant coniferous tree line on the north side of driveway, where technically feasible.
4. Maintain existing vehicular access to the property from Highway 50 to ensure the long-term viability of the residential heritage resources.

The property should comply with the 'City of Brampton Guidelines for Securing Vacant Built Heritage Resource' and all applicable by-laws.

Finally, this report will be submitted to the Brampton Heritage Board and the Heritage Coordinator in the Planning, Design and Development Department at the City of Brampton for review and comment, and subsequently filed and archived at the Region of Peel Archives.

8. CONCLUSION

This Environmental Study Report presents the results of the Environmental Assessment Study carried out to determine the specific needs for the Highway 50 Corridor from Castlemore Road / Rutherford Road to Mayfield Road / Albion-Vaughan Road and the Mayfield Road Corridor from Highway 50 to Coleraine Drive. The Study recommends:

- Widening of Highway 50 (between Mayfield Road and Castlemore Road) to 6 lanes;
- Widening of Mayfield Road (between Highway 50 and Coleraine Road) to 4 lanes;
- Providing sidewalks and multi-use trails along the corridors;
- Supporting Travel Demand Management (e.g. carpool options, transit usage); and
- Providing transit priority measures.

The project was found to be feasible with no major impediments or unacceptable environmental impacts. It conforms to the requirements for Schedule 'C' projects, in accordance with the Municipal Engineers Association, Municipal Class Environmental Assessment (October 2000, as amended in 2007).

Due to completion of the study, this Environmental Study Report is being placed on the public record for 40 calendar days for review. Interested stakeholders and the public have received a notice of filing the Environmental Study Report.

Following the review period, if no Part II Order requests or objections are brought forward to the Minister of the Environment and the Region of Peel, the requirements of the Environmental Assessment Act will be deemed to have been satisfied and the project can then proceed to the implementation phase.