



**HIGHWAY 401 IMPROVEMENTS
From HIGHWAY 410/403 INTERCHANGE
TO EAST OF THE CREDIT RIVER**

**Region of Peel
City of Mississauga**

**CLASS ENVIRONMENTAL ASSESSMENT FOR
PROVINCIAL TRANSPORTATION FACILITIES
GROUP 'B' PROJECT**

**MINISTRY OF TRANSPORTATION
CENTRAL REGION**

G.W.P. 2149-01-00 and 2150-01-00

**TRANSPORTATION ENVIRONMENTAL
STUDY REPORT**

Volume 1

AUGUST 2005

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**Ministry of Transportation
Central Region
G.W.P. 2149-01-00 and 2150-01-00**

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THE PUBLIC RECORD

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EXECUTIVE SUMMARY

The Ontario Ministry of Transportation (MTO) has retained Marshall Macklin Monaghan to undertake a preliminary design study for improvements to Highway 401 from the Highway 410/403 interchange westerly to east of the Credit River, in the City of Mississauga, Region of Peel. The project follows earlier preliminary design studies, which examined the need and justification for improvements to this section of Highway 401. The current project is reviewing and updating the previous work to confirm the final configuration of improvements with an emphasis on opportunities to integrate transit and High Occupancy Vehicle facilities within the corridor. Ecoplans Limited was retained to carry out the Class Environmental Assessment component of this project.

Based on the earlier evaluation of alternatives, the recommended design includes widening of Highway 401 to provide a 12-lane express/collector configuration.

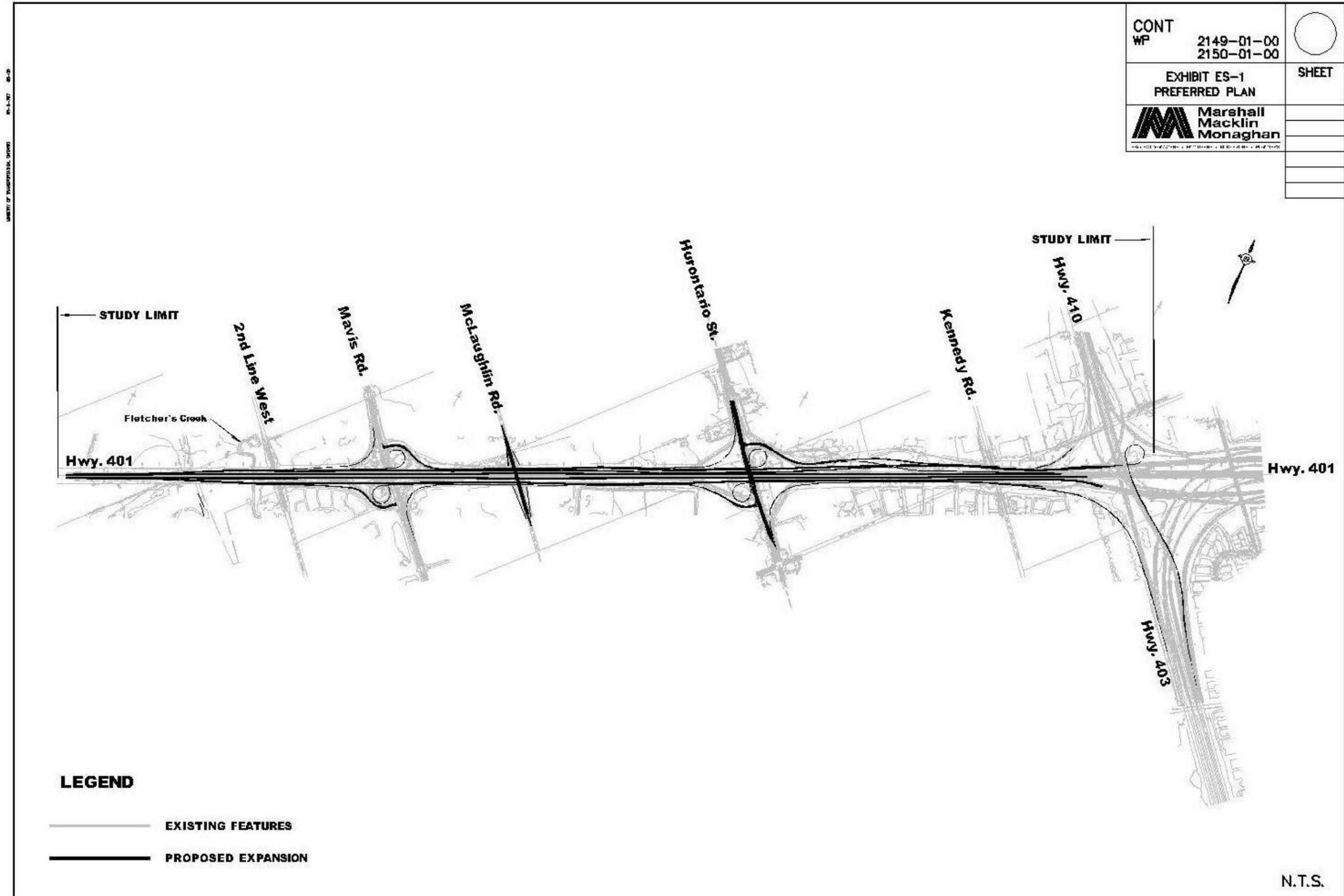
Specifically, the recommended design includes:

- Widening Highway 401 from a basic 6-lane Highway to a 12-lane express/collector configuration;
- Collector lanes consisting of 3 general purpose lanes in each direction;
- Express lanes consisting of 2 general purpose lanes and 1 HOV lane in each direction;
- Reconstruction of the Hurontario Street interchange, including replacement of the structure over Highway 401;
- Reconstruction of the Mavis Road interchange, including expansion of the existing structure over Highway 401;
- Replacement of the McLaughlin Road structure over Highway 401;
- Removal of the 2nd Line West structure over Highway 401.

Exhibit ES-1 displays the preferred plan for the Highway 401 widening within the project limits.

Information about the following environmental conditions was collected in order to compare alternatives for the highway widening and to assess the environmental impacts of the selected design:

- Natural Environment: physiography and soils, aquatic resources and fisheries, vegetation resources, wildlife resources and environmentally designated areas
- Socio-Economic Environment: adjacent land uses, noise, waste and property contamination and archaeological/heritage resources



- Transportation and Utilities

Following consultation with municipal staff, interested Federal and Provincial Ministries and Agencies and the general public, the environmental assessment was completed. The Table below provides a summary of the anticipated environmental concerns and mitigation measures associated with this project.

Legend

MTO: Ministry of Transportation	CVC: Credit Valley Conservation
MNR: Ministry of Natural Resources	MIS: City of Mississauga
MOE: Ministry of the Environment	RES/BUS: Local residents and/or business owners
MUN: Regional Municipality of Peel	MCL: Ministry of Culture
UTIL: Utilities	TRCA: Toronto Region Conservation Authority

Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
NATURAL ENVIRONMENT		
Erosion and Sediment Control (Section 3.1.1 of TESR)		
<ul style="list-style-type: none"> • Soil types have been assessed through secondary source mapping. Further investigations and testing will be completed (sampling, classification, laboratory testing) during detail design. 	MOE MTO MNR CVC TRCA MUN	<ul style="list-style-type: none"> • Standard erosion and sediment control measures will be incorporated into the contract. • Side slopes will be formed at a maximum of 2 horizontal to 1 vertical to ensure slope stability • Carry out a geotechnical investigation to assess the stability of the slope along the west property line for the Fletcher's Creek SWM Pond. • Additional measures will be reviewed following completion of the detailed geotechnical investigation.
Management of Excess Material and Property Contamination (Section 3.1.2 of TESR)		
<ul style="list-style-type: none"> • The site investigation did identify potential environmental impacts within the Highway corridor and areas within the MTO Patrol Yard. 	MTO MOE	<ul style="list-style-type: none"> • Conduct Phase II ESA to assess soil and groundwater conditions associated with past spills along the Highway Corridor. A supplementary Phase II ESA is also recommended in specific areas of the MTO Patrol Yard. • Opportunities to minimize waste generation through salvage and reuse will be identified as part of the detail design phase. • Excess materials generated during construction will be managed by the Contractor in accordance with OPSS 180.
Fisheries & Aquatic Habitat (Section 3.1.3 of TESR)		
<ul style="list-style-type: none"> • There are four watercourses affected by the project which require culvert extensions. 	MOE MNR	<ul style="list-style-type: none"> • Construct works during less sensitive time period (July 1 to Sept 15). • Minimize in-stream works.

Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
<ul style="list-style-type: none"> Two of these watercourses support warmwater fish species. Existing drainage patterns are being maintained. 	<p>CVC TRCA</p>	<ul style="list-style-type: none"> Implement fisheries mitigation measures for Fletcher's Creek during construction. Isolate the construction area from watercourses through by-pass pumping and temporary diversion of specific reach to install the extensions. Erosion and sediment control measures will be incorporated into the contract.
Vegetation (Section 3.1.4 of TESR)		
<ul style="list-style-type: none"> Impacts to approximately 2 ha of removal of the Meadowvale Station Woods ESA/ANSI due to Highway widening Impacts to 1.5 ha of woodlot in the southwest portion of the Highway 401/403 interchange 	<p>CVC TRCA MNR</p>	<ul style="list-style-type: none"> Only vegetation directly affected by grading, ditching operations and traffic safety will be removed. Graded areas will be covered with topsoil seed and mulch. Landscaping and tree planting will be included in the contract, which will be determined during the detail design stage. Landscaping measures will be implemented in the area of the 2nd Line West to mitigate vegetation removals. Tree management measures will be implemented during construction to protect vegetation not being removed.
Wildlife Habitat (Section 3.1.5 of TESR)		
<ul style="list-style-type: none"> Impacts to wildlife habitat primarily within the Fletcher's creek ESA/ANSI Impacts to the existing wildlife will be of low to moderate significance. 	<p>CVC MNR</p>	<ul style="list-style-type: none"> Existing wildlife habitat areas will not be fragmented, as impacts are limited to edge effects associated with the Highway widening in vicinity of Fletcher's Creek. Amphibian ponds on the east side of Fletcher's Creek are not anticipated to be affected as grading will not affect drainage characteristics. Wildlife passage opportunities through Fletcher's Creek culvert currently low and will remain low.
Drainage (Section 3.1.6 of TESR)		
<ul style="list-style-type: none"> Additional Stormwater runoff from new pavement can impact receiving watercourses and cause flooding. 	<p>MTO</p>	<ul style="list-style-type: none"> Stormwater management practices will be implemented to minimize impacts. Provide SWM Pond for Fletcher's Creek watershed in northwest quadrant of Highway 401 and closed 2nd Line West. Provide SWM Pond for Little Etobicoke Creek Watershed in northwest quadrant of Highway 401 and Highway 403/401 interchange. Provide vegetated swales elsewhere to treat highway runoff.

Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
SOCIO-ECONOMIC ENVIRONMENT		
Adjacent Land Uses/Property (Section 3.2.1 of TESR)		
<ul style="list-style-type: none"> Limited property is required for Highway widening No residential properties are required. No impacts to existing businesses are anticipated. 	MTO RES/BUS	<ul style="list-style-type: none"> Property will be purchased based on fair market value. No residential or commercial buy-outs required since majority of land is within MTO Right-of-Way
Highway & Construction Noise (Section 3.2.2 of TESR)		
<ul style="list-style-type: none"> Residential areas are situated adjacent to Highway 401 within the project limits 	MOE MTO RES/BUS	<ul style="list-style-type: none"> Noise assessment has concluded no mitigation required given noise increase is limited to a maximum of 2 dBA. Where possible, certain operations (e.g. pile driving) will be restricted to daytime hours. Standard contract provisions regarding restrictions on operations causing significant construction noise will be included in the contract. Complaints about noise will be investigated in accordance with the MTO/MOE Noise Protocol.
Archaeology/Heritage (Section 3.2.3 of TESR)		
<ul style="list-style-type: none"> A stage 1-2 Archaeological survey was completed for this project with no significant finds 	MCL MTO	<ul style="list-style-type: none"> If the Contractor's operations expose any items, which may indicate an archaeological find or presence of built heritage structures, work in the area will be suspended immediately and MCL will be contacted.
Air Quality (Section 3.2.4 of TESR)		
<ul style="list-style-type: none"> Impact to air quality during construction 		<ul style="list-style-type: none"> During construction, dust and emissions will be generated by construction equipment and activities. Standard mitigation measures will be applied during the construction. Special Provisions for Dust Suppressants will be incorporated in the contract to ensure dust is effectively managed. Construction equipment will be required to conform to emissions standards and the idling of equipment will be restricted to ensure that air quality is not unduly impacted. Where construction activities are expected to have a direct impact on public traffic, these activities will be undertaken during off-peak periods whenever possible to minimize traffic congestion and idling of vehicles.

Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
TRANSPORTATION		
Traffic (Section 3.4 of TESR)		
<ul style="list-style-type: none">Motorists may experience delays and disruption during construction.	MTO RES/BUS	<ul style="list-style-type: none">Collector lanes will be generally constructed first thereby minimizing traffic disruptions on Highway 401.Closure of Highway 401 lanes only once additional capacity of the network has been provided.Short-term closures will be limited to off-peak and/or nighttime hours

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GLOSSARY

AADT -	Annual Average Daily Traffic
ANSI -	Area of Natural and Scientific Interest
a.s.l -	Above Sea Level
AST-	Above Ground Storage Tank
Class EA -	Class Environmental Assessment for Provincial Transportation Facilities (1999, as amended 2000)
CSA -	Canadian Standards Association
CVC -	Credit Valley Conservation
DFO -	Department of Fisheries and Oceans, Canada
dba-	Decibels on the 'A' scale
ESA -	Environmentally Sensitive Area
TESR -	Transportation Environmental Study Report
HADD -	Harmful, Alteration, Disruption or Destruction of Fish Habitat
HOV Lanes -	High Occupancy Vehicle Lanes
MCL -	Ontario Ministry of Culture
MNR -	Ontario Ministry of Natural Resources
MOE -	Ontario Ministry of the Environment
MTO -	Ontario Ministry of Transportation
NHIC -	Natural Heritage Information Centre
OPSS -	Ontario Provincial Standard Specifications
ROW -	Right-of-Way
SARA -	Species at Risk Act
SWM-	Stormwater Management
SWMP-	Stormwater Management Plan
TRCA -	Toronto Region Conservation Authority
UST-	Underground Storage Tank
W.P. -	Work Project

1. THE ENVIRONMENTAL ASSESSMENT PROCESS

1.1 THE ONTARIO ENVIRONMENTAL ASSESSMENT ACT

The Ministry of Transportation's *Class Environmental Assessment for Provincial Transportation Facilities* (MTO Class EA) was approved under the Ontario *Environmental Assessment Act* in the fall of 1999 and amended in 2000. This planning document defines the group of projects and activities, and the environmental assessment processes that MTO has committed to follow for these projects. Provided that this process is followed, projects and activities included under the Class EA do not require formal review and approval under the Ontario *Environmental Assessment Act*. The MTO Class EA process is principle based. For a summary of how the principles of the MTO Class EA were achieved the reader is referred to Chapter 5.0 Class EA Principles.

The following principles underlie the Class EA process for Group A, B and C projects:

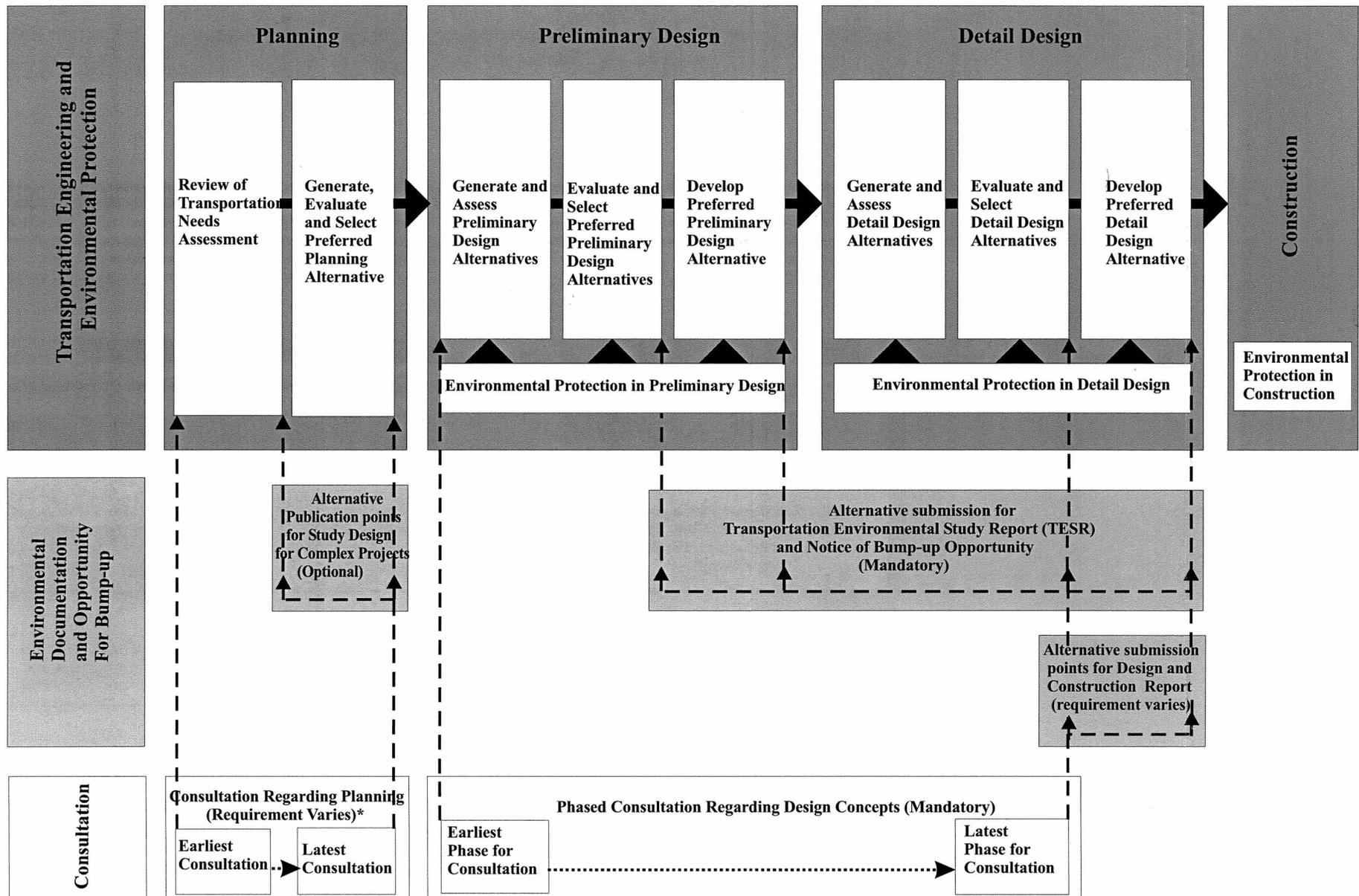
- Transportation engineering principles;
- Environmental protection principles;
- External consultation principles;
- Evaluation principles that are intended to achieve the best overall balance of these principles;
- Documentation principles;
- Bump-up principles; and
- Environmental clearance principles to proceed.

This project is following the Class EA process for Group 'B' projects. Group 'B' projects are major improvements to provincial transportation facilities and generally include:

- Improvements to existing highways and freeways providing a significant increase in capacity;
- New interchanges or modifications to existing interchanges;
- Major realignments;
- New or modified water crossings or watercourse alterations; and
- New highway service facilities.

The Class EA process for Group 'B' projects is shown in Exhibit 1-1. This project addresses the Preliminary Design Phase and includes submission of a Transportation Environmental Study Report (TESR).

This TERS will be filed for a minimum 30-day period of public and external agency review. If concerns are raised during this review period that cannot be resolved through discussions with the Ministry of Transportation, members of the public, interested groups or technical agencies



*Mandatory if a Study Design is prepared.

EXHIBIT 1-1: OVERVIEW OF CLASS EA PROCESS B PROJECTS

may request a “bump up” (Part II Order) to the Minister of the Environment, thereby requiring an individual environmental assessment. This would require submission of a formal letter (as required by Section 5 (1) of the Ontario *Environmental Assessment Act*) to the Ministry of the Environment for formal review and approval.

The decision whether a “bump-up” is appropriate or necessary rests with the Minister of the Environment.

If no “bump-up” requests are outstanding by the end of the 30-day review period, the project is considered to have met the requirements of the Class EA, and MTO may proceed to tender and construct the project subject to resolving any commitments documented in this TESR during the detail design phase and obtaining any other outstanding environmental approvals.

1.2 THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT

The Canadian Environmental Assessment Act (CEAA) is “triggered” by:

- Need for Federal funding
- Need for Federal lands (including First Nation lands)
- Issuance of a Federal approval identified on the Law List

This project currently is not currently eligible for Federal funding, and will not affect any lands owned by the Federal Government or First Nations. Therefore, the first two “triggers” do not apply.

Regarding the third “trigger”, there are two potential federal approvals that do not apply as follows. In accordance with the Ministry of Natural Resources / Ministry of Transportation Fisheries Protocol, MNR has indicated to date that an Authorization under the Section 35(2) of the Federal Fisheries Act is not anticipated given the proposed crossing design at Fletcher’s Creek. In addition, the Canada Coast Guard has confirmed that Fletcher’s Creek is not navigable at Highway 401, therefore approvals under the Navigable Waters Protection Act are also not anticipated.

Therefore approvals under CEAA are not currently anticipated at this time for this project.

1.3 PURPOSE OF THE TRANSPORTATION ENVIRONMENTAL STUDY REPORT

This Transportation Environmental Study Report (TESR) documents the environmentally significant aspects of the planning, design and construction of the Highway 401 Improvements from Highway 410/403 interchange to east of the Credit River, a Group ‘B’ project as defined in the *Class Environmental Assessment For Provincial Transportation Facilities (1999, as*

amended 2000). It includes: a description of the project and its purpose; the existing natural, social/health, economic and cultural environmental factors; anticipated environmental effects and proposed mitigation measures; and commitments for further work, consultation, and monitoring associated with the implementation of the project.

Additional information about the Class Environmental Assessment process for Group 'B' projects is contained in *Class Environmental Assessment for Provincial Transportation Facilities (1999, as amended 2000)*. Readers interested in this information are encouraged to refer to that document. In addition, other related studies have been carried out in this area. A number of background studies and reports contain additional information that may be of interest to the reader. These are described in Section 2.1.3 (Related / Adjacent Studies and Projects).

Additional information about this project is also available by contacting the key Project Team members involved in this project, as follows:

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2. PROJECT SUMMARY

2.1 DESCRIPTION OF PROJECT

2.1.1 Project Location and Highway Classification

Highway 401 is a six-lane divided highway with a median barrier along the length of the highway. Ditches are present on either side of the pavement and catchbasins are present intermittently along the Highway Corridor to collect surface run-off from between the eastbound and westbound lanes. Most of the land beyond the paved highway shoulders is grassed. Traffic monitoring systems were noted to exist at several locations within the Highway Corridor.

Existing structures within the Highway Corridor include the Highway 410/403 interchange structures, Kennedy Road, Hurontario Street, McLaughlin Road, Mavis Road and 2nd Line overpasses. Five utility corridors and a deer crossing pass through the Highway Corridor. Other noteworthy features include Credit River valley lands and a forested area associated with Fletchers Creek (Meadowvale Station Woods) that extend north and south of the Highway Corridor west of Mavis Road which has been identified as an Environmentally Significant Area.

The Highway 401 right-of-way is generally bounded by commercial/industrial developments at the easterly ends of the project limits. The development consists of primarily warehousing and light manufacturing, and various telecommunication, technology and office support companies. A MTO patrol yard is in the northwest quadrant of Highway 401 and Hurontario Street. Undeveloped land and/or agricultural land are present on the north side of Highway 401 between Mavis Road and Hurontario Street and on the south side between the Credit River and 2nd Line West Road. A telecommunications tower is situated just west of McLaughlin Road on the north side of the Highway Corridor. Residential uses are west of Mavis Road on the north and south sides of Highway 401.

Exhibit 2-1 displays the project limits.

2.1.2 Selected Design

The selected design consists of:

- Widening Highway 401 from a basic 6-lane Highway to a 12-lane express/collector configuration;
- Collector lanes consisting of 3 general purpose lanes in each direction;
- Express lanes consisting of 2 general purpose lanes and 1 HOV lane in each direction;
- Reconstruction of the Hurontario Street interchange including replacement of the structure over Highway 401;
- Replacement of the McLaughlin road structure over Highway 401;

- Reconstruction of the Mavis Road interchange, including expansion of the existing structure over Highway 401 ;
- Removal of the 2nd Line West structure over Highway 401;

Other features of the recommended design include:

- High mast illumination on Highway 401 throughout the project limits. Conventional illumination will be provided or upgraded on intersecting roads;
- Carpool parking lot at the Highway 401/Hurontario Street Interchange;
- New ramps to and from the west at the Highway 403 interchange;
- Stormwater management including provision of stormwater ponds;
- New structures to carry the collector lanes over Fletchers Creek;
- Reconstruction of the existing highway pavement.

Exhibit 2-2 displays the preferred plan and Exhibit 2-3 the typical cross-section for the Highway 401 widening within the project limits.

The improvements will be implemented in a series of construction contracts phased over a number of years. The work is anticipated to progress from east to west, with the express/collector system initially opened to Hurontario Street and then to west of Mavis Road. The staging of construction will be established to maintain the existing basic number of lanes at all times. To achieve this, the new collector lanes will be constructed and opened to traffic before proceeding with rehabilitation of the existing lanes (future express lanes). Once this rehabilitation is completed, the full express/collector lanes will be opened to traffic.

The McLaughlin Road structure will be replaced with a new four lane structure before reconstruction of the Hurontario Street and Mavis Road interchanges, in order to maximize the available north-south traffic capacity during the interchange work. Although both Hurontario Street and Mavis Road will remain open during construction, lane reductions are anticipated and therefore the interchange reconstruction works will not occur concurrently.

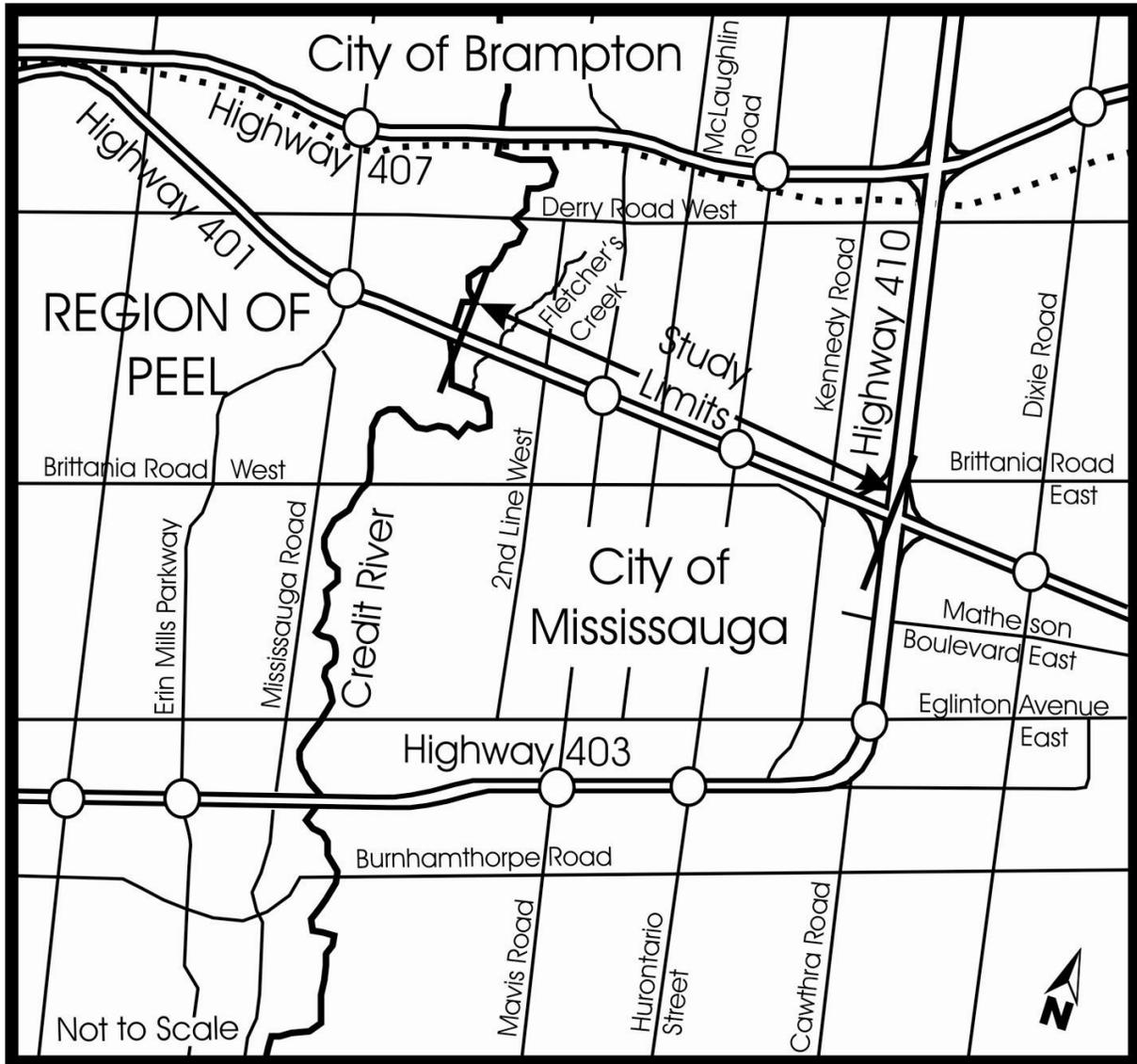


EXHIBIT 2-1 KEY MAP

CONT WP	2149-01-00 2150-01-00	
EXHIBIT 2-2 PREFERRED PLAN		SHEET
		



LEGEND

-  EXISTING FEATURES
-  PROPOSED EXPANSION

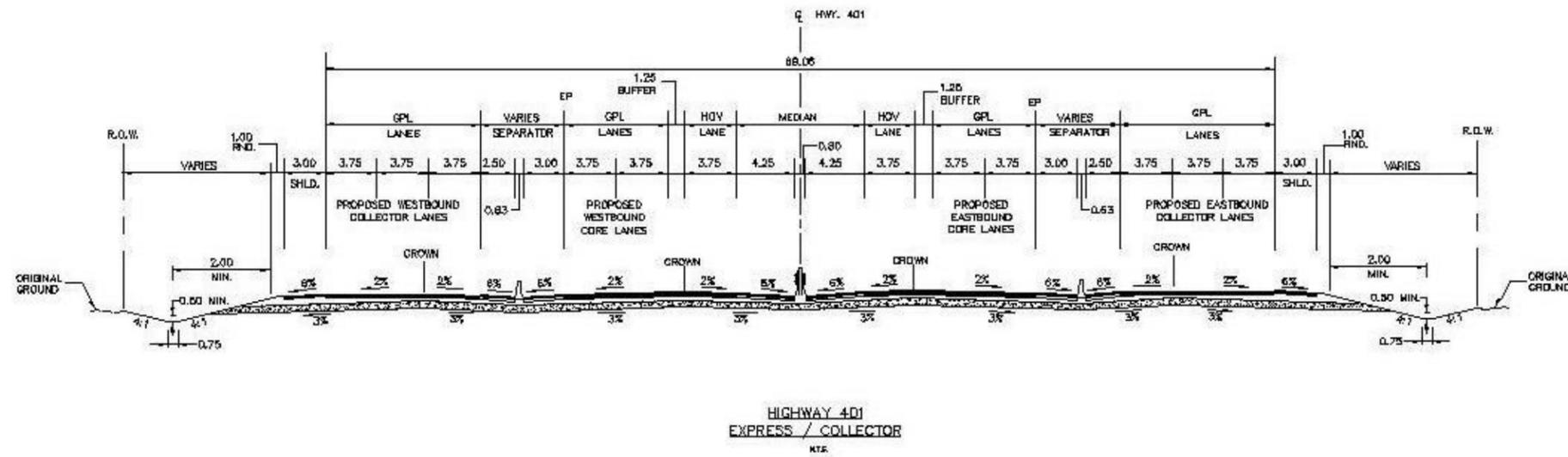
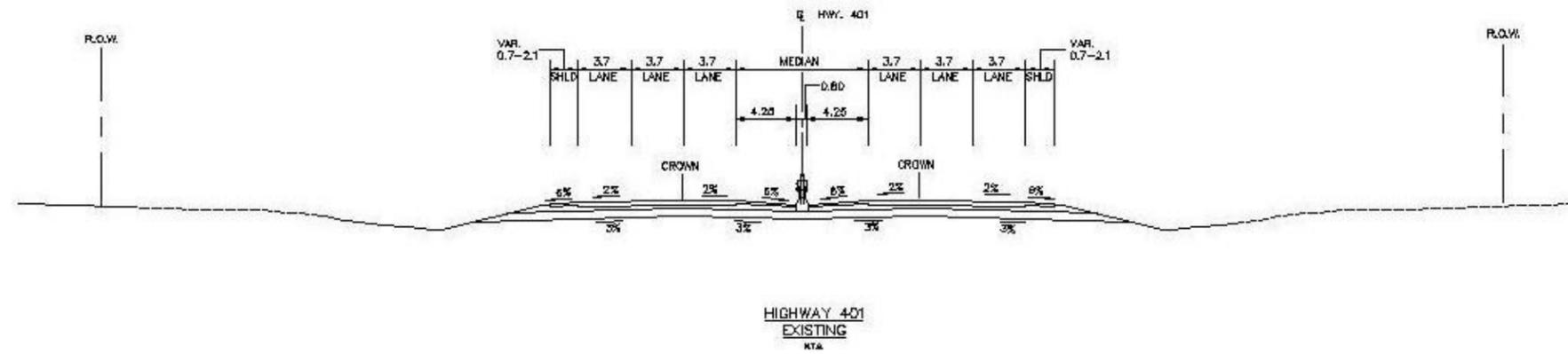
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CONT
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EXHIBIT 2-3
 TYPICAL CROSS-SECTIONS

SHEET



N.T.S.

It is proposed that the Highway 401 widening be prioritized to begin construction under the Ministry's Capital Construction Program within the next five years subject to obtaining the necessary approvals and the availability of funding.

2.1.3 Related / Adjacent Studies and Projects

A number of previous studies are related to this Class Environmental Assessment and Preliminary Design Study.

The Ministry of Transportation undertook internal reviews in 1982 and 1992 to examine Highway 401 through the City of Mississauga and develop recommended improvements to address existing and anticipated deficiencies on this section of the highway. The previous studies have involved long range planning to define future improvement requirements. The Ministry used these studies to protect property within the corridor.

A Preliminary Design Report was completed in 1982, which included this section of Highway 401 (W.P. 127-66-64). A Pre-Design and Concept Review Report (W.O. 89-23-033) dated April 1992, updated and expanded upon this earlier study. A Value Engineering and Construction Staging Study (W.O. 99-23009) followed in 2000-2001, resulting in the design concept generally described herein. All of these studies have recognized the need for significant capacity improvements to accommodate growing travel demands. The need for an express/collector system west of Highway 410/403 was recognized in the 1982 study.

2.2 PROJECT JUSTIFICATION AND PURPOSE

2.2.1 Project Justification

Highway 401 is recognized as a key economic corridor. It provides access within the Greater Toronto Area, across Ontario and to the U.S.A. through border crossings at Windsor and Sarnia. Continued truck and car traffic growth has resulted in frequent congestion and operational problems in the corridor. The current project is reviewing and updating the previous work to confirm the final configuration of improvements with an emphasis on opportunities to integrate transit and High Occupancy Vehicle facilities within the corridor.

The study section of Highway 401 is currently a basic six lane divided freeway. East of Highway 410/403, a 12-lane express-collector system is in place.

The following concerns and deficiencies have been identified:

- Existing and future traffic congestion;
- Safety and operational concerns;

- Interchange capacity and operational problems; and
- Deteriorating infrastructure (e.g. bridges, pavement, illumination, roadside barriers)

Highway 401 is a key economic corridor, carrying a commodity value of \$ 900 M per day through the project limits. Safe and efficient goods movement plays an important role in this transportation corridor.

The Ministry is also currently undertaking a number of studies to examine broader transportation initiatives such as transit and high occupancy vehicle facilities. In addition to addressing the above deficiencies, design alternatives are being developed to maintain compatibility with, and support, these other initiatives.

Existing and anticipated future travel demand in the Highway 401 corridor has been evaluated, recognizing planned development and other transportation network improvements such as the future expansion of Highway 407 and improvements to the municipal road network. An analysis of the traffic operations along Highway 401 within the study area found that existing (2001) traffic volumes are nearly at or have already reached capacity of the existing six lanes (three in each direction). Future traffic operations are expected to become worse to the point that traffic volumes will exceed capacity and create significant delays along this section of Highway 401 by the year 2011. Based on the traffic growth models, traffic volumes will exceed capacity by the year 2011 if there are less than ten lanes provided (five in each direction). By the year 2021, Highway 401 will be operating beyond the capacity of ten lanes (five in each direction) for the following segments:

- Westbound from Highway 410 to Mavis Road; and
- Eastbound from Hurontario Street to Highway 410.

2.2.2 Project Objectives

The project objectives are to address the identified operational and capacity concerns along Highway 401 between Highway 410/403 Interchange to the Credit River.

The purpose of this Preliminary Design and Environmental Assessment Study is to:

- i. Identify a preferred solution that meets both short-term and long-term needs.
- ii. Investigate all significant issues, concerns and deficiencies within the project limits.
- iii. Develop, assess and evaluate a complete range of alternatives that address the operational and capacity concerns along Highway 401 within the project limits.

2.3 EXISTING ENVIRONMENTAL FEATURES

The study area is located within the City of Mississauga in the Region of Peel. The land uses within the project limits are predominantly residential and industrial with some agricultural. There is new residential development occurring along the western portion of the route and one environmentally significant area. There are cultural and recreational resources close to the roadway. Exhibit 2-4 displays the existing environmental features.

INSERT EXHIBIT 2-4 EXISTING ENVIRONMENTAL FEATURES

Information about the existing environmental features within the project limits was collected from the following sources:

- *Assessment of Fisheries and Aquatic Habitat along Highway 401 From Highway 10 to Calfass Road*, Tarandus Associates Limited (March 2002).
- *Credit River Watershed Environmentally Significant Area. Prepared for the Credit River Valley Conservation Authority. ESA #14: Meadowvale Station Woods ESA. Ecologistics (1979)*
- *Environmental Scoping Report. W.O. 99-23009 Highway 401, from 410, from 410 Westerly to Sixth Line, Region of Peel/City of Mississauga, Region of Halton/Town of Milton and Town of Halton Hills, MTO (1999)*
- *Highway 401 Expansion Highway 410/403 Interchange to Credit River – Terrestrial Environment Report*, Marshall Macklin Monaghan (September 2004).
- *Natural Areas Database, NHIC (2002)*
- *Roadway Improvements to McLaughlin Road from Highway 401 To North City Limit Environmental Study Report*, City of Mississauga. (February 2000).
- Environmental Site Assessment Report Ministry of Transportation Patrol Yard King's Highway No. 401 and No. 10, City of Mississauga, Regional Municipality of Peel, Ontario, Conestoga-Rovers & Associates (September 2000)
- Observations made during site visits.
- Phase 1 Environmental Site Assessment, Highway 401 Expansion, Highway 410/403 Interchange to the Credit River, W.P. 2149 & 2150-01-00, Marshall Macklin Monaghan Limited (July 2003)
- Highway 401 Expansion, Hwy 410/403 to Credit River, W.P. 2149 & 2150-01-00, Contract Sequencing Study, Marshall Macklin Monaghan Limited. (May 2003)
- Archaeological Site Assessment, W.P. 2149 & 2150-01-00, Archaeoworks (May 2005)
- Environmental Noise Assessment, Highway 401 Expansion: Highway 410/403 Interchange to Credit River, Marshall Macklin Monaghan Limited (February 2005)

2.3.1 Natural Environment

2.3.1.1 Physiography and Soils

The area between Lake Ontario and the Oak Ridges Moraine has been divided into three regions. The Iroquois Lake Plain occupies the lowest land, between 122 m above sea level (a.s.l) to 183 m a.s.l in west to east. The Peel Plain is located centrally in the extended western section and is separated from the Iroquois Shoreline by the Trafalgar Moraine and a strip of till plain. The South Slope is the southern slope of the Oak Ridges Moraine including the narrow piece south of the Peel plain. It rises to connect with the Oak Ridges Moraine in an average width of 10 to 11 km. The Oak Ridges Moraine extends from the Niagara Escarpment to the Trent River, covering an area of approximately 2,435 square kilometres. The study area is located on the South Slope in the strip of till plain located immediately east of the Trafalgar Moraine, south of the Peel Plain, and north of the Iroquois Shoreline. The majority of the western portion of the South Slope of the Oak Ridges Moraine lies to the north of the Peel Plain but the Trafalgar Moraine and the adjacent till plain to the south of the Peel Plain are included in the designation. The surface can be characterized by ground moraine with irregular knolls and hollows. The slope is drumlinized with the exception being the Trafalgar Moraine located between the former villages of Streetsville and Nelson with its moderate knob and kettle relief. The study area lies on till plains made up of a large amount of red shale that characterizes the Queenston Formations (Chapman and Putnam, 1984).

The soil composition is composed of the Oneida catena, which consists of the well-drained Oneida series, the imperfectly drained Chinguacousy series, and the poorly drained Jeddo series. The Oneida clay loam can be characterized by smooth moderately sloping topography. The soil can be described as approximately 15 cm of greyish brown clay loam surface soil over well-developed horizons. It resides over a dark yellowish brown calcareous parent material containing few stones. It is a member of the Grey-Brown Podzolic Great Soils Group. Dissection of the land by watercourses creates the smooth moderately rolling topography of the Oneida clay loam. Percolation of moisture through the soil is slow, but run-off is fairly rapid which results in a well-drained soil. The soil is susceptible to erosion. The Chinguacousy clay loam can be characterized by a smooth gently sloping topography. The soil can be described as 18 cm of dark greyish brown clay loam over mottled less well-defined horizons. The underlying clay parent material is dark yellowish brown containing few stones. The parent material is high in limestone content but shale is present in large amounts. This results in a soil whose drainage is imperfect, and susceptibility to erosion is slight. It is also a member of the Grey-Brown Podzolic Great Soils Group. The Jeddo Clay Loam can be characterized by its smooth very gently sloping topography. The soils can be described as 20 cm of very dark grey to black clay loam over very mottled, poorly defined lower horizons. The parent material is dark yellowish brown clay with few stones. It is a member of the Dark Grey Gleisolic Great Soil Group. This type of soil usually occurs adjacent to watercourses (Hoffman and Richards, 1953).

2.3.1.2 Aquatic Resources and Fisheries

The Study area is drained by tributaries that convey flow south to the Credit River and south to Lake Ontario and by tributaries that flow into Cooksville Creek and south into Lake Ontario. This drainage pattern reflects the generally flat surface topography in the area.

The proposed area crosses over 4 tributaries of the Cooksville Creek watershed and 2 tributaries of the Credit River. The eastern limits of the study area are within the Little Etobicoke Creek watershed, however all drainage from this area is conveyed via trunk Storm Sewer.

Little Etobicoke Creek Watershed

The section of Highway 401 located within the little Etobicoke Creek watershed drains to Little Etobicoke Creek via an existing storm sewer system located within the Highway 410/Highway 401 interchange. The trunk sewer for this system is referred to as the Heart Lake Road trunk storm sewer tunnel, and it discharges to Little Etobicoke Creek at a storm sewer outfall located south of Highway 401 and east of Tomken Road.

Cooksville Creek Watershed

The Headwaters of Cooksville Creek originate in the vicinity of Highway 401 and Highway 10, from here it flows southward to where it discharges into Lake Ontario near the R.K. MacMillan Conservation Area.

This watershed is smaller than that of the Credit River and most of its tributaries run through residential and industrial areas in Mississauga. Many of the tributaries have been channelized, some in concrete, and as a result much of Cooksville Creek is a stormwater conveyance feature. All four tributaries within the project area are all considered to be intermittent. The 2 furthest to the east discharge to underground storm sewers and the other 2 are stormwater channels. Due to the degradation of the watershed, only 3 species of fish have been reportedly collected and that was 10 km south of Highway 401. These 3 species are creek chub (*Semotilus atamaculatus*), white sucker (*Catostomus commersoni*) and brook stickleback (*Culaea inconstans*). All 4 crossings had little sign of fish life and their low levels of dissolved oxygen echoes the stormwater origin of water in this area. Riparian vegetation is dominated by cattail and old-field vegetation including grasses, milkweed, goldenrod, ragweed, thistle, deadly nightshade, pampas grass and some maple trees.

Credit River Watershed

The headwaters of the Credit River watershed are near Orangeville, Ontario. Currently there are over 55 fish species that exist along this watercourse and its tributaries.

The main tributary in this watershed is Fletcher's Creek, located about 150 m west of Mavis Road. Its headwaters are in Brampton and flows southward into the Credit River 500 m south of Highway 401, between Mississauga Road and Mavis Road. The creek channel is well-defined with an average width of 5 metres and depth of 1 metre. Upstream the riparian vegetation consists of grasses, thistle and goldenrod as well trees such as alder, maple, birch, cedar and poplar. Loosestrife, grasses, goldenrod and scattered trees are found further downstream. The aquatic species found in the creek are diverse and include warmwater, coldwater and foraging species. Some fish species it features are rainbow trout (*Oncorhynchus mykiss*), bluntnose minnow (*Pimephales notatus*), northern hogsucker (*Hypentelium nigricans*) and common shiner (*Luxilus cornutus*) along with several others. Rainbow trout have been known to spawn in this creek, their success at reproduction is unknown. Redside dace (*Clinostomus elongatus*) have also been reported at several locations in the creek, this species is classified by the Committee On the Status of Endangered Wildlife in Canada as a species of "special concern". Due to its associated habitat and diverse, high-quality fish community, Fletcher's Creek is considered quite significant.

The second tributary of the Credit that crosses the project area originates in a farmer's field a few hundred metres north of the highway. It flows southwesterly and its confluence with the Credit River is 300 m south of Highway 401. The channel is not well defined and its vegetation consists of cattails, grasses and ragweed. There were 4 species of fish gathered at this location; brook stickleback (*Culaea inconstans*) found in summer and fall, common shiner (*Luxilus cornutus*) and central mudminnow (*Umbra limi*) in spring and summer and bluntnose minnow in spring. This watercourse is considered intermittent because of varying degrees of flow and even though it does support small fish, the water quality is considered to be comparable to stormwater and not a natural watercourse.

2.3.1.3 Vegetation Resources

The Credit River valleyland lies just beyond the western limits of the project however the most significant natural area in the study corridor is the Meadowvale Station Woods ESA/ANSI as noted on Exhibit 2-4. This forested habitat is made up of mainly upland forest cover and habitat that includes the valleyland of Fletcher's Creek, in addition to the adjoining tableland to the north and south of Highway 401 and to the east and west of Fletcher's Creek.

Meadowvale Station Woods is considered an Environmentally Sensitive Area as it fits a number of conditions. Hydrologically it is quite significant because it has storage capacity for peak flows in Fletcher's Creek. It also provides habitat to the regionally rare one-flowered broomrape

(*Orobanche uniflora*) and rose-twisted stalk (*Streptopus roseus*). In addition, abundant spring flora provides habitat for white-tailed deer (*Odocoileus virginianus*) in the area and is important for nesting birds.

The Credit River valleyland consists of scattered shrub and tree cover that form a band along the river banks. The prevailing tree cover is Manitoba maple (*Acer negundo*), willow (*Salix* sp.) and red ash (*Fraxinus pennsylvanica*), and the most widespread ground cover is reed canary grass (*Phalaris arundinacea*). There are also agricultural lands north and south of the highway between Fletcher's Creek and the Credit River.

The vegetation can be divided into 5 categories based on the Ecological Land Classification for Southern Ontario (Lee et. al. 1998).

i) Dry-Fresh Sugar Maple Deciduous Forest (FOD 5-1)

This is the most dominant category in the Meadowvale Station Woods ESA/ANSI. The primary species in the canopy is sugar maple (*Acer saccharum*) followed by American beech (*Fagus grandifolia*), red oak (*Quercus rubra*), shagbark hickory (*Carya ovata*), black cherry (*Prunus serotina*), ironwood (*Ostrya virginiana*) and white ash (*Fraxinus americana*). Black walnut (*Juglans nigra*) is found near the bottom of the slope. Some species in the shrub layer include chokecherry (*Prunus virginiana*), blue-beech (*Carpinus caroliniana*) and tartarian honeysuckle (*Lonicera tatarica*). The spring ephemeral species found include trout lily (*Erythronium americanum*) and blood root (*Sanguinaria canadensis*). Others are mayapple (*Podophyllum peltata*), lance-leaved toothwort (*Cardamine concatenata*), rose-twisted stalk, Canada mayflower (*Maianthemum canadense*), Virginia waterleaf (*Hydrophyllum virginianum*), blue cohosh (*Caulophyllum thalictroides*), zig-zag goldenrod (*Solidago flexicaulis*), herb robert (*Geranium robertianum*), wild zinger (*Asarum canadense*), sedge (*Carex pennsylvanica*) and garlic mustard (*Alliaria petiolata*). One-flowered broomrape and rose-twisted stalk, two species of concern in the Toronto Region and Conservation Authority jurisdiction, were found in the southern part of this community, south of Highway 401.

ii) Fresh-Moist Lowland Deciduous Forest (FOD 7)

Located on the north and south sides of the 401, this community occupies the Fletcher's Creek floodplain. In the spring of 2002 the floodplain was flooded, creating conditions ideal for hydric forest cover. Some tree species include sugar maple, American elm (*Ulmus americana*), black ash (*Fraxinus nigra*) and Manitoba maple. The moist soil conditions also sustain cursed crowfoot (*Ranunculus scleratus*), duckweed (*Lemna minor*) and horsetail (*Equisetum arvense*). Reed canary grass (*Phalaris arundinacea*) is found in open, uncovered areas.

iii) Dry Fresh Oak-Maple-Hickory Deciduous Forest (FOD2)

Situated southwest of the Highway 401/403 interchange, the topography is flat with scattered low-lying areas moist enough to support vegetation that prefer wet conditions. The main species include white oak (*Quercus alba*), shagbark hickory, basswood (*Tilia americana*), white

ash (*Fraxinus americana*) and common buckthorn (*Rhamnus cathartica*). Trout lily, mayapple, trillium (*Trillium grandiflorum*) and garlic mustard (*Alliaria petiolata*) mark up the ground cover while purple loosestrife (*Lythrum solicaria*) and common reed (*Phragmites australis*) are found in the wetter fringe areas.

iv) Cultural Meadow (CUM 1-1)

This community is found in the highway ROW and throughout the study corridor including the Meadowvale Station Woods ESA/ANSI. Species included are Queen Anne's lace (*Daucus carota*), common burdock (*Arctium minus*), teasel (*Dipsacus fullonum*), bluegrass (*Poa*), Canada goldenrod (*Solidago canadensis*), common dandelion (*Taraxacum officinale*), common sowthistle (*Sonchus oleraceus*) and garlic mustard while common cattail and purple loosestrife dominate in the low, wet areas. Primary shrubs are common buckthorn and staghorn sumac (*Rhus typhina*). Areas of inclusion include a Lombardy poplar (*Populus nigra*) plantation, cattail and a mowed lawn.

v) Coniferous Plantations (CUP3)

These plantations are found on the north side of the highway ROW between Mavis Road and Hurontario Street. A number of them are located within cultural meadow sites. Species included are Norway spruce (*Picea abies*), white spruce (*Picea glauca*) and Austrian pine (*Pinus nigra*).

2.3.1.4 Wildlife Resources

i) Birds

The tall, enclosed canopy structure of the Meadowvale Station Woods ESA/ANSI provides the most important habitat for birds on a seasonal and year round basis. Species include blue jay (*Cyanocitta cristata*), American robin (*Turdus migratorius*), white-throated sparrow (*Zonotrichia albicollis*), white-breasted nuthatch (*Sitta carolinensis*), wood thrush (*Hylocichla mustelina*), downy woodpecker (*Picoides pubescens*), black-capped chickadee (*Poecile atricapillus*), red-eyed vireo (*Vireo olivaceus*) and American crow (*Corvus brachyrhynchos*). There is evidence of the presence of pileated woodpecker (*Dryocopus pileatus*) and the habitat is suitable for supporting them. At the forest edge, mourning dove (*Zenaida macroura*), song sparrow (*Melospiza melodia*) and gray catbird (*Dumatella carolinensis*) were found.

ROW field vegetation, agricultural fields and man-made structures made up the remaining part of the corridor. Species in this habitat are generally found throughout the area, as they have no general habitat needs. They include European starling (*Sterna vulgaris*), house sparrow (*Passer domesticus*), American crow, American robin, chipping sparrow (*Spizella passerine*), red-winged black bird (*Agelaius phoeniceus*) and mourning dove.

The local species of concern as identified by the Toronto Region and Conservation Authority are the pileated woodpecker, white-throated sparrow and wood thrush. However none of these three species are considered significant provincially or federally.

ii) Mammals

The surrounding land development and the presence of Highway 401 limits the mammal community. Grey squirrel (*Sciurus carolinensis*) primarily inhabits the wooded areas such as the Meadowvale Station Woods. White-tailed deer tracks have been spotted in the area. The Fletcher's Creek culvert provides the opportunity for wildlife to pass from the north and south parts of the Meadowvale Station Woods ESA/ANSI. The easterly culvert generally has a greater elevation and there is normally no flow through this culvert in late spring to fall period. Therefore this would provide an ideal opportunity for deer and other wildlife to cross under the highway. None of the species cited are considered significant provincially or federally.

iii) Herpetofauna

There are two ponded areas within the Fletcher's Creek floodplain that provide frog habitat that extends from Highway 401 south for a distance of 75 to 80 m. The size of the larger pond is approximately 10 m x 40 m in size and appears to provide a permanent habitat as it contains some wetland emergent species. Both green frog (*Rana clamitans melanota*) and bullfrog (*Rana catesbeiana*) have been observed in the pond and this would indicate that these ponds provide a lasting pool habitat in spring. The larger pond likely may extend into the summer period to provide a breeding habitat for the typical bullfrog breeding period.

The west side of the Creek south of the highway crossing is a potential seasonal pond. Forest ponds also occur at the north end of the northerly part of the Meadowvale Station Woods. Green frogs have been identified in the pool habitat on the south side of the highway, east of Fletcher's Creek. Two American toads (*Bufo americanus*) were observed north and south of Highway 401.

Credit Valley Conservation has acknowledged that Jefferson's salamander (*Ambystoma jeffersonianum*) has been observed in the Meadowvale Station Woods ESA/ANSI, however Jefferson's Salamander was not found during site visits. On a separate site reconnaissance 12 red-backed salamanders (*Plethodon cinereus*), 3 of which were lead-backed morph were seen under rotted logs. Six red-backed salamanders, 2 of which were lead-backed morph, were seen under rotted logs on the south side of the highway.

The Toronto and Region Conservation Authority regards the bullfrog and the red-backed salamander as species of concern. None of the observed species are considered significant provincially or federally. Nor are any of the terrestrial species observed considered Species-At-Risk as listed under the Species at Risk Act. A copy of the Terrestrial Environment Report is provided in Appendix A.

2.3.2 Socio-Economic Environment

2.3.2.1 Political Jurisdictions

The study area is located in the GTA within the City of Mississauga in the Region of Peel. The City of Mississauga has a population of 612,925 while the population of the Region of Peel is 988 945 (2001 Census). The Region of Peel is the largest Municipality in the GTA next to the City of Toronto.

The Meadowvale Village (Residential) Planning District is situated north of Highway 401 and is bounded by the Credit River to the west and Fletchers Creek to the east. The lands along Highway 401 in this Planning District include a portion of the Meadowvale Station Woods ESA/ANSI around the Credit River and Fletchers Creek as well as residential lands and some open space from 2nd Line West to McLaughlin Road.

Most of the lands within the district are undeveloped agricultural fields. The area also features the northern section of the Meadowvale Station Woods ESA/ANSI west of 2nd Line West Road. The portion of land north of Highway 401 between 2nd Line West and McLaughlin Road is designated as a developed area.

The East Credit (Residential) Planning District is situated south of Highway 401 and is bounded by the Credit River to the west, Mavis Road to the east and Highway 403 to the south. Along Highway 401 in this Planning District features a portion of the provincial Greenbelt from the Credit River to 2nd Line West and residential land from 2nd Line West to Mavis Road. A strip of business employment and general commercial land is found at Mavis Road and Britannia Road West.

The Gateway (Employment) Planning District is situated on the north and south sides of Highway 401 between Mavis Road / Credit River and Highways 403 and 410. The lands along Highway 401 in this Planning District are primarily designated as business employment. Additional designations include the Meadowvale Station Woods ESA/ANSI along Fletchers Creek, portions of the Parkway Belt West and some open space west of Highways 403 and 410.

2.3.2.2 Adjacent Land Uses

The majority of the Highway 401 corridor is developed or in the process of being developed. Land use in the study area has been changing from rural uses in the early 1990s to developed residential/commercial and industrial uses. Commercial and institutional land uses are common in the eastern part of the study area, while residential development activity is common towards the western limit of the project.

Table 2-1 provides a summary of development (as of January 1, 2004) within the study area using the following categories:

- **Existing:** development that is built, under construction or for which a building permit has been issued as of January 1, 2004 (December 31, 2003 for residential)
- **Committed:** vacant lands that are appropriately designated and zoned and for which no building permit has been issued
- **Endorsed Applications:** vacant lands subject to a development application for which City Council has adopted a recommendation approving the application. While approved by City Council, these applications have not completed the development application process and are still subject to appeal to the Ontario Municipal Board.
- **Potential:** vacant lands where the zoning does not conform to the Official Plan / City Plan / Mississauga Plan and a development application, if submitted, has not been endorsed by City Council.

Table 2-1: Study Area Development

Planning District	Existing	Committed	Endorsed Applications	Potential	Total*
Residential Development (Total Units) ¹					
<i>East Credit</i>	15,810	1,140	860	100	17,920
<i>Meadowvale Village</i>	6,950	600	870	830	9,240
Employment Lands Development (Hectares) ²					
<i>East Credit</i>	1	24	0	1	26
<i>Gateway</i>	887	236	46	82	1,251
Office Commercial Development (m²) ³					
<i>East Credit</i>	0	120,700	0	0	120,700
<i>Gateway</i>	249,900	1,694,500	0	502,100	2,446,500
Retail Commercial Centres Development (m²) ⁴					
<i>East Credit</i>	93,700	39,300	0	9,300	142,300
<i>Meadowvale Village</i>	9,300	200	0	0	9,500
<i>Gateway</i>	123,300	11,600	0	0	134,900

* Numbers may not add due to rounding

¹ Source: City of Mississauga Planning and Building Department. *Mississauga Development Profile 2004: Residential Development*. Newsletter May 2004.

² **Source:** City of Mississauga Planning and Building Department. *Mississauga Development Profile 2004: Employment Lands Development*. Newsletter May 2004.

³ **Source:** City of Mississauga Planning and Building Department. *Mississauga Development Profile 2004: Office Commercial Development*. Newsletter May 2004.

⁴ **Source:** City of Mississauga Planning and Building Department. *Mississauga Development Profile 2004: Retail Commercial Centres Development*. Newsletter May 2004.

2.3.2.3 Noise

The land uses along the Highway 401 study corridor consist of industrial, agricultural and residential uses. Three specific outdoor locations were identified as Noise Sensitive Areas (NSA). These NSA's are located on the north and south side of Highway 401 west of Mavis Road and on the north side of Highway 401 west of Hurontario Street.

The end lots of the residential townhouses on the north side of Highway 401 west of Mavis Road, which front onto Jazzy Mews and Highway 401, do not have separate noise barriers, although the homes were constructed in the last few years and therefore any required noise mitigation would have been the responsibility of the developer.

The residential homes on the south side of Highway 401 west of Mavis Road front onto Delgado Drive and Highway 401. There is an existing 6-foot (1.8 metres) noise barrier along the Highway 401 road allowance in the vicinity of Delgado Drive between 2nd Line West and Mavis Road, which provides screening from road traffic noise for the Delgado Drive residents. These barriers and the shielding provided by existing residential homes were included in this assessment.

Identification of the receptor locations was based on base mapping, aerial photography and a site visit. The results of the noise analysis are summarized in Appendix B.

2.3.2.4 Waste and Property Contamination

A MTO Patrol Yard is located on the north side of the Highway Corridor at 6130 Edwards Blvd., between Kennedy Road and Hurontario Street. This facility was built in 1961. Based on the results of the Phase I ESA, it is concluded that there is a potential for environmental impacts within the Highway Corridor. A copy of the Phase I ESA is provided in Appendix C. The areas of environmental concern include the following:

- Several spills have occurred within the Highway Corridor that have been assessed by the MOE to have likely caused adverse effects to soil and/or groundwater.
- The quality of soil that may be removed during preparation of the subgrade is unknown. These include areas to be widened, deep cuts and high fill, bridge foundations and drainage improvements.
- Lead paint is present on the guard rails of the Highway 10 and McLaughlin Road bridges.

- The potential for the presence of asbestos in the bridge ducts should be confirmed during detail design.
- MTO Patrol Yard:
 - Designated substances such as lead paint, asbestos and PCBs are likely present within the buildings and electrical transformers.
 - The existing laydown areas and former solid waste disposal area north of the sand dome which stored material such as dead animals, road sweepings, asphalt and concrete debris. It is not known if the former solid waste disposal area was remediated completely.
 - Past and current operations such as vehicle washing and salt storage have resulted in elevated chloride concentrations in both surface water and groundwater on site. Equipment wash water was apparently discharged to on-site ditches without any treatment.
 - Four former underground storage tanks (USTs) and the impacted soils around the tanks were removed in January 1999. The results of verification testing of subsoil around the former USTs suggest that the clean-up was completed in accordance with the applicable MOE Guidelines.

2.3.2.5 Archaeological Resources

A Stage 1 and Stage 2 archaeological assessment was conducted in December 2004; these assessments including background research and field investigations, and was carried out by *Archaeoworks Inc.* A copy of the Stage 1-2 Archaeological Assessment is provided in Appendix D. A background review of the Ontario Archaeological Sites Database, maintained by the *Ministry of Culture*, found that 20 archaeological sites have been registered within 2000m or less to the study area; however, these sites do not fall within the specific proposed construction boundaries of the study area. Nevertheless, the identification of these sites, both Aboriginal precontact sites (11) and 19th century Euro-Canadian (nine), attested to the potential for the recovery of additional archaeological remains within the study area boundaries.

The results of the archaeological investigations are further discussed in section 3.2.3 of the TESR.

2.3.3 Highway Conditions

2.3.3.1 Road Network

Exhibit 2-5 shows the existing transportation network. Highway 401 runs east/west along the study corridor with Highway 403/410 serving as a north-south freeway link. The north-south freeway carries the Highway 410 designation north of Highway 401 and Highway 403 south of Highway 401. The existing Highway 401 is intersected by the following north-south urban roads:

- 2nd Line West;
- Mavis Road;
- McLaughlin Road;
- Hurontario Street (Highway 10); and
- Kennedy Road.

Provincial (Ministry of Transportation)

Highway 401 transitions down to 6 lanes (both directions) at the Highway 410/403 interchange, the east study limit.

Regional (Region of Peel)

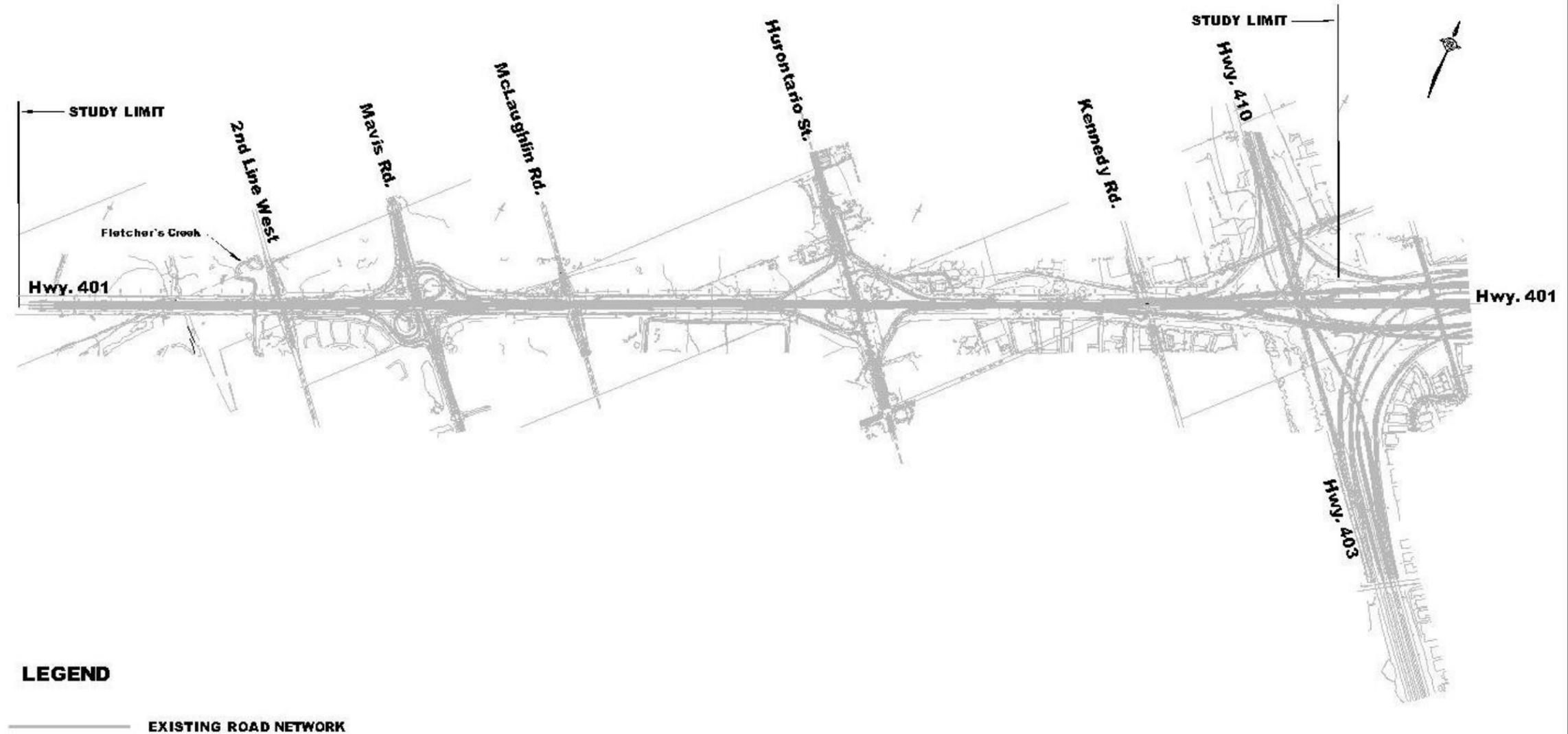
There are no regional roads that cross Highway 401 within the project limits.

Local / Municipal (City of Mississauga)

There are 5 local roads that cross Highway 401 within the study area. From west to east they are 2nd Line West, Mavis Road, McLaughlin Road, Hurontario Street and Kennedy Road. Mavis Road and Hurontario Street are the only two local roads that have interchanges on the highway. All of these roads provide access to local residents and businesses.

LIMIT OF TRANSPORTATION NETWORK

CONT WP	2149-01-00 2150-01-00	
EXISTING ROAD NETWORK		SHEET
		



N.T.S.

Exhibit 2-5 Existing Transportation Network

2.3.3.2 Traffic Volumes

The existing and forecasted AADT (Average Annual Daily Traffic) volumes are shown in the following table:

Table 2-2: AADT Volumes for Highway 401

Section	AADT		
	Existing (1999)	Projected (2011)	Projected (2021)
Mississauga Rd. to Mavis Rd.	122,250	290,500	310,160
Mavis Rd. to Hurontario St.	123,600	269,960	278,770
Hurontario St. to Hwy 410/403	150,000	294,870	318,320

2.3.3.3 Traffic Operations

This section of Highway 401 presently operates near its capacity (as discussed in Section 2.2.1). Significant highway expansion is required to accommodate projected future volumes. During Peak Hour traffic the queue for the westbound exit ramps at both Hurontario St. and Mavis Rd. extend onto the Highway 401 mainline. This long queue significantly affects the movement of through traffic on Highway 401 during p.m. peak hours.

2.3.3.4 Pavement Condition

Highway 401 within the study area was originally constructed in the 1950's as a four lane divided highway with dowelled joint exposed concrete pavement. The highway was paved with an asphalt surface between 1969 and 1974. The highway was widened with one additional lane in each direction in the late 1970's. Further rehabilitation was undertaken in 1986/87. East of Kennedy Road, rut repairs were completed in 1996 and resurfacing in 2000. West of Kennedy Road, emergency strip repairs were completed in 1991. Complete resurfacing was completed between Kennedy Road and McLaughlin Road in 1999. The section from McLaughlin Road to Credit River was resurfaced in 1996. Pavement drainage improvements (subdrains) and joint repairs have been undertaken over the years to address pavement performance issues.

Pavement Condition Ratings were completed in 2002 and a further field review was undertaken in 2003. In general, the ride comfort of the pavement section was found to be in fair to good condition, with the pavement east of McLaughlin Road being generally better. The pavement does exhibit low to medium severity transverse and longitudinal cracking, varying from sparse to

extensive throughout the length of the study area. There were also localized areas of high severity potholes and isolated failure areas identified.

Ramp pavements at the Hurontario Street interchange were found to be in poor to fair condition, while the more recently constructed Mavis Road interchange ramps are generally in good to excellent condition.

2.3.3.5 Structures

Structures within the project limits include underpasses at Kennedy Road, Hurontario Street, 1st Line West (McLaughlin Road), Mavis Road and 2nd Line West. The Kennedy Road underpass was constructed in the 1980's and the Mavis Road underpass was constructed in the mid-1990's. The remaining structures date back to the 1950's and 1960's.

The 2nd Line West structure is a four span concrete T-beam bridge, showing various signs of moderate to severe distress. Deterioration includes spalling of pier columns, abutment faces and soffit, delamination of girder ends and diaphragms and deterioration of the asphalt deck surface. Limited maintenance repairs have been undertaken in recent years to keep the structure operational.

The 1st Line West (McLaughlin Road) structure is a four span girder structure. Identified deterioration includes rusting of abutment bearings, delamination and spalling of piers, leakage of expansion joints and settlement of the approach slab.

The Hurontario Street underpass is a single span rigid frame structure. The condition of the various bridge components ranges from poor to good. Deterioration includes spalling of the soffit and abutment faces, scaling of retaining walls and deteriorated pavement surface.

2.3.3.6 Lighting

Lighting within the study area includes combination of conventional and high mast illumination. The Highway 401/410/403 interchange area is illuminated with High Mast lighting. Conventional, median mounted illumination is in place on Highway 401 from approximately Kennedy Road westerly to east of McLaughlin Road. High mast lighting was installed at the recently constructed Mavis Road interchange. The section from east of 2nd Line West to the Credit River is currently not illuminated.

2.3.4 Utilities

There are several utilities that have been identified within the project limits.

- Rogers Cable has fibre optic cables on the west side of Hurontario Street (aerial), and on the east side of Mavis Road (buried)
- There are no Trans-Canada Pipeline Limited or Enbridge facilities within the project limits
- There are north-south Hydro and Bell utilities crossing Highway 401 at all of the intersecting roads (2nd Line West, McLaughlin Road, Hurontario Street and Kennedy Road)

2.4 ALTERNATIVES AND EVALUATION

This section describes the identification, analysis and evaluation of the alternatives to the undertaking as well as the alternative methods of carrying out the undertaking for Highway 401 between 410/403 Interchange to the Credit River. This section also provides a detailed account of the review process that led to the study recommendations. Exhibit 2-6 summarizes the process that identified the preferred alternative.

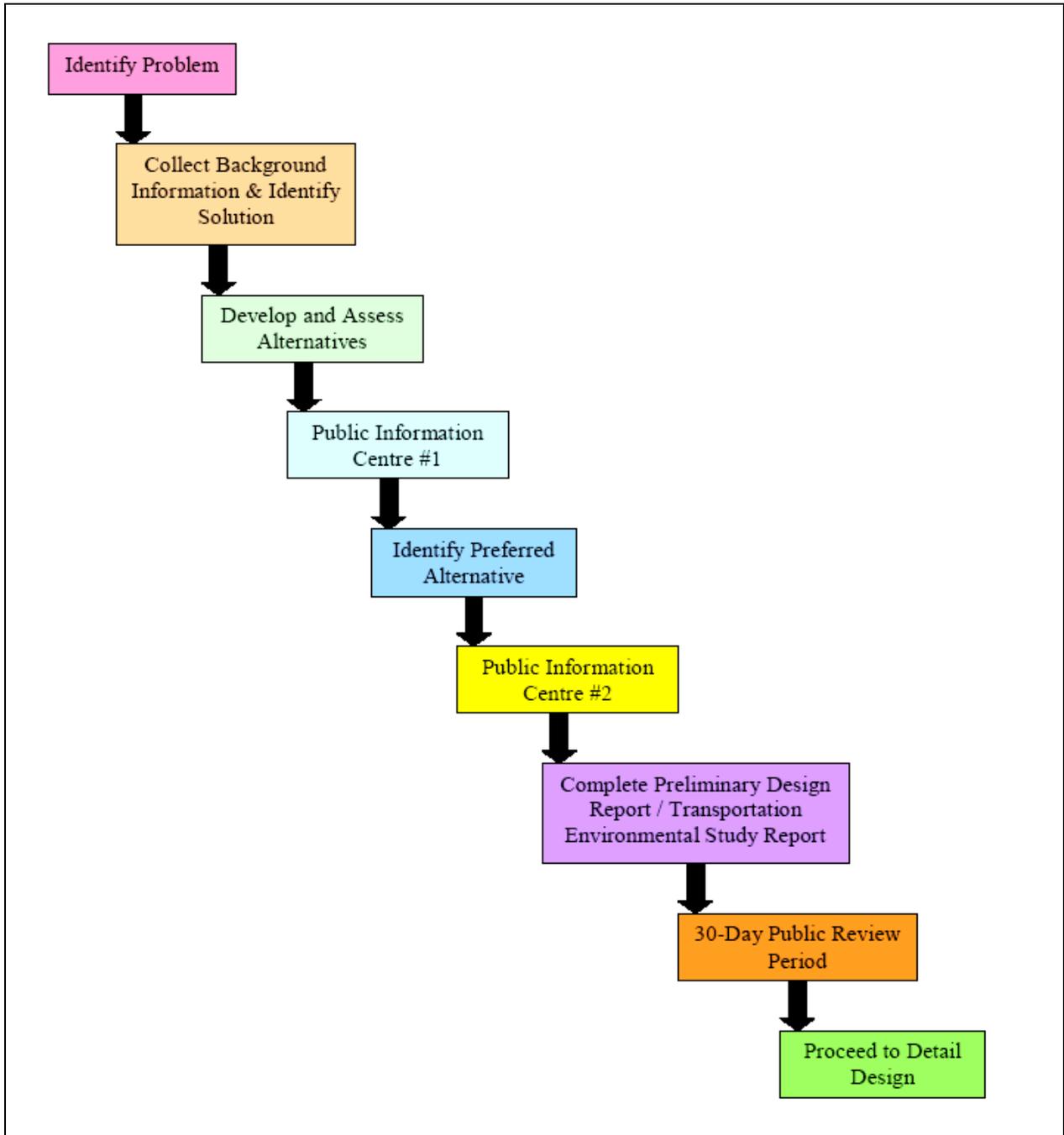
2.4.1 Planning Alternatives

The Environmental Assessment Act of Ontario requires that “alternatives to the undertaking” be considered to ensure that there is reasonable and adequate justification to proceed with the proposal and that the need for the project is clearly demonstrated. Various alternative solutions have been considered to address the identified concerns and deficiencies. These include:

- Do Nothing;
- Alternate modes of transportation (carpooling, high occupancy vehicle lanes, transit etc.);
- Improvements in other corridors;
- Improvements to Highway 401; and
- Improvements to Highway 401 in conjunction with other Road Improvements and Alternative Modes.

These alternatives have been evaluated with respect to their ability to address the identified concerns and deficiencies. This evaluation is summarized below.

Exhibit 2-6: Problem Identification & Alternative Selection Process



2.4.1.1 Do Nothing

As the title suggests, this option involves retaining the existing system in its present form, with all the inherent problems that currently exist.

This option fails to address the operational and capacity concerns for this stretch of Highway 401 for the existing and future traffic conditions. Since this option does not address the study objectives, it is not considered to be a reasonable alternative (to the undertaking) and was therefore not carried forward for further study.

2.4.1.2 Alternative Modes (Transit, Rail)

Rail and transit expansion would provide a more competitive choice of travel modes for some users and thus alleviate the existing and future traffic congestion to a certain degree. However, the current level of congestion being experienced on Highway 401 along with the anticipated growth along the highway corridor cannot be addressed solely through additional rail and transit service. Currently the study area is serviced by both Go Transit (train and bus) and Mississauga Transit (local public bus service). Thus, expanding these two systems is not likely to address the capacity deficiencies along Highway 401. This solution does not address the other infrastructure deficiencies on Highway 401. This option is not considered to be a reasonable alternative; therefore it was not carried forward for further study.

2.4.1.3 Improvements in Other Corridors

Improvements in other corridors, including Highway 407 and various municipal road expansions, are being implemented or are being planned to address growing travel demand and other needs including proposed widening of Britannia Road between Queen Street easterly to Hurontario Street. Even with these improvements, there remains a significant need for capacity and operational improvements on Highway 401. These improvements do not address the capacity deficiencies on Highway 401.

2.4.1.4 Improvements to Highway 401

Improvements to Highway 401, such as Highway widening, can address the capacity deficiencies as well as the other identified concerns and deficiencies specific to this section of the Highway 401 corridor. However, capacity improvements alone will not provide opportunities to support broader transportation demand management initiatives such as HOV lanes and reserved bus lanes.

2.4.1.5 Improvements to Highway 401 in Conjunction with other road Improvements and Alternative Modes

This option involves capacity improvements to Highway 401 within the project limits combined with consideration of measures to support alternative modes of transportation such as carpool parking lots, high occupancy vehicle (HOV) lanes and reserved bus lanes.

This option addresses the existing and future travel demands, the identified operational and safety concerns, and the infrastructure deficiencies in the corridor, while making the most effective use of the highway facility. Widening Highway 401 will integrate with the other planned network improvements and also provide the opportunity to support alternate modes of transportation to optimize the capacity of the highway.

Accordingly, Improvements to Highway 401 in conjunction with other road improvements and alternative modes has been identified as the best alternative to address the identified problems and provide opportunities for transit supportive measures to the highway corridor. During design development, measures to support alternative modes of transportation will be considered in conjunction with general capacity improvements on Highway 401.

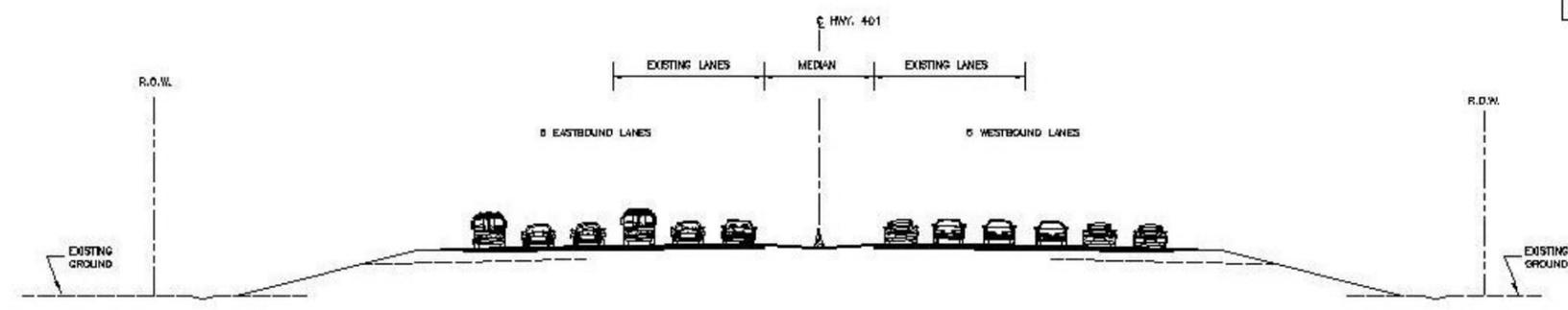
2.4.2 Alternative Methods

Alternative methods of carrying out the undertaking were developed and reviewed for the widening of Highway 401 to a 12-lane facility.

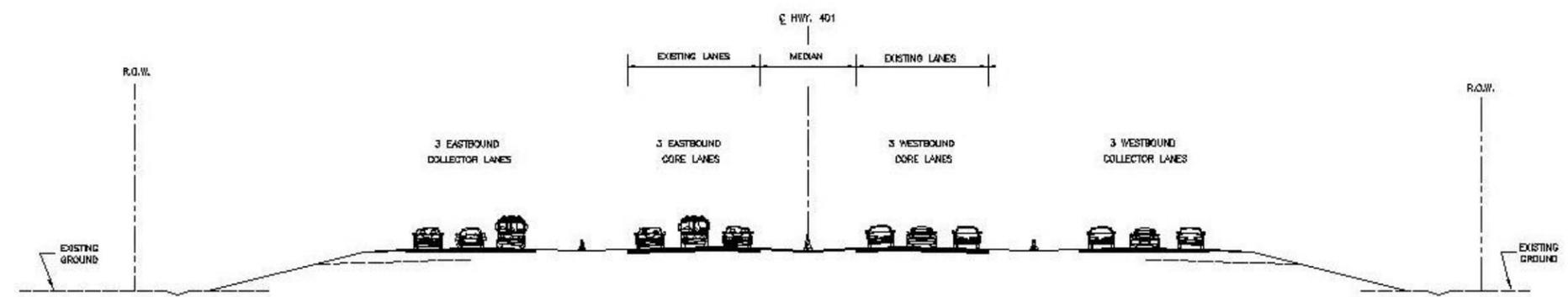
Consideration was given to implementing 12 lanes as a simple freeway or as an express-collector system. Exhibit 2-7 illustrates these two alternatives.

The express-collector alternative offers a number of advantages in terms of traffic operations, safety, incident management, maintenance and work zone implementation for both the proposed expansion and future rehabilitation. Specifically, the express-collector system reduces potential concerns with respect to weaving of traffic, allows improved drainage of the pavement surface, enhances visibility and effectiveness of signage, allows for easier winter maintenance and the provides greater ability to manage incidents such as vehicle breakdowns and collisions. **Accordingly, a 12 lane express-collector system has been identified as the preferred design alternative.**

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12 LANE SIMPLE FREEWAY



12 LANE CORE/COLLECTOR CROSS-SECTION

N.T.S.

In order to minimize impacts on adjacent development, simplify construction staging and make best use of the available corridor, equal widening along the existing highway centreline is recommended.

Alternative operational scenarios for the 12-lane Highway 401 within the project limits have been considered, with the objective of making best use of the highway infrastructure and supporting a sustainable transportation network for the GTA. These alternatives include:

- 12 general purpose lanes (GPL)
- 10 general purpose lanes plus high occupancy vehicle (HOV) lanes and/or reserved bus lanes.

Exhibit 2-8 illustrates these two alternatives.

Evaluation of these alternatives indicates that the HOV alternative offers a number of benefits, as follows:

- ability to provide higher person throughput with fewer vehicles;
- significant travel time savings for HOV users;
- reduced environmental impacts (less fuel consumption, reduced emissions, etc.);
- improved used of the corridor infrastructure; and
- opportunity to support broader transportation demand management initiatives.

Therefore, the Ministry is carrying forward the general purpose plus HOV/Reserved Bus Lanes alternative for further study.

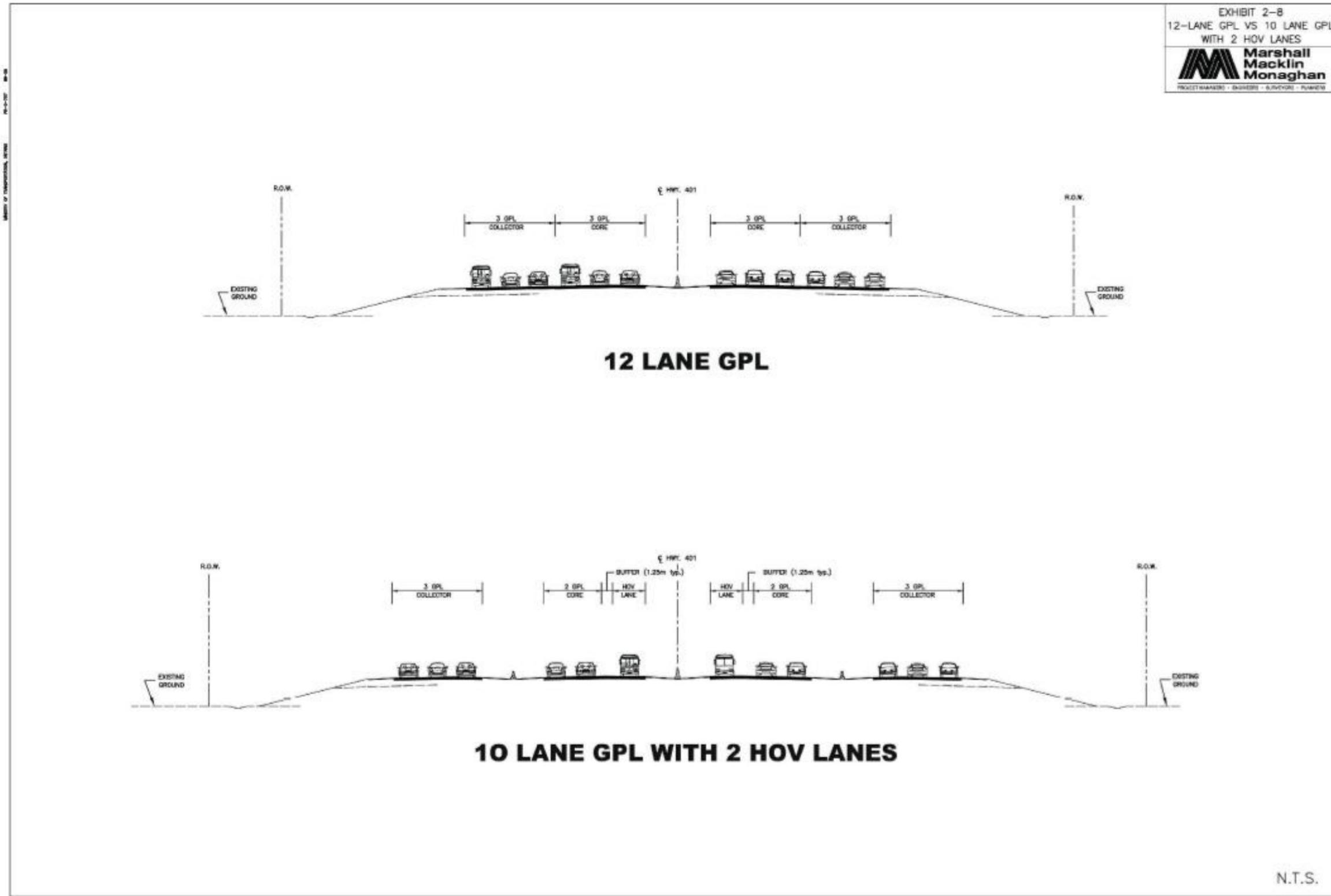


EXHIBIT 2-8 12 LANE GPL VS. 10 LANE GPL WITH 2 HOV LANES

The interchanges within the study limit are being reconstructed to accommodate the Highway 401 widening and updated to better address safety as well as capacity requirements. As such all interchanges, except for the freeway to freeway interchange at the 401/410 interchange are Parclo A4 interchanges matching the existing interchanges within the highway corridor.

2.4.2.1 Fletcher's Creek Alternatives

A number of alternatives were considered to accommodate the Highway widening at Fletcher's Creek. Four options were developed and evaluated for the Fletcher's Creek crossing. The crossing requires increasing of the capacity of the existing twin culverts and provisions for crossing the watercourse with the EB and WB collector lanes.

The four options that have been considered are as follows:

Option 1 - extend the existing twin cell culvert and add a third cell full length.

Option 2 - extend the existing twin cell culvert to the north and add a third cell from the south end of the existing culverts to the north. Provide a rigid frame structure to carry the southbound lanes over the watercourse.

Option 3 - retain the existing twin cell culvert and provide a third cell under the future core lanes. Provide rigid frame structures to carry both the EB and WB collectors over the watercourse.

Option 4 - provide a new full length rigid frame structure to replace the existing culverts and carry the new collector lanes over the watercourse.

These options are shown in Appendix E.

The preliminary estimate of costs for the various options are as follows:

Option 1 - \$4.45 million

Option 2 - \$4.93 million

Option 3 - \$5.10 million

Option 4 - \$8.55 million

Although not the least expensive option, Option 3 is preferred for the following reasons:

- provides for clear span of the watercourse for both "extensions", minimizing impacts on aquatic habitat;
- relatively small incremental cost over options 1 and 2; and

- readily "constructible" with minimal watercourse impact. Footings for the extension components are outside the active channel. Third cell for the culvert can be constructed "in the dry" at somewhat higher elevation than the existing culvert, since this cell is providing major storm capacity to address flooding concerns under the Regional event.

While option 4 would provide a "clear span" for the entire length of the crossing, allowing for recreating a natural substrate through the entire length of the crossing, this option is substantially higher in cost. It would also be disruptive during construction as removal of the existing culvert would be necessary. Also, there are opportunities to enhance conditions within the box culvert section to better define a low flow channel and enhance fish passage. These can be explored further in detailed design.

One potential drawback of utilizing the open span upstream of the multi-cell culvert is the possibility of debris collecting at the upstream end of the three cell culvert. This may result in somewhat greater maintenance effort. However, given the large cell openings and the fact that a twin cell culvert has been functioning at this location for some time, it is not anticipated that this will be a major concern.

2.5 CONSULTATION

2.5.1 External Agency Participation

Review agencies and interest groups were notified at the beginning of the study by letter mailed on June 9, 2003 informing them of the study and soliciting their comments. Individuals and groups that expressed an interest in the project were kept informed throughout the project. Also the agencies that expressed an interest in this project were notified of the public information centres held on June 17, 2003 and June 29, 2004. These agencies were:

Provincial & Federal Government Agencies

Ministry of the Environment (MOE)
Ministry of Culture (MCL)
Ministry of Natural Resources (MNR)
Ministry of Municipal Affairs and Housing (MMAH)
GO Transit
Department of Fisheries and Oceans (DFO)

Municipal Agencies

Ontario Provincial Police (OPP)
City of Brampton
Region of Peel
City of Mississauga
Peel Board of Education
Dufferin-Peel Separate School Board

Other Agencies/Stakeholders

Credit Valley Conservation (CVC)
Credit River Angling Association
Toronto and Region Conservation Authority (TRCA)

A Summary of External Participation is provided in Table 2-3. Relevant correspondence is found in Appendix F.

Several responses were received as noted in the Table below. A site meeting was held with Credit Valley Conservation on June 25, 2004 to introduce the project and discuss the options and impacts associated with the widening of Highway 401 at Fletcher's Creek. Meeting minutes are available in Appendix F. CVC expressed concern that a culvert extension on the north side of Highway 401 might require stream relocation. They were also concerned about deer movement under the highway, in addition to the possible presence of Jefferson Salamander in the area (see Section 2.3.1.4iii).

A Subsequent meeting was held with MNR and CVC March 21, 2005 to discuss the stormwater management strategy and the preferred design for the Fletcher's Creek crossing. MNR confirmed that based on the proposed design at Fletcher's Creek a HADD is not anticipated. MNR and CVC expressed some concern regarding footprint impacts to the ESA associated with use of a stormwater management pond in this area. The stormwater management approach in this area is being revised to address these comments. Meeting minutes are available in Appendix F.

Table 2-3: Summary of External Participation				
PARTICIPANT	NOTICES		OTHER CONTACTS	COMMENTS RECEIVED
	STUDY COMMENCEMENT/ PIC 1 (June 17, 2003)	PIC 2 (June 29, 2004)		
Ministry of Natural Resources Aurora District	ü	ü	Met with CVC and MNR Mar. 21, 2005 to discuss the stormwater management strategy and preferred design option for the Fletcher's Creek crossing.	Letter received Nov. 3, 2003 expressing interest in the study and outlining concerns related to fisheries and stormwater management
Ministry of Environment	ü	ü		Letter received on June 25, 2003 identifying comments related to the ESA, groundwater/surface water, Contaminate Soils, Dust and Noise and mitigation
Ministry of Municipal Affairs and Housing	ü	ü		Comment form faxed June 13, 2003 indicating that they do not wish to participate in this project.
Peel Region	ü	ü	Met with the Region of Peel June 16, 2003 prior to the first PIC Met with the Region of Peel (Transportation Planning and Public Works) June 23, 2004 prior to the second PIC In response to a request from the Region of Peel a digital copy (PDF) of the PIC display boards was provided June 29, 2004	

Table 2-3: Summary of External Participation				
PARTICIPANT	NOTICES		OTHER CONTACTS	COMMENTS RECEIVED
	STUDY COMMENCEMENT/ PIC 1 (June 17, 2003)	PIC 2 (June 29, 2004)		
City of Mississauga	ü	ü	Email received June 12, 2003 indicating that Fire & Emergency Services is interested in this project regarding access for emergency vehicle continued along the route at all times during the construction phase of project. Met with City of Mississauga July 8, 2003 to discuss the project.	Comment Form faxed June 19, 2003 indicating they would like to participate in the project.
Department of Fisheries and Oceans (Coast Guard)	ü	ü	Letter received August 5, 2003, indicating that a site inspection was made and that in their opinion the creek at the site is not navigable.	Letter received June 19, 2003 indicating that any work in navigable waters must first get permission from the DFO and an application should be submitted detailing river width and prominent features.
Credit Valley Conservation	ü	ü	Letter received Feb. 10, 2004 indicating the project area's environmental attributes and identifying the EA study's objectives. Site meeting held with CVC June 25, 2004 to discuss design options and impacts associated with project along Fletcher's Creek. Met with CVC and MNR Mar. 21, 2005 to discuss the stormwater management strategy and preferred design option for the Fletcher's Creek crossing.	Comment Form faxed Oct. 6, 2003 indicating their concerns regarding: stormwater, fisheries, valley land impacts, hazard and land issues.
Peel District School Board	ü	ü		Letter received Jul. 2, 2004 expressing interest in project as they have a school in study area.

Table 2-3: Summary of External Participation				
PARTICIPANT	NOTICES		OTHER CONTACTS	COMMENTS RECEIVED
	STUDY COMMENCEMENT/ PIC 1 (June 17, 2003)	PIC 2 (June 29, 2004)		
Toronto and Region Conservation Authority	ü	ü	Letter received July 12, 2004 including natural features and study requirements to include in the EA report. Letter received August 5, 2003 requesting to be informed regarding the progress.	Comment Form faxed June 12, 2003 identifying their concern being stormwater management and a note that area west of Hurontario is within Credit Valley Conservation jurisdiction.

2.5.2 Consultation with Property Owners and the Public

2.5.2.1 Public Information Centres

The notice of study start-up and Public Information Centre 1 was published at the beginning of the study in local newspapers as follows:

- Toronto Star June 10, 2003
- L'Express June 10, 2003
- The Mississauga News June 11, 2003

The first Public Information Centre was advertised in the Toronto Star daily newspaper on June 10, 2003, L'Express weekly French language newspaper on June 10, 2003, and in the Mississauga News daily newspaper on June 11, 2003. Copies of these newspaper notices are found in Appendix G.

PIC notification letters were distributed by direct mail to government agencies, municipalities, interest groups, stakeholders, and local MPPs. Copies of these notification letters are found in Appendix H. In addition, approximately 5,500 PIC brochures (with French translation on the reverse side) were delivered through Canada Post AdMail to residents and businesses abutting the project area. A copy of the brochure text is found in Appendix H.

The PIC was held Tuesday, June 17, 2003 from 5:00 p.m. to 8:00 p.m. at the Best Western Sunset Inn, which is located close to the study area at 5825 Dixie Road in Mississauga, Ontario.

Ministry of Transportation representatives along with their consultants were available to answer questions and discuss any aspect of the study. The purpose of the PIC was to allow area residents and other stakeholders to review and comment on background information, evaluation of alternatives and the recommended plan. The PIC was attended by 3 people with 3 people signing the registration sheet. A total of 2 comment sheets were filled out and returned to the project team at the PIC, and one email was sent prior to the PIC. Copies of these comments are included in Appendix H. No additional comments were received after the PIC. Overall, there was recognition of the need for Highway 401 improvements in this area, however there was also a low overall attendance at this PIC.

The public were notified of the second information centre through newspaper advertisement in the following newspapers:

- The Toronto Star June 22, 2004
- L'Express June 22, 2004
- The Mississauga News June 23, 2004

Copies of these newspaper notices are included in Appendix G.

PIC notification letters were distributed by direct mail to government agencies, municipalities, interest groups, stakeholders, and local MPPs. Copies of these notification letters are found in Appendices D. In addition, approximately 8,000 PIC brochures (with French translation on the reverse side) were delivered through Canada Post AdMail to residents and businesses abutting the project area. A copy of the brochure text is found in Appendix H.

The second PIC (June 29, 2004) was attended by over 20 people with 20 people signing the registration sheet. A total of 6 comment sheets were filled out and returned to the Project Team at the PIC. Copies of these comments are included in Appendix H.

Overall, there was recognition and support for the Highway 401 improvements in this area. However, several people raised concerns about increasing noise and air pollution, and the impacts of construction on local residents.

2.5.3 Integration of External Consultation

The intent of holding a Public Information Centres for this project was to ensure the public had an opportunity to identify their concerns and influence the outcome of the recommended plan while also addressing the consultation principles identified in the Class EA document. One of consultation principles relates to showing how the input received in earlier stages affected the project.

The table below highlights some of the concerns and comments provided by the public and how they were addressed throughout the study.

Concern Expressed	# of Concerns	How the Concern Was Addressed
1. Supports expansion of Highway 401.	3	Support for expansion acknowledged.
2. Concerned about environmental impacts such as air and noise pollution.	3	Air quality is a long term province wide issue. The Government is pursuing stricter truck and car emission standards, phasing out Ontario's coal generating stations. In addition, the implementation of HOV lanes will reduce emissions by reducing the

Table 2-4: External Consultation Concerns and Comments		
Concern Expressed	# of Concerns	How the Concern Was Addressed
		number of vehicles on the road An acoustical assessment was completed for this project and determined no noise mitigation is required. Inclusion of special provisions in the contract to control dust & emissions during construction.
3. Requested to be put on the contact list and kept informed of project developments.	2	Placed on the contact list.
4. Question about how long the project will take to complete.	1	Construction of these improvements will be implemented over a multi-year timetable involving several contracts given the large scope of the work involved.
5. Suggestion made to implement improvements immediately due to congestion.	1	Every effort is being made to expedite this project in order to complete the Detailed Design and the preparation of several contract packages.
6. Impressed with the information presented.	1	Acknowledged.
7. Suggestion made to prioritize the widening of McLaughlin Road.	1	Suggestion will be considered.
8. Concerned about construction disruptions during rush hours.	1	Although traffic impacts of construction cannot be entirely avoided, staging of the work and special provisions will be developed to minimize the impacts of construction activities on traffic flows.
9. Concerned about the closure of the bridge over Highway 401 at 2 nd Line West.	1	Comment noted.
10. Concerned with loss of trees and requested aerial photograph of the affected forested areas.	1	Landscaping will offset vegetation impacts. Aerial photograph provided.
11. Justification for highway improvements questioned. Public transportation, and working from home or close to home is suggested as more appropriate solutions.	1	The growing travel demand and declining levels of service has warranted these highway improvements. The proposed improvements also accommodate High Occupancy Vehicles which supports transit initiatives.

The comments received relate primarily to supporting the expansion and construction-related impacts relating to the environment (air quality, emissions). These concerns will be carried forward and addressed during detail design.

3.0 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATION MEASURES AND COMMITMENTS TO FURTHER WORK

This section focuses on the direct and indirect environmental effects associated with the project. It also describes the mitigation measures that will be implemented to minimize the effects. Mitigation includes planning decisions, design features, construction requirements and construction constraints.

Project design plates can be found in Appendix I.

The key to ensuring effective environmental quality control and risk management during the project is the development and proactive implementation of an approach that:

- Identifies the environmental sensitivities;
- Presents the environmental protection measures in a way that can be translated into contractual requirements and for which compliance can be verified;
- Includes a monitoring program that verifies that the environmental protection measures are being implemented and are effective; and
- Ensures that the detail designers, Contract Administrator and Contractor are made aware of, and are prepared to deal with, all environmental issues that may arise during construction.

Environmental controls will be included in the contract documents to address specific environmental and operational concerns during the preparation of the contact documents in the detail design phase.

3.1 NATURAL ENVIRONMENT

3.1.1 Erosion & Sediment Control

The potential for significant erosion generated by the proposed improvements is moderate as major grading is restricted to the area in the vicinity of the Fletcher's Creek crossing. This area will require additional attention to ensure erosion is controlled through slope stabilization measures such as the use of erosion control blankets and construction monitoring to ensure slope stabilization is achieved quickly. Grading will be required to accommodate the Highway widening and new structures over Fletcher's Creek and new interchange ramps.

Side slopes of the embankments will be formed at a maximum to 2 horizontal to 1 vertical to ensure slope stability.

Vegetation cover will be established as soon as possible after excavation to protect against erosion and sedimentation of local drainage.

Erosion and sediment control practices will be implemented during construction to minimize the risk of sediment loading to sensitive stream crossings.

Erosion and sediment control practices will focus on two separate targets: minimizing site erosion and keeping any eroded material on site. Permanent erosion and sediment control measures will be identified on the contract drawings, and may include:

- Limiting vegetation removal to only what is required for grading and ditching operations;
- Constructing embankment slopes at a maximum ratio of 2 horizontal to 1 vertical;
- Placing rip rap on spillways; and
- Treating all graded areas with topsoil, seed and mulch.

Temporary measures such as erosion control blanket, silt fence barriers, rock flow checks and quickly treating exposed earth surfaces with stabilizing cover material (seed and mulch, sod, etc.) are governed by special provisions, which will be developed during the detail design stage. Implementation of such measures will then be monitored and documented during construction.

3.1.2 Management of Excess Material and Property Contamination

The management of excess materials will be dealt with in accordance with normal Ministry of Transportation practices (regulated by OPSS 180). The final contract package will emphasize reducing, reusing and recycling excess materials generated during construction. Excess earth material will be utilized for slope flattening to the greatest extent possible. Disposal areas may be specified within the contract to address any excess earth material generated from this project.

Two other items that relate to compliance issues are:

- The two active aboveground propane tanks and other two inactive ASTs at the MTO Patrol Yard are not in conformance with the CSA B149.2 00 Propane Storage and Handling Code due to the lack of the required protection from impact.
- Any abandoned water wells will need to be decommissioned in accordance with Ontario Regulation 903.
- An oil/water separator may be required to be removed

The Preliminary Site Screening (PSS) carried out by Marshall Macklin Monaghan was then followed by a Phase I ESA (as described in section 2.3.2.4) A copy of the Phase I ESA is

provided in Appendix C. A Phase II ESA is recommended to assess soil and groundwater conditions associated with past spills along the Highway Corridor. A supplementary Phase II ESA is also recommended in specific areas of the MTO Patrol Yard. The Phase II ESAs should include sampling and testing of subsoil, groundwater and/or designated substances. The Phase II ESA will be carried out by MMM.

Lead paint is present on the guard rails of the Highway 10 and McLaughlin Road bridges. This is considered a Designated Substance and shall be managed in accordance with the Ontario Occupational Health and Safety Act (Regulation 843) and Ontario Environmental Protection Act (Regulation 347).

The potential for the presence of asbestos in the bridge ducts will be confirmed during detail design. Asbestos is also considered a Designated Substance and if present the contract documents would require the materials to be managed in accordance with the legislation noted above for the management of lead.

The location of the local MOE office for reporting spills will be identified in the accordance with SSP 199F34 (Identification of Local MOE Office).

Standard mitigation will be used for dust control (i.e., water, calcium chloride) during construction.

3.1.3 Fisheries and Aquatic Habitat

Potential impacts to the aquatic habitat and adjacent riparian habitat in the study area associated with construction of single span bridges at Fletcher's Creek and installation of an additional culvert at Fletcher's Creek crossing include:

- Construction during periods of sensitivity (spawning, incubation, emergence) to the resident fish community.
- Impacts to riparian habitat as a result of grading requirements for the new culvert and bridge embankments.
- The introduction of sediment from the work area to the watercourse during and following construction may result in the burial of habitat (spawning habitat, pools), increased turbidity and a reduction in productivity as benthic organisms and their habitats are buried.
- Transport of additional deleterious substances (oil, grease) from the construction area to the watercourse during and following construction.

The proposed design at Fletcher's Creek is to provide single span bridges over Fletcher's Creek to accommodate the new eastbound and westbound collector lanes. The core lanes would utilize the existing twin cell culverts for conveyance of Fletcher's Creek and an additional culvert

to accommodate hydraulic requirements would be constructed. It is proposed that this culvert be placed at a slightly higher elevation to facilitate wildlife movement since there is evidence of deer using the existing culverts despite a low "Tunnel Openness" ratio.

The use of bridge at Fletcher's Creek to accommodate the widening avoids the need to re-align the stream channel or work within the existing watercourse. The location of the new culvert under the existing lanes is proposed immediately east of the existing culverts because this location centers the bridge opening on the existing stream channel.

It has been noted by MNR and CVC that the location of the new culvert has the potential to impact the stream bank, which may result in a HADD, however this will be determined in detail design and these agencies consulted further at that time.

Mitigation measures will be incorporated to minimize the impacts to the aquatic habitat associated with the proposed construction works. In-stream works at Fletcher's Creek are not anticipated; therefore the contractor will be prohibited from carrying out any instream works at Fletcher's Creek.

As Fletcher's Creek is considered a cool/coldwater watercourse an in-water construction timing window of July 1st to September 15th recommended by the MNR will be implemented if it is subsequently determined that instream works are required. Additional consultation with MNR and CVC will also be required to discuss potential impacts and mitigation once sufficient design details are determined.

Sediment and erosion control measures will be installed to prevent the transport of sediment and deleterious substances to the watercourse. If instream works are required, they will be completed "in the dry" by isolating the work area, diverting the stream around the work area and removing the remaining water from the work area. Prior to removing water from the work area a qualified fisheries biologist will remove any fish trapped within the work area and place them in suitable habitat downstream. All vehicle fuelling will be carried out a minimum of 30 m from the watercourse to prevent the entry of deleterious substances (fuel, oil, lubricant) into the watercourse.

3.1.4 Vegetation

A portion of the Meadowvale Station Woods ESA/ANSI immediately adjacent to the roadway will be subject to removal due to the widening of the highway corridor. This will result in approximately 2 ha of forest being removed extending 30 m into the forest on the south side and 14 m on the north side extending from the highway and covering a length of 550 m. Both lowland and upland mature trees will be removed, including black maple, sugar maple, bitternut hickory, shagbark hickory, black walnut, red ash, American elm, American basswood, red oak,

and bur oak. This will not extend into the section of the forest that contains the two regionally rare plant species, the one flowered broomrape and rose-twisted stalk.

Additionally, widening will result in the removal of 1.5 ha of woodlot in the southwest portion of the Highway 401/403 interchange for the 403 west to south ramp. This removal will be located along the north and east limit of the woodlot.

Given the closure of the 2nd Line West crossing of Highway 401 there are opportunities to re-naturalize the bridge approaches and associated closed roadway to a more naturalized state. This existing road will be removed and the area re-graded. The development of a restoration plan for this area will offset vegetation impacts associated with the Highway widening.

3.1.5 Wildlife Habitat

Breeding frog habitat occurs downstream of Highway 401 in the Fletcher's Creek floodplain just east and west of Fletcher's Creek. Widening of the roadway will not intrude into the more permanent southerly pond but may intrude into the northerly ephemeral pond. Similarly, the highway widening may intrude into the ephemeral pond on the west side of Fletcher's Creek.

The amphibian ponds on the east side of Fletcher's Creek are supported by drainage from the adjacent forest slope. The southerly pond which is more permanent may also be supported by a possible contribution from overflow of a storm drainage channel that travels northerly beginning at the residential development at the southeast corner of the woodlot adjacent to 2nd Line and then west to Fletcher's Creek. The southerly pond area may be supported by perched water table conditions as the ponds are noted to remain wet through the summer period. The potential amphibian pond located on the west side of Fletcher's Creek is also supported by drainage from the slope. This habitat is smaller than that on the east side and is more ephemeral. Even though there was significant rain in the summer of 2004 this depression was dry at the time of the September 1, 2004 reconnaissance.

Grading will not affect the drainage characteristics that support the permanent pond on the east side as the eastbound collector will not travel through the forest slope area on the east side. Drainage related with the design of the highway should be planned so that it will not be directed to the amphibian ponds on the east side.

The existing twin cell Fletcher's Creek culvert provides passage opportunity for wildlife between the north and south portions of the Meadowvale Station Woods ESA/ANSI. The Fletcher's Creek culvert shows that the potential to provide crossing opportunity for white-tailed deer is low, although field evidence suggests Deer use this passage for wildlife movement under Highway 401 at this location. The opportunity for wildlife to pass through or beneath a structure can be evaluated based on the "openness" of the structure. The "Tunnel Effect" (TE) is a means of determining the "openness" and is calculated by multiplying the width of the structure by the height and dividing this figure by the distance the animal must travel through or beneath the structure (Reed *in* ESP 1992). The higher the number the greater the openness and

therefore, opportunity for wildlife to use the crossing. A TE of 1 indicates minimum requirements for a deer (mule deer) to use the crossing and a TE of 2 or greater is considered optimal to support deer use of the crossing. We assume that the TE values identified here for a mule deer can be applied for a crossing for white-tailed deer.

For the existing Fletcher's Creek culvert (single cell) with a height of 2.44 m, width of 3.04 m and length of 56.95 m, the TE value (as calculated in feet) is 0.4. This would indicate that the potential to provide crossing opportunity for white-tailed deer through the existing culvert is low. Although the potential is low, deer have been spotted in the area and are still expected to continue using the culvert crossing. The construction of an additional culvert will provide enhanced wildlife movement opportunities since it will be placed at a slightly higher invert, thereby being more dry. The use of single span bridges to accommodate the widening will also facilitate wildlife movement compared to the extension of these culverts.

3.1.6 Drainage

Agencies including CVC, TRCA and MNR have raised concerns regarding the proposed widening of Highway 401 and additional runoff into receiving watercourses. MTO acknowledges that the widening of Highway 401 may increase stormwater flows due to increased runoff from widening Highway 401. Proper mitigation measures to control the increased stormwater flows will be addressed through standard Best Management Practices. A Stormwater Management Report was prepared to address these concerns (see Appendix J). The stormwater management plan provides treatment for 100% of the new pavement on an equivalent area basis and as much of the existing pavement area as feasible. The following highlights the recommendations of the stormwater management approach utilized for this project.

Evaluation Criteria

The detailed evaluation of the feasible Stormwater Management Plan (SWMP) options was carried out by developing preliminary designs for each option and considering the advantages and disadvantages of each option based on the following criteria:

- Effectiveness
- Land requirements
- Engineering complexity
- Capital and maintenance costs
- Public Safety
- Aesthetics

Fletchers Creek Watershed

The feasible options for providing quality treatment of the runoff from the section of Highway 401 within the Fletchers Creek watershed consists of detention ponds and vegetated swales.

The City of Mississauga has passed a by-law for the closure of 2nd Line West road allowance in the vicinity of Highway 401 (see Appendix K). Consequently, the project team has investigated the opportunity to provide a stormwater management pond within the available space.

The area of Highway 401 tributary to a proposed pond at 2nd Line West will be 15ha (from McLaughlin Road to Fletchers Creek) with a post-development imperviousness of 70%. A wet pond with a permanent pool volume of 5,500 m³ and an active storage volume of 1,180 m³ is required. The pond would encroach into the Regional Floodplain of Fletchers Creek, but would remain outside of the 100 year flood zone in accordance with the requirements of Credit Valley Conservation (CVC).

The conclusion that a wet pond with sufficient capacity to treat the post-development runoff from the section of Highway 401 between McLaughlin Road and Fletchers Creek can be accommodated at 2nd Line is preliminary, and would have to be confirmed at the detail design stage. For example, a geotechnical investigation will have to be carried out to assess the stability of the slope along the west property line.

The section of Highway 401 west of Fletchers Creek continues to slope downwards and westwards to the Credit River. Runoff from this section of the highway will not be treated in the proposed wet pond. It is recommended that quality treatment of the post-development runoff from Highway 401 between Fletchers Creek and the Credit River be provided by vegetated swales on either side of the highway (see Appendix J – Figure 2).

Cooksville Creek Watershed

Quantity control for the section of Highway 401 expansion within the Cooksville Creek watershed is not required given the presence of a Stormwater Management (SWM) facility at Bristol Road that captures Highway drainage in this area.

Through communication with various parties (City of Mississauga and MTO) involved with the design of the stormwater management pond at Bristol Road, we understand that this facility has been designed to provide quantity control for the upstream lands. It has been confirmed that the 2100 mm diameter sewer constructed at the Highway 401 has been designed to accommodate the runoff from the fully developed ROW.

The existing stormwater management pond at Bristol Road has been identified by the City of Mississauga as a facility that can potentially be retrofitted for quality control. However, the Bristol Road pond has not been identified as a high priority project, and therefore will not be retrofitted for quality control in the foreseeable future.

Since there is insufficient space to locate a SWM pond within the ROW of this section of Highway 401 (draining to Cooksville Creek), vegetated swales are the only feasible SWMPs for

this section of the highway. These swales will be located along the north and south limits of the ROW and will discharge to the existing 2100 mm diameter storm trunk sewer.

The locations of the proposed vegetated swales are shown in Appendix J - Figure 3.

Little Etobicoke Creek Watershed

The section of highway draining to Little Etobicoke Creek drains eastward to the storm sewer system under the Highway 401/410 interchange. The receiving storm sewer is referred to as the Heart Lake Road storm trunk sewer, which discharges to Little Etobicoke Creek just east of Tomken Road. The runoff from the existing section of Highway 401 draining to Little Etobicoke Creek is picked up by a number of inlets and conveyed to the Heart lake trunk sewer. It is not expected that the increased runoff from the Highway expansion will have a significant impact on flooding and erosion in Little Etobicoke Creek. However, the increased runoff from the proposed highway expansion can potentially adversely impact the Heart Lake trunk sewer by increasing the elevation of the hydraulic grade line along the trunk sewer. A previous study of the Heart Lake trunk sewer by R.J. Burnside and Associates has indicated that Tomken Road is potentially at risk of flooding from surcharge from the Heart Lake trunk sewer.

In order to mitigate the potential impact of the increased runoff from the highway expansion, a stormwater management pond is proposed at the northwest quadrant of the Highway 401/410 interchange to control flows to Little Etobicoke Creek from Highway 401 to existing levels for rainstorm up to the 100 year event. Hydrologic simulations of the 18 ha of ROW of Highway 401 west of Highway 410 draining to Little Etobicoke Creek determined that 2,100 m³ of storage is required to control the 100 year peak flow to existing levels.

The stormwater management pond will also be used to provide and quality treatment of the runoff from the expanded Highway. It will be designed to provide an enhanced level of treatment for the runoff from the expanded Highway. Based on the area of the ROW contributing to Little Etobicoke Creek it was determined that a total of 4,300m³ of storage is required for quality control (3,600 m³ of permanent pool storage and 700 m³ of active storage assuming a wet pond).

The location and footprint of the proposed wet pond is shown in Appendix J -Figure 4.

3.2 SOCIO-ECONOMIC ENVIRONMENT

3.2.1 Adjacent Land Uses

Land Use adjacent to the Highway 401 corridor within the study limits is developed or in the process of being developed. Commercial and Industrial land use dominates east of Hurontario Street while adjacent residential occurs at the western end of the project around Mavis Road.

As the majority of the project is contained within the existing MTO right-of-way adjacent land-uses will not be affected.

3.2.2 Highway and Construction Noise

Presented in the table below are the projected year 2021 future “do nothing” and future “build” 24-hour ($L_{eq}(24 \text{ hr})$) noise levels for the outdoor living areas of the critical residential dwelling units located within the study corridor.

Table 3-1: Outdoor Sound Levels ($L_{eq}24 \text{ Hr}$) At Key Receptor Locations			
Receptor Location	Future (2021) “Do Nothing” Sound Levels (dBA)	Future (2021) “Build” Sound Levels (dBA)	Change in Sound Levels (dB)
Hurontario Street (North Side)	64	66	+2
2nd Line West (North Side)	51	52	+1
2nd Line West (South Side)	60	62	+2

The results in the table show increases in sound levels are expected to range between one and two decibels for all receptor locations. Accordingly, noise mitigation is not required since the increase in sound levels is less than five decibels. The noise analysis for this project can be found in Appendix B.

3.2.3 Archaeological Resources

A Stage 1 and Stage 2 archaeological assessment was conducted in December 2004; these assessments including background research and field investigations, and was carried out by *Archaeoworks Inc.* A copy of the Stage 1-2 Archaeological Assessment is provided in Appendix D. A background review of the Ontario Archaeological Sites Database, maintained by the *Ministry of Culture*, found that 20 archaeological sites have been registered within 2000m or less to the study area; however, these sites do not fall within the specific proposed construction boundaries of the study area. Nevertheless, the identification of these sites, both Aboriginal precontact sites (11) and 19th century Euro-Canadian (nine), attested to the potential for the recovery of additional archaeological remains within the study area boundaries.

The background historical review of the *1877 Illustrated Historical Atlas for Peel County* provided an assessment of the potential for the presence of nineteenth century archaeological sites within the study area. The map indicates the Highway 401 corridor passes through Lot 6 in Concessions 1-2 East of Hurontario Street (EHS) and Lots 6-9 in Concessions 1-3 West of Hurontario Street (WHS), formerly in the northern part of Toronto Township. The atlas indicates one cemetery is located just south of the study corridor, within Lot 5, Concession 1 EHS and one homestead was located within close proximity to the north of the study corridor, within Lot 7, Concession 2 WHS. These indications of former historic sites identify the potential for historic archaeological sites within the study area.

Thus, while the Stage 1 assessment established that no registered archaeological sites existed within the study corridor boundaries, sub-surface remains, both connected to First Nation archaeological sites and early 19th century Euro-Canadian farmsteads, could be encountered based on the numerous water crossings and large number of registered sites within close proximity. Water is regarded as the primary indicator of archaeological site potential and distance from water is one of the most commonly used variables for predictive modeling of archaeological site location. The study area is bisected by Fletcher's and Cooksville Creek and is bounded to the west by the Credit River. Therefore, it was recommended that, due to the established moderate to high archaeological concern, a Stage 2 archaeological assessment be undertaken in all undisturbed locations.

The Stage 2 archaeological field investigation was carried out during the month of December 2004 to identify and describe any archaeological resources extant within the 6.0km 401 Highway corridor, prior to construction activities. The Stage 2 assessment took place both within and just outside the limits of the existing right-of-way (ROW), to accommodate the construction. The study corridor consists of a mixture of fallow, herbaceous and cultivated fields and woodlot that required Stage 2 testing. Disturbed areas included grading activities associated with commercial and residential development, landscaping, utilities, paving, berms, deep drainage ditches, gravel fill and floodplain associated with both Fletcher's and Cooksville Creek. Due to the low archaeological potential of these disturbed areas, no archaeological testing was conducted.

A total area measuring approximately 3.0-acres was test-pitted, while a total area measuring 1.4-acres was surveyed by pedestrian survey, the test-pit surveys undertaken at 5m intervals and the pedestrian surveys at 2m intervals. The width of testing varied from one metre to 11m and a total of 485 test-pits were excavated to subsoil depths ranging from only 10cm to 45cm. All test-pits were backfilled with the original fill and all lands that were subjected to Stage 2 survey followed the *Archaeological Assessment Technical Guidelines* (1993), published by the *Ministry of Tourism, Culture and Recreation*, now the *Ministry of Culture*. Despite careful scrutiny throughout the Stage 2 field investigation, no archaeological remains were encountered and as such, recommendations will be made to the *Ministry of Culture* to clear this study corridor of further archaeological concern.

3.2.4 Air Quality

The proposed improvements are part of a broader provincial transportation strategy which is focused on providing for the efficient movement of people and goods utilizing various modes of transportation. This strategy includes a variety of initiatives to relieve congestion by reducing the number of vehicles on the roads and enhancing system capacity (to reduce idling and start-stop traffic flow), thus supporting province-wide air quality improvement goals. The province is also pursuing other air quality initiatives such as stricter vehicle emission standards and enhanced enforcement of those standards through the “Drive Clean” program, phasing out coal burning generating stations and incentives for alternate fuels and hybrid electrics.

The proposed Highway 401 improvements will result in substantial relief to the existing congestion in the study area, allowing traffic to proceed in a more energy efficient manner. In addition, the provision of High Occupancy Vehicle (HOV) lanes and carpool parking facilities as a component of the project will support the diversion of traffic from single-occupant vehicles to both multi-occupant private vehicles and transit. Some growth in traffic volumes is anticipated over the life of the project, but with the increased capacity in place, the emissions from additional vehicles will be offset by the more efficient operating environment (reduced congestion), continual improvements in vehicle emissions standards and fuel quality, and ongoing programs to reduce emissions from both cross-border and local sources.

During construction, dust and emissions will be generated by construction equipment and activities. Standard mitigation measures will be applied during the construction. Special Provisions for Dust Suppressants will be incorporated in the contract to ensure dust is effectively managed. Construction equipment will be required to conform to emissions standards and the idling of equipment will be restricted to ensure that air quality is not unduly impacted. Where construction activities are expected to have a direct impact on public traffic, these activities will be undertaken during off-peak periods whenever possible to minimize traffic congestion and idling of vehicles.

3.3 TRANSPORTATION

3.3.1 Utilities

There are several utilities that have been identified within the project limits as discussed in Section 2.3.4.

Impacts to existing utilities are expected at crossing roads and along the Highway 401 alignment. The extent of relocations will be determined at the detailed design stage.

3.4 CONSTRUCTION STAGING AND CONSTRAINTS ASSOCIATED WITH ENVIRONMENTAL EFFECTS

3.4.1 Staging Sequencing Study Results

The recommended staging of the work within the corridor will be phased under a number of contracts subject to availability of funding as follows:

- Replacement of the McLaughlin Road structure.
- Construction of the WB collectors from Highway 410 to Hurontario. Traffic flow on the existing Highway 401 lanes.
- Construction of EB collectors from Highway 410 to Hurontario. Traffic flow on existing Highway 401 and newly constructed WB collectors (410 to Hurontario).
- Upgrade of Hurontario Street and interchange.
- Rehabilitation of Highway 401 core lanes from Highway 410 to Hurontario. Traffic flow on the newly constructed WB/EB collector lanes.
- Removal of the 2nd Line West structure
- Construction of the EB collectors from Hurontario to the west project limit, including interchange improvements at Mavis Rd. Traffic flow on existing Highway 401.
- Rehabilitation of EB core lanes from Hurontario to west project limit. Traffic flow on newly constructed EB collectors from Hurontario to west project limit.
- Construction of WB collectors from Hurontario to west project limit, including interchange improvements at Mavis Rd. Traffic flow on existing Highway 401 and newly constructed EB collectors.
- Rehabilitation of WB core lanes from Hurontario to west project limit. Traffic flow on newly constructed EB core and collector lanes and WB collectors.
- Interchange improvements at the 401/403/410 freeway to freeway interchange.

3.4.2 Lane Closures

The Construction staging philosophy for the implementation of the core-collector system is one that only permits the closure of a lane once additional capacity has been provided elsewhere on the network. For example, in order to accomplish the rehabilitation of the WB core lanes, the construction of the WB collector has to be completed and ready for traffic. However, short term lane closures required for construction tie-ins will be required. These short term closures will be limited to off-peak and/or nighttime hours.

3.4.3 Illumination

There is presently full illumination on Highway 401 from the 410/403 interchange to 2nd Line West. There is also full illumination at the Mavis Road interchange. With the extension of the existing highway express/collector system from the eastern limit of this project through to the western end, at the Credit River, it is planned to update the existing illumination system and to extend it westerly to the western limit of this project. Thus the Hwy 401 corridor will have full illumination from the 410/403 interchange through to the Credit River. The interchanges within the project limits will be fully lit, as will the crossroads. The ramp terminal traffic signals will be rebuilt.

The High Mast lighting will be designed to minimize light trespass beyond the highway right-of-way limits.

3.5 SUMMARY OF IDENTIFIED CONCERNS AND PROPOSED MITIGATION

Table 3-2 summarizes the identified concerns and the proposed mitigation measures, based on the identified environmental sensitivities and the proposed Preliminary Design Plan.

Legend

MTO: Ministry of Transportation	CVC: Credit Valley Conservation
MNR: Ministry of Natural Resources	MIS: City of Mississauga
MOE: Ministry of the Environment	RES/BUS: Local residents and/or business owners
MUN: Regional Municipality of Peel	MCL: Ministry of Culture
UTIL: Utilities	TRCA: Toronto Region Conservation Authority

Table 3-2: Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
NATURAL ENVIRONMENT		
Erosion and Sediment Control (Section 3.1.1 of TESR)		
<ul style="list-style-type: none"> Soil types have been assessed through secondary source mapping. Further investigations and testing will be completed (sampling, classification, laboratory testing) during detail design. 	MOE MTO MNR CVC TRCA MUN	<ul style="list-style-type: none"> Standard erosion and sediment control measures will be incorporated into the contract. Side slopes will be formed at a maximum of 2 horizontal to 1 vertical to ensure slope stability Carry out a geotechnical investigation to assess the stability of the slope along the west property line for the Fletcher's Creek SWM Pond. Additional measures will be reviewed following completion of the detailed geotechnical investigation.
Management of Excess Material and Property Contamination (Section 3.1.2 of TESR)		
<ul style="list-style-type: none"> The site investigation did identify potential environmental impacts within the Highway corridor and areas within the MTO Patrol Yard. 	MTO MOE	<ul style="list-style-type: none"> Conduct Phase II ESA to assess soil and groundwater conditions associated with past spills along the Highway Corridor. A supplementary Phase II ESA is also recommended in specific areas of the MTO Patrol Yard. Opportunities to minimize waste generation through salvage and reuse will be identified as part of the detail design phase. Excess materials generated during construction will be managed by the Contractor in accordance with OPSS 180.
Fisheries & Aquatic Habitat (Section 3.1.3 of TESR)		
<ul style="list-style-type: none"> There are four watercourses affected by the project which require culvert extensions. Two of these watercourses support warmwater fish species. Existing drainage patterns are being maintained. 	MOE MNR CVC TRCA	<ul style="list-style-type: none"> Construct works during less sensitive time period (July 1 to Sept 15). Minimize in-stream works. Implement fisheries mitigation measures for Fletcher's Creek during construction. Isolate the construction area from watercourses through by-pass pumping and temporary diversion of specific reach to install the extensions. Erosion and sediment control measures will be incorporated into the contract.
Vegetation (Section 3.1.4 of TESR)		
<ul style="list-style-type: none"> Impacts to approximately 2 ha of removal of the Meadowvale Station Woods ESA/ANSI due to Highway widening Impacts to 1.5 ha of woodlot in the southwest portion of the Highway 401/403 interchange 	CVC TRCA MNR	<ul style="list-style-type: none"> Only vegetation directly affected by grading, ditching operations and traffic safety will be removed. Graded areas will be covered with topsoil seed and mulch. Landscaping and tree planting will be included in the contract, which will be

Table 3-2: Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
		<p>determined during the detail design stage.</p> <ul style="list-style-type: none"> Landscaping measures will be implemented in the area of 2nd Line West to mitigate vegetation removals. Tree management measures will be implemented during construction to protect vegetation not being removed.
Wildlife Habitat (Section 3.1.5 of TESR)		
<ul style="list-style-type: none"> Impacts to wildlife habitat primarily within the Fletcher's creek ESA/ANSI Impacts to the existing wildlife will be of low to moderate significance. 	CVC MNR	<ul style="list-style-type: none"> Existing wildlife habitat areas will not be fragmented, as impacts are limited to edge effects associated with the Highway widening in vicinity of Fletcher's Creek. Amphibian ponds on the east side of Fletcher's Creek are not anticipated to be affected as grading will not affect drainage characteristics Wildlife passage opportunities through Fletcher's Creek culvert currently low and will remain low.
Drainage (Section 3.1.6 of TESR)		
<ul style="list-style-type: none"> Additional Stormwater runoff from new pavement can impact receiving watercourses and cause flooding. 	MTO	<ul style="list-style-type: none"> Stormwater management practices will be implemented to minimize impacts. Provide SWM Pond for Fletcher's Creek watershed in northwest quadrant of Highway 401 and closed 2nd Line West. Provide SWM Pond for Little Etobicoke Creek Watershed in northwest quadrant of Highway 401 and Highway 403/401 interchange. Provide vegetated swales elsewhere to treat highway runoff.
SOCIO-ECONOMIC ENVIRONMENT		
Adjacent Land Uses/Property (Section 3.2.1 of TESR)		
<ul style="list-style-type: none"> Limited property is required for Highway widening No residential properties are required. No impacts to existing businesses are anticipated. 	MTO RES/BUS	<ul style="list-style-type: none"> Property will be purchased based on fair market value. No residential or commercial buy-outs required since majority of land is within MTO Right-of-Way
Highway & Construction Noise (Section 3.2.2 of TESR)		
<ul style="list-style-type: none"> Residential areas are situated adjacent to Highway 401 within the project limits 	MOE MTO RES/BUS	<ul style="list-style-type: none"> Noise assessment has concluded no mitigation required given noise increase limited to a maximum of 2 dBA.

Table 3-2: Summary of Identified Concerns and Proposed Mitigation		
ENVIRONMENTAL ISSUE/CONCERN	CONCERNED AGENCIES	PROPOSED MITIGATION
		<ul style="list-style-type: none"> Where possible, certain operations (e.g. pile driving) will be restricted to daytime hours. Standard contract provisions regarding restrictions on operations causing significant construction noise will be included in the contract. Complaints about noise will be investigated in accordance with the MTO/MOE Noise Protocol.
Archaeology/Heritage (Section 3.2.3 of TESR)		
<ul style="list-style-type: none"> A stage 1-2 Archaeological survey was completed for this project with no significant finds 	MCL MTO	<ul style="list-style-type: none"> If the Contractor's operations expose any items, which may indicate an archaeological find or presence of built heritage structures, work in the area will be suspended immediately and MCL will be contacted.
Air Quality (Section 3.2.4 of TESR)		
<ul style="list-style-type: none"> Impact to air quality during construction 		<ul style="list-style-type: none"> During construction, dust and emissions will be generated by construction equipment and activities. Standard mitigation measures will be applied during the construction. Special Provisions for Dust Suppressants will be incorporated in the contract to ensure dust is effectively managed. Construction equipment will be required to conform to emissions standards and the idling of equipment will be restricted to ensure that air quality is not unduly impacted. Where construction activities are expected to have a direct impact on public traffic, these activities will be undertaken during off-peak periods whenever possible to minimize traffic congestion and idling of vehicles.
TRANSPORTATION		
Traffic (Section 3.4 of TESR)		
<ul style="list-style-type: none"> Motorists may experience delays and disruption during construction. 	MTO RES/BUS	<ul style="list-style-type: none"> Collector lanes will be generally constructed first thereby minimizing traffic disruptions on Highway 401. Closure of Highway 401 lanes only once additional capacity of the network has been provided. Short-term closures will be limited to off-peak and/or nighttime hours.

4.0 MONITORING

4.1 *CHANGES DURING DETAIL DESIGN*

During the next study stage, the contract drawings and specifications will be developed to allow the project to be tendered for construction. There is a possibility that minor design modifications or refinements may be required either during the detail design stage or as a result of recommendations made by the contractor, which could result in environmental benefits, or impacts that may not have been anticipated or identified in this document. Should this occur, the modifications are not anticipated to alter the basic intent of the undertaking. Any changes resulting from design modifications/refinements will be discussed with appropriate external agencies and property owners prior to construction. A series of Design and Construction Reports will be prepared during detail design to document any changes or refinements made during the detail design stage and to document the incorporation of the commitments made in this TESR.

4.2 *MONITORING DURING CONSTRUCTION*

The Ministry of Transportation has an internal process to identify and address updates to the Ontario Provincial Standard Specifications, and MTO Special Provisions and Non-Standard Special Provisions. This includes ongoing review of unanticipated events that occur during other construction contracts and incorporation of required updates into future contract provisions. This helps to assess the effectiveness of the contract provisions to ensure that they are providing the expected control and/or protection.

On-site construction administration/inspection staff (retained by MTO) will ensure that the environmental protection measures outlined in this report are carried out. Environmental specialist staff will be available if needed to review operations with significant mitigating measures or environmental concerns. The timing and frequency of the involvement of specialist staff will be determined by the schedule of the construction operations, the sensitivity of environmental concerns, and the development of any unforeseen environmental problems. In the event that problems develop, the MTO Environmental Planner and appropriate external agency representatives will be contacted to provide additional input.

If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation will be changed or modified to reduce those impacts in consultation with MTO.

5.0 CLASS EA PRINCIPLES

This Transportation Environmental Study Report (TESR) documents the environmentally significant aspects of the planning, design and construction of the Highway 401 Improvements from Highway 410/403 interchange to the Credit River, a Group 'B' project as defined in the *Class Environmental Assessment For Provincial Transportation Facilities (1999, as amended 2000)*.

This Class Environmental Assessment process is based on achieving mandatory principles for transportation engineering, consultation, environmental protection, documentation, and bump-up. Where appropriate this document has referenced the principles to be applied and how they were achieved during the environmental assessment process.

The following principles underlie the Class EA process for Group A, B and C projects:

- Transportation engineering principles;
- Environmental protection principles;
- External consultation principles;
- Evaluation principles that are intended to achieve the best overall balance of these principles;
- Documentation principles;
- Bump-up principles; and
- Environmental clearance principles to proceed.

Table 5-1 below summarizes how the principles of the Class EA were addressed in this project.

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
Transportation Engineering (Section 4.1)	
<ul style="list-style-type: none"> • Provide for the efficient movement of people and goods 	<ul style="list-style-type: none"> • Proposed widening of Highway 401 will double existing capacity and provide for the efficient movement of people and goods • Proposed widening of Highway 401 will address existing congestion and will also operational/safety issues
<ul style="list-style-type: none"> • Meet the needs of the traveling public as a whole, by maximizing opportunities to satisfy existing and future provincial travel demand 	<ul style="list-style-type: none"> • Proposed widening of Highway 401 will address future provincial travel demand for 20 year planning horizon • Proposed widening of Highway 401 will provide overall economic benefits in terms of reduced travel time and congestion
<ul style="list-style-type: none"> • Reflect sound engineering judgment, site specific transportation engineering and/or environmental constraints, transportation demand, capacity of existing and future transportation facilities, traffic composition, trip length, population density and land development, and traffic habits 	<ul style="list-style-type: none"> • Proposed widening reflects sound engineering judgment and site specific constraints. For example, the proposed widening occurs primarily within MTO right-of-way that has been protected for widening • The need for widening is based on traffic projections

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
of the overall transportation system users, in meeting or exceeding current provincial design standards and practices	which reflect historical trends, land development, existing and proposed transportation infrastructure improvements and regional population projections
<ul style="list-style-type: none"> • Ensure compatibility with the existing and future provincial and municipal transportation system and system needs, and improve the level of service, safety and operation for the provincial transportation system users 	<ul style="list-style-type: none"> • Proposed widening is compatible with existing and future provincial and municipal transportation system and system needs and has been planned and protected for several decades • The level of service, safety and operations will improve with widening of Highway 401
<ul style="list-style-type: none"> • Ensure consistency with other transportation facilities in the vicinity to ensure rational and predictable behavior of users 	<ul style="list-style-type: none"> • Consistent lane configuration with eastern limit of project (12-lane express/collector configuration) • Provision of typical HOV lane configuration in lane 1 (left lane) of the express with buffer separation consistent with other proposed provincial HOV facilities
<ul style="list-style-type: none"> • Ensure the technical feasibility of construction, operation and maintenance 	<ul style="list-style-type: none"> • The widening of Highway 401 is technically feasible from a construction, operation and maintenance point of view and meets MTO design standards for freeways
<ul style="list-style-type: none"> • Minimize environmental impacts and the use of non-renewable natural resources such as aggregates 	<ul style="list-style-type: none"> • Environmental impacts have been minimized through provision of standard construction mitigation measures (erosion control, dust control, construction timing) and provision of mitigation/compensation for impacts to Fletcher's Creek and Fletcher's Creek ESA/ANSI • A Stormwater Management Plan has been developed to minimize quality and quantity impacts to receiving watersheds
<ul style="list-style-type: none"> • Minimize property requirements and impacts on adjacent properties 	<ul style="list-style-type: none"> • Property impacts have been minimized through previous property protection/acquisition. • Impacts on adjacent properties are minimal since existing highway corridor will accommodate widening
<ul style="list-style-type: none"> • Minimize net energy usage of the transportation system 	<ul style="list-style-type: none"> • Improvements in level of service will minimize traffic congestion and excess fuel consumption during idling and stop and go traffic • Implementation of HOV in this corridor will further reduce net energy usage by encouraging car pooling and transit.
<ul style="list-style-type: none"> • Avoid directing large volumes of long-distance provincial traffic through settlement areas 	<ul style="list-style-type: none"> • Widening occurs within an existing transportation corridor, settlement areas not affected
<ul style="list-style-type: none"> • Maximize opportunities to make the facility "more safe" 	<ul style="list-style-type: none"> • Barrier and end treatments are being brought up to current MTO standards as part of this project • Widened highway meets current MTO design and safety standards. • Proposed interchange improvements at Mavis Road, Hurontario and 401/403/410 interchanges
<ul style="list-style-type: none"> • In consideration of all of the above, provide the maximum benefit for the lowest cost (considering construction, maintenance and operation costs) 	<ul style="list-style-type: none"> • The maximum benefit has been provided for the lowest cost, especially since the majority of the property is already in MTO ownership
Environmental Protection (Section 3.0)	
<ul style="list-style-type: none"> • Conduct studies and/or projects with an inherent approach of avoiding or minimizing overall environmental impacts through consideration of alternatives 	<ul style="list-style-type: none"> • Studies were conducted for fisheries and aquatic habitat, vegetation, wildlife, archaeology, heritage and site contamination to determine environmental sensitivities and constraints to design • Also considered were existing and proposed land use,

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
	<p>and noise</p> <ul style="list-style-type: none"> • Alternatives developed/assessed which best meets study objectives with least overall environmental impact
<ul style="list-style-type: none"> • Identify existing environmental conditions and potential impacts relevant to the study and/or project 	<ul style="list-style-type: none"> • Existing environmental conditions presented in Section 2.3 of TESR • Potential impacts and mitigation presented in Section 3.0 of TESR
<ul style="list-style-type: none"> • Meet the statutory duties and other requirements of federal and provincial environmental legislation 	<ul style="list-style-type: none"> • Statutory requirements of Environmental Assessment Act addressed through adherence to the Class Environmental Assessment for Provincial Transportation Facilities (1999, as amended 2000) • Statutory requirements of Federal environmental legislation addressed through conformance with Federal Fisheries Act at a level of detail appropriate to Preliminary Design stage (conceptual fisheries compensation agreement with external agencies)
<ul style="list-style-type: none"> • Meet the intent of government-approved policy and interministerial protocols 	<ul style="list-style-type: none"> • Intent of MOE/MTO Noise Protocol met through conducting noise study as per protocol requirements (Appendix B of TESR) • Intent of MTO/MNR Fisheries Protocol addressed through conducting fisheries study and discussion with MNR to determine whether a HADD would occur and agreement in principle for fisheries compensation (Section 3.1.3 of TESR)
<ul style="list-style-type: none"> • Address the Ministry of Transportation's Statement of Environmental Values 	<ul style="list-style-type: none"> • The preliminary design has demonstrated a protection for the natural environment by minimizing impacts and incorporating mitigation (See Table 3-2) • Environmental concerns in decision-making have been demonstrated in this preliminary design through inclusion of environmental criteria in the evaluation of alternatives. In addition, selection of HOV lanes reduces overall environmental impacts by encouraging car pooling and transit • Integrated transportation planning has been provided in this preliminary design through application of sound transportation engineering and environmental planning principles • Public participation has been addressed (See External Consultation)
<ul style="list-style-type: none"> • Balance environmental protection considerations with transportation engineering considerations during each stage of the study and/or project process, recognizing that safety and effectiveness of the transportation system is fundamental to such decisions 	<ul style="list-style-type: none"> • Environmental protection considerations have been balanced with transportation engineering considerations. The impacts to fisheries at Fletcher's Creek will be subject to compensation plan to ensure no net loss of fisheries habitat
<ul style="list-style-type: none"> • Recognize that it is seldom possible to satisfy all interests when making the tradeoffs necessary in the EA process, and that no single environmental factor is always "paramount" 	<ul style="list-style-type: none"> • Trade-offs were made between widening Highway 401 and maintaining the status quo, however the need to widen from a transportation perspective is clearly demonstrated and providing for HOV lanes will maximize the use of the transportation infrastructure • 2nd Line West is used by local residents to cross Highway 401, however to minimized environmental impacts and maintain safety under a widened Highway 401 this access is eliminated with a cul-de-sac on either

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
	side of Highway 401
<ul style="list-style-type: none"> Recognize that environmental mitigation measures themselves may have environmental impacts which offset their benefit 	<ul style="list-style-type: none"> It is recognized that environmental mitigation measures themselves may have environmental impacts which offset their benefit (e.g. additional vegetation removal may be required to install silt fence barrier for erosion control)
<ul style="list-style-type: none"> Provide mitigation effort in proportion to environmental significance and ability to reasonably mitigate 	<ul style="list-style-type: none"> Appropriate mitigation effort provided. Emphasis has been placed on reducing impacts and providing mitigation to the Fletcher's Creek ESA/ANSI and on fisheries mitigation
<ul style="list-style-type: none"> Monitor the implementation of environmental protection and mitigation measures during construction 	<ul style="list-style-type: none"> Monitoring requirements are specified (see Section 4.0 of the TESR) and will be refined during detail design prior to construction
External Consultation (Chapter 5)	
<ul style="list-style-type: none"> External stakeholders, including external agencies and the public will be notified of the proponent's intention to carry out a study at the beginning of the study, before the proponent becomes committed to a particular solution. 	<ul style="list-style-type: none"> External stakeholders were notified at the beginning of the study by letter and by newspaper advertisements in local newspapers (<i>The Toronto Star</i>, <i>The Mississauga News</i> and <i>L'Express</i>) (see Section 2.5.2)
<ul style="list-style-type: none"> In all cases, the consultation plan will be developed to place emphasis on consultation with the stakeholders most directly affected. 	<ul style="list-style-type: none"> Emphasis was placed on consulting with local stakeholders by advertising in local newspapers and contacting local municipal authorities and agencies in addition to provincial ministries (see Section 2.5 of the TESR) Advertisement of the PIC also involved Canada Post Bulk mail delivery of brochures in advance of the PIC to local residents and businesses adjacent to Highway 401 within the study limits (see Section 2.5.2.1 of the TESR)
<ul style="list-style-type: none"> The consultation plan will provide timely, user-friendly opportunities for input by the public and the agencies whose mandates are most directly affected. 	<ul style="list-style-type: none"> The consultation plan provided opportunity for input throughout the project, and more formally during the initial notification, PIC notification and TESR filing notification. Meetings were held with affected stakeholders throughout the duration of the project (Region of Peel and CVC (see Table 2-3)
<ul style="list-style-type: none"> Consultation will be used to assist in the identification of data requirements. 	<ul style="list-style-type: none"> External agencies were contacted initially to determine existing background information and sensitivities and assisted in determining further data requirements
<ul style="list-style-type: none"> The proponent will constructively address input received during the consultation process. 	<ul style="list-style-type: none"> Input received during the preliminary design process was integrated into the study (see Section 2.5.3)
<ul style="list-style-type: none"> During later planning and design phases, the proponent will show how the input received in earlier stages affected the project. 	<ul style="list-style-type: none"> How the input received in the preliminary design phase affects the project in the detail design phase will be documented in the Design and Construction Report prepared in the detail design stage
<ul style="list-style-type: none"> The amount, extent and timing of consultation will vary according to the complexity of a specific project, the nature of the specific environmental issues, and the concerns expressed by the public and external agencies. 	<ul style="list-style-type: none"> The extent of consultation focused on stakeholders most directly affected as discussed above The timing of consultation provided opportunity for input throughout the project, and more formally during the initial notification, PIC notifications and TESR filing which was appropriate for a project of this complexity
<ul style="list-style-type: none"> For each study, appropriate methods of notification will be selected based on the nature of the study area, the external parties to be contacted, the stage of the study, and the 	<ul style="list-style-type: none"> Conventional methods of notification were utilized during this study including letter notification, newspaper advertisements and use of bulk-mail delivered

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
issues to be addressed.	brochures
<ul style="list-style-type: none"> The proponent will make reasonable efforts to resolve concerns. Mediation will be considered for major issues, at key decision points. 	<ul style="list-style-type: none"> Few concerns were raised by stakeholders Construction Impacts will be addressed through standard environmental mitigation to address noise, dust, erosion and sediment control Closure of 2nd Line West has proceeded through separate approval process (see City of Mississauga by-laws in Appendix K) Mediation was not required to resolve concerns
Evaluation (Section 4.3)	
<ul style="list-style-type: none"> The evaluation process must be traceable, replicable, and must be understandable by those who may be affected by the decisions. 	<ul style="list-style-type: none"> The evaluation process is traceable, replicable and understandable and was based on a qualitative trade-off analysis and is clearly explained using factors and associated indicators (see Section 2.4 of the TESR) This evaluation process is commonly used in MTO projects for alternative selection and is generally accepted as a reasonable methodology for projects of this scope and complexity
<ul style="list-style-type: none"> All relevant factors, including transportation engineering and environmental protection, will be given due consideration. 	<ul style="list-style-type: none"> All relevant factors were considered (see Section 2.4.2 of the TESR)
<ul style="list-style-type: none"> The evaluation may be subjective (based on reasoned argument) or objective (using quantifiable data). 	<ul style="list-style-type: none"> The evaluation was based on reasoned argument and augmented with quantifiable data where appropriate
<ul style="list-style-type: none"> For Group A projects, the proposed evaluation process in planning will be established through consultation with external stakeholders 	<ul style="list-style-type: none"> Not applicable, this is a Group B project, however the evaluation was presented to the public at the first PIC
<ul style="list-style-type: none"> Factors may be refined from one stage of a project to the next. 	<ul style="list-style-type: none"> Not applicable as selection of preferred alternative was generally accepted at the first PIC
Environmental Documentation (Section 6.1)	
<ul style="list-style-type: none"> The document content requirements will be fulfilled. 	<ul style="list-style-type: none"> The document content requirements have been fulfilled. The content requirements and the corresponding sections in this TESR are as follows: <ul style="list-style-type: none"> study objectives - Section 2.2 earlier and related work - Section 2.1.3 significant transportation engineering issues – Section 2.3.3 significant environmental issues – Section 2.3 alternatives developed and evaluated – Section 2.4 external consultation – Section 2.5 changes made as a result of external consultation – section 2.5.3 recommended plan – Section 2.1.2 Exhibits 2-2, 2-3 commitments to future action – Section 3.5, Section 4.0, Table 3-2
<ul style="list-style-type: none"> Documentation will deal with project-specific details and issues. Information presented in this Class EA will not be repeated. 	<ul style="list-style-type: none"> This TESR addresses project specific details and issues (e.g. need and justification, site specific natural, cultural and socio-economic features, alternatives selection, impact assessment and mitigation) Information in the Class EA is not repeated except where necessary

Table 5-1: Class EA Principles¹	
PRINCIPLES (SECTION OF CLASS EA)	HOW THE CLASS EA PRINCIPLES WERE ADDRESSED
<ul style="list-style-type: none"> Documentation will cover the results of the study to date. A TESR and DCR must cover full phases. 	<ul style="list-style-type: none"> This TESR covers the results of the study to date This TESR covers the full preliminary design phase
<ul style="list-style-type: none"> Where a Study Design Report, TESR or DCR is required, an opportunity to review the documentation and provide comments will be provided. 	<ul style="list-style-type: none"> An opportunity to review this TESR has been provided at the review locations as noted in The Public Record (page i) An opportunity to provide comments on this TESR has been provided as noted in Section 1.3 of this TESR
<ul style="list-style-type: none"> The review period for Study Design Reports, TESRs and DCRs will be at least 30 days. 	<ul style="list-style-type: none"> A review period of at least 30 days has been provided for in this TESR
Bump-up (Section 6.2)	
<ul style="list-style-type: none"> Notice of bump-up opportunity will be provided upon formal submission of the TESR in all cases, and if applicable, upon submission of the DCR. 	<ul style="list-style-type: none"> Bump-up opportunity notification has been provided for in the newspaper notification for filing this TESR
<ul style="list-style-type: none"> The review period following the notice of bump-up opportunity will be at least 30 days in all cases. 	<ul style="list-style-type: none"> A review period of at least 30 days has been provided for in this TESR
<ul style="list-style-type: none"> Environmental Clearance - Construction Start will not be issued, and the construction of physical works will not begin, until the 30-day review period is over and any bump-up requests have been dealt with. 	<ul style="list-style-type: none"> Environmental Clearance – Construction Start will not be issued until after the 30-day review period is over and any bump-up requests have been dealt with and after a DCR is completed and filed for 30 day review during the detail design stage
Environmental Clearance (Chapter 8)	
<ul style="list-style-type: none"> The study principles for transportation engineering, environmental protection, evaluation, consultation, documentation, and bump-up set out in this Class EA have been applied to the project. 	<ul style="list-style-type: none"> Study principles have been applied to this project as detailed in this table
<ul style="list-style-type: none"> The study process set out in this Class EA has been applied. 	<ul style="list-style-type: none"> The study process for a Group 'B' project under this Class EA have been applied

¹ Principles excerpted from Class Environmental Assessment for Provincial Transportation Facilities (1999, as amended 2000)