

City of Mississauga

Second Line West Pedestrian/Cyclist Crossing of Highway 401

Schedule 'C' Municipal Class Environmental Assessment

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2		City of Mississauga
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1		Credit Valley Conservation Authority (CVC)
1		Ministry of Environment and Climate Change (MOECC)

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	Michelle Pinto	09/05/2014	Incorporating City of Mississauga's Comments
2	Michelle Pinto	10/28/2014	Incorporation MTO and MOECC Comments (no comments from CVC)

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Executive Summary

Introduction

The existing Second Line West bridge structure over Highway 401 is being removed to accommodate the widening of Highway 401. The need and justification for the removal of this structure was documented by the Ontario Ministry of Transportation (MTO) in a Transportation Environmental Study Report (ESR) for the ultimate widening of Highway 401 from the Highway 403/410 interchange to the Credit River (August 2005), gaining environmental approval in 2007.

The transportation objectives of the 2010 City of Mississauga Cycling Master Plan and the City of Mississauga's Official Plan (Schedule 7) identify the need to establish a pedestrian/cyclist connection for Second Line West across Highway 401.

The City of Mississauga has initiated this Class Environmental Assessment (EA) Study to identify existing and future transportation problems and opportunities in the study area and to pursue recommendations for a north-south pedestrian/cyclist crossing over Highway 401. This EA was undertaken in accordance with Schedule 'C' of the *Municipal Class Environmental Assessment* (2000, amended 2007 & 2011). As a separate process, the City is undertaking an analysis related to existing traffic conditions in order to investigate public comments for enhanced traffic management in the vicinity of the study area.

The study area was established early in the Class EA process and comprises the existing right-of-way for the Second Line West bridge over Highway 401, extending approximately 100 metres north and south of the existing Highway 401 right-of-way. Highway 401 bisects the overall study area.

This ESR documents the planning and decision making process, including public consultation, which was followed to arrive at the preferred bridge design. The ESR also sets out mitigating measures proposed to avoid or minimize environmental impacts prior to, during, and after construction.

Specifically, this ESR documents:

- The background of the study
- The consultation process
- The need and justification for the study
- Description of existing conditions
- The alternative solutions and design concepts
- Description of the preferred bridge design
- Anticipated impacts and mitigation prior to, during, and after construction.

Consultation

The involvement of the community – residents, stakeholders, agencies and those who may be potentially affected by a project – is an integral part of the Class EA process. The purpose of the EA Study consultation process is to

Figure ES-1: Study Area



provide an opportunity for stakeholder groups and the public to gain an understanding of the study process; contribute to the process for development and selection of alternatives; and provide feedback and advice at important stages in the EA process. Specifically, the consultation efforts had the following objectives:

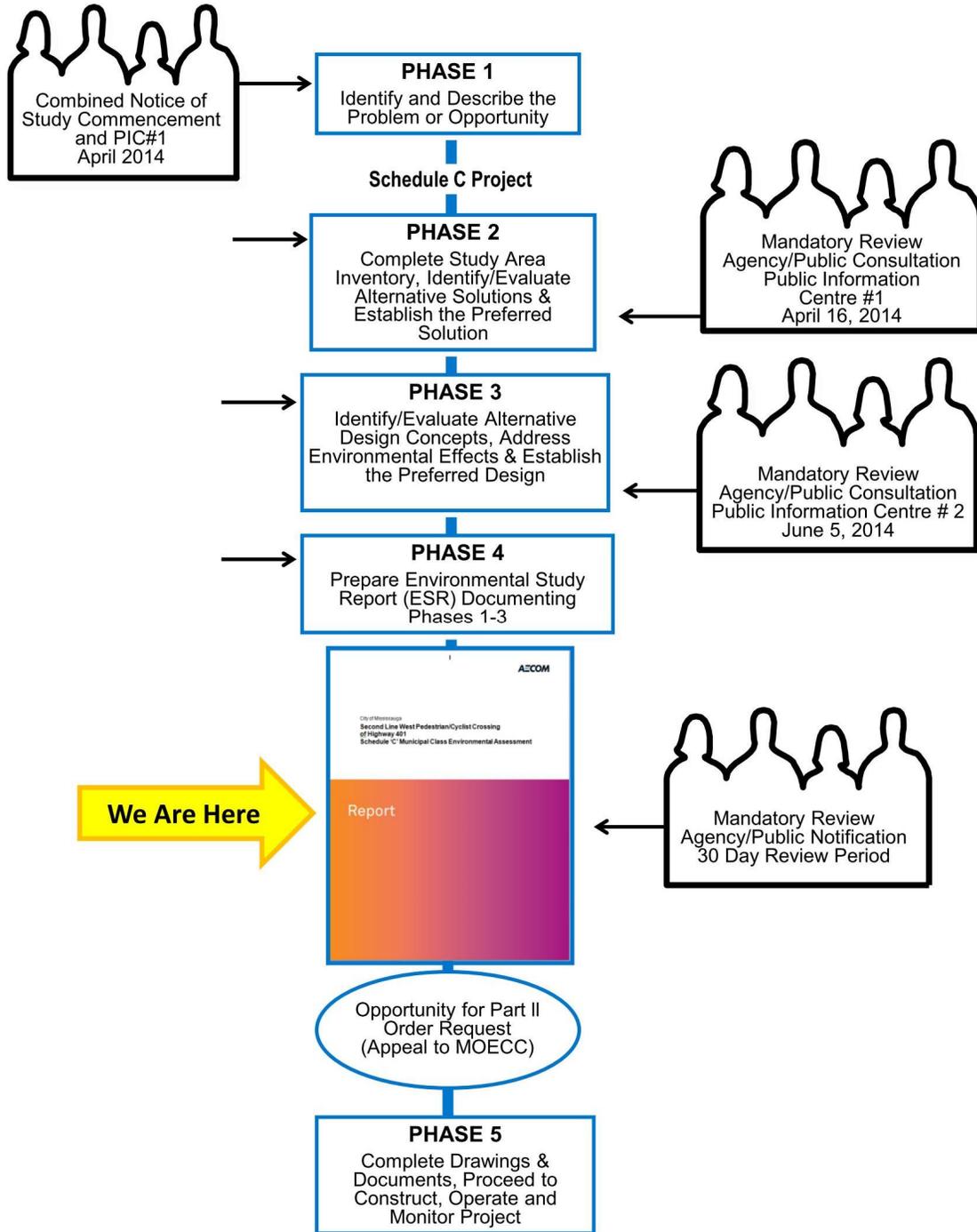
- Generate awareness of the project and provide opportunities for involvement throughout the planning process
- Facilitate constructive input from public and agency stakeholders at key points in the EA process, prior to decision-making.

An enhanced consultation program was incorporated into the study in order to meet the above objectives. The consultation program included:

- Posting project milestones on the City of Mississauga's project website (<http://www.mississauga.ca/portal/residents/secondlinewest>)
- Holding meetings with the Ministry of Transportation at key phases during the study
- Publication of newspaper notices in the *Mississauga News* for all project milestones
- Notification to stakeholders, affected land owners, the general public and review agencies regarding project milestones
- A Second Line West Neighbourhood Traffic Study conducted by the City of Mississauga
- Holding two Public Information Centres (PICs) to engage and obtain input from the public, review agencies and stakeholders
- Issuing a Notice of Study Completion.

Refer to **Figure ES-2** for the Project Schedule, including key dates of consultation. The main areas of concern raised by the public related to the need and justification to remove the existing vehicular bridge, the safety of pedestrians and cyclists using the crossing, traffic and congestion, and noise impacts. These issues have been addressed throughout the EA Study process and are documented in this ESR.

Figure ES- 2: Project Schedule



Phase One: Problem/Opportunity Statement

An opportunity exists to:

- Restore the missing connection after removal of the existing Second Line West structure to accommodate for the MTO's Highway 401 widening project
- Improve the pedestrian and cyclist connectivity of the two communities on either side of Hwy 401, while still retaining the local character and space
- Provide for more sustainable modes of travel (cycling and walking), in compliance with the 2010 City of Mississauga Cycling Master Plan which identifies a proposed Highway 401 crossing
- Buffer pedestrians and cyclists from traffic
- Connect to parks and trails north and south of Highway 401, as part of the Credit River Parks Strategy; and,
- Co-ordinate improvements and construction with the Highway 401 expansion project.

A review of existing and future conditions indicates:

- Numerous planning documents and studies have established a need for a pedestrian/cyclists connection over Highway 401, including the Peel Region Official Plan, City of Mississauga Official Plan, City of Mississauga Cycling Master Plan, Credit River Parks Strategy, City of Mississauga "Living Green" Master Plan and the City of Mississauga "Our Future Mississauga" Strategic Plan.
 - Currently, pedestrians and cyclists must utilize alternative routes which accommodate vehicular traffic to move from one side of Highway 401 to the other, resulting in greater potential for conflicts with vehicles and increased safety risk.
 - Potential for crossing to connect with existing and future cycling network
- The study area is comprised primarily of low-density residential land use, with wooded areas to the west (Meadowvale Station Woods) and northeast.
- Eight (8) school bus transportation routes use the existing Second Line West crossing. There are no public transportation routes which currently utilize the crossing.

Phase Two: Alternative Solutions

Alternative solutions were identified to address the need for transportation improvements within the study area. Alternative solutions were assessed on the basis of a comprehensive set of factors and criteria that reflected the following considerations:

- Provincial and federal government legislation, policies and guidelines
- Municipal policy (City of Mississauga, and the Region of Peel)
- Existing and future social, economic, cultural and engineering conditions within the study area
- Issues and concerns identified during consultation with ministries, agencies, municipalities, ratepayer and interest groups and the general public
- Project Team investigations and expertise.

Technical, Socio-Economic and Financial screening criteria were used as the basis for assessment for the following alternative solutions. This list of alternative solutions was reviewed by the Project Team members to "screen-out" unsuitable alternatives and ensure that only the alternative solutions that adequately address the identified transportation problems/opportunities were carried through to the detailed assessment. The summary of the assessment of alternative solutions concludes the following:

1. Do Nothing

- Included as a benchmark for the assessment of the other alternatives
- Involves the removal of the existing vehicular crossing at Highway 401 to accommodate the widening of Highway 401 with no provision of a pedestrian/cyclist crossing
- **Not recommended** – does not enhance the cycling/pedestrian network connectivity as outlined in the City's Official Plan and Cycling Master Plan

2. Underpass – Pedestrian/Cyclist Crossing of Highway 401

- Construct a cycling/pedestrian trail connection under Highway 401 utilizing the new Fletcher's Creek bridge structures
- **Not recommended** – potentially greater and significant impacts to Species at Risk and the Natural Environment within the Meadowvale Station Woods. Additionally, Alternative 2 may potentially involve the re-design of the already approved future Highway 401 Fletcher's Creek Bridges. This Alternative is also not preferred from a personal safety perspective.

3. Overpass – Pedestrian/Cyclist Crossing of Highway 401

- Construct a pedestrian/cyclist overpass within the existing second Line West right-of-way
- **Recommended** – best addresses the problem Problem/Opportunity Statement. Addresses the planned cycling/pedestrian network connectivity while having the least impact on the natural environment, and allows for co-ordination and cost savings with the Highway 401 expansion. Implementing this Alternative would also allow for the construction of a unique, aesthetically pleasing structure that would be viewable from the future expanded Highway 401.

Thorough assessment of the alternative solutions (developed in consultation with public and agency stakeholders) resulted in selection of **Alternative 3–Overpass – Pedestrian/Cyclist Crossing of Highway 401** recommended to be carried forward as the Preferred Solution.

Phase Three: Alternative Design Concepts

Alternative design concepts were identified, developed and evaluated for the Preferred Solution.

For Phase 3 of the study, the assessment criteria were further refined and design standards were identified to reflect an appropriate level of detail associated with the Preferred Solution. Following the identification of any constraints, the Alternative Design Concepts were organized into two evaluation groups based on bridge type, with two alternatives for alignment. The Alternative Design Concept Options include either a Box Girder (1) or Steel Truss (2) bridge with a perpendicular (A) or skewed (B) crossing to Highway 401, as follows:

- **Option 1A** - 3-span Steel Box Girder Bridge accommodating a 4 m wide multi-use trail with a perpendicular alignment
- **Option 1B** - 3-span Steel Box Girder Bridge accommodating a 4 m wide multi-use trail with a skewed alignment
- **Option 2A** - 3-span Steel Truss Bridge accommodating a 4 m wide multi-use trail with a perpendicular alignment
- **Option 2B** - 3-span Steel Truss Bridge accommodating a 4 m wide multi-use trail with a skewed alignment

The final comparative evaluation of the alternative design concepts incorporated a confirmation of the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts. The evaluation process was completed separately for each assessment group.

Based on the detailed evaluation completed and documented within **Section 6** of this ESR, it is recommended that one of the two following alternative design concepts be advanced as the Preferred Solution:

- **Option 1B**- Steel Box Girder Bridge with a skewed alignment
- **Option 2B**- Steel Truss Bridge with a skewed alignment.

Preferred Design Concept

The Preferred Design for the Second Line West pedestrian/cyclist crossing over Highway 401, as illustrated in the design plans, profiles and drawings included in Section 7 and Appendix E of this ESR, includes:

- 4 m wide pedestrian/cyclist path, using the existing pavement
- 2H:1V foreslopes, with a minimum 10.0m offset from the edge of the through lane to the vertical face of the north and south abutments
- Two piers between the future Highway 401 core/collector lanes
- 5.3m minimum vertical clearance over Highway 401
- Bridge consists of either a three-span steel box girder or steel truss structure with a 200mm precast concrete deck slab
- Open-rail concept to meet MTO bridge requirements and to prevent build-up of snow during the winter months
- Pathway connections will incorporate passive landscaping and streetscape features, which will be confirmed during the detail design phase. The preliminary landscaping plan for the Preferred Design concept is illustrated in **Figure ES- 3**.

Minor traffic staging is required for resurfacing the intersections of the approaches to the crossing. A more elaborate traffic staging on Highway 401 is required. The intent is to coordinate this part of the construction staging with the MTO Highway 401 widening contract.

The preliminary construction cost associated with the preferred design is estimated at \$2.0 million.

Anticipated Impacts and Proposed Mitigation Measures for the Preferred Design Concept

Many of the environmental concerns related to this project have been mitigated through the process by which the preferred design was selected, as described in this ESR. It is recognized that the proposed construction of the Second Line West pedestrian/cyclist crossing with preferred alternative design concepts **1B** and **2B**, which includes either a box girder or steel truss structure with a skewed alignment, will result in minor impacts on the existing environment. Mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detail design. Construction of the proposed crossing and pathway connections will be restricted to the existing right-of-way to avoid impacts into the Meadowvale Station Woods Environmentally Sensitive Areas (ESA). This ESR has identified potential impacts and recommended mitigation measures to address commonly experienced impacts relating to safety, bridge maintenance, the socio-economic environment, property and access, the natural environment and co-ordination with the Ministry of Transportation. Traffic related impacts during construction will be mitigated during the detail design and construction phase by reviewing the need for traffic calming measures and notifying area residents and businesses of traffic disruptions prior to construction start. As a separate process, the City is undertaking a traffic study to address existing and future deficiencies in traffic operations in the Second Line West neighborhood and to introduce a mitigation plan.

Second Line West Neighbourhood Traffic Study – City of Mississauga

The City of Mississauga conducted a Neighbourhood Traffic Study in 2014 as a separate study to this Class EA Study. The reference material for this study can be found on the project website at <http://www.mississauga.ca/portal/residents/secondlinewest>. The Traffic Study reviewed the existing traffic conditions in the study area and the surrounding neighbourhood. The Study also conducted an assessment of the anticipated future conditions and a proposed plan to mitigate impacts upon removal of the Second Line West vehicular crossing. The Study concluded that while traffic volumes are predicted to grow within the study area, due to potential future developments, the overall road capacity is expected to remain within an acceptable threshold. The Study also reviewed public comments collected at the 2011 public meeting held by the City, and comments from the two Public Information Centres held for this Class EA. Recommendations for potential geometric improvements, where warranted, were provided. A monitoring program will be developed to measure operations and safety conditions after the vehicular crossing has been removed.

Figure ES- 3: Preliminary Landscaping Plan for the Preferred Design Concept

PLEASE SEE SEPARATE FILE FOR FIGURE ES-3/FIGURE 8-3

Table ES-1 below presents the proposed mitigation measures, pertinent to the preferred design concept, in further detail.

Table ES-1: Anticipated Environmental Effects and Proposed Mitigation Measures

	Factor	Potential Impacts	Potential Mitigation
Technical	Safety	Safety of cyclists and pedestrians using the crossing	During Detail Design: <ul style="list-style-type: none"> Railings and illumination will be incorporated into the final design to ensure the safety of users The proposed crossing will be constructed in accordance with Ministry of Transportation Ontario (MTO) standards City of Mississauga Crime Prevention Through Environmental Design principles will be incorporated into the design of the pathway connection
	Maintenance	Snow accumulation	During Detail Design: <ul style="list-style-type: none"> Open rail design will be used avoid snow accumulation over the winter months Curbs will be used to prevent water from dripping over the sides of the crossing and forming icicles
	Property/Access	Impacts to residential/private property in the study area	During Detail Design and Construction: <ul style="list-style-type: none"> Second Line West vehicular crossing will be terminated south of Sombrero Way (north of Highway 401) and at Donway Drive (south of Highway 401) The residential/commercial driveway south of Sombrero Way and east of the existing Second Line West structure will be maintained as a private entrance. South of Sombrero Way, signage will be installed to identify restricted access to the property, as well as the pathway connection
	Ministry of Transportation Coordination	Highway 401 Widening project	During Detail Design and Construction: <ul style="list-style-type: none"> The crossing will maintain required MTO clearances over Highway 401 and will adhere to MTO guidelines. The bridge railing will be positioned to ensure safety of users and Highway 401 travelers below. Re-vegetation along Second Line West will be co-ordinated with the MTO as part of MTO's mitigation required by impacts to the MSW created by the Highway 401 widening.
Socio-Economic environment	Network Connectivity	Maintaining existing network connectivity	During Detail Design: <ul style="list-style-type: none"> <i>Accessibility for Ontarians with Disabilities Act</i> requirements will be met Trail connections to streets north (Jazzy Mews) and south (Delgado Drive) of the bridge, as well as existing and future cycling network will be maintained
	Noise	Disruption to residences and businesses.	During Detail Design: <ul style="list-style-type: none"> Construction noise constraints will be incorporated into contract documents. Construction activities throughout the project will conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. Prior to Construction: <ul style="list-style-type: none"> Develop reactive complaint resolution procedure for responding to complaints resulting from construction. During Construction: <ul style="list-style-type: none"> Comply with MOECC noise limits, and local noise control by-laws. Use construction equipment that meets the requirements of the MOECC Construction Equipment Publication (NPC 115). Prevent unnecessary noise and vibration by maintaining equipment in proper operating condition, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts. Restrict use of equipment to the minimum necessary to perform the specified work. Do not allow excessive idling
	Air Quality	Potential for decrease in localized air quality due to construction dust.	During Construction: <ul style="list-style-type: none"> Apply water and non-chloride dust suppressants during construction, as needed. During construction, vehicles/machinery and equipment should be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.

Table ES-1: Anticipated Environmental Effects and Proposed Mitigation Measures

	Factor	Potential Impacts	Potential Mitigation
	Archaeology	Loss or disruption to archaeological resources	<p>During Construction:</p> <ul style="list-style-type: none"> Should previously unknown or unassessed deeply buried archaeological remains be uncovered during construction; Cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario <i>Heritage Act</i>. <p>The office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146) should be contacted immediately. Any person discovering human remains must immediately notify the office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146), the police or coroner, and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Government Services (416-326-8404).</p>
Natural Environment	Natural Environment	Impacts to Meadowvale Station Woods ESA Soil disturbance Terrestrial Disturbance to Wildlife	<p>During Detail Design and Construction:</p> <ul style="list-style-type: none"> Construction of the proposed crossing and pathway connections will be restricted to the existing right-of-way to avoid impacts into Meadowvale Station Woods ESA No intrusion or disturbance of any kind within 10m from the dripline of the Meadowvale Station Woods will be permitted Direct illumination to the Meadowvale Station Woods will be restricted
	Erosion and Sedimentation	Potential for erosion and sedimentation.	<p>During Detail Design:</p> <ul style="list-style-type: none"> Develop erosion and sedimentation control strategy. <p>During Construction:</p> <ul style="list-style-type: none"> Implement and monitor the erosion and sedimentation control strategy, including appropriate phasing to avoid impacts to Fletcher's Creek, west of the study area. Any areas disturbed by construction will be restored and stabilized as soon as practically possible.
	Wildlife and Migratory Birds	Disruption to wild life habitat and migration patterns.	<p>During Detail Design:</p> <ul style="list-style-type: none"> Confirm Migratory Bird Nesting season. For this area, a timing window of April 1 – August 8 can be assumed for nesting season. <p>During Construction:</p> <ul style="list-style-type: none"> Require contractor to avoid disturbance of any migratory birds found nesting in the project area during the peak breeding season.
	Waste Management and Control of Inadvertent Spills	Potential inadvertent spill of hazardous materials during construction.	<p>During Construction:</p> <ul style="list-style-type: none"> Store all oils, lubricants, fuels and chemicals in secure areas. Contact appropriate regulatory agencies in event of a spill to the environment.
	Landscaping and Vegetation Protection	Physical damage and loss of vegetation/trees for material management and construction activities	<p>During Detail Design:</p> <ul style="list-style-type: none"> Finalize Landscaping Plan in consultation with the MTO to confirm streetscape enhancement. Construction restrictions and maintenance practices such as the following should be considered for tree protection during development of the contract specifications: If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction. A construction work plan will be developed which designates locations for stockpiling of soils and other materials including fuel. <p>During Construction:</p> <ul style="list-style-type: none"> Fence areas of retained trees prior to construction commencement, and prohibit entry of equipment and materials within fenced areas until final grading and landscaping is completed.

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1. Introduction

The City of Mississauga has completed a Class Environmental Assessment (Class EA) Study, including preliminary design, for a Second Line West north-south pedestrian/cyclist crossing of Highway 401, as recommended in the City's 2010 Cycling Master Plan. This Class EA Study was completed in accordance with Schedule 'C' requirements of the Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* (Municipal Class EA) (October 2000, amended 2007 & 2011), which is approved under the *Ontario Environmental Assessment Act*.

1.1 Purpose of Environmental Study Report and Study Background

This Environmental Study Report (ESR) documents the planning and preliminary design components for the *Second Line West Crossing of Highway 401 Class Environmental Assessment (EA) Study*. A variety of tasks were undertaken for this Class EA including the identification of a project need/justification, public / agency consultation, assessment of design alternatives, environmental and socio-economic impact reviews, development of a preferred design concept and preparation of this ESR.

The existing Second Line West bridge structure over Highway 401 is being removed to accommodate the widening of Highway 401. The need and justification for the removal of this structure was documented by the Ontario Ministry of Transportation (MTO) in a Transportation Environmental Study Report (ESR) for the ultimate widening of Highway 401 from the Highway 403/410 interchange to the Credit River (August 2005), gaining environmental approval in 2007.

The long-term cycling objectives of the City of Mississauga's Official Plan (Schedule 7), the 2010 Mississauga Cycling Master Plan and other policies identify the need for a pedestrian/cyclist crossing on Second Line West over Highway 401. This pedestrian/cyclist crossing is a key network connection to the area's integrated active transportation system, connecting neighbourhoods north and south of Highway 401 to the existing and future cycling network.

1.2 Study Area

The study area, indicated in **Figure 1-1**, comprises the existing right-of-way for Second Line West, extending to Sombrero Way to the north and Donway Drive to the south. Highway 401 bisects the study area.

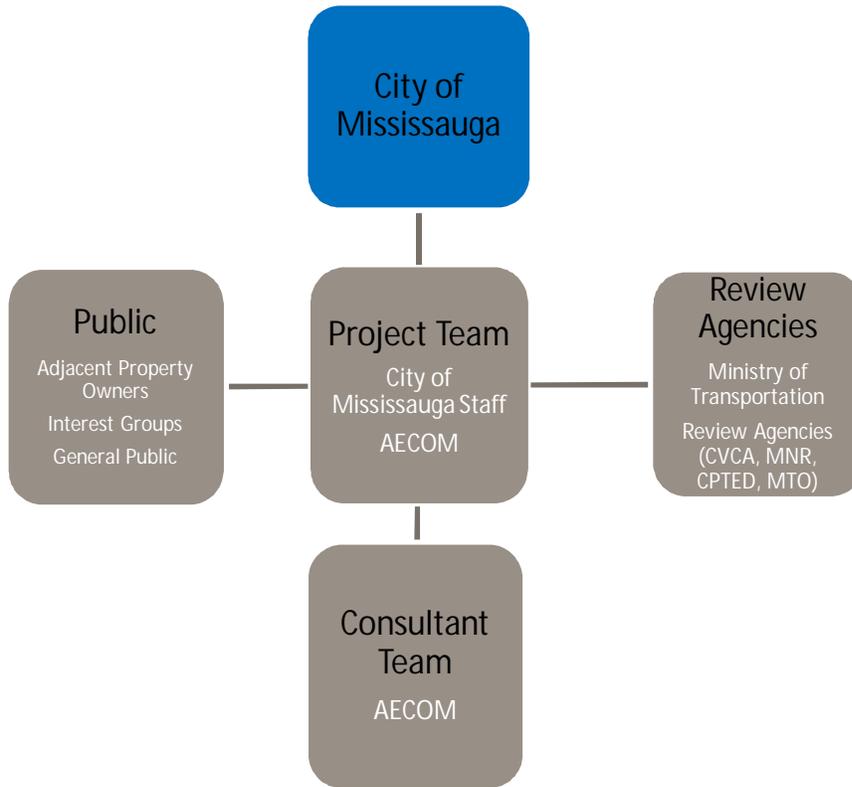
Figure 1-1: Study Area



1.3 Project Team

The City of Mississauga retained AECOM Canada Ltd. (AECOM) to undertake the Class EA for this study. The project team included representatives from the City of Mississauga and AECOM. Project team meetings were held at key points in the process and prior to presenting the study findings to the public, agencies and stakeholders. **Figure 1-2** depicts the study organization.

Figure 1-2: Study Organization

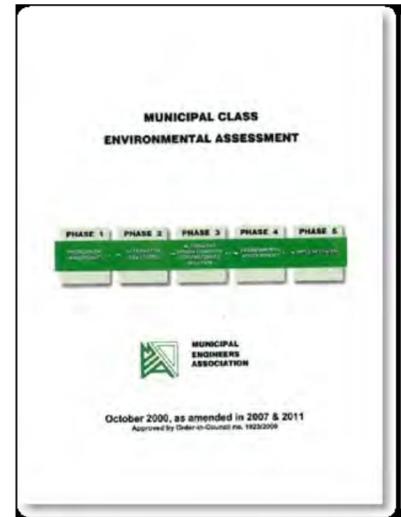


2. Planning Process

2.1 Municipal Class Environmental Assessment Process

To address the need and justification for the proposed pedestrian/cycling crossing and develop and evaluate a range of alternative solutions, the City of Mississauga must comply with the requirements of the Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* document (2000, as amended in 2007 & 2011). Approved under the Ontario *Environmental Assessment Act*, the Municipal Class EA process incorporates the following key principles of EA planning:

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



As illustrated in **Figure 2-1**, the Municipal Class EA document outlines a mandatory five-phase planning and design process. Each phase is summarized below:

- Phase 1. Problem or Opportunity:**
Identify the problem and/or opportunity, need and justification.
- Phase 2. Alternative Solutions:**
Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and regulatory agency review and input.
- Phase 3. Alternative Design Concepts for Preferred Solution:**
Examine alternative methods of implementing the preferred solution taking into account the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts.
- Phase 4. Environmental Study Report:**
Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design and consultation process undertaken through Phases 1 to 3. The ESR is made available for public and agency review and comment.
- Phase 5. Implementation:**
Complete contract drawings and documents and proceed to construction and operation. Monitor construction and operation where necessary for adherence to environmental

provisions and mitigation. Phase 5 is not part of this study. This phase will be undertaken immediately prior to construction.

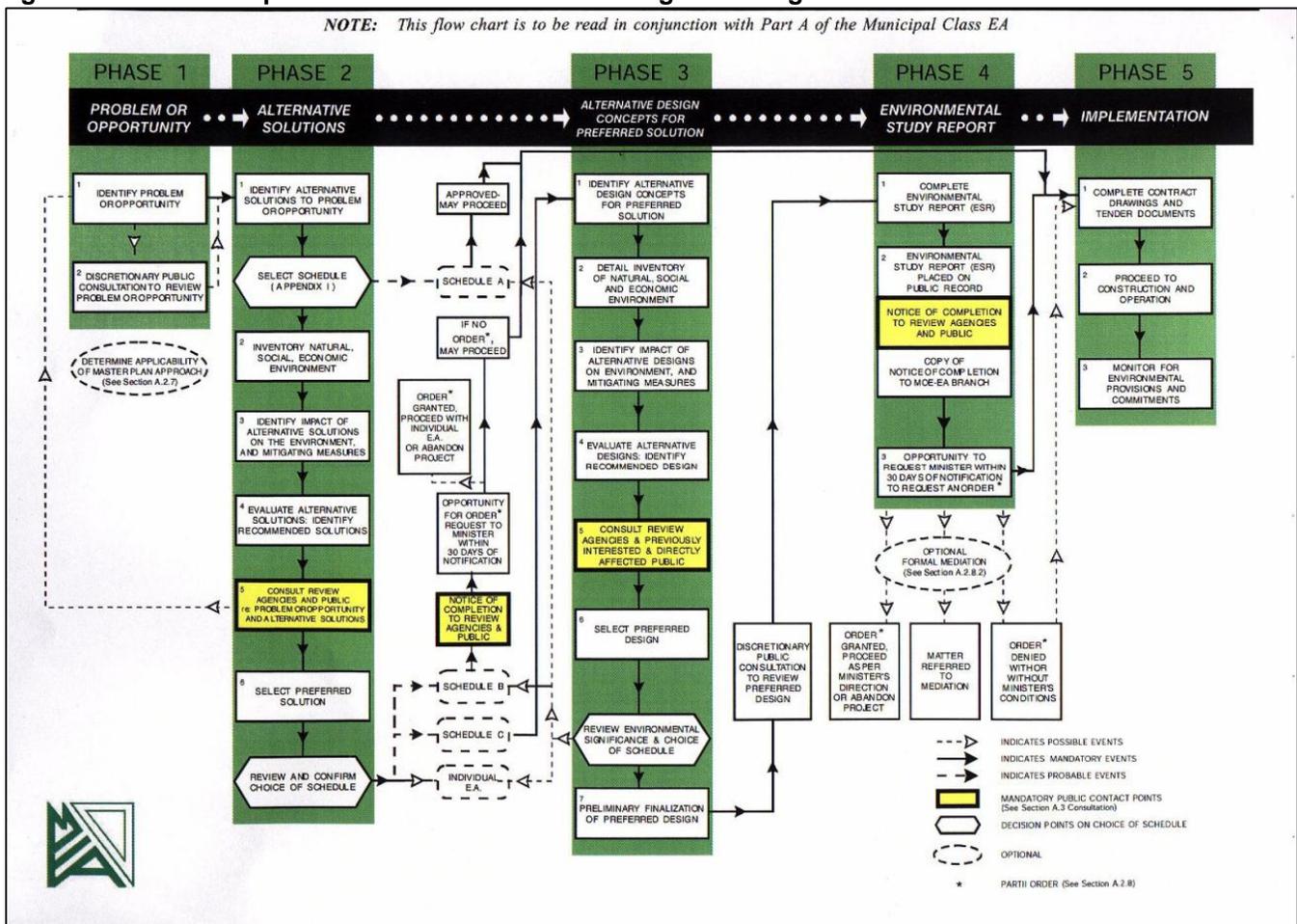
In addition, the Municipal Class EA document classifies projects into four separate categories (i.e., schedules). These are referred to as Schedule A, A+, B or C projects based on the anticipated level of impact, and for some projects, the anticipated construction costs. Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to the Class type. Each schedule is described as follows:

- Schedule A:** Projects are limited in scale, have minimal adverse environmental impacts, and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the full Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities where environmental effects of these activities are usually minimal. Examples of Schedule A projects include culvert repairs and replacements where capacity is not increased or road resurfacing with no change to road alignment. As such, these projects are pre-approved and consequently do not require any further planning and public consultation.
- Schedule A+:** The purpose of Schedule A+ is to ensure some type of public notification for certain projects that are pre-approved under the Class EA. It is appropriate to inform the public of municipal infrastructure project(s) being constructed or implemented in their area; however, there would be no ability for the public to request a Part II Order. If the public has comments, they should be directed to municipal staff and/or municipal Council where they would be appropriately addressed. Examples of Schedule A+ projects include construction of localized operations improvements at specific locations (e.g. addition of turning lanes at an intersection, but not a continuous centre left turn lane).
- Schedule B:** The projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process, involving mandatory contact with the directly affected public and regulatory agencies, to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Examples of Schedule B projects include reconstruction or widening where the reconstructed road results in additional lanes. As a result, the proponent is required to proceed through the screening phase (Phases 1 and 2) including consultation with those who may be affected. At the end of Phase 2, a Project File documenting the planning process shall be finalized and made available to the public and agency review. However, if the screening process raises a concern which cannot be resolved, a Part II Order may be requested and considered by the Minister of the Environment and Climate Change. Alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking.
- Schedule C:** Projects have the potential for significant environmental impacts and must proceed under the full planning and documentation (Phase 1 to 4) procedures of the Municipal Class EA document. Schedule C projects require that an ESR be prepared and filed on the public record for review by the public and regulatory agencies. If concerns are raised that cannot be resolved then a Part II Order may be requested.

2.1.1 Class EA Schedule

This Study is classified as a Schedule C project which involves completion of Phases 1 through 4 of the planning and design process (Phase 5 will be completed prior to construction). The planning and design process for 'Schedule C' projects are documented within an ESR. The ESR is made available for a minimum 30-day public review period. During this review period, any person or party with an outstanding issue may bring the issue forward to the City for resolution. If the issue cannot be resolved, the person or party with the concern may request the Minister of the Environment and Climate Change to order the City to comply with 'Part II' of the *Environmental Assessment Act*. 'Part II' of the *Environmental Assessment Act* requires the completion of an individual EA study with formal government review and approval. This request is called a 'Part II Order Request' (formerly 'Bump-up Request') and must be submitted to the Minister in writing within the minimum 30-day review period. If no requests for a 'Part II Order' are received during the public review period, the project will proceed to Phase 5 (Implementation).

Figure 2-1: Municipal Class EA Five Phase Planning and Design Process



2.2 Canadian Environmental Assessment Act (CEAA)

The *Canadian Environmental Assessment Act (CEAA)* was repealed and replaced with *CEAA 2012* which received Royal Assent on July 6, 2012. Recent changes to *CEAA* include replacing "triggers" with the *CEAA 2012* Regulation Designating Physical Activities list. A proponent is not required to complete the Federal EA Process if a project is not on this list. A review of this list has determined that the Second Line West Pedestrian/Cyclist

Crossing of Highway 401 Class EA Study does not include physical activities identified on the list and is therefore not a *Designated Project*. Hence, this study is not subject to the federal EA process.

2.3 Planning Studies and Policy Context

2.3.1 Provincial Planning Studies

The Planning Act (2006) describes the fundamentals of land use planning in Ontario, including how land uses may be controlled and who may control them. Pursuant to the *Planning Act*, the Province of Ontario is the primary planning authority in Ontario. The Act enables the Province to delegate some of its planning authority to upper-tier municipalities (e.g., regional municipalities) while retaining control through the approval process.

Additional details concerning provincial policies relevant to this Class EA are summarized below.

Provincial Policy Statement, 2014

The *Provincial Policy Statement* (PPS) is the complimentary policy document to the *Planning Act*. Issued under the authority of Section 3 of the *Planning Act*, the PPS provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial 'policy-led' planning system that recognizes and addresses the complex inter-relationship among environmental, economic and social factors in land use planning (MMAH, 2005; MMAH Website, 2007). Recent updates to the PPS came into effect on April 30, 2014.

The PPS provides for enhanced protection of the environment by identifying the significance of the natural heritage system and water resources, including natural hazards and water quality, air quality and energy use.

Furthermore, the PPS also contains policies¹ requiring municipalities to:

- Plan and provide for a full range and equitable distribution of publicly-accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and where practical, water based resources (1.5.1b)
- Recognize additional elements of healthy communities, such as community design and planning for all ages (1.1.1)
- Support the adaptive re-use of infrastructure and require consideration of the life-cycle cost of infrastructure (1.6.1, 1.6.3)
- Provide a transportation system that is safe, energy efficient, facilitates the movement of goods and people, and is appropriate to address projected needs (1.6.7.1)
- Preserve and re-use abandoned corridors for purposes that maintain the corridor's integrity and continuous linear characteristics (1.6.8.4).

Growth Plan for the Greater Golden Horseshoe, 2006

In June 2006, the Province of Ontario released the Growth Plan for the Greater Golden Horseshoe (Growth Plan). The Growth Plan was prepared under the *Places to Grow Act, 2005* which provides a legal framework for growth planning in Ontario. The Growth Plan guides decisions on a wide range of issues including transportation, infrastructure, land use planning, housing, natural heritage and resource protection. Planning and strategic investment for transportation, water and wastewater systems and community infrastructure to support efficient growth is outlined in the Growth Plan.

With respect to pedestrian and cycling networks, the Growth Plan states the following:

¹ *Provincial Policy Statement, 2014, Ministry of Municipal Affairs and Housing*

3.2.3.3 Moving People - Municipalities will ensure that pedestrian and bicycle network are integrated into transportation planning to:

- *Provide safe, comfortable travel for pedestrians and bicyclists within existing communities and new development;*
- *Provide linkages between intensification areas, adjacent neighbourhoods, and transit stations, including dedicated lane space for bicyclists on the major street network where feasible.*

Transportation Environmental Study Report - Highway 401 Improvements, From Highway 401/403 Interchange to East of the Credit River, Ministry of Transportation, 2005

This study identified potential improvements to address the capacity and operational needs for this section of the Highway 401 corridor. The following lists the improvements of the Recommended Plan that relate to the Second Line West study area (MMM, MTO, 2005):

- 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
- Removal of the 2nd Line West structure over Highway 401 to accommodate the widening.

The removal of the Second Line West bridge structure over Highway 401 was identified as necessary to accommodate the planned highway widening. In recent correspondence with the Project Team, the Ministry of Transportation has indicated that they would support the re-construction of a pedestrian/cyclist crossing over Highway 401 in the study area, and provide preliminary construction support wherever feasible. See Section 3.4.5 for further detail.

2.3.2 Regional/ Local Planning Studies

The need for a pedestrian/cycling crossing of Highway 401 is supported at the planning level through the following policies/studies:

- Peel Region Official Plan, 2013
- City of Mississauga Official Plan, 2011
- City of Mississauga Cycling Master Plan, 2010
- City of Mississauga "Living Green" Master Plan, 2012
- City of Mississauga "Our Future Mississauga" Strategic Plan, 2007
- Mississauga Crime Prevention Through Environmental Design Principles, 2013
- Credit River Parks Strategy, 2013.

Peel Region Official Plan, 2013

The Peel Region Official Plan is the Regional Council's long-term policy framework for decision making. It sets the Regional context for detailed planning by protecting the environment, managing resources, directing growth and setting the basis for providing Regional services in an efficient and effective manner. The Official Plan provides direction for future planning activities and for public and private initiatives aimed at improving the existing physical environment.

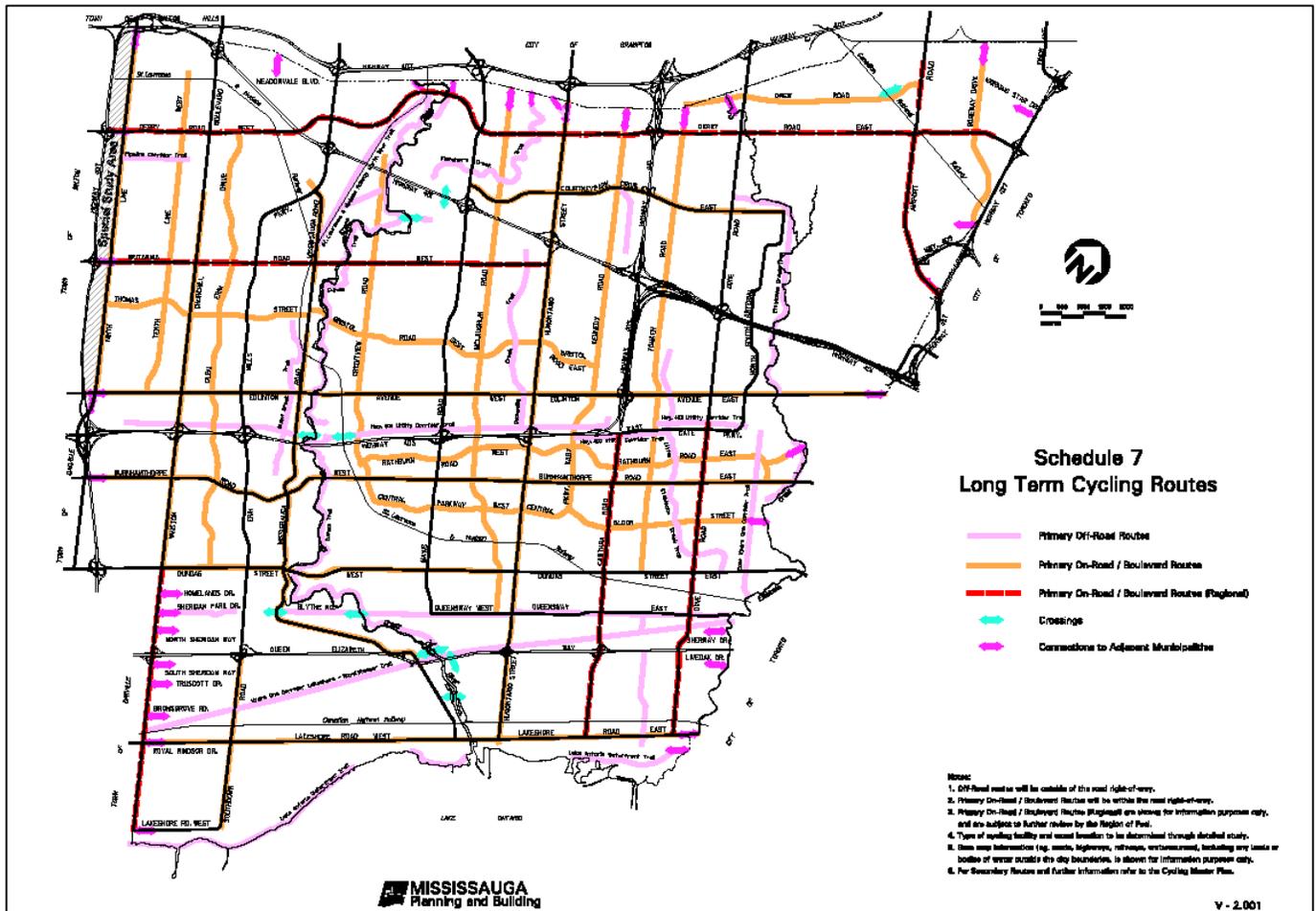
The Peel Region Official Plan (working Draft Office Consolidation, 2013) lists many objectives in relation to the development of active transportation, including promoting an integrated network of bicycle and pedestrian facilities that enhance quality of life and promote the improved health of Peel residents.

City of Mississauga Official Plan, 2011

The City of Mississauga is at a decisive moment in its history as most of its Greenfield lands have been developed and much of the City's infrastructure is in place. New growth will take place primarily through infilling and redevelopment in appropriate areas, which can benefit from growth and change. Many areas, such as existing stable residential neighbourhoods, will experience little change in the future. The Official Plan for the City of Mississauga provides a new policy framework to protect, enhance, restore and expand the Natural Areas System, to direct growth to where it will benefit the urban form, support a strong public transportation system, protect, enhance, restore and expand the Natural Areas System and address the long term sustainability of the City. The Official Plan also outlines goals to create a multi-modal transportation network that promotes public and active transportation. Increasing opportunities for walking and cycling by improving connections is a key part of the Plan. The City's Official Plan will be an important instrument in city building. All change within the urban environment will be considered for its capacity to create successful places where people, businesses and the natural environment will collectively thrive.

Schedule 7 of the Official Plan is shown in **Figure 2-2** and specifies long term cycling routes within the City of Mississauga. The purpose of Schedule 7: Long Term Cycling Routes is to connect key city destination and locations, such as Major Transit Stations, with cycling routes and provide cycling linkages to adjacent municipalities. A proposed crossing of Highway 401 at Second Line West is identified within the Official Plan which would facilitate the connection of the existing neighbourhoods north and south of Highway 401.

Figure 2-2: City of Mississauga Official Plan (Schedule 7)



Source: City of Mississauga Official Plan, 2011, City of Mississauga

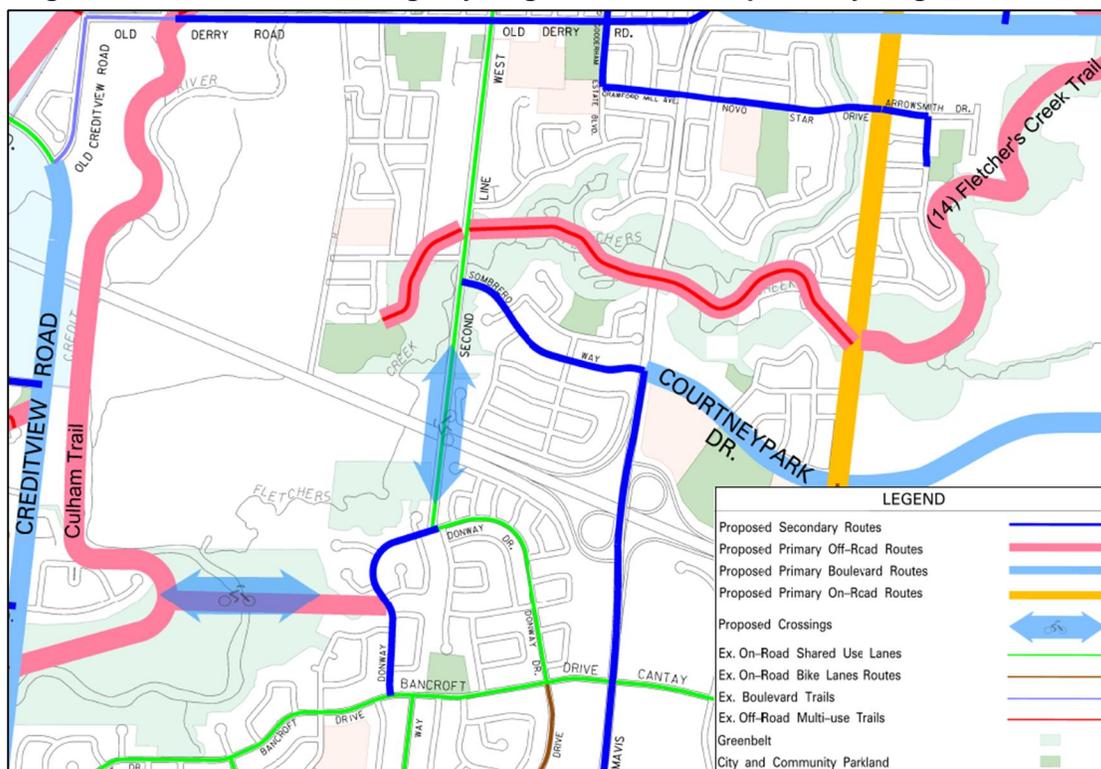
City of Mississauga Cycling Master Plan, 2010

The City of Mississauga's Cycling Master Plan outlines a strategy to develop over 900 kilometres (km) of on and off-road cycling routes in the city over the next 20 years. The plan focuses on fostering cycling as a way of life in the city through an integrated network of cycling routes and aims to adopt a safety first approach to cycling. The vision is to make Mississauga a city where people choose to cycle for recreation, fitness and for their daily transportation needs. When fully implemented, the plan will provide an integrated multi-modal approach to transportation throughout the city, connecting destinations and placing 95 per cent of the city's population within 1 km of a primary cycling route. The Second Line West pedestrian/cyclist Class EA study considered both the existing and proposed cycling networks detailed as part of the City's Cycling Master Plan.

The existing cycling route network shown in **Figure 2-3** specifies on-road shared use bicycle lanes on the existing Second Line West bridge structure over Highway 401. As seen on **Figure 2-3**, these on-road shared use bike lanes provide the only existing cycling connectivity over Highway 401 for a significant distance. This existing connection will be severed with the removal of the bridge structure to accommodate the Highway 401 widening.

However, the Cycling Master Plan has anticipated the removal of the Second Line West bridge and has proposed a future crossing of Highway 401 to facilitate the continued connectivity of the cycling network in the vicinity. The proposed crossing would connect proposed Secondary Cycling Routes along Sombrero Way, Donway Drive and Old Derry Road, as well as the existing Off-Road Multi Use Trail north of Highway 401 (Fletcher's Creek Trail) and the existing On-Road Shared Use Lanes on Second Line West (outside of the study area), Donway Drive, Bancroft Drive, and beyond. Perhaps most importantly, the crossing would provide a unique opportunity to connect the proposed natural trail networks along the Credit River and Fletcher's Creek.

Figure 2-3: 2010 Mississauga Cycling Master Plan Proposed Cycling Route Network



Source: Mississauga Cycling Master Plan, 2010, City of Mississauga

City of Mississauga "Living Green" Master Plan, 2012

The Living Green Master Plan (LGMP) is Mississauga's first environmental master plan. It builds on the Strategic Plan vision of a clean and healthy natural environment with healthy people, clean air and water, all in a sustainable energy-efficient urban form. The Plan organizes the City's current and future environmental policies and programs in a strategic framework for action.

The purpose of the LGMP is to:

- Identify priority actions to meet the environmental objectives of the Strategic Plan, Official Plan and other corporate plans
- Instil a corporate culture where City staff and elected officials consider the environmental impact of their decisions, practices, policies, activities, operations, strategic investments, administrative organization and future growth

- Identify how the City can measure its environmental performance at both a neighbourhood and city-wide level
- Ensure that residents, community groups and businesses have the information to contribute to “living green” in their homes, businesses and neighbourhoods.

Section 2.1.1 of the Plan identifies the Transportation priority actions. Some of the most pertinent actions for this Class EA study include:

Action 4: Invest in the expansion of alternative forms of transportation, including cycling, walking and car-sharing.

Action 6: Develop guidelines that advance new or rehabilitated transportation infrastructure that supports natural ecological functions.

City of Mississauga “Our Future Mississauga” Strategic Plan, 2007

Since 1992, the City has highlighted its future opportunities through its Strategic Plan. In 1999, Council and staff worked together to create the current Strategic Plan –Our Future Mississauga, which has become the foundation for the City’s policies and key strategic actions. Our Future Mississauga also identified a number of “Pillars for Change” – the numerous opportunities, challenges and external forces that can affect planning for the City’s future.

These include:

- *Move – Developing a transit oriented city*
- *Belong – Ensuring youth, older adults and new immigrants thrive*
- *Connect – Completing our neighbourhoods*
- *Prosper – Cultivating creative and innovative businesses*
- *Green –Living green*

With respect to the Second Line West pedestrian/cycling crossing of Highway 401 study area, one of the more significant ‘Pillars for Change’ is ‘Completing Our Neighbourhoods’. The aspects of this pillar for change include:

“...Our Future Mississauga is a beautiful, sustainable city with safe neighbourhoods that support a strong, connected and vibrant community – a place where all can live, work, and prosper...Principle – Mississauga is a city that nurtures a unique quality of life within each neighbourhood, where residents value the beauty of the natural environment, engage in active transportation, and support a rich, healthy and prosperous social and cultural mosaic...”

One of the strategic goals for this ‘Pillar for Change’ especially pertinent to the study area is as follows:

- *Provide Mobility Choices – to provide all with the choice to walk, cycle and use transit or active modes of transportation in all seasons, because it is convenient, connected, desirable and healthy.*

City of Mississauga Crime Prevention through Environmental Design (CPTED) Principles, 2013

The City of Mississauga’s CPTED Principles document aligns with ‘*Connect*’ Pillar for Change. One of the goals for this pillar is to “*Maintain a Safe City*”. The CPTED review process is an opportunity to plan and design safe environments, including parks, open spaces and road network developments prior to construction. CPTED design strategies can be used to reduce the fear and incidence of crime and improve the quality of life. These include:

- *Natural Surveillance: keeping intruders under observation by other users of the space or from surrounding areas;*
- *Natural Access Control: decreasing crime opportunities by denying access to a crime target and creating a perception of risk for potential offenders; and*
- *Territorial Reinforcement: physical design can create or extend a sphere of influence so that users of a property develop and sense of proprietorship over it.*

For this Class EA study, a preliminary streetscape plan has been developed for the pedestrian/cyclist crossing and for the multi-use trail connection from Sombrero Way to Donway Drive. The City of Mississauga will work towards applying CPTED design strategies during the detail design phase to ensure personal safety of its users and decrease opportunities for crime.

Credit River Parks Strategy, 2013

The City has developed a 25-year strategy to preserve and enhance the 1,600 acres of parkland and natural areas that run along the Credit River.

The strategy identifies improvements to the natural and cultural heritage of the valley and where parks and natural areas can be connected throughout the system. Key points include:

- Establishing a continuous trail system with diverse experiences and opportunities
- Building new links to neighbourhoods and bridges to connect locations throughout the system to accommodate alternative transportation such as walking and biking to support healthy lifestyles
- Recognizing cultural assets and educational opportunities
- Identifying areas to restore habitat, promote horticulture and urban agricultural opportunities
- Enhance picnic and festival opportunities
- Create new opportunities for kayaking, canoeing and fishing.

Portions of the Meadowvale Station Woods ESA/ANSI, including Credit Meadows Park adjacent to the study area have been identified within the plan as key areas for improvements, including the provision of neighbourhood linkages in the form of multi-use trails.

2.3.3 Consultation and Communications Program

The MEA Class EA document outlines specific mandatory public and agency consultation contact points and methods. As part of the Municipal Class EA 'Schedule C' planning process, several steps have been undertaken to inform government agencies, the local community and the general public of the project and to solicit comments. In order to properly communicate the project and solicit feedback throughout the planning process, the following activities were undertaken:

- Posting project milestones on the City of Mississauga's website, including Notices of Study Commencement, Public Information Centres(PICs) and Study Completion
- Publication of newspaper notices in the *Mississauga News* for all project milestones
- Notification to stakeholders, the general public and review agencies regarding project milestones
- Holding two PICs to engage and obtain input from the public, review agencies and stakeholders
- Holding meetings with the Ministry of Transportation and Credit Valley Conservation Authority at key phases during the study.

The above communications and consultation program outputs are further described in **Section 3**.

2.3.4 EA Documentation Filing

The filing of this ESR completes the planning and preliminary design stage of the project. The ESR is placed on the public record and made available for review for a period starting on **December 1, 2014** and ending **January 16, 2015**. A public notice (Notice of Study Completion) has been published to announce commencement of the review period. To facilitate public review of the document, hard copies of the report have been made available for viewing during regular business hours at the following locations:

Mississauga City Hall Clerk's Department	Courtneypark Public Library
300 City Centre Drive Mississauga, ON L5B 2T4	730 Courtneypark Drive W Mississauga, ON L5W 1L9

The Notice of Study Completion advises that if, after reviewing the report, stakeholders have questions or concerns they should follow this procedure:

- Contact Farhad Shahla, City of Mississauga Project Manager, at the address below to discuss questions or concerns:

Farhad Shahla, M.Eng., P.Eng.

City of Mississauga Project Manager
 201 City Centre Drive, Mississauga, ON L5B 2T4
 Tel: 905-615-3200, Ext. 3377 Fax: 905-615-3173
 Email: farhad.shahla@mississauga.ca

- Arrange a meeting with the above, if there are significant concerns that require more detailed explanations.
- If major concerns arise, the City will attempt to resolve the issue(s). A mutually acceptable time period for this meeting will be set. If the issues remain unresolved, a person or party may request that the Minister of the Environment and Climate Change (see address below), by order, to require the City to comply with Part II of the *EAA* before proceeding with the project (referred to as a Part II Order). The Minister may make one of the following decisions:
 - Deny the request with or without conditions
 - Refer the matter to mediation
 - Require the City to comply.

Anyone wishing to request a 'Part II Order' of the *Second Line West Crossing of Highway 401 Class Eames* submit a written request by the end of the thirty (30) calendar day review period to the Minister of the Environment at the following address, with a copy sent to the City of Mississauga:

**Ministry of the Environment and Climate Change
 address:**

Honourable Glen Murray, MPP
 Minister of the Environment and Climate Change
 77 Wellesley Street West
 11th Floor, Ferguson Block
 Toronto, ON M7A 2T5

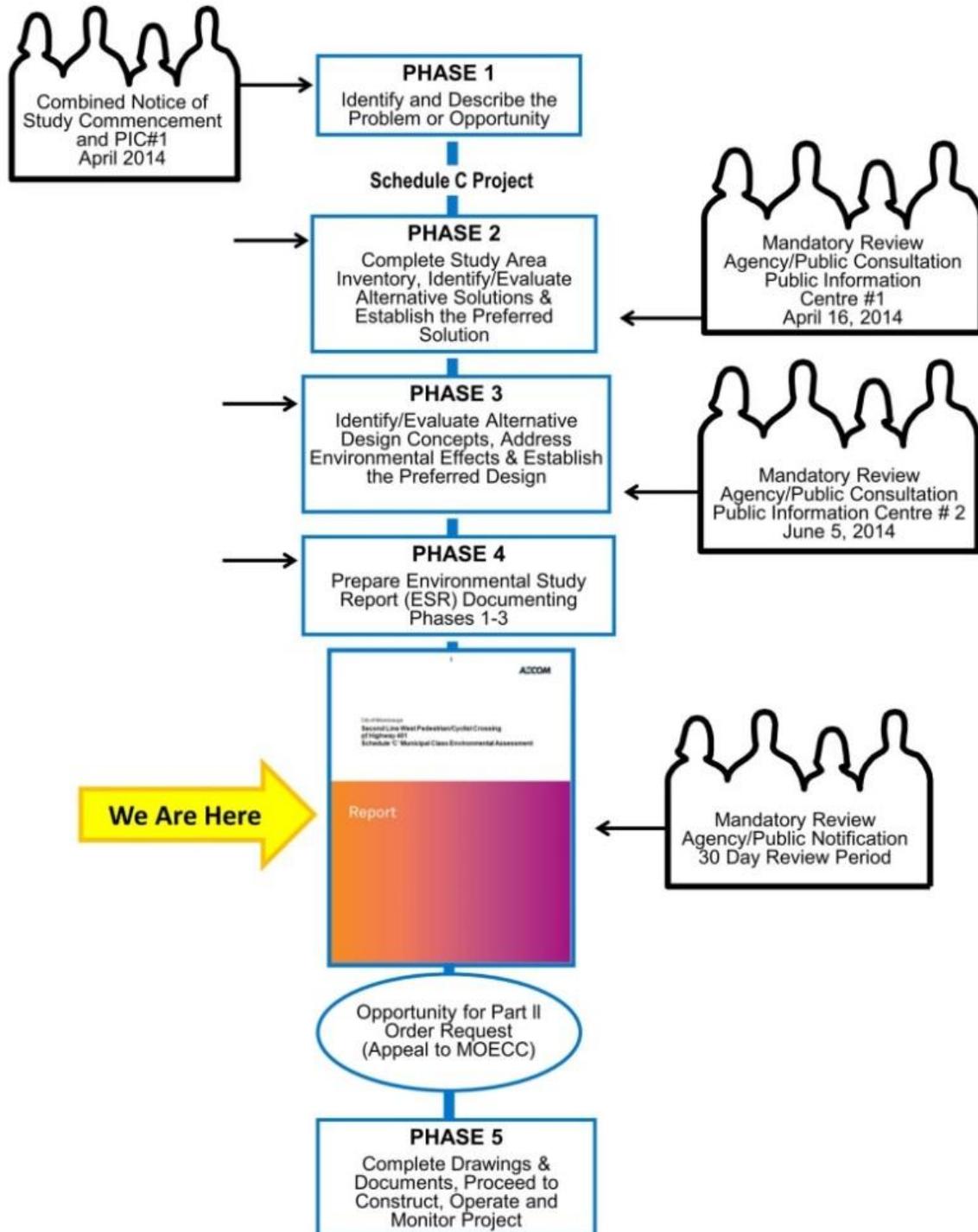
City of Mississauga address:

Mr. Farhad Shahla, M.Eng., P.Eng.
 City of Mississauga Project Manager
 201 City Centre Drive, Suite 800
 Mississauga, ON L5B 2T4

2.4 Project Schedule

The Class EA work was undertaken from April 2014 through October 2014. A Geometric Feasibility Study and Traffic Analyses were completed prior to the initiation of the Class EA and used as input into the EA study. The project schedule, including the key points of consultation, is presented in **Figure 2-4** below. The submission of this Environmental Study Report falls between Phases 4 and 5 of the overall project schedule.

Figure 2-4: Project Schedule



3. Consultation

The involvement of the community – residents, agencies, stakeholders and those who may be potentially affected by a project – is an integral part of the Class EA process. The purpose of the Class EA study consultation process is to provide an opportunity for stakeholder groups and the public to gain an understanding of the study process; contribute to the process for development and selection of alternatives; and provide feedback and advice at important stages in the Class EA process. Specifically, the consultation efforts had the following objectives:

- Generate awareness of the project and provide opportunities for involvement throughout the planning process
- Facilitate constructive input from public and agency stakeholders at key points in the Class EA process, prior to decision-making.

A summary of the consultation activities undertaken for the *Second Line West Crossing of Highway 401 Class EA* is provided below.

3.1 Public Consultation Methods

3.1.1 Public Mailing List

A public mailing list was developed at the outset of the Class EA study based on a list of public and stakeholder members, as well as a list of homeowners residing within 300 m of the study area, provided by the City of Mississauga. As the Class EA study progressed, the list was updated to include individuals who requested to be notified of future public consultation efforts and study updates.

3.1.2 Project Website

A project website page (<http://www.mississauga.ca/portal/residents/secondlinewest>) was developed at the outset of this Class Restudy. Study notices, presentation materials and comment sheets were posted on the project website throughout the project duration.

3.1.3 Notice of Study Commencement and Public Information Centre No. 1

A Notice of Study Commencement was combined with the Notice of Public Information Centre (PIC) No. 1, and placed in the *Mississauga News* on April 2 and April 9, 2014. The notice announced the study commencement, outlined the study purpose and rationale, solicited comments, invited the public to participate in the study and announced the date and location of Public Information Centre No. 1. Contact names were provided in the notice for the public to obtain additional information, if desired.

The combined Notice of Commencement and PIC No. 1 was mailed to over 4000 residences/businesses in the vicinity of the study area and mailed or e-mailed to contacts identified on the study mailing list. Several comments were received from the public which were addressed by the City in advance of PIC No. 1.

3.1.4 Notice of Public Information Centre No. 2

A Notice of Public Information Centre No. 2 was placed in the *Mississauga News* on May 21 and May 28, 2014. The notice advised the public of the preliminary preferred solution that was selected following PIC No. 1 (i.e. a pedestrian/cyclist overpass constructed within the existing Second Line West right-of-way) and announced the date and location of the second PIC.

The notice was also mailed to over 4000 residences/businesses in the vicinity of the study area and a letter was sent to the study mailing list, including those individuals who requested inclusion on the list.

3.1.5 Notice of Study Completion/Filing of the ESR

A Notice of Study Completion and Filing of this ESR will be placed in the Mississauga News and uploaded to the website to announce the commencement of the 30-day public and regulatory agency review period, the locations where the ESR can be viewed and the closing dates for comments to be submitted.

Notification letters for the filing of the ESR (with a copy of the notice) will be mailed to the names on the study mailing list.

3.2 Public and Stakeholder Consultation Summary

3.2.1 Public Information Centre No. 1

All appropriate review agencies, relevant Aboriginal organizations and interested members of the public were invited to a Public Information Centre (PIC) held on April 16, 2014, from 5:30 p.m. to 8:00 p.m. at the Meadowvale Village Hall (6970 Second Line West, Mississauga, ON).

The PIC provided an opportunity for ministries, agencies, public and other stakeholders to discuss the proposed undertaking, including the preliminary recommended alternative, and allowed the public to discuss their issues or concerns directly with the City and their consulting team. This feedback was used to confirm the recommended alternative solution. The City's Second Line West Neighbourhood Traffic Study was also presented at the PIC, which included a summary of the public comments collected at the 2011 public meeting and the proposed actions to respond to the existing and future conditions upon removal of the vehicular crossing. Potential improvements, where warranted, were highlighted for further review and monitoring. A comment sheet was made available, and was also posted on the project website, at <http://www.mississauga.ca/portal/residents/secondlinewest>.

The PIC was well attended with a total of ninety-three (93) people registered at the PIC. The main issues raised include:

- Increased traffic and congestion along residential streets within the study area following removal of the existing vehicular bridge
- Safety of pedestrians and cyclists using the crossing.

Copies of the notification materials, presentation boards, reference materials, summary report, comments, and responses to comments are provided in Appendix A.5.

3.2.2 Public Information Centre No. 2

As noted earlier, all appropriate review agencies, relevant Aboriginal organizations and interested members of the public were invited to Public Information Centre (PIC) #2, held on Thursday June 5, 2014, from 5:30 p.m. to 8:00 p.m. at the Meadowvale Village Hall (6970 Second Line West, Mississauga, ON).

The objective of PIC No. 2 was to present the details of Phase 3 of the Class EA process. The project team presented the alternative design concepts developed along with their evaluation. The PIC provided an opportunity for the public and other stakeholders to discuss the proposed undertaking, including the preliminary recommended alternative and design concepts and allowed the public to discuss their issues or concerns directly with the City and the consulting team. This feedback was used to confirm the recommended alternative design concept and provide

insight into the issues of concern regarding the future mitigation measures. Additionally, the comments received from PIC No. 1 were gathered and responses were provided at PIC No. 2.

A total of sixty-one (61) people registered at the PIC. Comment sheets were provided to gather feedback from the attendees. The main issues raised included many of the issues raised during prior public consultation, namely:

- Traffic mitigation within surrounding neighbourhoods
- Safety of residents and most importantly children
- Safety of crossing users
- Objection to allow parking on the proposed path.

At PIC No. 2, the City presented the Second Line West Neighbourhood Traffic Study, providing an updated summary of public comments and responses received since the April 16, 2014 meeting. Additionally, an update on the work completed to address existing deficiencies in traffic operations in the Second Line West neighborhood was presented. Some of the proposed improvements presented at the PIC could be implemented prior to removal of the bridge, upon consultation of the residents. The City will introduce a mitigation plan, which includes the monitoring of traffic operations after the removal of the vehicular crossing. Additionally, speed data will be collected and police enforcement will be requested to address any speeding concerns in the study area. Additional improvements will be considered in the future to address potential operational deficiencies upon removal of the bridge.

Copies of the PIC display boards, comments, and responses to comments are provided in Appendix A.6 and can also be found on the project website at <http://www.mississauga.ca/portal/residents/secondlinewest>.

3.2.3 Design Workshop

A Design workshop was hosted by the City of Mississauga on September 29, 2014 at the municipal offices: 300 City Centre Drive, Mississauga, following suggestions that were received from members of the public at PIC No. 2 regarding the design of the multi-use pathway (Refer to Appendix A.2 for the meeting invitation). Three (3) residents from the immediate neighbourhood were contacted who had expressed an interest to remain further involved in the study. In addition, a member of the Crime Prevention through Environmental Design (CPTED) committee, members of City Staff and AECOM participated in the informal workshop to discuss elements of concern such as providing sufficient lighting for the crossing structure and multi-use trail. Suggestions to enhance the proposed multi-use trail included providing waste facilities, directional signage, formalizing the connecting pathways and possibly providing parking at the north and south ends for users were received. These suggestions, together with the CPTED strategies outlined in Section 8.1.5, will be investigated during detail design.

3.2.4 Second Line West Neighbourhood Traffic Study

In 1982, the City of Mississauga Council adopted a recommendation for the removal of the Second Line West vehicular crossing over Highway 401 to accommodate the MTO's Highway 401 widening project. In 2005, the MTO documented the need for the removal of the crossing in a Transportation Environmental Study Report, following two public meetings for the recommended Highway 401 expansion.

On November 16, 2011, the City of Mississauga staff met with the members of the public to discuss updates on the Highway 401 widening project, including the permanent removal of the Second Line West vehicular crossing and opportunities for a pedestrian/cyclist crossing. In the 2011 public meeting, the members of the public raised a number of concerns related to the existing transportation operation conditions in the surrounding neighborhood and upon removal of the vehicular crossing.

As a separate study to this Class EA study, the City of Mississauga has undertaken the Second line West Neighbourhood Traffic Study. The purpose of this study is to document public concerns and to identify mitigation measures to respond to the existing transportation needs and any potential impacts to the study area in the future. The City has carried out a thorough public consultation process, documenting public concerns and providing feedback and updates at all stages of the process. The comments received were addressed at the two PICs with recommendations for actions and next steps. Reference material for the City's Traffic Study can be found on the project website.

3.3 Agency Involvement

3.3.1 Agency Mailing List

At the initiation of this study, a mailing list (see Appendix A.1) was created comprising regulatory agencies, First Nation communities and potentially interested stakeholders. The agencies were identified according to Appendix 3 of the *Municipal Class EA* document, which outlines relevant agencies, based on the nature of a project, as well as guidelines for establishing contact with these review agencies. Throughout the study, this list was used to notify stakeholders of study milestones and public consultation events. The list was updated regularly.

3.4 Agency Consultation Methods

3.4.1 Regulatory Agencies

Regulatory agencies and First Nations/First Nations organizations were notified of the study commencement via letter, which included a copy of the combined Notice of Commencement and Public Information Centre No. 1 on April 2, 2014. A Reply-Form was included with the notification package requesting agency feedback on the study. Agency correspondence is included in Appendix A.2. Upon receipt of agency feedback, the study mailing list was updated to maintain currency. Further, the same regulatory agencies and First Nations communities were notified of Public Information Centre No. 2 on May 13, 2014.

3.4.2 First Nations

The First Nations and First Nations organizations contacted as part of this Class EA study included:

- Lands & RRBG, Indian and Northern Affairs Canada
- Aboriginal Affairs and Northern Development Canada
- Office of the Federal Interlocutor for Métis and Non-status Indians, Aboriginal Affairs and Northern Development Canada
- Consultation Unit, Ministry of Aboriginal Affairs
- Strategy Policy & Planning Division, Ministry of Aboriginal Affairs
- Métis Nation of Ontario
- Mississauga's of the New Credit, Lands/ Research/ Membership Department.

Email correspondence received on April 24, 2014, from the 'Consultation and Accommodation Unit- Aboriginal Affairs and Northern Development Canada' advised that a search of the Aboriginal and Treaty Rights Information System (ATRIS) be conducted to confirm the location and nature of established and potential Aboriginal and Treaty rights which may relate to the study area. A subsequent search of the website http://sidait-atris.aadnc-aadnc.gc.ca/atris_online/ confirmed the absence of Aboriginal or treaty rights which may apply.

Ontario's Duty to Consult

A letter was received from the Ministry of the Environment on April 11, 2014 (*now Ministry of the Environment and Climate Change*), which provided guidance material for Aboriginal Consultation, as well as checklist to identify potential adverse effects on Aboriginal or treaty rights. Based on the completion of the checklist (Appendix A.3), the proposed Second Line West Pedestrian/Cyclist Crossing of Highway 401 is not expected to result in adverse effects on Aboriginal or treaty rights; therefore there is no trigger for *Ontario's Duty to Consult*.

3.4.3 Municipal Agencies and Authorities

City of Mississauga Fire and Emergency Services

The City of Mississauga staff met with Mississauga Fire and Emergency Services on Wednesday June 4, 2014 to discuss the removal of the Second Line West structure over Highway 401 and the City's plan for an active transportation crossing to be aligned with the City's 2010 Cycling Master Plan. The latter expressed concerns over the removal of the vehicular bridge and subsequent changes to emergency services. It is important to note that the proposed pedestrian/cyclist crossing structure will not be designed to support a fire truck.

City of Mississauga Crime Prevention through Environmental Design (CPTED) Advisory Committee

The Project Team met with members of the Mississauga CPTED Advisory Committee on June 26, 2014 to present the preliminary preferred pedestrian/cyclist crossing and conceptual streetscape plan. The preliminary preferred design concept was generally well-received by the Committee and requested that it be consulted during detail design. A copy of the presentation can be found in Appendix A.7.

City of Mississauga Cycling Advisory Committee

City Staff delivered a presentation to the Mississauga Cycling Advisory Committee on Tuesday July 8, 2014. The project was well received with some discussion around the construction schedule and budget. Endorsement of the Second Line West pedestrian/cyclist crossing and multi-use trail by the Cycling Advisory is provided in Appendix A.8.

3.4.4 Credit Valley Conservation Authority

The project team met with the Credit Valley Conservation (CVC) Authority on Thursday July 10, 2014 to present the project and obtain feedback. No significant issues were identified. Minutes of the meeting can be found in Appendix A.4.

3.4.5 Provincial Agencies

Ministry of Natural Resources

The Ministry of Natural Resources (MNR) was contacted at the outset and at key points of the study. The MNR advised that it would not participate in the Class EA study unless the project anticipated impacts to species at risk. It is anticipated that the project will result in no impact to SAR or their habitat. MNR will be consulted during detail design regarding illumination along the multi-use trail to avoid impacts to SAR within the Meadowvale Station Woods. Correspondence received from the MNR is found in Appendix A.2.

Ministry of Transportation

It is important to note that the permanent removal of the Second Line West vehicular bridge is required as part of the Ministry of Transportation's (MTO) Highway 401 widening project (GWP 2150-01-00 Highway 401 Widening - Highway 403/410 Interchange to the Credit River). The highway expansion planning dates back to 1982 when the MTO completed a preliminary design study for Highway 401. The preliminary design identified the permanent removal of the Second Line West vehicular bridge across Highway 401 to accommodate the highway widening. The City of Mississauga Council subsequently adopted a recommendation for the closure and removal of the vehicular bridge at the time of the future Highway 401 widening, with no plan to reconstruct a vehicular crossing. The need and justification for the removal of this structure was documented by the Ontario Ministry of Transportation (MTO) in a Transportation Environmental Study Report (ESR) in August 2005. In 2007, the MTO received approval for the preliminary design and environmental assessment study for Highway 401 from the Highway 410/403 interchange westerly to east of the Credit River, identifying the need for removal of the Second Line West vehicular crossing, following reconstruction of the Mavis Road interchange.

The City of Mississauga has met with the MTO project team on numerous occasions to discuss removal of the Second Line West structure over Highway 401, the subsequent closure of Second Line West as a vehicular roadway and opportunities for pedestrian/cycling crossing options. Due to delays in the Highway 401 widening project schedule, the MTO indicated an opportunity to work with the City to construct a portion or all of a new pedestrian/cyclist crossing during Highway 401 construction, following the City's completion of a Class EA study within the MTO timeframe. It has been agreed by the City and MTO project teams that this solution will significantly reduce construction times, costs and traffic staging impacts to both parties. It is MTO's intent to complete the design for the widening of Highway 401 by the end of 2014, with construction beginning in 2015. Removal of the existing Second Line West bridge is expected as early as 2015.

The MTO has also been consulted on the design requirements for the preliminary preferred pedestrian/cyclist crossing option (i.e., overpass). Coordination with the MTO will continue throughout detail design to ensure that the structure is designed according to MTO bridge guidelines and to confirm potential illumination of the structure, as well as landscaping/re-vegetation along the proposed multi-use trail connection. Relevant meeting minutes with the MTO are included in Appendix A.4.

4. Description of the Existing Environment

This section provides a description of the existing conditions for the Second Line West pedestrian/cyclist crossing of the Highway 401 study area for planning context. It deals with the provincial and municipal planning framework and the technical, socio-economic, cultural and active transportation conditions for the study area corridor. In preparing the baseline description of the study area, available background information was assembled and reviewed. A number of secondary source information (e.g., maps, reports) were used to characterize the study area corridor and record significant natural, socio-economic and cultural features. Much of the data was obtained from existing studies completed for the Highway 401 widening project.

In addition, roadside reconnaissance activities and technical studies were carried out to confirm and/or augment the secondary information collected and reviewed. The scope of the data collection exercise was to provide the City of Mississauga with sufficient information to identify, evaluate and compare planning alternatives.

4.1 Active Transportation/Technical

4.1.1 Access

The current Second Line West vehicular crossing can be accessed from the north via the existing Second Line West road and from the south via Donway Drive. It can also be accessed from connections to existing trails within the vicinity, including the multi-use trail located north of Highway 401 on the east side of Second Line, between Silverthorn Mill Ave. and Sombrero Way, which provides direct access to Fletcher's Creek.

4.1.2 Pedestrian and Cycling Facilities

Second Line West is currently identified as a Signed Bicycle Route in the City of Mississauga Bikeways and Trails Map (2014). Street signage provided throughout the corridor indicates that it is a bike route and that cars and bicycles must share the road. In the present conditions, the existing Second Line West crossing of Highway 401 does not provide a buffer for pedestrians and cyclists from traffic. Thus, there are a greater amount of opportunities for conflicts with vehicular traffic when crossing Highway 401 via Second Line West. This may result in a decreased perception of personal safety for pedestrians and cyclists using the bridge, making active transportation mode choices less attractive. Additionally, the major north-south arterial roads parallel to Second Line West do not provide for a protected crossing of Highway 401 for pedestrians and cyclists and have even greater volumes of vehicular traffic than Second Line West. The future multi-use crossing will address this deficiency in the existing network.

4.1.3 North-South Connection

The Second Line West vehicular crossing of Highway 401 will be closed as early as 2015, as part of the MTO's Highway 401 widening project. As such, the existing north-south connection between neighbourhoods north and south of Highway 401 in the study area will be removed. The City of Mississauga has identified the opportunity to implement a pedestrian/cyclist crossing along Second Line West across Highway 401 to restore this connection. This new connection will improve accessibility and connectivity for the northerly and southerly neighbourhoods, across Highway 401, and provide residents in the study area access to facilities for alternative transportation modes.

4.1.4 Right-of-way

The width of the existing Second Line West right-of-way (ROW) is approximately 20 m. The current bridge is a three-span bridge with a concrete superstructure and accommodates for one lane of vehicular traffic in each

direction. There are paved curbs on each side of the roadway that terminate at the bridge approaches. The bridge also contains steel box beam railings. The posted speed of the road is 50 km/h.

4.1.5 Utilities and Lighting

There is an existing watermain and overhead hydro lines located to the east of the right-of-way. There is also an underground hydro line located north of Highway 401, on the east side of Second Line West. There is no existing utilities plant within the current right-of-way. Conflicts with the existing utilities in the surrounding study area will be avoided through selection of the preferred design.

4.2 Socio-Economic Environment

4.2.1 Land Uses

The study area lies within the City of Mississauga and the Region of Peel. As stated previously, the study area comprises the existing right-of-way for Second Line West, from Sombrero Way at the north end and Donway Drive at the south end. Highway 401 bisects the study area. A review of the orthophotography indicates that land use in the vicinity of the study area is predominately residential with wooded areas to the west (Meadowvale Station Woods Environmentally Sensitive Area/ANSI) and northeast. The residences in the vicinity of the study area all have frontage and access on local roads. These residential land uses consist of a mix of townhomes, semi-detached and detached residences.

A recreational multi-use trail with access off Second Line West on the west side traverses Meadowvale Station Woods ESA/ANSI north of Highway 401.

4.2.2 Noise

The principal source of noise in the study area is freeway traffic from Highway 401. Noise mitigation measures, including berms and noise barriers exist along the Second Line West roadway and on Highway 401 east of Second Line West. As part of the Highway 401 widening project, it has been identified that further noise mitigation is not warranted.

4.2.3 Waste and Property Contamination

A Phase I Environmental Site Assessment (Phase I ESA) was conducted by AECOM on behalf of the City of Mississauga as part of the EA process for a portion of the Second Line West road right-of-way (Appendix D). The Phase I ESA was conducted in general accordance with the Canadian Standard Association (CSA) Z768-01 Phase I Environmental Site Assessment (November 2001, updated April 2003) protocol. The objective of the Phase 1 ESA was to identify areas of actual or potential environmental concern that may have resulted from past or current operations on the site and/or neighbouring properties. The following tasks were carried out as a part of the Phase I ESA:

- Records review including, but not limited to aerial photographs and geological and topographic maps
- Request to EcoLog ERIS (ERIS) for any fire insurance records for the site
- Request to the Technical Standards and Safety Authority (TSSA) for any records of the site
- Review of available environmental databases and records, including an EcoLog ERIS search report
- Review of previous environmental reports
- Interviews with persons associated with the Site
- A site visit
- Evaluation of information and preparation of a Phase I Environmental Site Assessment report.

The Phase I ESA found that no underground storage tanks or aboveground storage tanks are known or reported to be located at the site and none were observed during the site visit. Furthermore, no visual evidence of water wells, monitoring wells, dry wells, clarifiers, septic tanks or leach fields were observed on the site. Finally, no visual evidence of discoloured soil, water, or unusual vegetative conditions or odours was observed.

Based on the information gathered during the Phase I ESA conducted for the Site, this Phase I ESA has revealed no evidence of contamination in connection with the site.

Given the age of the bridge, it may contain asbestos or lead based paint. AECOM recommends that a designated substances survey should be completed for the bridge prior to its demolition, to be undertaken by the Ministry of Transportation as part of the Highway 401 widening project.

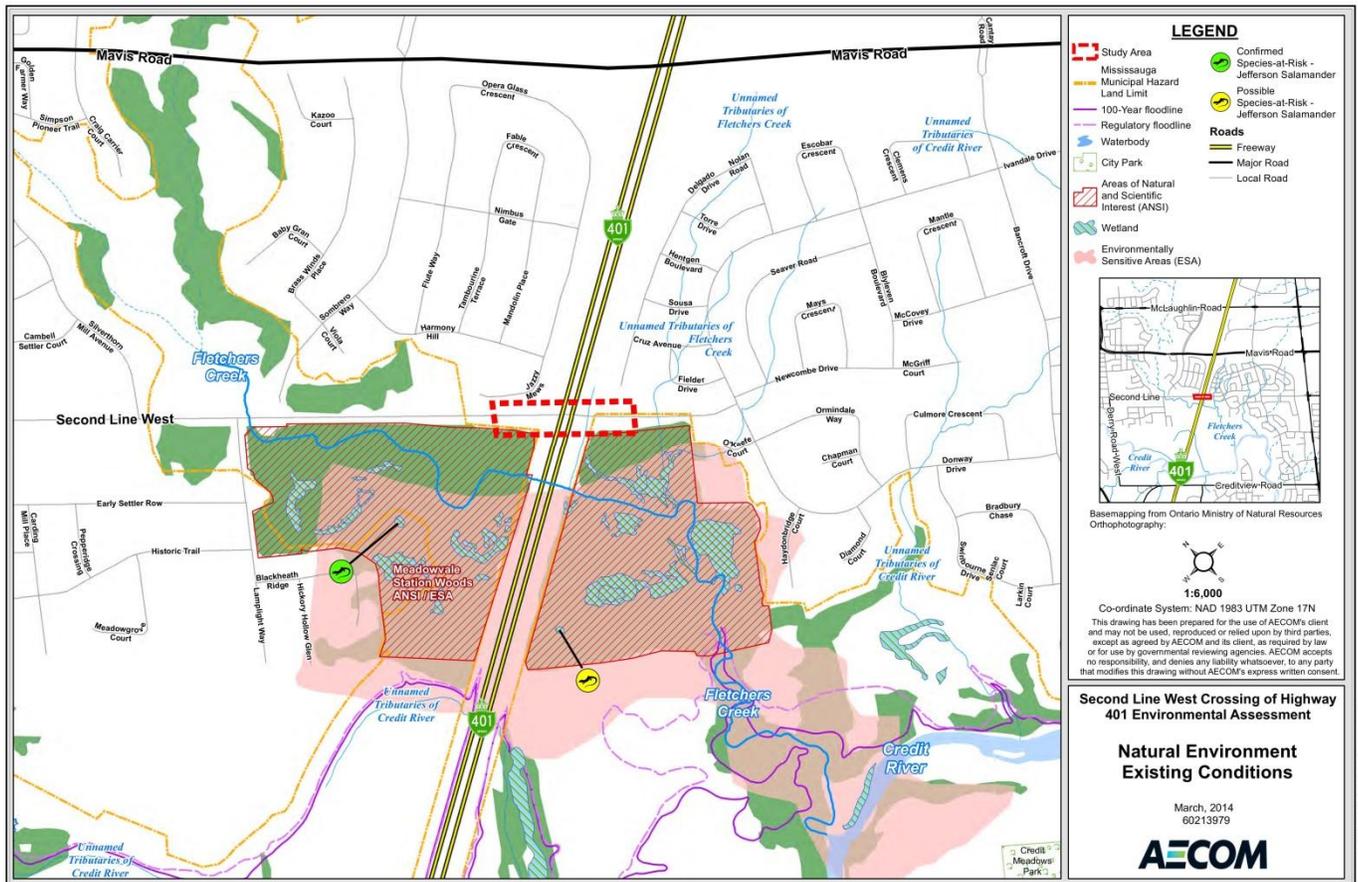
4.3 Natural Environment

Existing conditions of the natural environment within the study area were identified based on a review of secondary source information and desktop analysis, as well as a site visit conducted by AECOM ecologists on May 3 and July 14, 2014. The following existing documentation was reviewed:

- Aerial Photos and associated mapping
- Fish and Fish Habitat Existing Conditions Report for Highway 401 Widening from Highway 403/401 Interchange to the Credit River (AECOM, 2012)
- Terrestrial Ecosystems Report for Highway 401 Widening from Highway 403/401 Interchange to the Credit River (AECOM, 2012)
- Draft Natural Environment Existing Conditions Report for Creditview Road Class EA (AECOM, 2013)
- City of Mississauga Natural Area Survey 2011 and 2012 Updates
- Meander Belt and Erosion Assessment of Fletcher's Creek at Highway 401 (AECOM, 2011)
- Information obtained from the websites of Peel Region, the City of Mississauga, CVC, and MNR
- The Physiography of Southern Ontario, Third Edition (Chapman and Putnam, 1984)
- Soil Survey of Peel County (Hoffman and Richards, 1953).

The existing conditions of the natural environment are summarized in **Figure 4-1**.

Figure 4-1: Natural Environment Existing Conditions



4.3.1 Aquatic Environment

The study area is situated within the Credit River Watershed which covers a drainage area of approximately 1,000 square kilometres (km²) and is under the jurisdiction of the Credit Valley Conservation Authority (CVC). The Credit River and its tributaries flow approximately 90 km southeast towards Lake Ontario from its headwaters in Orangeville (CVC, 2011). The Credit River Watershed is divided into three physiographic zones including the Upper, Middle and Lower Watersheds. The study area is located within the Lower Watershed, which includes most of the City of Mississauga and contains 87% of the entire watershed's population (CVC, 2012a). The Lower Watershed has a flat landscape and is highly urbanized. Land use in the Lower Watershed is dominated by urban use (60%) followed by agricultural and open space (24%). Upland woodlands, successional meadows and wetlands comprise 7%, 8% and 1% of the remaining landscape respectively (CVC, 2012b).

The CVC monitors key aquatic and terrestrial indicators to track the health of the Credit River Watershed. CVC also monitors the groundwater quality of the watershed following the Provincial Groundwater Monitoring Network (PGMN) Long-term Groundwater Quality Sampling Program and uses two groundwater quality parameters: chloride and nitrogen concentrations. In the Lower Watershed, chloride concentrations are below the Canadian Water Quality Guidelines (CWQG) and Ontario Drinking Water Standards, Objectives and Guidelines (ODWS) while nitrogen concentrations exceed the same guidelines. High nitrogen concentrations are likely the result of agricultural run-off although there is a weak decreasing trend of nitrogen concentrations for the whole watershed (CVC, 2012c).

Fletcher's Creek is the only watercourse in the vicinity of the study area. Fletcher's Creek crosses Highway 401 approximately 150 m west of Second Line West. Fletcher's Creek is a large, meandering watercourse that flows through Meadowvale Station Woods (designated ESA/ANSI) and discharges to the Credit River approximately 1.5 km downstream of the highway. Diverse channel morphology and complex in stream cover contribute to a diverse fish community of 25 species found in Fletcher's Creek. Fletcher's Creek is a permanent stream with a cool water thermal classification. Fletcher's Creek is classified by the MNR as a Redside Dace Occupied Reach. The CVC has identified a meander belt from the creek that is approximately 40 m west of the Second Line Bridge.

The water quality in Fletcher's Creek, a tributary of Credit River which runs approximately 150 m west of Second Line West, is poor due to the high concentrations of chloride, phosphorus, aluminum, copper and iron that exceed Provincial Water Quality Objectives (PWQO), thereby reducing the water quality of Credit River (CVC, 2013a). Overall, the Credit River Watershed Report Card 2013 (CVC) ascertains the Lower Watershed to have poor to very poor water quality in Credit River and its tributaries and poor to very poor forest conditions (CVC, 2013b).

The proposed project is not expected to have an impact on Fletcher's Creek due to its location approximately 150 m to the west.

4.3.2 Terrestrial Environment

The study area is located within Ecoregion 7E (Lake Erie – Lake Ontario Ecoregion, also known as the Carolinian Forest Ecoregion). An ecoregion is defined by the Ministry of Natural Resources (MNR) as “an area of land within which the response of vegetation to the features of landform follows a consistent pattern” and is “defined by a characteristic range and pattern of climatic variables” (MNR, 2007). Ecoregion 7E is the southernmost Ecoregion in Ontario and generally consists of a very flat landscape formed as a result of thick deposits of glacial and post-glacial sediments in the Late Wisconsin glacial period. The bedrock is primarily composed of exposed limestone, with the exception of the southern portion of the Niagara Escarpment. Wetlands and water are found on less than 2% of the ecoregion (MNR, 2007a). Ecoregion 7E has the greatest diversity of flora and fauna species in Canada, and is home to approximately 2,200 species of herbaceous plants, 70 species of trees, and 400 species of birds (MNR, 2007a).

According to the Forest Regions of Canada (Rowe, 1972), the study area occurs within the Deciduous (Carolinian) Forest Region which are dominated by deciduous trees. Tree species in this region predominantly consist of Sugar Maple (*Acer saccharum*) and American Beech (*Fagus grandifolia*) as well as Basswood (*Tilia americana*), Red Maple (*Acer rubrum*), White Oak (*Quercus alba*) and Bur Oak (*Quercus macrocarpa*) (Rowe, 1972).

The study area stretches along approximately 500m of the existing Second Line West right-of-way. The majority of the terrestrial environment consists of the Meadowvale Station Woods considered as part of the Natural Areas System as identified in Schedule 3 of the City of Mississauga Official Plan (2013). There are also roadside trees planted approximately 5-10 metres from Second Line West.

According to the CVC Credit River Watershed Health Report (2013), the forest integrity of the Lower Watershed is generally poorer than the Middle and Upper Watershed, as result of heavy urbanization. Forest communities in the Lower Watershed have low species richness, few ephemeral spring species, and a higher abundance of weedy non-native species that are tolerant of disturbance. Bird species similarly contain a higher abundance of habitat generalists such as American Robin and Northern Cardinal that are typical of highly urbanized areas (CVC, 2013d). The wetland integrity for the Lower Watershed is ranked as fair to poor which is attributed to the high abundance of non-native and invasive species. Frog communities are dominated by disturbance tolerant species such as Green Frogs and American Toads (CVC, 2013e).

Vegetation

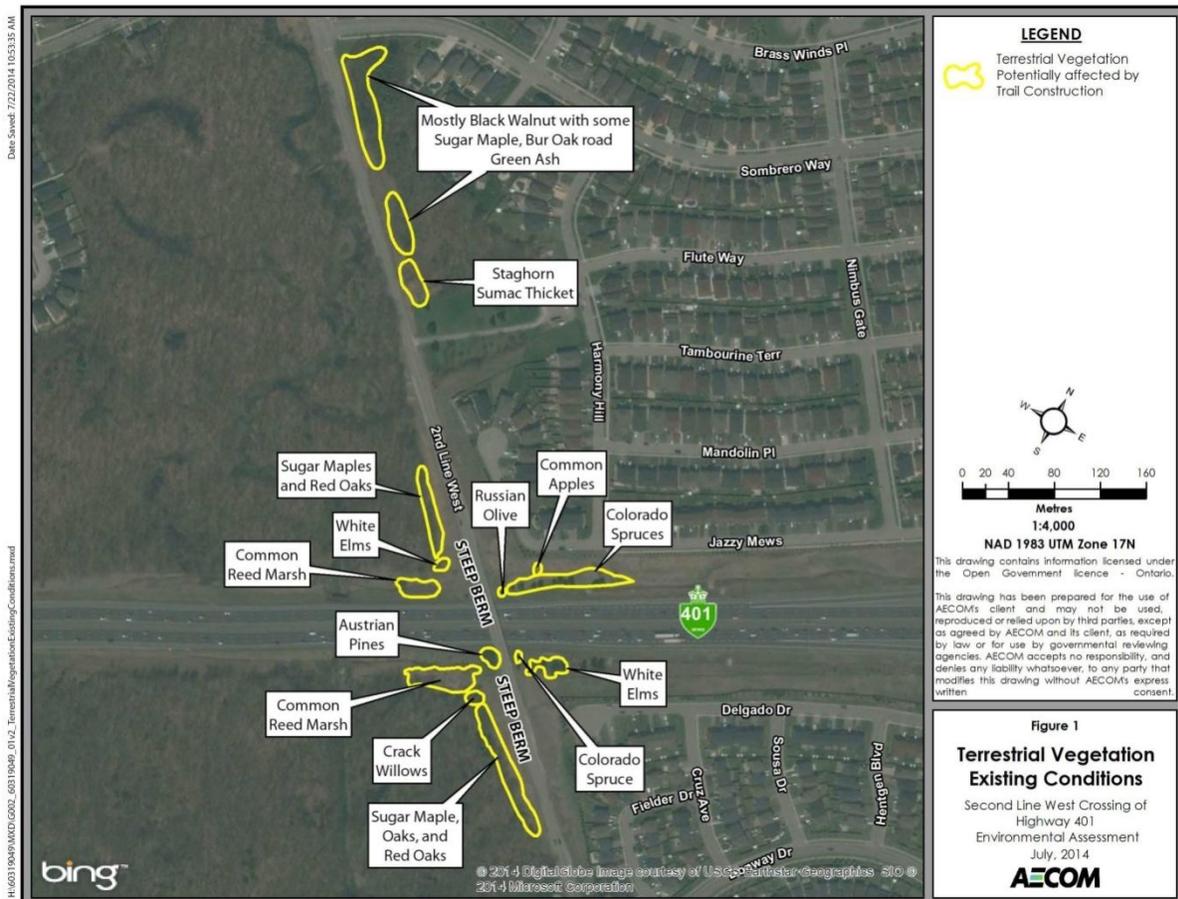
A terrestrial field investigation took place on May 23 and July 14, 2014 within the study area and focused on identifying vegetation in areas immediate to and on either side of Second Line West from Sombrero Way to Donway Drive. The details of the investigation are documented in a Memorandum which can be found in Appendix C. AECOM Biologists walked along the length of Second Line West and recorded dominant vegetation present within approximately 20 m of the right-of-way on either side. No plant species that are regulated under the Ontario *Endangered Species Act* or the federal *Species at Risk Act* were encountered.

The results of the terrestrial field investigation are broken down into four areas for simplicity and are described as follows:

- Southwest corner – south of Hwy 401 and west of Second Line West
- Southeast corner – south of Hwy 401 and east of Second Line West
- Northwest corner – north of Hwy 401 and west of Second Line West
- Northeast corner – north of Hwy 401 and east of Second Line West
- Woodlot east of Second Line, south of Sombrero Way.

Descriptions of the vegetation composition present at each of the five (5) areas are provided below. Vegetation compositions in the vicinity of Second Line West are shown on **Figure 4-2**.

Figure 4-2: Terrestrial Vegetation Existing Conditions



Southwest Corner

Meadowvale Station Woods is located in the southwest corner approximately 20 m from Second Line West and 30 m from the current crossing. Meadowvale Station Woods is described in the City of Mississauga's Natural Areas Survey (NAS) as a mature deciduous forest and was confirmed as such in the field. According to the NAS (City of Mississauga 2012), the vegetation community closest to Second Line West is characterized as a dry-fresh Sugar Maple deciduous forest type (FOD5-1). It was confirmed during the field investigation that the majority of the forest edge is dominated by Sugar Maple (*Acer saccharum*); however, trees located along the woodlot edge, closest to the Second Line Bridge consist of Red Oak (*Quercus rubra*), Bur Oak (*Quercus macrocarpa*) and American Beech (*Fagus grandifolia*).

A small wetland area occurs at the bottom of the slope on the south side of Highway 401 and west side of Second Line West. This wetland area consists of a dense Common Reed (*Phragmites australis*) marsh surrounded by several Crack Willows (*Salix fragilis*). There is a steep embankment associated with the current crossing. The slope consists of disturbed cultural meadow that is occasionally mowed as part of roadside maintenance. The main ground cover species includes Canada Bluegrass (*Poa compressa*), Wild Carrot (*Daucus carota*), White Sweet Clover (*Melilotus alba*), Wild Teasel (*Dipsacus fullonum*), Ox-eye Daisy (*Leucanthemum vulgare*), goldenrod (*Solidago sp.*), fescue (*Festuca sp.*) and Canada Thistle (*Cirsium arvense*). A grove of Austrian Pine (*Pinus nigra*) is present on the top of the embankment near the current crossing.

Southeast Corner

Much of the vegetation in the southeast corner has been anthropogenically influenced and cleared in the past. Regenerating vegetation in the field adjacent to Second Line West consists mostly of ground cover species including Awnless Brome (*Bromus inermis*), grasses (*Festuca sp.* and *Poa sp.*) and Wild Teasel. A few Common Buckthorns (*Rhamnus cathartica*), Tartarian Honeysuckles (*Lonicera tatarica*), White Elms (*Ulmus americana*) and Red Cedars (*Juniperus virginiana*), approximately 1-2 m tall, are scattered throughout the field. A few planted Colorado Spruces (*Picea pungens*) are present along the Highway 401 right-of-way near Second Line West.

Northwest Corner

The edge of Meadowvale Station Woods is located approximately 35 m northwest of the current crossing and 15 m back from Second Line West. According to the NAS (City of Mississauga 2012), the vegetation community closest to Second Line West is characterized as Dry-Fresh Sugar Maple – Oak Deciduous Forest Type (FOD5-3). It was confirmed during the field investigation that the forest edge was dominated largely by Sugar Maple with fewer amounts of Red Oak and American Basswood (*Tilia americana*). A steep embankment associated with the current Second Line West crossing is also present at the northwest corner and consists of similar ground cover species present on the embankment in the southwest corner. A marsh located in a ditch north of Highway 401 and west of Second Line West is similarly dominated by Common Reed.

Northeast Corner

The northeast corner has also been anthropogenically influenced and cleared in the past. Regenerating ground cover species are similar to those identified in the southeast corner. There are several Colorado Spruces located along Highway 401 and several Red Cedars, Common Apples (*Malus Pumila*) and Common Buckthorns located in the Second Line West right-of-way. There is one Russian Olive (*Elaeagnus angustifolia*) beside Second Line West that is noted to be approximately 4 m tall.

Woodlot South of Sombrero Way

This small woodlot is a medium deciduous forest largely dominated by Sugar Maple. Old senescing Scots Pines (*Pinus sylvestris*) are present in the middle indicating that it was once a plantation that eventually succeeded to a deciduous forest. Trees along the woodlot edge along Second Line West consist mainly of Black Walnut (*Juglans nigra*) with some Sugar Maple, Bur Oak and Green Ash (*Fraxinus pennsylvanica*). The walnuts at the north end are large and have a diameter at breast height of 30 to 40 cm. A developing Staghorn Sumac thicket occurs along Second Line on the south side of this woodlot.

This woodlot does not form part of Meadowvale Station Woods and therefore is less significant but has a similar structure and provides a buffer between the ESA and residential development to the east. It will also provide visual seclusion for the future trail and therefore removal of trees from this woodlot should be avoided if possible.

Wildlife

A total of twenty (20) bird species were observed during the breeding bird surveys conducted in 2011 for the Highway 401 widening project. Most species are considered common and typical of areas that are highly developed. No Species at Risk were observed during survey work.

Amphibians

Amphibian investigations were conducted in 2012 as part of the Highway 401 widening project. No amphibians were heard within the study area during investigations. From the terrestrial condition description above, wetland communities occur within the study area. Considering their small size, proximity to the highway and lack of permanent water, this area is not suitable amphibian habitat. Also, the high volumes of traffic noise would inhibit amphibian species from hearing mating calls.

Wildlife Observations

During site investigations AECOM Ecologists came across several deer sightings, as well as tracks in several locations indicating a healthy population.

Species at Risk

A total of thirty-eight (38) Species at Risk (SAR) are known to occur throughout the Region of Peel through current and historical records. It has been determined that only fifteen (15) have suitable habitat within the immediate project limits. These are:

Endangered Species

- Bird - Acadian Flycatcher (*Empidonax vireescens*)
- Tree - Butternut (*Juglans cinerea*)
- Bird - Northern Bobwhite (*Colinus virginianus*)
- Aquatic - Rapids Clubtail (*Gomphus quadricolor*)
- Aquatic - Redside Dace (*Clinostomus elongatus*)
- Amphibian - Jefferson Salamander (*Ambystoma jeffersonianum*)

Threatened Species

Bird - Barn Swallow (*Hirundo rustica*)

Reptile - Eastern Musk Turtle (*Sternotherus odoratus*)

Plant - White wood aster (*Eurybia divaricata*)

Special Concern

Bird - Cerulean Warbler (*Dendroica cerulea*)

Reptile - Eastern Ribbonsnake (*Thamnophis sauritus*)

Bird - Golden-winged Warbler (*Vermicora chrysoptera*)

Bird - Louisiana Waterthrush (*Seiurus motacilla*)

Reptile - Milksnake (*Lampropeltis triangulum*)

Bird - Red-headed Woodpecker (*Melanerpes erythrocephalus*)

Considering that the proposed works will be limited to the existing Second Line West right-of-way, it is expected that there will be no impact to Meadowvale Station Woods, Species at Risk or their habitat, where there is suitable habitat for several SAR bird, plant, amphibian and reptile species.

Jefferson Salamander Habitat

The 2010 COSEWIC report describes Jefferson Salamander habitat as deciduous or mixed upland forests containing suitable breeding ponds. Breeding ponds are devoid of predatory fish, often ephemeral, and are filled by spring runoff, groundwater or springs. Breeding ponds must also contain attachment sites for egg masses and ephemeral ponds must exist for the duration of larval development. The embryonic period from egg deposition to hatching ranges between three to fourteen weeks while the larval period lasts between two to four months. This means that ponds must contain water for at least three to eight months, dependent on seasonal time of egg deposition and water temperature. Egg masses are normally attached to submerged twigs or branches. Prey items in ponds include a variety of invertebrates as well as other amphibian larvae or tadpoles.

A suitable breeding pond north of Highway 401 within Meadowvale Station Woods has been confirmed as containing breeding Jefferson Salamander by staff at the Credit Valley Conservation Authority (CVC) and MNR. There is also a potential breeding pond within the southern portion of Meadowvale Station Woods. Here, there have been observations of breeding Blue-spotted Salamander (*Ambystoma laterale*) by CVC staff. This salamander can also breed and hybridize with Jefferson Salamander. Therefore, there is potential for Blue-spotted Salamander to have the genetic code for Jefferson Salamander (COSEWIC, 2010). The location of these ponds is provided in Figure 4-1.

Butternut Habitat

The 2003 COSEWIC report describes butternut habitat as rich, moist, well-drained loams often found on stream bank sites but also on well-drained gravelly sites, especially those of limestone origin. Butternut is intolerant of shade and is often found on forest edges. Butternut is reported in the northern portion of Meadowvale Station Woods, however, was not observed during field investigations near Highway 401.

Note that aquatic SAR are described and covered under the Fish and Fish Habitat Existing Conditions Report for Highway 401.

There are no Butternut trees located within the study limits for this Class EA.

Designated Natural Areas

In the Natural Areas Survey, 2009 Update (NAS), the City of Mississauga has characterized certain locations within the study area as outstanding from a natural areas perspective. A significant Natural Site has the following qualifications: an Area of Natural and Scientific Interest (ANSI)/ Environmentally Sensitive Area (ESA); woodlands greater than 10 hectares in size; areas which support provincially significant species (S1, S2, S3) or species at risk listed as special concern, threatened or endangered; woodlands which support old-growth trees; and the Credit River Etobicoke Creek valley. Consequently, a Natural Site must fulfill one of the following criteria: a woodland greater than two (2) hectares but less than ten (10) hectares; areas which support uncommon vegetation communities; areas which support regionally significant plant/animal species; areas that include natural landscape features (valley lands, watercourses, and unusual landform features).

As per the Natural Areas Survey, the following Significant Natural Sites are located within the study area:

- i) *Meadowvale Station Woods ESA/ANSI* - Meadowvale Station Woods is listed as a regionally significant Area of Natural and Scientific Interest (ANSI), as well as, an Environmentally Significant Area (ESA). It is a 25 hectare forest which is comprised of upland and lowland vegetative communities. Fletcher's Creek, a Credit River tributary flows through this particular area.
- ii) *Credit River Watershed* - *The Credit River is situated in the most densely populated area of Ontario. This watershed runs through both the Niagara Escarpment and the Oak Ridges Moraine. The Credit River runs 90 km from its southeast headwaters in Orangeville, eventually draining into Lake Ontario in the City of Mississauga. This river system is approximately 300 m west of the study area.*

4.3.3 Soils/Physiography

The predominant soils through the study area are Oneida Clay Loam and Chinguacousy Clay Loam. Both soils are typical of the Halton Till and have limited infiltration capacity. Chinguacousy Clay Loam is classified as Hydrologic Soil Group C in the US Soil Conservation Service (SCS) system, and Oneida Clay Loam falls under soil group D. The Ontario Soil Survey Report Number 18 of Peel County (Hoffman and Richards, 1953) indicates small areas where Fox and Berrien Sandy Loams are more predominant.

The majority of the study area lies within the Peel Plain Physiographic Region (Chapman and Putnam, 1984). The Peel Plain is a level to undulating tract of clay, with limited areas where sandy alluvium borders stream valleys. The study area generally slopes southward toward Lake Ontario.

4.4 Cultural Environment

4.4.1 Archaeology

The following documents were reviewed to confirm the presence of any archaeological resources within and adjacent to the future Highway 401 right-of-way, within the Second Line West pedestrian/cyclist crossing of Highway 401 study area:

- *Stage 1-2 Archaeological Assessment for the Highway 401 Expansion from Highway 401/403 Westerly to the Credit River, Archeoworks, 2005*
- *Stage 2 Archaeological Assessment for the Highway 401 Widening from Highway 403/410 Interchange to the Credit River, Archeoworks, 2012.*

The Ministry of Tourism, Culture and Sport (MTCS) issued a Stage 2 Archaeological Clearance of the Highway 401 expansion study area, including the portion of the study area within the vicinity of the Second Line West crossing study area, in a letter dated March 5, 2013. See Appendix C for the letter.

The existing Second Line West road right-of-way north and south of Highway 401 is considered disturbed and therefore, has low archaeological potential.

Further archaeological study would be necessary for any improvements involving construction outside of the existing Second Line West right-of-way. However, because the Preferred Alternative (see Section 7 – Project Description) will be located entirely within the existing Second Line West right-of-way, the area does not require further archaeological study.

4.4.2 Cultural Heritage

The following documents were reviewed to confirm the presence of any cultural heritage resources within the study area:

- *Cultural Heritage Assessment Report, Cultural Heritage Landscapes and Built Heritage Resources, Highway 401 Widening from Highway 403/410 Interchange to the Credit River, Unterman McPhail and Associates, 2013*
- *Cultural Heritage Evaluation Report, Second Line West Underpass (Toronto Township Bridge #12), Unterman McPhail and Associates, 2012*

Within the study area, two (2) existing Cultural Heritage Landscapes have been identified:

Highway 401 Transportation Roadscape

Construction on sections of Highway 401 in Southern Ontario proceeded from 1950 onwards. The section of Highway 401 between Highway 10 and Highway 25 was officially opened on November 26, 1959. The Highway 401 corridor initially comprised two westbound and two eastbound lanes separated by depressed grass median. Grade separations were provided at interchanges and intersecting roads. Widening activities have resulted in the paving of the median and alteration of the original design. No mitigation measures for this road scape were recommended in the *Cultural Heritage Assessment Report, Cultural Heritage Landscapes and Built Heritage Resources, Highway 401 Widening from Highway 403/410 Interchange to the Credit River* (Unterman McPhail and Associates, 2013).

Fletcher's Creek Waterscape

Dense bush along Fletcher's Creek, located approximately 150m away from the Second Line West right-of-way forms a distinctive visual element from Second Line West and Highway 401. No mitigation measures for this waterscape were recommended in the *Cultural Heritage Assessment Report, Cultural Heritage Landscapes and Built Heritage Resources, Highway 401 Widening from Highway 403/410 Interchange to the Credit River* (Unterman McPhail and Associates, 2013).

There are no identified Built Heritage Resources within the study area. Pursuant to the above, the study area is considered clear of any cultural heritage resources.

²The 2nd Line West Underpass, (MTO Site No. 24-130) scored 36 points according to evaluation criteria set out in the Ontario Heritage Bridge Guidelines (January 2008) and therefore does not meet the threshold of 60 points to be considered provincially important and worthy of inclusion on the Ontario Heritage Bridge List. The structure was subsequently approved for demolition to accommodate the widening of Highway 401.

4.5 Traffic

Second Line West currently serves as a north-south minor collector road, with a 2-lane cross-section and a posted speed limit of 50 km/hr. The current annual average daily traffic (AADT) is approximately 4,300 veh/day.³ A Second Line West Neighbourhood Traffic Study was conducted by the City of Mississauga as part of a separate study, which reviewed the existing traffic conditions with the Second Line West structure in place and reassigned existing traffic conditions, with the Second Line West Structure removed.

The complete study area used for the traffic analysis is bounded by Old Derry Road to the north, Mavis Road to the east, Bancroft Drive to the south and a historic trail to the west. Specific focus in the Traffic Study was given to Sombrero Way, an east-west minor collector road north of Highway 401, specifically, Sombrero Way at Second Line West and Sombrero Way at Mavis Road.

A review of travel patterns found that the removal of the Second Line West vehicular crossing eliminates the potential for northbound vehicular traffic from the south and southbound vehicular traffic from the north of Highway 401 on Second Line West. This directs vehicular traffic to other north-south connections across Highway 401, parallel to Second Line West, mainly, Mavis Road to the east.

The residents of the study area provided comments and questions about traffic operations along Sombrero Way, Donway Drive, Bancroft Drive, at the Boyer Boulevard / Mavis Road Intersection, and at the Brass Winds Place / Sombrero Way Intersection, which were addressed as part of the Traffic Study. This material can be found online at the project's website (<http://www.mississauga.ca/portal/residents/secondlinewest>). It is anticipated that the proposed improvement measures outlined in the study would be implemented in stages to respond to existing traffic conditions. Additional improvements will be considered and subject to review upon removal of the bridge and consultation of the residents.

³Highway 401 Widening - Second Line West Structure Public Meeting (November 2011)

5. Phase One: Problem/Opportunity Statement

The widening of Highway 401 will result in the removal of the existing north-south connection across Highway 401 along Second Line West. Accordingly, there is an opportunity for the City to account for this missing connection between the northerly and southerly neighbourhoods through means of a pedestrian/cyclist crossing.

5.1 Background Studies

Numerous planning documents and studies have established a need to improve the network connectivity for pedestrians and cyclists over Highway 401 within the Second Line West corridor as documented earlier in this Environmental Study Report:

- Region of Peel Official Plan, 2013
- City of Mississauga Cycling Master Plan, 2010
- City of Mississauga Official Plan, 2011
- City of Mississauga "Our Future Mississauga" Strategic Plan, 2007
- City of Mississauga "Living" Green Master Plan, 2012
- Credit River Parks Strategy, 2013
- Mississauga Crime Prevention through Environmental Design Principles, 2013.

5.2 Problem/Opportunity Statement

Input obtained from Public Information Centre#1 led to the development of the Problem/Opportunity Statement as follows:

"The City of Mississauga Official Plan and Cycling Master Plan recognize Second Line West as a cycling route and recommend provision of a pedestrian/cyclist crossing of Highway 401.

An opportunity exists to address the type of pedestrian/cycling connectivity required on Second Line West corridor and take advantage of cost saving opportunities associated with the Highway 401 expansion.

This opportunity allows for the implementation of City-wide strategic objectives which promote sustainable active transportation options that provide residents with opportunities to walk and cycle to reach their destinations, 'because it is convenient, connected, desirable and healthy.'

6. Phase Two: Alternative Solutions

Phase 2 of the Class EA process requires the identification and evaluation of alternative solutions to address the identified problem and/or opportunity. Alternative solutions represent planning options for addressing the identified problems and opportunities. The problem and opportunity statement has identified the need for improving network connectivity north and south of Highway 401 for pedestrians and cyclists in order to promote sustainable active transportation options to residents.

Alternative solutions were assessed on the basis of a comprehensive set of factors and criteria that reflected the following considerations:

- Provincial and federal government legislation, policies and guidelines
- Municipal policy (City of Mississauga and the Region of Peel)
- Existing and future social, economic, natural, cultural and active transportation conditions within the study area
- Issues and concerns identified during consultation with ministries, agencies, the municipality, and the general public
- Project Team investigations and expertise.

A number of planning alternatives were identified and subjected to a screening process to determine whether they would improve pedestrian and cyclist network connectivity within the study area and serve the needs of the community in the surrounding area.

6.1 Identification of Alternative Solutions

The following list of alternative solutions was identified as having potential to address the problems and opportunities within the study area. Alternative solutions considered and presented at PIC#1 include:

- Alternative 1 – Do Nothing
- Alternative 2 – Underpass – Pedestrian/Cyclist Crossing of Highway 401
- Alternative 3 – Overpass – Pedestrian/Cyclist Crossing of Highway 401

6.1.1 Alternative 1 – Do Nothing

This alternative demonstrates what would happen if no action was taken to improve the pedestrian and cyclist network connectivity within the study area. In this alternative, the existing vehicular crossing at Highway 401 is removed by the MTO to accommodate the widening of Highway 401, with no provision of a pedestrian/cyclist crossing. This alternative solution was included for comparison purposes in order to evaluate the other alternatives.

6.1.2 Alternative 2 – Underpass – Pedestrian/Cyclist Crossing of Highway 401

This alternative involves the construction of a cycling/pedestrian underpass connection which utilizes the new Fletcher's Creek bridge structures under Highway 401. This alternative includes a connection between the Fletcher's Creek culvert and the existing Fletcher's Creek trail system/Second Line West right-of-way. Underpass options on the existing Second Line West right-of-way are not viable due to interference with Species at Risk in the Meadowvale Station Woods, excessive costs and significant personal safety concerns.

6.1.3 Alternative 3 – Overpass - Pedestrian/Cycling Crossing of Highway 401

This alternative involves the construction of a cycling/pedestrian overpass within the existing Second Line West right-of-way across Highway 401, using the existing roadbed.

6.2 Identification of Assessment Criteria for Alternative Solutions

An evaluation framework was developed and is presented in **Table 6-1**, including technical considerations and environmental components that address the broad definition of the environment as described in the *Environmental Assessment Act* in addition to considering comments received from review agencies. The factor groups for the evaluation criteria were confirmed through consultation with project team members and by public attendees of PIC No. 1. The existing environment was taken into consideration leading to a descriptive or qualitative assessment based on criteria developed within the following categories.

Table 6-1: Evaluation Factors and Description

Factor Group	Criteria	Description/Measure
Technical	• Safety	<ul style="list-style-type: none"> • Potential for conflicts with vehicular traffic • Level of personal safety associated with use of crossing
	• Connectivity of Pedestrians / Cyclists across Highway 401 and Beyond	<ul style="list-style-type: none"> • Potential to provide a north-south connection across Highway 401 and to adjacent communities • Potential to connect with existing and future cycling network
	• Costs	<ul style="list-style-type: none"> • Potential cost for design, construction and maintenance
	• Ease of Construction	<ul style="list-style-type: none"> • Staging and compatibility with other projects (e.g. Highway 401 mainline widening)
	• Permitting and Coordination with External and Regulatory Agencies	<ul style="list-style-type: none"> • Permits and/or agency approvals/agreements and coordination
	• Timing	<ul style="list-style-type: none"> • Ability to construct within a reasonable timeframe
Socio-Economic	• Compliance with Planning Policies, Transportation Plans and other relevant agreements/approvals	<ul style="list-style-type: none"> • Adherence to 2010 City of Mississauga Cycling Master Plan • Adherence to 2011 Official Plan (Schedule 7: Long Term Cycling Routes)
	• Noise Impacts	<ul style="list-style-type: none"> • Potential for noise impacts along ROW and within MSW
	• Property Requirements	<ul style="list-style-type: none"> • Property impacted as a result of the alternative being carried out
Cultural	• Archaeological Sites	<ul style="list-style-type: none"> • Impacts to known archaeological sites along the route
	• Built Heritage	<ul style="list-style-type: none"> • Impacts to known heritage buildings or cultural landscapes
Natural	• Vegetation and Wildlife	<ul style="list-style-type: none"> • Amount of woodlot or hedgerows affected or removed • Impacts to wildlife
	• Watercourses and Fisheries	<ul style="list-style-type: none"> • Aquatic habitat within or adjacent to Fletcher's Creek that may be harmfully altered or disturbed
	• Species at Risk	<ul style="list-style-type: none"> • Amount and quality of SAR (Jefferson Salamander, Redside Dace) and/or habitat removal or disturbance
	• Designated Natural Heritage Areas (ESAs, ANSIs, wetlands)	<ul style="list-style-type: none"> • Amount of ESA, ANSI or wetlands removed or disturbed

6.3 Evaluation of Alternative Solutions

The alternatives were assessed using the reasoned argument method of evaluation. This method identifies and highlights the differences in net impacts associated with the various alternatives. The relative significance of the impacts is examined to provide a clear rationale for the selection of a preferred alternative. The criteria have been put forward based on their ability to identify the potential environmental effects of each alternative and distinguish the advantages and disadvantages between them.

Table 6-2 presents the assessment table used to evaluate the three (3) Alternative Solutions, including the Do Nothing Alternative. Through this table, technical, socio-economic, cultural and natural criteria are used to evaluate and compare impacts of each of the Alternative Solutions. A recommendation was made for the Preferred Alternative Solution based on the results presented in this table.

Table 6-2: Evaluation of the Alternative Solutions

Evaluation Criteria	Alternative 1 Do Nothing – No Crossing Of Highway 401	Alternative2 Underpass Pedestrian / Cycling Crossing	Alternative 3 Overpass Pedestrian / Cycling Crossing
TECHNICAL			
<p>Safety – Conflicts with Vehicular Traffic</p> <ul style="list-style-type: none"> Potential for vehicle / cycling conflict 	<ul style="list-style-type: none"> Highest potential for conflict - To cross Highway 401 in this area, cyclists must travel east to Mavis Road which has several cyclist/vehicle conflict points at the Highway 401 ramps, or west to Creditview Road where there is a high potential for vehicle / cycling conflict on the Highway 401 bridge due to reduced width and gravel shoulders. 	<ul style="list-style-type: none"> Low potential for conflict between cyclists and vehicles due to exclusive use of trail and underpass at Highway 401 by cyclists and pedestrians. 	<ul style="list-style-type: none"> Low potential for conflict between cyclists and vehicles due to exclusive use of crossing over Highway 401 by cyclists and pedestrians.
<p>Safety – Crossing Security</p> <ul style="list-style-type: none"> Opportunity to provide a high level of personal safety with use of crossing 	<ul style="list-style-type: none"> No change; no impact 	<ul style="list-style-type: none"> Provides low level of personal security due to low visibility on trail and within the Highway 401/Fletchers Creek underpass 	<ul style="list-style-type: none"> Provides high level of personal security due to high visibility of overpass
<p>Connectivity of Pedestrians / Cyclists across Highway 401 and Beyond</p> <ul style="list-style-type: none"> Potential to provide a north-south connection and to adjacent communities 	<ul style="list-style-type: none"> No opportunity to provide connectivity for pedestrians / cyclists across Highway 401. No connectivity to adjacent existing and planned cycling routes on either side of Highway 401. 	<ul style="list-style-type: none"> Significant improvement to exclusive pedestrian / cyclist connectivity with passage under the highway. Improvement to pedestrian /cycling connectivity to adjacent and planned cycling routes. 	<ul style="list-style-type: none"> Significant improvement due to exclusive pedestrian/cycling use of structure across the highway. Improvement to pedestrian/ cycling connectivity to adjacent and planned cycling routes.
<p>Costs</p> <ul style="list-style-type: none"> Potential cost for design, construction 	<ul style="list-style-type: none"> No cost 	<ul style="list-style-type: none"> Higher crossing alternative costs due to complex design. Will require a re-design of the Fletchers Creek crossing 	<ul style="list-style-type: none"> Lower crossing alternative costs due to moderate complexity and coordination with agencies (i.e. MOECC, MNR, CVC, MTO).

Evaluation Criteria	Alternative 1 Do Nothing – No Crossing Of Highway 401	Alternative2 Underpass Pedestrian / Cycling Crossing	Alternative 3 Overpass Pedestrian / Cycling Crossing
and maintenance		<ul style="list-style-type: none"> structures, as well as coordination with agencies (i.e. MOECC, MNR, CVC, MTO). Seasonal maintenance of underpass and trail connections (re-surfacing). 	<ul style="list-style-type: none"> Seasonal maintenance (i.e. snow clearing).
Ease of Construction <ul style="list-style-type: none"> Staging and compatibility with other projects (e.g. Highway 401 mainline widening) 	<ul style="list-style-type: none"> No change to existing conditions 	<ul style="list-style-type: none"> Proposed Highway 401 crossing structure of Fletchers Creek does not meet City’s vertical requirements for flood protection. The new structures would have to be lengthened at a considerable cost. Would have to be built within MTO contract. 	<ul style="list-style-type: none"> Opportunity to construct part or all of the crossing structure within the MTO Highway 401 contract. Could be built after MTO contract but at higher cost.
Permitting and Coordination with External and Regulatory Agencies <ul style="list-style-type: none"> Permits and/or agency approvals/agreements and coordination 	<ul style="list-style-type: none"> No permit or coordination required 	<ul style="list-style-type: none"> Subject to permits from MNR, CVC; extensive consultation required. Extensive consultation with MTO due to re-design of Fletchers Creek crossing, as well as staging, permitting and connection of trail. 	<ul style="list-style-type: none"> May be subject to permits from MNR, CVC. Consultation with MTO regarding staging, permitting, construction of overpass.
Timing <ul style="list-style-type: none"> Ability to construct within a reasonable timeframe 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> Construction of underpass may not be compatible with MTO schedule for Highway 401 widening due to re-design of Fletchers Creek crossing. 	<ul style="list-style-type: none"> Construction of part or all of the pedestrian /cycling structure is compatible with MTO schedule for Highway 401 widening.

Evaluation Criteria	Alternative 1 Do Nothing – No Crossing Of Highway 401	Alternative2 Underpass Pedestrian / Cycling Crossing	Alternative 3 Overpass Pedestrian / Cycling Crossing
CULTURAL ENVIRONMENT			
Archaeological and Built /Cultural Heritage Resources <ul style="list-style-type: none"> Impacts known archaeological sites along the route Impacts known heritage buildings or cultural landscapes 	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> Potential impact due to the need for a trail connection outside of the existing ROW. No impact to built or cultural heritage 	<ul style="list-style-type: none"> No impact provided design and construction is within existing ROW; study area is previously disturbed and cleared of archaeological potential. No impact to built or cultural heritage
SOCIO-ECONOMIC ENVIRONMENT			
Compliance with Planning Polices, Transportation Plans and other relevant agreements/approvals	<ul style="list-style-type: none"> Does not adhere to 2010 City of Mississauga Cycling Master Plan and 2011 OP (Schedule 7: Long Term Cycling Routes); does not provide for north south cycling crossing of Highway 401 	<ul style="list-style-type: none"> Adheres to 2010 City of Mississauga Cycling Master Plan and 2011 OP (Schedule 7: Long Term Cycling Routes); provision for north south cycling crossing of Highway 401. 	<ul style="list-style-type: none"> Adheres to 2010 City of Mississauga Cycling Master Plan and 2011 OP (Schedule 7: Long Term Cycling Routes); provision for north south cycling crossing of Highway 401.
Noise Impacts <ul style="list-style-type: none"> Potential for noise impacts along ROW and within MSW 	<ul style="list-style-type: none"> No change to existing conditions 	<ul style="list-style-type: none"> Minimal increase along ROW and within MSW in noise due to cycling/pedestrian use of trail and underpass. 	<ul style="list-style-type: none"> Minimal increase along ROW in noise due to cycling/pedestrian use of trail and underpass. No impact to MSW
Property Requirements	<ul style="list-style-type: none"> No property required 	<ul style="list-style-type: none"> Easement required from MTO for trail connection within MSW 	<ul style="list-style-type: none"> No property required
NATURAL ENVIRONMENT			
Vegetation and Wildlife <ul style="list-style-type: none"> Amount of woodlot or hedgerows affected or removed Impacts to wildlife 	<ul style="list-style-type: none"> Full restoration plan can be implemented (as per MOECC Condition of Approval) within existing Second Line West ROW on both sides of Highway 401. Significant improvement to 	<ul style="list-style-type: none"> Opportunity for integration with the re-vegetated/restored area within Second Line West ROW. Greater human activity alongside Fletchers Creek and within Meadowvale Station Woods, 	<ul style="list-style-type: none"> Could be integrated with re-vegetated area within Second Line West ROW. Moderate improvement to surrounding existing vegetation and wildlife habitat with exclusive use of overpass by cyclists /pedestrians.

Evaluation Criteria	Alternative 1 Do Nothing – No Crossing Of Highway 401	Alternative2 Underpass Pedestrian / Cycling Crossing	Alternative 3 Overpass Pedestrian / Cycling Crossing
	vegetation and wildlife habitat due to reduced human activity.	therefore potential for negative impacts within woodlot and wildlife habitat from garbage, trespass etc.	
Watercourses and Fisheries <ul style="list-style-type: none"> Aquatic habitat within or adjacent to Fletchers Creek that may be harmfully altered or disturbed 	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> Greater human activity alongside Fletchers Creek and within Meadowvale Station woods, therefore potential for negative impacts to Fletchers Creek and adjacent areas from garbage, trespass etc. 	<ul style="list-style-type: none"> No impact
Species at Risk <ul style="list-style-type: none"> Amount and quality of SAR (Jefferson Salamander, Redside Dace) and/or habitat removal or disturbance 	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> Disturbance to regulated habitat (both Jefferson Salamander and Redside Dace) from construction of a trail and human activity. Endangered Species Act permit required 	<ul style="list-style-type: none"> No Endangered Species Act permit required due to construction within existing ROW
Designated Natural Heritage Areas (ESAs, ANSIs, wetlands) <ul style="list-style-type: none"> Amount of ESA, ANSI or wetlands removed or disturbed 	<ul style="list-style-type: none"> Significant improvement to Meadowvale Station Woods ESA/ANSI with reduced human activity 	<ul style="list-style-type: none"> Potential for negative impacts on Meadowvale Station Woods ESA/ANSI due to increased human activity along the trail and underpass 	<ul style="list-style-type: none"> No impact due to construction of overpass within existing ROW
OVERALL SUMMARY AND CONCLUSIONS	NOT PREFERRED; DOES NOT ADDRESS NEEDS AND OPPORTUNITIES	NOT PREFERRED; DOES NOT ADDRESS NEEDS AND OPPORTUNITIES	CARRIED FORWARD

6.4 Identification of the Preferred Solution

Based on the detailed comparative evaluation, **Alternative 3 - Pedestrian/Cycling Overpass Crossing of Highway 401** was recommended to be carried forward as the Preferred Solution.

Alternative 1 was not recommended as it would not enhance the cycling/pedestrian network connectivity, as outlined in the City of Mississauga Official Plan and Cycling Master Plan.

Alternative 2 was not recommended as there would be potentially greater and significant impacts to Species at Risk and the Natural Environment within the Meadowvale Station Woods and concerns with personal safety. Alternative 2 would also potentially involve the re-design of the already approved future Highway 401 Fletcher's Creek culvert to accommodate a pedestrian/cycling trail, resulting in delay to the Highway 401 expansion project.

Alternative 3 is expected to address the Problem/Opportunity Statement as it addresses the planned cycling/pedestrian network connectivity while having the least impact on the natural environment, and allows for co-ordination and cost savings with the Highway 401 expansion project. Implementing this Alternative would also allow for the construction of a unique, aesthetically pleasing structure that would be viewable from the future expanded Highway 401.

7. Phase Three: Alternative Design Concepts

This section of the report discusses the alternative design concepts that were identified, developed and evaluated for the Preferred Solution. These alternative design concepts are described below followed by an evaluation and comparison between alternatives. Details of the Preferred Design are presented in **Section 7.0**.

7.1 Assessment Criteria

For Phase 3 of the study, the assessment criteria used to evaluate the Alternative Designs is similar to the criteria presented in Phase 2, with additional criteria related to structure crossing type. The crossing design standards were identified to reflect an appropriate level of detail associated with the Preferred Solution. **Table 7-1** presents the Assessment Criteria for Phase 3 of the study.

Table 7-1: Assessment Criteria for Alternative Designs

Factor	Description/Measure
Technical	<ul style="list-style-type: none"> Safety – conflicts with vehicular traffic, crossing security, costs, ease of construction, permitting and coordination with external regulatory agencies, timing
Socio-Economic	<ul style="list-style-type: none"> Connectivity of pedestrians/cyclists across Highway 401 and beyond, compliance with planning policies, transportation plans and other relevant agreements/approvals, noise impacts and property requirements
Natural	<ul style="list-style-type: none"> Vegetation and wildlife, watercourses and fisheries, Species at Risk and designated natural heritage areas (ESA, ANSI, wetlands)
Cultural	<ul style="list-style-type: none"> Archaeological resources, built and cultural landscape
Structure Crossing Type	<ul style="list-style-type: none"> Alignment of structure Aesthetics: Steel truss versus steel box girder Cost: Comparative cost to construct each design concept Construction feasibility: Partial versus full bridge construction

7.1.1 Design Codes

The design of the structure will be carried out in accordance with the Canadian Highway Bridge Design Code (CHBDC) – CAN/CSA-S6-06 and subsequent revisions. Design details shall be in accordance with the MTO Structural Manual.

7.1.2 Constraints to Alternative Design Concepts

Following confirmation of the assessment criteria and crossing design standards, the following constraints were identified prior to the development of the Alternative Design Concepts:

- Existing right-of-way alignment and available property
- Existing elevation north and south of Highway 401
- Preferred perpendicular crossing to Highway 401, reducing span lengths and resulting in lower capital costs
- Existing utilities
- Bridge span sufficient to allow for the future Highway 401 cross-section, which includes:
 - 12-lane core/collector system plus ramps
 - A minimum vertical clearance of 5.3 m
 - A three span structure over Highway 401 with piers in the outer separators that divide future core and collector lanes
- MTO design requirements
- MTO Highway 401 expansion timing.

7.2 Identification and Description of Alternative Design Concepts

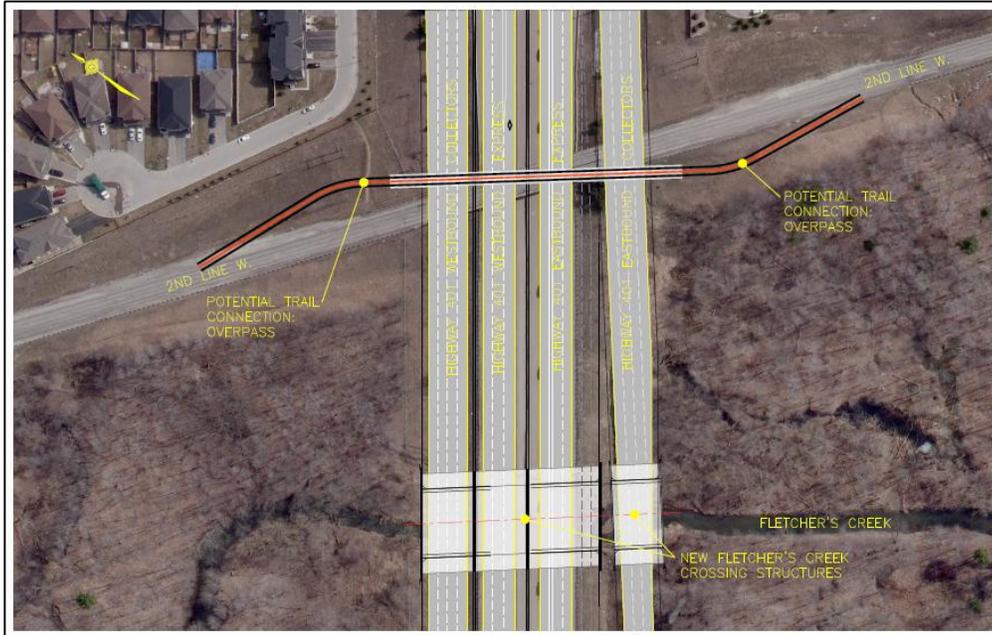
Alternative Design Concepts were organized into two (2) evaluation groups based on structure type, with two alternatives for alignment. The alternatives include either a Steel Box Girder (1) or Steel Truss (2) structure with a perpendicular (A) or skewed (B) crossing to Highway 401.

- Option 1A** - 3-span Steel Box Girder structure accommodating a 4 m wide multi-use trail with a perpendicular alignment
- Option 1B** - 3-span Steel Box Girder structure accommodating a 4 m wide multi-use trail with a skewed alignment
- Option 2A** - 3-span Steel Truss structure accommodating a 4 m wide multi-use trail with a perpendicular alignment
- Option 2B** - 3-span Steel Truss structure accommodating a 4 m wide multi-use trail with a skewed alignment

7.2.1 Alternative Alignment A – Perpendicular Crossing

Alternative Alignment A provides a perpendicular crossing to Highway 401, reducing the total length of the crossing structure. This Alternative Alignment is shown in **Figure 7-1**. For this configuration, realignment is required to the pathway approaching the crossing, which will encroach into Meadowvale Station Woods and potentially impact Species at Risk habitat. Realignment of the pathway would also cause the approaches of the crossing to be close to residential properties on the north end. This alternative also has a greater impact on utilities in the area than the skewed alignment. Finally, a perpendicular alignment decreases the future pathway’s ability to be integrated into the existing road infrastructure.

Figure 7-1: Alternative Alignment A – Perpendicular Crossing to Highway 401



7.2.2 Alternative Alignment B – Skewed Crossing

Alternative Alignment B provides a skewed crossing to Highway 401, as shown in **Figure 7-2**. This configuration requires a slightly longer structure than in Alternative A, however, the existing road infrastructure has a greater opportunity to be integrated into the future multi-use pathway. In addition, there is no impact to the Meadowvale Station Woods for this alternative and no impact to Species at Risk, which is preferred by the Ministry of Natural Resources. Finally, a skewed alignment has fewer impacts to the surrounding utilities than a perpendicular alignment.

Figure 7-2: Alternative Alignment B – Skewed Crossing to Highway 401



7.2.3 Preferred Alignment

The pros and cons associated with each alignment, as discussed above, were presented to the public during PIC No. 2 (see Appendix A.5). Taking into account the existing environment, public and regulatory agency input, anticipated environmental impacts and methods of minimizing negative impacts and maximizing positive impacts, **Alternative Alignment B**, the skewed crossing of Highway 401, is being carried forward as the preferred alternative. This is because costs are relatively equal for the two alignments and Alternative Alignment B has less of an impact on the surrounding environment and utilities.

7.2.4 Structure Crossing Type #1- Box Girder

This proposed structure is shown in **Figure 7-3**. It includes a three span (29.9m-49.3m-34.4m) continuous integral abutment structure with 2H:1V foreslopes, and 10 m and 15 m clear zones north and south of Highway 401, respectively. A 1400mm deep welded steel box girder, composite with a 200 mm precast concrete deck slab, are supported by RSS False abutments and piers. The abutments and piers are supported on steel H-piles and concrete spread footings, respectively.

7.2.5 Structure Crossing Type #2- Steel Truss

This structure alternative is shown in **Figure 7-4**. The structure includes a three span (34.7m-49.3m-34.5m) continuous truss structure with 2H:1V foreslopes and a 15 m clear zone north and south of Highway 401. The steel trusses and 200 mm precast concrete deck slab are supported by conventional abutments and piers. The abutments and piers are supported on concrete spread footings.

The two structure types will be compared to one another in the following section, with recommendation provided for the preferred structure. The structure type will be finalized in the detail design stage.

Figure 7-3: Alternative Design Concept Option 1B - 3-Span Steel Box Girder Bridge Accommodating a 4 m Wide Multi Use Trail with a Skewed Alignment

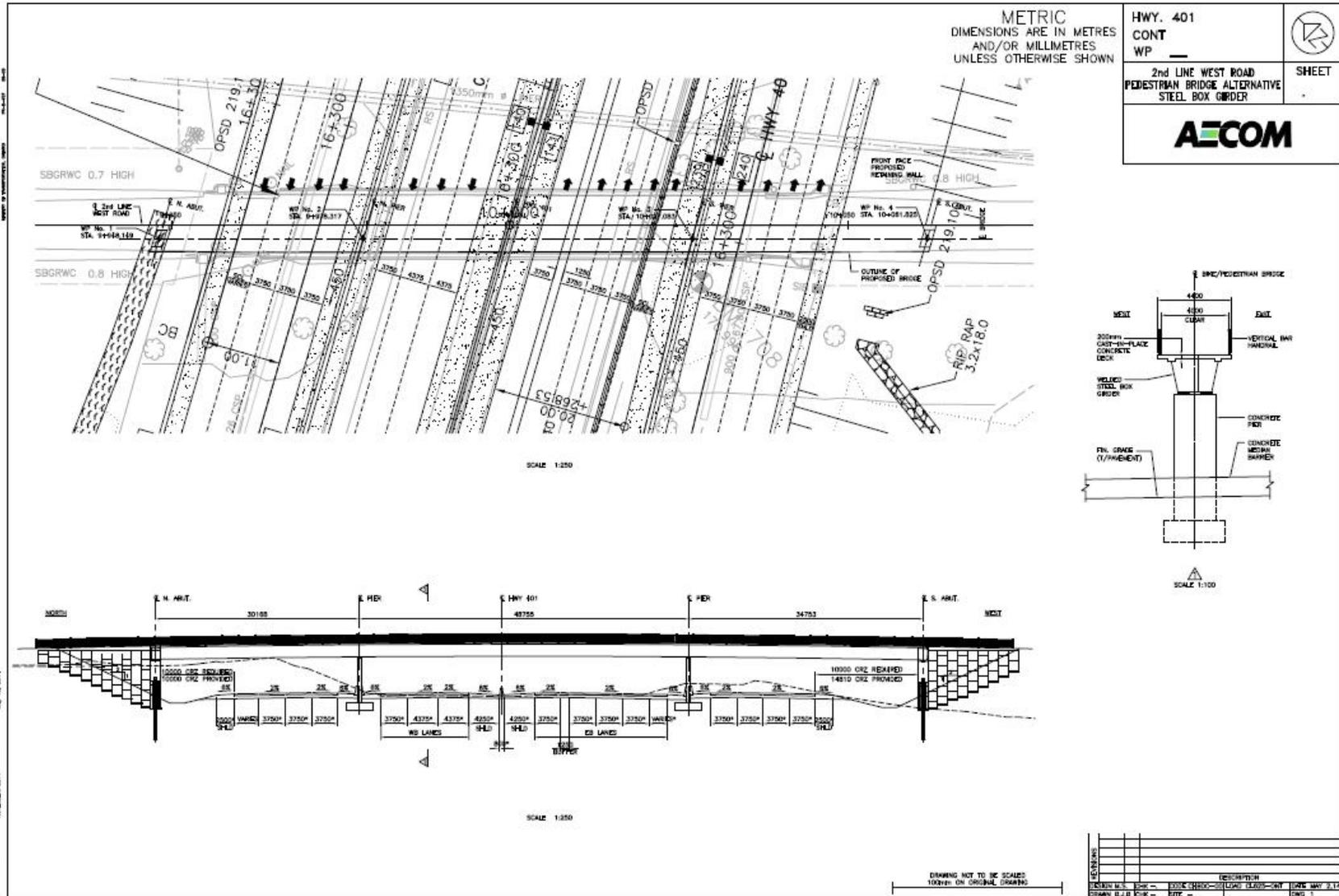
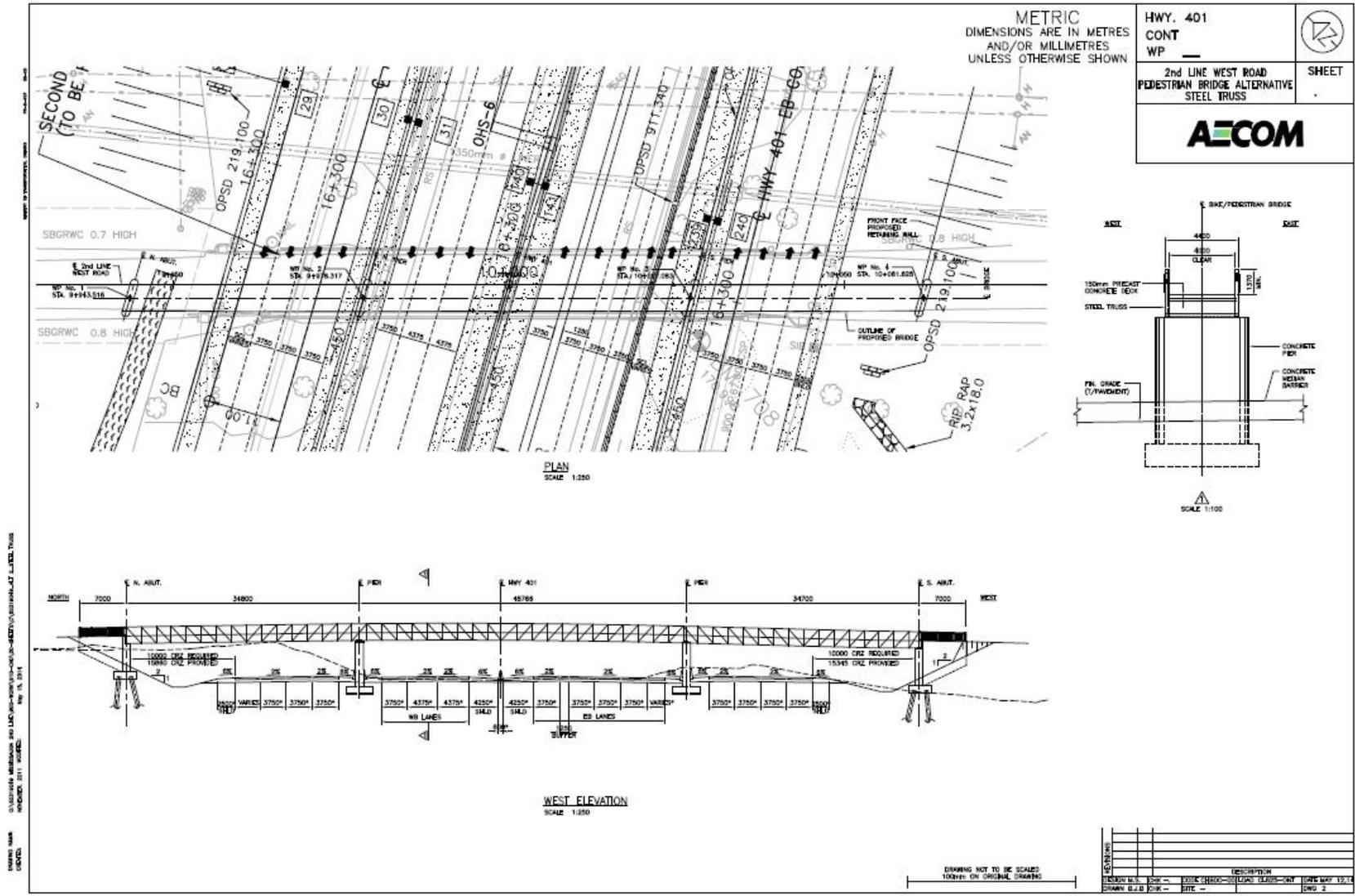


Figure 7-4: Alternative Design Concept Option 2B – 3-span Steel Truss Bridge Accommodating a 4 m Wide Multi Use Trail with a Skewed Alignment



8. Preferred Design Concept

8.1 Recommended Alternative Design

The recommended alternative design concept was for a skewed alignment, Alignment B, with either a Box Girder or Steel Truss structure. The purpose of this section is to provide a preliminary design and details concerning the major features of the preferred alternative design concept. A comparative evaluation of the two structure types will be carried out, with a recommendation provided for the preferred structure.

8.1.1 Plan

As discussed in Section 6, the pedestrian/cyclist connection along Second Line West will be achieved using a skewed alignment to Highway 401, with a relatively flat horizontal curve. The Preliminary Design plans are shown in the top left of **Figure 7-3** and **Figure 7-4** and enclosed in Appendix E.

8.1.2 Profile

As discussed during the evaluation of the alternative design concepts (see **Figure 7-3** and **Figure 7-4**), the road profile requires 2H:1V foreslopes necessary for meeting the minimum clearance requirements of the proposed pedestrian/cyclist crossing over Highway 401. There is a 10.0 m offset from the edge of the through lane to the vertical face of the north and south abutments.

8.1.3 Typical Sections

Figure 8-1 and **Figure 8-2** depict the proposed pedestrian/cyclist crossing cross sections for both the Box Girder and Steel Truss structure type alternatives. The proposed cross sections for each crossing alternative would accommodate for a 4.0 m wide multi-use trail.

Figure 8-1: Box Girder Cross Section

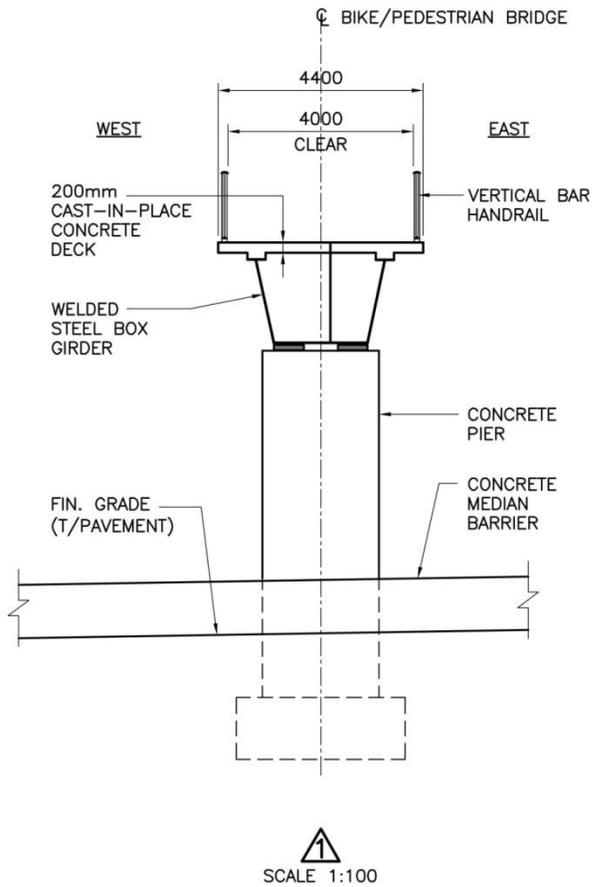
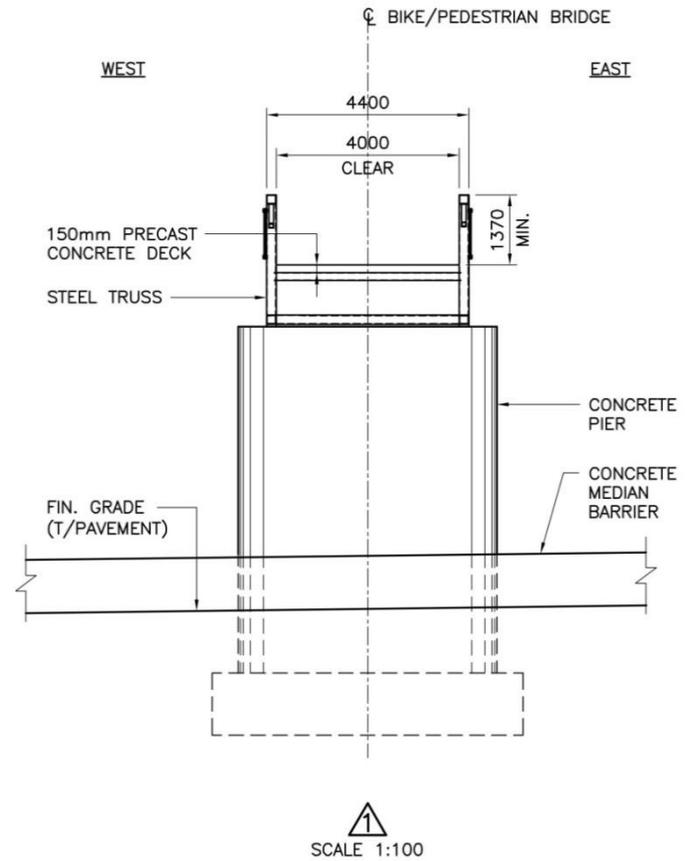


Figure 8-2: Steel Truss Cross Section



8.1.4 Bridge

The proposed new pedestrian/cyclist crossing will be approximately 120 m in length and include either a three-span steel box girder bridge or a steel truss, with two piers between the future Highway 401 core/collector lanes. The proposed crossing will have an open rail concept which meets MTO bridge requirements and prevents the build-up of snow during the winter months. The conceptual design of the structure was closely co-ordinated with the MTO and addresses the requirements of the future widening of Highway 401. The crossing provides a minimum vertical clearance of 5.3 m across the entire future Highway 401 cross-section. The 4.4 m wide deck will accommodate a 4m wide pedestrian/cyclist path, which will allow for two-way travel for both pedestrians and cyclists without dismounting. It will use the existing pavement in order to minimize the footprint of the existing right-of-way.

Additional information may be found on the General Arrangement drawings included in Appendix E. The actual bridge type will be confirmed during detail design, however, **Sections 8.3** and **8.4** will provide a recommendation for the preferred design.

8.1.5 Mississauga Crime Prevention Through Environmental Design Principles (CPTED)

The proposed pedestrian/cyclist crossing will incorporate Mississauga's Crime Prevention Through Environmental Design (CPTED) principles (2013). The goal of these principles is to create a safer and more liveable city for the citizens of Mississauga. Natural surveillance, natural access control and territorial reinforcement will be taken into account during detail design. The strategies that could be incorporated into the detail design phase are summarized in **Table 8-1**.

Table 8-1: CPTED Detail Design Strategies

CPTED Strategy	Detail Design
Natural Surveillance	<u>Visibility of Public Realm</u> <ul style="list-style-type: none"> • Good visibility of pedestrian/cyclist crossing from Highway 401 and surrounding area • Design road profile such that a pedestrian or cyclist entering from one approach can clearly see the opposing side of the crossing. This ensures a clear sightline and avoids isolated or hidden spaces. • Opportunity to create 'pause-points' with benches and interpretive signs to promote casual public encounters • Pedestrian lighting uniformly along the pathway and across the bridge • Desire lines to adjacent subdivisions will be maintained allowing for casual surveillance and an active relationship with the neighbourhood • Landscaping/vegetation maintenance along the pathway to ensure sightlines are maintained
Natural Access Control	<ul style="list-style-type: none"> • Signage at both ends of the pathway to identify length of pathway and adjacent circulation routes • Maintain a limited number of entrances and exits to the pathway which can be identified on signage • Desire lines to adjacent neighbourhoods could be formalized to clearly define connectivity
Territorial Reinforcement	<u>Sense of Belonging/Defensible Space</u> <ul style="list-style-type: none"> • Existing paved area will be maintained to define public vs. natural space and will provide orientation to the north and south • To avoid pockets of isolation, 'pause-points' can be integrated into the pathway to promote casual public encounters <u>Connectivity</u> <ul style="list-style-type: none"> • Pathway will be integrated into the existing neighbourhood and existing/future planned cycling routes • Desire lines into the adjacent neighbourhoods will be maintained

8.1.6 Drainage

Deck drainage shall be in accordance with the CHBDC and the MTO drainage manual. Deck drains are not required. It should be noted that the project will result in 'no impact' to the floodplain which is under the jurisdiction of the CVC. Furthermore, a reduction in the pavement width from the existing 10 m road right-of-way to approximately 4 m will allow for increased infiltration, allow for the enhancement of existing natural features and will partially remove the existing flooding hazard to the floodplain.

8.1.7 Property

The City of Mississauga owns the necessary lands for the construction of the project and no property acquisition is anticipated.

Second Line West will be terminated south of Sombrero Way (north of Highway 401) and at Donway Drive (south of Highway 401) to accommodate a proposed multi-use path leading up to the pedestrian/cyclist crossing. The driveway located on the east side of Second Line West, north of Highway 401 will be maintained as a private entrance. South of Sombrero Way, the existing right-of-way will be maintained for private access and fire/emergency clearances. Signage will be installed to identify restricted access to the property, as well as the multi-purpose pathway connection.

8.1.8 Utilities and Lighting

There are no companies that have utilities plant within the study limits. Utilities on the pedestrian/cycling crossing approaches will remain unchanged. Lighting is anticipated along both approaches and across the bridge. Lighting details will be confirmed during the detail design phase.

8.1.9 Landscaping

The Landscape Concept Plan for the approaches to the Second Line West pedestrian/cycling crossing and multi-use path will be confirmed during detail design. The Preliminary Landscape Concept Plan is illustrated in **Figure 8-3** and outlines the preliminary streetscape details of the new crossing between Sombrero Way and Donway Drive. This includes the delineation of the proposed multi-use path and 6.0 m driveway and fire route, potential tree and naturalized planting areas along the path, possible outlook areas with bench seating, pedestrian lighting and connections to adjacent trails in the vicinity. Landscaping and re-vegetation will occur in conjunction with the MTO Highway 401 widening project. *(Note: As a condition of TESR approval, MTO will re-vegetate 1.4ha, as replacement for removals within Meadowvale Station Woods for the highway widening).*

Figure 8-3: Preliminary Landscape Concept Plan

PLEASE SEE SEPARATE FILE FOR FIGURE ES-3/FIGURE 8-3

8.1.10 Services

There are no conflicts with watermains in the vicinity of the proposed pedestrian/cyclist crossing alignment. Conflicts were avoided through selection of the skewed alignment.

8.1.11 Construction Staging

Since the bridge approaches will be constructed in a dedicated empty corridor, no traffic staging is required for this construction phase except for a minor staging for resurfacing the intersections of the approaches to the crossing. Access to the construction zones on the crossing and under the crossing, to the north and south of the abutments, will be from the Second Line West right-of-way.

The construction of the bridge central piers and abutments will require an elaborate staging of the traffic on Highway 401. The intent is to co-ordinate this part of the construction staging with the MTO Highway 401 widening contract. Access to the construction zone at the bridge piers will be from Highway 401.

8.1.12 Cost Estimate

The estimated construction cost breakdowns for the Box Girder and Steel Truss structures are provided in **Table 8-2**. As shown in this table the total capital cost of the project is approximately \$2.0M. The Box Girder and Steel Truss structures are similar in price.

Table 8-2: Cost Estimate Comparison

Description of Item	Sub-Total-Box Girder (\$)	Sub-Total – Steel Truss (\$)
Temporary Shoring	\$60,000	\$60,000
Excavation for Foundations	\$7,500	\$7,500
Steel Piles	\$48,000	\$48,000
Concrete in Footings	\$28,000	\$28,000
Concrete in Piers	\$52,500	\$52,500
Concrete in Abutments & Wingwalls	\$67,500	\$67,500
RSS Retaining Walls	\$200,000	-
Supply, Fabricate & Erect Steel	\$500,000	\$690,000
Concrete Deck	\$142,500	\$142,500
Vertical Bar Handrail	\$69,000	\$69,000
Backfill Abutments	\$10,000	\$10,000
Subtotal - Bridge	\$1,185,000	\$1,297,750
Approach Works/Grading –Trail	\$100,000	\$100,000
Hwy 401 Traffic Management	\$600,000	\$600,000
Lighting	\$200,000	\$200,000
Miscellaneous (10%)	\$118,500	\$129,750
Total	\$2,003,500	\$2,127,500
Rounded Total	\$2,200,000	\$2,350,000

8.2 Active Transportation and Connectivity

The proposed pedestrian/cyclist crossing and associated multi-use pathway will allow for increased connectivity between neighbourhoods north and south of Highway 401. The crossing will also connect these neighbourhoods to the existing and future cycling network. This includes connections to the existing Fletcher’s Creek Trail and Culham Trail, as shown in the 2010 City of Mississauga Cycling Master Plan (**Figure 2-3**).

The future pedestrian/cyclist connection along Second Line West across Highway 401 is expected to result in changes to travel patterns for the surrounding residents. The removal of the vehicular bridge and the implementation of the proposed pedestrian/cyclist crossing will attract cyclists and pedestrians to use this connection as an alternative to other routes. This will ultimately reduce pedestrian and cyclist volumes in the surrounding arterial roads and provide increased safety for pedestrians and cyclists due to reduced conflicts with vehicular traffic. The crossing will improve the network connectivity of the neighbourhoods north and south of Highway 401 and provide a connection to the existing and future cycling network.

The proposed pedestrian/cyclist crossing will improve the overall active transportation efficiency of the network serving the surrounding community by providing additional pedestrian and cyclist facilities and offering access to enhanced active transportation systems and bicycle networks. This opportunity is consistent with the City's Official Plan and Cycling Master Plan, offers better access to community amenities and promotes sustainable multi-modal transportation options contributing to the reduction of vehicular emissions.

8.3 Comparative Evaluation of the Alternative Design Concepts

Table 8-3 shows a comparative evaluation for the two different structure type alternatives: the Steel Box Girder and the Steel Truss. The table includes information about cost, material properties and availability, construction staging and traffic disturbance, maintenance and aesthetics for the associated structure type.

Table 8-3: Box Girder vs. Steel Truss Comparison

Factor/Criteria	Option 1B: Box Girder with Skewed Alignment	Option 2B: Steel Truss with Skewed Alignment
Cost	\$2,200,000	\$2,350,000
Material Availability	<ul style="list-style-type: none"> Available in Ontario 	<ul style="list-style-type: none"> Available in Ontario
Material Technology	<ul style="list-style-type: none"> High torsional rigidity Precast Deck Panels are an option to eliminate any need for formwork over the 401, although deck panels would need to be grouted and post-tensioned. 	<ul style="list-style-type: none"> Wider and taller superstructure May be stiffer and lighter More complex to design and fabricate Precast deck panels can be used to eliminate any formwork or use of uncured concrete over the 401; panels can be bolted in place.
Construction Staging and Traffic Disturbance	<ul style="list-style-type: none"> A similar degree of construction staging and traffic disturbance will be required for the box girder and steel truss, as discussed in Section 8.1.11. 	
Maintenance	<ul style="list-style-type: none"> Simpler maintenance due to few components to monitor, although bracing elements are located in a confined space within the box girder 	<ul style="list-style-type: none"> Numerous amount of connections which are subject to corroding, rusting and exposure to the elements Potentially higher maintenance and inspection costs May attract bird nests
Aesthetics	<ul style="list-style-type: none"> Structure is more visually appealing due to being more slender and having a smooth bottom surface 	<ul style="list-style-type: none"> Overall appearance sometimes looks overly busy and congested. Large trusses may obscure view from the bridge
RECOMMENDATION	RECOMMENDED ALTERNATIVE	MORE MAINTENANCE REQUIRED IN THE LONG-TERM, NOT AS VISUALLY APPEALING

8.4 Recommendation for the Preferred Alternative Design Concept

Based on the comparison of the structure types presented in **Table 8-3**, the **Box Girder** is the recommended structure type. While both structures are comparable in terms of cost, material availability and construction staging, there may be additional labour requirements and maintenance associated with the Steel Truss bridge as opposed to the Box Girder. The Box Girder is also known to be more visually appealing, providing a nicer view of the structure from Highway 401 beneath. **Table 8-3** is meant to provide a comparison and recommendation for the chosen bridge type used for the crossing. The selected bridge type will be finalized in the detail design stage.

9. Anticipated Environmental Impacts and Proposed Mitigation Measures for the Preferred Design Concept

It is recognized that the proposed construction of the Second Line West Pedestrian/Cyclist Crossing with preferred Alternative Alignment **B**, and either a 3-span Box Girder or Steel Truss structure, will result in minor impacts on the existing environment. In order to address the effects, the following approach was taken:

1. Avoidance

The first priority is to prevent the occurrence of negative effects (i.e., adverse environmental effects) associated with the implementation of an alternative.

2. Mitigation

Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate mitigation measures to eliminate or reduce to some degree, the negative effects associated with implementing the alternative.

3. Enhancement/Compensation

In situations where appropriate mitigation measures are not available, or significant net adverse effects will remain following the application of mitigation, enhancement or compensation measures may be required to counterbalance the negative effect through replacement in kind, or provision of a substitute or reimbursement.

The following mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detail design. **Table 9-1** provides a detailed assessment of the potential impacts associated with the project and the recommended mitigative measures required to reduce these effects.

This section provides a detailed list of specific commitments to be carried forward to Phase 5 of the Municipal Class EA process - Implementation. It is recommended these mitigation measures presented become part of the contract package so that contractors are aware of the requirements prior to tendering. The City of Mississauga will work with the Ministry of the Environment and Climate Change, Ministry of Transportation, Credit Valley Conservation Authority, and other authorities, during detail design and prior to the start of construction to ensure that the proposed works are acceptable and to obtain required permits.

Environmental monitoring will be combined with construction supervision to include periodic site visits and inspections throughout the course of the work (e.g. confirm the proper placement and maintenance of all erosion and sediment control measures).

9.1 Soils

Soil disturbance associated with the construction of the Second Line West pedestrian/cyclist crossing of Highway 401 will occur generally within and adjacent to the existing right-of way. Impacts resulting from grading operations will be temporary in nature. Erosion and sedimentation mitigation measures will be implemented prior to and during the construction phase, in conjunction with work occurring for the Highway 401 widening. These control measures will include:

- Limit the geographical extent and duration that soils are exposed to elements
- Implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 577 Construction Specification for Temporary Erosion and Sediment Control Measures. These standard measures include: silt fence placed along the margins of areas of soil disturbance; applying conventional seed and mulch and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long term slope stabilization.

Monitoring of these erosion and sediment control measures during and after construction will be implemented to ensure their effectiveness.

9.2 Terrestrial

It is anticipated that the construction of the crossing will be limited to within the current area of the Second Line West right-of-way. Meadowvale Station Woods is a highly significant feature within the study area as it supports a core habitat for a diversity of plants and animals and provides a wildlife movement corridor. Given its distance from Second Line West, the proposed works are not anticipated to adversely affect Meadowvale Station Woods since no vegetation removal is required within this sensitive natural area. The remaining vegetation surrounding the existing Second Line West crossing Highway 401 has been disturbed and provides lower quality of habitat for plants and animals compared to Meadowvale Station Woods. It is important that no intrusion or disturbance of any kind occur within 10 m from the dripline of Meadowvale Station Woods. A temporary construction fence shall be erected 10 m from the dripline to ensure that this limit is respected.

Although the woodlot on the south side of Sombrero Way, east of Second Line West is not part of Meadowvale Station Woods and therefore is less significant, it has a similar structure and provides a buffer between the ESA and residential development to the east. It will also provide visual seclusion for the future trail and therefore removal of trees from this woodlot should be avoided, if possible.

If vegetation removal is required and occurs during the breeding bird season (May 1st to July 31st), nest search surveys must be conducted by a qualified Biologist prior to removal to ensure that nests of migratory birds are not destroyed, which would otherwise be a contravention of the *Birds Migratory Convention Act, 1994*.

9.2.1 Species at Risk

As noted in Section 4, no plant species that are regulated under the Ontario *Endangered Species Act* or the federal *Species at Risk Act* were encountered within the study area.

9.3 Wildlife and Wildlife Habitat

9.3.1 Disturbance to Wildlife From Noise, Light and Visual Intrusion

Given that wildlife are acclimatized to the presence of the existing Second Line West road right-of-way, the limited zone of influence of the proposed pedestrian/cyclist crossing and multi-use trail will have no significant adverse impact and may in fact, provide an overall improvement, to wildlife from noise, light and visual intrusion. Proposed illumination of the multi-use pathway and crossing will be designed to direct light away from Meadowvale Station Woods, to the extent possible.

9.4 Air Quality

Activities associated with the construction of the pedestrian/cyclist crossing are not expected to create large quantities of dust that will exceed acceptable MOECC guidelines; nevertheless appropriate mitigation measures will

be implemented to reduce localized dust emissions around the site. During construction, best management practices and control measures to mitigate any air quality impacts caused by construction dust will be carried out. Non-chloride dust suppressants will be applied, as recommended by the MOECC.

Material handling, such as excavation, loading and hauling will be the most significant source of dust during construction of the pedestrian/cyclist crossing. In addition to the above, dust control will be achieved through planning and proper implementation of construction controls and mitigation which include, but are not limited to, use of dust suppression measures such as spraying down the site and approaches, washing trucks on a regular basis and use of dust covers on haulage trucks.

To prevent air quality impacts associated with construction vehicle exhaust fumes, emission control devices on equipment should be functional and effective. Further, new or well-maintained heavy equipment and machinery, preferably fitted with muffler/exhaust system baffles, as well as the use of engine covers, will be used.

9.5 Noise

There is potential for short-term construction related noise impacts to occur in the immediate vicinity of the site, although sound levels are expected to be well below MOECC Sound Level Limits. Construction activities will be restricted to hours prescribed by the City of Mississauga Noise Control by-law. Further, the construction contract will specify the use of hoarding around the site.

Ensuring that equipment is in sound working order and using noise attenuation devices (i.e. mufflers on motorized equipment) will ensure compliance with government requirements and will result in sound levels being within acceptable levels both on and off-site.

Although these recommended mitigation measures will be effective at minimizing the likely environmental effects due to construction-related noise, minimal residual localized effects may result, particularly for those buildings in very close proximity to the structure.

9.6 Construction Timing

Construction activities should be limited to a period after 7:00 a.m. and before 7:00 p.m. daily. Also, construction during early spring bird breeding should be avoided. Reasons to avoid the bird nesting period are due to the need to not interfere with territory selection, mate selection, nest construction, egg-laying, and nestling to fledgling periods.

9.7 Staging Areas

Staging areas should not be located within the vicinity of the Meadowvale Station Woods as to avoid contamination through chemical spills and to avoid the compaction of the soil.

9.8 Traffic Operations

The City of Mississauga has completed a Traffic Study for existing traffic conditions in the study area and has introduced a mitigation plan, which includes the monitoring of traffic operations after removal of the vehicular crossing. The City will continue to review concerns and address issues such as on-street parking, enhanced pavement markings, school bus stop consolidation, etc., prior to removal of the vehicular crossing. Speed data will also be collected and police enforcement will be requested to address any speeding concerns in the study area.

Table 9-1: Anticipated Environmental Effects and Proposed Mitigation Measures

	Factor	Potential Impacts	Potential Mitigation
Technical	Safety	Safety of cyclists and pedestrians using the crossing	During Detail Design: <ul style="list-style-type: none"> • Railings and illumination will be incorporated into the final design to ensure the safety of users • The proposed crossing will be constructed in accordance with Ministry of Transportation Ontario (MTO) standards • City of Mississauga Crime Prevention Through Environmental Design principles will be incorporated into the design of the pathway connection
	Maintenance	Snow accumulation	During Detail Design: <ul style="list-style-type: none"> • Open rail design will be used avoid snow accumulation over the winter months • Curbs will be used to prevent water from dripping over the sides of the crossing and forming icicles
	Property/Access	Impacts to residential/private property in the study area	During Detail Design and Construction: <ul style="list-style-type: none"> • Second Line West vehicular crossing will be terminated south of Sombrero Way (north of Highway 401) and at Donway Drive (south of Highway 401) • The residential/commercial driveway south of Sombrero Way and east of the existing Second Line West structure will be maintained as a private entrance. South of Sombrero Way, signage will be installed to identify restricted access to the property, as well as the pathway connection
	Ministry of Transportation Coordination	Highway 401 Widening project	During Detail Design and Construction: <ul style="list-style-type: none"> • The crossing will maintain required MTO clearances over Highway 401 and will adhere to MTO guidelines. The bridge railing will be positioned to ensure safety of users and Highway 401 travelers below. • Re-vegetation along Second Line West will be co-ordinated with the MTO as part of MTO's mitigation required by impacts to the MSW created by the Highway 401 widening.
Socio-Economic environment	Network Connectivity	Maintaining existing network connectivity	During Detail Design: <ul style="list-style-type: none"> • <i>Accessibility for Ontarians with Disabilities Act</i> requirements will be met • Trail connections to streets north (Jazzy Mews) and south (Delgado Drive) of the bridge, as well as existing and future cycling network will be maintained
	Noise	Disruption to residences and businesses.	During Detail Design: <ul style="list-style-type: none"> • Construction noise constraints will be incorporated into contract documents. • Construction activities throughout the project will conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. Prior to Construction: <ul style="list-style-type: none"> • Develop reactive complaint resolution procedure for responding to complaints resulting from construction. During Construction: <ul style="list-style-type: none"> • Comply with MOECC noise limits, and local noise control by-laws. • Use construction equipment that meets the requirements of the MOECC Construction Equipment Publication (NPC 115). • Prevent unnecessary noise and vibration by maintaining equipment in proper operating condition, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts. • Restrict use of equipment to the minimum necessary to perform the specified work. Do not allow excessive idling
	Air Quality	Potential for decrease in localized air quality due to construction dust.	During Construction: <ul style="list-style-type: none"> • Apply water and non-chloride dust suppressants during construction, as needed. • During construction, vehicles/machinery and equipment should be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
	Archaeology	Loss or disruption to archaeological resources	During Construction: <ul style="list-style-type: none"> • Should previously unknown or unassessed deeply buried archaeological remains be uncovered during construction; <ul style="list-style-type: none"> - Cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork,

Table 9-1: Anticipated Environmental Effects and Proposed Mitigation Measures

	Factor	Potential Impacts	Potential Mitigation
			<p>compliance with Section 48 (1) of the Ontario <i>Heritage Act</i>.</p> <p>The office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146) should be contacted immediately. Any person discovering human remains must immediately notify the office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146), the police or coroner, and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Government Services (416-326-8404).</p>
Natural Environment	Natural Environment	Impacts to Meadowvale Station Woods ESA Soil disturbance Terrestrial Disturbance to Wildlife	<p>During Detail Design and Construction:</p> <ul style="list-style-type: none"> Construction of the proposed crossing and pathway connections will be restricted to the existing right-of-way to avoid impacts into Meadowvale Station Woods ESA No intrusion or disturbance of any kind within 10m from the dripline of the Meadowvale Station Woods will be permitted Direct illumination to the Meadowvale Station Woods will be restricted
	Erosion and Sedimentation	Potential for erosion and sedimentation.	<p>During Detail Design:</p> <ul style="list-style-type: none"> Develop erosion and sedimentation control strategy. <p>During Construction:</p> <ul style="list-style-type: none"> Implement and monitor the erosion and sedimentation control strategy, including appropriate phasing to avoid impacts to Fletcher's Creek, west of the study area. Any areas disturbed by construction will be restored and stabilized as soon as practically possible.
	Wildlife and Migratory Birds	Disruption to wild life habitat and migration patterns.	<p>During Detail Design:</p> <ul style="list-style-type: none"> Confirm Migratory Bird Nesting season. For this area, a timing window of April 1 – August 8 can be assumed for Nesting season. <p>During Construction:</p> <ul style="list-style-type: none"> Require contractor to avoid disturbance of any migratory birds found nesting in the project area during the peak breeding season.
	Waste Management and Control of Inadvertent Spills	Potential inadvertent spill of hazardous materials during construction.	<p>During Construction:</p> <ul style="list-style-type: none"> Store all oils, lubricants, fuels and chemicals in secure areas. Contact appropriate regulatory agencies in event of a spill to the environment.
	Landscaping and Vegetation Protection	Physical damage and loss of vegetation/trees for material management and construction activities	<p>During Detail Design:</p> <ul style="list-style-type: none"> Finalize Landscaping Plan in consultation with MTO to confirm streetscape enhancement. Construction restrictions and maintenance practices such as the following should be considered for tree protection during development of the contract specifications: <ul style="list-style-type: none"> If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction. A construction work plan will be developed which designates locations for stockpiling of soils and other materials including fuel. <p>During Construction:</p> <ul style="list-style-type: none"> Fence areas of retained trees prior to construction commencement, and prohibit entry of equipment and materials within fenced areas until final grading and landscaping is completed.

9.9 Monitoring

Environmental inspection and monitoring will be provided during Contract Administration, as required by the MTO Construction Administration and Inspection Task Manual or construction monitoring requirements outlined by the City of Mississauga.

9.10 Permits and Approvals

The Second Line West Corridor project is subject to various regulatory approvals including EA requirements under Ontario's *Environmental Assessment Act*. The Canadian *Environmental Assessment Act* (CEAA) was not triggered for this project.

Following successful completion of the Class EA process documented in this ESR prepared under the Municipal Class EA, all requirements will have been met. Other approval requirements will be addressed for the project during detail design which may include:

9.10.1 Ministry of Transportation

Ministry of Transportation coordination regarding landscaping requirements, under the direction of the Ministry of Natural Resources, will be carried out. A condition of environmental approval of the 2005 TESR requires re-vegetation of 1.39ha north and south of Highway 401. Portions of the study area (i.e. multi-use pathway connection) fall within this area, therefore landscaping and re-vegetation of the study area will be designed in conjunction with the MTO Highway 401 Widening project.

The detail design of the Second Line West Pedestrian/Cyclist Crossing of Highway 401 requires MTO approval with the corresponding corridor encroachment permits. The City will need to enter in a cost-sharing agreement with the MTO.

9.10.2 Municipal Approvals

Municipal approvals (i.e., site screening, incorporation of Crime Prevention Through Environmental Design Principles, Cycling Committee recommendations), if applicable, will be obtained.

9.10.3 Utilities

Potential notification/permissions from respective utilities with facilities in the area will be obtained prior to construction.

9.10.4 Permit to Take Water

It should also be noted that water takings in Ontario are governed by the Ontario *Water Resources Act* (OWRA) and the Water Taking Regulation (O.Reg. 387/04). A Permit to Take Water (PTTW) is required for construction dewatering, groundwater or surface water extraction and the active diversion of surface water flows, if needed for pumping water volumes greater than 50,000 L per day. Based on the current regulation, a Category 2 application requiring a technical review of the proposed water taking by a qualified person would be needed if volumes exceed the above amount. Further information and specific details will be determined during detail design, however, it is not anticipated that this will be required. The project team will consult with the MOECC Central Region PTTW Co-ordinator during detail design to confirm any approval requirements for water takings during construction or operation. If a PTTW is required for construction dewatering, a site specific monitoring and mitigation program for discharge water quality and quantity may need to be developed.

Furthermore, if any wells are discovered to be used domestically, any affected well owners will continue to have water supplies of adequate quality and quantity during construction. Any work done on affected wells or replacement wells will comply with the O. Reg. 903, Wells (pursuant to the Ontario Water Resources Act).

9.10.5 Ontario Regulation 160/06

The study area is located within the Credit Valley Conservation Area Regulation Limit, as defined by Ontario Regulation 160/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, therefore, a permit will be required and is to be obtained prior to construction.

9.10.6 Ontario Occupational Health and Safety Act

Health and safety requirements will be adhered to during construction under Ontario's *Occupational Health and Safety Act*.

10. Conclusion

This Environmental Study Report (ESR) has been prepared in accordance with the requirements of the Ontario *Environmental Assessment Act (EA)* and describes the Class EA process that has been carried out for this study. This ESR has been made available for agency, public and stakeholder review and comments from **December 1, 2014** until **January 16, 2014**. Comments and letters received during this time period will be addressed by the City, as required by the Class EA process. Following the review period, if no Part II Order requests or objections are brought forward to the Minister of the Environment and Climate Change and the City of Mississauga, the requirements of the Ontario *EA Act* will be deemed to have been met and the project can then proceed through to detail design and construction.

The City of Mississauga has completed a transportation review for the existing traffic conditions in the study area and for future traffic conditions, upon removal of the bridge. A mitigation plan and a monitoring plan are being introduced, and additional improvements will be subject to further review. Details regarding the City's Second Line West Neighbourhood Traffic Study can be found on the project website at <http://www.mississauga.ca/portal/residents/secondlinewest>.