Environmental Study Report

McLaughlin Road Class Environmental Assessment - Bristol Road West to Britannia Road West

Schedule ‘C’

Prepared for City of Mississauga
by IBI Group

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Executive Summary

1. Introduction

In 2012, IBI Group (on behalf of the City of Mississauga) initiated a Schedule 'C' Municipal Class Environmental Assessment for improvements to McLaughlin Road from Bristol Road West to Britannia Road West. Within this section McLaughlin Road is designated as a Major Collector road. From Bristol Road West to Matheson Boulevard West, it is also designated as a Scenic Route.

As part of this study, the need for capacity, safety and operational improvements to McLaughlin Road from Bristol Road West to Britannia Road West was investigated. While considering this need, a context sensitive approach was undertaken taking into consideration the Scenic Route designation of McLaughlin Road (Bristol Road West to Matheson Boulevard West), adjacent land uses, cycling plans, streetscape improvement opportunities and local community interests.

The main objective of this study is to investigate the need for traffic management and active transportation (walking, cycling) improvements along McLaughlin Road from Bristol Road West to Britannia Road West. These improvements are needed for the following reasons:

- Traffic on McLaughlin Road currently operates near capacity and is expected to exceed capacity within the next planning horizon (2031);
- Higher volumes will result in significant congestion during the AM and PM peak hours;
- Additional travel time will be required for north-south movements through the study area;
- Increased delay will be experienced at all intersections, with significant delay at the Matheson Boulevard West intersection;
- Excessive queuing will block driveways and intersecting streets;
- Movements from the intersecting streets onto McLaughlin Road will operate poorly;
- There are no sidewalks available on the east side of McLaughlin Road; and
- There are no cycling facilities along McLaughlin Road.

Existing planning policies relating to McLaughlin Road include, the City of Mississauga Strategic Plan (2009) whereby the direction the plan is going leads to developing alternatives for travel such as improved transit and "complete streets with inclusive cross-sections and an urban form that supports walking and active modes of transportation" (City of Mississauga Strategic Plan, 2009).In addition, the City's objectives to improve the movement of people and goods using existing transportation infrastructure, and to support public transit and active transportation along McLaughlin Road are supported by the Provincial Policy Statement.

2. Public Consultation

The Notice of Study Commencement was first published in the Mississauga News on September 26, 2012, and was followed by two Public Information Centres (PIC) and a Community Workshop on January 29, 2013, March 5, 2014 and May 9, 2015, respectively. A total of 80 individuals attended PIC #1, 127 individuals attended PIC #2 and 60 individuals attended the Community Workshop. As part of this study, a variety of comments/questions from the community and stakeholders have been received, which have been taken into account as the project has proceeded. The comments received to date have ranged from concern to support for the project.

Both PICs were held in an open house format. At the first PIC, ideas were suggested and concerns were noted on subjects ranging from traffic volume, speed and noise, through to the ability to

make left turns McLaughlin Road from side streets, pedestrian safety crossing the street and impacts on the woodlot.

The second PIC presented design alternatives for the road, with public responses focused on access from side streets, both positive feedback and concern regarding widening the road, concern regarding the impact to mature trees along the corridor and related requests to add traffic signals at some intersections, opportunity to provide complete sidewalks and cycling facilities along the road and include noise attenuation features.

When the preferred improvement design was presented at the Community Workshop (May 9, 2015) residents expressed concern regarding the widening of the road and the need to protect the scenic character of the roadway and the mature trees along the corridor as part of the design.

3. Transportation Conditions

McLaughlin Road is a key link within the City's transportation network serving both commercial/commuter and local residential/community traffic. The character of the roadway changes within the study limits, with Matheson Boulevard West serving as the primary divide between the two sections.

- From Bristol Road West to Matheson Boulevard West, McLaughlin Road operates as a two lane roadway with centre turn lane between Ceremonial Drive and Matheson Boulevard West, and a basic two lane roadway within a constrained (23 m) right-of-way adjacent to the Britannia Farm property. Although an urban road, it has a 'rural' feel which is reflective of its designation as a Scenic Route. This section of the road provides access to mainly residential.
- From Matheson Boulevard West to Britannia Road West, McLaughlin Road operates as an urban two lane roadway with centre left turn lane and provides access to adjacent commercial and light industrial land uses.

McLaughlin Road currently operates at/near capacity during the peak hours, and significant congestion occurs particularly at the Matheson Boulevard West intersection. South of Matheson Boulevard West, there are fewer north-south traffic controls and traffic flow improves; however, vehicles accessing McLaughlin Road from the local roads and minor collectors experience significant delays resulting in poor operations with long delays.

It is estimated that traffic demands along the corridor will increase by approximately 19% (in the peak direction of travel) by 2031, as the City of Mississauga continues to grow and develop its urban growth area. This increase will exacerbate existing congestion problems (long delays and extensive queuing) that occur between Bristol Road West and Britannia Road West. Specifically, without improvements along McLaughlin Road, operations will significantly break-down at the Matheson Boulevard West intersection, and movements from minor roads (i.e. Regal Drive, Avonwick Avenue and Faith Drive / Parkwood Place) will operate very poorly. Long delays at these minor roads are likely to lead to driver frustration and safety problems as drivers force turns into smaller gaps in traffic.

Additional improvements are also recommended to provide a more continuous and improved facility for pedestrians. Currently no sidewalks are provided on the east side of McLaughlin Road between Faith Drive and the access south of Britannia Road West.

Needs and Opportunity

Based on projected traffic demands along McLaughlin Road, improvements are required to manage congestion, promote effective performance for all modes and enhance safety. These improvements also provide an opportunity to implement cycling facilities along the corridor in keeping with the City's Cycling Master Plan, and incorporate urban design/streetscaping features to enhance the scenic designation of the corridor and the adjacent woodlot (Britannia Farm).

4. Alternative Planning Solutions

The following alternative solutions were considered to address the identified problem.

- Do Nothing;
- Traffic Diversion to Alternative Routes;
- Transportation System Management Measures (TSM);
- Transportation Demand Management (TDM); and
- Capacity Enhancement and Improvement.

As part of this study it was concluded that diverting traffic to alternative routes, encouraging increased use of alternative travel modes and improving road and intersection operations would not, by themselves, fully address the traffic congestion and safety problems experienced on this key road section.

The "Preferred Solution"

To address the existing capacity and safety issues, as well as promote effective performance for all modes within the McLaughlin Road corridor, it is recommended to widening the existing roadway. Doing so provides an opportunity to protect for the needs of the corridor, as well as address the following planning policy objectives:

- Manage congestion and promote effective performance for all modes;
- Enhance urban design/streetscaping in keeping with scenic designation; and
- Provide an opportunity to incorporate cycling facilities along the corridor

5. Alternative Design Concepts

Through consultation with the community and stakeholders, the study team gained a clear understanding of the key concerns and sensitivities along the corridor. Furthermore, that to effectively address transportation problems and related opportunities along this section of McLaughlin Road, a context-sensitive design approach was needed in the design of the road. Most importantly, to minimize the impacts between Bristol Road West and Matheson Boulevard West, a balanced approach to address the key objectives of the study was required.

To this end, the following design concepts were developed as part of this study.

- Do Nothing;
- Option 1 - Maintain 2-Lanes plus a Centre Turn Lane;
- Option 2 - Widen to 4-Lanes plus On-Road Bike Lanes; and
- Option 3 - Widen to 4-Lanes (Sharrow Lane and Underground Hydro).

In assessing these design concepts, the evaluation was not limited only to technical transportation criteria. The evaluation included 13 criteria that captured traffic/transportation considerations, socio-economic environment, natural environment, cost and official city policies.

6. Preferred Alternative Design Concept

Based on a well-balanced evaluation of traffic/transportation, socio-economic environment, natural environment, cost and official city policy considerations, ***Option 3 was selected as the preferred alternative design concept*** for McLaughlin Road.

For the section from Bristol Road West and Matheson Boulevard West, this involves widening McLaughlin Road to four travel lanes (including sharrow lanes to accommodate cyclists) and turn

lanes at signalized intersections. It also includes burying the overhead hydro lines and improving sidewalks along most of the road to enhance sidewalk continuity and streetscape opportunities.

For the section from Matheson Boulevard West to Britannia Road West, the preferred design concept involves widening to provide four travel lanes and continuous centre turn lane with sidewalks, marked bike lanes and streetscaping improvements.

7. Recommended Design

The recommended design for McLaughlin Road was developed in recognition of the community and stakeholders strong desire to minimize the impacts of the improvements on the character of the roadway, particularly between Bristol Road West and Matheson Boulevard West. It represents a balance of the key study objectives to provide a context sensitive design that will manage congestion and promote effective performance for all transportation modes (including cycling facilities along the corridor) and enhancing urban design/streetscaping in keeping with scenic designation.

Key elements for the recommended design include:

<u>Bristol Road West to Matheson Boulevard</u>

- **4-lane cross-section** (3.25 m inner lane width, 4.0 m outer/sharrow lane). Left turn lanes are restricted to signalized intersections and minimized with respect to length and width where it is practical to do so;
- **Sharrow lanes** (a road marking placed in the travel lane to indicate that both cyclists and drivers are sharing the lane) **to support cycling** rather than bike lanes;
- **Tree replacements and new planting**: 842 trees added (260 trees within the right-of-way, plus 582 additional trees beyond the right-of-way) to offset 421 trees to be removed;
- **Sidewalk continuity**: sidewalks added to east side, with the exception of no sidewalk between Faith Drive and Ceremonial Drive. This is an example where balancing objectives was important, sidewalk continuity is important but for tree preservation, sidewalks were not implemented between Faith Drive and Ceremonial Drive;
- **Bury overhead hydro**: remove hydro poles along the west side of McLaughlin Road and relocate hydro underground, which increases landscaping opportunities and potential for tree canopies. Enersource today has to trim the tree so they do not conflict with their infrastructure;
- **Streetscaping**: recreate the rural character using stone and rail fences, replanting of street trees, decorative lighting, heritage and interpretative signage, and resting points;

- **Woodlot Edge Management**: implement a woodlot edge management/ regeneration plan, using best principles of urban forestry management, to improve quality of the existing woodlot;
- **Speed Control**: incorporate raised intersections treatments and narrow lane widths to mitigate speeds and improve pedestrian visibility; and,

- **Noise Walls:** replace existing noise walls.

The recommended design minimizes pavement widening through the use of narrower lane widths and sharrow lanes, to minimize the impact to trees and property requirements. Although the design involves the removal of trees forming the edge of the existing Britannia Farm, the current health of this woodlot edge is not excellent and therefore will benefit from some arboricultural thinning, interplantings, and strengthening of the understorey and herbaceous layers. To this end, the road widening presents an opportunity to restore the Britannia Farm woodlot edge.

Matheson Boulevard West to Britannia Road West

- **4-lane cross-section (**3.5 m lanes) plus 3.5 m centre turn lane;
- **1.5 m bike lanes**: wider right-of-way available in this section allows for bike lanes to be added; and,
- **Sidewalk continuity**: provides for a new sidewalk on the east side and maintains the existing sidewalk on the west side.

Property Impacts

To accommodate the recommended improvements, additional right-of-way will be required from three properties along the corridor, including:

- Additional right-of-way from the Britannia Farm site (typically 0.5 m to 1.5 m width along the frontage), directly opposite and north of Ceremonial Drive to accommodate a sidewalk and bus pad at this location.
- Additional right-of-way from the residential property the north-east quadrant of the Matheson Boulevard West intersection (i.e. approximately 2m of additional frontage and intersection daylighting triangle) to accommodate intersection improvements, and,
- Additional right-of-way from the vacant parcel on the east side south of Britannia Road to accommodate the road widening and lengthen the existing northbound right turn lane.

Capital Costs

The roadway reconstruction costs are estimated at approximately $ 9.5M (million), and utility relocation costs at $3.6M (the majority which is associated with burying existing hydro ($2.95M)), excluding property acquisition and HST.

1 Introduction and Background

1.1 Study Purpose

The City of Mississauga retained IBI Group to undertake a Class Environmental Assessment (Class EA) Study for the section of McLaughlin Road from Bristol Road West to Britannia Road West (see Exhibit 1.1). The study was undertaken to investigate the need for additional north-south roadway capacity and traffic management improvements along this section of McLaughlin Road, while taking into consideration the Scenic Route designation, adjacent land uses, streetscape improvement opportunities, plans for a cycling route and local community interest. The study was conducted in accordance with the planning and design process for 'Schedule C' projects as outlined in the Municipal Engineers Association *"Municipal Class Environmental Assessment,"* (October 2000, as amended in 2011).

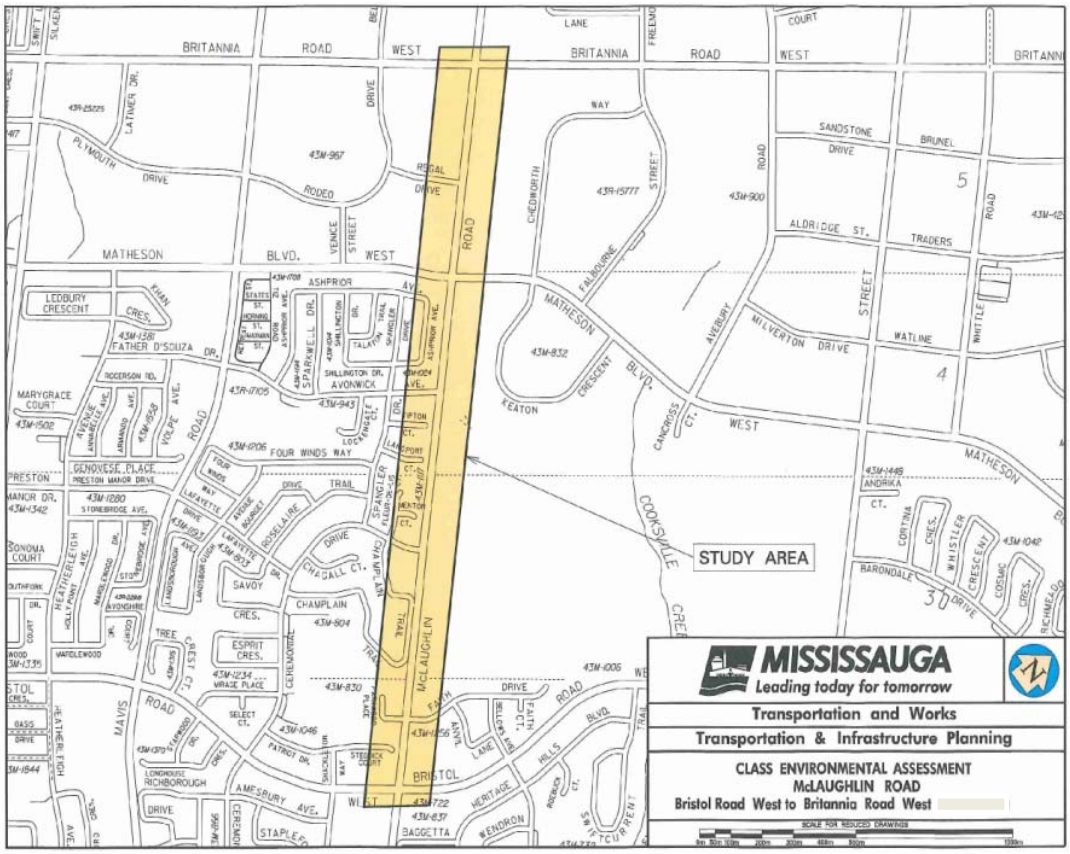

Exhibit 1.1 Primary Study Area

1.2 Study Area

The primary study area of this Class EA is the McLaughlin Road corridor extending from south of Bristol Road West to north of Britannia Road West, a total distance of 2.5 km, as shown in **Exhibit 1.1**. The section between Bristol Road West and Matheson Boulevard West is classified as a Major Collector and a Scenic Route in the City of Mississauga Official Plan, with a designated right-of-way of 26 m Boulevard West. The section between Matheson Boulevard West and Britannia Road

West is classified as a Major Collector with a right-of-way of 30 m, and has no Scenic Route designation.

1.3 Study Objectives

As part of this study, the need for capacity, safety and operational improvements to McLaughlin Road from Bristol Road West to Britannia Road West is investigated. While considering this need, a context sensitive approach is to be undertaken taking into consideration the Scenic Route designation of McLaughlin Road (Bristol Road West to Matheson Boulevard West), adjacent land uses, cycling plans, streetscape improvement opportunities and local community interests.

The main objective of this study is to investigate the need for traffic management and active transportation (walking, cycling) improvements along McLaughlin Road from Bristol Road West to Britannia Road West. These improvements are needed in this section of McLaughlin Road for the following reasons:

- Traffic on McLaughlin Road currently operates near capacity and is expected to exceed capacity within the next planning horizon (2031);
- Higher volumes will result in significant congestion during the AM and PM peak hours;
- Additional travel time will be required for north-south movements through the study area;
- Increased delay will be experienced at all intersections, with significant delay at the Matheson Boulevard West intersection;
- Excessive queuing will block driveways and intersecting streets;
- Movements from the intersecting streets onto McLaughlin Road will operate poorly;
- There are no sidewalks available on the east side of McLaughlin Road; and
- There are no cycling facilities along McLaughlin Road.

1.4 Related Studies

Provincial Policy Statement 2014

The *Provincial Policy Statement* (PPS) 2014 promotes densities and mixed land uses that support active transportation, transit and the efficient movement of goods. The PPS sets out the policy direction to guide land use planning and development in Ontario that support three key areas: building strong communities, wise use and management of resources, and protecting public health and safety.

The PPS also calls for safe, energy efficient transportation systems that facilitate movement of people and goods and support projected needs. It highlights the importance of connectivity of transportation systems, integration of transportation and land use planning to support sustainable transportation choices, and efficient use of existing infrastructure.

Growth Plan for the Greater Golden Horseshoe

The *Growth Plan for the Greater Golden Horseshoe* (2013) guides land use planning in the Greater Golden Horseshoe under the *Places to Grow Act* (2005). It focuses on building prosperous communities while managing rapid growth. The plan guides the transportation network by promoting more choice when it comes to travel including public transit and active transportation.

Region of Peel Official Plan

The *Region of Peel Official Plan* (ROP, 2014) provides a long-term planning framework for land use in the Region. The ROP promotes a collective set of transportation polices to serve the need of those who work and reside in the Region. The ROP advocates considering all modes of travel, with a focus on "*Moving people by modes other than single occupant automobiles",* and *"increasing travel choice to meet diverse needs"* (ROP, 2014).

Region of Peel Active Transportation Plan

The Region's *Active Transportation Plan* (2012), offers a framework for how the Region will improve the share of trips by cycling and walking, connect with transit, and create a pedestrian and cycling friendly environment. The Plan sets out policies that "*direct the practices of the Region to support more walking and cycling; recommends active transportation improvements to the existing cycling and pedestrian networks, and recommends strategies/programs to shift travel behaviour"* (Active Transportation Plan (2012)).

City of Mississauga Strategic Plan

The *City of Mississauga Strategic Plan* was approved in 2009 *as* a decision making document that guides the choices made to achieve the vision of the City. The plan has five key pillars of change including:

- 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

In order to remain sustainable, there must be transportation alternatives to how people move around the City that support a strong, connected and vibrant community. The direction the plan is going leads to developing alternatives for travel such as improved transit and "*complete streets with inclusive cross-sections and an urban form that supports walking and active modes of transportation*" (City of Mississauga Strategic Plan, 2009).

City of Mississauga Official Plan

One of the visions of the *City of Mississauga Official Plan* (OP) is to create a "*multi-modal transportation network for the movement of people and goods that supports more sustainable communities*" (Mississauga Official Plan, 2013). The OP includes policies to guide and plan for a multi-modal transportation system. A multi-modal transportation system will provide transportation choices that encourage more sustainable transportation modes such as transit and active transportation.

Within the study area, McLaughlin Road is designated as a Major Collector Road. It is also designated as a "Scenic Route" between Bristol Road West and Matheson Boulevard West. The OP includes policies to ensure that maintenance or physical modification of scenic routes will reinforce or enhance the scenic route qualities. McLaughlin Road is also identified as a Primary On-Road / Boulevard cycling route to protect for cycling facilities.

Mississauga Cycling Master Plan

The City of Mississauga Cycling Master Plan provides the framework to developing and managing a "*safe, comprehensive and cost effective cycling network*" (City of Mississauga Cycling Master Plan, 2010).

The Master Plan identifies McLaughlin Road as a one of the roads with the highest demand for cycling. It has been identified as a Proposed Primary On-Road Route.

Living Green Master Plan

The *Living Green Master Plan* (LGMP, 2012) provides a framework to meet the environmental goals for a sustainable City of Mississauga. In the case of McLaughlin Road, application of the LGMP aims to make transit more efficient and, therefore, more attractive to commuters; promotes investment in the expansion of alternative forms of transportation including cycling; and uses "green infrastructure" to reduce environmental impacts of travel instead of grey or hard infrastructure.

Mississauga Transit Business Plans

The *City of Mississauga 2013-2016 Business Plan* aims to provide transit that offers accessible, safe and efficient transportation to its riders. In the case of McLaughlin Road application includes encouraging businesses to build partnerships with MiWay and a targeted customer outreach program to promote economic and environmental benefits of transit.

More recently, the *MiWay Five Plan* has evolved public transit planning in Mississauga over the five years from 2016 to 2020. It provides a comprehensive review of where transit operates, when it operates, and how frequently. The plan defines MiWay's service standards for the next five years and set the stage for future transit expansion.

1.5 Municipal Class Environmental Assessment Study Process

1.5.1 Schedule 'C' Requirements

The Municipal Class EA Process is required as the approval process for this project. This process involves a five-phase planning procedure under the Ontario Environmental Assessment Act, which applies to public infrastructure projects. Projects undertaken through this planning process are classified as one of four "Schedule" types, Schedule 'A' , 'A+', 'B" or 'C' in accordance with their degree of anticipated environmental impact and magnitude.

The key features of the Class EA process, as well as a detailed outline of the process are shown in

Exhibit 1.2 and **Exhibit 1.3** respectively. The Class EA process is broken down into five phases:

Phase 1 – Identify the problem or opportunity;

Phase 2 – Identify alternative solutions, evaluate and select preferred solution;

Phase 3 – Identify alternative design concepts, evaluate and select the preferred design concept;

Phase 4 – Document in an Environmental Study Report the rationale, planning, design and consultation process and place it on public record; and,

Phase 5 – Project implementation, complete contract drawings and tender documents and proceed to construction and operation of the project.

A Schedule 'C' generally includes the construction of new facilities and major expansions to existing facilities. The McLaughlin Road Class EA is being conducted as a Schedule 'C' EA as this project is a "*Reconstruction or widening where the reconstructed road or other linear paved facilities will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (e.g. additional lanes, continuous centre turn lane), where the expected cost is anticipated to exceed $2.7 million to construct*."

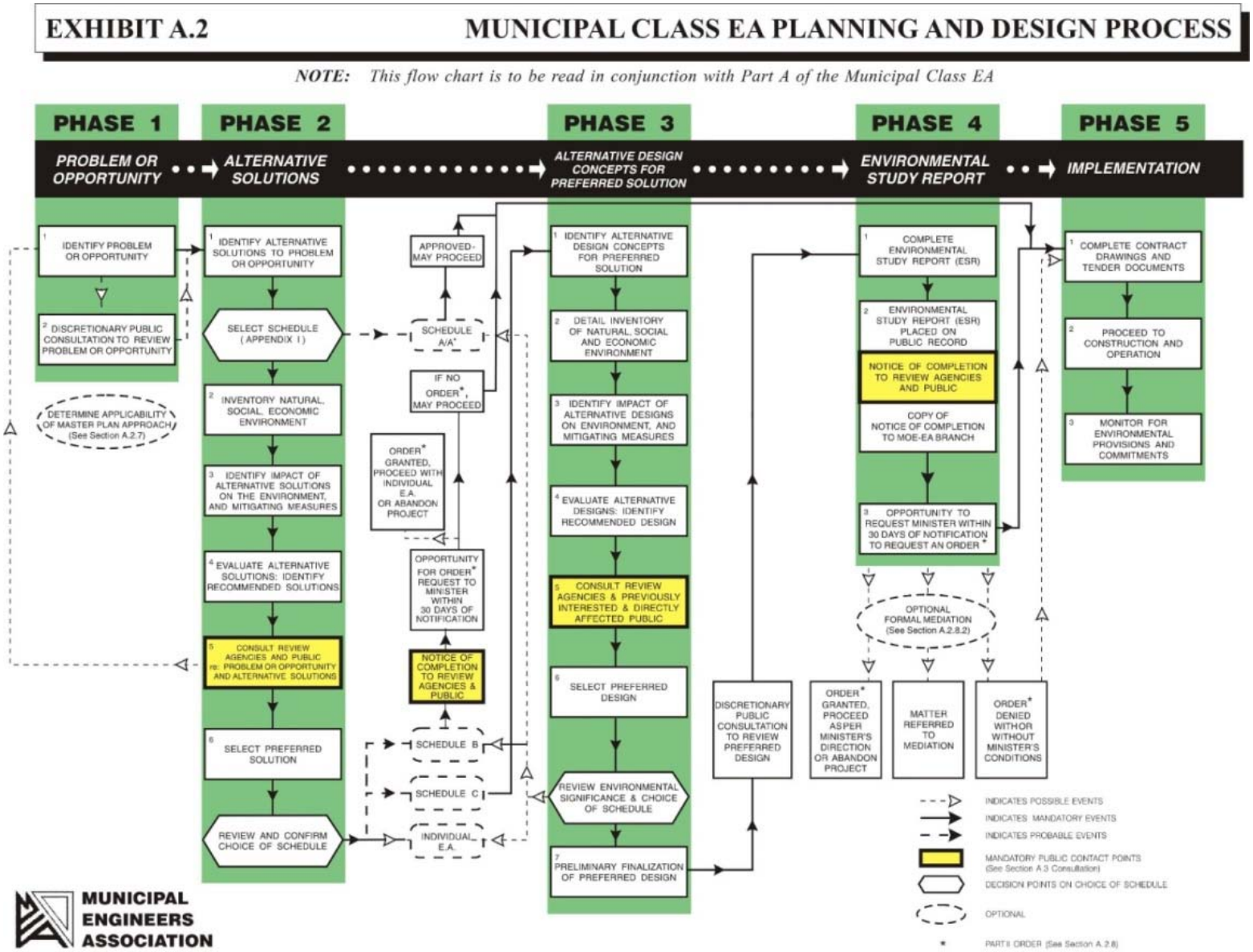

Exhibit 1.2 Key Features of the Municipal Class EA

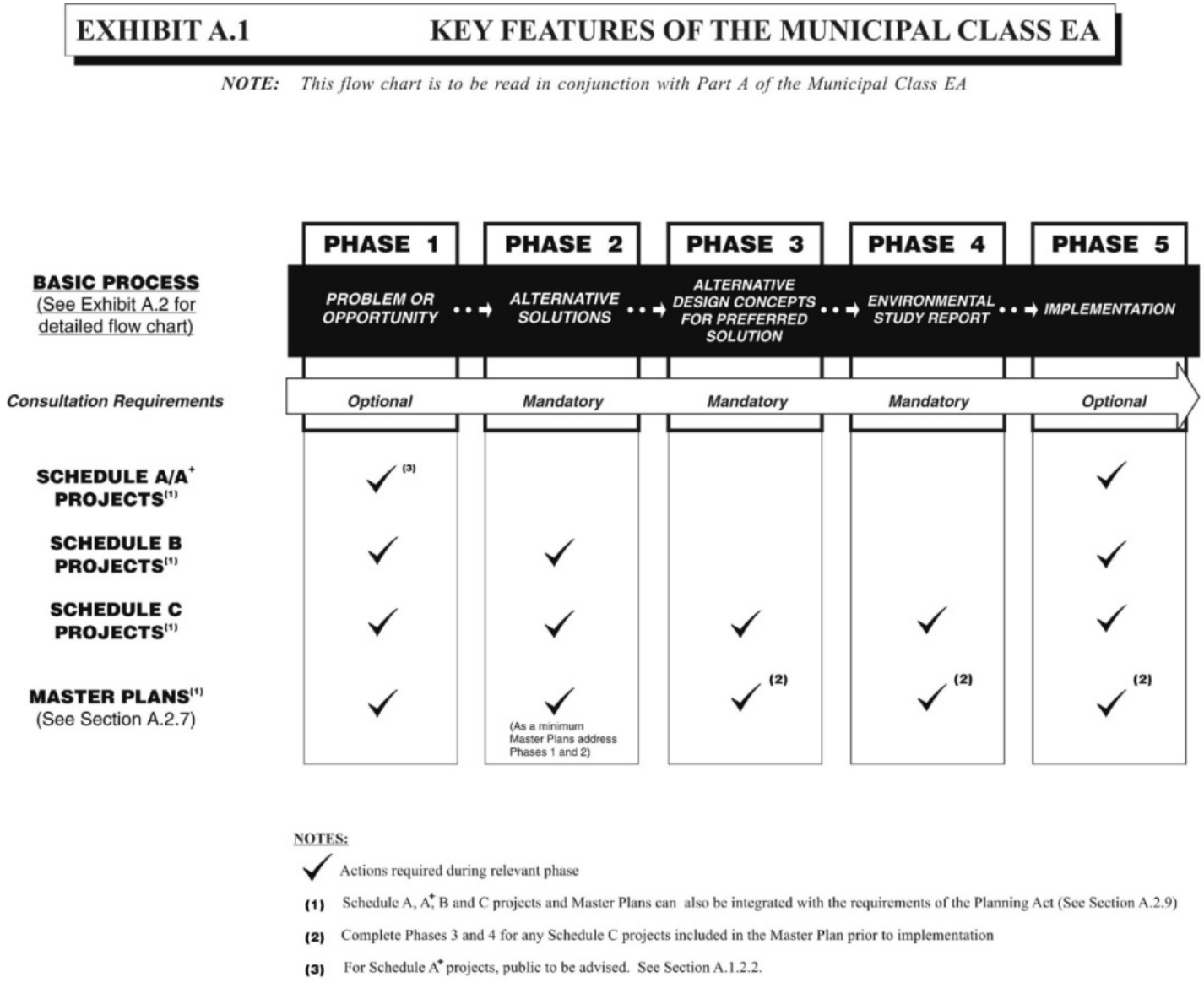

Exhibit 1.3 Municipal Class EA Planning and Design Process

1.5.2 Part II Order Process

As part of the Class EA process, it is preferred that all stakeholders work together to determine the preferred means of dealing with a problem or opportunity. If concerns regarding a project cannot be resolved in discussion with the proponent, members of the public, interest groups or technical review agencies may write to the Ontario Minister of the Environment and Climate Change (MOECC) requesting that the project is required to comply with Part II of the *Environmental Assessment Act* before proceeding with the proposed undertaking. The MOECC then decides whether to deny the request, refer the matter to mediation or require the proponent to comply with Part II of the Environmental Assessment Act.

The procedures for dealing with concerns are outlined as follows:

1. For Schedule 'C' projects a person or party with a concern should bring it to the attention of the City of Mississauga (the proponent) in Phase 4 of the planning process.

2. If a concern is not resolved through discussion with the proponent, the person or party raising the objection may request the City of Mississauga to voluntarily elevate the Schedule 'C' project to an Individual Environmental Assessment.

If the City of Mississauga declines, and the person or party with the concern wishes to pursue the matter, they may write the Minister of MOECC, or delegate, to request a Part II Order. These requests shall be copied by the requestor to the City of Mississauga at the same time they are submitted to the Minister, or delegate. For a Schedule 'C' project, a written request must be submitted to the Minister or delegate within the 30 day review period after the Notice of Completion has been issued.

1.6 Project Team

The study organization reflects the general administrative and technical needs of the study as well as the study's consultation program. The latter has been developed to ensure that all of those with a potential interest in the study will have the opportunity to participate and provide input during the process.

The study was carried out under the direction of the Project Team comprised of staff from the City of Mississauga and IBI Group:

Dana Glofcheskie, Project Manager, City of Mississauga

Leslie Green, Manager, Transportation Projects, City of Mississauga

Steve Barrett, Manager, Transportation Asset Management, City of Mississauga

Allan Ortlieb, Project Manager, IBI Group

Todd Smith, Landscape Architect, IBI Group

Don Drackley, Transportation Planner, IBI Group

Scott Johnston, Traffic Engineer, IBI Group

Marianne Radue, Environmental Planner, IBI Group

2 Public, Agency and Stakeholder Consultation

Public, stakeholder and agency consultation is a key feature of the Municipal Class EA planning and design process. Through an effective consultation program, the City of Mississauga was able to generate meaningful dialogue between the Project Team and the agencies, stakeholders and the public, resulting in an exchange of ideas recorded in the Project File and summarized in this Environmental Study Report, and the broadening of the information base leading to better decision making.

2.1 Notice of Study Commencement

The Notice of Study Commencement for the McLaughlin Road Municipal Class Environmental Assessment (EA) was published in The Mississauga News on September 26, 2012 (see **Appendix A**). The notice was also posted on the City's website at: http://www.mississauga.ca/portal/residents/mclaughlinroadenvironmentalassessmentstudy.

Property owners within 300 m of the study area were mailed a notice via tax role information obtained from the City of Mississauga (a total of 2,134 notices).

Technical agencies, utilities, special interest groups, stakeholders and First Nations with potential interest in the project were notified of this EA process by mail on September 25, 2012 by IBI Group. The notification letter included the Notice of Study Commencement and a response request sheet inviting participation in the Class EA. The list of agencies, utilities, stakeholders, First Nations and Special Interest Groups contacted are summarized below. A complete mailing list and template of the letters and response request sheet can be found in **Appendix A**.

- Aboriginal Affairs and Northern Development Canada
- Transport Canada
- Eve Adams, MP
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Aboriginal Affairs
- Ministry of Tourism, Culture and Sport
- Infrastructure Ontario
- Ministry of Natural Resources and Forestry
- Ministry of the Environment and Climate Change
- Ministry of Transportation
- GO Transit
- Region of Peel
- Peel District School Board
- Credit Valley Conservation
- City of Mississauga
- Mississaugas of the New Credit First Nation
- Association of Iroquois and Allied Indians
- Six Nations of the Grand River Territory
- Haudenosaunee Confederacy Chiefs Council
- Rogers Cable
- Bell Canada
- Enbridge Gas Distribution Inc.
- Hydro One
- Enersource Mississauga
- TransCanada Pipeline
- The Friends of Old Britannia Schoolhouse
- Mississauga Cycling Advisory Committee

2.2 Public Information Centre #1

The Notice of Public Information Centre (PIC) #1 (**Appendix A**) was advertised twice, published in the Mississauga News on January 16, 2013 and January 23, 2013, and posted on the following City of Mississauga website which was accessible to all external stakeholders and members of the public.

(http://www.mississauga.ca/portal/residents/mclaughlinroadenvironmentalassessmentstudy)

The Notice of PIC #1 was also mailed to residences within 300 m of the study area, and mailed or e-mailed to contacts identified on the Project Contact List developed at the outset of the study and identified through the Notice of Study Commencement process.

The PIC was a drop-in format where members of the project team were available to answer questions and address concerns. The session was held as follows:

Date: Tuesday, January 29, 2013

Time: 5:00 p.m. to 8:00 p.m.

Location: Peel District School Board, "Mississauga Room"
5650 Hurontario Street
Mississauga, Ontario L5R 1C6

Approximately 80 individuals attended the PIC (signed in). Councillor Bonnie Crombie (Ward 5) and members of her team were present. The display boards, attendance register and comment sheets are available in **Appendix A**.

The public was requested to submit comments by February 12, 2013. Those who provided contact information were added to the project contact list to receive future notifications relating to the study. In total 58 comment forms were completed and submitted to the project team during or after the PIC along with two email responses. **Exhibit 2.1** summarizes the written comments/concerns received as of February 19, 2013.

Exhibit 2.1 Summary of Comments/Concerns

QUESTION #1 MY PROPERTY/INTEREST IS:	
	Number of Responses
• Access onto and off McLaughlin Road	40
• Residential property	50
• Travel along McLaughlin Road	40
• Commercial/Industrial property	1
• General interest	15
• Other: 1. Have clients who live there. 2. Environmental impact of supposed scenic route. 3. Scenic route. 4. The sugar bush. 5. Noise/truck traffic. 6. Cycling.	

QUESTION #2 HOW OFTEN DO YOU USE MCLAUGHLIN ROAD BETWEEN BRISTOL ROAD WEST AND BRITANNIA ROAD WEST?

	Number of Responses
• Daily	47
• Weekly	7
• Monthly	2
• Rarely	1

QUESTION #3 PLEASE RANK THE FOLLOWING TYPES OF POTENTIAL SOLUTIONS TO IMPROVE OPERATIONS WITHIN THE CORRIDOR.

	#1	#2	#3	#4	#5
• Improve intersection operations (i.e. add traffic signals, restrict left turns)	24	10	7	5	5
• Improve transit services/facilities (i.e. frequency of service, bus stops)	3	8	8	10	16
• Increase road capacity/operations (i.e. add travel lanes, turn lanes)	13	6	3	4	14
• Improve facilities for cyclists (i.e. add on-road cycling lanes or off-road pathway)	6	13	8	10	11
• Improve pedestrian facilities (i.e. add sidewalks and/or multi-use path)	12	7	14	10	6

- Other
  1. Add lane on east side.
  2. No changes needed, protect nature.
  3. Leave as is. Please do not touch the trees. Widen Mavis Road instead.
  4. Preserve the scenic route Bristol Road West-Matheson Boulevard West. No widening.
  5. Enforcement and removal of truck traffic.
  6. Widen Mavis and Hurontario.
  7. Do nothing.
  8. Increase safety and reduce car accidents.
  9. Limit traffic by detour to Mavis Road.
  10. Roundabout at key intersections.
  11. Make it one way southbound.
  12. Speed bumps to slow down traffic.
  13. Status Quo.

QUESTION #4 IN ADDITION TO THE SOLUTIONS PRESENTED TODAY, ARE THERE OTHER TYPES OF SOLUTIONS THAT SHOULD BE CONSIDERED FOR MCLAUGHLIN ROAD?

- Put a traffic signal at Avonwick Avenue and McLaughlin Road.
- Do nothing.
- Widen other roads (e.g., Mavis Road and Highway 10).
- Road calming options to decrease the speed of traffic (e.g., speed bumps).
- Bike lanes are not necessary.
- People should use alternative routes (e.g., Mavis Road).
- Centre lane as a reversible traffic flow lane.
- Bike path through the forest.
- Widen at intersections and put in left turn lanes.
- Keep the trees from being cut down.

QUESTION #5 IN ADDITION TO THE STUDY ISSUES PRESENTED TODAY, ARE THERE ANY OTHER ISSUES WE SHOULD BE AWARE OF?

- Increase in noise due to the increase in traffic.
- Pedestrian and traffic safety at McLaughlin Road and Ceremonial Drive (e.g., parking on the street).
- Truck traffic on McLaughlin Road even though they are not permitted. By-law does not have the ability to stop and ticket.
- The southbound partial lane from Britannia Road West onto McLaughlin Road (ends before Loblaws turnoff) is an accident waiting to happen as merging from 70km/hr traffic north of Britannia can be very dangerous.
- Drivers are cutting through industrial parking lots (behind Keaton Crescent) trying to access McLaughlin Road during grid lock times.
- Very dangerous for transit users to cross at Avonwick Avenue/Faith Drive.
- The sound attenuation fences are in need of renewal/repair.
- Remove sidewalk on the east side all together and replace with a path for cycling/walking.
- Transit vehicles blocking traffic during busy times.
- Health of trees along McLaughlin between Matheson and Bristol.
- Bristol Road West is used to escape McLaughlin Road congestion.
- House prices will depreciate if the road is widened.
- Add speed bumps forcing traffic to alternative lanes (Mavis Road).
- Neighbourhood children on the west side of McLaughlin Road need to be safe crossing a busy road to get to the schools on the east side of McLaughlin Road. More lanes make it less safe.

EMAIL RESPONSE TO PIC.

Email #1

- Place signals at Regal Drive and Faith Drive.
- Need cycling route.
- Put a sidewalk on the east side of McLaughlin Road.
- Some intersections need new or lengthened turn lanes (e.g., Matheson Boulevard West, Avonwick Avenue, Ceremonial Drive and Bristol Road West).
- Add pedestrian crossovers at Langport Court and Ceremonial Drive bus stops. [included a cross-section drawing].

Email #2

- Does not want McLaughlin Road widened along the scenic route section.
- Instead of basing decision heavily on traffic statistics and data, the socio-economic impacts should be examined in more detail.
- A scenic route study and a noise study have not been completed or planned.
- Have staff from other relevant disciplines been consulted (e.g., planning, parks, health).
- Right-of-way is misleading as widening will not occur within the existing paved area.
- Concerned about the socio-economic rating of "good" for alternative 5.
- How will widening enhance and preserve the scenic route designation.
- McLaughlin Road is not an arterial road according to the OP. Was a licence plate survey completed to confirm the source of traffic along McLaughlin Road.
- How would widening the road reduce speed and improve safety. Over a 24 hour period road capacity is not an issue.
- Consider the following to improve traffic capacity along McLaughlin Road:
    - Add bus bays at all bus stops.
    - Add cycling lanes/shoulders.
    - Improve/synchronize traffic signals along McLaughlin Road.
    - Add traffic lights at Avonwick Avenue.
    - Add turning lanes at traffic lights.
    - Enforce/place no parking restrictions along Ceremonial Drive and McLaughlin Road next to the plaza.

2.3 Public Information Centre #2

The Notice of PIC #2 (**Appendix A**) was advertised twice, published in the Mississauga News on February 19, 2014 and February 26, 2014 and posted on the following City of Mississauga website:

(http://www.mississauga.ca/portal/residents/mclaughlinroadenvironmentalassessmentstudy).

For PIC #2, the mailing list was further expanded. The Notice of PIC and a letter written by Councillor Bonnie Crombie (Appendix **A**) were mailed to residences by unaddressed admail within the area bound by Highway 401 to the north, Highway 403 to the south, Hurontario Street to the east, and Mavis Road to the west. In total approximately 11,460 notices were distributed in this manner. Additional direct mailing was made to the original 300 m resident mailing list compiled for PIC #1 and interested persons who signed up from PIC #1 (2,095 notices in total). Mailings were also made to External Agencies, Stakeholders and First Nation/Aboriginal Communities.

The PIC was a drop-in format where members of the project team were available to answer questions and address concerns. The session was held as follows:

Date: Tuesday, March 5, 2014

Time: Information Display Drop In: 5:00 p.m. to 8:00 p.m.

Location: Peel District School Board, "Mississauga Room"
5650 Hurontario Street
Mississauga, Ontario L5R 1C6

Approximately 127 individuals attended the PIC (127 signed in).

The public was requested to submit comments by March 19, 2014. Those who provided contact information were added to the project contact list to receive future notifications relating to the study. In total 79 comment forms were completed and submitted to the project team during the PIC. **Exhibit** 2.2 summarizes written comments/concerns received as of March 19, 2014. All display boards, comment forms, correspondence received as part of PIC #2 are available in **Appendix A.**

Exhibit 2.2 Summary of Comments/Concerns as of March 19, 2014

QUESTION #1 MY PROPERTY/INTEREST IS:

	Number of Responses
• Access onto and off McLaughlin Road	53
• Residential property	44
• Travel along McLaughlin Road	55
• Commercial/Industrial property	1
• General interest	21

- Other
  1. Environmental Preservation
  2. Sound attenuation fences backing my property (facing onto McLaughlin Road, south of Matheson Boulevard) are deteriorating
  3. Mississauga Cycling Committee
  4. Condominium
  5. Sound barrier
  6. Transit (2 responses)
  7. Sugar bush
  8. Property sides onto McLaughlin Road
  9. I walk and bike along McLaughlin Road
  10. Langport Court

QUESTION #2 DO YOU SUPPORT THE PRELIMINARY PREFERRED DESIGN OPTION?

	Number of Responses
• Yes	40
• No	36
• Unknown	3

SUPPORTS OPTION #3 (4 lanes with Sharrow lanes and underground hydro)

- Road widening is necessary (7 comments).
- Local traffic will increase once the LRT is built (1 comment).
- Design will relieve traffic congestion (3 comments).
- Option #3 with raised bike lanes (1 comment).
- Improved and attractive landscaping (3 comments).
- Supports the elimination of the right merge lane northbound at Bristol Road (1 comment).
- Provides needed space for safe pedestrian traffic and cyclists (3 comments).

- Disappointed so many trees need to be removed (3 comments).
- Only 421 trees will be removed and 842 will be replanted (1 comment).
- Utility lines will be underground (1 comment).
- Traffic calming measures are necessary (1 comment).
- Bus lane improvement flow is favourable (1 comment).

Although in support of Option #3, attendees offered the following additional comments / suggestions:

- Concern about traffic and parking at the plaza on Ceremonial Drive and McLaughlin Road (2 comments).
- Concerns about the safety of the shared bike lanes (2 comments).
- Cycling lanes not necessary (1 comment).
- Concerned about turning left off Faith Drive with extra lanes (2 comments).
- Consider upgrading/adding noise walls (2 comments).
- Would like to see a sidewalk on the east side between Ceremonial Drive and Faith Drive (1 comment).
- Keep sidewalks away from the road (1 comment).

DOES NOT SUPPORT OPTION #3

- Prefer Option #1 (maintain 2 lanes plus centre turn lane and on-road bike lanes) with the separate bike lanes (3 comments).
- Option #1 has fewer trees removed (1 comment).
- Protect the sugar bush (9 comments).
- Need a traffic light at Avonwick and McLaughlin (1 comment).
- Concerned about access to McLaughlin Road from Parkwood Place (1 comment).
- Speed will increase (8 comments).
- Concerned about noise (10 comments).
- Concerned about pollution (1 comment).
- Keep McLaughlin Road as is (4 comments).
- Widening will invite more traffic onto McLaughlin Road (16 comments).
- Supports four lanes north of Matheson Boulevard (1 comment).
- Increasing lanes will make it difficult to turn left or right from Faith Drive (1 comment).
- Property values will decrease (1 comment).
- More traffic will make backyards too noisy to enjoy (1 comment).
- Encourage drivers to use alternate routes (e.g., Mavis Road and Hurontario Street) (3 comments).
- Truck traffic will increase (1 comment).
- Do not need bike lanes (2 comments).

QUESTION #3 DO YOU HAVE ANY ADDITIONAL COMMENTS REGARDING THE MATERIALS AND DISPLAYS YOU HAVE SEEN TODAY?

- The design is a welcome and necessary change (1 comment).
- Excellent displays (6 comments).
- Like the aesthetic appeal of the renderings (2 comments).
- Need to remember this is a residential area with many children and seniors (2 comments).

- Need a traffic light between Ceremonial Drive and Matheson Boulevard (1 comment).
- Need a traffic signal at Avonwick Ave and McLaughlin Road (5 comments).
- Need a traffic signal at Faith Drive and McLaughlin Road (1 comment).
- Enforce no trucks on McLaughlin Road at any time (3 comments).
- Property will lose its value if road is widened (2 comments).
- Increase in noise (4 comments).
- Put noise walls/replace noise walls along McLaughlin Road (4 comments).
- Parking/traffic at the Ceremonial Drive plaza creates congestion (9 comments).
- Need a crosswalk and Faith Drive and McLaughlin Road (1 comment).
- The renderings are deceiving and inaccurate (2 comments).
- Bike lanes should be raised to the same level as the speed table (1 comment).
- The woodlot would be positively affected (1 comment).
- Does not respect concerns of the residents most impacted (1 comment).
- Adjust timings on traffic lights (3 comments).
- Concerned with the increase in traffic (4 comments).

EMAIL REPONSES

- Appreciates concerns residents have with the trees being cut down. However this stretch of road has long been unable to support the amount of traffic it is carrying (this route goes directly to Square One) onto McLaughlin Road without traffic lights. Widening this stretch of McLaughlin Road in essential for growth in this part of Mississauga.
- Attended PIC #2. Very impressed with the thorough display of all the issues and design alternatives. Long-time resident of Roselaire Trail, and has lived with the deficiencies of the exiting road and welcomes the improvement. Fully support the preferred design presented at the PIC. The opening of the Confederation Parkway bridge over the 403 has made the access to the city centre and Square One so much more enjoyable from their neighbourhood. Makes perfect sense to enhance this gateway from the north with the preferred design of improvements to McLaughlin Road.
- Has lived off of McLaughlin Road for many many years. Mississauga has grown in population over the years. Although McLaughlin Road does have moments during the day where it gets busy and a bit congested (travels on it daily), the reason they don't mind is because it is a beautiful road with gorgeous trees surrounding it. The traffic is only from Bristol to Britannia, which is not a big stretch. The traffic is only during rush hour and the traffic doesn't last more than an extra few minutes, which is not a big deal. Re-consider this and leave the beauty and the beautiful trees on McLaughlin Road the way it is. It is not a big deal on a small stretch of road and the minimal amount of traffic that is caused.
- For the posted design of options 2 and 3 at the intersection of McLaughlin Road and Faith Dr./Parkwood Pl. the lane markings indicate that traffic travelling on McLaughlin Road (both northbound and southbound) can either go straight or turn right. This would seem to suggest that left turns onto Faith Drive or Parkwood Place from McLaughlin Road are not permitted. Surely this cannot be the case. Thus, should the widening of McLaughlin proceed and one of these options is selected, it is imperative that the lane marking that are painted include left turn arrows at this intersection

2.4 Community Workshop #3

The Notice of PIC / Workshop #3 (**Appendix A**) was published in the Mississauga News on April 9, 2015 and posted on the following the City of Mississauga website which is accessible to all external stakeholders and members of the public.

http://www.mississauga.ca/portal/residents/mclaughlinroadenvironmentalassessmentstudy

The Notice Community Workshop #3 (**Appendix A**) was mailed to residences by unaddressed admail for the area bound by Highway 401 to the north, Highway 403 to the south, Hurontario Street to the east, and Mavis Road to the west. In total approximately 11,460 notices were distributed in this manner. Additional direct mailing was made to the original 300 m resident mailing list used for PICs #1 and #2 and interested persons who signed up from PICs #1 and #2 and throughout the study (2,095 notices in total). Mailings were also made to External Agencies, Stakeholders and First Nation/Aboriginal Communities.

The PIC was a workshop format where members of the project team were available to answer questions and address concerns. The session was held as follows:

Date: Saturday, May 9, 2015

Time: 8:30 a.m. to 12:00 p.m.

Location: St. Gertrude Separate School, Gymnasium - 815 Ceremonial Dr.

Approximately 60 individuals attended the workshop. Councillor Carolyn Parrish (Ward 5) and her Executive Assistant (Danny Singh) were in attendance. In addition, Councillor George Carlson (Ward 11) attended the workshop part-time. There was no media present.

Opening remarks were provided by Councillor Parrish. This was followed by a presentation by the Project Team. After the presentation, the attendees broke into groups with a team member at each table. The goal was to identify any questions or concerns about the Preferred 4-lane Alternative and Mitigation Plan. Display panels were arranged by topic and organized in a manner which effectively presented information on the project. The stations were as follows:

1. Transportation Safety
2. Active Transportation
3. Streetscape/Woodlot Restoration Plan
4. Design and Implementation

Participants were invited to visit each station and discuss the Preferred Plan with a Project Team member. Display material including a roll plan highlighting the applicable attributes of the preferred plan was provided at each station. The group then reconvened for the question and answer period as well as closing remarks. In general, many residents expressed concern regarding the widening of the road and the need to protect the scenic character of the roadway and the mature trees along the corridor as part of the design.

Details of the workshop can be found in **Appendix A**.

2.5 Agency and Stakeholder Consultation

Peel District School Board

The Peel District School Board (PDSB) has been consulted throughout the environmental assessment and previous plans to improve McLaughlin Road as the corridor abuts the Britannia Farm woodlot which is under their ownership and management. As part of this EA Study, the PDSB was first contacted as an interested agency through the Notice of Study Commencement process. An introductory meeting was then held with PDSB staff on December 4, 2012 to review the EA process, and discuss the types of improvement alternatives to be considered for both the road and abutting vegetation and landscaping. Prior to PIC #1 on January 29, 2013, the PDSB was provided with the PIC #1 final draft displays on January 23, 2013 for internal review.

A second meeting with PDSB staff was then held on October 22, 2013 to present the preferred road improvement plan, expected impacts and associated mitigation approaches. It was agreed that PDSB staff would present this information to PDSB committee members, advising them of the City's preferred plan. A follow-up meeting was also arranged on-site with the City and PDSB staff on October 29, 2013 to better understand the preferred roadway plan and impacts. The plan received a favourable response from the PDSB staff.

Staff from the PDSB also attended PIC / Workshop #3 on May 9, 2015. In addition, City staff met PDSB staff on July 21, 2015 to review the material that was presented at the workshop.

Mississauga Cycling Advisory Committee

An introductory presentation was made on January 8, 2013 to the Mississauga Cycling Advisory Committee about the purpose, objectives and alternatives being considered to accommodate cycling on the section of McLaughlin Road that is the subject of this EA. The Committee supports the project to improve transportation along the section of McLaughlin Road from Bristol Road West to Britannia Road West. Their preference is for an on-road cycling solution, with their first choice being for on-road bike lanes with mountable curbs for these reasons:

- Segregation from motor vehicle traffic provides cyclists with an attractive safety margin that will encourage use;
- With treatments that provide right of way at intersections, this option will provide an effective north-south commuter route for cyclists that is more effective than a multi-use trail; and
- This solution will integrate well with cycling infrastructure already in place to the south.

A second presentation was made on May 12, 2015 to the Mississauga Cycling Advisory Committee to discuss the Preferred Design and Mitigation Plan for the project. The Project Team noted that bike lanes are proposed from Matheson Boulevard West to Britannia Road West and sharrows are proposed from Bristol Road West to Matheson Boulevard West. The Committee voiced concerns about having a sharrow facility versus a bike lane or multi-use trail. The Project team indicated in order to balance the objectives of the project and be context sensitive, sharrows were proposed in order to minimize impacts to the existing trees while still improving the roadway and active transportation facilities.

2.6 First Nations Consultation

To assist with developing a meaningful First Nations consultation list for the project, and to fulfill the requirements of the Class EA process, correspondence was initiated with the Ministry of Aboriginal Affairs, and the Environmental Assessment and Approvals Branch of the Ministry of the Environment and Climate Change to identify which First Nations might have a local interest in the project. Project notification mailings were also sent to the Mississaugas of the New Credit First Nation and the Association of Iroquois and Allied Indians on September 25, 2012. On November 28, 2012 the Ministry of Aboriginal Affairs identified Six Nations of the Grand River, Haudenosaunee Confederacy Chiefs Council and Mississaugas of the New Credit First Nation. Project notification mailings were made to Six Nations of the Grand River and the Haudenosaunee Confederacy Chiefs Council on December 20, 2012.

These potentially interested First Nations were contacted directly by IBI Group concerning project commencement on behalf of the City of Mississauga, and were also informed of the Public Information Centres. The letter encouraged First Nations to provide relevant comments related to the study, and pertaining to areas of Aboriginal uses and/or activities. No responses have been received. Follow up contact was initiated with the First Nations prior to issuing the Notice of Study Completion to ensure they received all consultation materials. Details of First Nations consultation undertaken during the Class EA can be found in **Appendix A**.

3 Transportation and Related Problem / Opportunity

3.1 Background Conditions

A complete reporting of existing and forecasted transportation conditions in the primary and surrounding study area is provided in **Appendix B** as a technical appendix provided under separate cover to this ESR document.

The City's OP designates McLaughlin Road as a Major Collector throughout the study area, as well as a "Scenic Route" between Bristol Road West and Matheson Boulevard West. It provides a key link within the City's transportation network serving both commercial/commuter and local residential/community traffic. The character of the roadway changes within the study limits, with Matheson Boulevard West serving as the primary divide between the two sections.

From Bristol Road West to Matheson Boulevard West

McLaughlin Road operates as a two lane roadway (one lane per direction) with turning lanes provided at Avonwick Avenue, Ceremonial Drive, and Faith Drive/Parkwood Place intersections. These roads provide local access to residential lands east and west of McLaughlin Road. The posted speed limit along this section of McLaughlin Road is 50 km/h and heavy trucks are not permitted.

Photo Location: Looking south along McLaughlin Road north of Parkwood Place/ Faith Drive

From Matheson Boulevard West to Britannia Road West:

McLaughlin Road operates as a two-lane roadway (one lane per direction) plus a centre turn lane. It provides access to the Heartland Town Centre, one of the largest retail nodes in Ontario, and generates significant demands during the PM peak hour and weekend traffic conditions. On the weekends, the retail demands within this segment are offset by the lower demands associated with employment land uses which are located on the east side of McLaughlin Road. The posted speed limit along this section of McLaughlin Road is 60 km/h.

Photo Location: Looking north along McLaughlin Road towards Matheson Boulevard West.

South of the study limits, the Confederation Parkway Bridge was opened in August 2008 to connect McLaughlin Road and Confederation Parkway. This connection provides access to and from Downtown Mississauga.

Within the localized study area, the following east-west arterial and major collector roads intersect McLaughlin Road and are included in the transportation analysis:

- **Bristol Road West** is an east-west major collector which draws significant traffic due to its crossing of the Credit River and access to Streetsville. Bristol Road West provides access to nearby residential communities but does not extend to employment lands east of Highway 403. The posted speed limit is 50 km/h.
- **Matheson Boulevard West** is an east-west major collector that provides a crossing of Highway 403. The crossing attracts large volumes of commuting traffic travelling eastbound in the AM peak hour and westbound in the PM peak. The intersection with McLaughlin Road is congested as is shown in the analysis herein.
- **Britannia Road West** is an east-west arterial road under the jurisdiction of Peel Region. The posted speed limit along Britannia Road West is 80 km/h. It was recently widened to six lanes, including improvements at the McLaughlin Road intersection. The eastbound and westbound approaches at the intersection are painted to accommodate a dual left turn (if required) in the future.

The following east-west roads intersect McLaughlin Road within the localized study area and are included in the transportation analysis:

- **Regal Drive** intersects south of Britannia Road West and serves the Heartland Town Centre.
- **Avonwick Avenue and Ceremonial Drive** each intersect at McLaughlin Road south of Matheson Boulevard West and service the low to medium density residential development located on either side of McLaughlin Road. Only Ceremonial Drive is signalized at McLaughlin Road. These roads have a posted speed limit of 50km/h.

- **Parkwood Place** and **Faith Drive** are local streets that also intersect with McLaughlin Road north of Bristol Road West.

Within the larger study area, the following roads exist:

- **Eglinton Avenue,** located at the south boundary of the study area, is a six-lane east-west arterial which extends across the City of Mississauga, and serves both local and regional travel needs, and provides a connection to Highway 403.
- **Mavis Road** is a six-lane north-south arterial in the City of Mississauga. Mavis Road connects to Highway 403, Highway 401, and Highway 407, and serves significant employment lands and access to east-west roads including Britannia Road, Eglinton Avenue, Burnhamthorpe Road, and Dundas Street.
- **Hurontario Street** is a major north-south arterial that provides access to Downtown Mississauga and extends from Port Credit to north of Brampton. It provides connections to QEW, Highway 403, Highway 401, and Highway 407. A Light Rail Transit (LRT) is currently planned for Hurontario Street which would occupy the two centre lanes (leaving Hurontario Street as a four divided roadway). The posted speed limit on Hurontario Street is 60 km/h.
- **Highways** crossing under McLaughlin Road (flyovers) at Highway 407 and Highway 401, and at Highway 403.

A summary of major road characteristics in the surrounding area (as opposed to the primary study area shown in Exhibit 1.1) is provided in **Exhibit 3.1.** The lane configuration of McLaughlin Road is illustrated in **Exhibit 3.2**.

Exhibit 3.1 Summary of Major Road Characteristics within Sub-Area

ROAD	POSTED SPEED LIMIT(km/h)	LANE CONFIGURATION	LAND USES SERVICED
Cantay Road	60	• East-west major collector • Four through lanes; median two-way left turn lane	• Business employment
Britannia Road West	70	• East-west regional arterial (Region of Peel) • Six through lanes; left and right turn bays • Some dual left turns (e.g. at Mavis Road)	• Business employment • Residential • Mixed-use development • Access to Heartland Town Centre
Matheson Boulevard West	60	• East-west major collector • Four through lanes; median two-way left turn lane • Some left turn bays (e.g. at McLaughlin Road)	• Business employment • Residential • Mixed Use • Industrial
Bristol Road West	50	• East-west major collector • Two through lanes, two-way left turn medians between intersections, left and/or right turn bays at intersections • One dedicated bike lane per direction	• Few connections to medium density residential and convenience commercial developments • Mixed-use development low density residential
Eglinton Avenue	60	• East-west arterial • Six through lanes; left and right turn bays • Dual left turn bays at: Mavis Road (westbound) and Hurontario Street (westbound). • Connection to Highway 403 (east of study area)	• General and convenience retail development • Several density-types of residential development

ROAD	POSTED SPEED LIMIT(km/h)	LANE CONFIGURATION	LAND USES SERVICED
Hurontario Street	60	• North-south arterial • Six through lanes; left and right turn bays • Some dual left turn bays (e.g. at Britannia Road West) • Connections to Highway 407, 401, 403, Downtown Mississauga, Queen Elizabeth Way	• Business employment • Medium to high density residential development
Mavis Road	60	• North-south arterial • Six through lanes; left and right turn bays • Some dual left turn bays (e.g. at Britannia Road) • Connections to Highway 401 403, and 407	• Business employment • Mixed-use development • Access to Heartland Town Centre • Low to medium density residential development

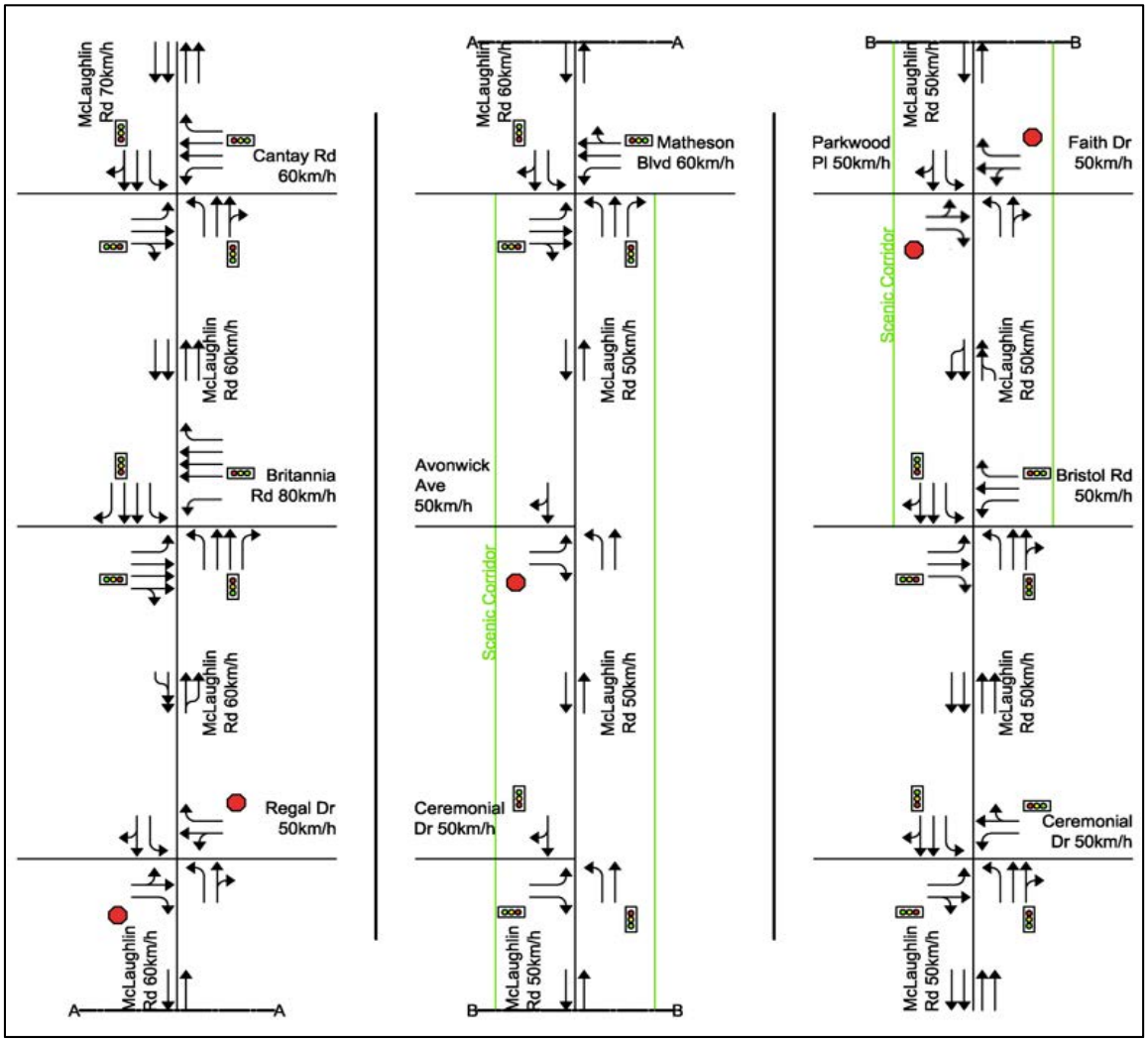

Exhibit 3.2 Existing Lane Configuration on McLaughlin Road

3.2 Existing (2012) Transportation Conditions

3.2.1 Vehicle Traffic Profile

Automated traffic recorder (ATR) counts as reflected in **Exhibit 3.3** were acquired from the City and the Region of Peel. The off-peak hour and weekend counts are lower than the AM and PM peak hours. Daily traffic volumes at the Britannia Road West and McLaughlin Road intersection recorded between 2003 and 2011 are summarized in **Exhibit 3.4**, with current (2011) AM and PM peak hour traffic volume profiles shown in **Exhibit 3.5.** Based on these counts the typical roadway AM and PM peak hour periods were found to be critical in terms of highest observed vehicle volume. Furthermore, counts indicate that peak periods are lengthening (peak-spreading) due to capacity constraints in the network.

Exhibit 3.3 Intersection ATR Count Date

INTERSECTION	ATR COUNT DATE
McLaughlin Road and Cantay Road	Thursday, December 16, 2010
McLaughlin Road and Britannia Road	Thursday, April 28, 2011
McLaughlin Road and Regal Drive	Tuesday, December 8, 2009
McLaughlin Road and Matheson Boulevard	Thursday December 9, 2010
McLaughlin Road and Avonwick Avenue	Thursday, February 11, 2010
McLaughlin Road and Ceremonial Drive (T-Intersection)	Thursday, December 9, 2010
McLaughlin Road and Parkwood Place / Faith Drive	Tuesday, December 6, 2011
McLaughlin Road and Bristol Road	Thursday, December 9, 2010
McLaughlin Road and Ceremonial Drive (4-way)	Thursday, December 9, 2010

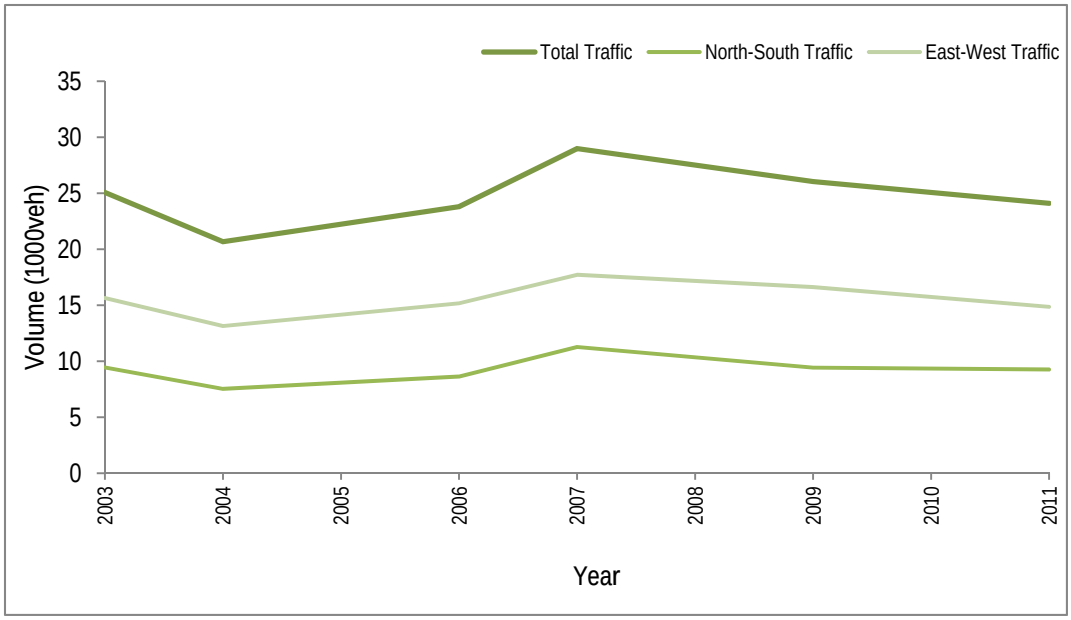

Exhibit 3.4 Historical Daily (7 AM to 6 PM) Traffic Volumes, Britannia Road West and McLaughlin Road Intersection

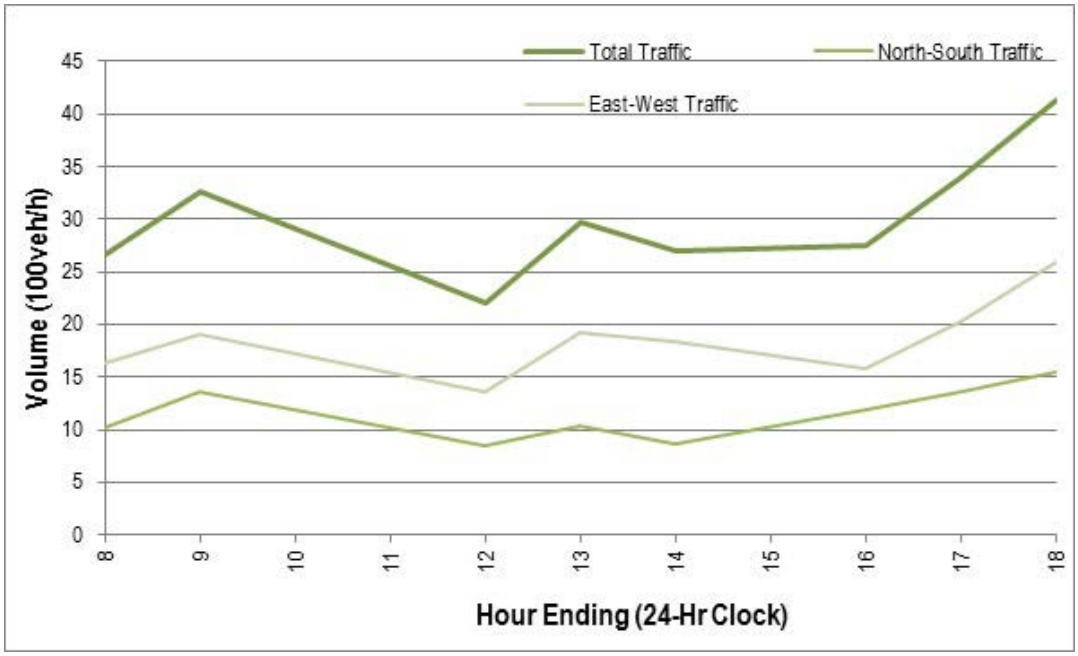

Exhibit 3.5 Traffic Profile, Britannia Road West and McLaughlin Road Intersection (April 28, 2011)

An assessment of the existing traffic counts revealed the following:

- Generally, the PM peak hour volumes along McLaughlin Road are highest and cause the most critical operations;
- Traffic volumes along McLaughlin Road are highest at the south end of study area, and secondly within the Scenic Route segment between Bristol Road West and Matheson Boulevard West;
- Traffic volumes along McLaughlin Road are highest in the southbound direction (south of Matheson Boulevard West) during the PM peak hour; and,
- During the AM peak hour, traffic volumes are highest in the northbound direction (south of Matheson Boulevard West).

In general, daily traffic volumes have been relatively stable on McLaughlin Road. However, it is likely that traffic volumes continue to be constrained by congestion at some locations along the road, such as the lane transition point at McLaughlin Road and Matheson Boulevard West.

3.2.2 Existing (2012) Traffic Volumes

To establish existing conditions, traffic counts were normalized from counts (typically 2009 to 2011) to 2012 conditions. This was undertaken by applying a normalizing factor of 1% per year to all movements at all intersections, except for the eastbound and westbound movements at Regal Drive, Avonwick Avenue, Parkwood Place/Faith Drive and Ceremonial Drive as these roads are minor collectors and local roads to established commercial/residential areas.

Detailed turning movement counts are provided in **Appendix B** for intersections along McLaughlin Road. Total 2012 AM and PM peak hour link volumes are summarized in **Exhibit 3.6**.

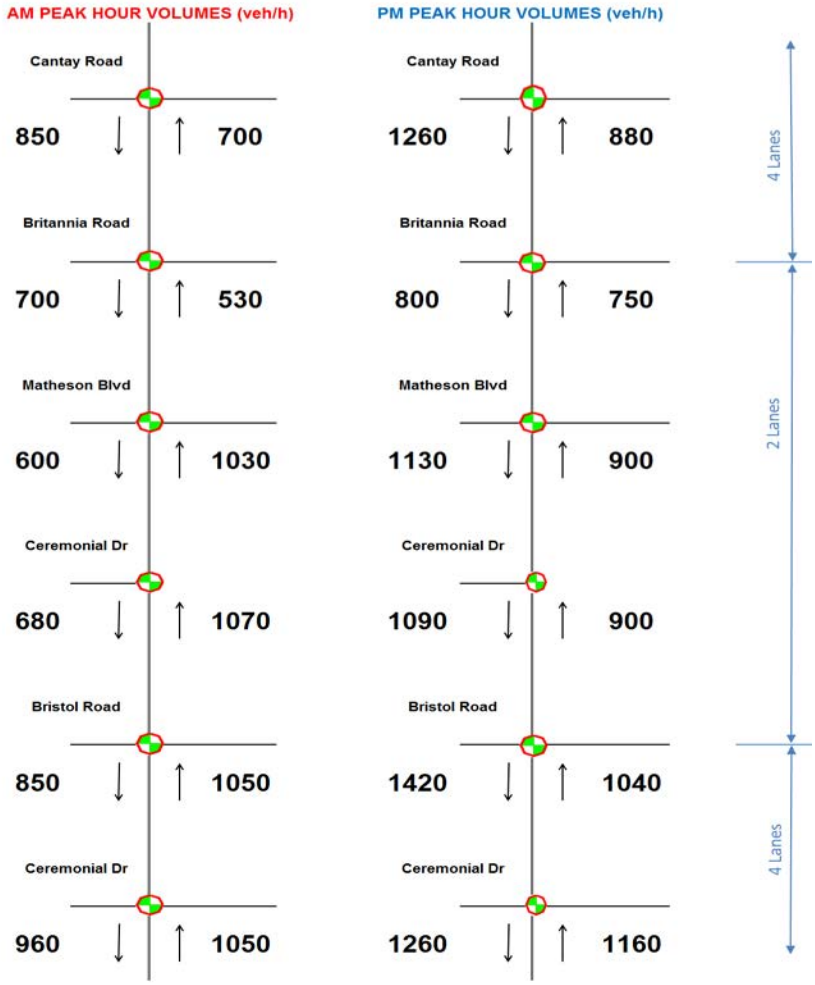

Exhibit 3.6 Existing (2012) Traffic Volumes along McLaughlin Road

Note: For Level-of-Service analysis, the typical planning capacity of an urban roadway lane such as on McLaughlin Road is 900 vehicles/lane/hour. McLaughlin Road between Bristol Road West and Matheson Boulevard West is currently operating beyond the road's planned capacity.

3.2.3 Transportation within the Larger Study Area

A traffic assessment was conducted in a larger study area using Marshall Macklin Monaghan's (MMM) EMME model that was developed for the Hurontario Street LRT Project. Volume to capacity ratios (V/C) ratios were used as an indicator of congestion, with values greater than 0.80 indicating that the road was operating near capacity and vehicles were experiencing delay. V/C ratios greater than 1.00 indicate severe congestion.

An assessment of the EMME model showed that the roads in the study area operate near capacity. Britannia Road West, Matheson Boulevard West, Eglinton Avenue West, Mavis Road, and Hurontario Street all had segments with V/C greater than 0.80. **Exhibit 3.7** summarizes critical corridor operations. **Exhibit 3.8** presents a V/C and flow schematic for the sub-area analysis.

The analysis indicated that there is only a small amount of available capacity in the network, particularly for north-south roads parallel to McLaughlin Road.

Exhibit 3.7 Notable Corridor Operations

ROAD	NOTABLE V/C / FLOW
Britannia Road West	• Near-capacity (V/C > 0.80) • 2,200-2,500 veh/h in both directions, from west of Mavis Road to east of Hurontario Street
Matheson Boulevard West	• Near-capacity (V/C > 0.80) eastbound, just east of McLaughlin Road
Hurontario Street	• Near-capacity (V/C > 0.80) south of Highway 401 • South of Britannia Road, V/C < 0.80
Mavis Road	• V/C between 0.60 and 0.79 • 1,700 veh/h approaching Eglinton Avenue, and Britannia Road
Eglinton Avenue	• Near-capacity (V/C > 0.80) around Mavis Road

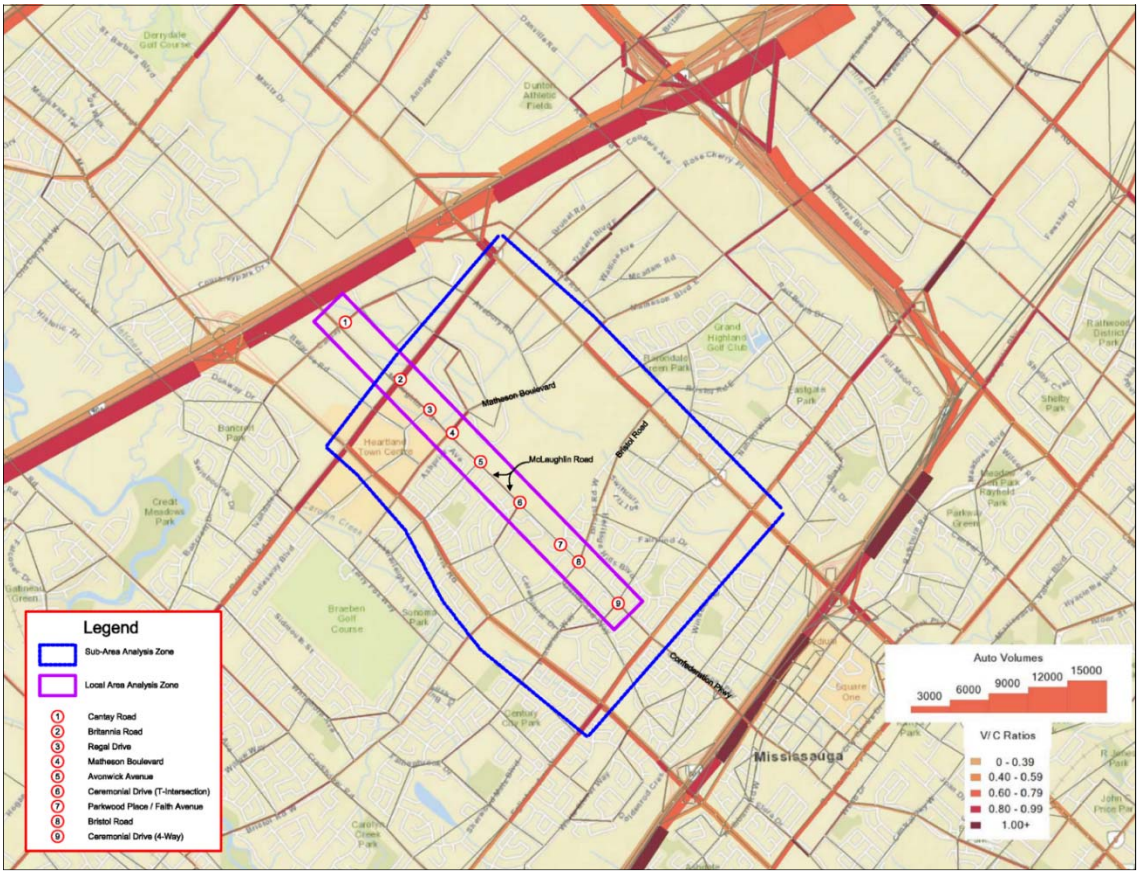

Exhibit 3.8 V/C and Flow Schematic for the Sub-Area Analysis

3.2.4 Traffic Operations along McLaughlin Road

An operational assessment of existing conditions was undertaken for intersections along McLaughlin Road using Synchro and the Highway Capacity Manual (HCM) methodology. Detailed results in this regard are provided in **Appendix B**. The operational analysis of existing (2012) traffic volumes revealed the following.

- Congestion is greatest during the PM peak hour. Significant congestion occurs in the northbound and westbound directions at Matheson Boulevard West, during this period.
- Traffic along McLaughlin Road at Regal Drive, Avonwick Avenue and Parkwood Place/Faith Drive operates poorly for movements turning onto McLaughlin Road. These operations indicate long delays but occur for a low number of vehicles (approximately 40 veh/h). Traffic along McLaughlin Road that crosses these intersections operates at a near free-flow state, without signalization. Long delays experienced by motorists turning onto McLaughlin Road could lead drivers to turn into smaller gaps in traffic, potentially resulting in a safety problem.
- At Ceremonial Drive (T-intersection), southbound traffic experiences long delays, with significant queuing in the PM peak hour.
- Bottlenecks in the traffic flow are commonly found in the transition areas between the two and four lane sections of McLaughlin Road as vehicles adjust to the changing lane configuration. This reduces the operational capacity of the road in these transition areas.
- Signals along McLaughlin Road were not coordinated with synchronized cycle lengths or offsets. Improvements to signal timing plans could benefit the corridor.

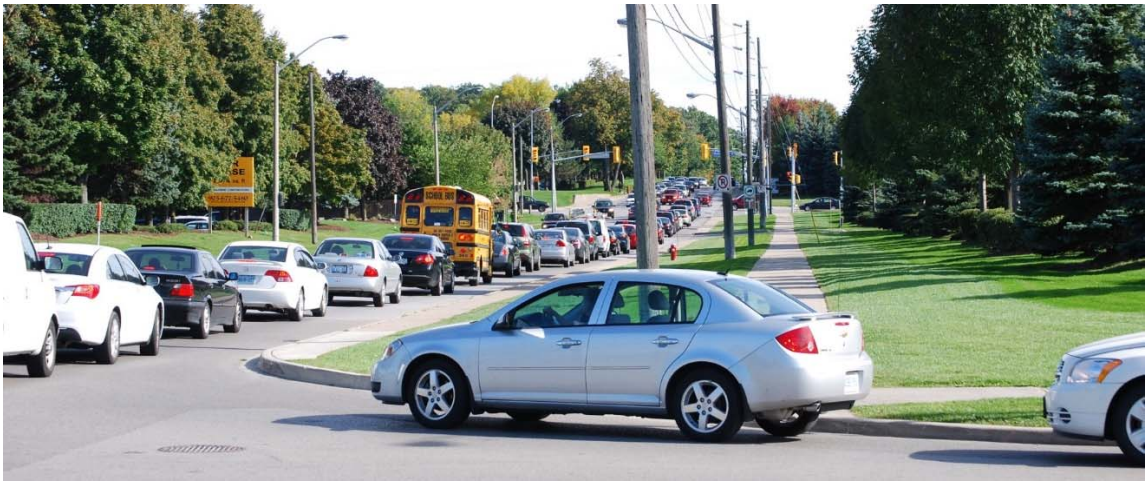

Photo Location: Looking south along McLaughlin Road from Regal Drive

3.3 Future Transportation Conditions

Future traffic volumes were forecasted using MMM's EMME model, which accounts for planned changes in land use and densification according to the City's Official Plan, as well as planned changes to the transportation network. Although the traffic profile indicates flat growth towards 2012, it can be expected that, as the economy recovers and grows, long-term traffic growth will occur since: demographic and economic forecasts indicate positive growth for the sub-area (see *Mississauga Growth Forecast Population 2008-2031* prepared by Mississauga Data in 2010 and *Mississauga Office Strategy Report* prepared by Canadian Urban Institute in 2008); growth in adjacent municipalities and Britannia Road West has recently undergone major capacity

augmentations (4 to 6 lanes along Britannia Road West, and developed north and south approaches), which will attract traffic to the area.

Once forecast traffic growth was determined, effects on corridor operations were analyzed using the Synchro model of the corridor. A range of improvements were tested where traffic operations were congested. Potential improvements to active transportation and transit were also considered.

3.3.1 Traffic Growth

Traffic growth was determined for the future base network and a future 'sensitivity scenario' in consideration of the planned LRT on Hurontario Street.

Between 2006 and 2031 base networks, the modelled road network in EMME was adjusted to account for planned road infrastructure improvements. Key changes were as follows:

- Highway 401, Mavis Road, Britannia Road West had lanes added to the cross-section, potentially attracting additional traffic to these roads; and
- Hurontario Street was reduced from 6 to 4 lanes to account for the Hurontario LRT. This will reduce traffic volumes along Hurontario Street.

To determine growth rates, five northbound-southbound and four eastbound-westbound traffic screenlines were developed using the MMM EMME model as shown in **Exhibit 3.9**. For the most part, the traffic forecasts and diversions used as part of this study are consistent with the EMME model prepared by MMM for the LRT Project. Model results are provided in **Appendix B.**

Exhibit 3.9 Screenline Locations

Findings from the screenline analysis reveals the following.

2031 Base Scenario

- The range of growth for north-south peak direction traffic was 21-26% by 2031. The range for the off peak direction traffic was 33-38%.
- The range of east-west peak direction traffic was 2-5%. This range appears low, which is due to near-capacity operations. The range of off peak direction traffic was 16-57%.

2031 Hurontario LRT Scenario

- Overall growth in the north-south direction is lower, as traffic capacity on Hurontario Street is limited and drivers either divert to alternative routes or switch to transit mode.
- The peak direction of traffic along McLaughlin Road experienced an increase of approximately 100 veh/h north of Britannia Road and 50 veh/h south of Britannia Road. This volume, while relatively low compared to background volume, accounts for drivers

diverting from Hurontario Street due to the reduction in capacity, as the LRT will remove two travel lanes (one per direction).

3.3.2 Future Traffic Projections (2031)

To forecast future (2031) traffic volumes, traffic growth measured by the EMME 2031 Base model was applied to existing volumes, applying the following principles:

- Since the EMME model used 2006 and 2031 (25 years) as trend endpoints, traffic growth was proportioned to represent 2012 to 2031 (19 years);
- Since the EMME model was limited to modelling AM peak hour traffic, PM peak hour peak direction of travel was assumed to be opposite, i.e. southbound and westbound;
- The derived growth rates for peak and off-peak directions were applied accordingly to through movements at all intersections; and,
- Application of the growth rates to only through movements limits the uncertainty associated with forecasting turning movements from EMME.

Exhibits 3.10 and **Exhibit 3.11** illustrate the forecasted link and detailed turning movement volumes respectively for the 2031 base scenario.

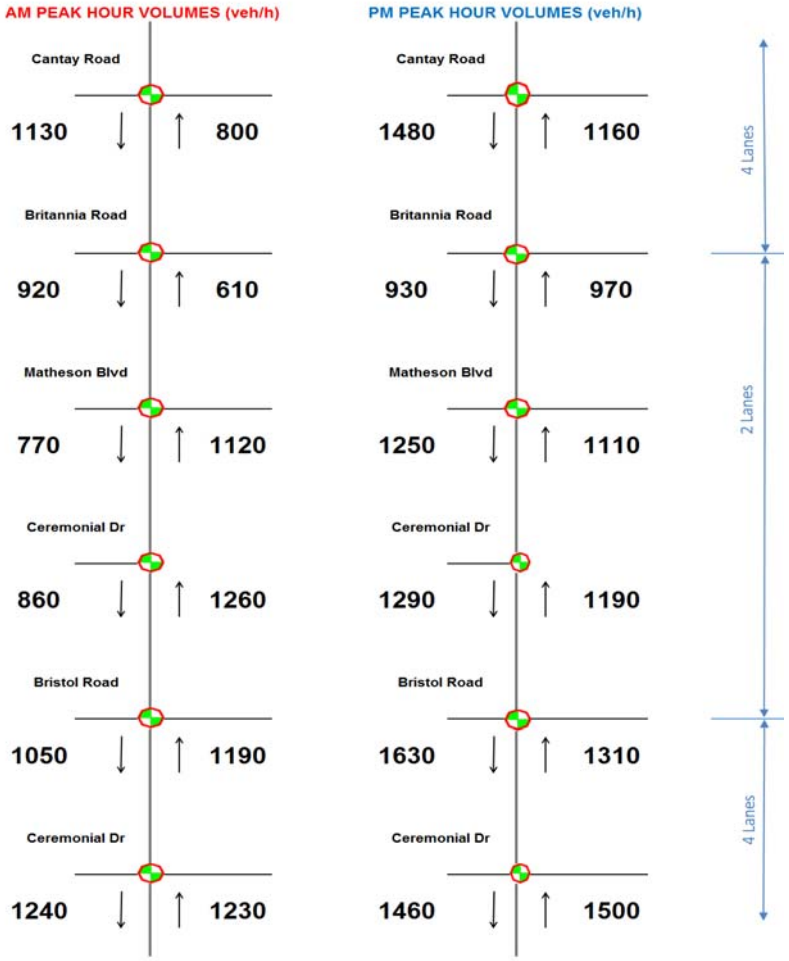

Exhibit 3.10 Projected (2031) Traffic Volumes along McLaughlin Road

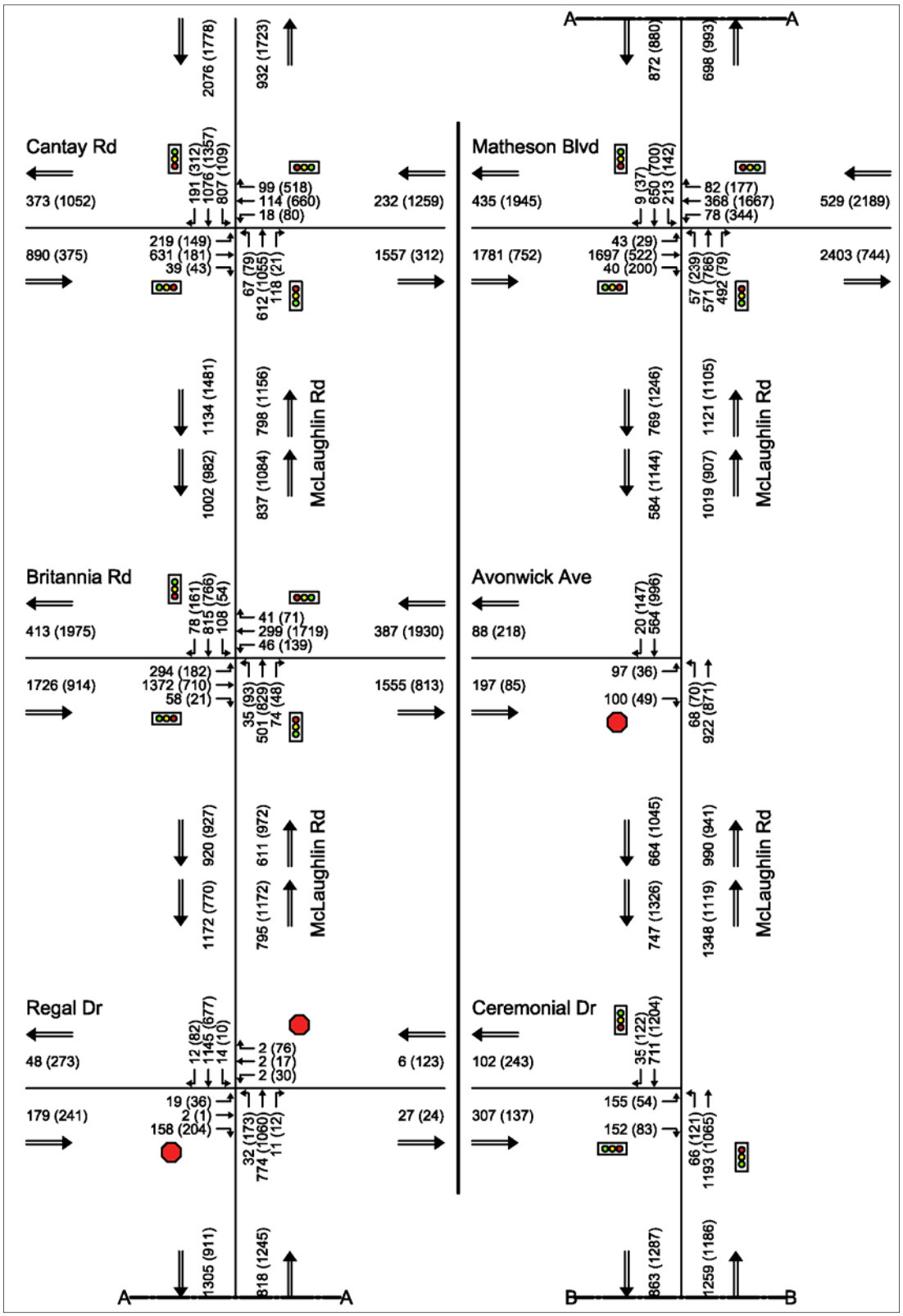

Exhibit 3.11 2031 Forecast Volumes, AM (PM)

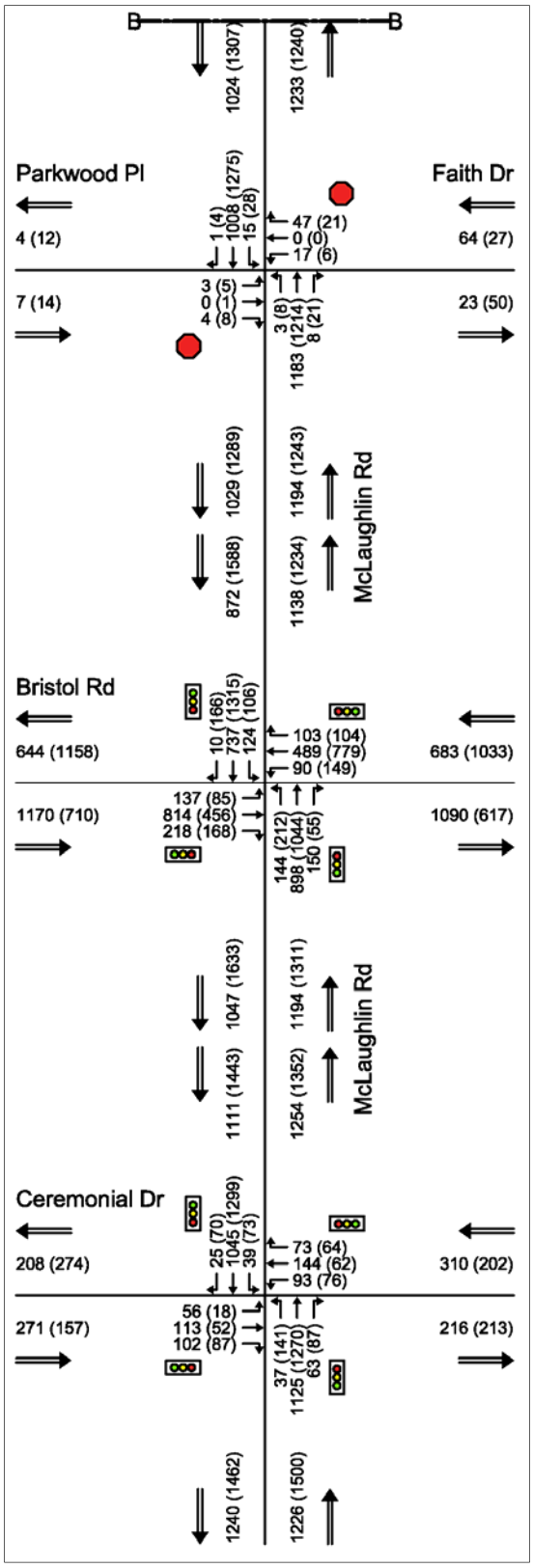

Exhibit 3.11 2031 Forecast Volumes, AM (PM) - continued

3.3.3 Future (2031) Traffic Operations Assessment – Do Nothing

An operational assessment of future conditions based on existing intersection configuration (representative of Do-Nothing Conditions) was undertaken for intersections along McLaughlin Road using Synchro and the Highway Capacity Manual (HCM) methodology. Level-of-service (LOS), an alphabetical metric based on delays experienced by vehicles, was used an indicator of traffic performance. **Exhibit 3.12** relates LOS with delay. Volume/Capacity (v/c) ratios are also used to indicate performance of specific movements and are illustrated in **Exhibit 3.14**.

Exhibit 3.12 LOS Definitions

LOS	Stopped Vehicle Delay (seconds)	
	Signalized	Unsignalized
A	≤10	≤10
B	>10, ≤20	>10, ≤15
C	>20, ≤35	>15, ≤25
D	>35, ≤55	>25, ≤35
E	>55, ≤80	>35, ≤50
F	>80	>50

The assessment of future conditions using 2031 forecasts reveals the following:

- Traffic operations along the McLaughlin Road will continue to deteriorate and will result in significant congestion, particularly during the PM peak hour. Southbound through movements approaching Matheson Boulevard West and Ceremonial Drive will operate overcapacity, resulting in significant queuing and delays which extend beyond these intersections, affecting operations throughout the study area.
- Access to McLaughlin Road from local roads will significantly worsen. At all unsignalized intersections (i.e. Regal Drive, Avonwick Avenue, Parkwood Place/Faith Drive) drivers will experience significant delays (i.e. LOS F) turning left onto McLaughlin Road. In each cases, the project demands will significantly exceed the available capacity. The higher north-south volumes and longer east-west delays make it more likely that drivers turning onto McLaughlin Road will do so unsafely (i.e. accepting shorter gaps in traffic to do so).

A signal warrant analyses undertaken at all unsignalized intersections found that none warranted signalization. Furthermore, unless McLaughlin Road is widened to four lanes, additional traffic signals will further restrict north-south movements.

Diversions away from congested operations along McLaughlin Road are not expected since the corridor provides key access to business commercial areas north of Matheson Boulevard, the Heartland Town Centre, and residential areas south of Matheson Boulevard.

Details of intersection operations assessment are summarized in **Exhibit 3.13** with mitigation opportunities provided for the 2031 base scenario. **Exhibit 3.14** illustrates intersection operations under the base do-nothing condition.

Exhibit 3.13 Future Conditions Critical Intersection Operations and Mitigation(s)

INTERSECTION WITH MCLAUGHLIN ROAD	CRITICAL OPERATIONS / OVERALL INTERSECTION LOS	MITIGATION(S)
Major Congestion Points		
Matheson Boulevard	• Overall LOS F in AM and PM peak hours • LOS F: eastbound approach in AM; westbound, northbound, southbound approach in PM • Longer queues than existing conditions	• Over-capacity approaches indicate need for roadway improvements (additional through or turning lanes) • Implement more advanced signal control
Ceremonial Drive (T-intersection)	• Overall LOS E in PM peak hour, C in AM peak hour • LOS F: southbound approach with V/C 1.22 in PM peak hour • 1,300veh/h southbound in PM peak hour • Longer queues than existing conditions	• Over-capacity approach indicates a need for roadway improvements (additional through or turning lanes)
Minor Congestion Points		
Regal Drive	• Side-street approach at LOS E/F (EBTL, WBTL) in AM and PM peak hours • Low eastbound-westbound left and through volumes (<40veh/h per movement)	• Consider restricting left turns during peak hours
Avonwick Avenue	• Side-street approach at LOS F (EBL) in AM and PM peak hours • Low eastbound volumes (<100veh/h)	• Consider restricting left turns during peak hours
Parkwood Place / Faith Drive	• Side-street approach at LOS F (eastbound and westbound approach) in AM and PM peak hours • Low eastbound and westbound volumes (<50veh/h per movement)	• Consider restricting left turns during peak hours
Bristol Road	• Overall LOS C in AM peak hour, D in PM peak hour • LOS F: WBL in AM and PM peak hours	• Implement more advanced signal control

Note(s): EBL = Eastbound Left, EBTL = Eastbound Shared Through Left, WBTL = Westbound Shared Through Left, NBL = Northbound Left, SBTR = Southbound Shared Through-Right, SBR = Southbound Right

Exhibit 3.14 Summary of 2031 Traffic Operations (Do- Nothing)

3.4 Related Problems and Opportunities

3.4.1 Safety

Over the five-year period between 2007 and 2011, a total of 232 collisions were reported within the study corridor. **Exhibit 3.15** illustrates the annual distribution of collisions over this period. The exhibit shows a significant and sustained increase in annual collision frequency along the corridor in the years after 2008. Most of the collisions (182 of 232) occurred at or near the corridor

intersections, particularly the intersections at Britannia Road West, Matheson Boulevard West, Ceremonial Drive, and Bristol Road West.

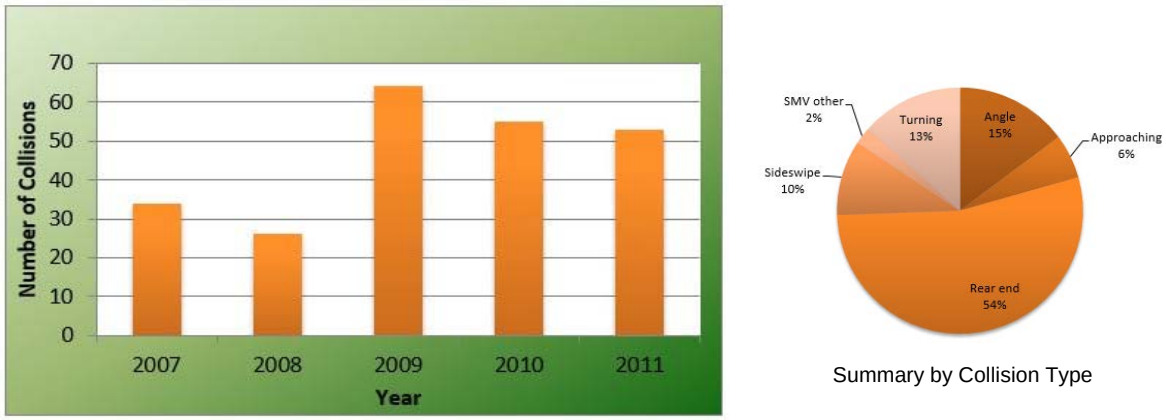

Exhibit 3.15 Five-year Collision Distribution

Collisions are also summarized by initial impact type. The observed distributions are characteristic of a congested, urban commuter corridor (i.e., primarily intersection-related with a high proportion of rear-end collisions). The dominant collision type along the corridor is rear-end collisions; likely the result of heavy congestion along the corridor. Rear-end collisions tend to be more common at intersections with significant queuing. After rear-end collisions, angle and turning movement collisions are the most common. These two collision types are also concentrated at the corridor intersections, and they too are heavily influenced by traffic congestion. As gaps between vehicles become smaller and less frequent, and delays increase, drivers will tend to attempt more aggressive turning movements, and turning and angle collisions subsequently tend to increase in frequency.

The complete traffic safety analysis can be found in **Appendix C.**

3.4.2 Active Transportation

In a broader context, pedestrians use sidewalks that are provided on both sides of McLaughlin Road. However, on the east side of McLaughlin Road between Faith Drive and Britannia Road (i.e. ninety percent of the project length), only a splash pad is available which is not considered to be a pedestrian facility.

Depending on the location, the sidewalk may be directly adjacent to traffic or behind either a concrete or a grass boulevard. **Exhibit 3.16** illustrates the configuration of sidewalks with either separation from traffic or directly adjacent to travel lanes.

Based on the 2012 traffic counts, in the AM peak hour, pedestrian activity is significant at Bristol Road West with 50 pedestrians/hr crossing east-west along the south approach and 25 pedestrians/hr crossing north-south along the east approach. In the PM peak hour, pedestrian activity is significant at Parkwood Place/Faith Drive with 30 pedestrians/hr crossing north-south along the east approach.

Existing on-road bicycle lanes are found along Confederation Parkway/ McLaughlin Road from Bristol Road connecting to Downtown Mississauga. Bicycle lanes are also provided north of the study area, between Cantay Road and Courtneypark Drive. Bike lanes are proposed to be added in the near future south of the study area along McLaughlin Road from Bristol Road West to Eglinton Avenue.

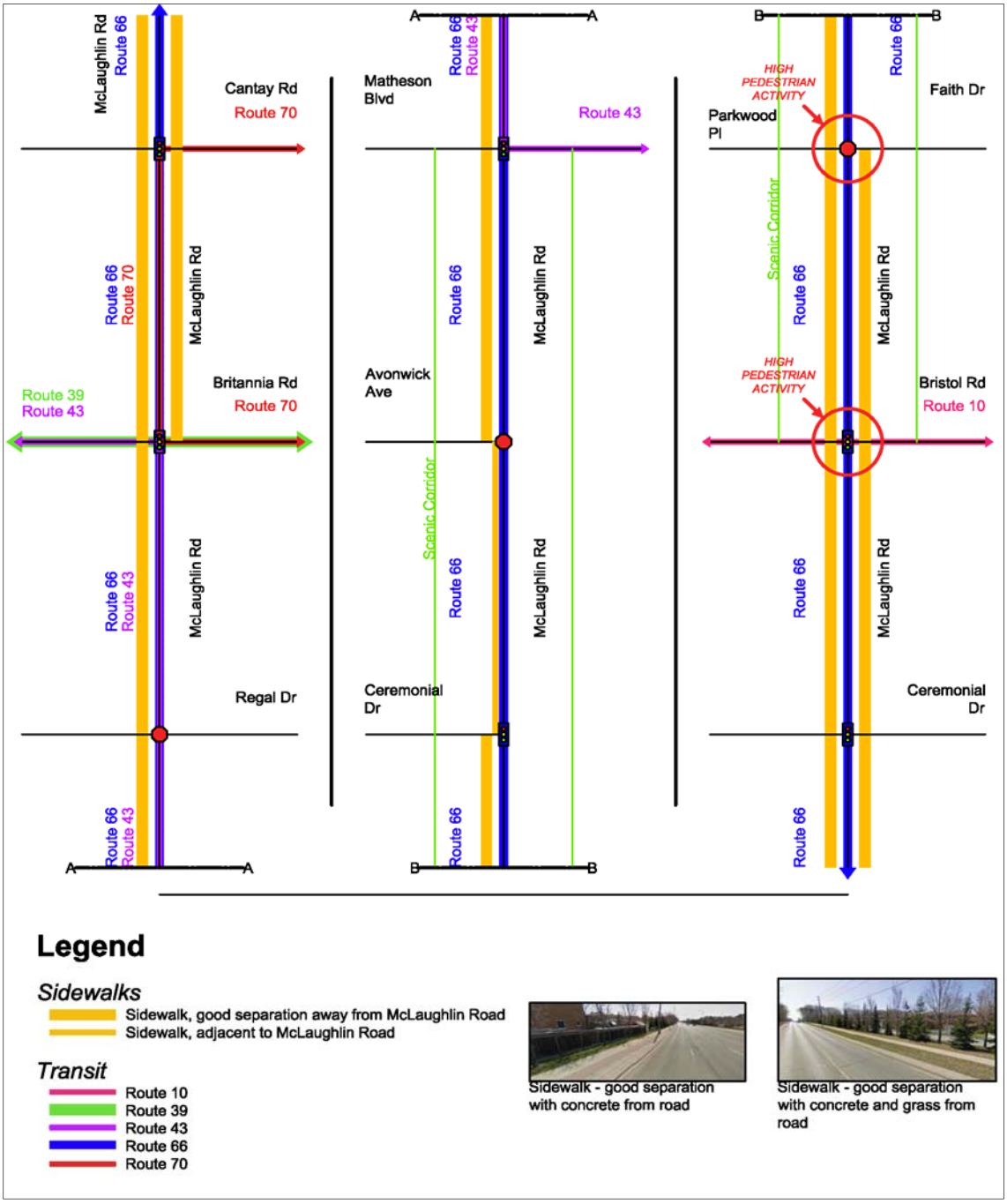

Exhibit 3.16: Existing Transit, Pedestrian and Cyclist Facilities

Along Confederation Parkway, 35 northbound and 58 southbound bicycles were counted between 5:30 AM and 8:30 PM according to the Region of Peel's Cordon Count (2011). On McLaughlin Road south of Highway 401, the Region of Peel (2006) counted 1 northbound and 27 southbound cyclists between 5:30 AM and 8:30 PM. McLaughlin Road crosses dedicated cycling routes at

Bristol Road West, Cantay Road and at Ceremonial Drive. McLaughlin Road can be described as a gap in the City's cycling network. Accordingly, in the City's Cycling Master Plan, McLaughlin Road is proposed as a 'primary on-road cycling route'.

3.5 Transit Services

Mississauga Transit (MiWay) operates several routes along McLaughlin Road and the major roads within the study area. There are five routes that directly use or connect to McLaughlin Road as **Exhibit 3.17**. **Exhibit 3.16** illustrates the location of these transit routes along McLaughlin Road.

Several other routes operate within the study area (refer Exhibit 3.17), including: route 19 Hurontario, route 34 Credit Valley, route 35 Eglinton, route 61 Mavis, route 68 Windsor Hill, route 87 Meadowvale Skymark, route 103 Hurontario Express, and Brampton Transit ZUM route 502 Hurontario. MiWay has observed that, in particular, ridership on Route 66 has been steadily growing over the past years resulting in many improvements to the route's service frequency.

Exhibit 3.17 Bus Stops Along McLaughlin Road

Exhibit 3.18 Transit along McLaughlin Road

ROUTE	SERVICE ROUTE / HUBS	HEADWAYS* (MINUTES)
66 McLaughlin	• Mississauga City Centre Transit Terminal to Sheridan College (Brampton) • Operations along McLaughlin Road	• AM / PM – 13 • Afternoon – 16
43 Matheson-Argentina	• Skymark Hub to Meadowvale Town Centre • AM – westbound only; PM – eastbound only; no afternoon service • Operations between Britannia Road and Matheson Boulevard along McLaughlin Road	• AM / PM – 22
70 Keaton	• Islington Subway Station to area (via Highway 401) bounded by Cantay Road, McLaughlin Road, Matheson Boulevard and Whittle Road (east of Hurontario Street) • Operations between Cantay Road and Matheson Boulevard along McLaughlin Road	• AM – 16-20 • PM – 19-30
10 Bristol-Britannia	• Meadowvale Town Centre and loops back at Hurontario Street • Crosses McLaughlin Road at Bristol Road	• AM / PM – 20 • Afternoon – 27
39 Britannia	• Meadowvale Town Centre and loops back near Kennedy Road and Britannia Road intersection • Crosses McLaughlin Road at Britannia Road	• AM / PM – 30

* Retrieved from 2013 MiWay service plans

3.6 Transportation Problem/Opportunity Statement

McLaughlin Road is a Major Collector within the City's transportation system. The section between Bristol Road West and Matheson Boulevard West is designated as 'scenic route' within the Official Plan. Within this section, McLaughlin Road is currently a two lane urban road with left turn lanes provided at intersections along the corridor. From Matheson Boulevard West to Britannia Road West, McLaughlin Road operates as a two-lane roadway (one lane per direction) plus a centre turn lane.

McLaughlin Road currently operates at/near capacity during the peak hours, and significant congestion occurs particularly at the Matheson Boulevard West intersection. South of Matheson Boulevard West, there are fewer north-south traffic controls and traffic flow improves; however, vehicles accessing McLaughlin Road from the local roads and minor collectors experience significant delays.

It is estimated that traffic demands along the corridor will increase by approximately 19% (in the peak direction of travel) by 2031, as the City of Mississauga continues to grow and develop its urban growth area. During this time, the existing operational problems will continue to worsen and result in unacceptable delays and potential safety concerns.

Based on projected traffic demands along McLaughlin Road, improvements are required to manage congestion, promote effective performance for all modes and enhance safety. Undertaking these improvements also provides an opportunity to incorporate cycling facilities along the corridor in keeping with City's Cycling Master Plan, and incorporate urban design/streetscaping features to enhance the scenic designation of the corridor and the adjacent woodlot (Britannia Farm).

Additional improvements are also recommended to provide a more continuous and improved facility for pedestrians. Currently no sidewalks are provided on the east side of McLaughlin Road between Faith Drive and the access south of Britannia Road West. Sidewalks should be provided along the east side of McLaughlin Road where appropriate; considering elements such as transit facilities and the Britannia Farm.

4 Inventory of Existing Conditions

4.1 Land Use

Existing Development

McLaughlin Road serves as a major collector within the City's transportation system. The adjacent land use changes substantially within the study limits and influences the character of the roadway. Matheson Boulevard West serves as the primary divider between these two sections, as described below:

Bristol Road West to Matheson Boulevard West

The section between Bristol Road West and Matheson Boulevard West is designated as 'scenic route' within the City's Official Plan (OP).

For the most part, lands on the west side of McLaughlin Road are part of a planned residential development and back onto McLaughlin Road, with the exception of a townhouse complex that fronts on to McLaughlin Road just north of Ceremonial Drive. A commercial plaza is located at the southwest corner of the intersection of Ceremonial Drive and McLaughlin Road.

On the east side of McLaughlin Road, a townhouse development backs onto McLaughlin Road between Bristol Road West and Faith Drive. Immediately to the north are the Britannia Farm lands, with approximately 600m of frontage along McLaughlin Road. These lands consist of a large woodlot on undeveloped lands owned by the Peel District School Board. The existing right-of-way is constrained at this location (i.e. 23.1 to 25.1 m) and any road widening may require that additional right-of-way be acquired from this property. The remaining lands on the east side south of Matheson Boulevard are a combination of light industrial and office space.

Matheson Boulevard West to Britannia Road West

From Matheson Boulevard West to Britannia Road West, the adjacent properties on both sides of McLaughlin Road are a combination of light industrial, office, and commercial buildings.

There is one undeveloped property (0.1 km south of Britannia Road) with approximately 61 m of frontage along the east side of McLaughlin Road. The existing right-of-way is constrained at this location (i.e. 28.3 m) and any road widening will require that additional right-of-way limit be acquired from this property.

Similarly, there is a single residence located on a large property parcel within the northeast corner of Matheson Boulevard West and McLaughlin Road intersection. The existing right-of-way is constrained at this location (i.e. 28.1 m) and any road widening will require additional right-of-way.

Land Use Planning

According to the City of Mississauga OP, Schedule 10 **(Exhibit 4.1)**, the lands adjacent to McLaughlin Road are designated as follows:

- West side of McLaughlin Road: Between Bristol Road West and Matheson Boulevard West is a mixture of Residential Low Density and Medium Density with Mixed Use located at Ceremonial Drive. Matheson Boulevard West to Britannia Road West is designated Mixed Use.
- East side of McLaughlin Road: Between Bristol Road West and the Britannia Farm is designated Mixed Use. The Britannia Farm is designated Institutional. The remainder of the study area from the Britannia Farm to Britannia Road is designated Business Employment.

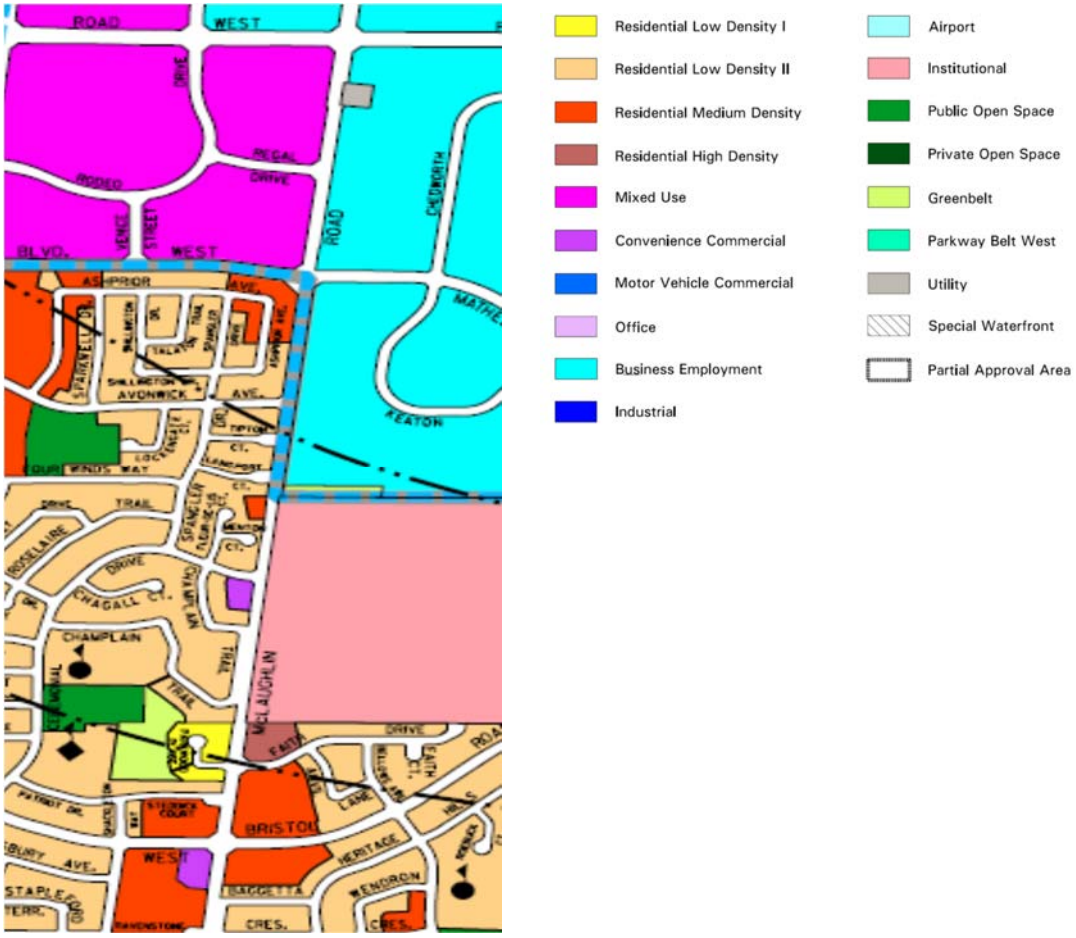

Exhibit 4.1 Part of Schedule 10 Land Use Designations of Mississauga Official Plan

4.2 Natural Heritage

4.2.1 Physiography and Soils

The study area is located within the South Slope physiographic region. This physiographic region occupies approximately 2,400 km^2 and extends from the Niagara Escarpment in the west to the Trent River in the east (Chapman and Putnam 1984). The South Slope predominately consists of shallow shale and till plains which slope gently in a southeasterly direction towards Lake Ontario. The topography is mostly subdued and includes low-relief drumlins and moraines.

The soils within the study limits include Oneida clay loam, Jeddo clay loam, Chingacousey clay loam and Bottom Lands (Hoffman and Richards, 1953). These soils are described below.

a) ***Oneida clay loams*** are found in southern areas of the Region of Peel and have developed from fine textured shale and limestone till on smooth moderately sloping topography. Oneida clay loam soils are slowly permeable, but are well-drained due to rapid run-off. These soils are susceptible to erosion. Oneida clay loam soils are located throughout the study limits (Hoffman and Richards 1953).

b) ***Jeddo clay loam*** is the poorly drained member of the Oneida catena, occurring in small areas within the southern portion of Peel Region. Jeddo soils occur in areas with a smooth and gently sloping topography. A band of Jeddo clay loam soils crosses McLaughlin Road in a west-east direction, just north of Bristol Road West (Hoffman and Richards 1953).

c) ***Chingacousey soils*** are the imperfectly drained member of the Oneida catena. Areas with this soil series are typically smooth and gently sloping. In the study area, Chingacousey soils are recorded adjacent to the Bottom Lands, at Matheson Boulevard West and Regal Drive (Hoffman and Richards 1953).

d) ***Bottom lands*** are associated with low lying areas along stream courses. Bottom land soils are prone to flooding, are poorly drained and show little soil horizon differentiation. These soils are recorded in a band that crosses McLaughlin Road between Matheson Boulevard West and Regal Drive. It should be noted that there is no longer a watercourse or valleyland at this location (Hoffman and Richards 1953).

4.2.2 Aquatic Habitats and Communities

The study area is located within the Cooksville Creek sub-watershed of the Credit River watershed; however, the closest watercourse is located parallel to McLaughlin Road, approximately 700 m to 800 m east of the study limits (between Matheson Boulevard West and Bristol Road West). Based on a review of Credit Valley Conservation (CVC) sub-watershed mapping and correspondence with CVC Staff on October 29, 2012, it was confirmed that there are no watercourses located within the study limits.

4.2.3 Vegetation and Vegetation Communities

The study area consists of a mixture of cultural and forest vegetation communities, including portions of vegetation communities that are already in a disturbed state as a result of the existing roadways and residential land uses. Evidence of disturbance includes a high proportion of non-native plant species that are well adapted to persist in areas that are regularly disturbed including species that are adapted to high light conditions, limited soil moisture, and species that are tolerant of salt spray.

Four Ecological Land Classification (ELC) vegetation community types were identified within the study limits including: dry-moist old field meadow (CUM1-1); mineral cultural thicket (CUT1); dry-fresh sugar maple deciduous forest (FOD5); and, dry-fresh deciduous forest (FOD4). All of the vegetation communities identified within the study area are considered widespread and common in Ontario and are secure globally. These vegetation communities are delineated in **Exhibit 4.2** and **Exhibit 4.3** and are described in **Exhibit 4.4.** There are several vegetation communities that are not recognized by ELC such as areas of manicured grass which include mown lawns, gardens and planted trees.

A total of 73 plant species were recorded within the study area. Five of these plants could only be identified to genus. Of the 68 plant species identified to species, 38 (56%) plant species identified are native to Ontario and 30 (44%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix D**.

Species at Risk

No plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during the botanical investigation within the study area (those plant species regulated as Endangered, Threatened, or Special Concern). However, a number of plant species considered rare in the City of Mississauga or CVC Species of Conservation Concern were recorded. These included: summer grape and linear-leaved willow-herb, which are rare in the City; ground juniper, which is uncommon in the City; and, 19 CVC flora Species of Conservation Concern.

Tree Inventory

A total of 1071 trees consisting of 29 species were examined and assessed within the right-of-way and 10 m beyond between Bristol Road West and Matheson Boulevard West. A total of 18 (60 %) of the tree species assessed are considered native to Ontario. Overall, trees within the study area range in size from 5 to 77 cm DBH and are generally considered to be in good to fair condition with the exception of a few in poor condition.

The majority of trees observed, 751 (63%) of the total number of trees, were planted as streetscape or amenity features on commercial properties. The majority of tree species (54%) identified within this portion of the study area are native to Ontario. A large portion of the trees within the manicured areas have exposed roots.

The woodlot on the east side of McLaughlin Road within the area of investigation contains 229 trees (21% of the total number of trees) within the study area. The majority of species (88%) identified within this portion of the study area are native to Ontario. The trees within the woodlot range in size from 10 to 77 cm DBH. See **Appendix E** for species size and composition.

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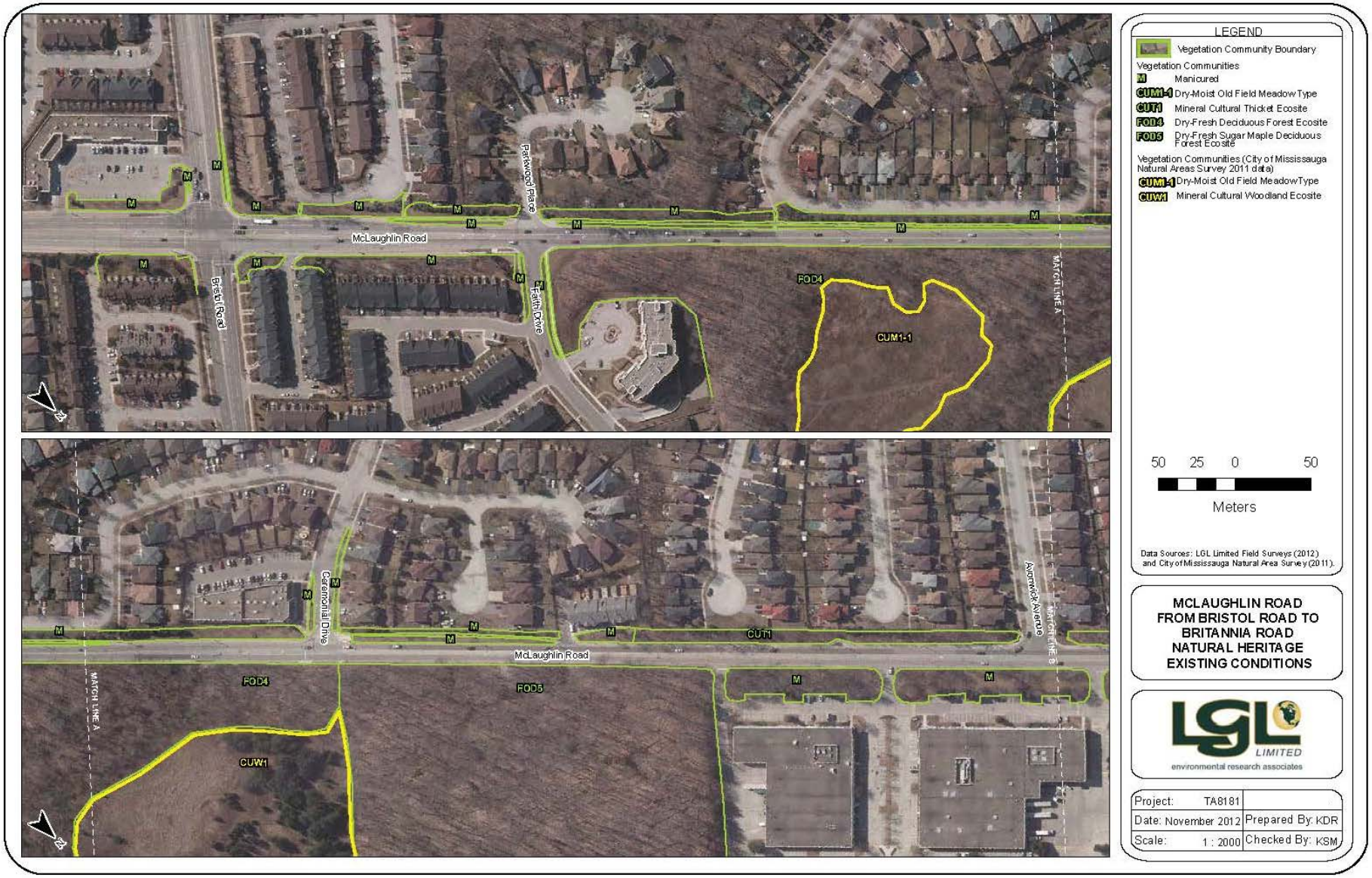

Exhibit 4.2 Existing Natural Heritage Conditions from Bristol Road West to Avonwick Avenue

Exhibit 4.3 Existing Natural Heritage Conditions from Avonwick Avenue to Britannia Road West

Exhibit 4.4 Summary of Ecological Land Classification Vegetation Communities

ELC CODE	VEGETATION TYPE	SPECIES ASSOCIATION	COMMUNITY CHARACTERISTICS
TERRESTRIAL – NATURAL/ SEMI-NATURAL			
FOD	Deciduous Forest		
FOD5	Dry- Fresh Sugar Maple Deciduous Forest	**Canopy:** includes sugar maple (*Acer saccharum* ssp. *saccharum*), black walnut (*Juglans nigra*), red oak (*Quercus rubra*), and white elm (*Ulmus americana*). **Understory**: includes common buckthorn (*Rhamnus cathartica*), riverbank grape (*Vitis riparia*), and sugar maple. **Ground cover**: includes garlic mustard (*Alliaria petiolata*), dame's rocket (*Hesperis matronalis*), white trillium (*Trillium grandiflorum*), and white baneberry (*Actaea pachypoda*).	• Tree cover >60 % (FO). • Deciduous trees >75 % of canopy cover (D). • Sugar maple forest (5). • Site conditions and substrate types variable.
FOD4	Dry- Fresh Deciduous Forest	**Canopy:** includes sugar maple, paper birch (*Betula papyrifera*), ironwood (*Ostyra virginiana*), and white ash (*Fraxinus americana*). **Understory**: includes common buckthorn, tartarian honeysuckle (*Lonicera tatarica*), and riverbank grape (*Vitis riparia*). **Ground cover**: includes garlic mustard, white baneberry, orchard grass (*Dactylis glomerata*), and Canada goldenrod (*Solidago canadensis*).	• Tree cover >60 % (FO). • Deciduous trees >75 % of canopy cover (D). • Tree species associations that are either relatively uncommon or a result of disturbance or management (4).
TERRESTRIAL – CULTURAL			
CUM	Cultural Meadow		
CUM1-1	Dry-Moist Old Field Meadow	**Ground cover:** includes New England aster (*Symphyotrichum novae-angliae*), Canada goldenrod, common St. John's wort (*Hypericum perforatum*), red clover (*Trifolium pratense*), and common evening-primrose (*Oenothera biennis*).	• Cultural community resulting from, or maintained by, cultural or anthropogenic- based disturbance (CU). • Tree cover and shrub cover < 25 % (M). • Parent mineral material or mineral soil (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). Grasses and forbs are dominant (-1).
CUT	Cultural Thicket		
CUT1	Mineral Cultural Thicket	**Canopy**: includes red oak (*Quercus rubra*), sugar maple, bur oak (*Quercus macrocarpa*), blue spruce (*Picea pungens*), white elm, and American beech (*Fagus grandifolia*). **Understory:** includes common buckthorn, staghorn sumac (*Rhus typhina*), hawthorn	• Cultural community (CU). • Tree cover < 25 % (T). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1).

ELC CODE	VEGETATION TYPE	SPECIES ASSOCIATION	COMMUNITY CHARACTERISTICS
		(*Crataegus* sp.), riverbank grape, and cherry (*Prunus* sp.). **Canopy:** includes garlic mustard, dame's rocket, scarlet strawberry (*Fragaria virginiana* ssp. *virginiana*), yellow avens (*Geum aleppicum*).	• Pioneer community resulting from, or maintained by, anthropogenic-based influences.
Other*	Manicured		
M (a-b)	Manicured grasses and planted shrubs and/or trees	Areas where large expanses of grass/shrubs/trees are maintained and/or planted. **Planted trees/shrubs:** includes Norway maple, blue grass (*Poa* sp.), Austrian pine (*Pinus nigra*), blue spruce, and honey locust (*Gleditsia triacanthos*).	
* Not identified as an ELC vegetation community by Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Natural Heritage Information Centre.			

4.2.4 Wildlife and Wildlife Habitat

Wildlife Habitat

Most of the habitat along McLaughlin Road within the study area is comprised of manicured grasses with short stretches of planted trees. However, a small fenced-in cultural meadow exists on the east side of McLaughlin Road just south of Britannia Road West, and approximately 700 metres of continuous natural heritage features is present on the east side of McLaughlin Road, north of Bristol Road West. The latter consisted primarily of deciduous forest along the east side of McLaughlin Road with a cultural thicket and cultural meadow along its eastern border. Most of the forest showed signs of human disturbance (e.g., walking trails and garbage). The cultural thicket and cultural meadows behind the forest looked relatively undisturbed. No significant wildlife habitat was identified within the study area.

Fauna

A total of 40 species of wildlife fauna were recorded during the field investigations undertaken s part of this study (see **Appendix D** for a list of wildlife species documented within the study area).

Only one herpetofaunal species, Eastern Gartersnake, was included in the species list based on the presence of suitable habitat within the study area. No amphibians or reptiles of any species were found during the field surveys.

The bird fauna recorded around the commercial and residential areas were generally considered urban species tolerant of human disturbances. Species such as American Robin, Chipping Sparrow, Northern Cardinal, and House Finch were all observed in and around the commercial and residential sections of the study area. Most of the species recorded, however, are not as tolerant of human presence and were concentrated within the forests and cultural meadows at the southeast limit of the McLaughlin Road study area. The forest contained species such as Northern Flicker, Downy Woodpecker, Red-breasted Nuthatch, Cedar Waxwing, Great Crested Flycatcher, Red-eyed Vireo, and Baltimore Oriole. Investigations into the cultural meadow and cultural thicket along the east side of the forest revealed bird species such as Red-tailed Hawk, Gray Catbird, Indigo Bunting, Barn Swallow, and American Goldfinch. Barn Swallow is regulated as a Threatened species under the Ontario *Endangered Species Act*.

All of the mammal species recorded are tolerant to human disturbance. Species such as Eastern Cottontail, Gray Squirrel, Eastern Chipmunk, Raccoon, Striped Skunk, Eastern Coyote, and White-tailed Deer were identified inhabiting the commercial, residential and natural heritage areas. Numerous migration corridors for these species were observed along McLaughlin Road. Corridors for smaller mammals were observed parallel to and along each side of McLaughlin Road through the tree planted areas. Some corridors lead to crossing points over McLaughlin Road to connect areas on both sides of the road. Most of the corridors, especially for the larger species such as Eastern Coyote and White-tailed Deer, were located in the forest and cultural meadows. Corridors occurred parallel to McLaughlin Road through the forest while other corridors connected the forest corridors to the cultural meadows and cultural thickets that bordered the forest. Although wildlife was recorded in the forest, evidence showed that the activity was minimal for a forest of this type and that human disturbance may be a contributing factor.

Species at Risk

Of the 29 species of birds recorded, one species, Barn Swallow is regulated as Threatened under the Ontario *Endangered Species Act* (ESA), and is listed as 'Threatened' by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). Twenty-two bird species are protected under the *Migratory Birds Convention Act* and one is protected under the *Fish and Wildlife Conservation Act*. Five bird species are considered birds of conservation priority for Southern Ontario by Bird Studies Canada. Three of these, American Goldfinch, Barn Swallow and Red-breasted Nuthatch, are considered area-sensitive birds, meaning that a reduction in habitat loss can directly affect their breeding success. Of the nine species of mammals recorded, eight are protected under the *Fish and Wildlife Conservation Act*.

Background information collected from Natural Heritage Information Center (NHIC) database revealed two species at risk previously reported within or adjacent to the study area. Henslow's Sparrow, which is regulated as 'Endangered' under the ESA and SARA, was recorded in 1932. Musk Turtle, which is regulated as 'Threatened' under both the ESA and SARA, was recorded in 1969. The required habitats of both these species have disappeared since these records were made and neither species were observed during the field investigations.

Designated Natural Areas

A review of the Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre indicates that there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area.

City of Mississauga Official Plan

The City of Mississauga OP, identifies the woodlands located along McLaughlin Road are designated as 'Significant Natural Areas and Natural Green Spaces' and 'Special Management Areas' within the Natural Area System of the City of Mississauga. A natural linkage connects the larger woodlands on the east side of McLaughlin Road to another natural system located along the Cooksville Creek valleylands.

Region of Peel and CVC Natural Areas Inventory

The Natural Areas Inventory for the Region of Peel was reviewed to identify any additional natural area data. However, none of the natural areas inventoried for the Region of Peel are located within the study limits.

CVC Natural Heritage System

The woodlands are part of the CVC Natural Heritage System, and are identified as High Functioning on the east side of McLaughlin Road. This natural area east of McLaughlin Road is identified as a 'Core ecofunction' habitat patch category of the CVC Natural Heritage System.

4.3 Groundwater

A hydrogeological review was undertaken as part of this study to assess the potential impacts to shallow ground water levels. Of the 30 boreholes drilled along the alignment of McLaughlin Road (ranging in depth from 2.0 m to 8.1 m below existing grade) all were observed to be dry, indicating that the groundwater levels were below the borehole termination depths. Till deposits were also observed to be brown in colour indicating that the shallow groundwater table is likely to be at depths greater than the depth of the drilling. See **Appendix F** for the results of the hydrogeological analysis.

4.4 Geotechnical Conditions

The pavement structures of McLaughlin Road, Matheson Boulevard West and Bristol Road West are summarized in **Exhibit 4.5**.

Exhibit 4.5 Pavement Structure of McLaughlin Road, Matheson Boulevard West and Bristol Road West

PAVEMENT COMPONENT	AVERAGE PAVEMENT THICKNESS (MM)		
	McLaughlin Road	Matheson Boulevard West	Bristol Road West
Asphaltic Concrete	160	170	165
Base/ Subbase Course	620	570	545
Total Average Pavement Thickness	780	740	710

Standard Penetration Tests (SPT) carried out in the granular base/sub-base courses of the pavement indicate that the relative density of the granular base/sub-base is compact to very dense.

Fill soils were encountered within the project limits. The fill material is variable in composition and generally consists of cohesive clayey silt to silty clay soils and non-cohesive gravelly sand and sandy silt to silty sand. The clayey silt to silty clay fill soils extend to depths ranging from 1.1 m to at least 2.0 m below ground surface. This fill has a firm to very stiff consistency. The non-cohesive gravelly sand, sandy silt and silty sand fill extend to depths ranging from 1.1 m to 4.6 m below ground surface. The non-cohesive fill is described as very loose to dense.

A major glacial till deposit was encountered throughout the site. This glacial deposit consists of broadly graded till soils with a soil matrix that ranges from cohesive clayey silt and silty clay; to non-cohesive silty sand, sandy silt and sand.

The Preliminary Pavement Design and Geotechnical Report, completed as part of this study, is provided in **Appendix G**.

4.5 Cultural Heritage

4.5.1 Archaeology

The study area is bordered by a mix of recent residential, commercial, and industrial development. One exception is Britannia Farm property, which remains relatively undisturbed due to the preservation efforts of the Peel District School Board. The study area also features a number of old trees and woodlots, indicating that while some areas have been recently developed, some parcels of land remain relatively undisturbed.

A Stage 1 Background Study was completed for the study area. Of the 37 archaeological sites located within 1 km of the study area, two are located within 50 m of the study area boundaries. The sites are described below:

- The first site is located within a proposed subdivision at the southwest corner of Britannia Road West and McLaughlin Road. The site consisted of a single chert flake that was recovered in gently rolling farm land of clay loam; and,
- The second site is located at the southwest corner of Britannia Road West and McLaughlin Road. The site yielded a total of 1129 historic artifacts including ceramics, crockery, glass, bottles, window glass, buttons, nails, pipes, and metal. The site was located on gently rolling farm land that was drained by two tributaries of Cooksville Creek.

Several areas of archaeological potential exist in the McLaughlin Road study area. These areas include woodlots with old oak trees and open green spaces that appear relatively undisturbed (see **Appendix H** for locations). These lands retain archaeological potential for Aboriginal and Euro-Canadian archaeological resources and will require further archaeological assessment should they be impacted by the proposed work.

4.5.2 Built Heritage

McLaughlin Road has a rural land use history dating back to the early 19th Century. Two Cultural Heritage Landscapes (CHL) were identified in the study area (see **Appendix I** for locations):

- Britannia Farm: Identified as a CHL by the City of Mississauga and includes: the Britannia Schoolhouse; Britannia Farmhouse and William Chisholm House.
- Scenic Road: Classified as a Scenic Route in the City of Mississauga Official Plan, this road was first established in the early 19th Century. Originally a two-lane dirt road, McLaughlin Road was an undulating road prior to grading that followed the natural topography of the landscape. In the 1950's the road was paved, and has since been graded and widened in sections. The existing canopy is composed of mature trees planted prior to development, which occurred in the late 1980's, and this forested appearance is important in maintaining the character of the area.

Britannia Farm

The Britannia Farm Property is owned by the Peel District School Board. The property consists of two nineteenth-century brick residences, one nineteenth-century barn, and a schoolhouse built in 1852. Landscape features include farmland under cultivation to the southwest of the buildings and a forested 'sugar bush' abutting McLaughlin Road at the northwest quarter of the property. The property was donated to be held in trust for the local board of education in 1833 by King William IV. The land was intended to support the local Schoolhouse through rental revenue. Subsequently, most of the property retains its agricultural character and in addition, the property retains its original boundaries.

Heritage attributes that express the values of the subject property include, but are not limited to:

- Britannia School House;
- Britannia Farm House;
- Gardner-Dunton House;
- Original hedgerows;
- Original field pattern;
- Mature oak and maple trees lining McLaughlin Road;
- Sugar bush; and
- Fence lines.

The Britannia Farm Heritage Impact Assessment (HIA) can be found in **Appendix J**.

4.6 Noise and Vibration

4.6.1 Noise

There are a number of noise barriers along the west side of McLaughlin Road. They range in height from 1.8 to 2.4 m. Although the majority are in good condition, some sections of the barrier north of Ceremonial Drive and north of Avonwick Avenue are structurally deficient. See **Appendix K** for a location of the barriers. Existing sound levels in the study area are summarized in **Exhibit 4.6**.

Exhibit 4.6 Sound Level Measurement Summary

LOCATION	MEASURED SOUND LEVEL ($L_{eq(20MIN)}$ DBA
McLaughlin Road/Faith Drive	64
5410 Champlain Trail	69
Edge of Langport Court	61
557 Ashprior Avenue	66

4.6.2 Vibration

Vibration measurements indicate that moderate levels of vibrations were recorded at some locations which may be perceptible inside the dwelling units, dependant on variables such as building construction and floor span. The ground borne vibrations were generally observed to be caused by larger trucks or buses driving over imperfections in the road surface and storm drains. The condition and makeup of the soil and bedrock may be a contributing factor to the amplification and/or propagation of ground borne vibration. Additional details in this regard can be found in **Appendix K**.

4.7 Stormwater Management

4.7.1 Existing Drainage Conditions

The study area is located within the Cooksville Creek sub-watershed of the Credit River watershed. The closest watercourse is located approximately 650 m east of the study area and runs roughly parallel to McLaughlin Road. There are no watercourses located within the study limits.

McLaughlin Road is an urban section, fitted with curb and gutter. The general slope of the road is from north to south, and there are three low points within the project limits. Runoff from the roadway is collected by catchbasins and conveyed by a storm sewer system which discharges into the following municipal trunk sewers:

- Cantay Road Municipal Trunk Sewer (Outlet 1): 800 mm diameter McLaughlin Road storm sewer collecting runoff from north of Cantay Road, draining to a 975 mm diameter Cantay Road storm sewer, and ultimately discharging into the Matheson Boulevard West trunk sewer system before draining into Cooksville Creek at the Matheson Boulevard West culvert crossing.
- Matheson Boulevard West Municipal Trunk Sewer (Outlet 2): 2550 mm diameter McLaughlin Road storm sewer discharging to a 2700 mm diameter Matheson Boulevard West storm sewer which in turn drains to the Cooksville Creek Culvert located across

Matheson Boulevard West. This truck sewer collects storm runoff between Britannia Road West and 450 m south of Matheson Boulevard West.

- Bristol Road West Municipal Trunk Sewer (Outlet 3): 1500 mm diameter McLaughlin Road storm sewer discharging into a 1650 mm diameter Bristol Road West storm sewer which in turn discharges into the Cooksville Creek Culvert at Bristol Road West. This truck sewer collects runoff from McLaughlin Road between Bristol Road West and 450 m south of Matheson Boulevard West.

- Eglinton Avenue West Municipal Trunk Sewer (Outlet 4): 750 mm diameter McLaughlin Road storm sewer draining to a 1200 mm Eglinton Avenue West trunk sewer which eventually discharge into the Cooksville Creek Culvert at Eglinton Avenue West.

The size of the existing storm sewer system ranges from 450 mm to 2550 mm. The current sewer system details are provided in **Exhibit 4.7**. The existing storm sewer system layout within the project limits and storm outlet locations can be found in **Appendix L**.

Exhibit 4.7 Existing Storm Sewer Systems

SEWER REACH	LENGTH (M)	SIZE /DIAMETER (MM)	SLOPE	RECEIVING SYSTEM
11+970 to 12+155	185	1200	0.35%	2700 mm Matheson Boulevard West Trunk Storm Sewer
11+790 to 11+970	180	1350	0.40%	
11+670 to 11+790	120	2550	0.48%	
11+524 to 11+670	146	2550	0.48%	
11+435 to 11+524	88.5	525	2.3%	
11+340 to 11+435	95	450	1.8%	
11+245 to 11+340	95	450	1.0%	
11+135 to 11+245	110	450	0.6%	
10+930 to 11+020	90	450	0.8%	1650mm Bristol Road West Trunk Storm Sewer
10+840 to 10+930	90	450	1.5%	
10+750 to 10+840	90	450	1.6%	
10+660 to 10+750	90	525	1.30%	
10+570 to 10+660	90	600	0.80%	
10+470 to 10+570	100	675	0.60%	
10+370 to 10+470	100	750	0.60%	
10+000 to 10+370	370	1500	0.50%	

Existing Drainage Design and Stormwater Management Issues

A review of information provided by City of Mississauga indicates that the existing right-of-way of McLaughlin Road was included in the drainage sub-catchment and development plans for areas along McLaughlin Road. The areas that had been modelled in the storm sewer design used a typical runoff coefficient of 0.75, reflective of an urban road section.

Previous development of the lands adjacent to the study area has resulted in the loss of drainage system headwater channels. The headwater channels have been replaced with storm sewer systems and particularly a number of trunk sewer pipes. There is no direct discharge of surface runoff from this section of McLaughlin Road into any watercourses. Upgrades to McLaughlin Road

will not alter this situation. The existing drainage system has been designed to address the minor and major system flow routes. No specific water quality treatment measures currently exist within the project limits.

4.8 Contaminated Soils

Development along McLaughlin Road includes light industrial facilities and a retail gas station. The Phase One Environmental Site Assessment (**Appendix M**) identified the following Areas of Potential Environmental Concern (APECs) that may have resulted in adverse impact to the environmental condition of the property. The sites are listed in **Exhibit 4.8**.

Exhibit 4.8 Areas of Potential Environmental Concern

LOCATION OF AREA OF POTENTIAL ENVIRONMENTAL CONCERN	POTENTIAL CONTAMINATING ACTIVITY		LOCATION OF PCA (ON-SITE OR OFF-SITE)	CONTAMINANTS OF POTENTIAL CONCERN	MEDIA POTENTIALLY IMPACTED (GROUNDWATER, SOIL AND/OR SEDIMENT)
Light industrial properties to the north and west	n/a*	Registered waste generators	Off-site	Metals volatile organic compounds (VOCs)	Groundwater
6015 McLaughlin Road (at Britannia Road intersection)	28	Gasoline and associated products storage in fixed tanks	Off-site	Metals VOCs Petroleum hydrocarbons (PHCs)	Groundwater
* n/a- contaminating activity is not specifically identified in Table 2, Schedule D of Ontario Regulation 153/04 (as amended)					

4.9 Existing Utilities

Existing utility information was initially secured from the City of Mississauga. This information was supplemented by detailed plans received from individual utility companies during the study. The latest information received from Enbridge Gas, Enersource, Peel Region, and Rogers was incorporated into a consolidated utility plan prepared for the study area.

A summary of existing utilities is provided below:

Gas (Enbridge)

North of Bristol Road West, Enbridge maintains a gas main on the east side of McLaughlin Road to approximately 115 m north of Faith Drive (offset ±5.25 m inside the existing right-of-way). At this point it crosses over to the west side of McLaughlin Road. The gas main on the west side extends from Parkwood Place to Langport Court and is typically offset 1.0 m from the existing right-of-way.

North of Matheson Boulevard West, a separate Enbridge gas main is located on the east side of McLaughlin Road (offset ±3.0 m inside the existing the right-of-way). This gas main extends northerly to Britannia Road West and is typically offset 1.0 m inside the existing right-of-way.

Hydro (Enersource)

Enersource maintains an overhead hydro facility along McLaughlin Road throughout the corridor. It runs along the east side of McLaughlin Road from south Bristol Road West to approximately 40 m south of Faith Drive. The facility then switches to the west side of McLaughlin Road immediately south of Faith Drive/Parkwood Place and runs along the west side for the remainder of the study area. The offset of hydro poles from the existing edge of pavement varies throughout the corridor between 1.1 m to 6.5 m.

Watermain (Peel Region)

South of Bristol Road West, a 150 m diameter (dia.) PVC watermain is located on the east side of McLaughlin Road. This watermain is located 1.7 m (minimum) below existing road grade. It is proposed to be abandoned and replaced with a new 300mm dia. PVC facility on the west side of McLaughlin Road. A 400mm dia. concrete pressure pipe (CPP) watermain is located on the west side of existing road centerline between Bristol Road West and Britannia Road West with varying offsets throughout the corridor. The watermain is partially located under existing roadway and the west side boulevard between Bristol Road West and Parkwood Drive. North of Parkwood Drive, it is within the west side boulevard up to Ceremonial Drive. Approximately 190 m north of Ceremonial Drive, the watermain exists under the roadway at an offset of 1.87 m from the edge of pavement. North of Britannia Road West, the 400 mm dia. watermain is connected to a 300 mm dia. C.P.P. watermain.

Storm Sewer

The details of existing drainage and storm sewers is discussed in Section 4.7 of this report.

Sanitary Sewer

There are three sizes of sanitary sewers present within the study area along McLaughlin Road:

- A 375 mm dia. sanitary sewer runs from Bristol Road West to ±160m north of Faith Drive/Parkwood Place along existing centreline of McLaughlin Road.
- Between Matheson Boulevard West and Regal Drive, a 450 mm dia. sanitary sewer exists. It is located at a minimum depth of ±5.3m below existing road grade and offset ±2.5m on the east side of the centreline.
- From north of Regal Drive to Britannia Road West, a 250 mm dia. sewer exists and is provided with a minimum ±3.9m cover between existing road grade and top of the existing sewer. The offset between the existing sewer and road centreline varies from 0.1m to 3.1m within this section.

Bell Canada

The existing Bell facility runs along the east side of McLaughlin Road between Bristol Road West and Faith Drive. It then crosses to the west side of McLaughlin Road and runs in the boulevard from Parkwood Place to ±155 m north of Ceremonial Drive. A Bell facility is also located within the west side boulevard between Matheson Boulevard West and Regal Drive.

On the east side, Bell facility runs along McLaughlin Road from immediately north of the Britannia Farm site (opposite the Langport Court cul-de-sac) to the north of Britannia Road West.

Rogers Cable

For the most part, Rogers Cable runs along the west side of McLaughlin Road with several crossings at major intersections. The location of Rogers cable are as follows:

- A buried coaxial and fiber TV cable is present along Bristol Road West, crossing McLaughlin Road at the southern leg of the intersection.
- A ±280m and ±240m long buried coaxial cable runs in the vicinity of Parkwood Place and north of Ceremonial Drive respectively within the west side boulevard. The cable adjacent

to Parkwood Place is also connected to the facility on the east side at Faith Drive with an underground connection across McLaughlin Road, immediately south of the Faith Drive/Parkwood Place intersection.

- At Matheson Boulevard West, a buried fiber cable crosses McLaughlin Road at the northern leg of the intersection and connects to an aerial fiber cable on the west side, which later connects to aerial facility on the south side of Britannia Road West.

The existing utilities are illustrated in the Utilities Plan contained in **Appendix N** and further summarized in **Exhibit 4.9**.

Exhibit 4.9 Existing Utilities along McLaughlin Road

UTILITY	WEST SIDE	EAST SIDE	COMMENTS
Gas	10+210 to 10+960 12+650 to 12+810	9+980 to 10+320 11+540 to 12+300	Crossings at 9+990, 10+320, 12+130
Hydro	10+170 to 12+900	9+300 to 10+170	Crossings at 10+170, 12+140
Water	- 9+990 to 12+250 12+250 to 12+880 -	9+300 to 9+990 - - 	150mm dia on East side 400mm dia on West side 300mm dia on West side Crossings at 9+520, 9+990, 10+200, 11+530, 12+170, 12+840, 12+900
Storm	-	-	Refer Exhibit 4.7 for details
Sanitary	10+000 to 10+380 11+520 to 11+800 11+800 to 12+740 - -		375mm dia along centreline 450mm dia along centreline (plus crossing at 11+520) 250mm dia along centreline Crossings at 11+670, 11+800, 11+930, 12+060 Connections from eastside at 10+000,12+240, 12+500
Bell	10+190 to 10+870 11+150 to 11+200 11+480 to 11+510 11+540 to 11+770 11+790 to 11+820 12+120 to 12+200	9+300 to 10+190 10+970 to 12+930	Crossings at 10+190, 11+510, 11+640, 11+770, 12+140, 12+180, 12+820
Rogers	- 10+130 to 10+370 10+720 to 10+930 11+540 to 11+560 11+560 to 12+140	- 10+170 to 10+200 - - -	Buried Coaxial and Fiber TV Plant Crossing at 9+970 Buried Coaxial TV Plant (plus Crossing at 10+170) Buried Coaxial TV Plant Buried Fiber TV Plant (plus Crossing at 11+540) Aerial Fiber TV Plant (plus Crossing at 12+140)

5 Alternative Planning Solutions

5.1 Alternative Transportation Planning Solutions

Alternative solutions are planning options that could potentially address the identified problem and/or could lead to an opportunity. The following sections describe the alternative solutions considered as part of this study to address the identified problem, as outlined in Section 3.6.

5.1.1 Do Nothing

As required by the Municipal Class EA process, the Do Nothing option was considered and evaluated against the other options. This alternative included no improvements or consideration for additional measures to address long-term project specific problems or opportunities on McLaughlin Road.

This alternative was considered to provide a baseline upon which other alternatives were evaluated. As the City of Mississauga continues to grow and develop its urban growth area, the current status of McLaughlin Road as a two lane major collector cannot adequately accommodate the traffic demands as it would exceed the available capacity of the road.

5.1.2 Traffic Diversion to Alternative Routes

This alternative solution considered diversion of traffic that is currently using McLaughlin Road to other parallel corridors such as Mavis Road or Hurontario Street. As such, it would not address the existing operational and safety deficiencies on McLaughlin Road or provide an opportunity to incorporate a cycling facility along the corridor. Shifting travel from McLaughlin Road to adjacent corridors is expected to be problematic since these roads are already six lanes and there is limited excess capacity available to accommodate the diverted traffic without creating additional operational and roadway deficiencies on these adjacent corridors. This alternative would result in similar or significant out of the way travel and associated environmental impacts.

5.1.3 Implement Transportation System Management Measures (TSM)

Transportation System Management (TSM) initiatives are considered useful tools (e.g., intersection and signal improvements) to improve traffic operations and help to alleviate some of the traffic congestion at the major intersections. The impact on natural, social, and cultural environments would be minimal with the introduction of TSM initiatives.

TSM initiatives would provide some improvements to traffic operations however would not fully address the traffic congestion and traffic safety problems. This alternative was subsequently carried forward as an element within the transportation improvements for McLaughlin Road.

5.1.4 Transportation Demand Management (TDM)

Transportation Demand Management (TDM) initiatives would help to alleviate some of the impacts of traffic congestion by encouraging a shift in the mode of travel (e.g., shift to transit, bike lanes, etc.) and/or shift in travel outside peak periods/work at home. The impact on natural, social, and cultural environments would be minimal with the introduction of TDM initiatives.

Successful TDM initiatives are not intended as an overall “fix” to the City’s transportation problems, but in conjunction with strategic transportation infrastructure improvements can result in addressing the City’s future transportation demand needs.

TDM initiatives may help to reduce the corridor vehicle demand; however, these initiatives in themselves, while forming an important element in the City’s overall transportation plan, are not considered as a standalone solution for the McLaughlin Road corridor. This alternative was

subsequently carried forward as an element within the transportation improvement for McLaughlin Road.

5.1.5 Capacity Enhancement and Improvement

Improvements to McLaughlin Road would include widening from two lanes to four lanes between Bristol Road West and Britannia Road West, to meet the anticipated demands and to resolve operational/traffic safety needs. Widening McLaughlin Road to four lanes will address existing capacity issues and accommodate for future growth on the corridor; however, this alternative solution will result in impacts on environmental features. It is anticipated that with proper mitigation measures and strategies the potential impacts can be minimized.

Improvements to McLaughlin Road would address the existing capacity issues, anticipated traffic growth and safety issues as well as promote effective performance for all modes. This alternative was carried forward for further consideration.

5.2 Preferred Transportation Planning Solution

To effectively support the increase in traffic demands along the corridor, improvements to McLaughlin Road are required. The following evaluation criteria was used in screening of alternative solutions and subsequent evaluation of design alternatives:

- ***Traffic Operations and Safety*** – having regard for level of traffic service, operations, travel delay, traffic safety, emergency response time, technical requirements, and constructability;
- ***Natural Environment*** – having regard for protecting the natural and physical components of the environment including natural and/or environmentally sensitive areas;
- ***Socio-Cultural Environment*** – having regard for residents, businesses, community/recreational/institutional facilities, driveways/access, parking, historical/archaeological remains and built heritage and cultural landscape features;
- ***Economic Impact / Cost*** – having regard for all costs associated with alternatives, including construction, utility relocations, maintenance, property, etc.; and
- ***Official Policy*** – having regard for City policies including the City of Mississauga Official Plan, City's Cycling Master Plan, etc.

The evaluation criteria was applied through a "net effects analysis" which enabled the identification of the most reasonable alternative solution, to provide an opportunity for improved mobility and transportation improvements, as well as, possess the least amount of environmental impacts. See **Exhibit 5.1** Evaluation of Alternative Planning Solutions.

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Exhibit 5.1 Evaluation of Alternative Planning Solutions

PLANNING ALTERNATIVES DESCRIPTION		DO NOTHING	UPGRADE PARALLEL ROADS INSTEAD OF MCLAUGHLIN ROAD	IMPLEMENT TRANSPORTATION SYSTEM MANAGEMENT MEASURES (TSM)	IMPLEMENT TRAVEL DEMAND MANAGEMENT (TDM)	CAPACITY/ OPEARTIONS IMPROVEMENTS ALONG MCLAUGHLIN ROAD
		NO CONSIDERATION FOR ADDITIONAL MEASURES TO ADDRESS PROJECT SPECIFIC PROBLEMS OR OPPORTUNITIES.	DIVERSION OF TRAFFIC THAT IS CURRENTLY USING MCLAUGHLIN ROAD TO OTHER PARALLEL CORRIDORS SUCH AS MAVIS ROAD OR HURONTARIO STREET.	IMPROVEMENTS TO ENHANCE THE CAPACITY OF AN EXISTING SYSTEM OF AN OPERATIONAL NATURE (I.E. INTERSECTION AND SIGNAL IMPROVEMENTS).	INCLUDES INITIATIVES TYPICALLY DIRECTED AT SPREADING OUT PEAK TRAVEL PERIODS AND REDUCING THE NUMBER OF VEHICLES ON THE ROAD (I.E. CAR POOLING, BIKE LANES, ETC).	INCLUDES WIDENING FROM 2 LANES TO 4 LANES TO MEET THE ANTICIPATED DEMANDS, AND TO RESOLVE OPERATIONAL/TRAFFIC SAFETY NEEDS.
TRAFFIC OPERATIONS AND SAFETY	**Network Capacity and Level of Service**	**Least Preferred** McLaughlin Road will operate over capacity, resulting in delays and potential safety concerns.	**Least Preferred** Results in out-of-way travel. Limited improvements to capacity and level of service due to a diversion of traffic. Increases demands/ potential congestion on adjacent roads. Little opportunity of capacity improvements on adjacent corridors (already six through lanes).	**Partially Preferred** TSM is encouraged to manage traffic growth, however will only marginally improve level of service at intersections along McLaughlin Road.	**Partially Preferred** Potential for marginal reduction in capacity requirements along corridor due to shift to other modes of transportation (transit, cycling).	**Preferred** Improvements to McLaughlin Road (i.e. widening to 4 lanes) will address the identified problem and opportunity.
	Traffic Safety	**Least Preferred** Does not improve traffic safety. Safety concerns expected to worsen with increasing traffic volumes.	**Partially Preferred** Potential for minor safety improvements due to the potential for reduction in traffic congestion; however creates similar problems elsewhere within network.	**Partially Preferred** Potential for safety improvements at intersections only (however new signals will hamper traffic flow along the corridor unless McLaughlin Road is widened).	**Partially Preferred** Potential for minor safety improvements due to the potential reduction in traffic congestion.	**Preferred** Potential for safety improvements along corridor in conjunction with geometric improvements improved traffic operations.
	Transit Services	**Least Preferred** No improvement in accessibility to transit service.	**Partially Preferred** Potential for minor reduction in transit delays due to diversion of traffic to other roads.	**Partially Preferred** Potential for marginal improvements in accessibility to transit services.	**Partially Preferred** Potential for minor reduction in traffic growth and related transit delays due to modal shift from auto to other modes including transit.	**Preferred** Potential for reductions in transit delays as operational flows are improved on McLaughlin Road.

PLANNING ALTERNATIVES DESCRIPTION		DO NOTHING	UPGRADE PARALLEL ROADS INSTEAD OF MCLAUGHLIN ROAD	IMPLEMENT TRANSPORTATION SYSTEM MANAGEMENT MEASURES (TSM)	IMPLEMENT TRAVEL DEMAND MANAGEMENT (TDM)	CAPACITY/ OPEARTIONS IMPROVEMENTS ALONG MCLAUGHLIN ROAD
		NO CONSIDERATION FOR ADDITIONAL MEASURES TO ADDRESS PROJECT SPECIFIC PROBLEMS OR OPPORTUNITIES.	DIVERSION OF TRAFFIC THAT IS CURRENTLY USING MCLAUGHLIN ROAD TO OTHER PARALLEL CORRIDORS SUCH AS MAVIS ROAD OR HURONTARIO STREET.	IMPROVEMENTS TO ENHANCE THE CAPACITY OF AN EXISTING SYSTEM OF AN OPERATIONAL NATURE (I.E. INTERSECTION AND SIGNAL IMPROVEMENTS).	INCLUDES INITIATIVES TYPICALLY DIRECTED AT SPREADING OUT PEAK TRAVEL PERIODS AND REDUCING THE NUMBER OF VEHICLES ON THE ROAD (I.E. CAR POOLING, BIKE LANES, ETC).	INCLUDES WIDENING FROM 2 LANES TO 4 LANES TO MEET THE ANTICIPATED DEMANDS, AND TO RESOLVE OPERATIONAL/TRAFFIC SAFETY NEEDS.
	Emergency Response	**Least Preferred** Adverse impacts to emergency response times due to increase in traffic volumes.	**Partially Preferred** Potential for minor improvements to emergency response times, however worsening on adjacent corridors.	**Partially Preferred** Potential for minor improvements to emergency response times.	**Partially Preferred** Potential for minor improvements to emergency response times.	**Preferred** Potential for improvements to emergency response times.
NATURAL ENVIRONMENT	**Terrestrial Resources (Wildlife and Vegetation)**	**Preferred** Minimal impacts on the natural environment, including adjacent trees along McLaughlin Road.	**Partially Preferred** Minimal impacts on natural environment. Relocating traffic volumes to alternative corridors will result in minor impacts along adjacent corridors.	**Partially Preferred** Minimal impacts on natural environment.	**Partially Preferred** Minor impacts on terrestrial resources associated with road widening to accommodate bike lanes.	**Least Preferred** Improvements (i.e. widening to 4 lanes) to McLaughlin Road will result in impacts on environmental features. It is anticipated with proper mitigation measures and strategies, the potential impacts can be minimized.
SOCIO-CULTURAL ENVIRONMENT	**Property Access**	**Least Preferred** Properties access becomes more difficult as traffic volumes increase.	**Least Preferred** Properties access becomes more difficult on adjacent corridors.	**Partially Preferred** Limited opportunity to improve accesses to adjacent properties with signalization and intersection improvements.	**Least Preferred** Property access becomes more difficult as traffic volumes increase.	**Preferred** Opportunities to improve accesses into adjacent properties along the corridor as adding lanes will improve the ability of side street traffic to access McLaughlin Road by providing more travel lanes and associated traffic gaps.
	Property Requirements	**Preferred** No additional property required.	**Partially Preferred**	**Partially Preferred** Potential for property requirements at intersections.	**Preferred**	**Least Preferred**

PLANNING ALTERNATIVES DESCRIPTION		DO NOTHING	UPGRADE PARALLEL ROADS INSTEAD OF MCLAUGHLIN ROAD	IMPLEMENT TRANSPORTATION SYSTEM MANAGEMENT MEASURES (TSM)	IMPLEMENT TRAVEL DEMAND MANAGEMENT (TDM)	CAPACITY/ OPEARTIONS IMPROVEMENTS ALONG MCLAUGHLIN ROAD
		NO CONSIDERATION FOR ADDITIONAL MEASURES TO ADDRESS PROJECT SPECIFIC PROBLEMS OR OPPORTUNITIES.	DIVERSION OF TRAFFIC THAT IS CURRENTLY USING MCLAUGHLIN ROAD TO OTHER PARALLEL CORRIDORS SUCH AS MAVIS ROAD OR HURONTARIO STREET.	IMPROVEMENTS TO ENHANCE THE CAPACITY OF AN EXISTING SYSTEM OF AN OPERATIONAL NATURE (I.E. INTERSECTION AND SIGNAL IMPROVEMENTS).	INCLUDES INITIATIVES TYPICALLY DIRECTED AT SPREADING OUT PEAK TRAVEL PERIODS AND REDUCING THE NUMBER OF VEHICLES ON THE ROAD (I.E. CAR POOLING, BIKE LANES, ETC).	INCLUDES WIDENING FROM 2 LANES TO 4 LANES TO MEET THE ANTICIPATED DEMANDS, AND TO RESOLVE OPERATIONAL/TRAFFIC SAFETY NEEDS.
			Potential property requirements along other roads.		Road widening expected to be accommodated with existing right-of-way.	Potential need for additional right-of-way to accommodate road expansion.
	Air Quality	**Least Preferred** Reduction in air quality due to traffic delay and congestion.	**Partially Preferred** Reduction in air quality due to increased out-of-way travel.	**Partially Preferred** Minor improvement with reduction in traffic demands and congestion.	**Partially Preferred** Reduction in vehicles will help reduce vehicle emissions.	**Preferred** Potential improvement in air quality with reduced traffic demands and congestion.
	Noise and Vibration	**Partially Preferred** Minor increase in road noise with higher traffic volumes.	**Partially Preferred** Potential increased road noise along adjacent corridors.	**Partially Preferred** Minor increase in road noise with higher traffic volumes.	**Partially Preferred** Minor increase in road noise with higher traffic volumes.	**Partially Preferred** Minor increase in road noise with higher traffic volumes.
	Aesthetic/ Streetscape	**Preferred** No impacts on McLaughlin Road.	**Partially Preferred** Potential impacts to existing landscapes and aesthetics on other road corridors.	**Partially Preferred** No impacts to existing landscape and aesthetics. Some opportunities to improve the landscaping (e.g. tree planting) at the intersections.	**Partially Preferred** Minor impacts to existing landscape and aesthetics. opportunities to improve the landscaping (e.g. tree planting).	**Partially Preferred** Impacts to existing aesthetics in road corridor. Opportunities to improve the landscaping (e.g. tree planting) on McLaughlin Road.
	Archaeological and Heritage Resources	**Preferred** No Impacts.	**Partially Preferred** Potential for impacts along other roads.	**Partially Preferred** Low potential for archaeological/ heritage impacts.	**Partially Preferred** Low potential for archaeological/ heritage impacts.	**Partially Preferred** Low potential for archaeological/ heritage impacts.
ECONOMIC IMPACT	**Capital Costs**	**Preferred** No capital construction cost.	**Least Preferred** Potentially significant capital costs associated with improvements to adjacent corridors.	**Partially Preferred** Low capital construction cost.	**Partially Preferred** Low capital construction cost.	**Least Preferred** High capital construction cost.

PLANNING ALTERNATIVES DESCRIPTION		DO NOTHING	UPGRADE PARALLEL ROADS INSTEAD OF MCLAUGHLIN ROAD	IMPLEMENT TRANSPORTATION SYSTEM MANAGEMENT MEASURES (TSM)	IMPLEMENT TRAVEL DEMAND MANAGEMENT (TDM)	CAPACITY/ OPEARTIONS IMPROVEMENTS ALONG MCLAUGHLIN ROAD
		NO CONSIDERATION FOR ADDITIONAL MEASURES TO ADDRESS PROJECT SPECIFIC PROBLEMS OR OPPORTUNITIES.	DIVERSION OF TRAFFIC THAT IS CURRENTLY USING MCLAUGHLIN ROAD TO OTHER PARALLEL CORRIDORS SUCH AS MAVIS ROAD OR HURONTARIO STREET.	IMPROVEMENTS TO ENHANCE THE CAPACITY OF AN EXISTING SYSTEM OF AN OPERATIONAL NATURE (I.E. INTERSECTION AND SIGNAL IMPROVEMENTS).	INCLUDES INITIATIVES TYPICALLY DIRECTED AT SPREADING OUT PEAK TRAVEL PERIODS AND REDUCING THE NUMBER OF VEHICLES ON THE ROAD (I.E. CAR POOLING, BIKE LANES, ETC).	INCLUDES WIDENING FROM 2 LANES TO 4 LANES TO MEET THE ANTICIPATED DEMANDS, AND TO RESOLVE OPERATIONAL/TRAFFIC SAFETY NEEDS.
OFFICIAL POLICY	**Official Plan (OP)/ Scenic Route Designation/ City's Cycling Master Plan/ etc.**	**Partially Preferred** In compliance with the scenic road designation but does not meet the objectives of the City's cycling master plan.	**Partially Preferred** In compliance with the scenic road designation but does not meet the objectives of the City's cycling master plan.	**Partially Preferred** In compliance with the scenic road designation but does not meet the objectives of the City's cycling master plan.	**Preferred** Minimal impacts to scenic road designation, in keeping with the City's cycling plan, and supportive of alternative modes (i.e. transit).	**Partially Preferred** Greatest potential to impact OP vision with respect to scenic designation along McLaughlin Road. Opportunity to provide bike lanes in keeping with City's cycling plan and supportive of alternative modes (i.e. transit). It is anticipated with proper mitigation measures and strategies, the potential impacts can be minimized.
RECOMMENDATION		**INEFFECTIVE** Does not address the identified problem and opportunity. ***Not carried forward.***	**INEFFECTIVE** Based on levels of congestion, motorists may on their own shift to other corridors. This would not address the identified problem and opportunity for the McLaughlin Road corridor and would cause similar impacts on adjacent corridors. ***Not carried forward.***	**RECOMMENDED** Does not fully address the identified problem and opportunity but can enhance traffic operations. ***Carried forward for further consideration in conjunction with capacity improvements along McLaughlin Road.***	**RECOMMENDED** Partially addresses the identified problem and opportunity. ***Carried forward for further consideration in conjunction with capacity improvements along McLaughlin Road.***	**RECOMMENDED** Effectively addresses the identified problem and opportunity. ***Carried forward for further consideration.***

5.2.1 Preferred Planning Solution

The “Preferred Solution” to address the existing capacity issues, is to implement a combination of Transportation System Management Measures (TSM), Transportation Demand Management (TDM), and Capacity Enhancement and Improvements.

Anticipated traffic growth and safety issues, as well as promoting effective performance for all modes within the McLaughlin Road corridor is best accommodated by providing additional capacity along McLaughlin Road, including the option of widening the existing two lane road to four lanes. This provides an opportunity to protect for the needs of the corridor, as well as address the following planning policy objectives:

- Manage congestion and promote effective performance for all modes;
- Enhance urban design/streetscaping in keeping with scenic designation; and
- Provide an opportunity to incorporate cycling facilities along the corridor.

6 Development and Evaluation of the Design Concepts

6.1 General Overview

The transportation analysis documented in Section 3 (Transportation and Related Problem/ Opportunity) and recommendations of Section 5 (Alternative Planning Solutions) support the need for capacity improvements along McLaughlin Road to address the poor traffic operations within the study area. In this regard, the following basic improvement alternatives were considered:

- Widen McLaughlin Road to 4 through travel lanes between Matheson Boulevard West and Britannia Road West, and maintain 2/3 lanes through the designated Scenic Route (between Bristol Road West and Matheson Boulevard West); and
- Widen McLaughlin Road to 4 through travel lanes throughout the study area (Bristol Road West to Britannia Road West).

Additional measures were considered in conjunction within the above strategic alternatives to improve intersection operations and accommodate the multi-modal travel environment along the street, including:

- Optimize intersection controls (i.e. signal phasing, etc.);
- Additional turn lanes at intersections;
- Roundabout at Ceremonial Drive (in conjunction with a 2/3 lane option);
- Modify existing lanes (i.e., restripe and resurface the existing road); and
- Add bicycle lanes or sharrow lanes.

A summary of the operational improvements are discussed in Section 6.2.

6.2 Traffic Operations Alternatives Analysis

6.2.1 Bristol Road West to Matheson Boulevard West

By 2031, two-way traffic demands along McLaughlin Road between Bristol Road West and Matheson Boulevard West will increase to approximately 2,480 veh/hr (1,290 veh/hr peak direction of travel, i.e. southbound) in the PM peak hour resulting in severe congestion if a two lane cross-section is maintained. To accommodate the projected demands and address operational deficiencies, as noted Section 3.3.3 (Exhibit 3.13), two options for widening McLaughlin Road were considered:

- Maintain 2/3 lanes between Bristol Road West and Matheson Boulevard West (two lane section limited to 0.3 km adjacent to Britannia Farm); and,
- Widen to 4 travel lanes throughout the study area (without a continuous centre left turn lane).

Although north-south traffic experiences little delay during off-peak periods, unless McLaughlin Road is widened (increasing gaps for left turning vehicle) access onto McLaughlin Road from local roads (i.e. Avonwick Ave, Parkwood Place/ Faith Drive) will operate poorly during peak hours. Furthermore, traffic operations at Ceremonial Drive will significantly deteriorate to LOS F, v/c greater than 1.00 and southbound queues greater than 300 m in the PM peak hour can be expected. Potential intersection improvements in this regard are detailed below.

a) McLaughlin Road and Ceremonial Drive Intersection

To address poor operations at the Ceremonial Drive and McLaughlin Road intersection, the following alternatives were considered:

- **Alternative 1**: Maintain traffic signals and add a southbound right turn lane;
- **Alternative 2**: Maintain traffic signals and add a southbound through lane (i.e., 1 southbound through lane and 1 through-right lane; and 1 northbound left turn lane and 1 through lane) in conjunction with widening to a three lane cross-section throughout the corridor (2 southbound lanes, 1 northbound lane);
- **Alternative 3**: Maintain traffic signals and add an additional through lane in both the northbound and southbound directions (i.e., 1 southbound through lane and 1 through-right lane; and 1 northbound left turn lane and 2 through lanes) in conjunction with widening to four lanes throughout the corridor;
- **Alternative 4**: Reconstruct intersection as a roundabout, providing a single entry and exit lane and a southbound right slip lane (see **Exhibit 6.1**); and
- **Alternative 5**: Reconstruct intersection as a roundabout, providing single northbound and eastbound entry and exit, and double southbound entry and exit lanes (see **Exhibit 6.1**).

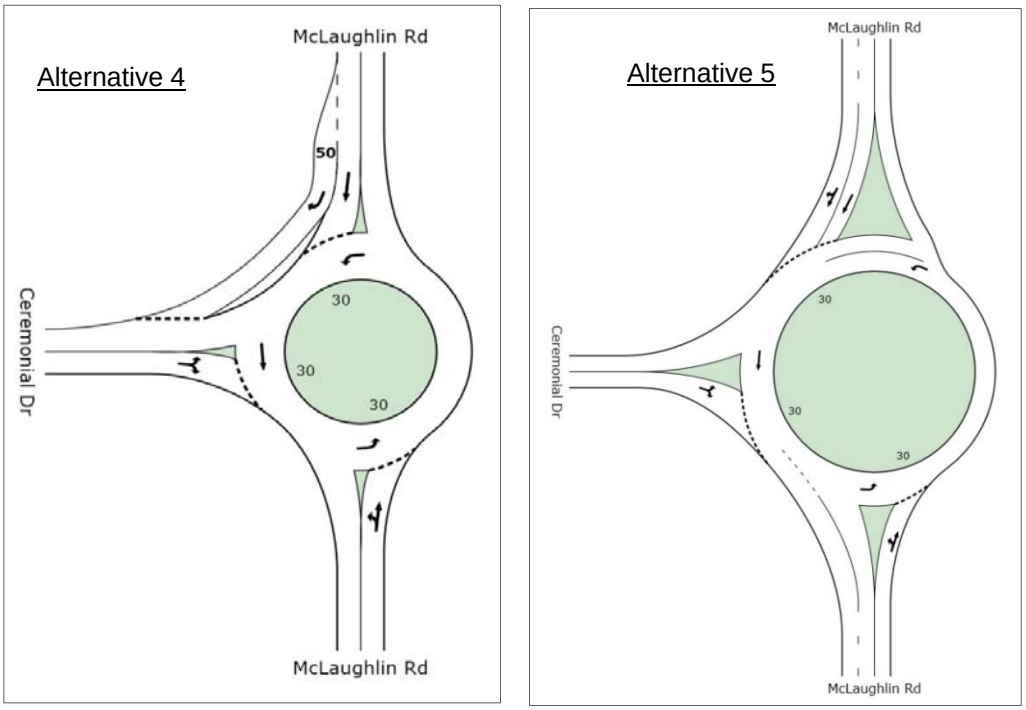


Exhibit 6.1 Roundabout Alternatives at McLaughlin Road and Ceremonial Drive
(left – 1 Lane Roundabout with Southbound Right Slip Lane; right – 2 Southbound Lanes and 1 Northbound Lane Roundabout)

Roundabouts were considered at Ceremonial Drive to: reduce southbound delays and queuing with a continuous flow type intersection; preserve a narrower cross-section along McLaughlin Road; take advantage of the long north-south approach road geometries; potentially reduce the delay access for vehicles from the west residential area to turn onto McLaughlin Road; and provide a speed management measure.

With options that maintain traffic signals at Ceremonial Drive, signal timing was optimized and an actuated northbound left permissive protected phase was provided.

Results comparing the alternatives at the McLaughlin Road and Ceremonial Drive intersection are presented in Error! Reference source not found. and reflect the following:

- Alternative 1: improves intersection operations from LOS E to C (v/c reduced from 0.98 to 0.89) in the PM peak hour. Queues in the southbound approach exceed 330 m;
- Alternative 2: improves intersection operations to LOS B (v/c less than 0.80), and effectively reduces southbound queuing (i.e. reduced to 85 m) in the PM Peak hour;
- Alternative 3: improves intersection operations to LOS A (v/c less than 0.60) and reduces queues to shorter than 85 m on all approaches;
- Alternative 4: minimizes delay but operates near capacity conditions. Significant northbound queues of 190 m are expected in the AM peak hour due to the high number of vehicles turning out from Ceremonial Drive onto McLaughlin Road. Since this option proposes to maintain 2 lanes along McLaughlin Road, left turns at Avonwick Ave will operate overcapacity. As a sensitivity test, the eastbound left turning volume from Avonwick Avenue was reassigned to Ceremonial Drive in conjunction with a potential prohibition of left turns from Avonwick Avenue. The intersection performance deteriorated to LOS E in the AM peak hour, resulting in very long queues in the northbound direction (795 m).
- Alternative 5: performed similarly to Alternative 4, and also unable to manage northbound queues in the AM peak hour if/when left turns from Avonwick Avenue were reassigned to the intersection. This is expected since the roundabout alternatives operate very near capacity (v/c equals 0.93) in the AM peak hour.

Exhibit 6.2 Operational Analysis, McLaughlin Road at Ceremonial Drive, AM (PM)

ALTERNATIVE	OVERALL		CRITICAL			
	LOS	V/C	MOVEMENT	LOS	V/C	QUEUES (M)
Existing Layout (Signals)	C (E)	0.81 (0.98)	SBTR NBL NBT	C (F) A (C) C (C)	0.59 (1.22) 0.18 (0.63) 0.92 (0.82)	155 (>310) 5 (20) 300 (260)
Ceremonial 1 (Signals) 1 SBT + 1 SBR, 1 NBL, 1 NBT	B (C)	0.81 (0.89)	SBT SBR NBL NBT	A (C) A (A) A (D) B (A)	0.52 (0.95) 0.02 (0.10) 0.14 (0.54) 0.85 (0.71)	30 (330) 5 (15) 5 (25) 125 (65)
Ceremonial 2 (Signals) 1 SBT, 1 SBTR, 1 NBL, 1 NBT	B (B)	0.81 (0.67)	SBTR NBL NBT	A (A) A (A) B (A)	0.29 (0.55) 0.13 (0.36) 0.85 (0.71)	15 (85) 5 (5) 125 (75)
Ceremonial 3 (Signals) 1 SBT, 1 SBTR, 1 NBL, 2 NBT	A (A)	0.47 (0.53)	SBTR NBL NBT	A (A) A (A) A (A)	0.29 (0.55) 0.13 (0.36) 0.45 (0.38)	15 (85) 5 (10) 25 (25)
Ceremonial 4 (Roundabout) 1 Lane + SBR Slip Lane	A (A)	0.93 (0.76)	SBT SBR NBL NBT	A (A) A (A) B (A) A (A)	0.43 (0.75) 0.03 (0.10) 0.93 (0.76) 0.93 (0.76)	30 (70) 5 (5) 190 (90) 190 (90)
Ceremonial 5 (Roundabout) 2 SB Lanes, 1 NB Lane	A (A)	0.93 (0.76)	SBT SBR NBL NBT	A (A) A (A) B (A) A (A)	0.26 (0.47) 0.26 (0.47) 0.93 (0.76) 0.93 (0.76)	10 (25) 10 (25) 190 (90) (90)

* Prefix: EB – Eastbound, SB – Southbound, NB – Northbound, WB – Westbound
Suffix: L – Left, T – Through, R – Right, TR – Shared Through-Right

The above findings for Ceremonial Drive indicate that traffic operations of the intersection will be better managed by a signal rather than a roundabout. In addition, a roundabout at this location would have significant property requirements and environmental impact to the Britannia Farm.

The above findings also indicate that, as a minimum an additional southbound through lane should be provided at the intersection (and throughout the corridor) to accommodate the heavy southbound demands during the PM peak hour. Alternative 2 results in an unbalanced lane configuration along McLaughlin Road (i.e. 2 Southbound, 1 Northbound lane) and would require the removal the continuous centre left turn lane which is present though the majority of this section. Given the high northbound demands during both the AM and PM peak periods, the removal of this centre left turn (without the addition of an additional northbound lane) is undesirable and may lead to safety and operational concerns elsewhere along the corridor (i.e. at Avonwick Ave, the private driveway north of Ceremonial Drive, transit stops, etc).

Overall, Alternative 3 results in the best operations and the preferred alternative to be carried forward.

b) Other Intersections

At the remaining unsignalized intersections and entrances within this section, the ability to find a suitable gap in traffic flow to turn left onto McLaughlin Road will become much more difficult. A signal warrant analyses undertaken at all unsignalized intersections found that none warranted signalization. Furthermore, unless McLaughlin Road is widened to four lanes, additional traffic signals will further restrict north-south movements. As an alternative, consideration may be given to mitigating this concern by prohibiting left turns from sideroads where possible (i.e. Avonwick Avenue).

Alternatively, providing four through lanes through the ***Avonwick Avenue*** and ***Parkwood Place/Faith Drive*** intersections will improve the ability of side street traffic to access McLaughlin Road by disbursing traffic platoons over two lanes in each direction, and thereby increasing the available traffic gaps. As detailed in **Exhibit 6.3**, although left turn and through movements exiting from the Parkwood Place intersection operate at LOS F, they remain well under capacity.

Exhibit 6.3 Intersection Operational Analysis (2031) – Bristol Road West to Matheson Boulevard West

INTERSECTION WITH MCLAUGHLIN ROAD	LOS – AM (PM)	V/C – AM (PM)	CRITICAL – LOS F
Avonwick Avenue	-	-	None
Ceremonial Drive (T-intersection)	A (A)	0.47 (0.53)	None
Parkwood Place/Faith Drive	-	-	PM: EBTL [0.14]
Bristol Road West	C (D)	0.84 (0.97)	AM: WBL [1.0] PM: WBL [0.9], EBL [0.84]

c) Conclusions

Based on the above, widening McLaughlin Road to a 4-lane cross-section between Bristol Road West and Matheson Boulevard West is recommended. In conjunction with this work, the following intersection improvements are recommended:

- At Avonwick Avenue (unsignalized), providing 1 through and 1 through-right lane in the southbound direction; and 1 left-through and 1 through lane in the northbound direction;

- At Ceremonial Drive (signalized), providing 1 through and 1 through-right lane in the southbound direction; and 1 left and 2 through lanes in the northbound direction;
- At Parkwood Place/Faith Drive (unsignalized), providing 1 left-through and 1 through-right lane in the northbound and southbound directions; and
- Maintain the existing intersection configuration including signals at Bristol Road West and Ceremonial Drive (4-way intersection – south of Bristol Road West)

6.2.2 Matheson Boulevard West to Britannia Road West

By 2031 two-way traffic demands along McLaughlin Road between Matheson Boulevard West and Britannia Road West will increase to approximately 1,900 veh/h (970 veh/hr peak direction of travel, i.e. northbound) in the PM peak, resulting in severe congestion if the existing 3 lane cross-section is maintained.

To accommodate the projected demands and address operational deficiencies, as noted Section 3.3.3 (Exhibit 3.13), a widening of McLaughlin Road to four through lanes (plus a centre left turn lane) from Matheson Boulevard West to Britannia Road West was examined in detail. This configuration would improve corridor operations by providing additional capacity and shorter queues along McLaughlin Road, as well as increase gaps for left turning vehicles.

The intersection of ***Britannia Road West*** and McLaughlin Road is expected to operate at a LOS D or better. This indicates that maintaining the existing road layout on the north/east/west legs of this intersection will be sufficient to accommodate future traffic volumes.

Traffic operations for vehicles turning onto McLaughlin Road from ***Regal Drive*** will significantly improve with widening. For the unsignalized intersection, the eastbound and westbound approaches (westbound approach is a private driveway) improve from LOS F to LOS E with less delay, as vehicles find more gaps to turn into north-south traffic.

The largest benefit would be realized from improved operations at the ***Matheson Boulevard West*** intersection, as discussed below:

a) McLaughlin Road and Matheson Boulevard West Intersection

Based on the existing intersection configuration, traffic operations are expected to severely deteriorate at this intersection by 2031. Both the southbound and northbound approaches will operate overcapacity during the PM peak hour and queues will extend for several hundred metres in advance of the intersection. The eastbound approach will breakdown in the AM peak period and the westbound approach in the PM peak period.

To accommodate demands three alternative lane configurations were considered. In all cases, it is recommended to provide an additional southbound lane through the intersection (i.e. 1 left, 1 through, and 1 through-right lane) in conjunction with the overall corridor widening north of the intersection. An operational analysis for the above lane configurations is presented in **Exhibit 6.4**. This analysis indicates the following:

- **Alternative 1:** No additional improvements beyond those on the southbound approach (i.e. maintain 1 left, 1 through, and 1 right turn lane northbound). The southbound left turn operates at LOS F during both the AM and PM peak hours. The northbound approach also continues to operate poorly during both the AM and PM peak hours (specifically the northbound right turn in the AM and the northbound through movement in the PM peak hour). In both cases, these movements operate overcapacity and significant queuing can be expected.

  To further improve operations, the following additional lane improvements were considered along McLaughlin Road for the northbound approach (while maintaining for the existing lane configuration on Matheson Boulevard West):

- **Alternative 2:** Convert the northbound right lane to a shared through/right lane (i.e. 1 left, 1 through, and 1 shared through-right lane). Converting the existing right turn lane to a shared through/right lane reduces congestion during PM peak hour, and overall the intersection will operate under capacity. However the combined northbound/right turn movement does little to alleviate concerns during the AM peak hour. Overall, the intersection operates at LOS E (v/c = 1.05) in the AM peak hour and long northbound delays and queuing remained a concern.
- **Alternative 3:** Add a single northbound through lane (i.e. 1 left, 2 through, and 1 right turn lane). The intersection continues to operate poorly in the AM peak hour. Furthermore, the additional northbound through lane does little to improve operations during the PM peak. Although queuing along McLaughlin Road is reduced, the northbound right queue is still estimated to be greater than 190 m, contributing to the underutilization of the additional through lane.

Exhibit 6.4 2031 Operational Analysis, McLaughlin Road at Matheson Boulevard West, AM (PM)

ALTERNATIVE	OVERALL INTERSECTION OPERATIONS	
	LOS	VOLUME/ CAPACITY
Existing Layout (baseline)	F (F)	1.09 (1.22)
Matheson Boulevard West Alternative 1 (NB: 1L, 1T, 1R) (SB: 1L, 1T, 1TR)	E (E)	1.06 (1.12)
Matheson Boulevard West Alternative 2 (NB: 1L, 1T, 1TR) *Recommended* (SB: 1L, 1T, 1TR)	E (D)	1.05 (0.88)
Matheson Boulevard West Alternative 3 (NB: 1L, 2T, 1R) (SB: 1L, 1T, 1TR)	D (D)	1.19 (0.87)

b) Conclusions

Based on the above, widening McLaughlin Road to a 4-lane cross-section (plus a centre left turn lane) between Matheson Boulevard West and Britannia Road West is recommended. At Matheson Boulevard West, Alternative 2 is recommended. This alternative provides for an additional southbound through lane and converting the existing northbound right turn to a shared through/ right lane.

Based on the above, the following performance measures can be expected.

Exhibit 6.5 Intersection Operational Analysis (2031)

INTERSECTION WITH MCLAUGHLIN ROAD	LOS – AM (PM)	V/C – AM (PM)	CRITICAL – LOS F [v/c]
Britannia Road West	C (D)	0.61 (0.70)	None
Regal Drive	-	-	None
Matheson Boulevard West	E (D)	1.05 (0.88)	AM: WBL [1.10], NBTR [1.13], SBL [1.13] PM: SBL [0.92]

6.2.3 Future (2031) Traffic Operations Assessment – Four Lane Option

An operational assessment of future conditions was undertaken for intersections along McLaughlin Road, based on the preferred intersection configurations noted above (representative of four lane widening option). The results, using Level-of-service (LOS) and Volume/Capacity (v/c) ratios as used indicators of traffic performance, are illustrated in **Exhibit 3.14**.

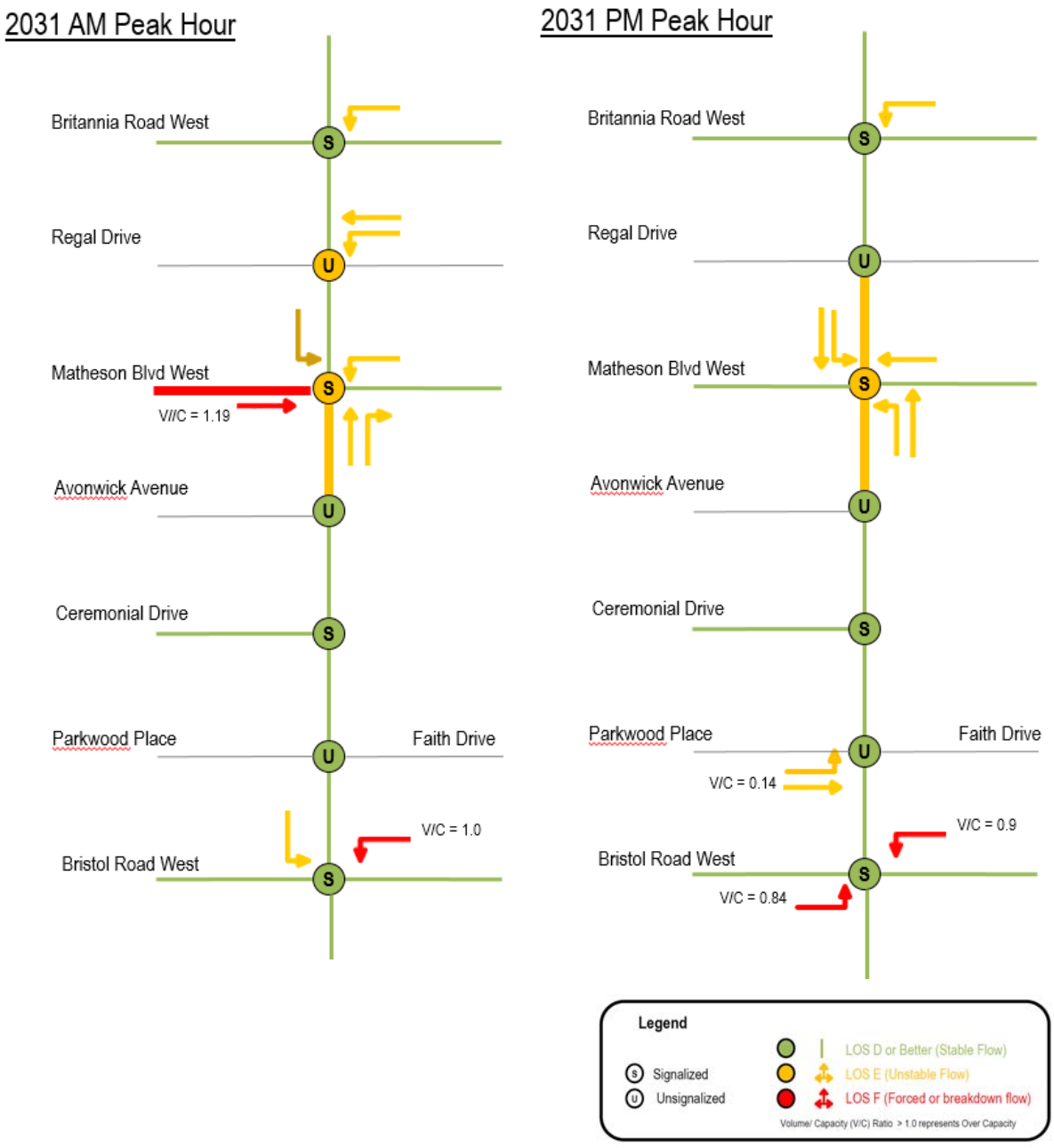


Exhibit 6.6 Summary of 2031 Traffic Operations (4 Lane Option)

6.3 Alternative Design Concepts

This section outlines the improvement alternatives that were developed for McLaughlin Road between Bristol Road West and Britannia Road West. For the most part, these options build upon the operational analysis documented in Section 6.2 and provide for four lanes along McLaughlin Road throughout the study area. However, recognizing the potential impacts of four laning from a natural environment, socio-economic, and cost perspective; consideration has been given to limit the widening between Bristol Road West to Matheson Boulevard West to accommodate the necessary active transportation elements (i.e. cycling facilities, sidewalks, etc.).

6.3.1 Bristol Road West to Matheson Boulevard West

The following is a summary of the three alternative design concepts that were considered for McLaughlin Road, from Bristol Road West to Matheson Boulevard West, and presented at Public Information Centre No.2:

a) Option 1 - Maintain 2 Lanes plus a Centre Turn Lane

This option minimizes the impacts to trees and offers improved cycling and pedestrian amenities. For the most part, it maintains the existing 2/3 lane configuration with restriping. Approximately 2.5 m of pavement widening will be required to accommodate bike lanes. The improvements can be accommodated within the existing right-of-way. Significant congestion will still remain during peak hours leading to poor operations and excessive queuing which will block driveways and side roads, as well as spreading congestion beyond the peak periods. Potential safety concerns (i.e. merge tapers and side road approaches) will remain, and opportunities for speed control are limited. This option would require approximately 300 trees to be removed.

In summary, Option 1 includes the following design elements (see **Exhibit 6.7**):

- Maintain 2 travel lanes immediately adjacent to Britannia Farm (0.3 km section);
- Incorporate a 3.5 m centre turn lane elsewhere within the section;
- Add 1.5 m on-road bike lanes (adjacent to 3.5 m travel lanes);
- 1.5 m sidewalk west side (offset 2.0 m curb);
- 2.0 m sidewalk east side (curbside); and
- Maintain hydro poles (west side) between curb and sidewalk.

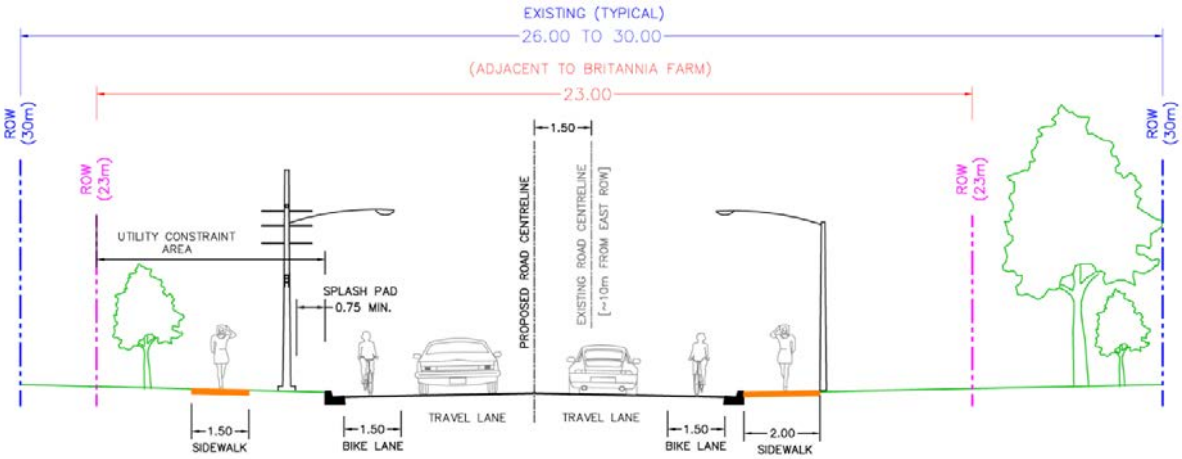


Exhibit 6.7 Option 1 – 2/3-Lane Section (2 lanes adjacent to Britannia Farm only)

b) Option 2 - Widen to 4-Lanes plus On-Road Bike Lanes

This option provides for road widening to accommodate four lanes and bike lanes throughout the section between Bristol Road West and Matheson Boulevard West. In doing so it offers an improved Level of Service (LOS) v/c = 0.6 to 0.9 and a better management of congestion along the roadway. Safety is improved, such as side road approaches and the elimination of merge tapers. In addition, there is the opportunity for providing raise intersections, which will provide for speed management along the corridor and improve pedestrian visibility. There is an improved cycling and pedestrian network as continuous facilities are provided. In addition, the four travel lanes provide for improved accessibility for both transit and emergency vehicles, and also gap opportunities for merging traffic.

The major disadvantage of this option is that there would be an increased impact to trees along the corridor, requiring 546 trees to be removed. In addition, approximately 2-3 metres of an additional right-of-way would be required from the Britannia Farm site (1256 m^2).

In summary, Option 2 includes the following design elements (see **Exhibit 6.8**):

- 4 travel lanes;
- Reduced travel lanes widths (3.35 m curb side /3.25 m median lane);
- 5.2 to 8.6 m pavement widening;
- 1.5 m on-road bike lanes;
- 2.0 m curbside sidewalks both sides;
- Hydro poles remain on west side;
- Reduced left turn lengths at intersections; and
- Use retaining walls and monolithic curb/sidewalk to reduce grading impacts.

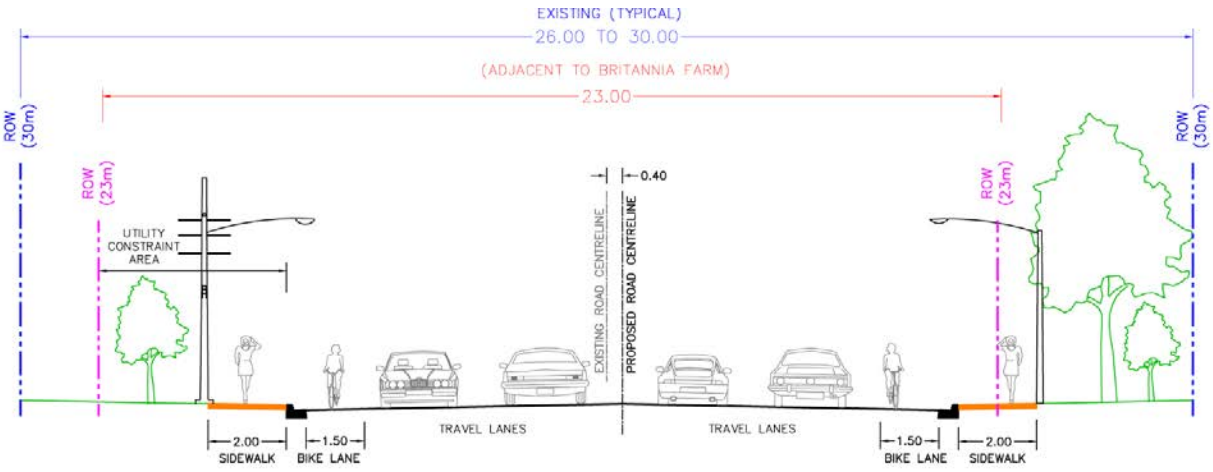


Exhibit 6.8 Option 2 – Widen to 4-Lanes plus On-Road Bike Lanes

c) Option 3 - Widen to 4-Lanes (Sharrow Lane and Underground Hydro)

This option is similar to Option 2, in that it provides for road widening to accommodate four lanes between Bristol Road West and Matheson Boulevard West; however it limits the amount of road widening and additional right-of-way required. The reduced impacts were achieved by accommodating cyclists through sharrow facilities. It is important to have sidewalk continuity and this alternative includes continuous sidewalks with the exception of the east side from Faith Drive to Ceremonial Drive where sidewalks are excluded in order to minimize tree impacts. Although sidewalks are excluded from this section of the roadway, sidewalk connections are still provided to adjacent land uses and transit facilities. Additionally, transit stops are proposed to be relocated to intersections, therefore not requiring mid-block access on the east side. It is proposed to bury the existing overhead hydro line located on the west side of the street as this allows for the replanting of trees and improved landscaping opportunity.

The major disadvantages of this option are the extent of tree removals, overall cost, property impacts, and less desirable cycling facilities. In short, 421 trees are required to be removed (however trees will be replaced at 2:1 ratio), burying the hydro will cost $2.95M, 0.5 to 1.5 m of additional right-of-way would be required from Britannia Farm, and the sharrow lanes are less desirable by cyclists.

In summary, Option 3 includes the following design elements (see **Exhibit 6.9**):

- 4 travel lanes including 4.0 m sharrow/curb lanes in both directions;
- Narrow median travel lane widths (3.1 to 3.35 m);
- Cycling provisions provided by sharrow facilities (a road marking placed in the travel lane to indicate where people should preferably cycle);
- 3.5 to 6.9 m pavement widening;
- 2.0 m curbside sidewalks, except no sidewalk on east side from Faith Drive to Ceremonial Drive;
- Relocate overhead hydro to underground;
- Reduced left turn lane lengths; and,
- Use retaining walls and monolithic sidewalk to reduce grading impacts.

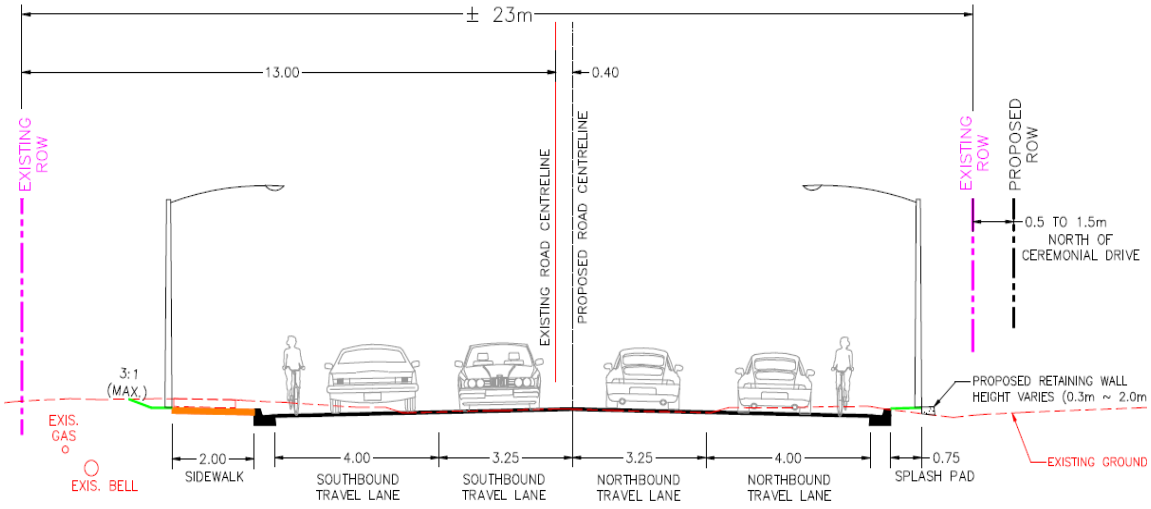


Exhibit 6.9 Option 3 – Widen to 4-Lanes (Sharrow Lane and Underground Hydro)

6.3.2 Matheson Boulevard West to Britannia Road West

This section is proposed to be widened to 4 lanes plus a centre turn lane. Given the close spacing of intersections and need to maintain the existing left turn lanes at Matheson Boulevard West, Regal Drive, and Britannia Road West intersections (from an operations and safety perspective), the existing centre turn lane is proposed to be continuous. The majority of the required right-of-way (≥30 m) is currently available and there will be little/no impacts to the natural environment. As such, options to improve corridor capacity are limited to providing an additional northbound and southbound through lane. In conjunction with the above, 1.5 m on-road bike lanes and a sidewalk are proposed on both sides of McLaughlin Road. See **Exhibit 6.10.**

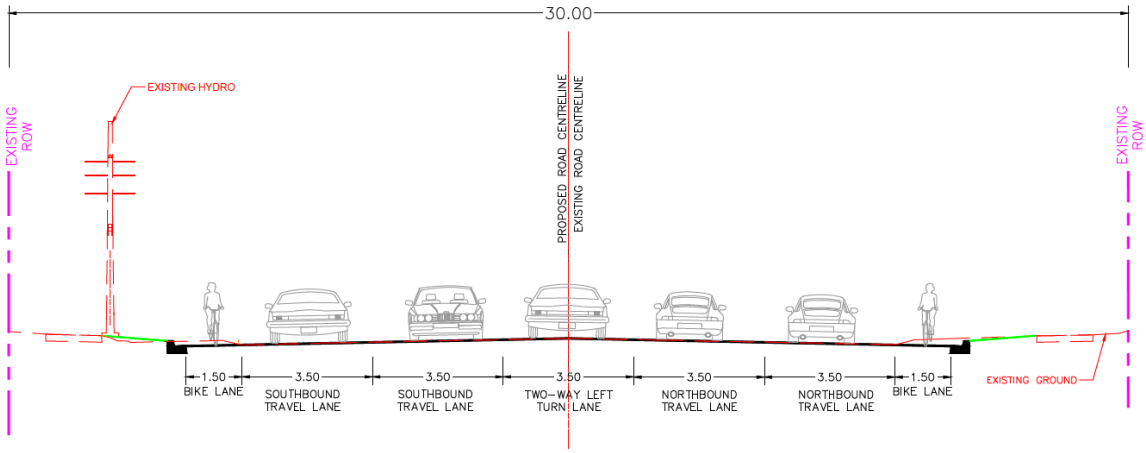


Exhibit 6.10 Alternative Design Concept Matheson Boulevard West to Britannia Road West

The above configuration was carried forward and combined with each of the options developed for the corridor between Bristol Road West and Matheson Boulevard West, as described in Section 6.3.1. The combined options were then evaluated in detail and discussed in Section 6.5.

6.4 Evaluation Methodology

To evaluate the design concepts, all relevant technical and environmental factors were given consideration and documented in a manner that is traceable, replicable and understandable by those affected. The evaluation included 13 criteria, within five key groupings as summarized below:

- **Traffic and Transportation:** Ability to manage motor vehicle, transit, pedestrian, and cycling traffic in a safe manner.
- **Natural Environment:** Impacts on trees, wildlife, and drainage.
- **Socio-Cultural Environment:** Impacts on existing residents and businesses, property access, noise, archaeological resources, built heritage features and visual character.
- **Cost:** Comparative cost to construct each option.
- **How the Alternative Complies with Official City Policy:** Scenic Route Designation, Cycling Master Plan, Strategic Plan, Living Green Master Plan and Natural Heritage and Urban Forest Strategy.

A “Reasoned Arguments” approach that compares the advantages and disadvantages of the alternatives against each of the evaluation criteria was adopted. This approach allowed the Project Team to identify the most reasonable alternative design concept to enhance mobility and improve the corridor, as well as, while minimize the extent of environmental impacts.

6.5 Rationale and Identification of the Preferred Alternative Design Concept

Traffic forecasting conducted for this study, based on the City's growth plans, shows that traffic volume will continue to grow on McLaughlin Road between Bristol Road West and Britannia Road West. The related deteriorating traffic conditions for all road users will also extend beyond the current morning and afternoon peak periods to adversely affect more times of the day, road users and adjacent properties.

This study has concluded that alternative planning solutions such as diverting traffic to alternative routes, encouraging increased use of alternative travel modes and improving road and intersection operations would not, by themselves, fully address the traffic congestion and safety problems that will continue to be experienced on this key road section.

Through consultation with the community and stakeholders, the study team gained a clear understanding of the key concerns and sensitivities along the corridor. Furthermore, that to effectively address transportation problems and related opportunities along this section of McLaughlin Road, a context-sensitive design approach was needed in the design of the road. Most importantly, to minimize the impacts between Bristol Road West and Matheson Boulevard West, a balanced approach to address the key objectives of the study was required.

To this end, the following design concepts for McLaughlin Road, from Bristol Road West and Britannia Road West, were evaluated as part of this study. These design concepts are detailed in Section 6.3 and were presented at Public Information Centre No.2:

- Do Nothing;
- Option 1 - Maintain 2-Lanes plus a Centre Turn Lane;
- Option 2 - Widen to 4-Lanes plus On-Road Bike Lanes; and
- Option 3 - Widen to 4-Lanes (Sharrow Lane and Underground Hydro).

Exhibit 6.11 provides a comparative summary of the impacts of each design concept on the basis of the evaluation criteria.

Exhibit 6.11 Identification of the Preferred Concept

CRITERIA		CRITERIA INDICATORS	UNIT OF MEASURE	DO NOTHING	OPTION 1 (2/3 Lanes with 1.5m bike lanes)	OPTION 2 (4 Lanes with 1.5m bike lanes)	OPTION 3 (4 Lanes with sharrow lanes)
Traffic and Transportation			**Overall**	**Unacceptable**	**Least Desirable**	**Preferred**	**Preferred**
			Britannia Road	• Intersection operates at LOS C in AM and LOS D in PM, V/C = 0.62 in AM and 0.71 in PM. Queues are well managed by storage lanes.			
			Regal Drive (Unsignalized)	• Regal Drive operates at LOS F (over-capacity) in AM and PM with excessive queuing	• Side street (Regal Drive) operates at LOS C in AM and LOS B in PM; V/C = 0.28 in AM and 0.23 in PM • Left turns onto Regal Drive operate at LOS B in AM and LOS A in PM; V/C less than 0.18 • Queues are well managed by storage lanes		
			Matheson Boulevard	• Intersection operates at LOS F in AM and PM; V/C = 1.09 in AM and 1.22 in PM • All approaches breakdown in either AM or PM peak	• Intersection operates at LOS E in AM and PM; V/C = 1.0 • The eastbound through lanes operates at LOS F; V/C = 1.19. • All other movements operate at LOS E or better		
			Avonwick Avenue (Unsiganlized)	• Avonwick operates at LOS F in AM and PM; V/C = 1.26 in AM and 2.35 in PM • Insufficient gaps available for vehicles to turn onto McLaughlin Road • Consider restricting left turns and redirect traffic to Ceremonial Drive		• Avonwick Ave operates at LOS D in AM and PM; V/C = 0.50 in AM and 0.35 in PM • Four lanes provide adequate gaps for vehicles to turn onto McLaughlin Road	
	Network Capacity and Level of Service	*Ability to accommodate traffic demands (Intersection level of service, capacity, queues)*	Ceremonial Drive	• Intersection operates at LOS C in AM and LOS E in PM; V/C = 0.81 in AM and 0.98 in PM • Southbound single shared through-right lane operates at LOS F, V/C = 1.22 in PM • If left turns from Avonwick Avenue are added, operations will further deteriorate.	• With addition of southbound right turn lane intersection operates at LOS B in AM and LOS C in PM; V/C = 0.81 in AM and 0.89 in PM • Lengthy southbound queue (330m) in PM, blocks exclusive right turn lane • If left turns from Avonwick Avenue are added, operations will further deteriorate.	• Intersection operates at LOS A in AM and PM , V/C = 0.47 in AM and 0.53 in PM • Queues are well managed along McLaughlin Road (less than 100m)	
			Faith Drive/ Parkwood Place (Unsignalized)	• Side street (Faith Drive /Parkwood Place) operates at LOS F in AM and PM (overcapacity) • Insufficient gaps available for vehicles to turn onto McLaughlin Road		• Parkwood Place operates at LOS E in PM; V/C = 0.14 • Movements operate well below capacity and delays reduced from present day conditions • Adjacent signals provide enough gaps for vehicles to turn onto McLaughlin Road	
			Bristol Road	• With signal improvements, intersection operates at LOS C in AM and LOS D in PM; V/C = 0.84 in AM and 0.97 in PM • Lengthy queues (220m) in the southbound direction during the PM peak hour			
	Traffic Safety	*Roadway Geometry / Traffic Speeds*	*Traffic Calming/ Speeds*	**Least Desirable** • No Speed Reduction measures in place	**Less Desirable** • Exclusive left turns lanes throughout are expected to reduce rear end collisions, however may increase operating speeds	**Preferred** • Additional through lane capacity will reduce impacts to through traffic at transit/bus stops • Reduced (3.3m) lane width to slow through traffic • Left turns from through lane at entrances and unsignalized intersections will slow down through traffic • Additional capacity enables traffic calming measures (i.e. raised /table intersections)	
			Lane merges and turn lanes	**Least Desirable** • Lane imbalance • 2 merge conditions (1 - SB south of Britannia and 1- NB north of Bristol) • Exclusive left turns at all intersections and two-way left turn at entrances	**Least Desirable** • Lane imbalance • 2 merge conditions (1 - SB south of Britannia and 1- NB north of Bristol) • Exclusive left turns at all intersections and two-way left turn at entrances	**Fair (Acceptable)** • Additional through lane capacity will reduce impacts to through traffic at transit/bus stops • Improved lane balance and continuity • No merge conditions • Exclusive left turns at signalized intersections • Shared thru/left turn lanes at Avonwick, Parkwood Place/Faith Drive, and commercial accesses (increased potential for rear end collisions)	
	Multi-Modal/ Active Transportation	*Ability to accommodate Pedestrian, Cyclists, Transit*	*Pedestrian and Cyclist Facilities*	**Least Desirable** • No sidewalk on the east side between Parkwood Place/Faith Drive and Matheson Blvd. West • No exclusive bike lanes	**Preferred** • 1.5m sidewalk is provided/maintained along the corridor • An additional sidewalk is provided on the east side between Parkwood Place/Faith Drive and Matheson Blvd. West road • Bike lanes on both east and west side of the road is provided along the corridor		**Less Desirable** • Improved however limited to sharrow lane within Scenic Area
			Transit	**Least Desirable** • Maintained as existing	**Least Desirable** • Maintained as existing	**Preferred** • Additional through lane capacity will reduce impacts to through traffic at transit/bus stops. • Improvement in bus operations along corridor can be expected with widening.	
	Traffic and Transportation Scoring			(Does not address problem)			

Criteria Scoring: Preferred / Good ● Less Desirable / Fair ● Least Desirable/ Poor ● Unacceptable •

CRITERIA		CRITERIA INDICATORS	UNIT OF MEASURE	DO NOTHING	OPTION 1 (2/3 Lanes with 1.5m bike lanes)	OPTION 2 (4 Lanes with 1.5m bike lanes)	OPTION 3 (4 Lanes with sharrow lanes)
Natural Environment	**Trees**	Trees within grading limits	*Number of trees to be removed*	**Preferred** • No impact	**Less Desirable** • ± 300 trees to be removed • Replace trees at 2:1 ratio. Majority of tree replacements outside corridor	**Least Desirable** • ± 546 trees to be removed (212 west side, 324 east side) • Includes 29 large diameter trees (DBH 50cm) • Based on 2:1 replacement ratio (i.e. 1084 new trees). Majority of tree replacements outside corridor	**Less Desirable** • ± 421 trees to be removed (161 west side, 260 east side) • Includes 24 large diameter trees (DBH 50cm) • Introduce Woodlot Edge Management Plan • Add ± 260 trees replacement within ROW, plus balance 566 additional trees beyond ROW, based on 2:1 replacement ratio
	Wildlife	Impact to wildlife and wildlife habitat	*Loss of Habitat – Britannia Farm*	**Preferred** • No impact	**Less Desirable** • Impacts are close to the edge of the forest and will have low impacts to wildlife habitat.	**Least Desirable** • Larger area of forest habitat impacted will result in greater impacts to wildlife habitat.	**Less Desirable** • Slightly larger area of forest habitat will result in greater impacts to wildlife habitat.
	Surface Drainage and Groundwater	Stormwater quality and quantity	*Additional pavement area*	**Preferred** • No impact	**Less Desirable** • Least amount of additional pavement/runoff for SWM treatment (2.4 to 2.5 m widening)	**Least Desirable** • Highest amount of additional pavement and grading (5.2 to 8.6m widening)	**Less Desirable** • Slightly larger pavement area/ runoff for SWM treatment (3.1 to 6.9 m widening)
	Natural Environment Scoring						
Socio- Cultural Environment	**Property Impact**	*Affect on Residential/ Commercial*	*Property Access*	**Less Desirable** • Traffic congestion will increase delays accessing properties.	**Less Desirable** • Traffic congestion will increase delays accessing properties	**Preferred** • Improves residential, business, and EMS access	**Preferred** • Improves residential, business, and EMS access
		Additional Right-of-Way	*Area (sq. m. of additional ROW)*	**Preferred** • No additional ROW required	**Preferred** • No additional property required between Bristol Rd and Matheson Blvd (plus ± 419 sq-m Matheson to Britannia)	**Least Desirable** • ± 1256 sq-m additional property required between Bristol Rd and Matheson Blvd (plus ± 419 sq-m Matheson to Britannia)	**Less Desirable** • ± 215 sq-m additional property required between Bristol Rd and Matheson Blvd (plus ± 419 sq-m Matheson to Britannia)
	Landscape/ Aesthetics	*Maintain/ Enhance Character of Roadway*	*Subjective*	**Preferred** • No impact • Maintain tree canopy	**Less Desirable** • Majority of trees/vegetation to be maintained • Minor impact to tree canopy	**Less Desirable** • Trees will be removed from the west side abutting residential development, as well as east side. • Overhead hydro limits tree planting opportunity	**Less Desirable** • Increased landscaping opportunity (260 trees to be added within ROW, plus 566 additional trees beyond ROW) • Allows canopy to develop on west side
	Archaeological and Cultural Heritage	*Potential for loss of archaeological or built heritage features*	*Area impacted beyond ROW*	**Preferred** • No change	**Less Desirable** • Generally, impacts are close to existing roadway and minor in nature.	**Less Desirable** • Limited/ no impacts are anticipated (to be confirmed through a heritage impact assessment of the Britannia Farm property)	**Less Desirable** • Limited/ no impacts are anticipated (to be confirmed through a heritage impact assessment of the Britannia Farm property)
	Noise Impact	*Proximity to Residences*	*Noise level*	• No change.	• No significant change. Noise levels do not warrant further attenuation.	• No significant change. Noise levels do not warrant further attenuation	• No significant change. Noise levels do not warrant further attenuation.
	Socio- Cultural Environment Scoring						
Cost	**Capital Cost**	*Capital Construction Cost (Excludes property cost)*	*Present Value $$ (Dollars)*	**Preferred** • No change	**Less Desirable** • ±$6 Million • Same as existing lane configuration with exception plus bike lanes • Incl. 4 Lanes Matheson Blvd to Britannia Rd	**Less Desirable** • ±$7 Million • Incl. 4 Lanes Matheson Blvd to Britannia Rd • One additional lane plus bike lanes between Bristol Road and Britannia Road West	**Least Desirable** • ±$9.5 Million • Includes additional landscaping cost and cost to bury hydro between Bristol Road and Matheson Drive at cost of $2.25M
	Cost Scoring						
Official City Policy	**Scenic Designation**	*Maintains Scenic Designation*	*Subjective*	• No Impact, Maintains Scenic Designation.	• Minimal Impact on Scenic Designation features and little remediation required.	• Most Impact to Scenic Designation and least opportunity to remediate.	• Moderate Impact to Scenic Designation with opportunity to remediate.
	Strategic Plan, Cycling Master Plan, and Living Green Master Plan	*In keeping with City's policies*	*Subjective*	• No improvement with respect to transit and cycling • No impact to Natural Areas	• In keeping with Cycling Master Plan • Minimal impact on Natural Areas	• In keeping with Cycling Master Plan • Mitigates tree impacts with replanting • Greatest impact on Natural Areas	• Partially in keeping with Cycling Master Plan • Improved transit service/ reduced delays • Mitigate impact to Natural Area with replanting
	Official City Policy Scoring						
	OVERALL			**Not Preferred** Does not address the key objectives of the study	**Not Preferred** Fails to adequately address operational and safety deficiencies, while still impacting trees	**Not Preferred** Significantly increases the number of trees to be removed and requires the most property.	**RECOMMENDED OPTION** Balances the transportation needs, while providing the opportunity to enhance urban design/ streetscaping along the corridor.

Criteria Scoring: Preferred / Good ● Less Desirable / Fair ● Least Desirable/ Poor ● Unacceptable ●

6.6 Preferred Alternative Design Concept

Based on a well-balanced evaluation of traffic/transportation, socio-economic environment, natural environment, cost and official city policy considerations, ***Option 3 was selected as the preferred alternative design concept*** on McLaughlin Road.

The Do-Nothing Option, Option 1, and Option 2, were not selected for the following reasons:

- Do Nothing Option does not address the key objectives of the study: improve traffic operations and safety, and create an urban environment that supports walking and cycling, while maintaining or enhancing the scenic route qualities.
- Option 1 improves cycling and pedestrian facilities along the corridor; however fails to adequately address operational and safety deficiencies. Despite efforts to avoid impacts to the natural environment 300 trees will still be impacted.
- Option 2 will best accommodate the transportation needs; however, it will significantly increase the number of trees that need to be removed (546 trees) and requires 2-3 m of additional right-of-way from the Britannia Farm.

Option 3 was selected as the preferred design concept because it balances the transportation needs, while providing the opportunity to enhance urban design/streetscaping along the corridor. For the section from Bristol Road West and Matheson Boulevard West, it proposes widening McLaughlin Road to four travel lanes, with turn lanes at signalized intersections and wider 4.0 m outside lanes to accommodate sharrow lanes (shared motorist/cyclist lanes). It also includes burying the overhead hydro lines and improving sidewalks along most of the road to enhance sidewalk continuity and streetscape opportunities.

For the section from Matheson Boulevard West to Britannia Road West, the preferred design concept has four 3.5 m wide travel lanes and continuous centre turn lane with sidewalks, marked bike lanes and streetscape improvements.

Exhibit 6.12 illustrates the lane configuration of the preferred design.

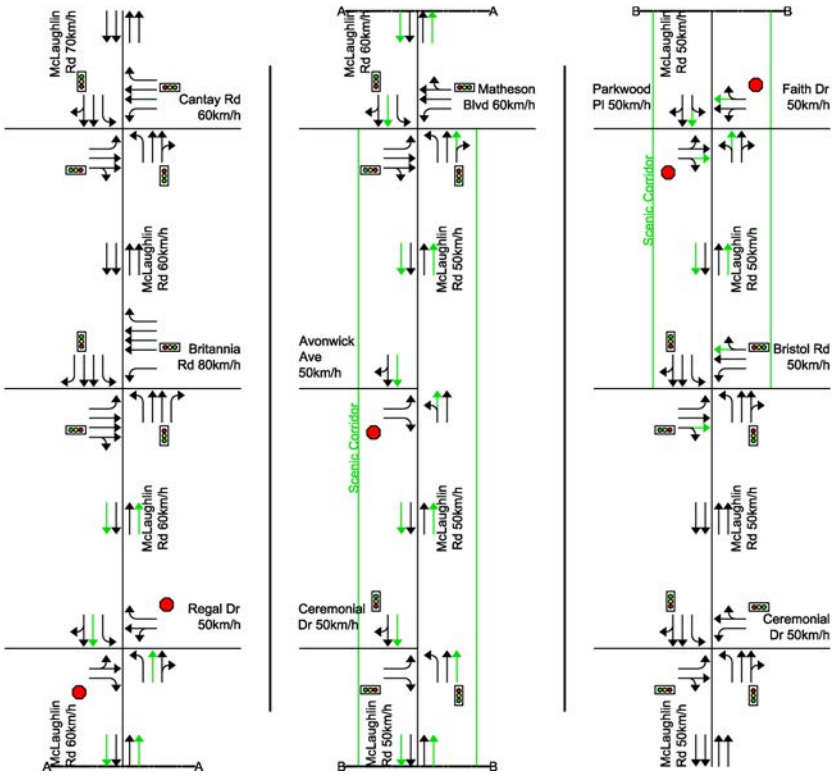


Exhibit 6.12
Recommended Lane Configuration

7 Description of Recommended Design Concept (Class EA Phase 3)

The recommended design for McLaughlin Road was developed in recognition of the community and stakeholders strong desire to minimize the impacts of the improvements on the character of the roadway, particularly between Bristol Road West and Matheson Boulevard West. It represents a balance of the key study objectives to provide a context sensitive design that will manage congestion and promote effective performance for all transportation modes (including cycling facilities along the corridor) and enhancing urban design/streetscaping in keeping with scenic designation.

Key elements for the recommended design include:

<u>Bristol Road West to Matheson Boulevard West</u>

- **4-lane cross-section** (3.25 m inner lane width, 4.0 m outer/sharrow lane). Left turn lanes are restricted to signalized intersections and minimized with respect to length and width where it is practical to do so;
- **Sharrow lanes** (a road marking placed in the travel lane to indicate that both cyclists and drivers are sharing the lane) to support cycling rather than bike lanes;
- **Tree replacements and new planting**: 842 trees added (260 trees within right-of-way, plus 582 additional trees beyond right-of-way) to offset 421 trees to be removed;
- **Sidewalk continuity**: sidewalks added to east side, with the exception of no sidewalk between Faith Drive and Ceremonial Drive. This is an example where balancing objectives was important, sidewalk continuity is important but for tree preservation, sidewalks were not implemented between Faith Drive and Ceremonial Drive;
- **Bury overhead hydro:** remove hydro poles along the west side of McLaughlin Road and relocate hydro underground (relocation cost $2.9M), which increases landscaping opportunities and potential for tree canopies. Enersource today has to trim the tree branches so they do not conflict with their infrastructure;
- **Streetscaping**: recreate the rural character using stone and rail fences, replanting of street trees, decorative lighting, heritage and interpretative signage, and resting points;
- **Woodlot Edge Management**: implement a woodlot edge management/ regeneration plan, using best principles of urban forestry management, to improve quality of the existing woodlot;

- **Speed Control**: incorporate raised intersections treatments and narrow lane widths to mitigate speeds and improve pedestrian visibility; and,
- **Noise Walls**: replace existing noise walls.

The recommended design minimizes pavement widening through the use of narrower lane widths and sharrow lanes, to minimize the impact to trees and property requirements.

Matheson Boulevard West to Britannia Road West

- **4-lane cross-section** (3.5 m lanes) plus 3.5 m centre turn lane**;**
- **1.5 m bike lanes**: wider right-of-way available in this section allows for bike lanes to be added; and,
- **Sidewalk continuity**: provides for a new sidewalk on the east side and maintains existing sidewalk on the west side.

7.1 Design Criteria

The design criteria established for McLaughlin Road is primarily based on Mississauga Design Standards (MDS). Majority of the design elements are outlined in MDS, however, Transportation Association of Canada - Geometric Design Guide for Canadian Roads (TAC) and Ministry of Transportation - Geometric Design Standards for Ontario Highways (GDSOH) were also considered where standards are not available in MDS.

The established design criteria is shown in **Exhibit 7.1**

Exhibit 7.1 Road Design Criteria

DESCRIPTION	DESIGN STANDARD	SOURCE (1)	PROPOSED STANDARD FOR MCLAUGHLIN ROAD
CLASSIFICATION			
Road Classification	UCU70 (Urban Collector Undivided)	-	UCU70 (Urban Collector Undivided)
Design Speed	70 km/h	MDS 2211.010	70 km/h
Posted Speed	50 km/h / 60 km/h	-	60 km/h 50 km/hr (Parkwood Place/Faith Drive to Avonwick Avenue)
AUXILLARY LANE LENGTHS (along McLaughlin Road)			
Intersection with Residential Street (i.e. Faith Dr., Parkwood Place, Avonwick Ave, Regal Dr.)			
Right turn lane	45 m storage 60 m taper	GDSOH Table E7-1	N/A
Left turn lane	25 m storage 50 m taper	MDS 2211.160 MDS 2211.170 MDS 2211.180 MDS 2211.181	40 m storage/ 60 m taper
Intersection with Collector Roads (i.e. Bristol Road, Ceremonial Drive., Matheson Boulevard)			
Right turn lane	45 m storage 60 m taper	GDS Table E7-1	N/A
Left turn lane	60 m storage 80 m taper	MDS 2211.190	40 m storage/ 60m taper
Intersection with Arterial Road (i.e. Britannia Road West)			
Right turn lane	80 m storage 80 m taper	MDS 2211.200	75 m storage/ 75 m taper
Left turn lane	80 m storage 80 m taper	MDS 2211.200	80 m storage/ 80 m taper

VERTICAL ALIGNMENTS			
Minimum grade	0.5%	MDS 2211.010	0.5%
Maximum grade	6.0%	MDS 2211.010	2.2%
Maximum grade through intersection	3.0%	MDS 2211.010	2.2%
Minimum crest vertical curve	K = 37	MDS 2211.020	K = 37 (Min.)
Minimum sag vertical curve	K = 24	MDS 2211.030	K = 30 (Min)
CROSS-SECTIONS			
Through lane width	3.5 - 3.7 m	TAC Table 2.2.2.3 GDSOH Table D2-4	3.5 m
			3.25 m (Bristol to Matheson)
Curb lane width	3.5 - 3.7 m	TAC Table 2.2.2.3 GDSOH Table D2-4	3.50 m
			4.00 m wide curb lane to accommodate sharrow facilities for cyclists (Bristol to Matheson)
Right turn lane width	3.3 - 3.5 m	TAC Section 2.2.3.2	3.3 m
Left turn lane width	3.0 - 3.5 m	TAC Figure 2.3.8.4	3.5 m without Median
			3.1 m (Ceremonial Drive, adjacent to Britannia Farm)
Tangent section cross fall	2.0%	TAC Section 2.1.5.3	2.0%
Centre Two-way left turn lane width	4.0 - 5.0 m	TAC Section 3.2.6.2	3.5 m (match existing condition)
Median width at intersection	1.5 m	MDS 2211.190	1.5 m slab on grade without gutter (F/C to F/C)
Bike lane width (One-way exclusive on-road)	1.2 - 1.8 m	City of Mississauga - Cycling Network Master Plan (Appendix B)	1.5 m to Edge of Pavement (excluding gutter)
Concrete splashpad width	0.75 m	MDS 2240.041	0.75 m
Sidewalk width	1.5 m	MDS 2240.010 MDS 2240.040	1.5 m (2.0 m abutting curb)
INTERSECTION CURB RADIUS			
Collector to Local	12	MDS 2211.180	12
Collector to Collector	15	MDS 2211.190	15
Collector to Arterial	15	MDS 2211.200	15
Design Vehicle	WB-20 (Min turning Radius = 14m for <15km/hr speed)		
	Single Unit Truck (SU) for 'No Heavy Vehicle Zone' (Between Bristol Road West and Matheson Boulevard West)		
INTERSECTION SIGHT TRIANGLES			
Collector to Arterial	15 m x 15 m	MDS 2211.210	15 m x 15 m

(1) SOURCE:

- *MDS: Mississauga Design Standards*
- *TAC: Transportation Association of Canada - Geometric Design Guide for Canadian Roads (1999)*
- *GDSOH: Ministry of Transportation - Geometric Design Standards for Ontario Highways (1985)*

NOTE: All dimensions are from Edge of Pavement (EOP)

7.2 Preliminary Design Features

The preliminary design of McLaughlin Road is based on providing facilities which make the roadway safer for all users including drivers, cyclist and pedestrians, as well as enhancing the scenic qualities of the roadway. As a result, the roadway design was developed with special attention to active transportation, transportation safety, and streetscape/woodlot restoration.

7.2.1 Active Transportation

According to the City's Cycling Master Plan, McLaughlin Road is proposed as a 'primary on-road cycling route'. In view of City's policies, active transportation will be promoted with implementation of cycling facilities and sidewalks along McLaughlin Road. The provision of on-road bike lanes / sharrow lanes will provide an opportunity to connect with cycling routes on intersecting streets. Similarly, sidewalk continuity is provided to adjacent land uses and transit facilities.

Bike Lanes

- 1.5 m bike lanes north of Matheson Boulevard West to Britannia Road West on both sides of the road;
- 4.0 m wide sharrow lanes (a road marking placed in the travel lane to indicate where people should preferably cycle) adjacent to Britannia Farm along McLaughlin Road (between Bristol Road West and Matheson Boulevard West);

Note: 1.5 m bike lanes south of Bristol Road West are proposed to be implemented as part of a separate project. To accommodate bike lanes north of Britannia Road West, the existing curb will need to be shifted 1.5 m to the outer side of the roadway.

Sidewalks

- A new 2.0 m sidewalk is proposed adjacent to the curb on the west side of McLaughlin Road from Bristol Road West to Matheson Boulevard West. North of Matheson Boulevard West, the sidewalk will be replaced were necessary to accommodate lower grades associated with the pavement widening (consider maintain existing sidewalk where acceptable boulevard grades can be provided).
- Similarly, a new 2.0 m sidewalk is proposed adjacent to the curb on the east side of McLaughlin Road between Ceremonial Drive and Matheson Boulevard West.
- A 1.5 m wide sidewalk is proposed between Matheson Boulevard West and Britannia Road West, with a 0.75 m splash pad between the proposed curb and the sidewalk.
- No sidewalk will be provided on the east side of McLaughlin Road between Faith Drive and Ceremonial Drive (to minimize impacts on trees along the Britannia Farm frontage).

Note: The sidewalk location was a balance between providing sidewalk connectivity and minimizing impacts on existing street trees and vegetation along McLaughlin Road.

7.2.2 Transportation Safety

It is proposed that the speed limit remain at 50 km/hr/ 60 km/hr on McLaughlin Road as it is a Major Collector road. In an effort to discourage speeding, speed management measures for inclusion in the design are proposed. As an example, intersection treatments such as textured, coloured, or raised intersections are being considered at the Parkwood Place/Faith Drive and

Avonwick Avenue intersections. The feasibility of these design features are to be reviewed with Mississauga Transit, Fire and Emergency Services and Traffic Operations during detail design.

7.3 Roadway Geometry

a) Horizontal Alignment

The existing road centreline is mostly tangential throughout the corridor. For the most part the existing centreline alignment, will be maintained. However, minor parallel shifts (up to 0.4 m east and 1.0 m west) are proposed to minimize impacts to the wooded area and adjacent properties. The proposed alignment shifts are summarized in **Exhibit 7.2** and on the **Preliminary Design Plates** at the end of this document.

Exhibit 7.2 Proposed Horizontal Alignment

START (STATION)	END (STATION)	LOCATION	DESCRIPTION
9+900	10+220	South Construction Limit to north of Bristol Road West	Match existing centreline
10+300	10+546	North of Bristol Road West (adjacent to Britannia Farms)	0.40 m shift towards east
10+660	10+760	North of Ceremonial Drive intersection	1.0 m shift towards west
10+830	11+400	South of Matheson Boulevard West	0.40 m shift towards west
11+460	12+200	North of Matheson Boulevard West	Match existing centreline

*Transitions: Sta. 10+220 to 10+300; Sta. 10+546 to 10+660; Sta. 10+760 to 10+830; and Sta. 11+400 and 11+460.

Illustrations of the proposed alignment shifts and road geometrics are shown in **Exhibit 7.3**, **Exhibit 7.4**, **Exhibit 7.5** and **Exhibit 7.6**.

b) Vertical Alignment

McLaughlin Road traverses a flat to rolling terrain throughout the study area. A minimum road longitudinal grade of 0.5% is maintained along the roadway (suitable for urban design) and crest/sag curves meet or exceed a 70km/h design standard. No sightlines concerns have been identified for drivers either travelling along McLaughlin Road or turning at intersecting streets. As such, the roadway design maintains existing grade to the extent possible. This approach minimizes construction cost, as well as impacts to existing woodlot and driveways/accesses to residential and commercial properties within the study limits.

The proposed design of McLaughlin Road considered the following:

- K=37 (minimum) for Crest curve
- K=24 (minimum) for Sag curve
- Minimum road grade = 0.50%
- Maximum road grade = 2.32%

c) Cross-Section

From Bristol Road West and Matheson Boulevard West, McLaughlin Road is to be widened to four travel lanes with turn lanes at signalized intersections. To keep the overall pavement width to a minimum sharrow lanes have been provided rather than on-road bike lanes. The

recommended design also includes burying the overhead hydro lines currently along the west side of the road (between Bristol Road West and Matheson Boulevard West) and improving sidewalks along most of the road to enhance sidewalk continuity and streetscape opportunities.

As part of a context- sensitive design approach, the following lane width reductions have been adopted:

- 4-lane cross-section with 3.25 m inner lane width (reduced from 3.5 m standard);
- 4 m outer/sharrow lane (shared motorist/cyclist) to support cycling;
- Shorten and narrow the left turn lane at Ceremonial Drive, adjacent to Britannia Farm (.i.e. width reduced to 3.1 m and length reduced to 40 m parallel/ 60 m taper; versus 3.25 m standard width, 60 m parallel and 80 m taper); and,
- Similarly, shorten and narrow the left turn lane at Matheson Boulevard West (i.e. width reduced to 3.1 m plus 1.5 m traffic island, and length reduced to 40 m parallel/ 60 m taper; versus 3.25 m standard width, 60 m parallel and 80 m taper).

For the section from Matheson Boulevard West to Britannia Road West, the recommended design has four 3.5 m wide travel lanes and continuous centre turn lane with sidewalks, marked bike lanes and streetscaping improvements. A 3.5 m wide centre turn lane, in keeping with existing conditions (reduced from standard 4.0 m width) to limit pavement width. Bike lanes have also been limited to 1.5 m width (no buffer).

Exhibits 7.3, Exhibit 7.4, Exhibit 7.5, and Exhibit 7.6 illustrates the cross-section of the recommended design.

To minimize the impacts to trees along the corridor and avoid property impacts, retaining walls are to be implemented along the corridor as follows:

- 0.3 m to 2.0 m high retaining wall adjacent to Britannia Farm;
- 0.3 m to 1.5 m high retaining wall in high cut/fill areas; and,
- Up to 0.3 m monolithic curb where minor/moderate regarding is required.

For the purposes of this study, it has been assumed that a 300 m cast-in-place cantilever wall will be provided in fill (avg. 1.5 to 2 m height) along Britannia Farm site; plus 650 m of gravity wall in cut elsewhere along Britannia Farm frontage and various locations along the corridor.

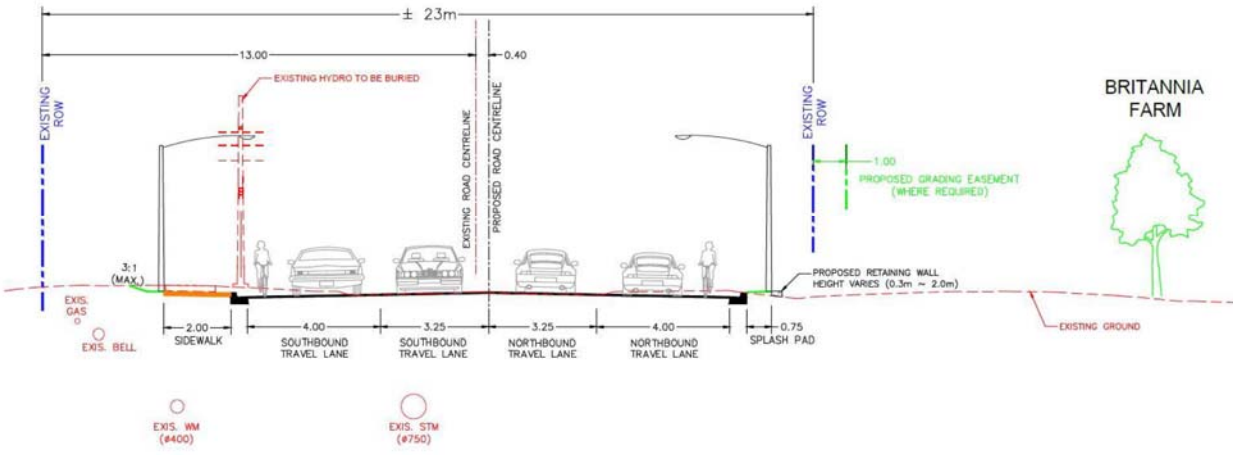


Exhibit 7.3 Typical Section - North of Bristol Road West (Sta. 10+420)

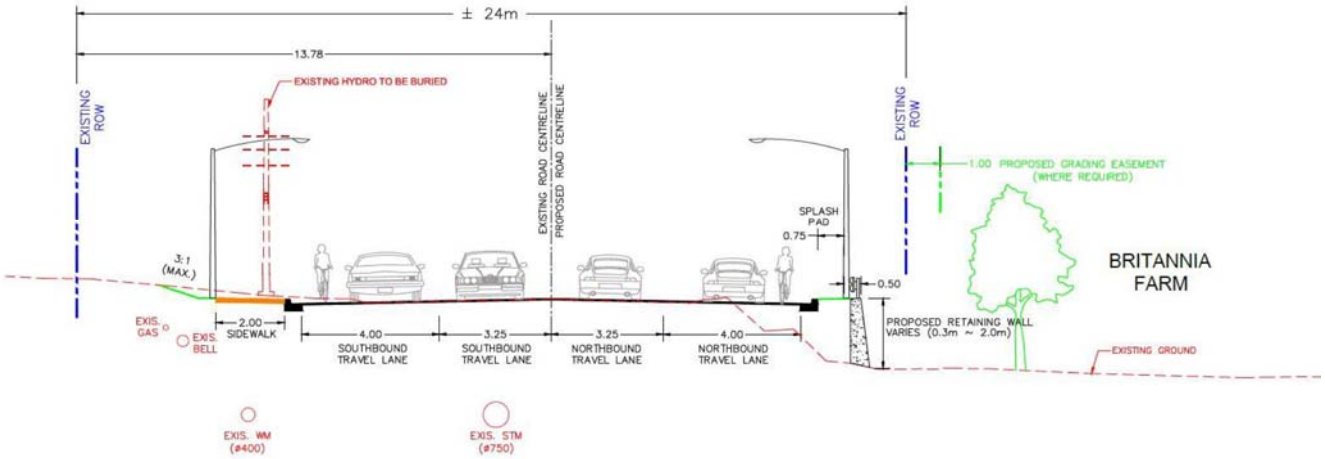


Exhibit 7.4 Typical Section - south of Ceremonial Drive Intersection (Sta. 10+590)

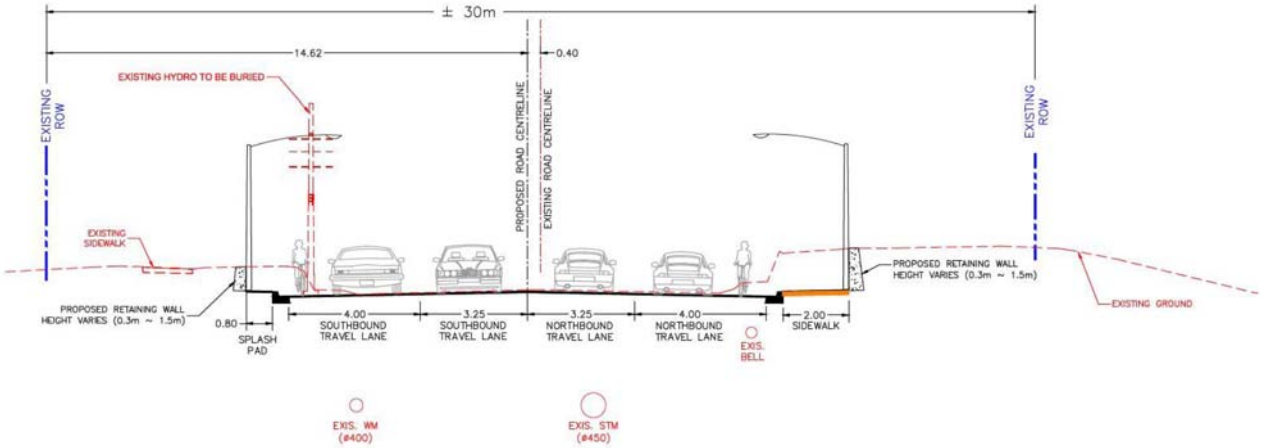


Exhibit 7.5 Typical Section - Ceremonial Drive to Matheson Boulevard West (Sta11+300)

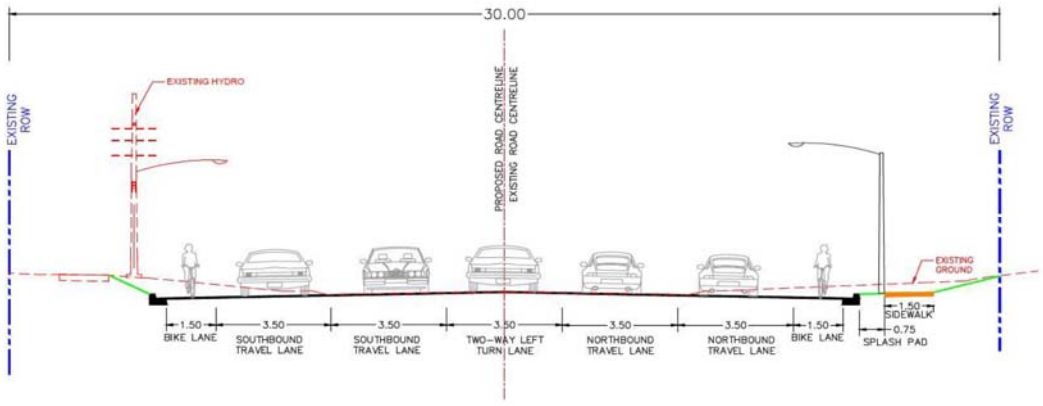


Exhibit 7.6 Typical Section - Matheson Boulevard West to Britannia Road West (Sta. 11+860)

7.4 Woodlot Edge Treatment

The preferred design concept for McLaughlin Road involves the removal of trees forming the edge of the existing Britannia Farm. This has the potential to result in a loss of urban tree

canopy, habitat, and climate change infrastructure. However the current health of this woodlot edge is not excellent and therefore would benefit from some arboricultural thinning, interplantings, and strengthening of the understorey and herbaceous layers.

To this end, the road widening presents an opportunity to do this best practice urban forest management work. The Britannia Farm woodlot edge will be restored with the following researched and practiced principles in mind:

- Species diversity, woodlot condition, age/size class distribution are equally important in aggregate as is canopy cover;
- Mimicking the layers of a forest (canopy/understorey/shrub/herbaceous/ rhizomatous) in edge restoration better provides for long-term success; and
- Consideration of entire woodlot condition as an urban natural area managed through thinning, planting, silviculture will enhance diversity and strength of edge condition (Kenney et al, 2011).

Proposed landscape restoration plans and species lists were presented to all agencies and stakeholders with generally positive responses to this approach. Details are in Section 8.1 and **Appendix E**.

These planting and management plans are a multi-year commitment (7-10 years) by the City that once realized, will successfully re-establish a stronger edge along this woodlot, both ecologically and structurally.

7.5 Streetscaping

The preferred design concept for McLaughlin Road incorporates a thorough review and design recommendation for how to improve the streetscape experience for persons using all modes of transport, whether passive or active. It is important to improve the public realm and increase the walkability of the area.

This urban corridor has a ‘rural’ feel to it, which is rare in large cities. As indicated previously, it is a designated Scenic Route with a traditional country scale and character. The design concept uses these existing strengths to propose reimagining of this rural character with stone and rail fencing; heritage and interpretive signage; resting points for pedestrians; and burying the overhead hydro lines.

- Putting hydro underground would obviate the destructive practice of line-clearing which affects the beauty and stature of canopy trees;
- Using pavers and cobblestones banding along sidewalks, and natural stone retaining walls, suggesting past foundations or homesteads;
- Hardwood fencing along the woodlot edge tells citizen s that this area is protected and important; and,
- Small orchards of flowering shrubs and small trees with interspersed benches bringing a human scale to the west side and encouraging walking and resting.

Perspective renderings showing realistic 10 years post-construction were presented to all agencies and stakeholders as well as members of the public at Public Information Centre #2 and the Community Workshop. It was imperative these were realistic and reasonable (refer to Exhibit 7.7).

Exhibit 7.7 Example Rendering of Recommended Design: Looking south along McLaughlin Road; north of Ceremonial Drive

7.6 Traffic Noise

Sound level predictions completed as part of this study indicate that future sound levels will range from 53 to 57 dBA $_{\text{Leq 16 hour}}$ at the receptor locations near McLaughlin Road with the widening of the road. These sound level predictions indicate no increases above the Do Nothing option. Since the future sound levels both with and without widening at all locations do not exceed 65 dBA and since the sound level increase due to widening is predicted to be less than 5 dBA, MTO guidelines indicate there is no requirement to consider noise mitigation features. In addition, the City's noise by-law and predicted noise increase does not require additional noise attenuation along this section of road. However in the preferred plan for McLaughlin Road in the study area includes the replacement of existing noise walls. See **Appendix K** for the Environmental Noise Assessment completed as part of this study.

7.7 Stormwater Management

Under the existing conditions, the entire drainage along McLaughlin Road (within the study limits) is accommodated through numerous piped storm sewers. These storm sewers discharge into trunk sewer systems, which ultimately outlet into a drainage system (i.e. Cooksville Creek). This situation will remain and no new systems are expected to be put in place. The road section is fitted with curb and gutter and catch basin inlets that direct drainage to storm sewers. Roadside ditching has been used at some locations to direct drainage to nearest storm sewer outlets. There are four outlets identified within the study limit. No culverts currently exist within the project limits. There is no direct discharge of surface runoff from this section of McLaughlin Road into any watercourses and the proposed upgrading will not alter this situation.

The proposed widening would not increase the design flows significantly and will not impact storm sewer system conveyance. The existing storm sewer was designed to include future widening with a 30 m right of way. The existing minor system capacity was confirmed and it

could be concluded that the existing storm sewers have enough capacity to convey 10 year event flows for an average 30 m paved right of way.

The physical condition of storm sewers is not known and need to be established either by existing/future CCTV/video inspection to determine its structural condition. CCTV inspection is to be completed during detail design.

Currently no quality control measures exist within the project limit. The proposed design will not alter the existing conveyance system and the size of outlets. The system was designed to convey 30 m right of way. Therefore, no quality controls are warranted. However, in order to achieve the stormwater management objectives outlined in *The Stormwater Management Planning and Design Manual* (2003) by MOECC, the following measures have been considered.

- For outlets 1 and 2 the proposed City of Mississauga Pond at Matheson Boulevard West will provide quality control; and,
- The outlets 3 and 4 will be treated by Oil and Grit Separator units. The sizing calculation will be provided during detail design.

It is recommended to maintain the grassed boulevard and drainage swales that presently exist. In addition, the various stormwater management measures such as providing sump for all new catch basins and permeable paving (low impact development techniques) on sidewalks, creating more green space within the right of way should be considered. Design of all quality control measures must be completed according to *The Stormwater Management Planning and Design Manua*l (2003) by MOECC.

The major system, in excess of those captured by the minor system, is conveyed overland on McLaughlin Road. Depth of flooding at the low points (sag) is to be determined during a 100 year storm event to ensure that all flow depths on the roads will remain less than 0.3 m above the gutter. Depth of ponding at the low points is to be determined during detail design.

See **Appendix L** for the Drainage and Stormwater Management Report.

7.8 Geotechnical – Pavement/Foundation Requirements

Pavement Material Types

The following mix types are considered suitable for this project:

- Asphalt Pavement: HL 1 Surface Course; and HDBC Binder Course.
- Crusher run limestone (19 mm) to be used for the base course and crusher run limestone (50 mm recommended for the subbase course). The 19 mm and 50 mm crusher run limestone material should meet the OPSS MUNI 1010 specifications.

Cuts and Fills

No slope stability problems are anticipated for earth fills or earth cuts less than 4 m high provided that the constructed side slope geometry is 2 Horizontal:1 Vertical (2H:1V) or flatter. Where existing embankments are to be widened the new fill material should be benched into the existing slope as per current OPSD standards.

The placement of borrow material must be carefully monitored and properly compacted. Mixing materials from different sources is not recommended because of the risks associated with differential settlement, drainage problems and frost heave. Seeding/mulching should be completed as soon as possible to control erosion.

Retaining Walls

An existing gabion retaining wall is located on the east side of McLaughlin Road adjacent to the wood lot area south of Ceremonial Drive (Station 10+600 to 10+700 approximately). A new retaining structure will be required in this area to accommodate widening on the east side. Proposed retaining wall locations are illustrated on the Preliminary Design Plates at the end of this report.

Preliminary foundation design recommendations for a new structure in this location, based on the subsurface stratigraphy encountered at this location, the recommended founding depths and geotechnical resistances for a structure foundation founded on undisturbed competent natural soils, can be found in **Appendix G**.

Soil Chemistry

Nine selected soil samples were submitted to AGAT Laboratories for chemical characterization with respect to general inorganic parameters including metals, pH, sodium adsorption ration (SAR) and electrical conductivity (EC) to assess options for reuse or disposal of excess soils that will be generated during construction. Based on visual and/or olfactory screening of soil samples, these nominal parameters are analyzed when there are no indications of environmental impacts. However, additional sampling/testing will likely be required during construction to confirm disposal or re-use options. The Certificates of Analysis are included in **Appendix G**.

During the detail design, additional sampling and chemical testing should be carried out. Soil that does not meet the Ontario Regulation 153/04 Table 3 Standards will typically have to be managed as waste.

7.9 Mississauga Transit

Mississauga Transit (MiWay) currently maintains 10 transit stops in each direction along McLaughlin Road between Bristol Road West and Britannia Road West. This includes a mix of nearside intersection and mid-block stops. In several cases, stops are closely spaced and ridership can be adequately served by stops provided at the adjacent intersection. As part of the recommended design, it is proposed that the existing northbound and southbound mid-block stops located in the vicinity of Champlain Trail and the south of Avonwick Avenue be removed (i.e. 3 northbound and 2 southbound).

The remaining bus stops will be near side bus stops within the outside through lane at the following intersections: Bristol Road West, Faith Drive/Parkwood Place, Ceremonial Drive, Avonwick Avenue, Matheson Boulevard West, and Regal Drive. At the Britannia Road West intersection, the existing southbound transit stop located south of Britannia Road West will remain while the existing stop in the northbound direction (located south of the right turn lane) will be shifted closer to the intersection, and function as near side stop along the right turn lane.

As part of the proposed improvements, a new concrete bus shelter pad (2.1 m x 5.4 m) will be provided at the following locations (as illustrated on the Preliminary Design Plans):

- Bristol Road West (northwest quadrant)
- Parkwood Place (northwest quadrant)
- Ceremonial Drive (southeast quadrant)
- Avonwick Avenue (northeast & northwest quadrant)
- Matheson Boulevard West (southeast & northwest quadrant)
- Regal Drive (northwest quadrant)
- Britannia Road West (southeast quadrant)

7.10 Illumination

The illumination between Bristol Road West and Matheson Boulevard West, where underground hydro facility is proposed, will be provided on decorative light standards on both sides of the road.

North of Matheson Boulevard West to Britannia Road West, an overhead hydro line is proposed on the east side of McLaughlin Road with poles spaced at approximately at 45-50 m intervals. These poles will be used to accommodate street lighting, in combination with new light standards on the west side of the roadway.

7.11 Utilities

To improve aesthetics along the corridor, minimize impacts to trees, and enhance streetscaping, the overhead hydro poles along the west side of McLaughlin Road between Bristol Road West and Matheson Boulevard West will be removed and a new underground hydro facility will be provided on the east side. The underground facility will be located between proposed curb and retaining wall under splash pad in the vicinity of Britannia Farm, in order to minimize impacts on trees in the area adjacent to Britannia farms between Bristol Road West and Matheson Boulevard West.

North of Matheson Boulevard West, an overhead hydro line is proposed on the east side of McLaughlin Road up to Britannia Road West. At the Britannia Road West intersection, two options are considered for reconnection to the existing facility on the west side. The first option is to cross McLaughlin Road ±150 m south of the intersection and connects to the existing hydro line. The second option is to continue proposed hydro line on the east side by crossing Britannia Road west intersection. The facility will be switched to the west side by crossing McLaughlin Road immediately north of the intersection and connecting to the existing hydro line.

It was determined that the provision of new hydro facility and road widening may conflict with existing utilities. In such a case, either the existing utilities needs to be relocated or the proposed location of new utilities will be adjusted as required. It is anticipated that the confirmation of exact location, size and depth of utilities as well as required modification to proposed utilities location will be completed during detail design.

The potential conflicts associated with road widening and relocated hydro lines are illustrated in Utilities Plan in **Appendix N**, as well as summarized **Exhibit 7.8.**

The proposed location of the hydro facility and associated property easement details were provided by Enersource and will be confirmed during the subsequent design phase. This information was integrated into the road design.

Exhibit 7.8 Utilities

UTILITY	POTENTIAL CONFLICT REASON	POTENTIAL CONFLICT LOCATIONS (STATION)*
Gas	New underground hydro crossing interference	9+986 (E), 10+080 (E), 10+185 (E) , 10+320 (E), 10+575 (W), and 10+625 (W)
	New overhead hydro posts on top of gas line	11+600-11+985 (E) 12+080-12+130 (E)
	New overhead hydro tension wires anchors on top of gas line	12+138 (E) 12+195 (E)
	Separation with new underground hydro <1.7m	10+030 to 10+185 (E) 10+575 to 10+730 (W)
Watermain	New underground hydro crossings: Ø 600 and Ø 150 WM Ø 200 WM Ø 400 WM Potential conflict with watermain due to CB relocation: Ø 300 WM Ø 400 WM Ø 400 WM Ø 300 WM	 9+990 (E) 10+200 (E) 10+624 (W) 10+705 (W) 10+730 (W) 10+870 (W) 12+300 (W), 12+470 -12+780 (W)
Storm Sewer	New underground hydro crossing	10+000 (E), 10+209 (E), 10+625 (E)
Sanitary	New underground hydro crossing	10+000 (E)
Bell	New underground hydro Overhead hydro post / tension wire anchor inference;	9+970 to 10+015 (E), 10+044 (E) , 10+200 (W), 10+575-10+735 (W), 11+500 (W), 12+060-12+132 (E) 12+130 (W), 12+140 (E)
Rogers	New underground hydro crossing	9+974 (E), 10+167 (E), 10+730 (W)

Notes *:(E): East side of McLaughlin Road; (W): West side of McLaughlin Road
Ø: Diameter in mm; WM: Watermain

7.12 Property Access

The proposed road design maintains all residential and commercial accesses without restrictions along McLaughlin Boulevard. Driveways impacted by the road construction will be restored at a suitable grade (minor grading beyond the property line will be required). The existing 3.5 m wide centre Two-way Left Turn Lane (TWLT) north of Matheson Boulevard West will be maintained to provide convenient access to the properties.

7.13 Property Requirements

As part of this study, a context sensitive design approach was used to minimize the extent of grading and the need to acquire additional property. In this regard, retaining walls have been used throughout the corridor, including the along the majority of the Britannia Farm frontage. In order to accommodate the roadway improvements, property acquisition is required from the three properties (**Exhibit 7.9**). These requirements are illustrated on the Preliminary Design Plates at the end of this report.

Exhibit 7.9 Property Requirements

#	PIN #	ADDRESS	APPROX. STATION	LOCATION	AREA
1	03894800	5520 Hurontario St. (Britannia Farm)	10+690 – 10+698	East of McLaughlin Road (at Ceremonial Drive)	± 20 m^2
			10+690 – 10+930	East of McLaughlin Road (at Ceremonial Drive)	± 195 m^2
2	03905900	5801 McLaughlin Rd	11+540 – 11+600	Northeast corner of McLaughlin Roadd and Matheson Boulevard West	± 218 m^2
3	03906000	N/A (vacant)	11+985 – 12+045	East of McLaughlin Road (South of Britannia Road West)	± 500 m^2 desirable
				TOTAL:	**±933 m^2**

Note: Excludes hydro easement requirements beyond the proposed right-of-way (i.e. to accommodate wire swing, load centres/transformers, etc). Refer to the composite utility plans in **Appendix N** for preliminary hydro easement requirements, as identified to date by Enersource.

Between Bristol Road West and Matheson Boulevard West, additional right-of-way will be required from the Britannia Farm site. By providing a splash pad only along the property frontage south of Ceremonial Drive, these requirements have been minimized. However, additional right-of-way (typically 0.5 m to 1.5 m width along the frontage) will be required directly opposite and north of Ceremonial Drive to accommodate a sidewalk and bus pad at this location.

To accommodate intersection improvements at Matheson Boulevard West and widening along McLaughlin Road, additional right-of-way will be required from the property the north-east quadrant of the intersection (i.e. approximately 2 m of additional frontage and intersection daylighting triangle). The centre traffic island at this location has been reduced in length to maintain full access to the existing residential driveway. However, as part of redevelopment or property negotiations consideration should be given to relocating the existing access further north.

On the northbound approach to Britannia Road West, the existing right turn lane has been cut short and terminates at the second property parcel on the east side. To accommodate the road widening and lengthen the existing right turn lane, additional right-of-way is required. This property is currently vacant and served by a (field) access located central to the site. This access will be maintained. If possible, a constant 8.3 m width should be secured across the entire (61 m) frontage.

7.14 Required Permits

Exhibit 7.10 details the applicable permits and approvals required for the preferred alternative.

Exhibit 7.10 Applicable Permits and Approvals

PERMIT	AGENCY
Heritage Permit: The alteration to Britannia Farm is proposed, and the property is designated under Part IV of the Ontario Heritage Act (Designation By-Law 0442-2001).	City of Mississauga
Encroachment agreement	City of Mississauga
Private tree removal/injury permit	City of Mississauga

7.15 Preliminary Capital Cost Estimate

The estimated cost of the recommended design alternative is summarized below. Overall, it is expected that the roadway reconstruction costs total approximately $ 9.5 M (million), and utility relocation costs total $3.6 M (the majority which is associated with burying existing hydro). This cost, detailed **Exhibit 7.11** excludes property acquisition and HST.

A detailed breakdown of capital costs is provided in **Appendix O**.

Exhibit 7.11 Preliminary Capital Cost Estimate

ITEM	TOTAL COST
Roadworks Construction	$2,331,500
Storm Sewer / Drainage	$550,000
Streetscaping / Landscaping	$1,345,000
Signals and Streetlighting	$1,090,000
Misc. (e.g., noise walls, retaining walls, etc)	$2,611,750
Contingencies (20% of all above)	$1,585,650
Total Construction Cost	$9,513,900
Utility Relocation	
O/H Hydro Relocation (overhead)	$180,000
O/H Hydro Relocation (underground)	$2,950,000
Other Utility Relocation (5% of construction)	$475,700
Engineering and Contract Administration (12%)	$1,141,700
Grand Total Construction Cost	$14,261,300
(Rounded)	**$14.3 M**

8 Environmental Impacts, Mitigation and Commitments

8.1 Vegetation Impact, Mitigation and Improvement

Tree Removals

To accommodate the recommended design, it is estimated that a total of 421 trees will be removed within the study area. Of the 421 trees to be removed, 161 are located on the west side of road and 260 are located on the east side of McLaughlin Road. Trees identified for removal range in size from 10 to 77 cm DBH. The majority of these trees are considered to be in good to fair condition.

The above, tree removal estimate is based on a detailed review of grading impacts and a field review of the design. This assessment determined the following:

- 413 trees were identified as directly impacted (i.e. trees within the grading limits and 1.5 m beyond); and,
- 8 trees of the 186 trees identified as impacted (where grading limits extend into the Tree Protection Zone (TPZ), however remain beyond 1.5 m of the tree trunk) will not survive.

The survivability of a tree with encroachment into the minimum TPZ is dependent on a number of factors including: tree species, tree condition prior to construction, proximity of grading to the tree, extent of grading and soil compaction, drainage modifications and extent of works within the dripline. An assessment of the survivability of impacted trees (encroachment into the minimum TPZ) was conducted. The percent lost of 'critical root zone,' species sensitivity and current health of tree was used to determine the likelihood of the tree to survive post-construction. 'Critical root zone' loss of greater than 15 % for sensitive trees, 25 % for intermediate trees, and 35 % for tolerant trees were considered not likely to survive post-construction.

In total, 186 trees were identified as impacted (i.e. encroachment into TPZ). Of the 186 trees, 103 are located on the west side and 83 are located on the east side of McLaughlin Road. In total, 96% of the total number of trees classified as impacted are expected to survive post construction (i.e. 178 of 186 trees).

Tree Protection

The following recommendations are provided to ensure impacts to all retained trees are minimized. Designation of a TPZ is imperative for the protection of trees (roots, trunks, branches) adjacent to construction works. The TPZ will restrict construction related machinery and activities from damaging trees identified for protection. Tree protection measures within the study area should follow the minimum tree protection limits developed by the City of Mississauga. This protection zone is the minimum distance from the tree trunk required for protection, and it varies depending on tree size.

Protection recommendations:

- Tree protection barriers should follow the City of Mississauga standard for frame and solid hoarding. On site needs will need to be assessed to determine whether the framed or solid hoarding should be used;
- Any excavations within the minimum TPZ must be completed by hand under the direction of a qualified Arborist or Forester;
- Tree protection hoarding/barrier must be installed prior to the commencement of any construction activities;

- Heavy machinery should not to be operated within the TPZ (including overhead swinging or machine arms);
- Construction materials, equipment, soil, construction waste or debris are not to be stored within the TPZ or dripline of the trees identified for protection;
- There should be no movement or parking of vehicles, placement of equipment or pedestrian traffic within the TPZ;
- Low pressure hydro-vac excavation technology is recommended to expose roots where encroachment within the minimum TPZ is required;
- Prune any exposed roots with a diameter of less than 5 cm to promote regeneration and prevent infection. All roots greater than 5 cm in diameter should not be removed;
- Any tree removals, pruning or root cutting required is to be conducted by a qualified Arborist or Forester;
- Apply a slow release deep root low nitrogen fertilizer to promote increased vigor;
- No signs or objects should be displayed or affixed to any trees;
  Disposal of any liquids shall not occur within the TPZ;
- Should any additional, incidental or accidental tree injuries occur during construction, a qualified Arborist or Forester should be consulted to determine whether additional mitigation measures should be employed; and,
- Tree clearing shall not be conducted during the Migratory Bird Convention Act (MBCA) breeding season commonly considered May- August, unless under appropriate permitting.

These efforts will help to ensure that impacts to retained trees are minimal and that the condition and character of these trees will not change, either in the short-term or long-term period.

Tree Reinstatement/ New Plantings

To mitigate for the loss of trees for the roadway improvements, it is proposed that a minimum of 842 trees be planted as part of this project (in keeping with a 2:1 replacement ratio). It is estimated that 260 trees can be reinstated within the McLaughlin Road right-of-way. Therefore approximately 582 trees are to be added elsewhere. In this regard, as part of the detail design landscape restoration and woodlot management plans, consideration should be given to planting trees on the east side of the Britannia Farm, as to minimize the overall impact to the woodlot.

The proposed landscape restoration plans and species lists are included in **Appendix E**.

Site Inspections

Site inspections should be conducted once the TPZ has been delineated and fencing erected. Construction should not begin until the TPZ meets the satisfaction of City of Mississauga staff. During construction, inspections should be conducted at regular intervals to monitor tree health as it relates to construction activity and provide mitigating recommendations where/if warranted.

8.1.1 Woodlot Edge Management

The removal of forest vegetation along the existing edge of the Britannia Farm or the removal of a portion of a forested feature that results in the exposure of a new forest edge will have several negative impacts along the forest borders and within the forest interior. Some of the direct and indirect impacts as a result of newly exposed edges include:

- Exposure of the retained vegetation to the effects of increased light, wind, and sun which results in decreased soil moisture;
- Exposure to salt spray;
- Reduced establishment of shade tolerant plant species and an overall reduction in plant species richness and abundance;
- Increased invasion/spread of aggressive non-native plant species;
- Loss of native seedbank;
- Decreased presence of interior habitat;
- Exposure of “edge” trees to windthrow;
- Changes in wildlife diversity and abundances;
- Destabilization of landforms composed of unconsolidated material and/or soil compaction;
- Changes to hydrology; and,
- Increased noise.

Forest edge management techniques and principles, in accordance with the Toronto and Region Conservation Authority (TRCA) *Forest Edge Management Plan Guidelines* (2004), are recommended for the Britannia Farm woodlot. CVC does not have edge management guidelines and as such, it is recommended that TRCA guidelines be used. Where new forest edges are exposed, forest management techniques will be implemented to mitigate the associated impacts to the Britannia Farm woodlot. As part of the Forest Edge Management, mitigation measures will include, but not be limited to the following:

- Planting of appropriate native trees, shrubs and ground flora shall be undertaken as soon as possible following vegetation removals. Plantings along the disturbed forest edges will provide a protective buffer. Newly exposed forest edges become exposed to a greater potential for aggressive and invasive species infiltration further into the forest interior causing greater impacts. Micro-habitat conditions are also altered due to a greater incident of light penetrating further into the forest resulting in decreased soil moisture and increased windthrow. Plant species used within the buffer shall be similar to those in the adjacent habitat and be non-invasive in nature.
- Grading within areas where edges will be newly created shall be designed to meet existing grades a minimum of 3 m away from the tree drip-line, to the extent possible.
- Compaction of soils on lands immediately adjacent to the newly exposed forest edge will be minimized to the extent possible. Construction activities can result in cut roots, and soil compaction due to re-grading and fill placement. Cut tree roots can reduce a tree’s capacity to uptake and transfer water and nutrients, and soil compaction can result in a decrease in air spaces within the soil which can reduce the infiltration capacity of the soil, limits soil oxygen and limits root penetration. Decompaction efforts and methodology shall be site specific. Where decompaction is required, it shall extend to a minimum depth of approximately 25 cm.
- Drainage patterns adjacent to newly created edges shall be maintained to avoid changes in soil moisture, this is especially important around wetland areas and forest communities with substrates that maintain increased moisture capacity.

- A plan must be in place to immediately mitigate the spread of invasive and/or non-native plant species.
- A monitoring plan must be developed to ensure that the newly planted material survives and fulfils the intended function and to ensure that the inadvertent spread of invasive and/or non-native plant species is appropriately managed.
- Plant species identified for planting within the newly exposed edges will consist of native species that have been identified within the existing forest communities, or native plant species that are suitable during the initial stages of restoration (i.e., higher light conditions, etc.), which will take up resources that could otherwise be taken up by invasive and/or non-native disturbance tolerant species. As tree and shrub seedlings grow and reduce light conditions, it is expected that those planted ground flora species requiring higher light conditions will be at a competitive disadvantage and those more suitable species already established within the remaining and undisturbed forests, will slowly establish.

8.1.2 Invasive Species Management

Although not extensive, invasive species such as garlic mustard (*Alliaria petiolata*), and common buckthorn (*Rhamnus cathartica*) have been identified within the study area. Disturbance activities can promote the spread of invasive plant species which could substantially alter the structure and function of mature vegetation communities that continue to exist post-construction.

It is not always possible or even desirable to completely remove all non-native species; however, truly invasive species such as buckthorn, swallow-wort (*Cynanchum rossicum*), garlic mustard, and cow vetch (*Vicia cracca*) should be managed over a five year period in support of the establishment of those native and planted species. Active invasive species management over the first five years is important to maintain the quality of restored vegetation communities by reducing competition from invasive species during the early stages of plant establishment and growth within newly planted areas (i.e., where edge management plantings have been undertaken along newly exposed forest and wetland edges, or within forest restoration sites).

An important step in managing aggressive and invasive plant species is implementing concentrated or dense plantings with suitable native plants. In areas where there are higher concentrations of invasive species, replacement will be with dense numbers of plant species that are fast-growing and suitable to the respective micro-habitat conditions. These types of replacement plantings following the removal of any invasive plant species shall be undertaken as soon as possible following removals. This strategy will help to mitigate the regeneration and subsequent spread of invasive and/or non-native plant species through competition.

To further mitigate the spread of invasive species during construction, the following actions shall be taken:

- The extent of the target invasive species within vegetation communities that will be impacted should be indicated on contract drawings and confirmed in the field by an experienced restoration/plant biologist;
- Only when required, herbicide treatment/application may be needed to reduce the size and spread of invasive species' population within restored areas. Any herbicide application must be applied by a licensed applicator. The preferred application method would be with an applicator that directly applies the herbicide with a wicking device/wand to mitigate spray drift onto desirable cohort species;
- Equipment working in the identified invasive species locations will be thoroughly cleaned prior to moving from the site; and,

- Soil removed from sites with a high incidence of non-native species will not be re-used for any vegetation restoration sites unless it is placed in an area that will be actively and regularly managed. Otherwise, such soils will be buried below impervious surfaces (e.g., road), to the extent possible.

8.1.3 Follow-up Surveys

A follow-up spring site visit will be conducted during detail design to ground truth the boundaries of vegetation communities and conduct a botanical survey.

8.1.4 Britannia Farm Restoration Consultation Opportunities

The City of Mississauga will look for restoration opportunities for the Britannia Farm property during detail design in consultation with the Peel District School Board.

8.2 Wildlife

A follow up breeding bird survey will be conducted during detail design to confirm bird species presence/absence within the study area, and to confirm the potential of species regulated under the Endangered Species Act.

8.3 Sediment and Erosion Control Measures

If uncontrolled, the construction activity associated with the McLaughlin Road improvements could result in increased rates of erosion and sedimentation within and adjacent to the site area and drainage systems. Erosion, for the purposes of this discussion, is described as the process whereby soil particles are detached from an exposed surface and transported by water, wind or some other agent. Sedimentation is defined as the deposition of (eroded) particles at a "downstream" point, typically a watercourse. The potential environmental impacts from increased erosion and sedimentation include: degradation of water quality; destruction of fisheries habitat; and, increased flooding potential.

Erosion and sedimentation processes are typically accelerated due to construction activities. Literature indicates that construction activities can increase erosion and sedimentation rates by 2 to 3 orders of magnitude over that expected from a natural forested area. Erosion and sedimentation control are therefore an integral and important component in the design and construction of any project.

Erosion and Sediment Control Measures

To minimize the potential environmental impacts, the following erosion and sedimentation control practices will serve to guide the design and implementation phase of the Erosion and Sedimentation Control Plan:

- Limit size of disturbed area;
- Limit duration of soil exposure;
- Retain existing vegetation where feasible,
- Limit slope length and gradient of disturbed areas;
- Preserve overland sheet flow and micro-drainage (avoid concentrated channel flows);
- Break and redirect flows to lower gradients;
- Design and implement staged stripping;
- Prevent disturbance of previously stripped and stabilized parcels; and,
- Stabilize stripped parcels with temporary vegetative controls.

Appropriate permanent/temporary erosion control measures to be considered in the design and implementation of the Erosion and Sedimentation Control Plan are:

- Hydroseeding - One step application of seed and hydraulic slurry with adhesive binder (provides permanent stabilization for moderate to steep slopes).
- Seed and Straw Mulch - Alternative two step application that will be applied to provide permanent/temporary vegetative stabilization of disturbed areas.
- Mulch (straw, wood etc.) - Used to provide temporary erosion protection of exposed slopes during over-wintering and for disturbed areas inactive for greater than 45 days.
- Sod - Utilized to provide quick permanent stabilization of disturbed areas. Applications include lateral ditches with gradients <5% and slopes with steep to moderate grades (i.e. 3% to 5%).
- Erosion Control Blanket - Applied as temporary/permanent erosion protection for slopes greater than 2:1 or as a ditch liner. For permanent applications, seed will be applied prior to installation.
- Aggregate Stone - Appropriate material, such as rip rap will be used to provide immediate permanent erosion protection of lateral ditches >5% gradient; and along chute/spillways. Geotextile fabric will be applied prior to placement of any aggregate material.

Sediment Control

The following elements should be included in the sediment control plan:

- Provision of a series of temporary interceptor/conveyor ditches to direct runoff to the siltation/stormwater management pond;
- Provision of rock or straw bale within drainage swales/ditches; and,
- Placement of a series of silt control fencing for the interception of sheet flow drainage.

All sediment control measures should not be removed until final stabilization of the site. In addition, any accumulated sediment shall be removed, as part of a maintenance program, from all control measures when accumulation reaches 50% of the height or volume of the control structure.

Environmental Inspection Process - As a component of erosion and sedimentation control, environmental inspections of the construction site will be conducted. Environmental inspections will be conducted to assess the performance of erosion and sedimentation control measures and identify any required maintenance. The frequent inspections will also permit the identification of localized erosion and sedimentation control issues that require site specific attention.

Implementation and Recommendation - A 200 m standby supply of prefabricated silt fence barrier, in addition to silt fence requirements, shall be maintained at the construction site prior to commencement of grading operations and throughout the duration of the contract.

Where interceptor ditches and/or subsurface drains are specified, they shall be constructed prior to commencement of any related cut or fill activities.

Cut and fill earth slopes and ditches, shall be treated with the specified cover material (seed and mulch, seed and erosion control blanket, seed and sod, rip rap, etc.) within 45 days from the commencement of the cut, fill or ditching operation. Commencement of a cut, fill or ditching operation shall be considered to have occurred when the original stabilizing cover has been removed, including grubbing, or has been covered with fill material.

Run-off from the site and stockpiles shall be controlled to the extent possible to minimize sediment entry to the adjacent watercourses.

Where dewatering is required, the effluent shall be discharged in a manner that prevents the entry of sediments to watercourses, or scouring and erosion at the outlet.

All erosion and sediment control measures will be clearly stated in the contract drawings and documents.

Erosion and sediment control plan for the project must adhere to Erosion and Sediment Control (ESC) Guidelines for Urban Construction, December 2006, Greater Golden Horseshoe Area Conservation Authorities.

8.4 Contaminated Soils

The Phase One ESA identified Areas of Potential Environmental Concern (i.e. including APEC 2, light industrial properties on the east side of McLaughlin Road between Matheson Boulevard West and Britannia Road West) that may result is an adverse impact to the environmental condition of the property.

Prior to the preparation and submission of a Record of Site Condition, if required, a Phase Two ESA would be required to investigate the issues of potential environmental concern that have been identified on the property and in the study area. This Phase Two study should be undertaken during the detail design phase.

If contaminated soils are found to be present, disposal of the soils will be consistent with *Part XV.1 of the Environmental Protection Act* and Ontario Regulation 153/04, Records of Site Condition. The MOECC Hamilton-Peel District office will be contacted if contaminated sites are present.

8.5 Geotechnical

It is recommended that the following issues be considered during detailed design:

- Carry out detailed field investigations and confirm the ground water level(s), perched or otherwise, at the retaining wall sites to assist in the design of retaining walls;
- Confirm and further refine the preliminary geotechnical recommendations provided in this report (including confirmation of crusher run limestone granular base and sub-base materials);
- Additional sampling and chemical testing be carried out during detail design; and,
- Investigate the origin of vibrations near the Parkwood Place intersection to determine if a change in pavement structure is necessary.

8.6 Air Quality

This EA has considered the potential impact of changes in local air quality that may result from enhancing the capacity and operational capability of McLaughlin Road between Britannia Road West and Bristol Road West. This includes the potential impacts of the common contaminants released from both vehicular traffic and construction activities.

In general terms, residents within 100 m of heavily travelled roadways can be exposed to two to three times the levels of fine particulate matter. Such levels occur when traffic on the routes is stagnated due to congestion. McLaughlin Road currently operates at/near capacity during the peak hours, with significant delays and congestion resulting in poor operations with long delays. If no improvements occur along McLaughlin Road, the forecasted increase in traffic demand will exacerbate the existing congestion. Reduction of congestion, for example in the form of stop-and-go traffic flows and excessive engine idling, has the potential to reduce common air quality contaminants produced by stagnated traffic.

Construction related air emissions can also be expected. Two major types of emissions are likely, namely those of dust from various material handling operations, and combustion emissions from construction equipment which is typically powered by diesel engines. Such emissions will be of a temporary nature and the impact is not predicted to move far from the immediate vicinity of the construction activities along McLaughlin Road. Mitigation measures to control dust releases around the construction sites are discussed in Section 8.9.3 of this ESR for minimizing the potential of combustion emissions from construction equipment.

8.7 Traffic Management and Control

Traffic impacts and neighbourhood disruption will be minimized during construction. A detailed traffic management plan that provides work zones, roadway lane closure extents, and times. The traffic management plan will be reviewed by the City to ensure that all traffic disruptions are minimized and congestion is within manageable and tolerable levels.

8.8 Cultural Heritage

8.8.1 Archaeology

The Stage 1 Archaeological Assessment makes the following recommendations:

- Archaeological potential exists in the study area and requires a Stage 2 Property Assessment (to be under taken during detailed design), which will be conducted by test pit survey and/or pedestrian survey (see Appendix H for locations). A test pit survey includes the systematic excavation of small test pits by hand at 5 m intervals and can only be conducted when ploughing for pedestrian survey is not feasible; and
- Should the proposed work extend beyond the current study area then further Stage 1 assessment must be conducted to determine the archaeological potential of the surrounding lands.
- In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Tourism, Culture and Sport should be immediately notified.

8.8.2 Built Heritage

The impacts of the preferred Option on the CHLs are as follows:

- Britannia Farm - Property acquisition will take place along the east side of McLaughlin Road from Ceremonial Drive northerly to the northern limits of the Britannia Farm property. This will result in alterations to the setting of the resource through encroachment, and direct impacts to character-defining elements, including: removal of established trees along the road and along the western edge of the Britannia Farm; and removal of part of the driveway leading into the Britannia Sugar Bush. The introduction of retaining walls will likely result in removal of the former gate/entrance associated with the former Guelph-Toronto Radial Railway alignment crossing at McLaughlin Road, located on the east side of McLaughlin Road to the south of Ceremonial Drive.
- Scenic Road - Impacts will include alteration to the historic thoroughfare through expansion from a two-lane to a four-lane road and the introduction of associated infrastructure, resulting in alteration to the overall character and setting. Impacts to associated character-defining elements will include removal of established trees along the corridor.

The proposed development at the Britannia Farm property will remove approximately 195 to 215 square metres of mature plantings along the edge of the property adjacent to McLaughlin

Road. Based on the review of the City of Mississauga's designation By-Laws for the Britannia School House, the Britannia Farm House, and the Gardner-Dunton House, as well as the City of Mississauga's Cultural Landscape Inventory and the McLaughlin Road 'Streetscape Design Guidelines', the heritage value of the property was firmly established. Further archival research, field review, site analysis, and review of identified cultural heritage resources and their associated character-defining attributes confirmed this heritage value. The following recommendations have been made based on the determined heritage values of the identified cultural heritage resource and in consideration of overall impacts to the property and surrounding environs:

- The proposed development should attempt to avoid direct and indirect impacts to heritage attributes associated with the Britannia Farm Property to result in compatible alterations to the property.
- If the western portion of the property along McLaughlin Road is to be impacted through the removal of mature plantings, a landscape documentation report should be completed to document the existing conditions of the subject property prior to construction. This report should be completed by a qualified cultural heritage professional to serve as a final record of this resource once it has been removed. The report should include input from a certified arborist to catalogue the size, species and location of individual mature trees on the lot.

The Heritage Impact Assessment can be found in **Appendix J**.

For the Scenic Road, a cultural heritage landscape documentation report should be prepared in advance of construction activities to serve as a final record of the resource. The results of photographic documentation activities should be compiled into a stand-alone report which should also include a review of historic maps from the nineteenth and twentieth centuries for the purposes of identifying changes to the resources over time. The Cultural Heritage Landscape Documentation Report should be filed with the local municipality and relevant repositories, such as the Canadiana Room at the Mississauga Public Library and the Region of Peel Archives.

Should future work require an expansion of the current study corridor and/or the development of other alternatives, a qualified heritage consultant will be contacted in order to confirm impacts of the undertaking on potential cultural heritage resources.

8.9 Other Construction Commitments

8.9.1 Noise

The contractor is required to ensure that factory recommended mufflers are maintained on all construction equipment. Sound emissions from all construction equipment should comply with MOECC Guideline NPC-115 "Sound Levels from Construction Equipment". An exemption should be obtained from the City of Mississauga if nighttime work or work on Sunday is required.

8.9.2 Monitoring

Recommended monitoring for this project includes compliance monitoring to ensure compliance with permit conditions, and also effectiveness monitoring to evaluate the performance of mitigation measures. The monitoring will also include the following:

- Monitoring the success and growth of new plantings and trees planted as part of road construction;
- Construction monitoring by an independent environmental monitor to determine if any wildlife has been inadvertently trapped or are found within the construction areas during construction;

- Construction monitoring by an independent environmental monitor to ensure implementation and adherence to permit conditions;
- Monitoring the effectiveness of sediment and erosion control; and
- Monitoring the re-establishment of salvaged plantings that have been relocated during construction.

8.9.3 Air Quality

In order to limiting the amount of dust released during construction, the City proposes to include the following mitigation measures:

- Watering to limit dust emissions from surfaces;
- Covering of excavated materials or fill materials stored on site; and
- Street cleaning to limit tracking of materials.

The City will also include guidelines to minimize the potential impacts from diesel powered construction equipment such as:

- Locating truck staging zones away from potential receptors; and
- Minimizing idling time for all diesel powered equipment operating on the site.

Other of measures that can be applied by the contractors and site inspectors to ensure that the impacts of combustion source exhaust and fugitive dust emissions are controlled during construction. For combustion related emissions and impacts, the following measures can be considered:

- Selecting construction equipment to be used on site based upon low emission factors and high energy efficiency;
- Ensuring that all construction equipment is tuned and maintained in accordance with the manufacturer's specifications;
- Using only ultra low sulphur fuel for diesel engines and ensuring that such equipment is equipped with diesel particulate matter traps to reduce particulate matter emissions;
- Utilizing electric or diesel powered equipment, in lieu of gasoline powered engines, where feasible;
- Ensuring that construction plans include a statement that work crews will shut off equipment when it is not in use;
- During smog alerts (May through October), measures should be taken to ensure that diesel equipment use is optimized to reduce the emissions of smog forming substances;
- Whenever possible, time the construction activities so as to not interfere with peak hour traffic and minimize obstruction of through traffic lanes adjacent to the site. If necessary, a flagperson should be retained to maintain safety adjacent to existing roadways; and
- Support and encourage ride sharing and transit use for the construction crew.

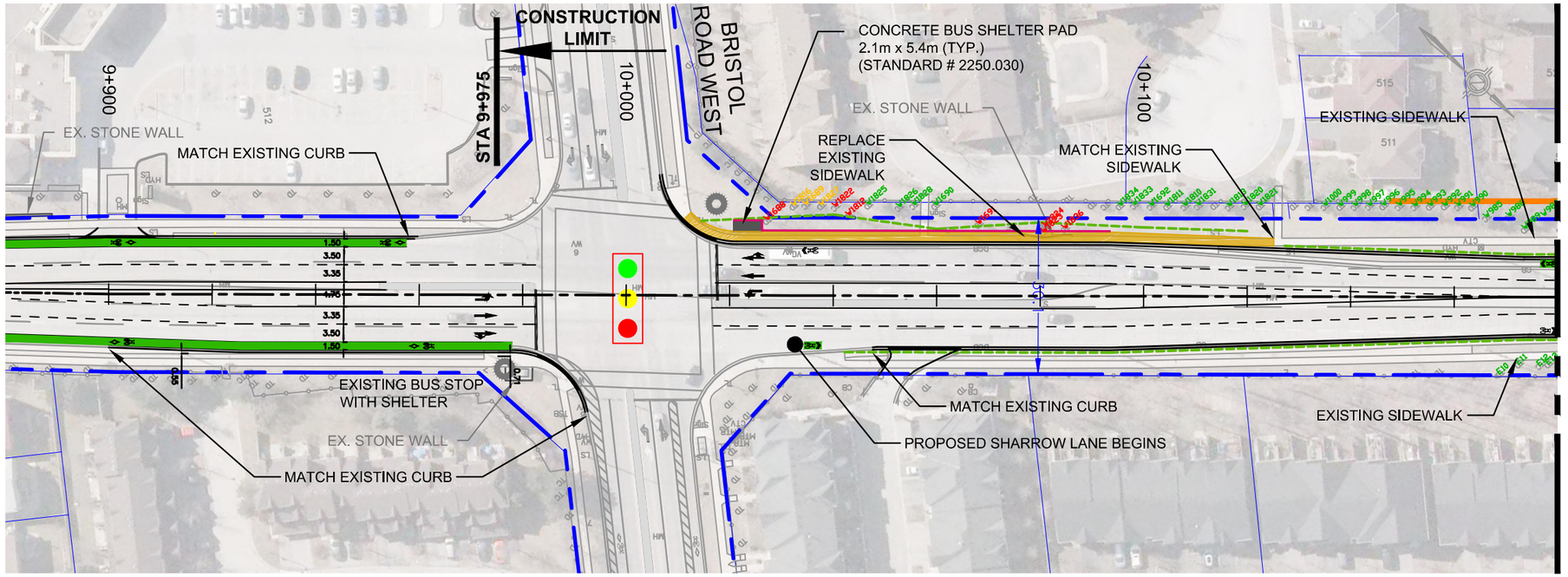
There are a number of additional measures that can be employed to reduce the amount of fugitive dust released from construction activities. Generally the objective should be to employ the best available control measures to ensure that such dust does not remain visible in the atmosphere beyond the property line of the emission source. These measures include dust suppression techniques such as:

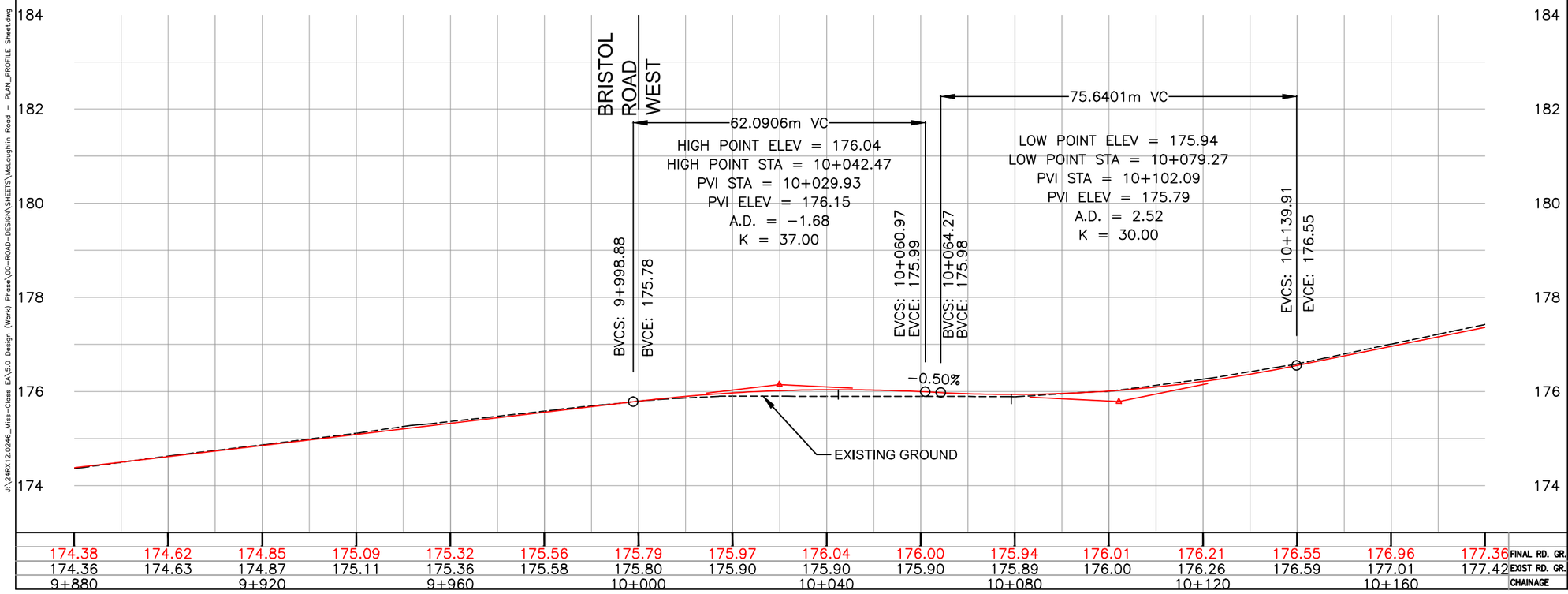
- Water active sites daily;
- All trucks hauling dirt, sand, soil, or other loose materials should be covered;
- All adjacent streets should be cleaned by the contractor if visible soil materials are present due to his operations; and
- Install wheel washers where vehicles enter and exit the work site onto public roads.

Air quality mitigation measures will be confirmed during detail design.

RECOMMENDED PRELIMINARY DESIGN PLATES

SHEETS 1 to 10





LEGEND:

- EXISTING ROAD RIGHT OF WAY
- PROPERTY LIMIT
- GRADING LIMIT
- PROPERTY REQUIRED FOR ROAD WIDENING
- PROPOSED SIDEWALK
- PROPOSED INTERSECTION TREATMENT
- PROPOSED BICYCLE LANE
- PROPOSED SHARROW LANE
- PROPOSED 0.3 m HIGH RETAINING WALL
- PROPOSED 0.3 m ~2.0 m HIGH RETAINING WALL
- NOISE WALL TO BE REPLACED
- PROPOSED TRANSIT STOP
- EXISTING BUS STOP
- TRAFFIC SIGNAL
- STOP SIGN

TREE LOCATION:
W - WEST SIDE OF THE ROAD
E - EAST SIDE OF THE ROAD

W999 — TREE IDENTIFICATION NUMBER
TREE POINTER

- W999 TREES TO BE REMOVED
- W999 TREES IMPACTED
- W999 TREES UNAFFECTED
- TD DECIDUOUS TREE
- TC CONIFEROUS TREE

MISSISSAUGA

McLAUGHLIN ROAD
PRELIMINARY ROAD DESIGN
STA: 09+880 to STA: 10+180

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	C– _____
DATE	SHEET 01		

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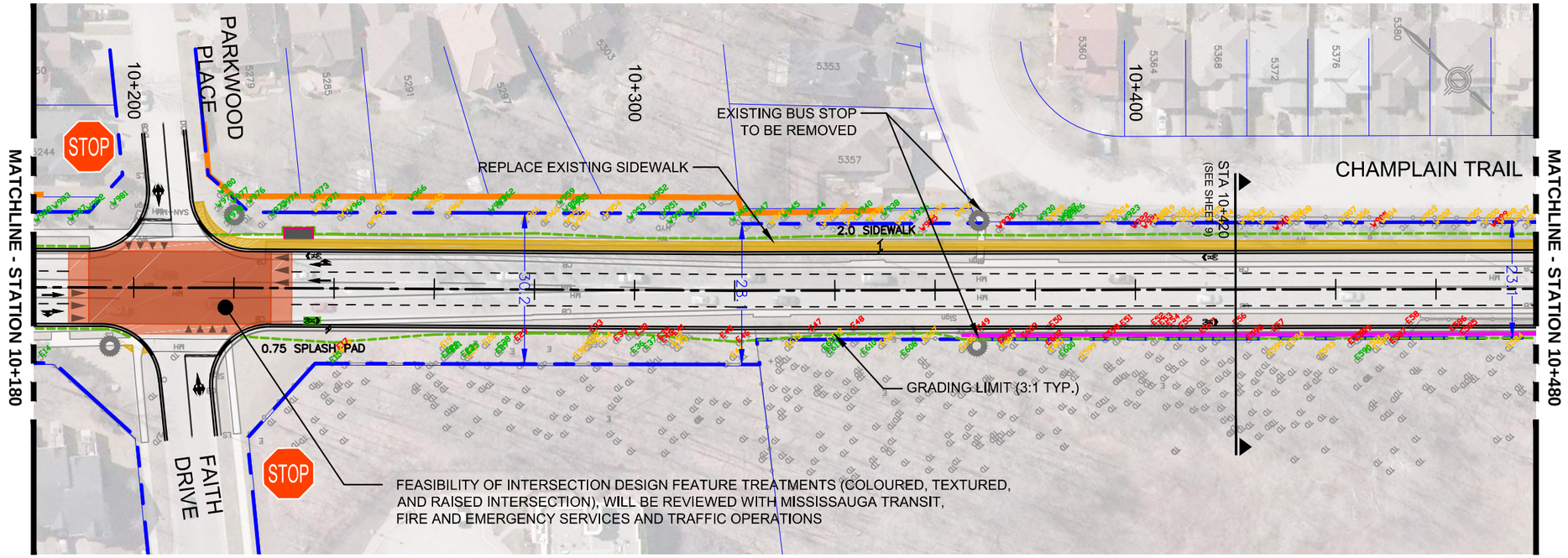

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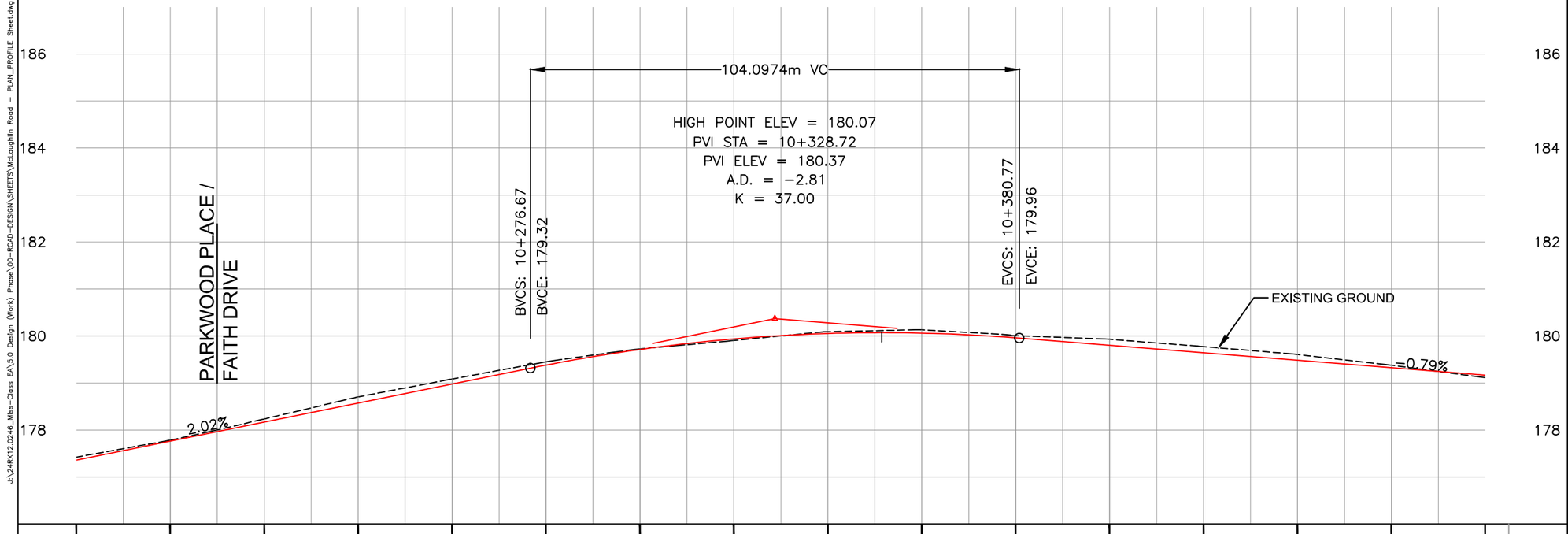

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77.42	177.79	178.23	178.70	179.09	179.45	179.73	179.91	180.09	180.13	180.01	179.93	179.77	179.61	179.38	179.11	EXIST RD. GR.
	10+200		10+240		10+280		10+320		10+360		10+400		10+440			CHAINAGE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 10+180 to STA: 10+480

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	
DATE	SHEET 02	C– _____	

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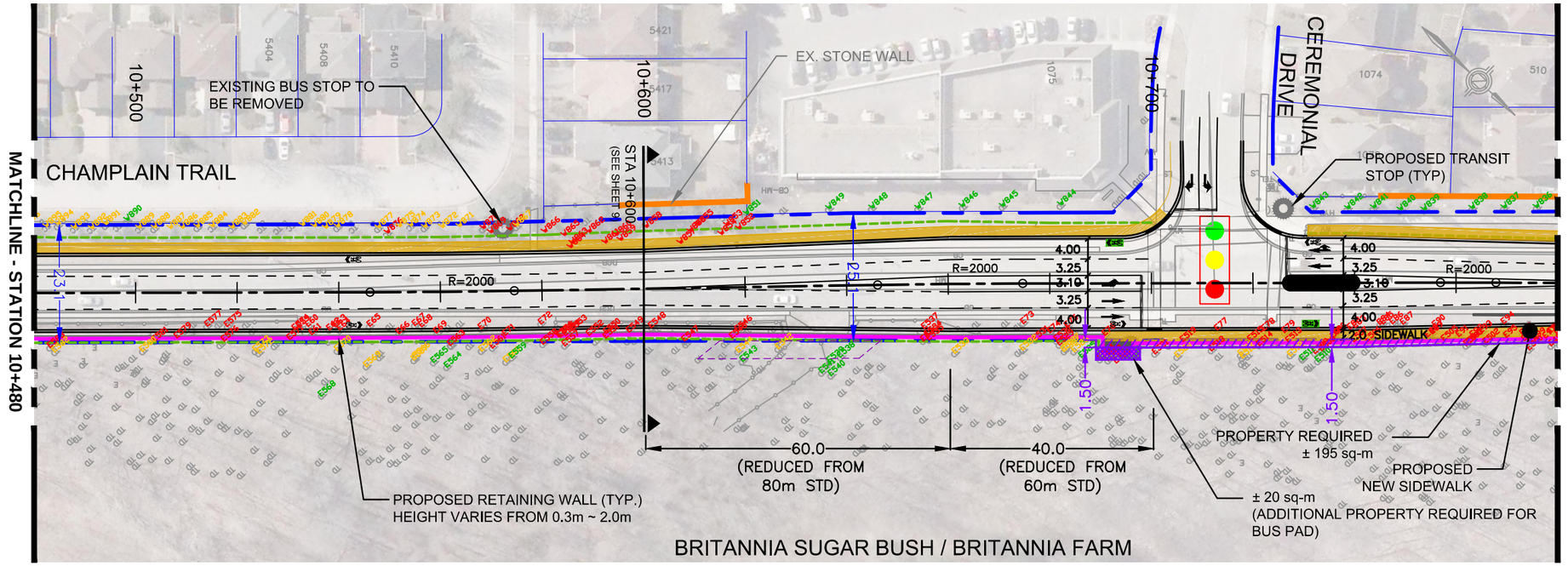

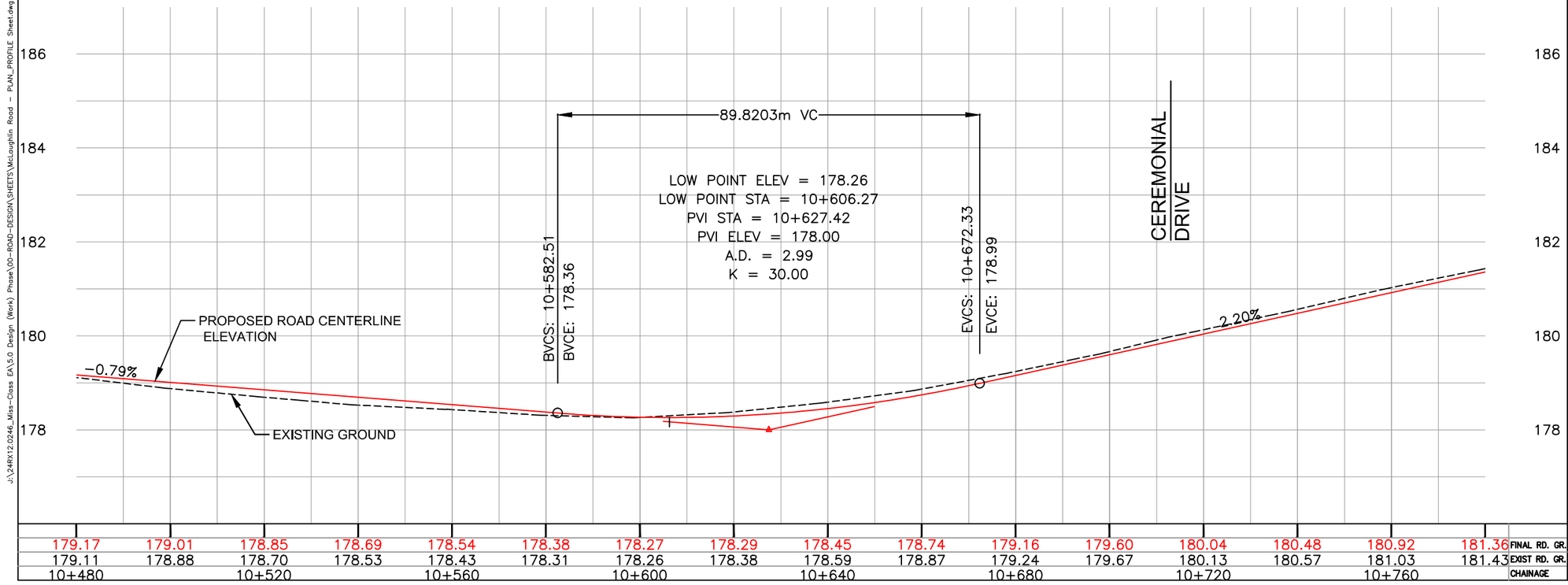

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TC	CONIFEROUS TREE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 10+480 to STA: 10+780

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	
DATE	SHEET 03	C- _____	

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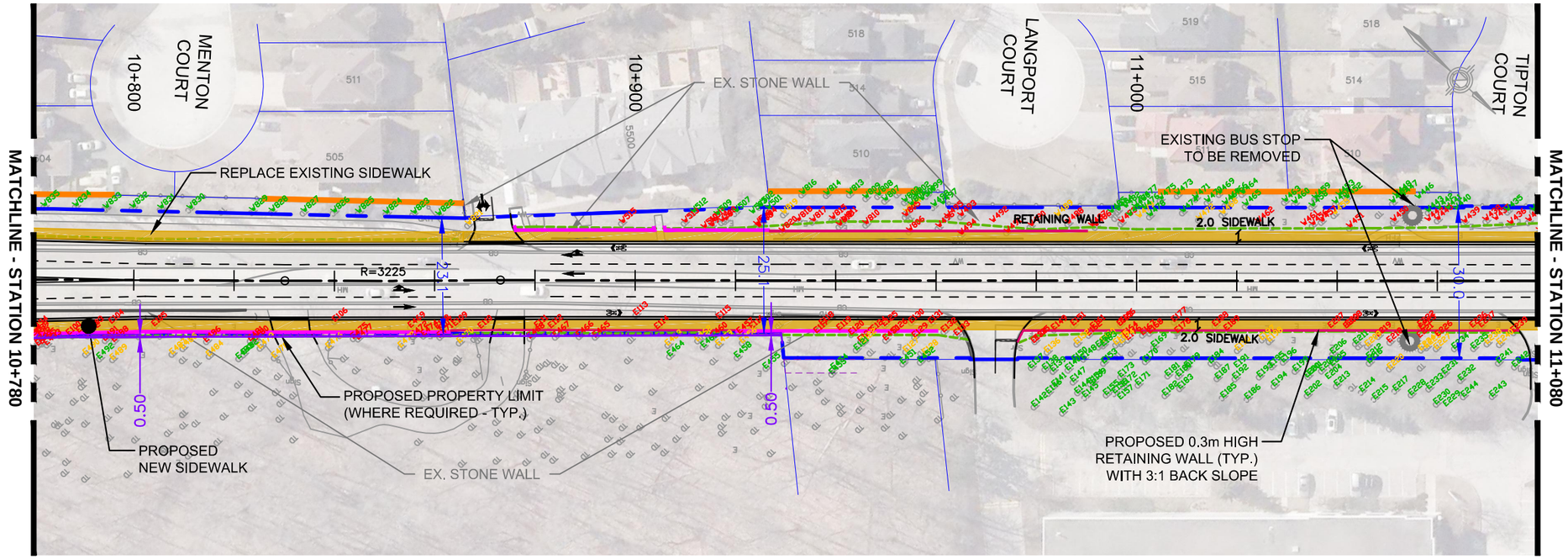

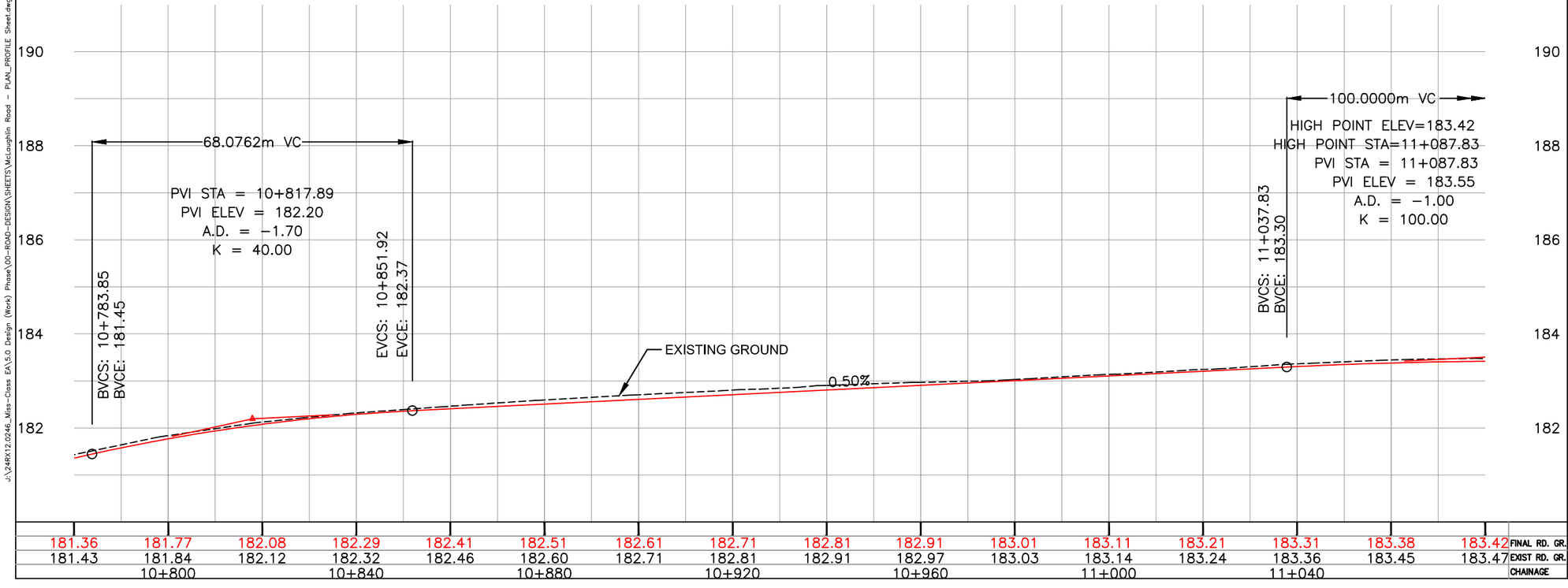

LEGEND:

- EXISTING ROAD RIGHT OF WAY
- PROPERTY LIMIT
- GRADING LIMIT
- PROPERTY REQUIRED FOR ROAD WIDENING
- PROPOSED SIDEWALK
- PROPOSED INTERSECTION TREATMENT
- PROPOSED BICYCLE LANE
- PROPOSED SHARROW LANE
- PROPOSED 0.3 m HIGH RETAINING WALL
- PROPOSED 0.3 m ~2.0 m HIGH RETAINING WALL
- NOISE WALL TO BE REPLACED
- PROPOSED TRANSIT STOP
- EXISTING BUS STOP
- TRAFFIC SIGNAL
- STOP SIGN

TREE LOCATION:
W - WEST SIDE OF THE ROAD
E - EAST SIDE OF THE ROAD

W999 — TREE IDENTIFICATION NUMBER
TREE POINTER

- W999 TREES TO BE REMOVED
- W999 TREES IMPACTED
- W999 TREES UNAFFECTED
- TD DECIDUOUS TREE
- TC CONIFEROUS TREE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 10+780 to STA: 11+080

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	
DATE	SHEET 04	C– _____	

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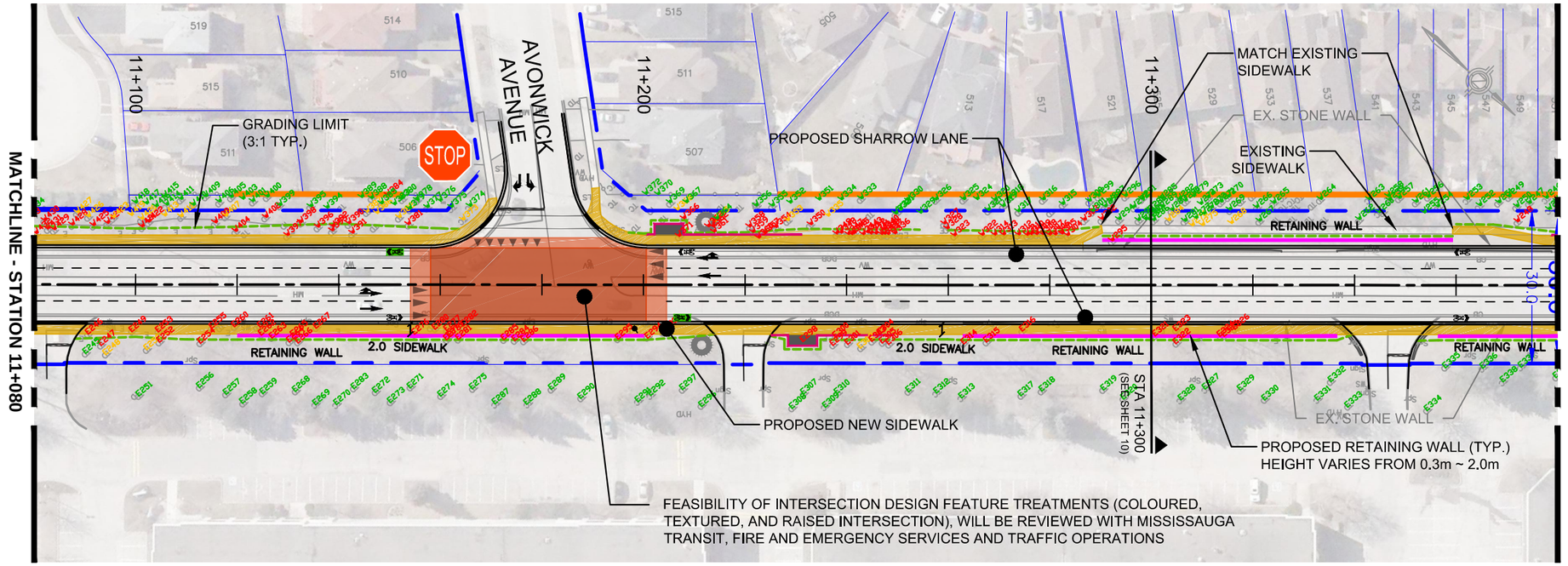

LEGEND:

- EXISTING ROAD RIGHT OF WAY
- PROPERTY LIMIT
- GRADING LIMIT
- PROPERTY REQUIRED FOR ROAD WIDENING
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TREE LOCATION:
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TREE POINTER

W999	TREES TO BE REMOVED
W999	TREES IMPACTED
W999	TREES UNAFFECTED
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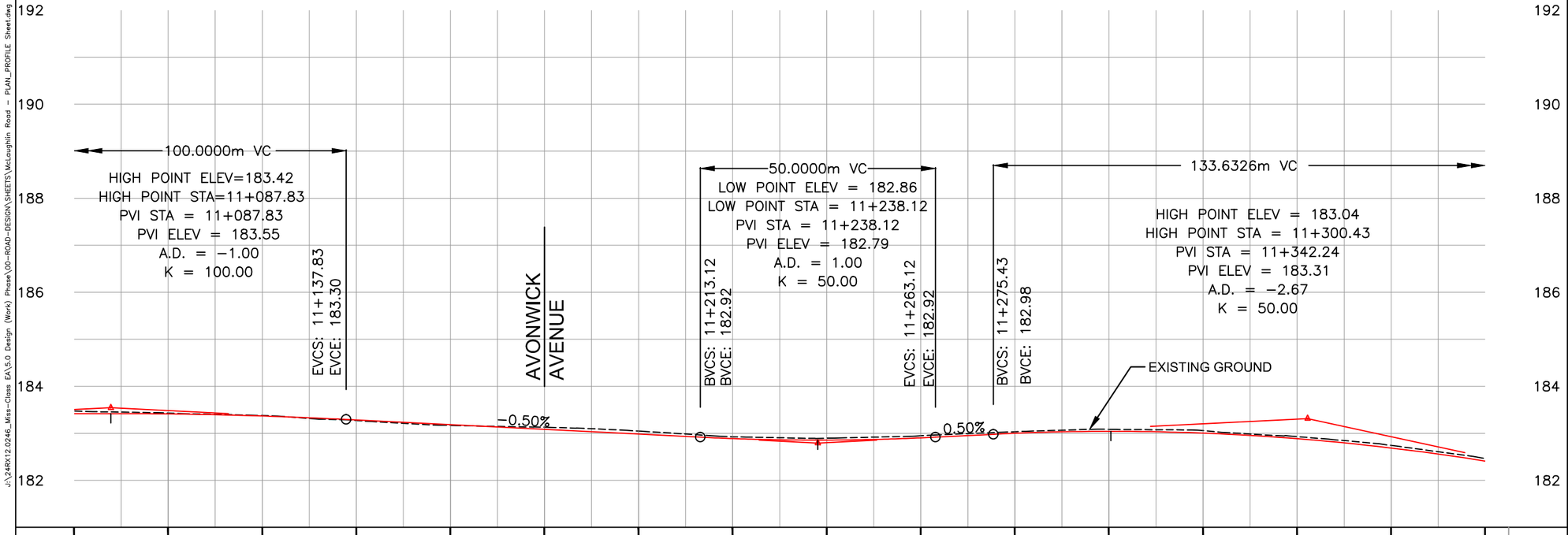

183.42	183.41	183.37	183.28	183.18	183.08	182.98	182.89	182.86	182.90	183.00	183.04	183.00	182.89	182.69	182.41	FINAL RD. GR.
183.47	183.43	183.38	183.27	183.17	183.13	183.05	182.93	182.90	182.95	183.03	183.09	183.06	182.93	182.74	182.46	EXIST RD. GR.
11+080		11+120		11+160		11+200		11+240		11+280		11+320		11+360		CHAINAGE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 11+080 to STA: 11+380

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	
DATE	SHEET 05	C– _____	

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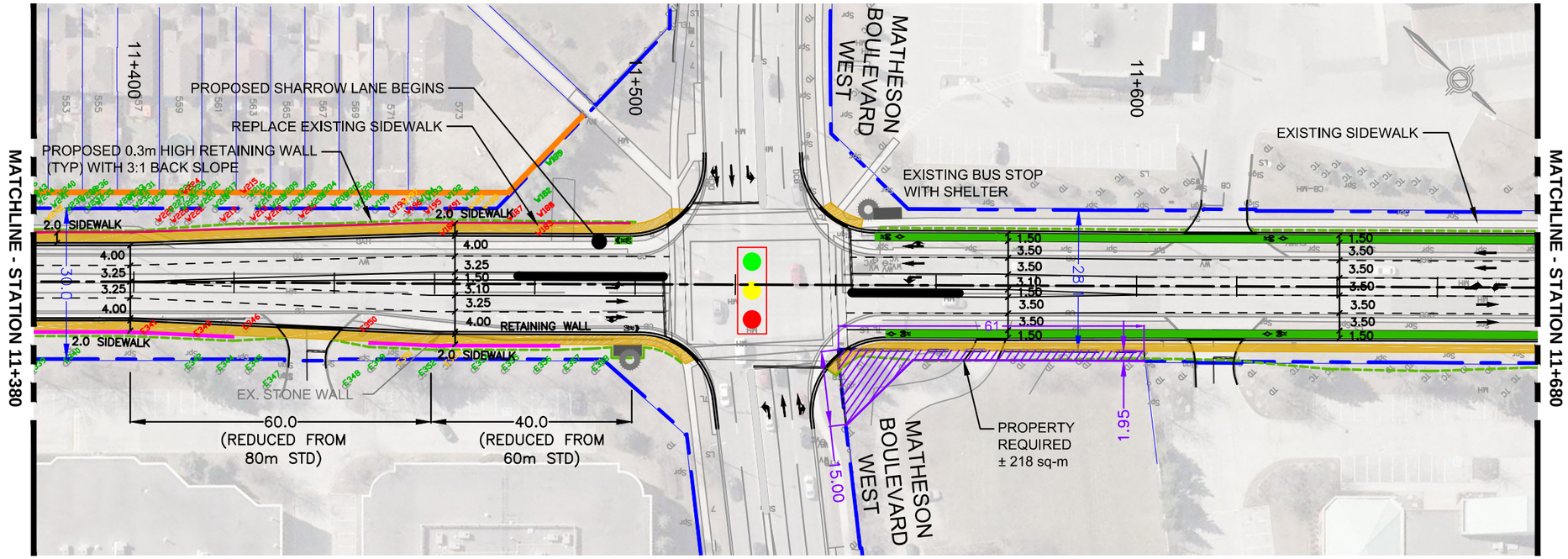

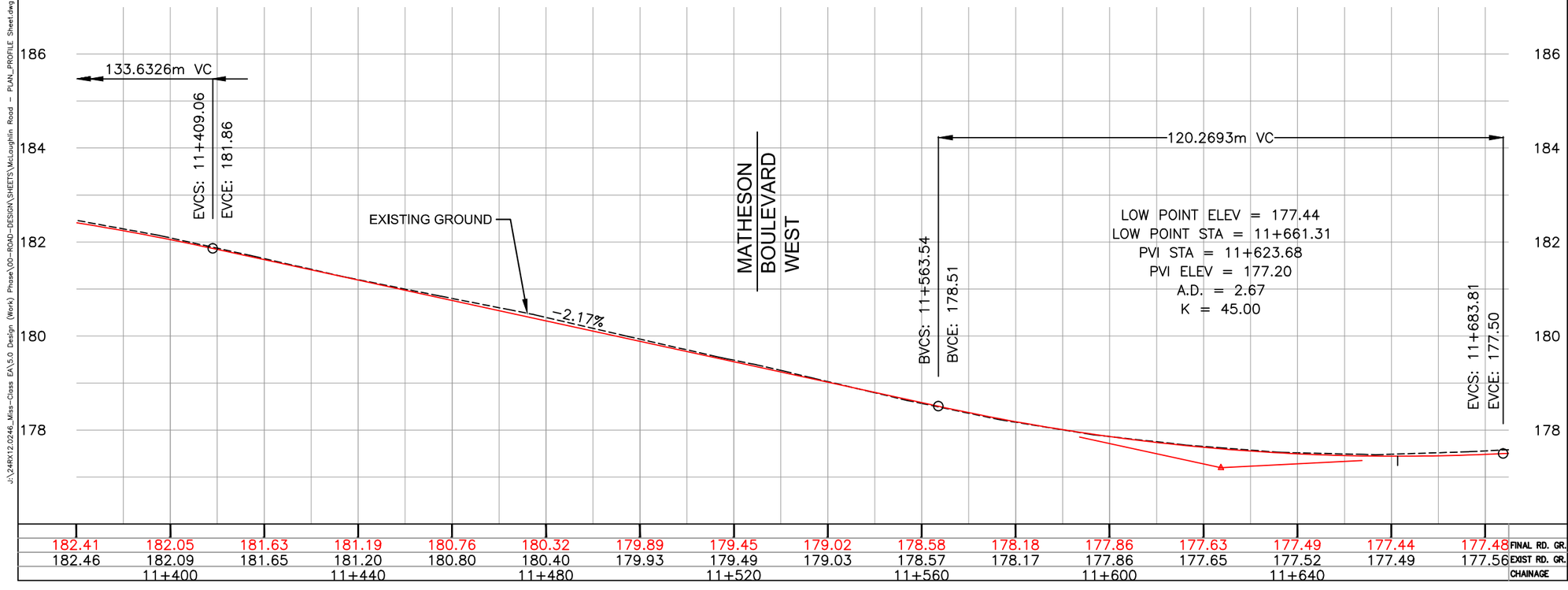

LEGEND:

- EXISTING ROAD RIGHT OF WAY
- PROPERTY LIMIT
- GRADING LIMIT
- PROPERTY REQUIRED FOR ROAD WIDENING
- PROPOSED SIDEWALK
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TREE LOCATION:
W - WEST SIDE OF THE ROAD
E - EAST SIDE OF THE ROAD

W999 — TREE IDENTIFICATION NUMBER
TREE POINTER

W999	TREES TO BE REMOVED
W999	TREES IMPACTED
W999	TREES UNAFFECTED
TD	DECIDUOUS TREE
TC	CONIFEROUS TREE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 11+380 to STA: 11+680

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No. C– _____	
DATE	SHEET 06		

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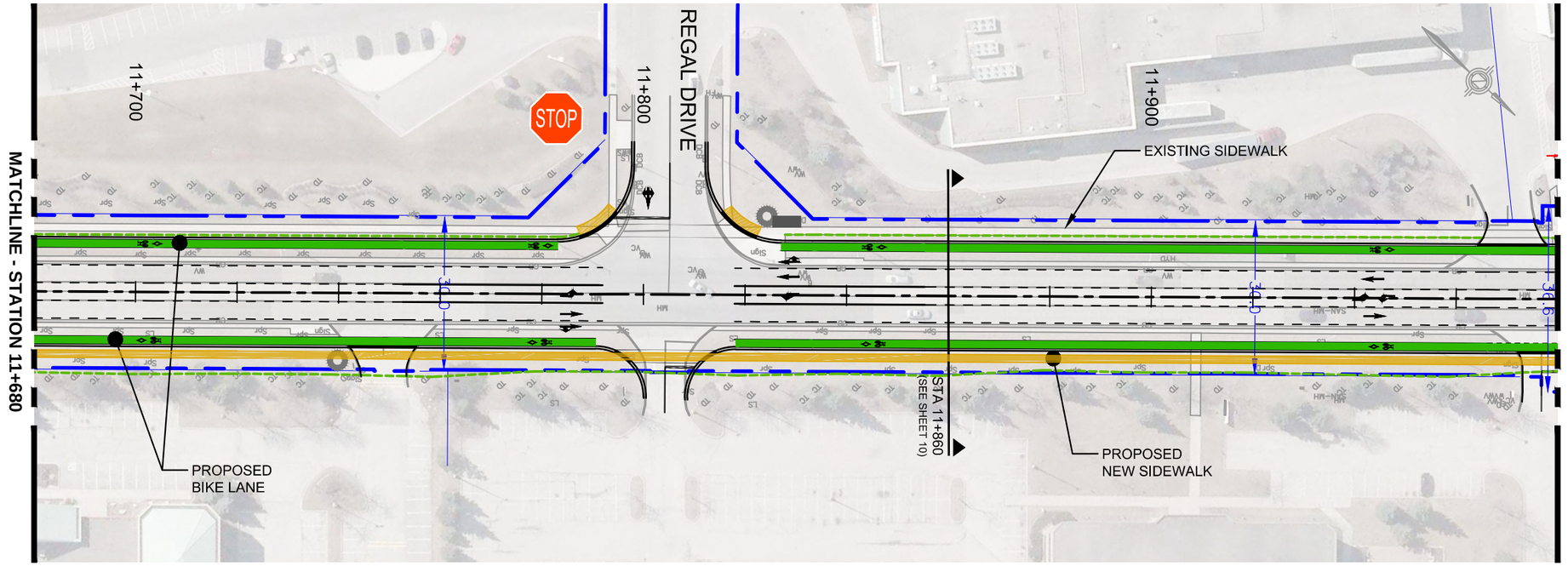

LEGEND:

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- PROPERTY LIMIT
- GRADING LIMIT
- PROPERTY REQUIRED FOR ROAD WIDENING
- PROPOSED SIDEWALK
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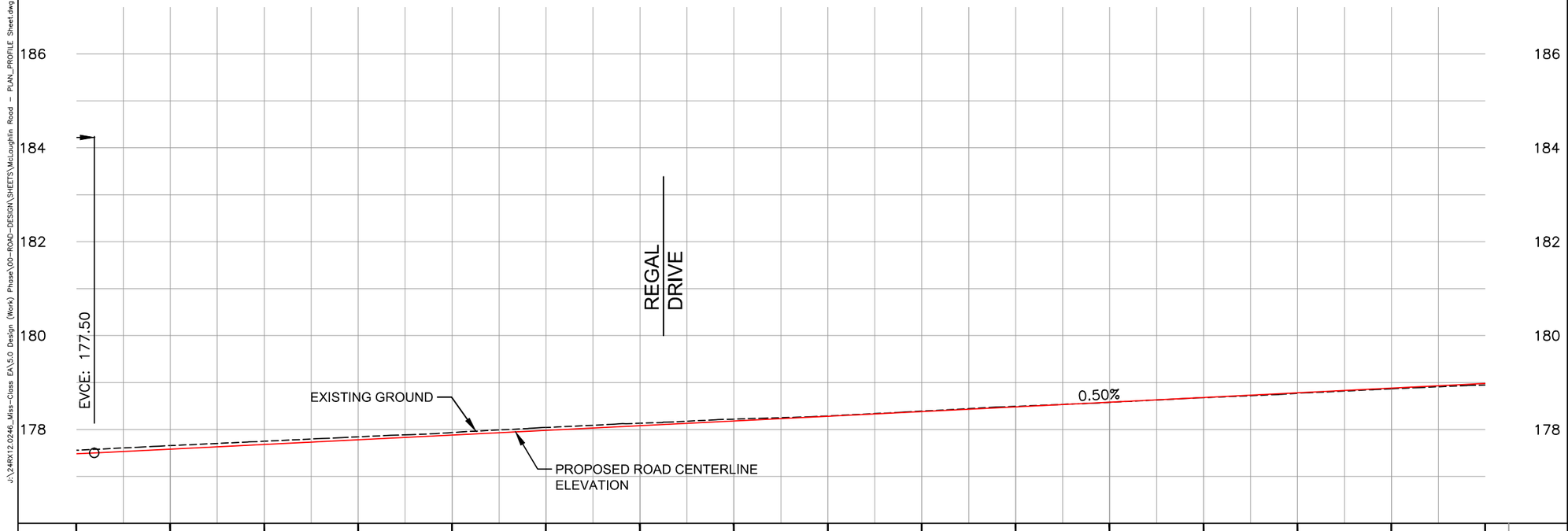

177.48	177.58	177.68	177.78	177.88	177.98	178.08	178.18	178.28	178.38	178.48	178.58	178.68	178.78	178.88	178.98	FINAL RD. GR.
177.56	177.66	177.75	177.84	177.93	178.04	178.13	178.22	178.29	178.39	178.49	178.58	178.68	178.77	178.87	178.95	EXIST RD. GR.
11+680		11+720		11+760		11+800		11+840		11+880		11+920		11+960		CHAINAGE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 11+680 to STA: 11+980

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	
DATE	SHEET 07	C– _ _ _ _ _	

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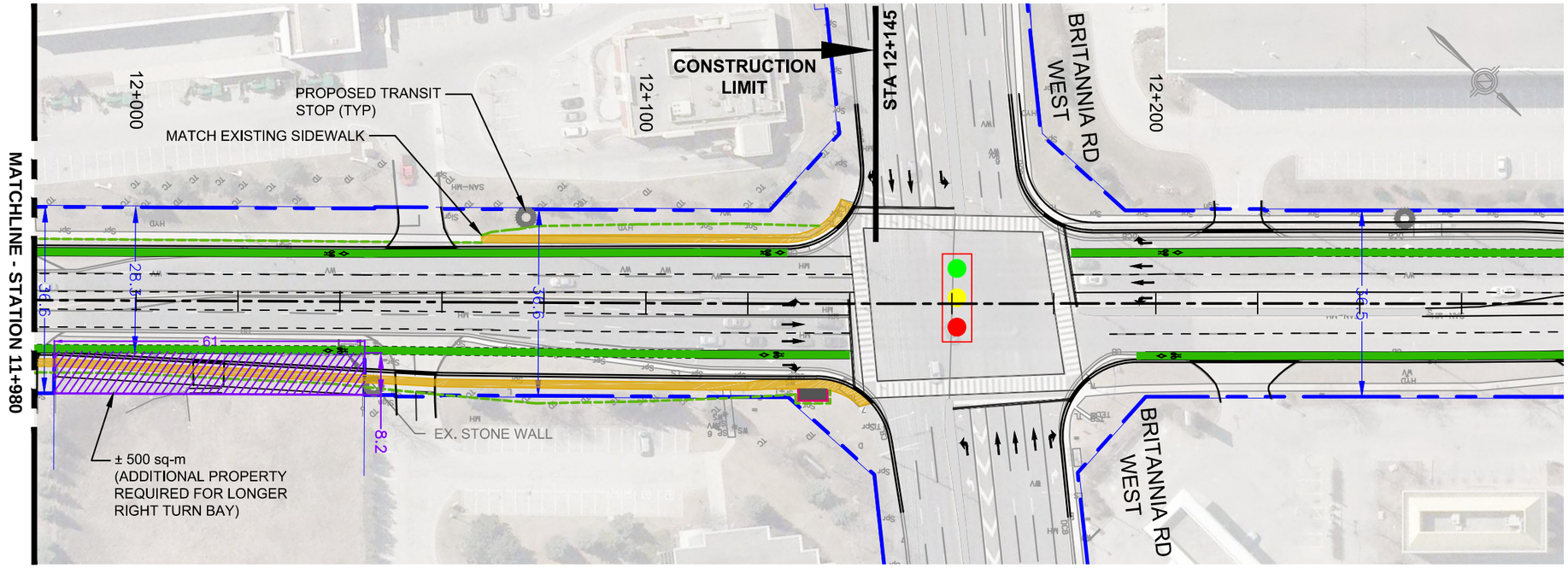

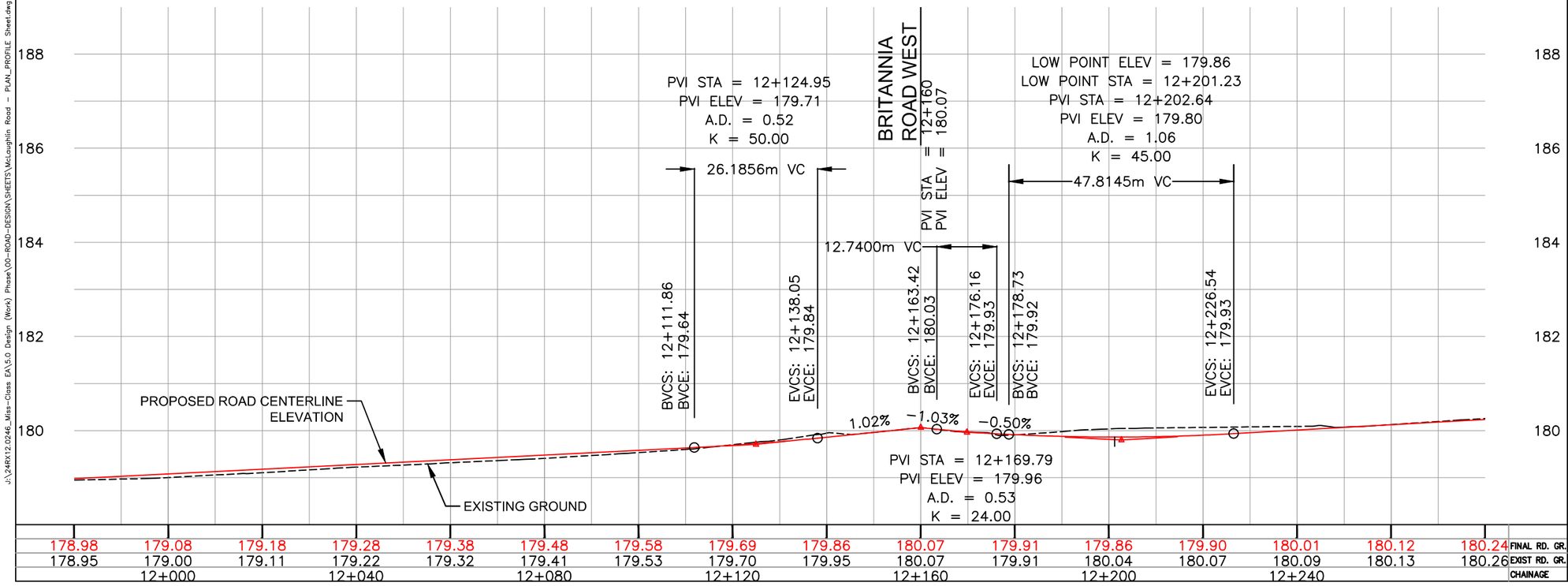

LEGEND:

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- W999 TREES UNAFFECTED
- TD DECIDUOUS TREE
- TC CONIFEROUS TREE

MISSISSAUGA

McLAUGHLIN ROAD

PRELIMINARY ROAD DESIGN

STA: 11+980 to STA: 12+280

SCALE HOR. 1:1000 VERT. 1:100	AREA	PROJECT No.	
C.A.D.D. BY	CHECKED BY	PLAN No.	C- _____
DATE	SHEET 08		

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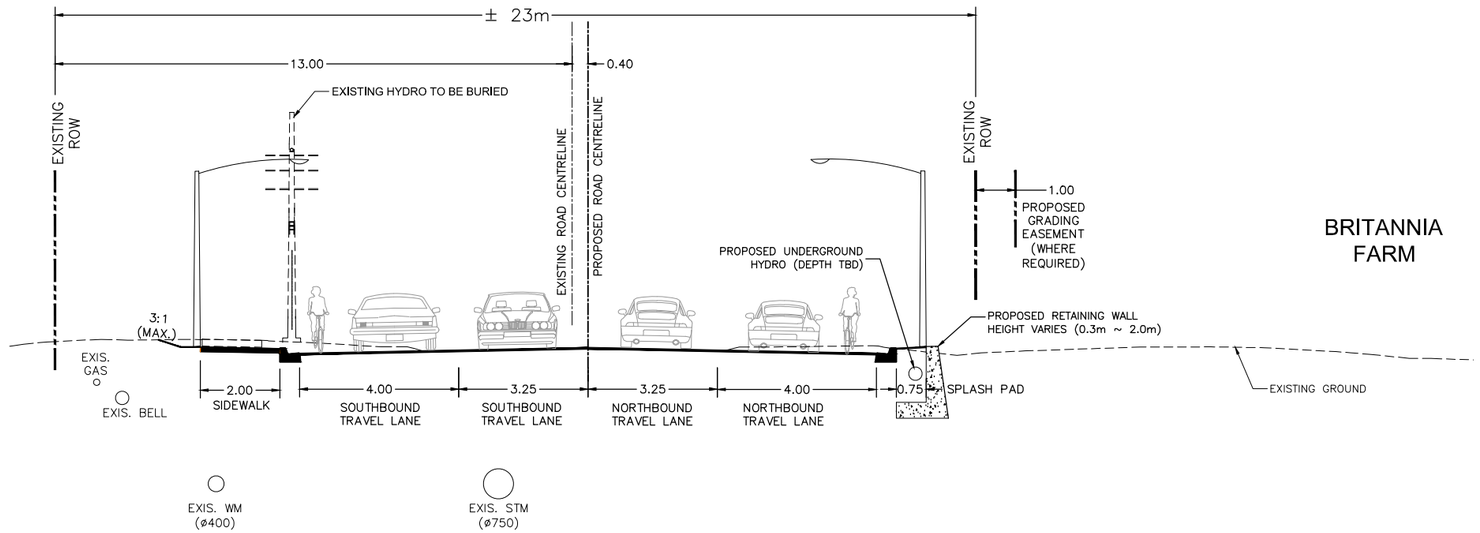
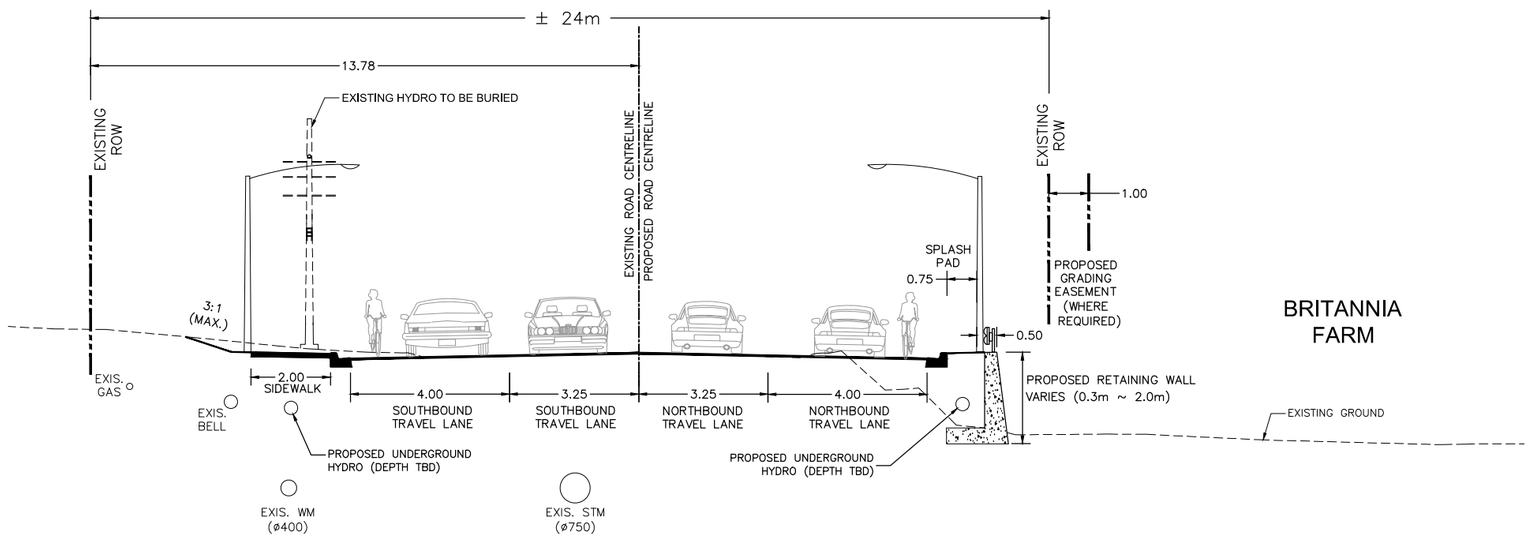


STA 10+420 (BETWEEN FAITH DR. AND CEREMONIAL DR.)

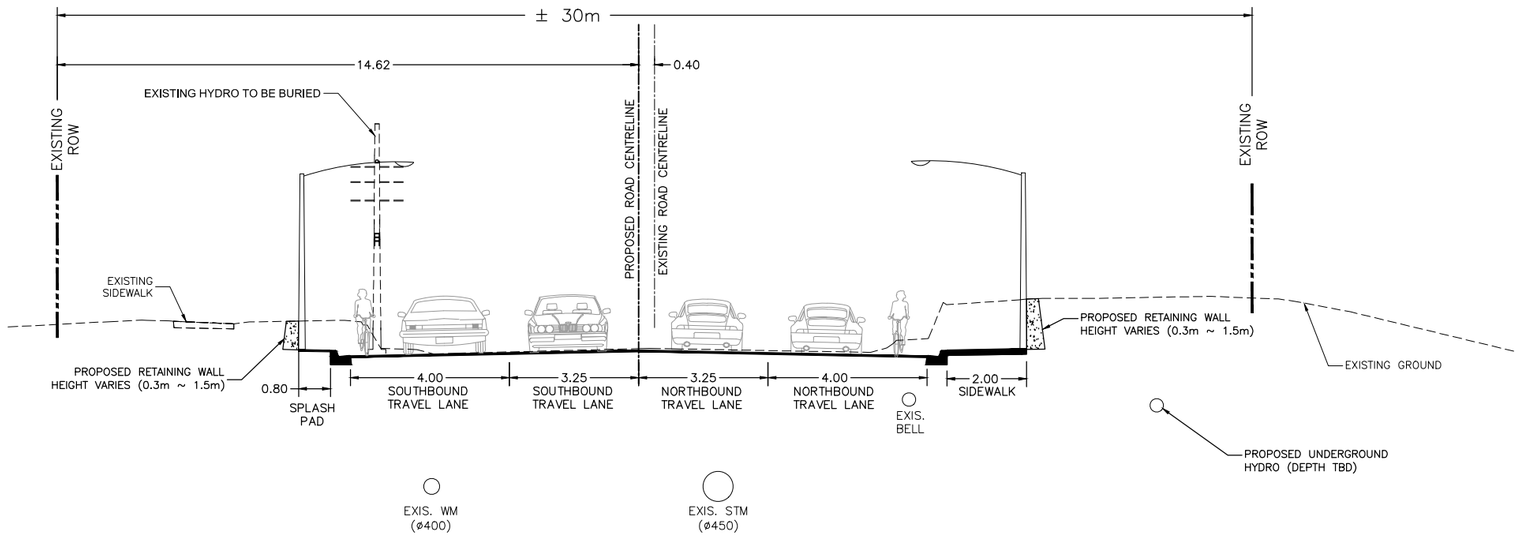


STA 10+600 (BETWEEN FAITH DR. AND CEREMONIAL DR.)

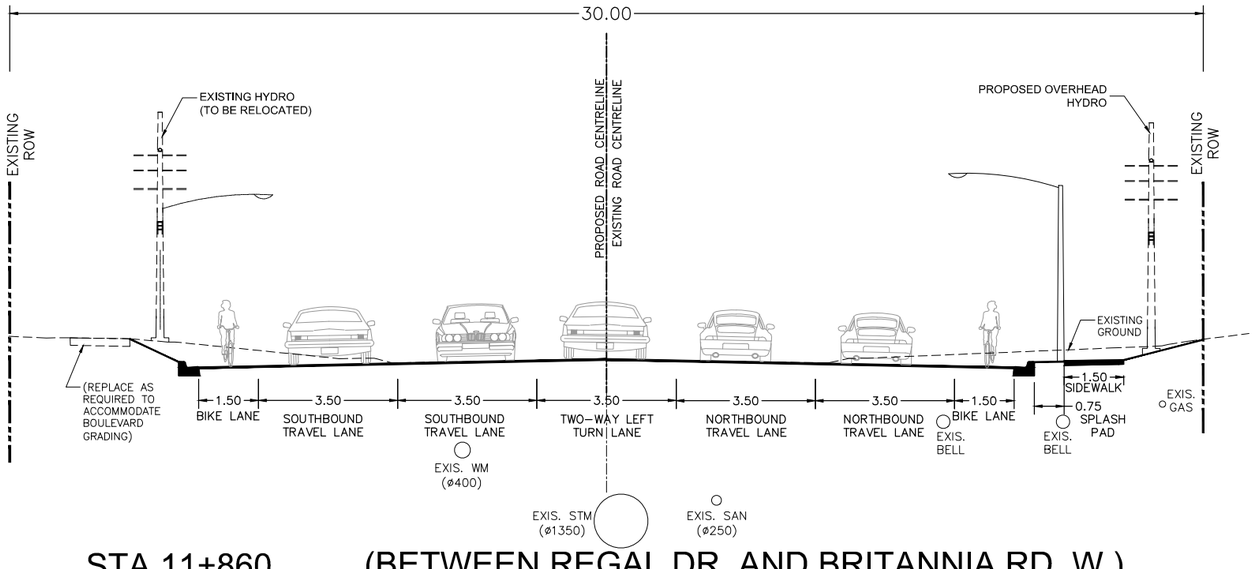
MISSISSAUGA

McLAUGHLIN ROAD
PRELIMINARY ROAD DESIGN

SCALE 1:150	AREA	PROJECT No.
C.A.D.D. BY	CHECKED BY	PLAN No. C– _____
DATE	SHEET 09	



STA 11+300 (BETWEEN AVONWICK AVE. AND MATHESON BLVD. W.)



STA 11+860 (BETWEEN REGAL DR. AND BRITANNIA RD. W.)

MISSISSAUGA

McLAUGHLIN ROAD
PRELIMINARY ROAD DESIGN

SCALE 1:150	AREA	PROJECT No.
C.A.D.D. BY	CHECKED BY	PLAN No. C– _ _ _ _ _
DATE	SHEET 10	

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