

4 PLANNING ALTERNATIVES

The Class Environmental Assessment for Municipal Road Projects, Schedule 'C' requires that, once a transportation need is determined (Phase 1), planning alternatives (alternative solutions) be considered (Phase 2). This ensures that there is reasonable and adequate justification to proceed with the proposal and that the need for the project is clearly demonstrated.

4.1 Transportation Analysis Summary

The existing traffic conditions can be summarized as follows:

- ▶ Average daily traffic volume is approximately 35,000 vehicles per day. Currently, traffic is operating at capacity, in particular during the morning and afternoon rush hours.
- ▶ Significant delays are being experienced at both the Derry Road and Courtney Drive West intersections during morning and afternoon rush hours.
- ▶ Due to traffic congestion on Mavis Road, intersecting local streets experience higher delays during rush hours.
- ▶ Delays at major intersections are causing drivers to divert through the surrounding residential communities.
- ▶ There are a relatively high number of collision incidents observed at Derry Road intersection.
- ▶ Mavis Road is six lanes, north and south of the study area. The four-lane roadway through the study area reduces efficiency of the overall road network.

The future traffic conditions can be summarized as follows:

- ▶ Based on the analysis, traffic volumes will exceed road capacity by 2021.
- ▶ If additional traffic capacity is not provided by this time:
 - Higher traffic volumes will result in more congestion during morning and afternoon rush hours, which will increase travel time;
 - Excessive queuing will block intersecting local roads through the study area;
 - Higher delays on Mavis Road could further increase traffic diversion through the surrounding residential communities; and
 - Higher traffic delays will increase idling time and emissions loadings.

- ▶ Even if more people choose transit or active transportation (walking and cycling), the other north-south roads such as Mississauga Road, McLaughlin Road and Hurontario Street will not be able to accommodate the future transportation demand.

4.2 Problems and Opportunities

Chapter 2 of this Environmental Study Report sets out the transportation needs (Phase 1) by providing the transportation and planning policy context and the analysis of existing and future traffic conditions to identify the transportation deficiencies. The problems and opportunities that have been identified through the Phase 1 work are highlighted below:

- ▶ Region of Peel is experiencing high population and employment growth that will continue over the next 20 years, and beyond.
- ▶ Average daily traffic volume is approximately 35,000 vehicles per day. Currently, traffic is operating at capacity, in particular during the morning and afternoon rush hours. Significant delays are being experienced at both the Derry Road and Courtney Drive West intersections during morning and afternoon rush hours. Traffic congestion impacts access to Mavis Road from local streets and also causes drivers to divert through the surrounding residential communities.
- ▶ Mavis Road is six lanes, north and south of the study area. The four-lane roadway through the study area reduces efficiency of the overall road network.
- ▶ Based on the analysis, traffic volumes will exceed road capacity by 2021. If additional traffic capacity is not provided by this time:
 - Higher traffic volumes will result in more congestion during morning and afternoon rush hours, which will increase travel time;
 - Excessive queuing will block intersecting local roads through the study area;
 - Higher delays on Mavis Road could further increase traffic diversion through the surrounding residential communities; and
 - Higher traffic delays will increase idling time and emissions loadings.
- ▶ Even if more people choose transit or active transportation (walking and cycling), the other north-south roads such as Mississauga Road, McLaughlin Road and Hurontario Street will not be able to accommodate the future transportation demand.
- ▶ Improvements to Mavis Road will provide opportunities for an expansion of the active transportation infrastructure to support walking and cycling and will support a more efficient transit network, making this a more attractive choice for travel.

In summary: Mavis Road is an arterial road intended to carry higher traffic volumes, supporting both local and regional mobility. Existing traffic volumes are at capacity during the morning and afternoon rush hours. Projected traffic growth will worsen these conditions. There is an opportunity to improve Mavis Road to accommodate the existing and future traffic demands and provide better connectivity for all modes within the overall Region / City road network. This includes the implementation of Region / City strategic objectives which promote sustainable and safe multi-modal transportation options that provide residents with opportunity to walk, cycle or use public transit as well as an opportunity to improve community amenities / aesthetics for this corridor.

4.3 Alternative Planning Solutions

Transportation planning alternative solutions represent reasonable means of addressing the stated transportation problems and opportunities. In addition to ‘doing nothing’, alternatives to address deficiencies in the transportation network capacity typically include those that increase network capacity, reduce transportation demand or combinations thereof.

Transportation planning alternatives provide an opportunity to examine, in a broad and general way, fundamentally different ways of addressing transportation problems. The alternatives are assessed against their ability to reasonably address the problems and opportunities, and in consideration of the constraints identified in the early stages of the study, to identify a preferred solution(s) for which alternative designs can be developed.

For this study, alternative solutions have been identified as:

- ▶ Do Nothing
- ▶ Manage Transportation Demand
- ▶ Upgrade Parallel Roads Instead of Mavis Road
- ▶ Intersection and Signal Improvements
- ▶ Alternative Modes of Transportation
- ▶ Improve Mavis Road

The six alternative solutions considered through this Class EA are described below and the analysis is presented in **Table 4-2**.

4.3.1 Alternative 1 – Do Nothing

“Do Nothing” is considered the status quo, maintaining the existing road network as is, with activities being limited to regular operations and maintenance. To maintain the status quo would result in the escalation of the existing traffic congestions issues, reduction in safety, and continuing operational issues at intersections within the transportation network. It would not address any of the identified problems and opportunities. This alternative would provide no appreciable improvement to traffic capacity and operations and is not consistent with City and Region transportation policies.

4.3.2 Alternative 2 – Manage Transportation Demand

This alternative seeks to reduce traffic demand on Mavis Road by:

- ▶ Diverting traffic onto adjacent corridors by redesigning the local road network to limit and/or restrict access onto Mavis Road. Examples of design changes include provision of alternative routes and reconfigured intersections.
- ▶ Implementing Transportation Demand Management (TDM) strategies: shifting demands to time periods outside of rush hours (encouraging flex time work schedules); encourage behavioural shift to alternative modes of transportation (transit, cycling, walking) or rideshare; providing traveler information tools including intelligent transportation systems, mobile and social applications and other methods for promoting more efficient use of the transportation network.

4.3.3 Alternative 3 – Upgrade Parallel Roads Instead of Mavis Road

Undertake capital improvements to existing nearby north-south roads including road widening to improve traffic operations in other parts of the existing road network. This does not address the problems and opportunities for Mavis Road and defers capital investment on Mavis Road.

4.3.4 Alternative 4 – Intersection and Signal Improvements

This alternative involves undertaking intersection improvements such as providing dedicated turn lanes, installation of new traffic signals and improving signal timing and phasing as a means of improving traffic operations and safety. This alternative does not address the traffic capacity needs throughout the entire study area.

4.3.5 Alternative 5 – Alternative Modes of Transportation

This alternative encourages the reduction in automobile use by providing safe and attractive pedestrian and cycling facilities and improving transit system efficiency and reliability by introducing transit priority measures such as transit queue jump lanes.

4.3.6 Alternative 6 – Improve Mavis Road

This alternative considers widening Mavis Road from four to six general traffic lanes between Courtneypark Drive West and Ray Lawson Boulevard to provide increased north-south traffic capacity, accommodate future projected travel demand and create a consistent capacity throughout the broader Mavis Road corridor by connecting the existing six lane sections north and south of the study area.

4.4 Analysis and Evaluation of Planning Solutions

As noted above, alternative solutions were assessed against their ability to reasonably address the problems and opportunities. Criteria were developed to guide the assessment process so that transportation planning, technical and environmental (socio-economic, cultural / heritage, natural environment) conditions were all factored into the assessment. The assessment criteria are listed in **Table 4-1** and the comparison of the alternative solutions can be found in **Table 4-2**.

Table 4-1: Assessment Criteria and Considerations













Category		Criteria / Considerations
	Transportation Planning	<ul style="list-style-type: none"> ➤ Addresses existing and future capacity concerns on Mavis Road ➤ Consistency with planning and policy documents ➤ Improves network connectivity (road, transit, pedestrians, cyclists)
	Transportation Engineering	<ul style="list-style-type: none"> ➤ Improves traffic operations ➤ Accommodates multi-modal demands ➤ Improves road safety ➤ Minimizes construction constraints and complexity
	Socio-Economic	<ul style="list-style-type: none"> ➤ Amount and type of property required ➤ Supports future growth and employment and economic sustainability (movement of people and goods) ➤ Potential impact to residences and businesses (disruption and nuisance) ➤ Ability to enhance streetscape
	Natural Environment	<ul style="list-style-type: none"> ➤ Potential impacts to environmentally sensitive areas ➤ Potential impacts to terrestrial and aquatic species and habitats ➤ Potential impacts to Species at risk and their habitat ➤ Potential changes to drainage
	Heritage	<ul style="list-style-type: none"> ➤ Effects on archaeological resources ➤ Effect on cultural heritage resources
	Cost	<ul style="list-style-type: none"> ➤ Comparative cost including utility relocation, capital, property and operations/maintenance

Table 4-2: Assessment of Alternative Planning Solutions

Category	Do Nothing	TDM	Upgrade Parallel Roads	Intersection Improvements	Alternative Modes of Transportation	Improve Mavis Road
	<ul style="list-style-type: none"> - Not consistent with City / Region planning policies - Does not address anticipated transportation needs - Does not improve network connectivity 	<ul style="list-style-type: none"> - Currently being implemented through City / Region planning policies - Does not address anticipated transportation needs - Does not improve network connectivity 	<ul style="list-style-type: none"> - Consistent with City / Region planning policies - Would provide additional north-south capacity in other corridors - Does not improve network connectivity 	<ul style="list-style-type: none"> - Consistent with City / Region planning policies - Does not address anticipated transportation needs - Only minor contribution to network connectivity 	<ul style="list-style-type: none"> - Consistent with City / Region planning policies - Does not address anticipated transportation needs - Does not improve network connectivity for all users 	<ul style="list-style-type: none"> - Consistent with City / Region planning policies - Addresses anticipated transportation needs - Improves network connectivity for all users
	<ul style="list-style-type: none"> - Does not improve road operations or safety - Does not support improvements to transit, pedestrian and cycling - No construction constraints 	<ul style="list-style-type: none"> - May result in some shift in travel demand which improves operations but overall does not improve road operations or safety - Does not improve transit, pedestrian and cycling facilities 	<ul style="list-style-type: none"> - Would not improve operations or safety on Mavis Road - Does not improve transit, pedestrian and cycling facilities along Mavis Road 	<ul style="list-style-type: none"> - Improves operations and safety at intersections but not for the entire Mavis Road corridor - Supports transit, cycling and pedestrian facilities 	<ul style="list-style-type: none"> - Does not improve road operations or safety - Supports transit, cycling and pedestrian facilities 	<ul style="list-style-type: none"> - Improves road operations and safety - Supports transit, cycling and pedestrian facilities
	<ul style="list-style-type: none"> - No property required - Congestion will worsen impacting local and regional trips - No opportunity to improve transit and cycling / pedestrian activities on Mavis Road - No opportunity to enhance streetscape 	<ul style="list-style-type: none"> - No property required - Congestion will worsen impacting local and regional trips - Although supportive of transit, cycling and pedestrian activities, this does not provide the infrastructure to support or enhance these forms of transportation - No opportunity to enhance streetscape 	<ul style="list-style-type: none"> - Potentially significant property impacts along other corridors - Congestion will worsen along Mavis Road, impacting local and regional trips - No opportunity to improve transit and cycling / pedestrian activities on Mavis Road - No opportunity to enhance streetscape 	<ul style="list-style-type: none"> - Some property may be required - Congestion will worsen impacting local and regional trips - No opportunity to improve transit and cycling / pedestrian activities on Mavis Road - No opportunity to enhance streetscape 	<ul style="list-style-type: none"> - Some property may be required but likely minimal - Congestion will worsen impacting local and regional trips - Some opportunity to enhance streetscape 	<ul style="list-style-type: none"> - May result in property impacts - Supports mobility for all modes within local community and across Region - Provides opportunity to enhance streetscape
	<ul style="list-style-type: none"> - Avoids potential impacts to natural environment, however features are located away from the roadway 	<ul style="list-style-type: none"> - Avoids potential impacts to natural environment, however features are located away from the roadway 	<ul style="list-style-type: none"> - Avoids potential impact to natural environment along Mavis Road but potential for impacts to natural features along other corridors 	<ul style="list-style-type: none"> - Very low potential for impacts to natural environment, since features are located away from intersections 	<ul style="list-style-type: none"> - Very low potential for impacts to natural environment, since pedestrian and cycling opportunities can likely be kept within the existing right-of-way 	<ul style="list-style-type: none"> - Low potential for impacts to natural environment, since pedestrian and cycling opportunities can likely be kept within the existing right-of-way
	<ul style="list-style-type: none"> - No potential archaeological impacts - No Built Heritage features identified 	<ul style="list-style-type: none"> - No potential archaeological impacts - No Built Heritage features identified 	<ul style="list-style-type: none"> - Some potential for impacts to archaeological and Built Heritage features in other corridors 	<ul style="list-style-type: none"> - Low potential archaeological impacts - No Built Heritage Features identified 	<ul style="list-style-type: none"> - Low potential archaeological impacts - No Built Heritage Features identified 	<ul style="list-style-type: none"> - Some potential archaeological impacts in undisturbed areas - No Built Heritage Features
	<p>N/A</p> <ul style="list-style-type: none"> - No capital costs - Continual costs for operations and maintenance 	<p>\$</p> <ul style="list-style-type: none"> - No capital costs - Continual costs for operations and maintenance 	<p>\$\$\$\$</p> <ul style="list-style-type: none"> - Construction and property costs are shifted to other corridors 	<p>\$</p> <ul style="list-style-type: none"> - Costs associated with construction and implementation of operational improvements are low compared to other alternatives 	<p>\$</p> <ul style="list-style-type: none"> - Costs associated with implementation of new transit routes and sidewalks/multi-use trails are low compared to other alternatives 	<p>\$\$</p> <ul style="list-style-type: none"> - Costs associated with construction for widening and improvements to pedestrian and cycling facilities
Evaluation Result	Not Carried Forward	Already Being Implemented	Not Carried Forward	Carry Forward	Carry Forward	Carry Forward

4.5 Preliminary Preferred Planning Solution

The preferred planning solution includes a combination of the following solutions:

- ▶ Implementing intersection improvements;
- ▶ Providing multi-use trail and sidewalk connections; and
- ▶ Providing transit priority; and
- ▶ Widening Mavis Road from 4 to 6 general traffic lanes between Courtneypark Drive West and Ray Lawson Boulevard.

Recognizing that the Cities of Mississauga and Brampton and Region of Peel will continue to experience population and employment growth in the near future, the proposed improvements to intersections, additional traffic lanes / road capacity and improved active transportation and transit facilities on Mavis Road will better meet the projected transportation needs.

The benefits of the preferred planning solution include: supporting complete communities by providing safe walking and cycling opportunities and efficient transit network; connecting neighboring communities and accommodating more efficient local and regional trips; reducing delays for residents and commercial vehicles and better serve motorists, pedestrians, cyclists and transit users.

4.6 Public and Agency Consultation during Phases 1 and 2

The public consultation aspects of the Mavis Road Class EA are documented in **Chapter 7**, and summarized here as they relate to Phases 1 and 2 of the Class EA process that involved the:

- ▶ review of background information and existing conditions;
- ▶ identification of the needs and justification and problems / opportunities;
- ▶ assessment of alternative planning solutions; and
- ▶ identification of the preliminary preferred planning solution.

4.6.1 Notice of Study Commencement Survey

The Notice of Study Commencement was issued in April 2016. A survey was made available at this time to collect information about how / when people used Mavis Road and what their experiences were with respect to driving, walking / cycling and taking transit. The survey is discussed further in **Chapter 7** and is provided in **Appendix A**.

Feedback from the survey were used in identifying problems and opportunities and in the assessment of alternative planning solutions.

A summary of the survey feedback was presented at Public Information Centre # 1 and is provided below:

Traffic

- ▶ Heavy traffic along Mavis Road results in long delays.
- ▶ Significant traffic congestion at Derry Road intersection, improvements are needed.
- ▶ Possible improvements could be additional lanes and / or improved signal timings.
- ▶ Bottleneck occurs on bridge over Highway 407.
- ▶ Too much traffic coming from Brampton.
- ▶ Removal of Second Line West Bridge will increase traffic on Mavis Road.
- ▶ Parents dropping off students along Courtneypark Drive create unsafe conditions and back-up traffic.
- ▶ Reduce speed limit.
- ▶ Delays on Mavis Road cause traffic to use local neighbourhood streets.
- ▶ Nothing to improve – this is one of the best roads in the City.

Pedestrian / Cyclists

- ▶ Improve pedestrian crossing signal timing at intersections (not enough time with turning traffic).
- ▶ Walk/bike trail is too close to the road - cars travel up and down Mavis at high speeds.
- ▶ Cycling down this road is unsafe because trail is not continuous.
- ▶ Support for existing sections of multi-use trail on Mavis Road.
- ▶ Better connections needed to trail network and across Highway 401 and 407 bridges.

Transit

- ▶ More frequent service required, including weekends.
- ▶ More bus shelters needed.

- ▶ Concerns regarding traffic effects on transit reliability.

4.6.2 Public Information Centre 1

The first of two Public Information Centers (PIC 1) was convened on June 14, 2016. The purpose of the PIC was to review and receive public input on Phases 1 and 2 of the Mavis Road Class EA process, specifically: the problem being addressed; the need for improvements; the alternative solutions being considered; the preliminary preferred alternative solution; and the design alternatives that would be generated in Phase 3 of the Class EA process.

A copy of the PIC notice and the PIC survey are provided in **Appendix A**. Results of the survey are discussed in Chapter 7 and summarized here:

- ▶ Strong agreement with the problem and opportunity statement (64% agreed that it captured the factors that are either key issues or areas of improvement).
- ▶ Response reflected a high level of support for widening Mavis Road to 6 lanes, improving intersection operations and facilities for cyclists, pedestrians and transit users.
- ▶ Traffic signal timing (23%), increased road capacity and improved travel time (23%), improved landscaping (14%) and provision of cycling facilities (8%) were the top ranked street elements that were most important to people.

It is noted that a significant portion of the feedback received from attendees at PIC 1 was related to the planned changes at Second Line West, and not related to Mavis Road.

4.7 Confirmation of the Recommended Planning Solution

Public and agency feedback received during and following PIC 1 did not trigger any changes to the alternative solutions being considered or the selection of the recommended alternative solution for Mavis Road. The Recommended Planning Solution includes: implementing intersection improvements; providing multi-use trail and sidewalk connections; and widening Mavis Road from 4 to 6 general traffic lanes between Courtneypark Drive West and Ray Lawson Boulevard.

The Recommended Planning Alternative has been carried forward for consideration of Alternative Design Concepts, as discussed in **Chapter 5**.

5 DESIGN ALTERNATIVES

Phase 3 of the Municipal Class EA process involves the development and review of alternative design concepts. Having established the need for improvements to the Mavis Road (Phase 1 discussed in **Chapter 2.2**), and selected a recommended planning alternative (Phase 2, discussed **Chapter 4**), this next study phase involved the following activities:

- ▶ developing a road cross-section concept for the recommended planning alternative to establish road right-of-way requirements;
- ▶ developing the approach to road widening, based on the road cross-section and associated right-of-way requirements and developing the Preliminary Preferred Plan;
- ▶ inviting participating agencies and the public to attend PIC 2 to review and provide comments on the Preliminary Preferred Plan; and
- ▶ refining the preliminary preferred plan based on feedback received from agencies and the public and confirming the Recommended Plan.

5.1 Road Cross-Section Elements

In developing the road cross-section concept, a number of key constraints and design elements were considered and are discussed below:

Compatibility with adjacent neighbourhoods and community features within the study area: the neighbourhood context was factored into the development of the road cross section. A primary objective was to avoid impacts to residential properties that surround Mavis Road. Mavis Road is the main thoroughfare and heart of the community with a variety of users. There are numerous schools that are accessed by driving, walking, cycling and transit, from Mavis Road. This was an important factor in developing the road cross-section concept.

Provision for pedestrians and cyclists and future multi-use trail connections: As discussed in Section 2.1, Mavis Road is not identified as a designated cycling route in the City of Mississauga or Region of Peel Cycling Master Plans. However, considering the community context (surrounding residential community and numerous schools) the road cross-section concept was developed to include opportunities for off-road cycling in the boulevard. A multi-use trail is proposed for the west side of Mavis Road. The trail offers a continuous cycling route connection between the designated cycling route on Sombrero Way (that connects to Second Line West) and the existing multi-use trail on the west of

side of Mavis Road, north of Ray Lawson Boulevard. It also provides connections between existing and proposed east-west cycling routes that cross Mavis Road, for example at Derry Road. The multi-use trail will be continuous over the Highway 407 Bridge, providing a safe active transportation connection between the cities of Mississauga and Brampton that does not currently exist.

Available existing right-of-way and minimizing property impacts: The existing four lane Mavis Road had been constructed anticipating that a six lane road may be implemented in future. Therefore, the existing road design incorporates wide median areas that have been protected for future road widening. This allows the additional two lanes to be accommodated largely within the existing right-of-way, minimizing impacts to private property.

The desire to avoid widening Fletcher's Creek Bridge and avoid impacts to the valley: The Fletcher's Creek Bridge was constructed anticipating a future six lanes and thus widening of the structure and the associated impacts to Fletcher's Creek valley could be avoided.

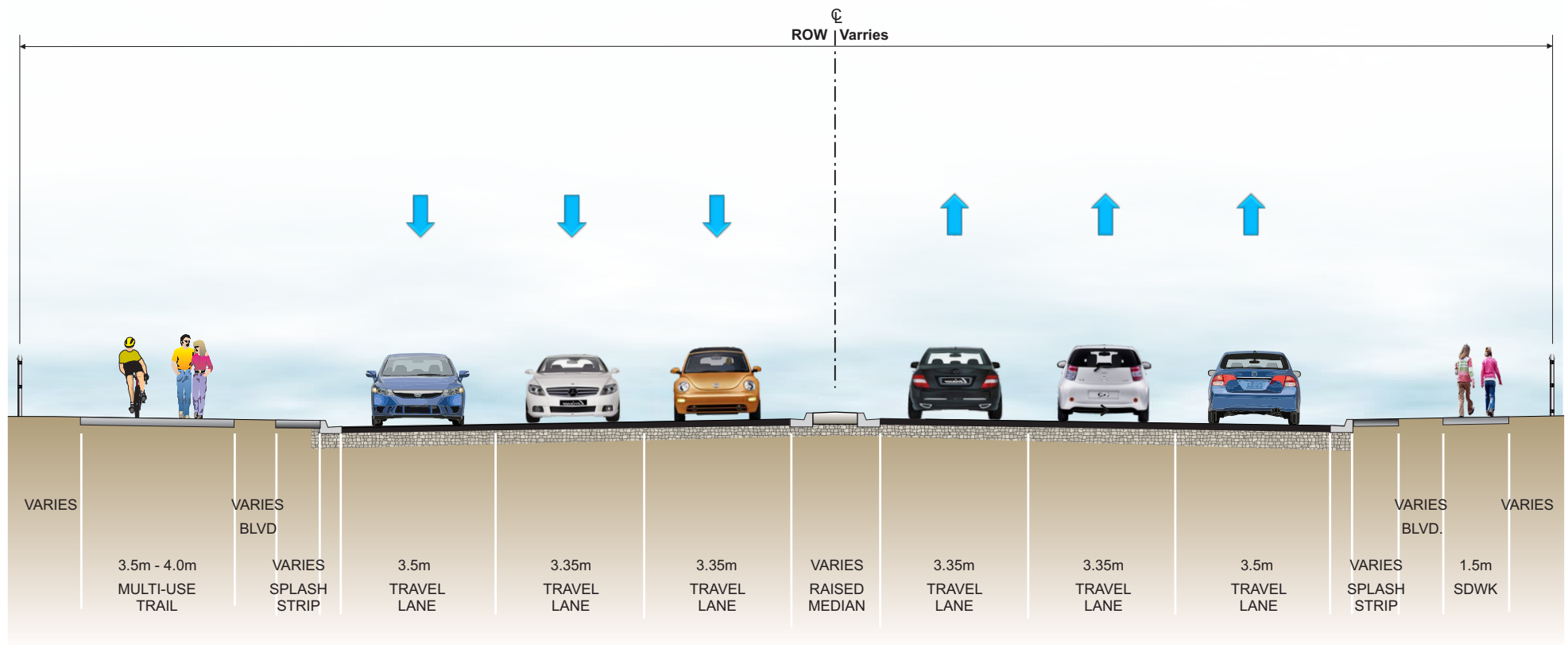
A reduction in speed limit within the City of Mississauga and associated reduced cross-section (lane widths): While Mavis Road has existing median areas to accommodate the additional traffic lanes (described above), the existing road design does not protect for new / enhanced active transportation facilities. As discussed above, a multi-use trail is proposed for the west side of Mavis Road. In order to accommodate the trail and still minimize property impacts to the extent possible, a reduction in travel lanes widths was considered. The reduction in travel lane widths from 3.5 m to 3.3 m is proposed and will require a reduction in the posted speed limit from 70 km/hr to 60 km/hr. The reduced speed limit is considered beneficial, again considering the nature of the corridor, surrounding residential community and higher numbers of school children travelling within the corridor.

Intersection and turning lane recommendations: The operation of all intersections were considered carefully, given the high level of feedback from the public regarding intersection operations and safety. Existing and future traffic demand and intersection operations were analyzed and recommendations with respect to intersection reconfiguration, new dedicated turn lanes, and lengthening of turn lane storage were made. The traffic analysis and recommendations are discussed in **Section 2.2**. The final intersection designs that are part of the recommended plan are discussed in **Chapter 6**. Pertinent information with respect to how technical recommendations for some key intersections were considered, modified, incorporated into the design or set aside, are discussed further below, in this chapter.

Design requirements and constraints at the Highway 407 Bridge: 407ETR and MTO were directly involved in the assessment of design alternatives for the Highway 407 Bridge. The bridge requires widening in order to accommodate the additional travel lanes and active transportation facilities. A more detailed discussion follows in **Section 5.3.3**.

Geometric design requirements: ultimately the road cross-section concept and the approach to road widening (discussed in **Section 5.2**) are governed by road design standards and guidelines.

The road cross-section concept developed for Mavis Road is depicted in **Exhibit 5-1**, it is noted that this depiction is ‘concept’ only and that the cross-section will vary depending on local conditions, constraints and intersection design. Actual cross-sections tied to specific locations along Mavis Road are provided as part of the Recommended Plan in **Chapter 6** of this ESR.



5.2 Road Widening Alternatives

The approach to the road widening design was based on the road cross-section concept developed for Mavis Road and factored in the numerous considerations outlined in **Section 5.1**.

Typically, the approach to road widening will consider four basic design alternatives, as outlined below and generally depicted on the schematic below:

- ▶ Widening into the median;
- ▶ Widening out from the existing centreline;
- ▶ Widening to the east only (i.e., holding westerly property line); and
- ▶ Widening to the west only (i.e., holding easterly property line).

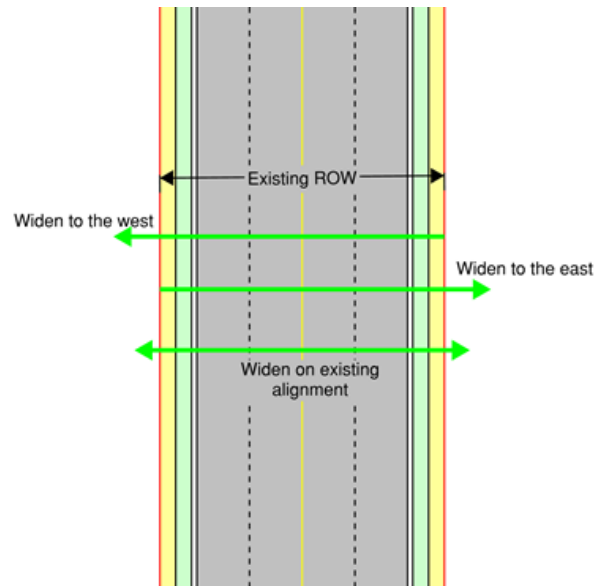
For much of the study area, there are existing constraints located along both sides of Mavis Road. Therefore, it was not considered reasonable to develop alternatives that widen “strictly” to the east or west, or out from the existing centreline.

Furthermore, the existing Mavis Road was constructed with numerous areas of wide median that protected for a potential future widening to six lanes, presenting an opportunity to widen into the median and therefore avoid / minimize impacts to adjacent properties.

Therefore, the approach widening was:

- ▶ Widen into the median where available;
- ▶ Where the median is not present or is too narrow to accommodate the entire widening, then widen into the boulevard, while still minimizing property impacts; and
- ▶ Incorporate design mitigation measures (e.g. retaining wall) to further minimize property impacts.

The approach is essentially a “best fit”, that is, widening the road in such a way that best accommodates the surrounding land uses and constraints. The ‘best fit’ design was



developed on a block by block basis, taking into account local right-of-way, median and boulevard widths and surrounding constraints.

5.3 Site-Specific Design Alternatives / Design Iterations

There are several locations along the Mavis Road corridor where design alternatives or design iterations were developed in consideration of local conditions / constraints and public and agency feedback. These are described below.

5.3.1 Sombrero Way Intersection Design

During the study, a high level of public feedback was received about the Sombrero Way intersection. Comments primarily related to the following aspects:

- ▶ access from northbound Mavis Road to Sombrero Way (left turn queues are very long);
- ▶ left and right turn movements from Sombrero Way (not enough storage length); and
- ▶ increased traffic on Sombrero Way as a result of the closure of the Second Line West Bridge.

With respect to design alternatives for the access from northbound Mavis Road, a dual left turn lane is not feasible since Sombrero Way is a two lane collector road and due to impacts to adjacent properties. However, the storage length for the left-turn lane on northbound Mavis Road was increased from 60 m to 150 m. The original recommendation was to increase storage length to 160 m. However, this was reduced to 150 m following review by MTO. The final result is that the lane was lengthened as much as could be accommodated given the close proximity to the Highway 401 Interchange.

With respect to left and right turn movements from Sombrero Way; the City considered how the dedicated left turn and right turn lanes could be lengthened, increasing storage and reducing the delays caused by queuing back into the single lane. However, it was determined that any road widening to accommodate the longer turn lanes would result in substantial impacts to several properties, particularly along the south side of Sombrero Way, including encroachment into the boulevards and front yards. Given the property impacts, these potential improvements were set aside from further consideration.

The comments related to increased traffic resulting from the closure of Second Line West are beyond the scope of the Mavis Road Class EA study. As discussed in **Section 2.1.13**, a separate Class EA study and supporting traffic study was completed. The

transportation analysis completed as part of this study assumed the closure of the Second Line West Bridge.

Chapter 6 documents the final design of Mavis Road at Sombrero Way which includes:

- ▶ Providing Dual left-turn lane for southbound traffic on Mavis Road turning left;
- ▶ Lengthening northbound Mavis Road left turn lane at Sombrero Way;
- ▶ Providing a multi-use trail on west side of Mavis Road for cycling connections to the future Second Line West Pedestrian Bridge and local schools;
- ▶ Widening Mavis Road into the median to avoid property impacts; and
- ▶ Enhancing streetscape and landscape design.

It is noted that the multi-use trail on the west side of Mavis Road narrows approaching Sombrero Way to accommodate the bus shelter and pad. Cyclists will be required to dismount. This design avoids impacts to the adjacent residential property. This design approach is based on a review of five design options at this location. The assessment of the various design options is provided in **Appendix G**.

5.3.2 Local Street Intersection Designs

As discussed in **Section 2.2**, additional storage for left-turn lanes was proposed at each collector road intersection with Mavis Road. The technical recommendations based on traffic operations, as identified in **Section 2.2**, were considered in the context of each location. In each case, the recommended design reflects a balance between the technical recommendation and the primary objective to minimize property impacts. The Recommended Design discussed in **Chapter 6** provides for increased storage in left-turn lanes while avoiding impacts to boulevards and properties.

5.3.3 Highway 407 Bridge Widening Alternatives

In order to accommodate proposed improvements through the Mavis Road / Highway 407 Interchange, the existing bridge will need to be widened. Due to a number of geometric constraints (e.g. vertical clearance, ramp radii, etc.), an evaluation of widening alternatives was carried out. This evaluation is documented in **Appendix F** and summarized below.

The alternatives considered were:

- ▶ Widen entirely to the west;
- ▶ Widen to both sides, maintaining existing Mavis Road centreline;

- ▶ Widen to both sides, maintaining existing N-E⁸ ramp; and
- ▶ Widen entirely to the east.

The analysis and evaluation of widening alternatives considered the following factors:

- ▶ Road alignment and ramp impacts;
- ▶ Minimum Vertical Clearance of bridge above Highway 407;
- ▶ Durability;
- ▶ Constructability; and
- ▶ Cost.

Each of the four widening alternatives were assessed against these factors, details of which are provided in **Appendix F**.

From an alignment perspective, Alternative 4 (widening entirely to the east) is least desirable, as it would require the greatest centerline shift for Mavis Road (6.9 m east), as well as modification to the smaller and most constrained on-ramp in the interchange (S-W ramp) – which was previously noted to be undesirable by 407ETR.

From a constructability perspective, Alternatives 2 and 3 (widening to both sides) are least desirable, as they would require longer construction durations / lane closures, additional crane set-ups, and inefficient use of column footings. In addition, these alternatives would not fully resolve constraint issues associated with the S-W ramp.

Alternative 1 (widening to the west) would have no impacts to the S-W ramp, instead impacting the larger N-E ramp to the west. In addition to having less ramp impacts, this structural alternative is also the least costly at \$2.28M (excluding grading) and would require a shorter construction duration compared to the other alternatives.

Overall, it was determined that Alternative 1, widening entirely to the west, is most preferred. By widening the structure by 11 m to the less constrained west side, this alternative would maintain both the existing full parallel lane and S-W ramp configuration to the east, as well as required vertical clearances to the west. Realignment of the larger N-E ramp would instead be required.

It is important to note that widening to the west will require more significant grading work in the vicinity of the N-E ramp and nearby Hydro One towers. Further consultation with

⁸Ramp naming convention is as follows: 'direction travelling from' - 'direction travelling to'. For example, the N-E ramp = travelling from the north (i.e. southbound) and to the east (eastbound).

Hydro One is required during the detailed design phase to ensure that their clearance and access requirements are met.

5.4 Preliminary Preferred Plan

Based on the road cross-section and the ‘best fit’ road widening approach, the Preliminary Preferred Plan carried forward to Public Information Centre 2 (PIC 2) encompassed the following key aspects:

- ▶ Widening to 6 through-lanes;
- ▶ Reducing the posted speed from 70 km/hr to 60 km/hr within the City of Mississauga section of Mavis Road;
- ▶ A sidewalk on the east side and multi-use trail on the west side;
- ▶ Widening the Highway 407 Bridge to accommodate the proposed additional lanes, sidewalk and multi-use trail;
- ▶ Modifications to existing 407 ramps to accommodate widened road and bridge;
- ▶ No impacts to natural features within the Fletcher’s Creek valley;
- ▶ Intersection design compliant with Accessibility for Ontarians with Disabilities Act (AODA);
- ▶ Improvements at local road intersections without impacting property;
- ▶ Intersection improvements at Derry Road and Sombrero Way / Courtneypark West Drive;
- ▶ A southbound transit queue jump lane at Derry Road;
- ▶ Streetscape / landscape enhancements that identify opportunities for landscaping, mitigation / replacement for street tree removals and other benefits amenities; and
- ▶ Minimized property impacts by design refinements including the use of retaining walls.

5.5 Public and Agency Consultation during Phase 3

The public consultation aspects of the Mavis Road Class EA are documented in **Chapter 7**. A summary of the feedback received related to the transportation needs assessment and the assessment of alternative, as presented at PIC 1, is provided in **Chapter 4**.

5.5.1 Public Information Centre # 2

The second of two Public Information Centers (PIC 2) was convened on November 9, 2017. The purpose of the PIC was to review and receive public input on the Preliminary Preferred Design for Mavis Road, including the streetscape / landscape concept plan.

A copy of the PIC notice and comments received are provided in **Appendix A**. A summary of the feedback received verbally and on the survey is provided below:

- ▶ High level of support for the Preliminary Preferred Plan including the road widening, the intersection improvements and active transportation facilities.
- ▶ Suggest connecting the Mavis Road multi-use trail to the trails along Fletcher's Creek;
- ▶ High level of support for multi-use trail (as opposed to on-road cycling);
- ▶ Support for changes being proposed at Derry Road including the enhanced landscape concept;
- ▶ High level of support for the streetscape / landscape concept with suggestions for a mix of different aged / sized trees to be utilized; and
- ▶ Should consider a protected left-turn signal phase (advanced green) for northbound Mavis Road at Crawford Mill Avenue given that this intersection provides access to schools.

5.5.2 Stakeholder Meetings during Phase 3

The Project Team met with the Ontario Ministry of Transportation (MTO) and 407ETR before and after PIC 2 to review the preliminary preferred design and receive feedback regarding the design at Highway 407 and near Highway 401. These meetings are summarized in **Table 7-6** in **Chapter 7** of this ESR.

5.6 Confirmation of the Preferred Design

Public and agency feedback received during and following PIC 2 did not trigger any significant changes to the Preliminary Preferred Plan. Design refinements to the Highway 407 Interchange ramps and the preferred design alternative for the Highway 407 Bridge was confirmed with 407ETR (as described in Section 5.4) following PIC 2. Design refinements were made to the Highway 401 Interchange ramps and the section of Mavis Road between Sombrero Way and Highway 401, per MTO direction. Based on these refinements, the Recommended Plan was confirmed. As noted above, these aspects are documented in the various design briefs provided in the Appendices. The Recommended Plan is discussed in **Chapter 6**.