

Appendix A4

Ontario Line Project

**East Harbour Station Early Works –
Traffic and Transportation Early Works Report**

Metrolinx

Traffic and Transportation Early Works Report

Ontario Line East Harbour Station Early Works

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Executive Summary

ES.1 Ontario Line East Harbour Station Early Works

The Ontario Line Project (the Project) is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the Environmental Assessment Act. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report, Environmental Impact Assessment Report, and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the Environmental Impact Assessment Report. The Environmental Conditions Report documents the local environmental conditions of the Ontario Line Study Area and provides a preliminary description of the potential environmental impacts from the Project. Information outlined in the Environmental Conditions Report is used to inform the Early Works Report(s) and Environmental Impact Assessment Report, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the Environmental Conditions Report.

Ontario Line early works are components of the Project that are proposed to proceed before the completion of the Ontario Line environmental impact assessment process. An overview of the Project is provided in **Section 1.2**. Early works are defined in Ontario Regulation 341/20: Ontario Line Project under the Environmental Assessment Act as follows:

“any components of the Ontario Line Project that Metrolinx proposes to proceed with before the completion of the Ontario Line assessment process, such as station construction, rail corridor expansion, utility relocation or bridge replacement or expansion.”

East Harbour Station early works are considered to be of strategic importance in enabling the timely implementation of the Project. These early works are being advanced in an area where the Project interfaces with GO Expansion. Advancing early works and supporting environmental and technical studies in this area provides planning and design efficiencies for the Project and GO Expansion and facilitates the timely implementation of both.

AECOM Canada Limited (AECOM) was retained by Metrolinx and Infrastructure Ontario to complete the Ontario Line East Harbour Station Early Works Report for the Project. This Final Traffic and Transportation Early Works Report (this Report) supports the Ontario Line Final East Harbour Station Early Works Report and has been prepared for

the Project to document the traffic and transportation impact assessment of East Harbour Station early works (**Figure ES-1**).

The East Harbour Station early works will include:

- Reconfiguration of the existing Lakeshore East GO tracks to accommodate station facilities and future Ontario Line tracks;
- Construction of station facilities such as platforms and entrances;
- Replacement and expansion of the existing Eastern Avenue rail bridge to accommodate four Lakeshore East GO tracks and two future Ontario Line tracks; and
- Site preparation activities such as grading, demolition of existing structures where required, and utility relocation or protection.

The East Harbour Station early works components and construction activities are further described in **Section 1.2**. East Harbour Station was previously assessed through the SmartTrack program in 2018 and since the completion of that assessment, changes have been made to the project to accommodate the Ontario Line, documented within this report.

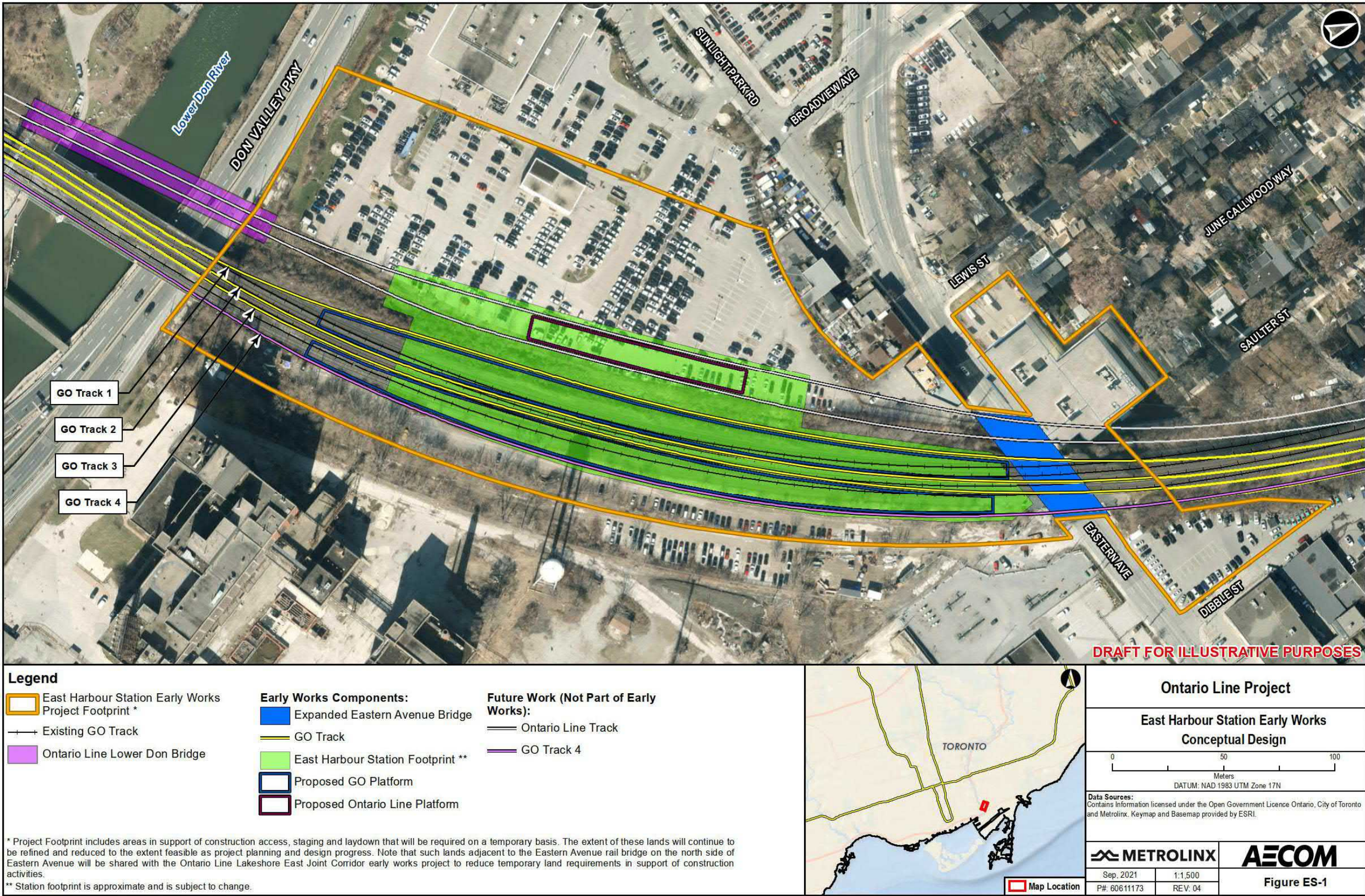
The purpose of this Report is to:

- Describe the local environmental conditions related to the identified transportation network and transit network within the East Harbour Station Study Area;
- Assess the potential impacts of East Harbour Station early works construction activities on the identified transportation network and transit network; and,
- Identify mitigation measures and monitoring activities for any potential negative impacts on traffic and transportation operations within the East Harbour Station Study Area.

This Report supports the Ontario Line East Harbour Station Early Works Report prepared in accordance with Ontario Regulation 341/20: Ontario Line Project.

Refer to **Section 1** of this Report for more information related to the Project and a detailed early works description.

Figure ES-1: East Harbour Station Early Works Conceptual Design



ES.2 Methodology

This Report documents the assessment of East Harbour Station early works construction impacts related to traffic and transportation operations. Impacts associated with Project operations will be addressed as part of the Environmental Impact Assessment Report, under a separate cover. Detailed methodology is provided in **Section 2**.

Local Environmental Conditions

The following traffic and transportation elements within the East Harbour Station Study Area were assessed:

- Transportation network:
 - Road Network
 - Pedestrian Network
 - Cycling Network
 - Rail Network
- Transit network.

AECOM received available traffic data (i.e., turning movement counts and signal timing plans) at the intersection of Eastern Avenue and Broadview Avenue within the East Harbour Station Study Area from the City of Toronto. In addition, the following secondary sources were used to conduct the background information review as part of the Ontario Line Final Environmental Conditions Report (AECOM, 2020)¹:

- City of Toronto’s website:
 - Open Data Portal (City of Toronto, no date);
 - Road Classification System Update (City of Toronto, 2018); and
 - Vision Zero Mapping Tool (City of Toronto, 2020).
- Transit schedule and route information:
 - GO Transit (GO Transit, 2020);
 - VIA Rail (VIA Rail, 2020); and
 - Toronto Transit Commission schedules (Toronto Transit Commission, 2019).

A quantitative multi-modal level of service assessment was undertaken at the intersections and road segments within the East Harbour Station Study Area where traffic data was available. The automobile level of service assessment was completed using Synchro 9 capacity analysis software in accordance with the methodologies outlined in the Highway Capacity Manual and in line with the capacity analysis guidelines outlined in the City of

1. The Ontario Line Final Environmental Conditions Report (AECOM, 2020) was published on November 30, 2020 in accordance with Ontario Regulation 341/20: Ontario Line Project.

Toronto's Guidelines for Using Synchro 9 (City of Toronto, 2016). The City of Ottawa's Multi-Modal Level of Service Guidelines (City of Ottawa, 2015) were generally followed to determine the level of service for non-auto modes of travel (i.e., pedestrians, cyclists, and transit). The City of Ottawa's Multi-Modal Level of Service Guidelines are widely used in transportation studies within Ontario and specifically the City of Toronto which has approved multiple studies in which they were used (e.g., Yorkdale Transportation Master Plan, Golden Mile Transportation Master Plan, etc.).

The level of service designation for all modes of travel range from level of service 'A' to level of service 'F' based on the relative attractiveness (e.g., the amount of average delay for automobile and transit users, the level of comfort, safety, and convenience experienced by pedestrians and cyclists) of the traffic and transportation elements within the East Harbour Station Study Area. A level of service target was set for each mode of travel to ensure that the respective mode users experience a minimum desirable level of service which is consistent with both the surrounding land use designation and the road classification. The levels of service targets set for motorized vehicles (i.e., automobiles and transit) and active transportation users are level of service 'D' and level of service 'C', respectively. This indicates that for motorized vehicles, level of service 'A' through 'D' typically indicate acceptable operations, while level of service 'E' or 'F' indicate critical operations. For active transportation users, level of service 'A' through 'C' indicate acceptable operations, while level of service 'D' through 'F' indicate critical operations.

The Ontario Line Final Environmental Conditions Report (AECOM, 2020) notes that turning movement counts and signal timing plans were not available at some intersections within the Ontario Line Study Area, and were not collected through new traffic surveys considering the uncharacteristic traffic conditions as a result of the COVID-19 pandemic. As a result of the data limitations related to the identified road network within the East Harbour Station Study Area, a quantitative traffic assessment of some intersections could not be undertaken.

Impact Assessment

This early works impact assessment and development of mitigation measures and monitoring activities considered the following in accordance with Ontario Regulation 341/20: Ontario Line Project under the Environmental Assessment Act:

- East Harbour Station early works components as described in **Section 1.3.1**;
- The East Harbour Station Early Works Project Footprint and East Harbour Station Study Area as described in **Section 1.3.2**;
- East Harbour Station construction activities as described in **Section 1.3.3**; and,
- Local environmental conditions within the East Harbour Station Study Area as described in **Section 3**.

A quantitative impact assessment was not completed at this stage as the detailed construction staging schemes that describe the potential modifications to the existing transportation network were not available. Quantitative impact assessment will be completed, if required, as detailed design progresses and this information becomes available. The quantitative impact assessment may include a larger study area.

ES.3 Local Environmental Conditions

The findings of the quantitative multi-modal level of service assessment of the existing transportation and transit networks within the East Harbour Station Study Area are summarized as follows:

- Automobiles experience acceptable Automobile Level of Service ‘B’ or better at the intersection of Eastern Avenue and Broadview Avenue in both the AM and PM peak hours;
- Pedestrians experience critical Pedestrian Level of Service ‘F’ at the intersection of Eastern Avenue and Broadview Avenue and critical Pedestrian Level of Service ‘E’ when travelling along the studied section of Eastern Avenue;
- Cyclists experience critical Bicycle Level of Service ‘D’ at the intersection of Eastern Avenue and Broadview Avenue and when travelling along the studied section of Eastern Avenue; and
- Transit vehicles operate at acceptable Transit Level of Service ‘B’ at the intersection of Eastern Avenue and Broadview Avenue and acceptable Transit Level of Service ‘D’ when travelling along the studied section of Eastern Avenue.

Local environmental conditions are further described in **Section 3**.

ES.4 Potential Impacts, Mitigation Measures and Monitoring Activities

Section 3.2.2 includes information related to potential impacts, mitigation measures, and monitoring activities for the East Harbour Station early works. Potential impacts may result from early works construction activities, including temporary closures and realignment of transportation network components (i.e., lanes, sidewalks, and rail tracks) and increased traffic within the East Harbour Station Study Area. Mitigation measures and monitoring activities are recommended to minimize the potential impacts during construction.

Refer to **Table ES-1** for a complete list of potential impacts, mitigation measures, and monitoring activities for the East Harbour Station early works.

ES.5 Permits and Approvals

Section 5 notes that federal or provincial permits and approvals related to traffic and transportation are not required for the East Harbour Station early works. Metrolinx will co-ordinate with the City of Toronto for transportation-related permits and approvals (e.g., street occupation permit) prior to construction, as required.

Table ES-1: Potential Impacts, Mitigation Measures and Monitoring Activities for the East Harbour Station Early Works

Environmental Component	Potential Impacts	Mitigation Measure(s)	Monitoring Activities
Transportation Network – Roads	<ul style="list-style-type: none">■ If required, temporary lane closures along Eastern Avenue and Broadview Avenue may result in impeding traffic flow and increased average delay of vehicles, including emergency vehicles.■ Construction vehicle traffic may impact traffic operations resulting in increased vehicular delays and queue lengths, especially at intersections where construction traffic is required to make left-turning movements.■ Potential overlapping construction timelines with other planned projects (e.g., capital projects and local developments) nearby may result in impacts to the transportation network and its road users.■ Potential sightline deficiencies might develop near construction egress locations for the eastbound traffic along Eastern Avenue due to the road’s curvature upstream of the rail bridge.	<ul style="list-style-type: none">■ A quantitative traffic impact assessment will be completed, as project planning progresses to consider vehicular traffic impacts as a result of the East Harbour Station early works.■ Develop and implement a transit and traffic management plan(s), which could include temporary changes to intersection lane configurations, traffic signal timing optimization, modifications to existing signal timing plans, etc. The transit and traffic management plan(s) will also address specific emergency services requirements in consultation with the City of Toronto.■ Traffic signal timing optimization may be assessed/implemented to increase capacity of affected intersections and to aid in the movement of traffic. Traffic signal timing adjustments would require coordination between Metrolinx and City of Toronto, and will be undertaken if required, to determine appropriate changes to traffic signal timings.■ Consider scheduling construction activities during off-peak periods and weekends to minimize disruptions to road users during the critical peak periods.■ Co-ordinate with the City of Toronto regarding other ongoing construction projects when scheduling the early works activities to maintain the mobility of road users.■ Implement flagging at locations with potential sightline deficiencies to ensure general traffic are aware of the construction vehicles operation within the construction area.■	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period and adjustments will be made based on actual field observations, as needed.
Transportation Network – Active Transportation	<ul style="list-style-type: none">■ Potential traffic congestion along the East Harbour Station Study Area roads, as a result of the increase in heavy vehicle traffic, could increase pedestrians’ and cyclists’ exposure to traffic.■ If required, temporary realignment of the existing sidewalks along some of the East Harbour Station Study Area roads (i.e., Eastern Avenue, Lewis Street, Broadview Avenue, Sunlight Park Road, and Dibble Street) may increase walking distances and impact the convenience of pedestrians.	<ul style="list-style-type: none">■ Reduce interference with pedestrians and cyclists. This may include fencing, hoarding (minimum 2 meters high, solid, and secured), shared-lane markings, signals, wayfinding signs, and lighting as required to provide pedestrians and cyclists with safe, accessible, and continuous routes.■ If required, co-ordinate with the City of Toronto to ensure any modifications to pedestrian crossing distances at signalized intersections are reflected in revised pedestrian clearance timings.■ Any temporary pedestrian facilities including temporary or relocated Toronto Transit Commission transit stops will be designed to meet Toronto Transit Commission accessibility standards.■ Implement flagging where construction vehicles are present to ensure construction vehicle operators are aware of pedestrian and vehicular traffic within the construction area.	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period and adjustments will be made based on actual field observations, as needed.
Transportation Network – Rail	<ul style="list-style-type: none">■ Early works construction may require temporary full or partial closure of existing rail tracks, which may disrupt existing commuter and freight rail operations.	<ul style="list-style-type: none">■ Consult with rail operators with current service along the rail corridor (i.e., VIA Rail, Canadian National Railway, and Canadian Pacific Railway) to assess how track closures would impact their service and co-ordinate temporary schedules to accommodate all rail services on the open tracks.	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period. Adjustments to the construction staging plans and transit and traffic management plan(s) will be made based on actual field observations, as needed.
Transit Network	<ul style="list-style-type: none">■ Potential increase of construction vehicles traffic could result in travel time delays to existing surface transit routes (i.e., Toronto Transit Commission bus route #143 Downtown / Beach Express) that travel within the East Harbour Station Study Area.■ Potential temporary lane restrictions on Eastern Avenue and Broadview Avenue could result in travel time delays to Toronto Transit Commission bus #143 Downtown / Beach Express travelling within the East Harbour Station Study Area.	<ul style="list-style-type: none">■ Co-ordinate with the Toronto Transit Commission and notify transit users regarding travel delays to the bus services in advance, if required.■ Consider scheduling some construction activities during off-peak periods and weekends to minimize delays to bus services during the critical peak periods.	<ul style="list-style-type: none">■ Transit services will be monitored through actual field observations throughout the construction period and additional mitigation measures will be considered, as needed.

Table of Contents

	page
1. Introduction.....	1
1.1 Purpose of the Ontario Line Early Works.....	1
1.1.1 Purpose of this Report	1
1.2 Ontario Line Project Overview	4
1.3 Early Works Description.....	4
1.3.1 Project Description	4
1.3.2 Early Works Project Footprint and Study Area	5
1.3.3 Construction Activities	7
2. Methodology	9
2.1 Local Environmental Conditions	9
2.1.1 Data Collection.....	9
2.1.2 Multi-Modal Level of Service Assessment.....	10
2.1.2.1 Automobile Level of Service	10
2.1.2.2 Pedestrian Level of Service	11
2.1.2.3 Bicycle Level of Service	13
2.1.2.4 Transit Level of Service.....	14
2.2 Impact Assessment	15
3. Local Environmental Conditions	16
3.1 Transportation Network.....	16
3.1.1 Road Network and Intersection Operations	16
3.1.1.1 Road Network	16
3.1.1.2 Intersection Operations	18
3.1.2 Pedestrian Network and Operations	18
3.1.2.1 Pedestrian Network.....	18
3.1.2.2 Pedestrian Operations.....	21
3.1.3 Cycling Network and Operations.....	23
3.1.3.1 Cycling Network	23
3.1.3.2 Cycling Operations.....	23
3.1.4 Rail Network.....	25
3.2 Transit Network and Operations	25
3.2.1 Transit Network.....	25
3.2.2 Transit Operations.....	28
4. Potential Impacts, Mitigation Measures and Monitoring Activities.....	30
5. Permits and Approvals.....	33
6. References	34

List of Figures

Figure 1-1:	East Harbour Station Early Works Conceptual Design	3
Figure 1-2:	East Harbour Station Early Works Project Footprint and East Harbour Station Study Area	6
Figure 3-1:	Existing Road Network Within the East Harbour Station Study Area	17
Figure 3-2:	Existing Pedestrian Network Within the East Harbour Station Study Area	20
Figure 3-3:	Pedestrian Level of Service Within the East Harbour Station Study Area	22
Figure 3-4:	Bicycle Level of Service Within the East Harbour Station Study Area	24
Figure 3-5:	Existing Transit Network Within the East Harbour Station Study Area	27
Figure 3-6:	Transit Level of Service Within the East Harbour Station Study Area	29

List of Tables

Table 1-1:	Report Contents in Accordance with Ontario Regulation 341/20: Ontario Line Project	2
Table 1-2:	Anticipated Construction Activities for the Ontario Line East Harbour Station Early Works	7
Table 2-1:	Key Determining Factors for Pedestrian Level of Service	12
Table 2-2:	Key Determining Factors for Bicycle Level of Service	13
Table 2-3:	Key Determining Factors for Transit Level of Service	14
Table 3-1:	Traffic Operations at the East Harbour Station Study Area Intersection under Existing Conditions (2020) during the AM and PM Peak Hours	19
Table 3-2:	Pedestrian Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)	21
Table 3-3:	Pedestrian Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)	21
Table 3-4:	Bicycle Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)	23
Table 3-5:	Bicycle Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)	23

Table 3-6:	Existing Transit Routes Within the East Harbour Station Study Area	25
Table 3-7:	Transit Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)	28
Table 3-8:	Transit Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)	28
Table 4-1:	Potential Impacts, Mitigation Measures and Monitoring Activities for the East Harbour Station Early Works	32

Appendices

Appendix A. Turning Movement Counts

Appendix B. Signal Timing Plans

Appendix C. Multi-Modal Level of Service Criteria

Appendix D. Synchro Modelling Assumptions and Parameters

Appendix E. Synchro Reports

Appendix F. Multi-Modal Level of Service Results

1. Introduction

1.1 Purpose of the Ontario Line Early Works

The Ontario Line Project (the Project) is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the Environmental Assessment Act. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report, Environmental Impact Assessment Report, and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the Environmental Impact Assessment Report. The Environmental Conditions Report documents the local environmental conditions of the Ontario Line Study Area and provides a preliminary description of the potential environmental impacts from the Project. Information outlined in the Environmental Conditions Report is used to inform the Early Works Report(s) and Environmental Impact Assessment Report, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the Environmental Conditions Report.

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“any components of the Ontario Line Project that Metrolinx proposes to proceed with before the completion of the Ontario Line assessment process, such as station construction, rail corridor expansion, utility relocation or bridge replacement or expansion.”

East Harbour Station early works are considered to be of strategic importance in enabling the timely implementation of the Project. The early works are being advanced where the Project interfaces with GO Expansion. Advancing early works and supporting environmental and technical studies in this area provides planning and design efficiencies for the Project and GO Expansion and facilitates the timely implementation of both. East Harbour Station early works are described in detail in **Section 1.2**.

1.1.1 Purpose of this Report

AECOM Canada Limited (AECOM) was retained by Metrolinx and Infrastructure Ontario to complete the Ontario Line East Harbour Station Early Works Report for the Project. This Traffic and Transportation Early Works Report (this Report) supports the Ontario

Line Final East Harbour Station Early Works Report and has been prepared for the Project to document the traffic and transportation impact assessment of East Harbour Station early works (**Figure 1-1**). The early works components and construction activities are described in **Section 1.3**.

The purpose of this Report is to:

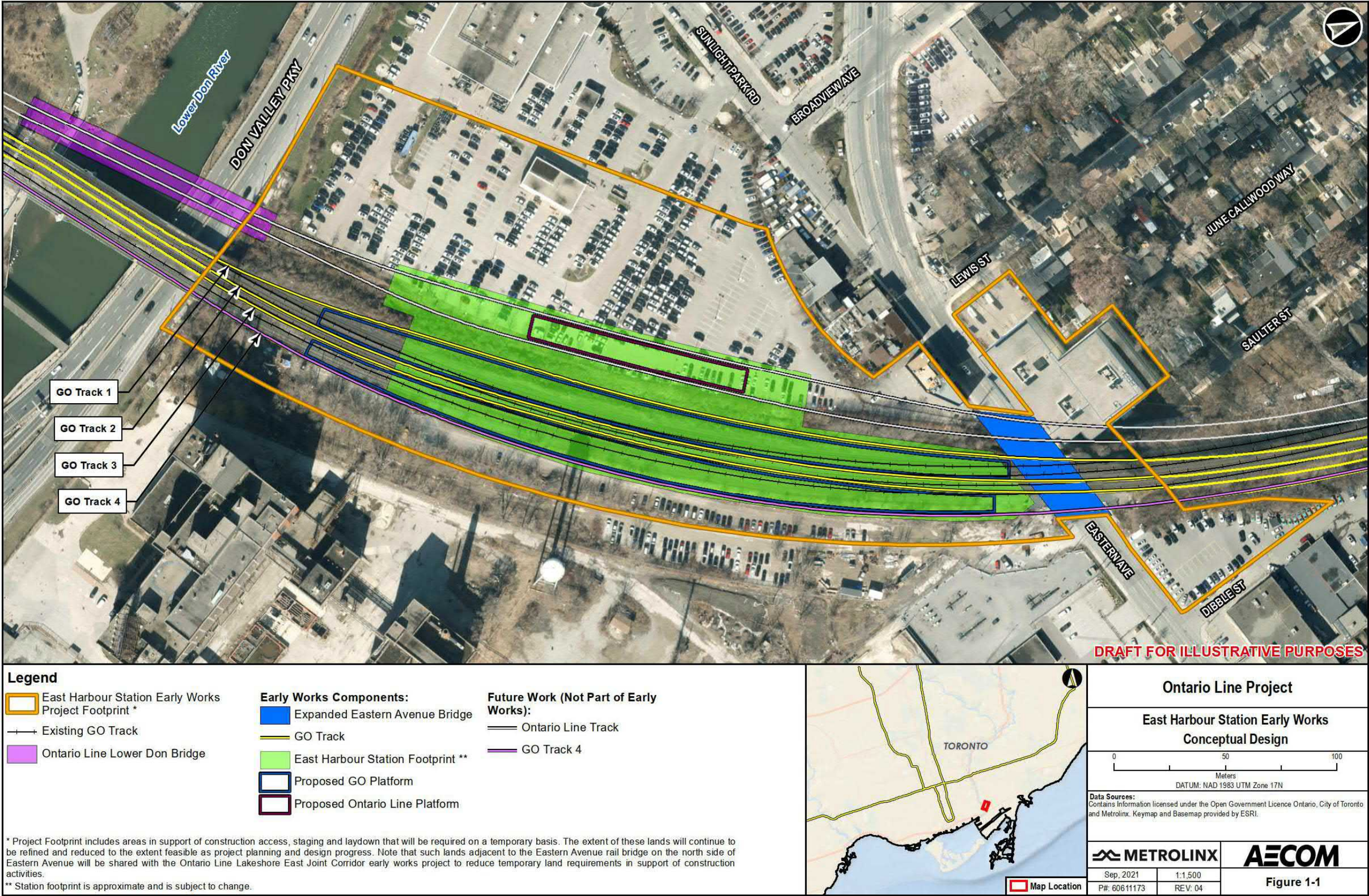
- Describe the local environmental conditions related to the identified transportation network and transit network within the East Harbour Station Study Area;
- Assess the potential impacts of East Harbour Station early works construction activities on the identified transportation network and transit network; and
- Identify mitigation measures and monitoring activities for any potential negative impacts on traffic and transportation operations within the East Harbour Station Study Area.

This Report has been prepared in accordance with Ontario Regulation 341/20: Ontario Line Project and contains the information outlined in **Table 1-1**.

Table 1-1: Report Contents in Accordance with Ontario Regulation 341/20: Ontario Line Project

Reg. Section	Requirement	Report Section
Section 8(2)2	The rationale for proceeding with the early works.	Section 1.1
Section 8(2)4	A description of the local environmental conditions at the site of the early works.	Section 3
Section 8(2)6	Metrolinx's assessment and evaluation of the impacts that the preferred method of carrying out the early works and other methods might have on the environment, and Metrolinx's criteria for assessment and evaluation of those impacts.	Section 3.2.2
Section 8(2)7	A description of any measures proposed by Metrolinx for mitigating any negative impacts that the preferred method of carrying out the early works might have on the environment.	Section 3.2.2
Section 8(2)8	A description of the means Metrolinx proposes to use to monitor or verify the effectiveness of mitigation measures proposed.	Section 3.2.2
Section 8(2)9	A description of any municipal, provincial, federal or other approvals or permits that may be required for the early works.	Section 5

Figure 1-1: East Harbour Station Early Works Conceptual Design



1.2 Ontario Line Project Overview

Metrolinx, an agency of the Province of Ontario, is proceeding with the planning and development of the Ontario Line, extending from Exhibition/Ontario Place to the Ontario Science Centre in the City of Toronto.

The Project is a new approximately 15.6-kilometre subway line with connections to Line 1 (Yonge-University) subway service at Osgoode and Queen Stations, Line 2 (Bloor-Danforth) subway service at Pape Station, and Line 5 (Eglinton Crosstown) light rail transit service at the future Science Centre Station. Fifteen stations are proposed, with additional connections to three GO Transit lines (Lakeshore East, Lakeshore West and Stouffville), and the Queen, King, Bathurst, Spadina, Harbourfront, and Gerrard/Carlton streetcar routes. The Project will reduce crowding on Line 1 and provide connections to new high-order rapid transit neighbourhoods. The Project will be constructed in a dedicated right-of-way with a combination of elevated (i.e., above existing rail corridor/roadway), tunnelled (i.e., underground), and at-grade (i.e., at grade with existing rail corridor) segments at various locations.

1.3 Early Works Description

1.3.1 Project Description

The East Harbour Station early works will include:

- Reconfiguration of the existing Lakeshore East GO tracks to accommodate station facilities and future Ontario Line tracks;
- Construction of station facilities such as platforms and entrances;
- Replacement and expansion of the existing Eastern Avenue rail bridge to accommodate four Lakeshore East GO tracks and two future Ontario Line tracks; and
- Site preparation activities such as grading, demolition of existing structures where required, and utility relocation or protection.

East Harbour Station rail corridor and third-party utility relocations and protection will be completed to facilitate the work described above as well as the future Ontario Line tunnel facilities. Utilities to be relocated include, but are not limited to, Bell 360 and existing Canadian National/GO signal underground fibre optic cables.

The East Harbour Station early works components are shown in **Figure 1-1**.

1.3.2 Early Works Project Footprint and Study Area

The East Harbour Station Early Works Project Footprint, shown in **Figure 1-2**, includes permanent infrastructure to be built as part of the East Harbour Station early works as well as lands anticipated to be temporarily impacted by early works construction staging/laydown and access; these lands are anticipated to be refined and reduced to the extent feasible as project planning progresses. Note that such lands adjacent to the Eastern Avenue rail bridge on the north side of Eastern Avenue will be shared with the Ontario Line Lakeshore East Joint Corridor early works project to reduce temporary land requirements in support of construction activities. Assessment of Project operations and construction of other project components will be documented in the Ontario Line Environmental Impact Assessment Report in accordance with Section 15 of Ontario Regulation 341/20: Ontario Line Project.

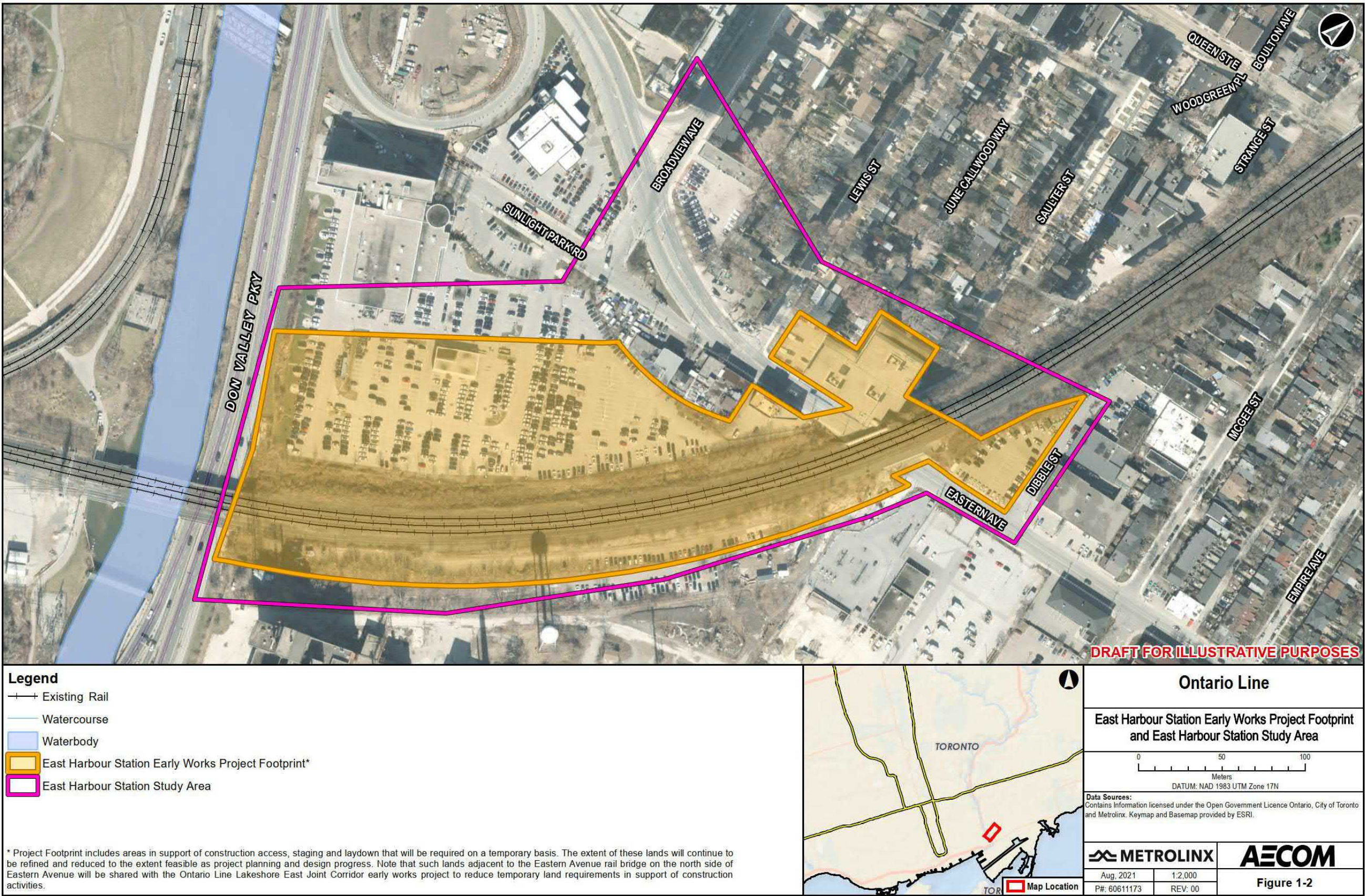
The East Harbour Station Early Works Project Footprint extends from east of the Don Valley Parkway, continues east along the Lakeshore East rail corridor, extending approximately 20 metres south of the Lakeshore East rail corridor, and approximately 100 metres north of the Lakeshore East rail corridor to approximately 60 metres north of Eastern Avenue.

For the purpose of this Report, the East Harbour Station Study Area, also shown in **Figure 1-2**, includes the East Harbour Station Early Works Project Footprint and adjacent road segments and intersections. The adjacent road segments and intersections within the East Harbour Station Study Area were identified as they meet either of the following criteria:

- Directly impacted by the early works activities within the East Harbour Station Early Works Project Footprint (i.e., replacement of the Eastern Avenue rail bridge is anticipated to result in potential lane closures along Eastern Avenue); or,
- Provide connection to the East Harbour Station Project Footprint (i.e., Eastern Avenue, Broadview Avenue, Lewis Street, Sunlight Park Road, and Dibble Street) and therefore may be considered as a route for construction vehicles, where heavy vehicles are permitted.

The East Harbour Station Study Area assessed in this Report is specific to the traffic and transportation impact assessment. The study areas for other environmental disciplines are outlined in the Ontario Line Final East Harbour Station Early Works Report.

Figure 1-2: East Harbour Station Early Works Project Footprint and East Harbour Station Study Area



1.3.3 Construction Activities

Table 1-2 provides a description of the anticipated construction activities for the East Harbour Station early works. These typical activities serve as the basis for the assessment of construction-related potential environmental impacts. These activities may be expanded, further refined, or found to be unnecessary as early works planning progresses.

Table 1-2: Anticipated Construction Activities for the Ontario Line East Harbour Station Early Works

Anticipated Construction Activity	Description	Associated Equipment
Site Preparation	<ul style="list-style-type: none"> ■ Mobilization of equipment and temporary facilities to the site. ■ Clearing and grubbing. ■ Erection of temporary and permanent fences. ■ Installation of environmental management features (e.g., erosion and sediment controls). 	<ul style="list-style-type: none"> ■ Site compaction equipment and grading equipment. ■ Vegetation removal equipment. ■ Excavation equipment. ■ Haulage/dump trucks.
Track Diversion/ Installation	<ul style="list-style-type: none"> ■ Grading. ■ Temporary drainage. ■ Relocation/Installation of track, ties, and fastenings. ■ Clear delineation and protection between active rail service and construction work zones. 	<ul style="list-style-type: none"> ■ Site compaction equipment and general grading equipment, dump trucks spoil removal equipment. ■ Thermal welding. ■ Tie placement (cranes, lifting equipment). ■ Ballast placement equipment. ■ Concrete pouring equipment. ■ Temporary concrete barriers. ■ Rail saw. ■ Stabilizers. ■ Tampers.
Temporary Road Closures	<ul style="list-style-type: none"> ■ Temporary road closures, as required. 	<ul style="list-style-type: none"> ■ Temporary traffic control devices such as signs, signals, barriers, traffic barrels.
Management of Stormwater	<ul style="list-style-type: none"> ■ All precipitation falling within the construction limits will be managed as stormwater within the existing system of collection, conveyance, and discharge features. Surface flows within the site will be managed within the site to ensure discharge to off-site receivers (e.g., municipal storm sewers) is appropriate in terms of water quantity and quality. 	<ul style="list-style-type: none"> ■ Site compaction equipment and general grading equipment. ■ Groundwater pumping equipment.

Anticipated Construction Activity	Description	Associated Equipment
Site Servicing	<ul style="list-style-type: none"> ■ Construction, relocation and/or extension of services and utilities on the site; which may include both underground and aerial services and utilities (e.g., sewers, water, electrical, communications, gas). This may also involve installation of utilities within the site. 	<ul style="list-style-type: none"> ■ Excavation equipment including backhoe, dump trucks, spoil removal equipment, jackhammers. ■ Vacuum trucks.
Excavation and Grading	<ul style="list-style-type: none"> ■ Excavation and grading activities may involve earth-moving activities and stockpiling, as applicable. Excavated material will be accommodated on-site on the degree practicable, however, where necessary, surplus material will be disposed of off-site to an approved facility. ■ Any off-site disposal shall be done in compliance with applicable law, including as it relates to contaminated material that may be encountered. ■ Any groundwater encountered will be managed and disposed of in accordance with applicable law. 	<ul style="list-style-type: none"> ■ Site compaction equipment and general grading equipment, dump trucks, soil removal equipment. ■ Groundwater pumping equipment. ■ Excavation equipment including backhoe, dump trucks, soil removal equipment, and jack hammers.
Construction of Buildings and Structures (including Eastern Avenue Bridge)	<ul style="list-style-type: none"> ■ Retaining walls. ■ All buildings and structures will be constructed using standard civil construction techniques. 	<ul style="list-style-type: none"> ■ Foundation placement equipment. ■ Augured piles or rammed aggregate piers. ■ Drill rigs. ■ Cranes and hoists. ■ Concrete trucks, pumps & vibrators. ■ Flatbed trucks, crane, excavators, and light equipment. ■ Hoe rams. ■ Backhoes.
Construction of Ancillary Facilities	<ul style="list-style-type: none"> ■ Ancillary facilities may include electrical transformer/supply equipment, parking areas, exterior yard facilities including lighting, electrification enabling facilities. 	<ul style="list-style-type: none"> ■ Flatbed trucks, cranes, concrete trucks. ■ Backhoe, pavement excavation equipment. ■ Mobile cranes and hoists. ■ Concrete trucks, pumps and vibrators.
Demolition of buildings and structures	<ul style="list-style-type: none"> ■ Removal of buildings and structures on properties acquired by Metrolinx for East Harbour Station or as required for construction of new infrastructure. 	<ul style="list-style-type: none"> ■ Demolition and excavation equipment including backhoe, dump trucks, soil removal equipment, and hoe rams.

2. Methodology

This Report documents the assessment of East Harbour Station early works construction impacts. Impacts associated with Project operations will be addressed as part of the Environmental Impact Assessment Report, under a separate cover.

2.1 Local Environmental Conditions

The following traffic and transportation elements within the East Harbour Station Study Area were assessed:

- Transportation network:
 - Road Network
 - Pedestrian Network
 - Cycling Network
 - Rail Network
- Transit network.

The types and sources of traffic data collected for the above-noted transportation elements are summarized in **Section 2.1.1**. The methodology and assumptions followed in the quantitative assessment of the transportation elements in the existing conditions are discussed in detail in **Section 2.1.2**.

2.1.1 Data Collection

Most recent available Turning Movement Count data at the studied intersection of Eastern Avenue and Broadview Avenue within the East Harbour Station Study Area was provided by the City of Toronto, consisting of eight-hour counts of vehicles (cars, trucks, and buses), pedestrians, and bicycles and collected at 15-minute intervals during the weekday peak periods. The Turning Movement Count data is presented in **Appendix A**.

In addition, the signal timing plan at the studied intersection of Eastern Avenue and Broadview Avenue was provided by the City of Toronto and is presented in **Appendix B**.

AECOM completed a desktop background review of secondary source information to complement the data provided by the City of Toronto and establish local traffic and transportation conditions within the East Harbour Station Study Area. The desktop resources included the following:

- Review of City of Toronto's Open Data Portal (City of Toronto, n.d.) to obtain mapping data related to roads, pedestrian and cyclist routes related to the East Harbour Station Study Area;

- Review of City of Toronto’s Road Classification System Update (City of Toronto, 2018) and Vision Zero Mapping Tool (City of Toronto, 2020) to obtain road classification and speed information related to roads within the East Harbour Station Study Area; and,
- Review of the GO Transit website (GO Transit, 2020), VIA Rail website (VIA Rail, 2020), and Toronto Transit Commission website (Toronto Transit Commission, 2020) to obtain transit schedule and route data related to the East Harbour Station Study Area.

The Ontario Line Final Environmental Conditions Report (AECOM, 2020)² notes that turning movement counts and signal timing plans were not available at some intersections within the Ontario Line Study Area, and were not collected through new traffic surveys considering the uncharacteristic traffic conditions as a result of the COVID-19 pandemic. As a result of the data limitations related to the identified road network within the East Harbour Station Study Area, a quantitative traffic assessment of some intersections could not be undertaken.

2.1.2 Multi-Modal Level of Service Assessment

2.1.2.1 Automobile Level of Service

The intersection capacity analyses for the studied intersection within the East Harbour Station Study Area were completed using Synchro 9 capacity analysis software in accordance with the methodologies outlined in the Highway Capacity Manual (Transportation Research Board, 2000) and in line with the capacity analysis guidelines outlined in the City’s Guidelines for Using Synchro 9 (City of Toronto, 2016). Synchro models were developed to replicate local traffic conditions within the East Harbour Station Study Area as the 2020 Existing Conditions (herein referred to as Existing Conditions) during the AM and PM peak hours on a typical weekday.

The measures of effectiveness used to assess an intersection’s operations are level of service and volume-to-capacity ratio. Level of service is an indicator describing the performance of individual intersection movements and of an overall intersection from the traffic operations standpoint. The level of service designation ranges from level of service ‘A’ to level of service ‘F’ based on the amount of average delay that a motorist experiences before taking a specific manoeuvre at an intersection. Level of service ‘A’ through ‘D’ typically indicate acceptable operations, while level of service ‘E’ indicates increasing congestion and at capacity operations, and level of service ‘F’ indicates long delays and, in some cases, severe traffic congestion. The level of service criteria for

2. The Ontario Line Final Environmental Conditions Report (AECOM, 2020) was published on November 30, 2020 in accordance with Ontario Regulation 341/20: Ontario Line Project.

signalized intersections are attached in **Appendix C**. The level of service target (i.e., the minimum desirable level of service) for automobiles is set to level of service 'D' which implies that intersections and movements with level of service 'E' or worse are considered to be operating at critical levels.

The volume to capacity ratio is another indicator representing the capacity utilization at an intersection or for a specific movement. A volume to capacity ratio of 1.00 indicates that a movement or an intersection is operating at capacity. The target volume to capacity ratio is 0.84 which implies that intersections and movements with volume to capacity ratio exceeding 0.84 are considered to be operating at critical levels.

The key assumptions and modifications made to the default values of the Synchro parameters in the traffic modelling exercise are summarized in **Appendix D**.

2.1.2.2 Pedestrian Level of Service

The City of Ottawa's Multi-Modal Level of Service tool was used to assign a Pedestrian Level of Service to both road segments and signalized intersections along a stretch of road, based on level of comfort, safety, and convenience experienced by pedestrians as they travel along that stretch of road. The City of Ottawa's Multi-Modal Level of Service Guidelines are widely used in transportation studies within Ontario and specifically the City of Toronto which has approved multiple studies in which they were used (e.g., Yorkdale Transportation Master Plan and Golden Mile Transportation Master Plan).

The key determining factors in evaluating the Pedestrian Level of Service are summarized in **Table 2-1**. The Pedestrian Level of Service on a road segment is determined based on the quality of pedestrian facilities and impact of adjacent motorized traffic on pedestrians. It should be noted that sidewalk crowding was not considered in determining the segment Pedestrian Level of Service due to the absence of accurate pedestrian volumes along the sidewalks of the studied road segments. At the intersection level, and as per the City of Ottawa's Multi-Modal Level of Service Guidelines, the Pedestrian Level of Service is evaluated separately for each approach to a signalized intersection. For any given approach to a signalized intersection, the Pedestrian Level of Service is considered as the worst of the following two levels of service for the specific approach: (1) the level of service determined based on average delay to pedestrians crossing the specific intersection approach as per the Highway Capacity Manual methodology and (2) the level of service determined as per the pedestrian exposure to traffic at signalized intersections scoring technique. The overall intersection Pedestrian Level of Service is determined as the worst Pedestrian Level of Service among the intersection approaches. In evaluating the Pedestrian Level of Service along the road segments and at the signalized intersection within the East

Harbour Station Study Area, the following assumptions were made in estimating the key determining factors (identified in **Table 2-1**):

- The sidewalk width, boulevard width, and corner radius were estimated using aerial street views in Google Maps;
- For any given road segment, the average daily curb lane traffic volume was estimated separately for each direction of travel by assuming that the average traffic volumes of the AM and PM peak hours represent 10% of the average daily traffic volumes in the corresponding direction of travel and that the traffic lanes are equally utilized by motorized vehicles;
- For any given approach to the intersection, the pedestrian green time / effective walk time was calculated as per the formula included in the Addendum to the City of Ottawa's Multi-Modal Level of Service Guidelines (2015) by conservatively assuming that no pedestrian is initiating their crossing during the Flashing Do Not Walk time; and
- For any given road segment within the East Harbour Station Study Area, the vehicular operating speed is assumed to be equal to the corresponding posted speed on the road segment.

As per the City of Toronto's Official Plan (2019), the land use designation within the East Harbour Station Study Area is "General Employment Areas" and "Core Employment Area". As shown in Exhibit 22 in the City of Ottawa's Multi-Modal Level of Service Guidelines, the Pedestrian Level of Service target for these areas is Level of Service 'C'. With the noted Pedestrian Level of Service target, the intersections, individual intersection approaches, and road segments within the East Harbour Station Study Area with Pedestrian Level of Service 'D' or worse are considered to be operating at critical levels.

Table 2-1: Key Determining Factors for Pedestrian Level of Service

Segment Pedestrian Level of Service	Intersection Pedestrian Level of Service
<ul style="list-style-type: none"> ■ Sidewalk width ■ Boulevard width ■ Average daily curb lane traffic volume ■ Average vehicular operating speed ■ Presence of on-street parking 	<ul style="list-style-type: none"> ■ Street width (number of lanes to be crossed) ■ Right- and left-turn conflicts based on signal phasing (e.g., permitted, protected/permitted, protected, and prohibited) and exclusive pedestrian phases (leading pedestrian interval) ■ Right-turn on red restrictions ■ Corner radius and type of right turn channel (e.g., no channel, right-turn channel with receiving lane, and smart right-turn channel) ■ Crosswalk type (e.g., standard transverse marking, textures/coloured crosswalks, and high visibility markings) ■ Cycle Length and pedestrian green time

Source: City of Ottawa's Multi-Modal Level of Service Guidelines (2015)

2.1.2.3 Bicycle Level of Service

The City of Ottawa’s Multi-Modal Level of Service tool assigns a Bicycle Level of Service to both road segments and signalized intersections on a stretch of road, based on the level of traffic stress experienced by cyclists as they travel along the stretch of road. The level of traffic stress of a cycling facility in turn represents the degree of comfort experienced by a cyclist and the targeted category of cyclists (e.g., novice cyclists and experienced cyclists) that are comfortable using the facility. The key determining factors in evaluating the Bicycle Level of Service are dependent on the cycling facility / intersection type as summarized in **Table 2-2**. For any given road segment, the Bicycle Level of Service is considered as the worst of the following two levels of service for the specific road segment: (1) the level of service determined based on the number of lanes and operating speed and (2) the level of service determined based on the cyclist crossing configuration at unsignalized crossings. For any given approach to a signalized intersection, the Bicycle Level of Service is qualitatively assessed based on the cycling facility type and the intersection’s lane configuration. The overall intersection Bicycle Level of Service is determined as the worst Bicycle Level of Service among the intersection approaches.

Table 2-2: Key Determining Factors for Bicycle Level of Service

Segment Bicycle Level of Service	Intersection Bicycle Level of Service
<ul style="list-style-type: none"> ■ Cycling facility type ■ Bike lane width ■ Number of travel lanes ■ Average vehicular operating speed ■ Frequency of bike lane blockages ■ Presence of on-street parking 	<ul style="list-style-type: none"> ■ Right-turn lane characteristics (number of right-turn lanes, length of right-turn lane, turning speed) ■ Left-turn accommodation (presence of bike box, number of left-turn lanes, number of lanes crossed) ■ Average vehicular operating speed

Source: City of Ottawa’s Multi-Modal Level of Service Guidelines (2015)

For the purpose of the Bicycle Level of Service assessment, Eastern Avenue is assumed to be designated as an equivalent to the City of Ottawa’s cycling “local route”. As per the City of Ottawa’s Official Plan, a cycling “local route” is described as a route that will typically be used at the neighbourhood level, providing access from residential streets and shopping areas to the more major spine and bikeway routes that will allow travel for longer distances through the city. As shown in Exhibit 22 in the City of Ottawa’s Multi-Modal Level of Service Guidelines, the Bicycle Level of Service target for an arterial road designated as a cycling “local route” in an employment area is recommended to be Level of Service ‘C’.

Given the above, the Bicycle Level of Service target for the mixed traffic network within the East Harbour Station Study Area is set at Level of Service 'C'. With the noted minimum desirable Bicycle Level of Service, the intersections, individual approaches, and road segments within the East Harbour Station Study Area with Bicycle Level of Service 'D' or worse are considered to be operating at critical levels.

2.1.2.4 Transit Level of Service

The City of Ottawa's Multi-Modal Level of Service tool assigns a Transit Level of Service to both road segments and signalized intersections along a stretch of road based on the relative attractiveness of transit facilities and services as compared to other modes of travel and especially autos. The relative attractiveness, for the purposes of Transit Level of Service, is evaluated based on transit travel time and level of transit priority given to transit vehicles based on varying facility types and conditions. The key determining factors in evaluating Transit Level of Service are presented in **Table 2-3**. As per the City of Ottawa's Multi-Modal Level of Service Guidelines, the Transit Level of Service for each approach to an intersection is evaluated separately. For any given approach to a signalized intersection, the Transit Level of Service is evaluated based on the average vehicular delay of each intersection approach, obtained from the traffic modelling output through Synchro. The overall intersection Transit Level of Service is considered to be the worst Transit Level of Service among all the intersection approaches on which buses are travelling. In evaluating the Transit Level of Service along the road segments and at the signalized intersections within the East Harbour Station Study Area, the following assumption was made in estimating the key determining factors (identified in **Table 2-3**):

- Average delay at a signalized intersection for transit vehicles is considered to be equal to the average vehicular delay obtained as one of the outputs of the Synchro modelling analysis. This indicates that the impact of transit signal priority measures is not factored into the assessment of Transit Level of Service at the intersection level.

Table 2-3: Key Determining Factors for Transit Level of Service

Segment Transit Level of Service	Intersection Transit Level of Service
<ul style="list-style-type: none"> ■ Facility Type (e.g., Mixed Traffic, Bus Lane, and Segregated Right-of-Way) ■ Ratio of average transit speed to posted speed 	<ul style="list-style-type: none"> ■ Average Signal Delay

Source: City of Ottawa's Multi-Modal Level of Service Guidelines (2015)

None of the road segments within the East Harbour Station Study Area are designated as a transit priority corridor. Accordingly, the studied streets are considered to have some isolated transit priority measures (e.g., transit signal priority, exclusive bus/streetcar lanes) or no transit priority measures at all, and for the purposes of identifying a level of service target, are considered as “Transit Priority with Isolated Measures”. As shown in Exhibit 22 in the City of Ottawa’s Multi-Modal Level of Service Guidelines, the Transit Level of Service target for any road designated as “Transit Priority with Isolated Measures” is recommended to be Level of Service ‘D’. With the noted minimum desirable Transit Level of Service, the intersections, individual approaches, and road segments within the East Harbour Station Study Area with Transit Level of Service ‘E’ or worse are considered to be operating at critical levels.

2.2 Impact Assessment

The early works impact assessment and development of mitigation measures and monitoring activities considered the following:

- East Harbour Station early works components as described in **Section 1.3.1**;
- The East Harbour Station Early Works Project Footprint and East Harbour Station Study Area as described in **Section 1.3.2**;
- East Harbour Station construction activities as described in **Section 1.3.3**; and,
- Local environmental conditions within the East Harbour Station Study Area as described in **Section 3**.

Mitigation measures and monitoring activities have been recommended for each of the transportation and transit network components within the East Harbour Station Study Area. The results of the impact assessment are provided in **Section 4**.

A quantitative impact assessment was not completed at this stage as the detailed construction staging schemes that describe the potential modifications to the existing transportation network were not available. Quantitative impact assessment will be completed, if required, as planning progresses and this information becomes available. The quantitative impact assessment may include larger study area. Prior to construction, Transit and Traffic Management Plan(s) shall be developed to provide more specific mitigation measures and monitoring activities. Transit and Traffic Management Plan(s) will outline the potential haul routes, staging and laydown areas, construction access, and road closures and potential detour routes.

3. Local Environmental Conditions

3.1 Transportation Network

3.1.1 Road Network and Intersection Operations

3.1.1.1 Road Network

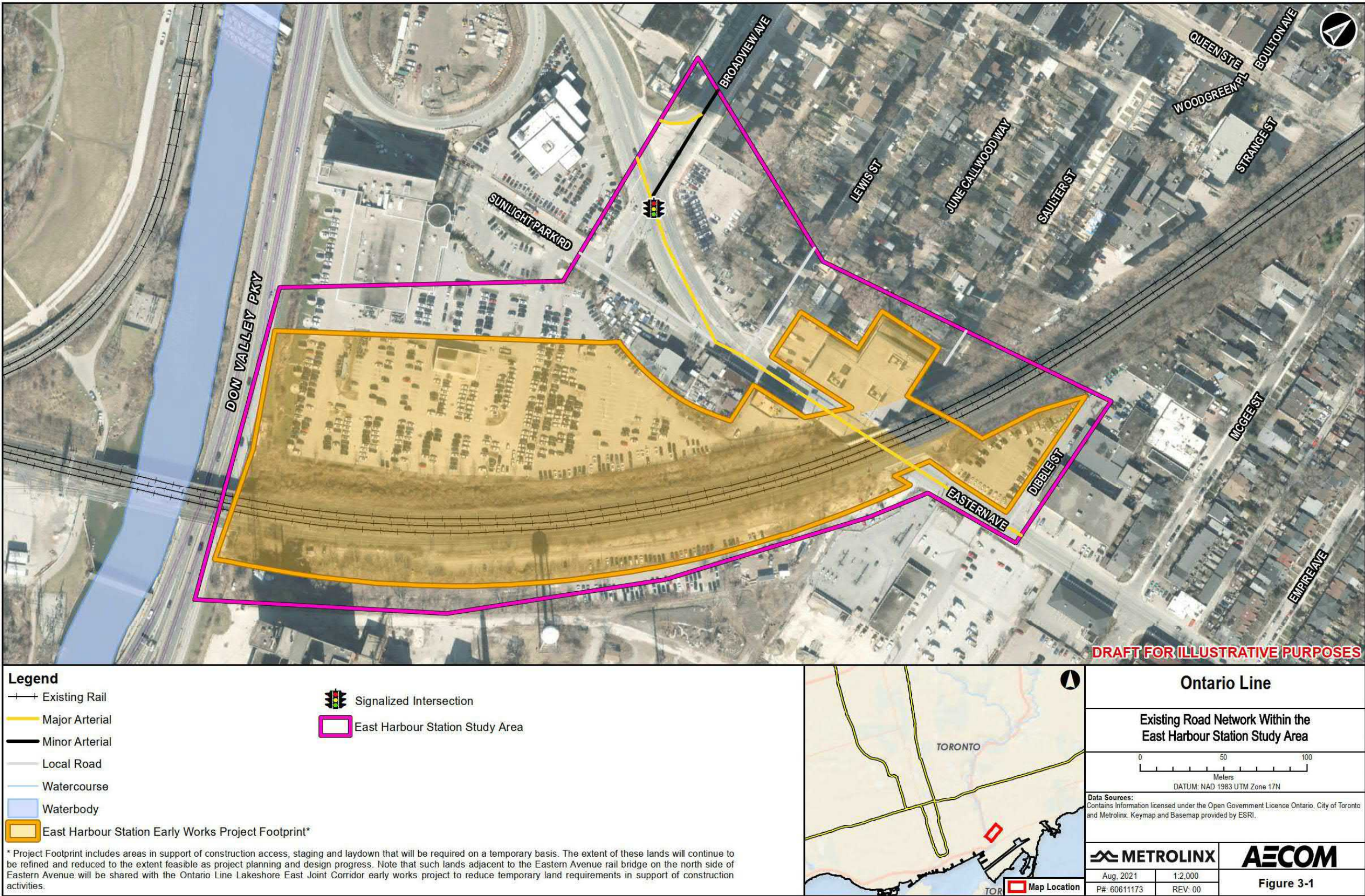
An overview of the roads located within the East Harbour Station Study Area is described below. All the described roads are under the jurisdiction of the City of Toronto and are classified according to the City of Toronto's Road Classification System Update (City of Toronto, 2018). As part of the City of Toronto's Vision Zero strategy, the City has been implementing speed reductions for several streets within the City (City of Toronto, 2020). Posted speed reductions that have already been implemented on the roads located within the East Harbour Station Study Area, if any, are reflected in the description below. **Figure 3-1** presents the existing road network, road classification, and the traffic control devices of the intersections within the East Harbour Station Study Area.

Eastern Avenue is a major east-west arterial road with a four-lane cross-section. Within the East Harbour Station Study Area, Eastern Avenue has a posted speed of 50 kilometres per hour west of Broadview Avenue which becomes 30 kilometres per hour immediately downstream. On-street parking is prohibited on both sides of the street.

Broadview Avenue is a minor north-south arterial road with a four-lane cross-section. It has a posted speed of 30 kilometres per hour between Sunlight Park Road and Eastern Avenue, and 40 kilometres per hour north of Eastern Avenue. On-street parking is prohibited south of Eastern Avenue and prohibited north of Eastern Avenue on the east side between 3 AM and 7 AM, except to permit holders, and in the afternoon peak period (4:00 PM to 6:00 PM). On the west side of the street north of Eastern Avenue, parking is prohibited between 3 AM and 7 AM, except to permit holders, and in the morning peak period (7:00 AM to 9:00 AM).

Lewis Street is a one-way local street with a two-lane cross-section. It has a posted speed of 30 kilometres per hour and on-street parking is permitted for a maximum of one hour on the east side of the road from 8:00 AM to 6:00 PM during the weekdays of the period extending from December 1st of one year to March 31st of the following year and from 8:00 AM to 6:00 PM from Monday to Saturday of the period extending from the first day to the fifteenth (15th) day of the remaining months of the year. On-street parking is shifted to the west side of the street during the period extending from the sixteenth (16th) day to the last day of each month from April 1st to November 30th.

Figure 3-1: Existing Road Network Within the East Harbour Station Study Area



Sunlight Park Road is an east-west local road with a two-lane cross-section. It has a posted speed of 30 kilometres per hour and on-street parking is permitted only on the south side of the road between the BMW dealership entrance and Broadview Avenue.

Dibble Street is a north-south local road with a two-lane cross-section. It provides access to businesses located immediately east of the rail bridge and north of Eastern Avenue. Dibble Street has a posted speed of 30 kilometres per hour and on-street parking is permitted on both sides of the road.

3.1.1.2 Intersection Operations

The analysis findings on traffic operations at the intersection of Eastern Avenue and Broadview Avenue in the Existing Conditions (2020) are summarized in **Table 3-1**. The detailed Highway Capacity Manual (Transportation Research Board, 2000) reports from Synchro pertaining to the existing conditions analysis are presented in **Appendix E**.

As shown in **Table 3-1**, the intersection of Eastern Avenue and Broadview Avenue operates within capacity at acceptable level of service 'B' in the AM peak hour and excellent level of service 'A' in the PM peak hour. In addition, all individual movements at the studied intersection operate at acceptable level of service 'D' or better.

3.1.2 Pedestrian Network and Operations

3.1.2.1 Pedestrian Network

Within the East Harbour Station Study Area, pedestrians are accommodated through sidewalks that are present on the following streets:

- Eastern Avenue;
- Broadview Avenue;
- Lewis Street;
- Sunlight Park Road; and,
- Dibble Street.

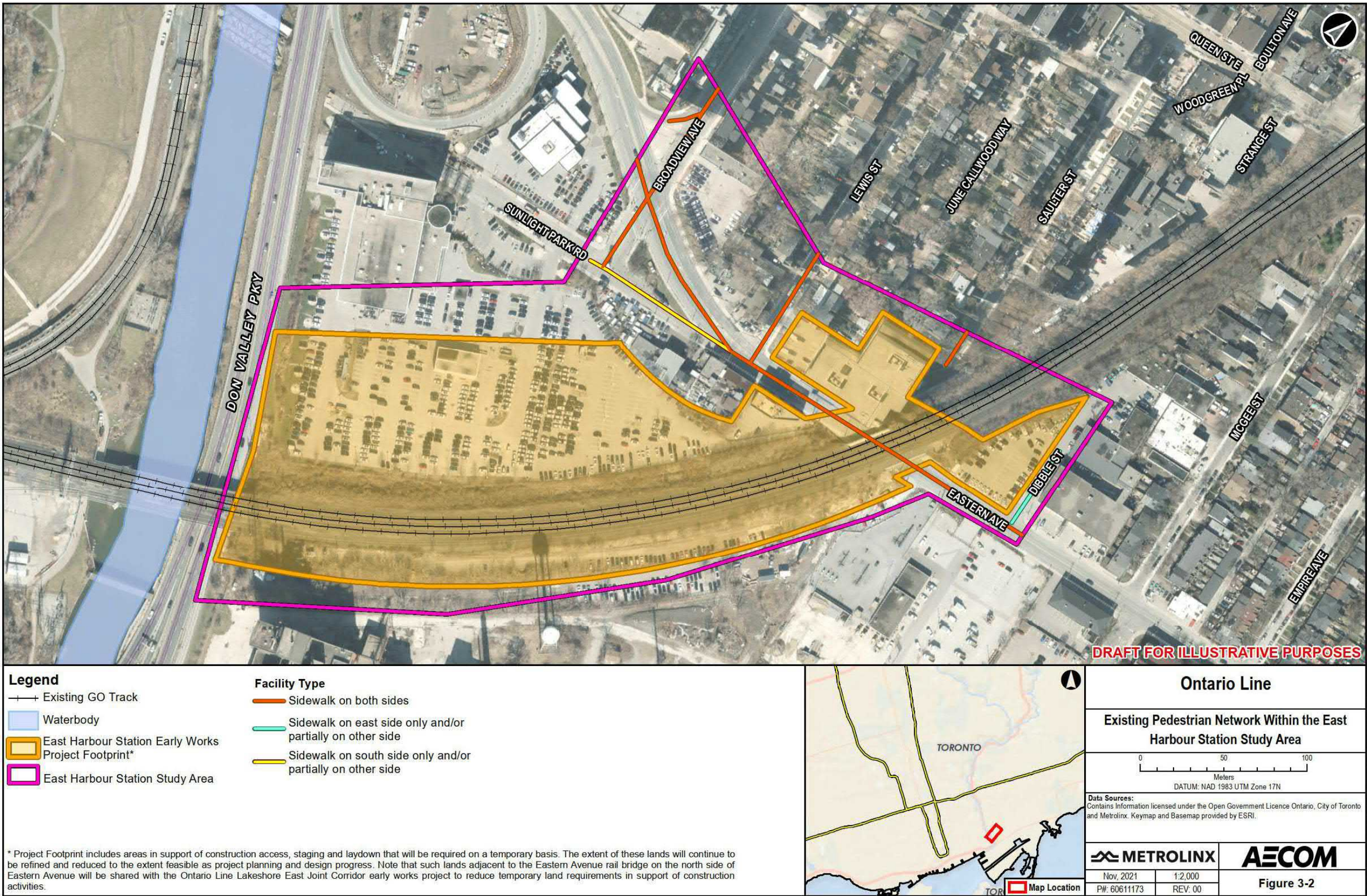
In addition, painted crosswalks are provided across all legs of the signalized intersection of Eastern Avenue and Broadview Avenue located within the East Harbour Station Study Area. **Figure 3-2** illustrate the location and type of pedestrian facilities provided within the East Harbour Station Study Area.

Table 3-1: Traffic Operations at the East Harbour Station Study Area Intersection under Existing Conditions (2020) during the AM and PM Peak Hours

Synchro ID: Intersection	Movement	AM Peak Hour Volume to capacity Ratio	AM Peak Hour Delay (sec)	AM Peak Hour Level of service	AM Peak Hour 95th Percentile Queue (metres)	PM Peak Hour Volume to capacity Ratio	PM Peak Hour Delay (sec)	PM Peak Hour Level of service	PM Peak Hour 95th Percentile Queue (metres)
325: Eastern Avenue and Broadview Avenue (Signalized)	EBL	0.46	11.0	B	26.8	0.70	12.9	B	#99.6
325: Eastern Avenue and Broadview Avenue (Signalized)	EBTR	0.26	4.7	A	29.8	0.43	4.5	A	49.5
325: Eastern Avenue and Broadview Avenue (Signalized)	WBL	0.05	4.0	A	4.5	0.03	2.9	A	1.8
325: Eastern Avenue and Broadview Avenue (Signalized)	WBTR	0.49	6.3	A	67.5	0.26	3.6	A	25.0
325: Eastern Avenue and Broadview Avenue (Signalized)	NBLTR	0.14	34.3	C	8.2	0.30	38.4	D	13.6
325: Eastern Avenue and Broadview Avenue (Signalized)	SBLT	0.36	35.9	D	16.2	0.38	39.0	D	14.2
325: Eastern Avenue and Broadview Avenue (Signalized)	SBR	0.46	37.2	D	30.9	0.04	36.9	D	11.1
325: Eastern Avenue and Broadview Avenue (Signalized)	Overall	0.48	10.1	B	-	0.66	8.8	A	-

Note: #: 95th percentile cycle volume exceeds capacity, queue may be longer

Figure 3-2: Existing Pedestrian Network Within the East Harbour Station Study Area



3.1.2.2 Pedestrian Operations

The findings of the Pedestrian Level of Service analysis at the intersection of Eastern Avenue and Broadview Avenue and the studied segment of Eastern Avenue within the East Harbour Station Study Area in the Existing Conditions (2020) are summarized in **Table 3-2** and **Table 3-3**, respectively, and illustrated in **Figure 3-3**. The detailed Pedestrian Level of Service analysis results at the individual intersection approach level under the Existing Conditions (2020) are presented in **Appendix F**.

As shown in **Table 3-2**, pedestrians experience critical Pedestrian Level of Service ‘F’ at the intersection of Eastern Avenue and Broadview Avenue. This is mainly attributed to the long average delays/waiting times that pedestrians experience before they receive Walk Time and start crossing Eastern Avenue. In addition, as they start crossing Eastern Avenue, they experience significant “exposure to traffic” due to the wide crossing distances across the east and west legs (i.e., number of lanes to be crossed, the potential conflicts with left-turning and right-turning vehicular traffic, and the absence of right-turn-on-red restrictions or pedestrian signal leading intervals).

Table 3-2: Pedestrian Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)

Signalized Intersection	Pedestrian Level of Service
Eastern Avenue and Broadview Avenue	F

Note: The studied intersection is highlighted in grey as it operates below the Pedestrian Level of Service target ‘C’.

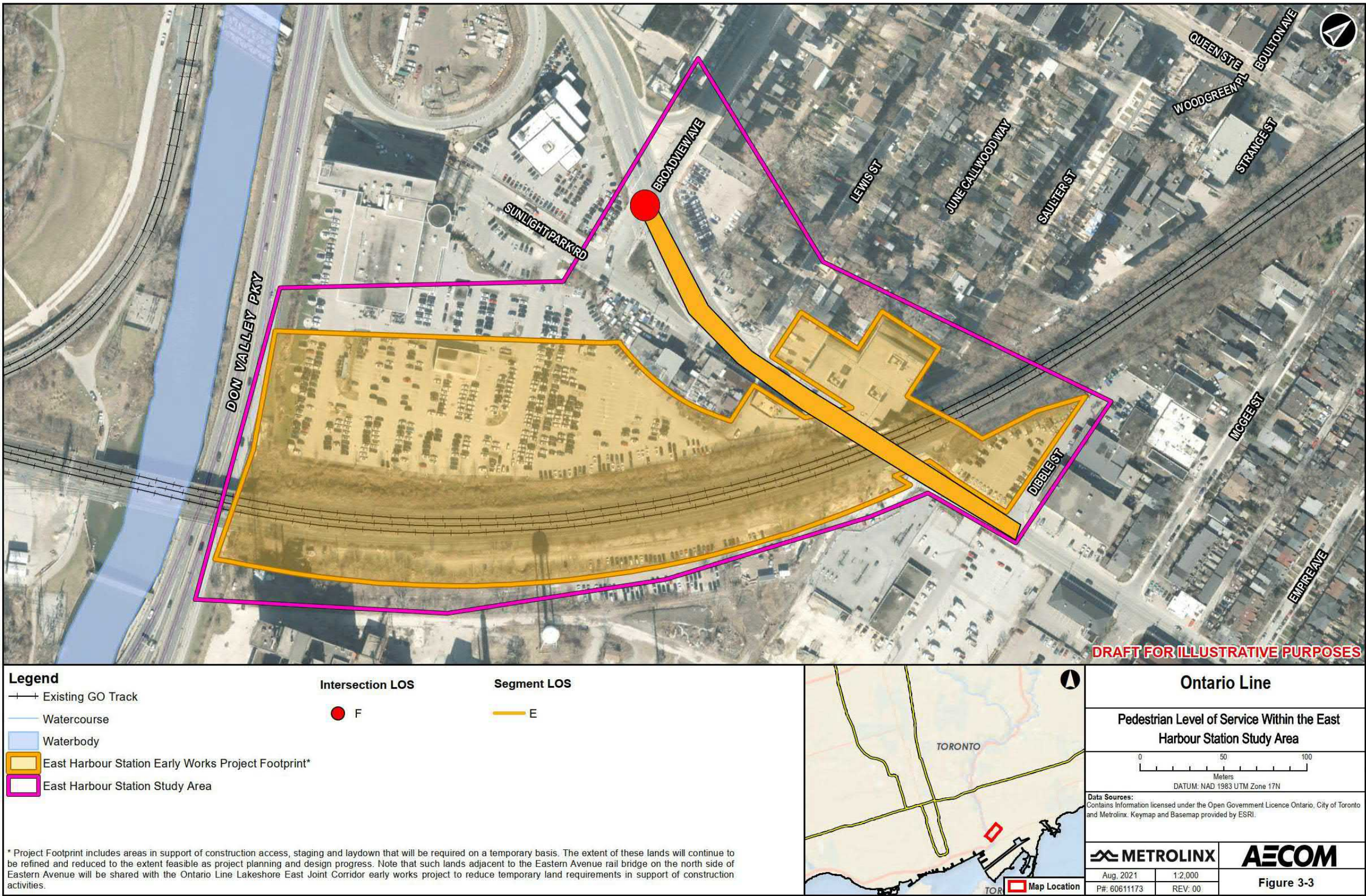
As shown in **Table 3-3**, the pedestrian facilities along the studied section of Broadview Avenue operate at critical Pedestrian Level of Service ‘E’. This is mainly attributed to the narrow sidewalks along the noted section.

Table 3-3: Pedestrian Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)

Road Segment	Pedestrian Level of Service
Eastern Avenue between Broadview Avenue and Dibble Street	E

Note: The studied road segment is highlighted in grey as it operates below the Pedestrian Level of Service target ‘C’.

Figure 3-3: Pedestrian Level of Service Within the East Harbour Station Study Area



3.1.3 Cycling Network and Operations

3.1.3.1 Cycling Network

There are no cycling facilities within the East Harbour Station Study Area, so cyclists share the roads with other modes of travel.

3.1.3.2 Cycling Operations

The findings of the Bicycle Level of Service analysis at the intersection of Eastern Avenue and Broadview Avenue and the studied segment of Eastern Avenue under Existing Conditions (2020) are summarized in **Table 3-4** and **Table 3-5**, respectively, and illustrated in **Figure 3-4**. The detailed Bicycle Level of Service analysis results for the Existing Conditions (2020) are presented in **Appendix F**.

As shown in **Table 3-4**, cyclists experience critical Bicycle Level of Service 'D' at the intersection of Eastern Avenue and Broadview Avenue. This is mainly attributed to the lack of designated cycling facilities on all the individual approaches to the studied intersection (e.g., bicycle left-turn box, pocket bike lanes, cross-rides, etc.) which requires a left-turning cyclist in mixed traffic to either dismount their bicycle and walk across two perpendicular intersection legs as a pedestrian or weave through and cross general-purpose traffic lanes(s) before making a left turn.

Table 3-4: Bicycle Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)

Signalized Intersection	Bicycle Level of Service
Eastern Avenue and Broadview Avenue	D

Note: The studied road segment is highlighted in grey as it operates below the Cyclist Level of Service target 'C'.

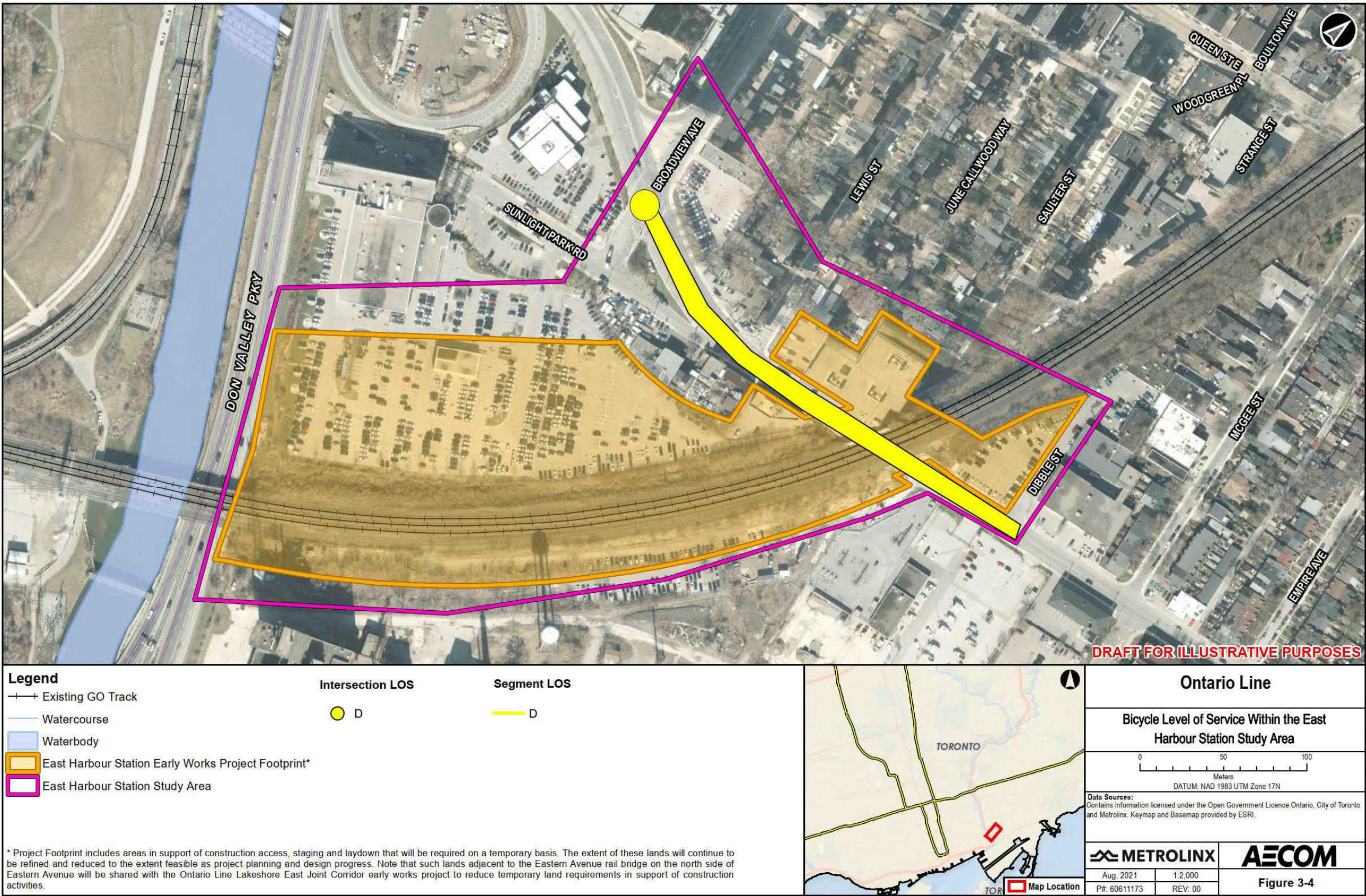
As shown in **Table 3-5**, cyclists experience critical Bicycle Level of Service 'D' along the studied segment of Broadview Avenue as cyclists travel on a total of four (two in each direction) mixed traffic lanes.

Table 3-5: Bicycle Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)

Road Segment	Bicycle Level of Service
Eastern Avenue between Broadview Avenue and Dibble Street	D

Note: The studied road segment is highlighted in grey as it operates below the Cyclist Level of Service target 'C'.

Figure 3-4: Bicycle Level of Service Within the East Harbour Station Study Area



3.1.4 Rail Network

There are multiple existing rail tracks within the East Harbour Station Study Area. These rail tracks are owned by Metrolinx and currently service the following commuter train lines:

- Lakeshore East and Stouffville GO lines; and
- VIA Rail Toronto-Ottawa and Toronto-Montreal lines.

The identified commuter train routes are further described in **Section 3.2**. Canadian National Railway and Canadian Pacific Railway freight trains also operate on these rail tracks.

3.2 Transit Network and Operations

3.2.1 Transit Network

The existing transit routes that operate within the East Harbour Station Study Area are summarized in **Table 3-6** and illustrated in **Figure 3-5**. All transit routes described in **Table 3-6** are operated by the Toronto Transit Commission, with the exception of the Lakeshore East and Stouffville GO lines operated by Metrolinx and the Toronto-Ottawa and Toronto-Montreal lines operated by VIA Rail.

The service headways provided in **Table 3-6** represent the hours of peak transit service within the AM peak period (6:00 AM to 9:00 AM) and PM peak period (4:00 PM to 7:00 PM). Off-peak transit services are generally less frequent than AM and PM peak period services; therefore, only AM and PM peak period service headways are provided in **Table 3-6** to represent the maximum transit service that could be impacted by construction to form the transit impact assessment.

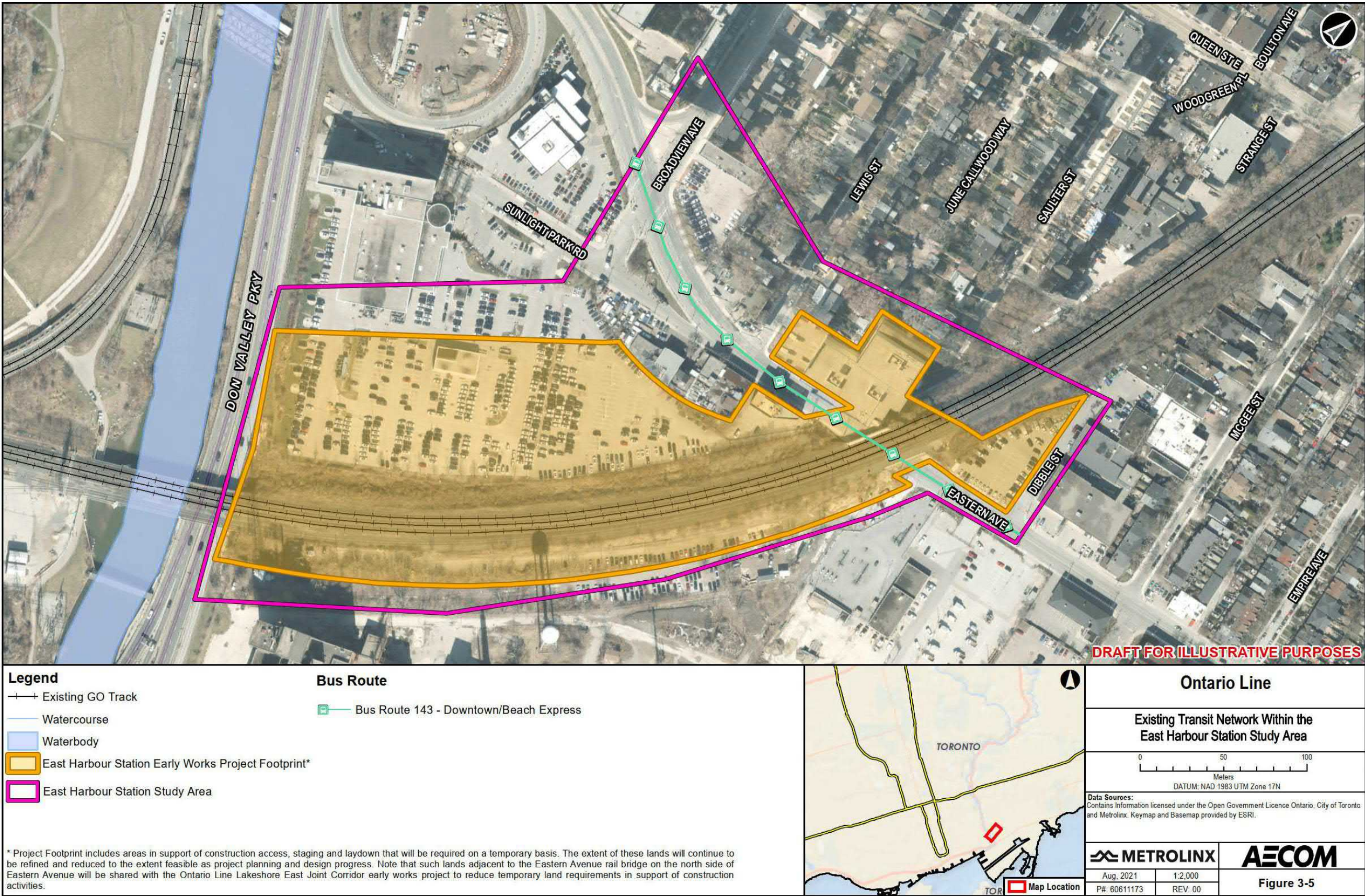
Table 3-6: Existing Transit Routes Within the East Harbour Station Study Area

Route Number – Name and Description	Service Headway during Peak Periods
Lakeshore East GO line operates between Union Station in Toronto and Oshawa GO Station in Oshawa, generally in an east-west direction. The train service operates seven days a week between 5 AM and 2 AM. The line does not have any designated stops at the rail tracks section within the East Harbour Station Study Area, but the eastbound and westbound trains pass through the noted rail tracks section shortly after each scheduled departure from Union Station and shortly before each scheduled arrival at Union Station.	15-minute for the peak direction (i.e., westbound in the AM peak hour and eastbound in the PM peak hour) 30-minute for the non-peak direction

Route Number – Name and Description	Service Headway during Peak Periods
<p>Stouffville GO line operates between Union Station in Toronto and Lincolnville GO Station in Whitchurch-Stouffville, generally in a north-south direction. The train service operates seven days a week between 9 AM and 7 PM. A bus service complements the train service by operating from 5 AM to 9 AM and from 7 PM to 2 AM. The Line does not have any designated stops at the rail tracks section within the East Harbour Station Study Area, but the eastbound and westbound trains pass through the noted rail tracks section shortly after each scheduled departure from Union Station and shortly before each scheduled arrival at Union Station.</p>	<p>30-minute for the peak direction (i.e., southbound in the AM peak hour and northbound in the PM peak hour)</p> <p>60-minute for the non-peak direction</p>
<p>Toronto-Ottawa VIA Rail line operates between Union Station in Toronto and Ottawa Station in Ottawa, generally in an east-west direction. The train service operates seven days a week. The line does not have any designated stops at the rail tracks section within the East Harbour Station Study Area, but the eastbound and westbound trains pass through the noted rail tracks section shortly after each scheduled departure from Union Station and shortly before each scheduled arrival at Union Station.</p>	<p>60-minute for the peak direction (i.e., westbound in the AM and PM peak periods and eastbound in the PM peak period)</p> <p>180-minute for the non-peak direction</p>
<p>Toronto-Montreal VIA Rail line operates between Union Station in Toronto and Gare Centrale in Montreal, generally in an east-west direction. The train service operates seven days a week. The line does not have any designated stops at the rail tracks section within the East Harbour Station Study Area, but the eastbound and westbound trains pass through the noted rail tracks section shortly after each scheduled departure from Union Station and shortly before each scheduled arrival at Union Station.</p>	<p>60-minute for the peak direction (i.e., westbound in the AM and PM peak periods and eastbound in the PM peak period)</p> <p>180-minute for the non-peak direction</p>
<p>#143 – Downtown / Beach Express bus route operates between the intersection of Charlotte Street and King Street and the Neville Park Loop, generally in an east-west direction. Within the East Harbour Station Study Area, the bus route operates along Eastern Avenue. The closest eastbound and westbound stops to the East Harbour Station Project Footprint are located nearside at the intersection of Eastern Avenue and Carlaw Avenue.</p>	<p>15-minute in the AM peak hour</p> <p>25-minute in the PM peak hour</p>

Sources: GO Transit, 2020; VIA Rail, 2020; and Toronto Transit Commission, 2019. Accessed in July 2021.

Figure 3-5: Existing Transit Network Within the East Harbour Station Study Area



3.2.2 Transit Operations

The findings of the Transit Level of Service analysis at the intersection of Eastern Avenue and Broadview Avenue and the studied segment of Eastern Avenue under Existing Conditions (2020) are summarized in **Table 3-7** and **Table 3-8**, respectively, and illustrated in **Figure 3-6**. The detailed Transit Level of Service analysis results are presented in **Appendix F**.

As shown in **Table 3-7**, the intersection of Eastern Avenue and Broadview Avenue operates at acceptable Transit Level of Service 'B' as buses along route #143 – Downtown / Beach Express experience minimal delay when travelling through the noted intersection during both the AM and PM peak hours.

Table 3-7: Transit Level of Service at the East Harbour Station Study Area Intersection under Existing Conditions (2020)

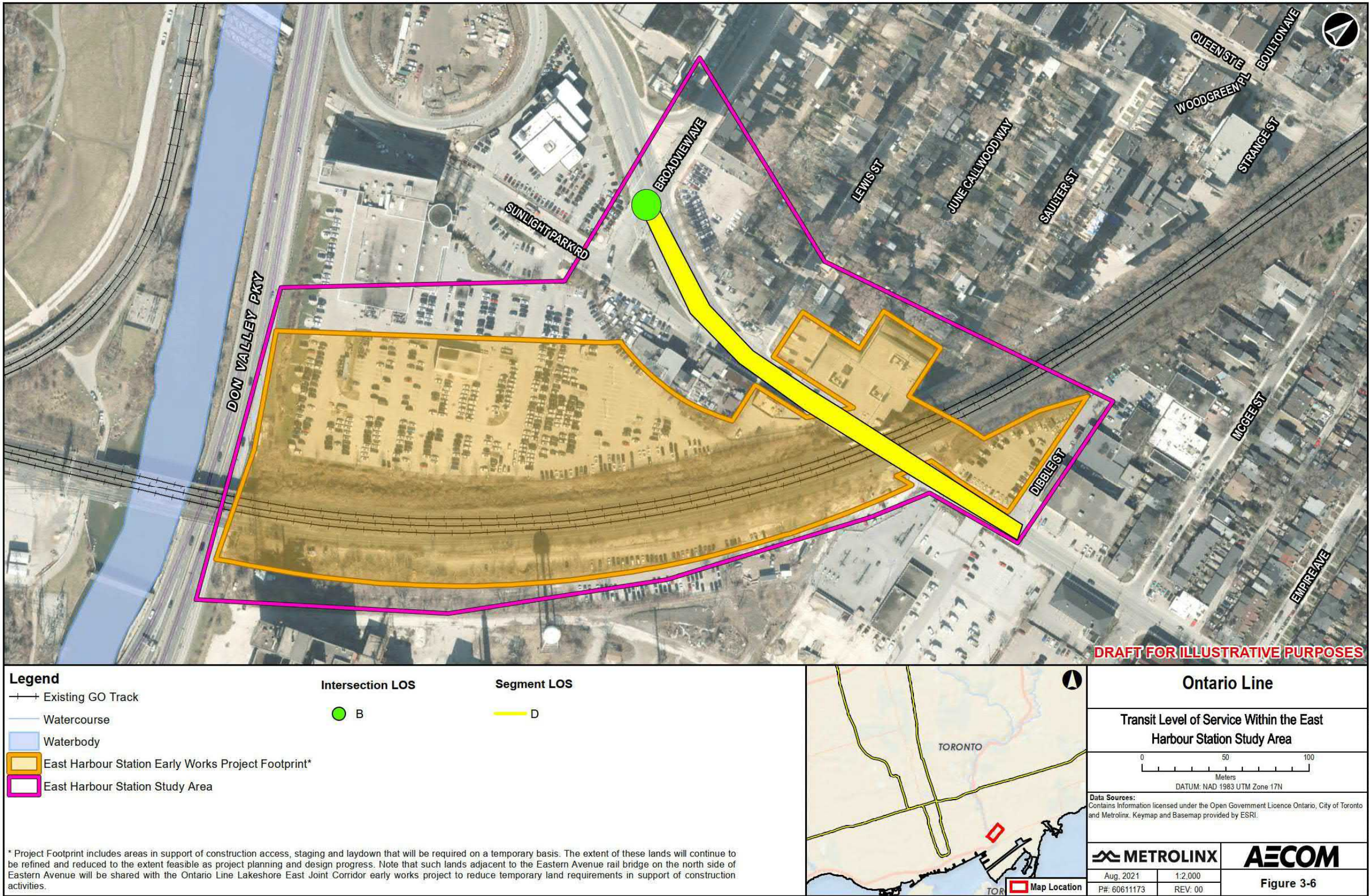
Signalized Intersection	Transit Level of Service
Eastern Avenue and Broadview Avenue	B

As shown in **Table 3-8**, all transit vehicles travelling along the studied segment of Broadview Avenue experience an acceptable Transit Level of Service 'D', meeting the minimum desirable Transit Level of Service for the studied sections.

Table 3-8: Transit Level of Service at the East Harbour Station Study Area Road Segment under Existing Conditions (2020)

Road Segment	Transit Level of Service
Eastern Avenue between Broadview Avenue and Dibble Street	D

Figure 3-6: Transit Level of Service Within the East Harbour Station Study Area



4. Potential Impacts, Mitigation Measures and Monitoring Activities

In accordance with Sections 8(2)6, 8(2)7 and 8(2)8 of Ontario Regulation 341/20: Ontario Line Project, this section describes the potential impacts, mitigation measures, and monitoring activities to verify the effectiveness of mitigation measures associated with the East Harbour Station early works.

Potential impacts to traffic and transportation operations as a result of the East Harbour Station early works have been assessed and are presented in **Table 4-1**, in addition to mitigation measures and monitoring activities.

The East Harbour Station early works may require temporary lane restrictions on Eastern Avenue and Broadview Avenue, which may result in impediment of the traffic flow and increased average vehicular delay of motorists and Toronto Transit Commission Bus #143 travelling in the East Harbour Station Study Area. The extent of such implications will depend on the level of encroachment into the right-of-way of the noted roads.

It is expected that construction vehicles will be travelling within the East Harbour Station Study Area, considering the extent of demolition, excavation and grading, and construction activities required. Depending on the available haul routes, the addition of these construction vehicles to the road network may impact traffic operations resulting in increased vehicular delays and queue lengths, especially at intersections where construction traffic is required to make left-turning movements. Construction vehicles are expected to be accommodated at off-road launch sites, and therefore it is not anticipated that these vehicles will occupy curb lanes of roads within the East Harbour Station Study Area.

Eastbound traffic along Eastern Avenue might have sightline deficiencies near construction egress locations due to the curvature of Eastern Avenue upstream of the rail bridge.

Other planned projects (e.g., capital projects and local developments) nearby with construction timelines that potentially overlap with the East Harbour Station early works may result in impacts to the transportation network and its road users within the East Harbour Station Study Area.

The East Harbour Station early works may require temporary realignment of sidewalks along Eastern Avenue, Lewis Street, Broadview Avenue, Sunlight Park Road, and Dibble Street, which would result in increased pedestrian walking distances and times and therefore compromised convenience. Increased traffic along the noted roads and other adjacent roads as a result of the potential lane closures could increase pedestrians' exposure to vehicular traffic.

The East Harbour Station early works may require partial or full closure of the existing rail tracks. The extent of track closure is dependent on the type of equipment used and the installation process applied. If partial or full closures are implemented, the operations of the existing commuter (i.e., Lakeshore East GO Line, Stouffville GO Line, Toronto-Ottawa VIA Rail line, and Toronto-Montreal VIA Rail line) and freight rail corridors may be temporarily disrupted.

Table 4-1 provides mitigation measures and monitoring activities to be implemented for potential impacts that may result from the East Harbour Station early works.

Table 4-1: Potential Impacts, Mitigation Measures and Monitoring Activities for the East Harbour Station Early Works

Environmental Component	Potential Impacts	Mitigation Measure(s)	Monitoring Activities
Transportation Network – Roads	<ul style="list-style-type: none">■ If required, temporary lane closures along Eastern Avenue and Broadview Avenue may result in impeding traffic flow and increased average delay of vehicles, including emergency vehicles.■ Construction vehicle traffic may impact traffic operations resulting in increased vehicular delays and queue lengths, especially at intersections where construction traffic is required to make left-turning movements.■ Potential overlapping construction timelines with other planned projects (e.g., capital projects and local developments) nearby may result in impacts to the transportation network and its road users.■ Potential sightline deficiencies might develop near construction egress locations for the eastbound traffic along Eastern Avenue due to the road’s curvature upstream of the rail bridge.	<ul style="list-style-type: none">■ A quantitative traffic impact assessment will be completed, as project planning progresses to consider vehicular traffic impacts as a result of the East Harbour Station early works.■ Develop and implement a transit and traffic management plan(s), which could include temporary changes to intersection lane configurations, traffic signal timing optimization, modifications to existing signal timing plans, etc. The transit and traffic management plan(s) will also address specific emergency services requirements in consultation with the City of Toronto.■ Traffic signal timing optimization may be assessed/implemented to increase capacity of affected intersections and to aid in the movement of traffic. Traffic signal timing adjustments would require coordination between Metrolinx and City of Toronto, and will be undertaken if required, to determine appropriate changes to traffic signal timings.■ Consider scheduling construction activities during off-peak periods and weekends to minimize disruptions to road users during the critical peak periods.■ Co-ordinate with the City of Toronto regarding other ongoing construction projects when scheduling the early works activities to maintain the mobility of road users.■ Implement flagging at locations with potential sightline deficiencies to ensure general traffic are aware of the construction vehicles operation within the construction area.	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period and adjustments will be made based on actual field observations, as needed.
Transportation Network – Active Transportation	<ul style="list-style-type: none">■ Potential traffic congestion along the East Harbour Station Study Area roads, as a result of the increase in heavy vehicle traffic, could increase pedestrians’ and cyclists’ exposure to traffic.■ If required, temporary realignment of the existing sidewalks along some of the East Harbour Station Study Area roads (i.e., Eastern Avenue, Lewis Street, Broadview Avenue, Sunlight Park Road, and Dibble Street) may increase walking distances and impact the convenience of pedestrians.	<ul style="list-style-type: none">■ Reduce interference with pedestrians and cyclists. This may include fencing, hoarding (minimum 2 meters high, solid, and secured), shared-lane markings, signals, wayfinding signs, and lighting as required to provide pedestrians and cyclists with safe, accessible, and continuous routes.■ If required, co-ordinate with the City of Toronto to ensure any modifications to pedestrian crossing distances at signalized intersections are reflected in revised pedestrian clearance timings.■ Any temporary pedestrian facilities including temporary or relocated Toronto Transit Commission transit stops will be designed to meet Toronto Transit Commission accessibility standards.■ Implement flagging where construction vehicles are present to ensure construction vehicle operators are aware of pedestrian and vehicular traffic within the construction area.	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period and adjustments will be made based on actual field observations, as needed.
Transportation Network – Rail	<ul style="list-style-type: none">■ Early works construction may require temporary full or partial closure of existing rail tracks, which may disrupt existing commuter and freight rail operations.	<ul style="list-style-type: none">■ Consult with rail operators with current service along the rail corridor (i.e., VIA Rail, Canadian National Railway, and Canadian Pacific Railway) to assess how track closures would impact their service and co-ordinate temporary schedules to accommodate all rail services on the open tracks.	<ul style="list-style-type: none">■ The effectiveness of the transit and traffic management plan(s) will be monitored throughout the construction period. Adjustments to the construction staging plans and transit and traffic management plan(s) will be made based on actual field observations, as needed.
Transit Network	<ul style="list-style-type: none">■ Potential increase of construction vehicles traffic could result in travel time delays to existing surface transit routes (i.e., Toronto Transit Commission bus route #143 Downtown / Beach Express) that travel within the East Harbour Station Study Area.■ Potential temporary lane restrictions on Eastern Avenue and Broadview Avenue could result in travel time delays to Toronto Transit Commission bus #143 Downtown / Beach Express travelling within the East Harbour Station Study Area.	<ul style="list-style-type: none">■ Co-ordinate with the Toronto Transit Commission and notify transit users regarding travel delays to the bus services in advance, if required.■ Consider scheduling some construction activities during off-peak periods and weekends to minimize delays to bus services during the critical peak periods.	<ul style="list-style-type: none">■ Transit services will be monitored through actual field observations throughout the construction period and additional mitigation measures will be considered, as needed.

5. Permits and Approvals

No federal or provincial permits and approvals related to traffic and transportation are required for the East Harbour Station early works.

Metrolinx will co-ordinate with the City of Toronto for transportation-related permits and approvals (e.g., street occupation permit) prior to construction, as required.

6. References

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Appendix A

Turning Movement Counts


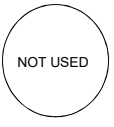
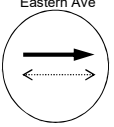
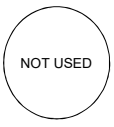
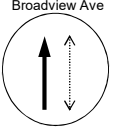
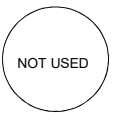
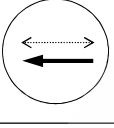
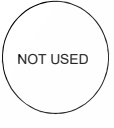
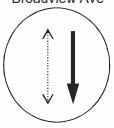
Survey Date: 2020-01-14

Source: <https://open.toronto.ca/dataset/traffic-volumes-at-intersections-for-all-modes/>

Intersection	Time Period	Start Time	End Time	Vehicle Type	Westbound				Total	Northbound				Total	Eastbound				Total	Southbound				Total	Pedestrians				Bikes			
					Exit	L	T	R		Exit	L	T	R		Exit	L	T	R		Exit	L	T	R		Exit	L	T	R	North	South	East	West
eastern Al boulevard	AM	7:30 AM	8:30 AM	Car	1206	25	1027	56	1108	172	38	7	0	45	600	109	522	67	698	104	78	12	141	231	9	2	0	0	1	0	0	0
				Truck	47	2	45	12	59	17	1	0	0	1	38	5	22	1	28	3	16	0	1	17								
				Bus	9	0	9	1	10	3	0	0	0	0	13	2	11	0	13	0	2	0	0	2								
				Total	1262	27	1081	69		192	39	7	0		651	116	555	68		107	96	12	142									
	PM	4:30 PM	5:30 PM	Car	662	10	565	104	679	528	30	50	1	81	1137	374	1069	41	1484	58	67	7	67	141	16	3	0	19	0	0	1	0
				Truck	8	0	8	0	8	3	0	2	1	3	31	1	17	0	18	0	13	0	0	13								
				Bus	3	0	3	0	3	1	0	0	0	0	2	1	2	0	3	0	0	0	0	0								
				Total	673	10	576	104		532	30	52	2		1170	376	1088	41		58	80	7	67									

Appendix B

Signal Timing Plans

LOCATION: Eastern Ave & Broadview Ave MODE/COMMENT: SA2-VMG with PR TCS: 817 PREPARED BY/ DATE: CIMA+/February 3, 2020 CHECKED BY/ DATE: Ameneh Dialameh / February 14, 2020 IMPLEMENTATION DATE: March 3, 2020		DISTRICT: Toronto & East York COMPUTER SYSTEM: TransSuite CONTROLLER/CABINET TYPE: Peek ATC-1000 / TS2 T1 CONFLICT FLASH: Red & Red DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s) CHANNEL/DROP: 4013/8 CONTROLLER FIRMWARE: 3.018.1.2976							
NEMA Phase		OFF	AM	PM	NIGHT	WKND	DVP	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	06:30-09:30 M-F	15:00-19:00 M-F	23:00-06:30 Daily	10:00-19:00 Sat & Sun	TBD		
	Local Plan Split Table	Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4	Pattern 5 Split 5	Pattern 16 Split 16		
1		WLK FDW MIN MAX1 AMB ALR SPLIT							Pedestrian Minimums: EWWK = 7 sec, EWFD = 15 sec NSWK = 7 sec, NSFD = 22 sec
2	Eastern Ave 	WLK 7 FDW 15 MIN 22 MAX1 39 AMB 3.3 ALR 3.2 SPLIT						Fixed	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is 7 seconds. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split. If a pedestrian call is received, the pedestrian minimums will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
3		WLK FDW MIN MAX1 AMB ALR SPLIT							Side Street Passage Time = 3 sec Gardiner Expressway Rehabilitation project, Section 1, 2019-2020
4	Broadview Ave 	WLK 7 FDW 22 MIN 7 MAX1 29 AMB 3.3 ALR 5.3 SPLIT						Callable by Stopbar loop and/or Pushbutton; Extendable by Stopbar loop.	
5		WLK FDW MIN MAX1 AMB ALR SPLIT							
6	Eastern Ave 	WLK 7 FDW 15 MIN 22 MAX1 39 AMB 3.3 ALR 3.2 SPLIT						Fixed	
7		WLK FDW MIN MAX1 AMB ALR SPLIT							
8	Broadview Ave 	WLK 7 FDW 22 MIN 7 MAX1 29 AMB 3.3 ALR 5.3 SPLIT						Callable by Stopbar loop and/or Pushbutton; Extendable by Stopbar loop.	
	CL OF	84 40	90 28	90 25	70 5	84 55	70 5		

NOTES:

Appendix C

Multi-Modal Level of Service Criteria

Automobile Level of Service

Highway Capacity Manual 2010

Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* (Transportation Research Board,2010).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤ 10	Free Flow
B	$>10 - 20$	Stable Flow (slight delays)
C	$>20 - 35$	Stable flow (acceptable delays)
D	$>35 - 55$	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	$>55 - 80$	Unstable flow (intolerable delay)
F ¹	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

Pedestrian Level of Service

Exhibit 4 – PLOS Segment Evaluation Table

Sidewalk Width (m)	Boulevard Width (m)	Motor Vehicle Traffic Volume (AADT)	Presence of On- street Parking	Segment PLOS			
				Operating Speed (km/h)			
				≤30	>30 or 50	>50 or 60	>60 ¹
2.0 or more	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	B	N/A
			No	A	B	C	D
	0.5 to 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0	≤ 3000	NA	A	B	C	D
		> 3000	Yes	B	B	D	N/A
			No	B	C	E	F
1.8	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0.5 to 2	≤ 3000	N/A	A	B	B	D
		> 3000	Yes	A	C	C	N/A
			No	B	C	E	E
	0	≤ 3000	N/A	A	B	C	D
		> 3000	Yes	B	C	D	N/A
			No	C	D	F	F
1.5	> 2	≤ 3000	N/A	C	C	C	C
		> 3000	Yes	C	C	D	N/A
			No	C	D	E	E
	0.5 to 2	≤ 3000	N/A	C	C	C	D
		> 3000	Yes	C	C	D	N/A
			No	D	E	E	E
	0	N/A		D	E	F ²	F ²
<1.5	N/A		F ³	F ³	F ³	F ³	
No sidewalk	N/A		C ⁴	F ³	F ³	F ³	

Notes:

1. On-street parking not provided on roadways with posted speed of 70 km/h or more

2. Sidewalk must be 1.8 m wide if no separation is provided (curb-face sidewalk) where speeds are high

3. Sidewalk must be 1.5 m wide to meet Provincial accessibility standards

4. Ottawa Pedestrian Plan, 2014: "all new and reconstructed urban local roads where pedestrian facilities are required in accordance with these policies but no dedicated pedestrian facility is provided, require that roads be designed for a speed of 30 km/h or lower (pending development of a new 30 km/h roadway design standard)." Where a roadway is specifically designed as 'shared space', with appropriate design controls and features, it can achieve LOS A.

5. Where a multi-use path is provided in lieu of sidewalks, the MUP can be evaluated using the same methodology.

5.1 Crossing Distance & Conditions		
Total travel lanes crossed	No median	With Median (>2.4m)
2	120	120
3	105	105
4	88	90
5	72	75
6	55	60
7	39	45
8	23	30
9	6	15
10	-10	0

5.2 Signal Phasing & Timing Features	
Left turn conflict ("Left_turns")	Points
Permissive	-8
Protected/permissive	-8
Protected	0
No left turn/prohibited	0
Right turn conflict ("Right_turns")	Points
Permissive or yield control	-5
Protected/permissive	-5
Protected	0
No right turn	0
Right turns on red ("RTOR")	Points
RTOR allowed	-3
RTOR prohibited	0
Leading ped interval? ("LPI")	Points
No	-2
Yes	0

5.3a Corner Radius	
Corner radius	Points
Greater than 25m	-9
> 15m to 25m	-8
> 10m to 15m	-6
> 5m to 10m	-5
>3m to 5m	-4
Less than/equal to 3m	-3
No right turn	0

5.3b Right Turn Channel	
Right turn channel	Points
Conventional right turn channel with receiving lane ⁽¹⁾	-3
Conventional right turn channel without receiving lane ⁽¹⁾	0
Right turn "smart channel" ⁽¹⁾	2
No right turn channel	-4
No right turn	0

⁽¹⁾ Right turn channels are counted as an additional "travel lane crossed" and so note that despite the points shown above overall they score lower than "No right turn channel".

5.4 Crosswalk Treatment	
Crosswalk treatment ("Crosswalk")	Points
Standard transverse markings	-7
Textured/coloured pavement	-4
Zebra stripe hi-vis markings	-4
Raised crosswalk	0

Exhibit 6 – PETS I Evaluation Table

Pedestrian Exposure to Traffic LOS	
Points threshold	LOS
≥ 90	A
≥ 75	B
≥ 60	C
≥ 45	D
≥ 30	E
< 30	F

Exhibit 7 – Pedestrian Delay Evaluation Table

Average Pedestrian Crossing Delay Component	
$\text{Delay} = 0.5 \times \frac{(\text{Cycle Length} - \text{Pedestrian Effective Walk Time})^2}{\text{Cycle Length}}$	
< 10 s per intersection leg	LOS A
≥ 10 to 20 sec	LOS B
> 20 to 30 sec	LOS C
> 30 to 40 sec	LOS D
> 40 to 60 sec	LOS E
> 60 sec	LOS F

Bicycle Level of Service

Exhibit 11 – BLOS Segment Evaluation Table

Type of Bikeway		LOS
Physically Separated Bikeway (cycle tracks, protected bike lanes and multi-use paths). Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes (adjacent to the bike lane along the travelled way i.e. not curbside).		A
Bike Lanes Not Adjacent Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 travel lanes in each direction separated by a raised median	B
	2 travel lanes in each direction without a separating median	C
	More than 2 travel lanes in each direction	D
Bike Lane Width	> 1.8 m wide bike lane (includes marked buffer and paved gutter width)	A
	≥1.5 m to <1.8 m wide bike lane (includes marked buffer and paved gutter width)	B
	≥1.2 m to <1.5 m wide bike lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 50 km/h operating speed	A
	60 km/h operating speed	C
	> 70 km/h operating speed	E
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Bike Lanes Adjacent to curbside Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 or more travel lanes in each direction	C
Bike Lane and Parking Lane Width	4.5 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	A
	4.25 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	B
	≤ 4.0 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	C
Operating Speed	< 40 km/h operating speed	A
	50 km/h operating speed	B
	60 km/h operating speed	D
	≥ 70 km/h operating speed	F
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Mixed Traffic		
No. of Travel Lanes and Operating Speed	2 travel lanes; ≤ 40 km/h; no marked centerline or classified as residential	A
	2 to 3 travel lanes; ≤ 40 km/h	B
	2 travel lanes; 50 km/h; no marked centerline or classified as residential	B
	2 to 3 travel lanes; 50 km/h	D
	4 to 5 travel lanes; ≤ 40 km/h	D
	4 to 5 travel lanes; ≥ 50 km/h	E
	6 or more travel lanes; ≤ 40 km/h	E
	≥ 60 km/h	F
Unsignalized Crossing along Route: no median refuge		
No. of Travel Lanes on Side Street and Operating Speed	3 or less lanes being crossed; ≤ 40 km/h	A
	4 to 5 lanes being crossed; ≤ 40 km/h	B
	3 or less lanes being crossed; 50 km/h	B
	4 to 5 lanes being crossed; 50 km/h	C
	3 or less lanes being crossed; 60 km/h	C
	4 to 5 lanes being crossed; 60 km/h	D
	6 or more lanes being crossed; ≤ 40 km/h	E
	3 or less lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 50 km/h	F
	4 to 5 lanes being crossed; ≥ 65 km/h	F
Unsignalized Crossing along Route: with median refuge (≥ 1.8 m wide)		
No. of Travel Lanes on Side Street and Operating Speed	5 or less lanes being crossed; ≤ 40 km/h	A
	3 or less lanes being crossed; 50 km/h	A
	6 or more lanes being crossed; ≤ 40 km/h	B
	4 to 5 lanes being crossed; 50 km/h	B
	3 or less lanes being crossed; 60 km/h	B
	6 or more lanes being crossed; 50 km/h	C
	4 to 5 lanes being crossed; 60 km/h	C
	3 or less lanes being crossed; ≥ 65 km/h	D
	6 or more lanes being crossed; 60 km/h	E
	4 to 5 lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 65 km/h	F

Exhibit 12 – BLOS Signalized Intersection Evaluation Table

Bikeway and Intersection Type		LOS
Bike Lanes or higher order facility on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below)	
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box: ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Pocket Bike Lanes on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	B
	Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection)	D
	Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane with any other configurations	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box: ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Mixed Traffic on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection)	E
	Right-turn lane longer than 50 m	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box: ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	D
	1 lane crossed, 50 km/h	D
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	F
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Left-turn Configurations		
<div> <div>Two-stage, left-turn bike box</div> <div>No lane crossed</div> <div>One lane crossed</div> </div>		

Notes:

1. Pocket bike lanes are defined as bike lanes that develop near intersections between vehicular right turn lanes on the right side and vehicular through or left lanes on the left side. All other configurations of bike lanes or separated facility that remain against the edge of the curb/parking lane and require right turning vehicles to yield to through cyclists will not impact the level of traffic stress (i.e. are considered to be LOS A).

Transit Level of Service

Exhibit 15 - TLOS Segment Evaluation Table

Facility Type		Level/exposure to congestion delay, friction and incidents			Quantitative Measurement	LOS
		Congestion	Friction	Incident Potential		
Segregated ROW		No	No	No	N/A	A
Bus lane	No/limited parking/driveway friction	No	Low	Low	$C_f \leq 60$	B
	Frequent parking/driveway friction	No	Medium	Medium	$C_f > 60$	C
Mixed Traffic	Limited parking/driveway friction	Yes	Low	Medium	$W/Vp \geq 0.8$	D
	Moderate parking/driveway friction	Yes	Medium	Medium	$W/Vp \leq 0.6$	E
	Frequent parking/driveway friction	Yes	High	High	$W/Vp < 0.4$	F

Notes:

C_f , Conflict Factor = (Number of driveways x crossing volume) / 1 km

W/Vp is the ratio of average transit travel speed to posted speed limit

Exhibit 16 – TLOS Signalized Intersection Evaluation Table

Delay	Typical Location	LOS
0	Grade Separation	A
≤ 10 sec	High Level TSP	B
≤ 20 sec		C
≤ 30 sec		D
≤ 40 sec	TSP & long cycle length	E
> 40 sec	No TSP & long cycle length	F

Note: Delay includes travel time from end of queue to entering the intersection

Level of Service Targets

Exhibit 22 – Minimum Desirable MMLOS Targets by Official Plan Policy/Designation & Road Class

OP Designation / Policy Area	Road Class	PLOS	Bicycle - BLOS				Transit - TLOS ³			Truck - TrLOS		Auto - LOS ⁴
			Cross-town Bikeway	Spine Route	Local Route	Elsewhere	Rapid Transit Corridor	TP - Continuous Lanes	TP - Isolated Measures	Truck Route	Other	
Land-Use Designation												
Central Area	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	E	No target	E
Developing Community	Arterial	C	B	C	B	D	B	C	D	D	No target	D
	Collector	C	B	C	B	D	B	C	D	D	No target	D
	Local	C	B	C	B	D	B	C	D	N/A	No target	D
Employment Area	Arterial	C	B	C	C	E	B	C	D	B	D	D
	Collector	C	B	C	C	E	B	C	D	B	D	D
	Local	C	B	D	C	No target	B	C	D	D	E	D
Entreprise Area	Arterial	C	B	C	B	D	B	C	D	B	E	D
	Collector	C	B	C	B	D	B	C	D	B	E	D
	Local	C	B	C	B	No target	B	C	D	D	No target	D
General Rural Area	Arterial	No target	N/A	D	D	No target	N/A	N/A	N/A	C	E	D
	Collector	No target	N/A	D	D	No target	N/A	N/A	N/A	C	No target	D
	Local	No target	N/A	D	D	No target	N/A	N/A	N/A	No target	No target	D
General Urban Area	Arterial	C	B	C	B	D	B	C	D	D	E	D
	Collector	C	B	C	B	D	B	C	D	D	No target	D
	Local	C	B	C	B	D	B	C	D	N/A	No target	D
Mixed Use Centre	Arterial	C	A	C	B	D	B	C	D	D	E	D
	Collector	C	A	B	B	D	B	C	D	D	No target	D
	Local	C	A	B	B	D	B	C	D	N/A	No target	D
Village	Arterial	C	B	C	B	D	N/A	N/A	N/A	D	No target	D
	Collector	C	B	C	B	D	N/A	N/A	N/A	D	No target	D
	Local	C	B		B	D	N/A	N/A	N/A	N/A	No target	D
Traditional Main Street	Arterial	B	A	C	C	D	B	C	D	D	E	D
	Collector	B	A	C	C	D	B	C	D	D	No target	D
Arterial Main Street	Arterial	C	B	C	D	D	B	C	D	D	E	D
All Other Designations	Arterial	D	B	C	C	D	B	C	D	D	No target	D
	Collector	D	B	C	C	D	B	C	D	D	No target	D
	Local	D	B	C	C	D	B	C	D	N/A	No target	D
Policy Area ²												
Within 600m of a rapid transit station	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	N/A	No target	E
Within 300m of a school	Arterial	A	A	C	B	D	A	C	D	D	E	E
	Collector	A	A	B	B	D	A	C	D	D	No target	E
	Local	A	A	B	B	D	A	C	D	N/A	No target	E

1. This table indicates the minimum desirable target. Efforts should be made to exceed these minimum targets whenever possible, without negatively impacting the ability to achieve the minimum targets for other modes.

2. Where a policy area applies to a project or area, the modal targets should reflect the policy area targets regardless of the land use designation.

3. Transit targets are intended to be applied only for streets with a proposed or existing transit route.

4. Auto LOS is based on the two and a half hour peak period.

5. Minimum guidelines as dictated by City policy must be maintained, regardless of MMLOS targets.

N/A - Not applicable

Appendix D

Synchro Modelling Assumptions and Parameters

Synchro Modelling Parameters and Assumptions

The key assumptions and modifications made to the default values of the Synchro parameters in the traffic modelling exercise are as follows:

- The Heavy Vehicle Percentages were calculated at the movement level based on the raw Turning Movement Count data.
- The Peak Hour Factors for each individual intersection was calculated based on the raw Turning Movement Count data.
- Conflicting pedestrian and bicycle volumes were input for the left-turn and right-turn movements based on the raw Turning Movement Count data.
- Bus Blockages were input into the model to represent delays to vehicular traffic due to passenger boarding and alighting at the bus / streetcar stops. Buses stopping at the nearside of an intersection were reflected in Synchro as bus blockages for the shared right-turn and through movements. Bus blockages were estimated as per the Toronto Transit Commission schedule available online for the Toronto Transit Commission bus and streetcar routes that have stops within the Study Area. It should be noted that Synchro assumes that Bus Blockages cause an average blockage of 14.4 seconds during each occurrence and reduces the Saturation Flow Rate of the respective blocked movements accordingly. Hence, any existing streetcar stop locations with a passenger servicing time exceeding 14.4 seconds could have its impacts on traffic operations underestimated, as a result.
- The Lost Time Adjust values for all the movements were set to -1 second as per the City's Guidelines for Using Synchro 9.
- The Synchro default values were used for all other parameters.

Appendix E

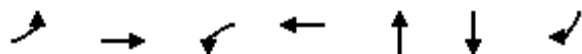
Synchro Reports

Queues

Existing Conditions - 2020 AM Peak

325: Eastern Avenue & Broadview Avenue

07/07/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	122	656	28	1211	48	114	149
v/c Ratio	0.46	0.26	0.05	0.49	0.14	0.36	0.56
Control Delay	13.5	5.0	5.1	6.8	33.0	37.1	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	5.0	5.1	6.8	33.0	37.1	30.2
Queue Length 50th (m)	7.2	16.3	1.2	38.7	3.9	9.6	15.4
Queue Length 95th (m)	26.8	29.8	4.5	67.5	8.2	16.2	30.9
Internal Link Dist (m)		195.1		217.1	54.9	118.2	
Turn Bay Length (m)	60.0		40.0				40.0
Base Capacity (vph)	267	2486	513	2474	852	787	581
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.26	0.05	0.49	0.06	0.14	0.26




















Intersection Summary

HCM Signalized Intersection Capacity Analysis

325: Eastern Avenue & Broadview Avenue

Existing Conditions - 2020 AM Peak

07/07/2021

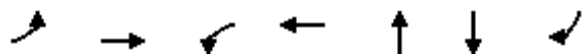
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	555	68	27	1081	69	39	7	0	96	12	142
Future Volume (vph)	116	555	68	27	1081	69	39	7	0	96	12	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			7.6			7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.99			1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.96	1.00
Satd. Flow (prot)	1752	3457		1704	3447			3413			3038	1617
Flt Permitted	0.20	1.00		0.40	1.00			0.71			0.73	1.00
Satd. Flow (perm)	372	3457		716	3447			2523			2330	1617
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	122	584	72	28	1138	73	41	7	0	101	13	149
RTOR Reduction (vph)	0	6	0	0	3	0	0	0	0	0	0	47
Lane Group Flow (vph)	122	650	0	28	1208	0	0	48	0	0	114	102
Confl. Peds. (#/hr)	9		2	2		9						
Confl. Bikes (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	1%	7%	4%	17%	3%	0%	0%	17%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	63.5	63.5		63.5	63.5			11.4			11.4	11.4
Effective Green, g (s)	64.5	64.5		64.5	64.5			12.4			12.4	12.4
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.14			0.14	0.14
Clearance Time (s)	6.5	6.5		6.5	6.5			8.6			8.6	8.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	266	2477		513	2470			347			321	222
v/s Ratio Prot		0.19			c0.35							
v/s Ratio Perm	0.33			0.04				0.02			0.05	c0.06
v/c Ratio	0.46	0.26		0.05	0.49			0.14			0.36	0.46
Uniform Delay, d1	5.4	4.4		3.8	5.6			34.1			35.2	35.7
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	5.6	0.3		0.2	0.7			0.2			0.7	1.5
Delay (s)	11.0	4.7		4.0	6.3			34.3			35.9	37.2
Level of Service	B	A		A	A			C			D	D
Approach Delay (s)		5.7			6.2			34.3			36.6	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			10.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			78.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing Conditions - 2020 PM Peak

325: Eastern Avenue & Broadview Avenue

07/07/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	388	1164	10	701	87	89	69
v/c Ratio	0.67	0.41	0.03	0.25	0.27	0.32	0.29
Control Delay	14.6	4.7	3.9	3.6	37.0	39.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	4.7	3.9	3.6	37.0	39.3	12.5
Queue Length 50th (m)	29.8	32.6	0.4	15.6	7.2	7.6	0.0
Queue Length 95th (m)	#99.6	49.5	1.8	25.0	13.6	14.2	11.1
Internal Link Dist (m)		178.4		186.2	54.8	167.6	
Turn Bay Length (m)	60.0		40.0				40.0
Base Capacity (vph)	577	2807	337	2780	975	822	581
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.41	0.03	0.25	0.09	0.11	0.12

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

325: Eastern Avenue & Broadview Avenue

Existing Conditions - 2020 PM Peak

07/07/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	376	1088	41	10	576	104	30	52	2	80	7	67
Future Volume (vph)	376	1088	41	10	576	104	30	52	2	80	7	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			7.6			7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.97
Flpb, ped/bikes	0.99	1.00		1.00	1.00			0.99			1.00	1.00
Frt	1.00	0.99		1.00	0.98			1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.96	1.00
Satd. Flow (prot)	1812	3560		1824	3520			3428			3041	1585
Flt Permitted	0.38	1.00		0.22	1.00			0.83			0.77	1.00
Satd. Flow (perm)	733	3560		427	3520			2882			2434	1585
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	388	1122	42	10	594	107	31	54	2	82	7	69
RTOR Reduction (vph)	0	1	0	0	8	0	0	2	0	0	0	62
Lane Group Flow (vph)	388	1163	0	10	693	0	0	85	0	0	89	7
Confl. Peds. (#/hr)	16		3	3		16	19					19
Confl. Bikes (#/hr)									1	1		
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	4%	50%	16%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	67.1	67.1		67.1	67.1			7.8			7.8	7.8
Effective Green, g (s)	68.1	68.1		68.1	68.1			8.8			8.8	8.8
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.10			0.10	0.10
Clearance Time (s)	6.5	6.5		6.5	6.5			8.6			8.6	8.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	554	2693		323	2663			281			237	154
v/s Ratio Prot		0.33			0.20							
v/s Ratio Perm	c0.53			0.02				0.03			c0.04	0.00
v/c Ratio	0.70	0.43		0.03	0.26			0.30			0.38	0.04
Uniform Delay, d1	5.7	4.0		2.7	3.3			37.7			38.0	36.8
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	7.2	0.5		0.2	0.2			0.6			1.0	0.1
Delay (s)	12.9	4.5		2.9	3.6			38.4			39.0	36.9
Level of Service	B	A		A	A			D			D	D
Approach Delay (s)		6.6			3.5			38.4			38.1	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			8.8									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			90.0									
Intersection Capacity Utilization			82.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Appendix F

Multi-Modal Level of Service Results

Multi-Modal Level of Service - Intersections Form

Consultant
Scenario

AECOM
MMLOS Assessment - Existing Conditions (2020) - AM Peak

Project
Date

OL Early Works - EH
22/06/2020

INTERSECTIONS		Eastern Avenue / Broadview Avenue			
Crossing Side		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	4	5	6
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane
	Corner Radius	10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	37	53	37	24
	Ped. Exposure to Traffic LoS	E	D	E	F
	Cycle Length	90	90	90	90
	Effective Walk Time	30	30	7	7
	Average Pedestrian Delay	20	20	38	38
Pedestrian Delay LoS	C	C	D	D	
Level of Service	E	D	E	F	
F					
Approach From		NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>	≤ 50 m			
	Dedicated Right Turning Speed	≤ 25 km/h			
	Cyclist Through Movement	D			
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	One lane crossed	One lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	B	B	B	D	
Level of Service	D	B	B	D	
D					
Transit	Average Signal Delay	≤ 10 sec			≤ 10 sec
	Level of Service	-	-	B	B
B					

Multi-Modal Level of Service - Intersections Form

Consultant
Scenario

AECOM
MMLOS Assessment - Existing Conditions (2020) - PM Peak

Project
Date

OL Early Works - EH
22/06/2020

INTERSECTIONS		Eastern Avenue / Broadview Avenue			
Crossing Side		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	4	5	6
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane
	Corner Radius	10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	37	53	37	24
	Ped. Exposure to Traffic LoS	E	D	E	F
	Cycle Length	90	90	90	90
	Effective Walk Time	30	30	7	7
	Average Pedestrian Delay	20	20	38	38
Pedestrian Delay LoS	C	C	D	D	
Level of Service	E	D	E	F	
F					
Approach From		NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>	≤ 50 m			
	Dedicated Right Turning Speed	≤ 25 km/h			
	Cyclist Through Movement	D			
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	One lane crossed	One lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	B	B	B	D	
Level of Service	D	B	B	D	
D					
Transit	Average Signal Delay	≤ 10 sec			≤ 10 sec
	Level of Service	-	-	B	B
	B				

Multi-Modal Level of Service - Segments Form

Consultant	AECOM
Scenario	MMLOS Assessment - Existing Conditions (2020)

SEGMENTS		Eastern Ave	Section Broadview Ave to Dibble St
Pedestrian	Sidewalk Width	E	1.5 m
	Boulevard Width		< 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000
	Operating Speed		> 30 to 50 km/h
	On-Street Parking		no
	Exposure to Traffic PLoS		E
	Level of Service		E
Bicycle	Type of Cycling Facility	D	Mixed Traffic
	Number of Travel Lanes		4-5 lanes total
	Operating Speed		≤ 40 km/h
	# of Lanes & Operating Speed LoS		D
	Bike Lane (+ Parking Lane) Width		
	Bike Lane Width LoS		-
	Bike Lane Blockages		
	Blockage LoS		-
	Median Refuge Width (no median = < 1.8 m)		
	No. of Lanes at Unsignalized Crossing		
	Sidestreet Operating Speed		
	Unsignalized Crossing - Lowest LoS		-
	Level of Service		-
Transit	Facility Type	D	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8
	Level of Service		D