Clark Boulevard Extension and Eastern Avenue Improvements Environmental Assessment Study

Rutherford Road to Kennedy Road

Environmental Study Report

City of Brampton

DECEMBER 2022

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Executive Summary

Introduction

The City of Brampton (City) has completed a Schedule 'C' Municipal Class Environmental Assessment (EA) study for the extension of Clark Boulevard from Rutherford Road to Hansen Road South, and for the widening of Eastern Avenue from Hansen Road South to Kennedy Road. The EA study is referred to as the Clark Boulevard Extension and Eastern Avenue Improvements EA study ("Clark Boulevard / Eastern Avenue EA"). The EA study considered improvements to accommodate current and future transportation needs of pedestrians, cyclists, transit users and motorists. The study was carried out in accordance with the Municipal Class Environmental Assessment planning and design process for Schedule 'C' projects, as outlined in the Municipal Engineers Association (MEA) guidelines (October 2000, as amended in 2007, 2011 and 2015).

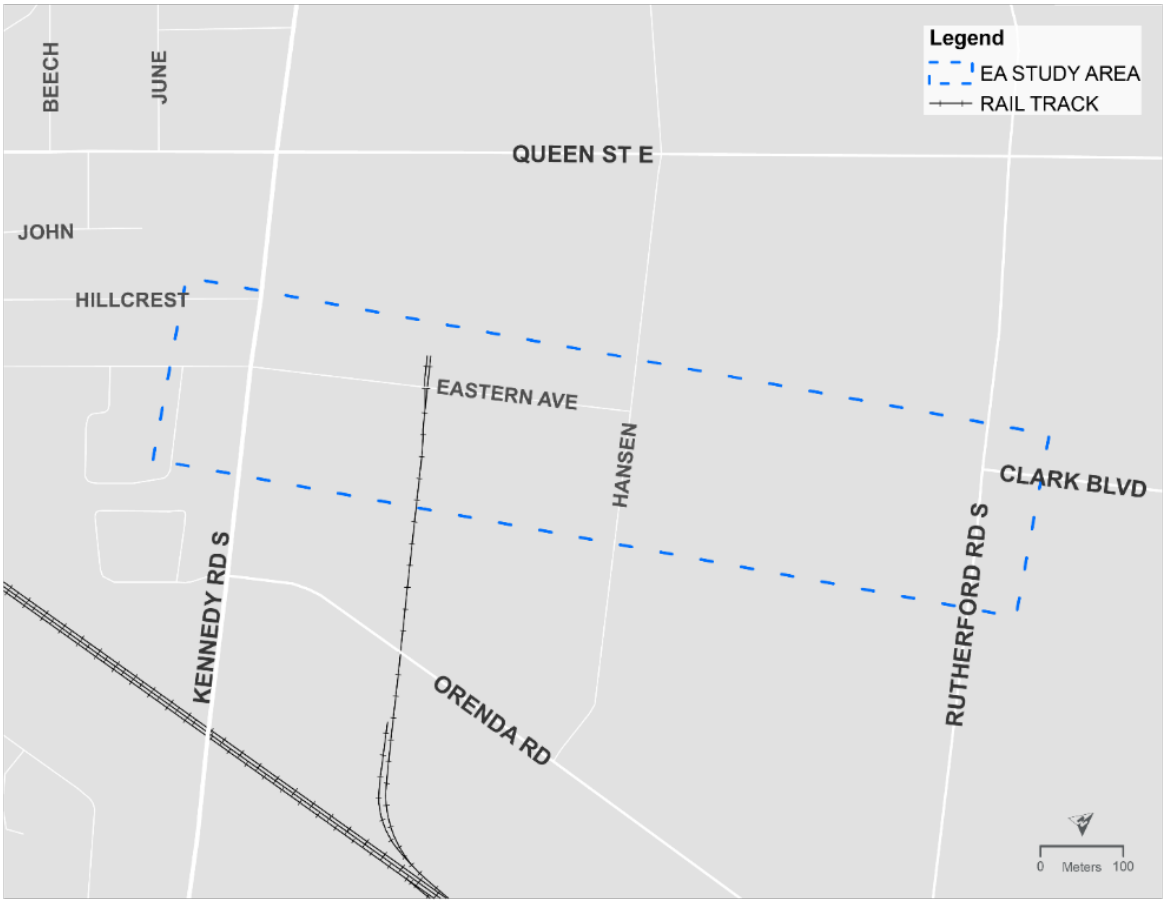
The purpose of the Clark Boulevard / Eastern Avenue Municipal Class EA study was to determine specific improvements to accommodate the current and future transportation needs of pedestrians, cyclists, transit users and motorists along a new connection for Clark Boulevard from Rutherford Road to Hansen Road South, and along the existing Eastern Avenue from Hansen Road South to Kennedy Road.

Study Area
The Clark Boulevard / Eastern Avenue EA study corridor is located in the City of Brampton and spans approximately 900m as is shown in **ES- 1**.The study corridor is comprised of two sections:

- Existing Eastern Avenue from Kennedy Road to Hansen Road South
- Clark Boulevard-Eastern Avenue Extension from Hansen Road South to Rutherford Road

Within the EA study corridor the existing 450m portion of Eastern Ave is a two lane rural minor arterial road between Kennedy Road and Hansen Road South. The posted speed limit is 50km/h and the road is under the jurisdiction of the City of Brampton. Eastern Avenue then terminates at its intersection with Hansen Road and approximately 450m east, is an intersection of Clark Boulevard and Rutherford Road. As per the City of Brampton Official Plan (2015 Office Consolidation), the EA study corridor is classified as a minor arterial road with an ultimate right-of-way (ROW) of 26-30 metres. The study corridor includes a crossing of the Tributary to Etobicoke Creek east of Hansen Road.

ES- 1: Study Area



Public, Agency, and Indigenous Consultation

Public input is an important part of the Clark Boulevard / Eastern Avenue EA. The project team engaged the general public, agencies, stakeholders and Indigenous Communities, through mail and email notifications as well as online Public Information Centres to ensure opportunities to provide input and voice concerns. Key consultation events undertaken throughout the EA study are listed in **ES- 2.**

ES- 2: Summary of Consultation Events

Consultation Event	Date
Notice of Study Commencement	January 24, 2019
Notice of Public Information Centre 1	September 9, 2020
Public Information Centre 1	September 10, 2020 to October 7, 202
Notice of Public Information Centre 2	October 7, 2021
Public Information Centre 2	October 7, 2021 to November 5, 2021
Notice of Study Completion	December 1, 2022

A variety of methods were used to update and inform the public, agencies, stakeholders, and Indigenous Communities about the study progress, including:

- Letters
- Emails
- Phone calls
- Notices
- Newspaper advertisements
- City of Brampton project website (http://www.brampton.ca/ClarkBlvdExt)
- Meetings
- Public Information Centres (PICs)

Residents living along the study corridor were in receipt of mailed notices. Following the study commencement, any individual who expressed interest in the project and requested, was added to the project mailing list (mail or email) to receive regular updates on the study progress.

To maximize public awareness, regular updates to the project website provided information to the "silent majority" – the members of the public interested in the project, but opt for a more passive role.

A Technical Advisory Committee (TAC) consisting of key technical agencies was formed for the study. In addition, a Stakeholder Group (SHG), consisting of public representatives who expressed interest in the study, was formed to gather feedback at key milestones in the process.

Indigenous Communities who may have an interest in the study area were identified through correspondence from Ministry of the Environment, Conservation and Parks (MECP)'s response letter to the Notice of Commencement. These communities were included in the mailing list and received study notices through email. They were invited to participate in the study by providing input via direct correspondence with the project team, and also participation in the online Public Information Centres via the project website. The Indigenous Communities contacted are:

- Six Nations of the Grand River;
- Haudenosaunee Confederacy Chiefs Council;
- Mississaugas of the Credit First Nation; and
- Huron-Wendat Nation

The first online Public Information Centre was posted on the City's project website between September 10, 2020 and October 9, 2020. The purpose of Public Information Centre #1 was to present the preliminary findings of Phases 1 and 2 (Problem and Opportunity and Alternative Solutions) for the study area and obtain feedback. PIC display boards (pdf) and a video presentation (voiceover format on the display boards) were posted on the project website for the public and stakeholders to review. Individuals had the opportunity to leave questions, comments, and concerns by October 9, 2020 through an online survey provided on the project website. Sixteen (16) surveys were completed to provide feedback.

A second Public Information Centre was posted on the City's project website between October 7, 2021 and November 5, 2021. The purpose of Public Information Centre #2 was to present the preliminary findings of Phases 3 (Alternative Designs) for the study area and obtain feedback.

PIC display boards (pdf) and a video presentation (voiceover format on the display boards) were posted on the project website for the public and stakeholders to review. Individuals had the opportunity to leave questions, comments, and concerns by November 5, 2021 through an online survey provided on the project website. Ten (10) surveys were completed to provide feedback.

Problem and Opportunity Statement

The Clark Boulevard / Eastern Avenue EA study presents an opportunity to improve the study corridor for motorists, pedestrians, cyclists, transit and trucks. The transportation assessment identified the need for the following:

- Provide an east-west link between Hansen Road and Rutherford Road from Eastern Avenue to Clark Boulevard to provide connectivity in the broader road network as recommended in the City of Brampton's Official Plan, 2015. An east-west connection would relieve congestion identified along Queen Street by providing an alternate route on a parallel road.
- Pedestrian and cyclist facilities to accommodate growth and provide connectivity in the larger network as recommended in City of Brampton's Transportation Master Plan, 2015. The lack of active transportation facilities results in low level of service which could be improved if facilities were provided.
- Evaluate opportunities to improve operations at the at-grade CN rail crossing as there are currently no warnings to on-coming vehicles, pedestrians or cyclists.

Alternative Solutions

Alternative Solutions are functionally different solutions for approaching and dealing with a problem or opportunity. The Class EA process requires documentation and examination of all reasonable alternatives to address the problem, referred to as Alternative Solutions.

The following alternative solutions were considered:

- Alternative 1: No-build "Do nothing"
- Alternative 2: Limit DevelopmentAlternative 3: Travel Demand Management Initiatives
- Alternative 4: Improve Other Roadways
- Alternative 5: Localized Intersection and Operational Improvements
- Alternative 6: Active Transportation Improvements
- Alternative 7: Widen/Construct to Four Lanes by Extending Clark Boulevard and Building a New Crossing of Etobicoke Creek

Each of the planning alternatives considered present a different approach to address the problems and opportunities identified for the study. To determine the most appropriate functional solution for the corridor, the advantages and disadvantages of each alternative solution were evaluated using the information collected from the review of existing and future

conditions. Based on the evaluation the preferred alternative solution was identified to consist of a combination of the following alternatives:

- Alternative 3 – Travel Demand Management (TDM) Initiatives
- Alternative 5 – Localized Intersection and Operational Improvements
- Alternative 6 – Active Transportation Improvements
- Alternative 7 – Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek

The recommended solution (combination of alternatives) was carried forward to the next phase of the EA for the development of alternative designs. A summary of the potential road cross-section improvements in the preferred solution is shown in **ES- 3.** Placement of elements within the cross-section (including street trees, active transportation facility types, light / hydro poles, vehicle lanes, etc.) was reviewed and assessed in the next stage of the study, Phase 3 – Alternative Design Concepts.

ES- 3: Preferred Solution

Alternative Designs

Alternative designs are different concepts developed to implement the preferred solution. This Class EA process examined all reasonable design options; referred to as Alternative Designs.

Active Transportation Facilities
The recommended active transportation (AT) solution is to provide continuous cycling and pedestrian facilities along Clark Boulevard / Eastern Avenue. Six alternative design concepts were developed to address the need for improved pedestrian and cyclist facilities and are:

- Alternative 1:Boulevard Cycle Tracks and Sidewalks, both sides

- Alternative 2: Multi-use Path (two-way shared facility), both sides
- Alternative 3: Sidewalk South Side and Multi-use Path North Side
- Alternative 4: Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
- Alternative 5: Sidewalk and boulevard one-directional Cycle Track South Side, and Multi-use Path on North Side
- Alternative 6: On-road Bike Lane and Sidewalks

Based on the findings of the Active Transportation Alternatives high level screening and evaluation, **Alternative 4- Sidewalk on south side, and dual boulevard cycle tracks and sidewalk on north side** is recommended as the preferred active transportation alternative because it:

- Provides the greatest separation of pedestrians from cyclists minimizing conflicts between both users and bi-directional cyclists
- Separates pedestrians and cyclists from vehicles
- Eliminates conflicts between pedestrians and cyclists with dedicated and separate facilities
- Provides pedestrians with direct access to adjacent lands / destinations in both boulevards
- Provides cyclist with direct access in the north boulevard to support the future greenway
- Limits potential conflict points for cyclists at driveways along the north boulevard

Roadway Widening

To widen the existing Eastern Avenue between Kennedy Road and Hansen Road from two to four lanes, three widening alternatives were considered:

- Alternative 1: Widening to the North
- Alternative 2: Widening about the Centreline
- Alternative 3: Widening to the South

Based on the findings of the Roadway Widening Evaluation, **Alternative 2- Widening About the Centreline** is the recommended widening alternative because it:

- Maximizes the existing right-of-way and balances impacts to businesses and accesses
- Minimizes property acquisition requirements in comparison to the other alternatives
- Low capital and construction costs

Road Alignment

To extend Clark Boulevard from Rutherford Road to meet Hansen Road, three alignment alternatives were considered:

- Alignment 1 - Road alignment curved at watercourse
- Alignment 2 - Road alignment curved east of watercourse
- Alignment 3 - Road alignment north of Tributary to Etobicoke Creek and jogged at Hansen Road

Based on the findings of the Road Alignment Evaluation, **Alternative 2- Road alignment curved east of watercourse** is the recommended road alignment alternative because it:

- Provides good connectivity to existing businesses for all users (pedestrians, cyclists, transit and motorist)
- Is compatible with the future greenway and supports continuous, direct and dedicated facilities for pedestrians and cyclists
- Improves traffic mobility and decreases congestion, having less negative impacts on climate change and air quality.
- Requires a new structure over the Tributary to Etobicoke Creek that is not anticipated to be curved.
- May require full displacement to 35 Rutherford Road (concrete plant), however opportunities to redevelop the site if displaced would be subject to further study

Recommended Design

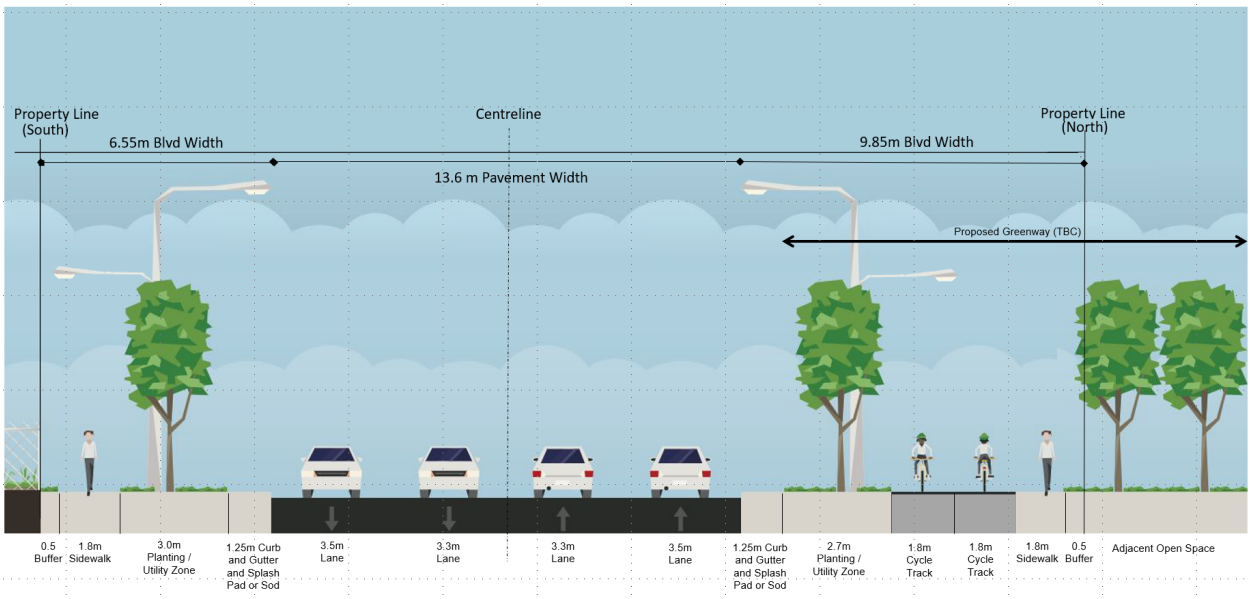
The recommended design of Clark Boulevard / Eastern Avenue between Rutherford Road and Kennedy Road was chosen with consideration of transportation service for all road users (pedestrians, cyclists, transit riders, and motorists) and potential impacts to the natural environment, community, cultural heritage, operations, aesthetics, driveway access, property requirements, and capital construction and maintenance costs. It best meets the goals of the project with regards to transportation service improvements, while also considering the overall impact of the project and mitigation measures.

The recommended design includes the following elements:

- Four general purpose lanes (two in each direction). Through lanes will be 3.3m and curb lanes will be 3.5m
- Separated 1.8m east-bound and 1.8m west-bound cycle tracks on the north side of the road
- Separated 1.8m sidewalks on both side of the road
- Urbanized section with 1.25m curb and gutter and splash pad / sod
- Accessibility for Ontarians with Disabilities (AODA) compliant intersections with crossrides and crosswalks at intersections
- New traffic signals proposed at Kennedy Road, Hansen Road and Rutherford Road
- Extension of Clark Boulevard from Rutherford Drive to Hansen Road
- Channel realignment of the Tributary to Spring Creek and new culvert crossing
- Illumination along the corridor
- Opportunities for streetscaping in the boulevards
- Utility relocations
- Property requirements

The typical cross-section for Clark Boulevard / Eastern Avenue between Kennedy Road and Rutherford Road is illustrated in **ES- 4.**

ES- 4: Typical Cross-Section – Clark Boulevard / Eastern Avenue



Preliminary Cost Estimate

Based on preliminary cost estimates, the cost of the recommended improvements is estimated at **$18.3M**. This preliminary cost estimate includes costs for road work, culvert construction, utility relocation, addition of streetlights, storm sewers and traffic signals, landscaping, traffic control, and engineering services; however, property acquisition costs are not included in the estimate.

The estimated costs are preliminary only and would be reviewed and confirmed during Detailed Design.

Potential Environmental Impacts and Mitigation

Anticipated impacts to the natural, socio-economic, and cultural environments, together with proposed mitigation measures, were identified to address the implementation of the preferred design. Anticipated impacts and proposed mitigation is provided for the following factors:

- Land Use and Socio-Economic Impacts
- Archaeology
- Cultural Heritage
- Noise
- Property Requirements
- Climate Change
- Air Quality
- Source Water Protection
- Streetscaping / Urban Design

- Utilities
- Construction Detours/ Temporary Lane Restrictions
- Vegetation and Vegetation Communities
- Fisheries and Aquatic Habitat
- Wildlife and Wildlife Habitat
- Groundwater / Hydrogeology
- Surface Water
- Soil Removal and Contaminants

Commitment of Future Work

This Environmental Study Report (ESR) identifies specific items to be reviewed and confirmed during the Detailed Design phase. Some of these commitments will address specific concerns raised by property owners and review agencies during the EA process. Items to be addressed during Detailed Design phase, include but are not limited to, resolution of outstanding concerns and any permits and approvals.

Timing of Improvements

Timing of improvements is to be confirmed during Detailed Design. Construction timing is anticipated to follow the timing outlined in the City's current (2022) Capital Plan. This plan is reviewed and approved by Council annually and is subject to change.

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1 Introduction and Background

The City of Brampton continues to evolve as a rapidly growing Greater Toronto and Hamilton Area (GTHA) municipality transitioning from a historically “suburban” to a more “urban” development context. To accommodate this growth, new infrastructure, transportation services, and travel demand management measures must be provided to recognize the capacity needs of planned growth and the objective of protecting establishes communities and businesses.

The City has identified, through its current Transportation Master Plan (TMP), the need for connectivity and additional capacity in the road network to the planning horizon year 2041, with individual capacity improvements to be confirmed through Environmental Assessment (EA) studies.

The City of Brampton (City) has completed a Schedule ‘C’ Municipal Class Environmental Assessment (EA) study for the extension of Clark Boulevard from Rutherford Road to Hansen Road South, and for the widening of Eastern Avenue from Hansen Road South to Kennedy Road. The EA study is referred to as the Clark Boulevard Extension and Eastern Avenue Improvements EA study (“Clark Boulevard / Eastern Avenue EA”). The EA study considered improvements to accommodate current and future transportation needs of pedestrians, cyclists, transit users and motorists. The study was carried out in accordance with the Municipal Class Environmental Assessment planning and design process for Schedule ‘C’ projects, as outlined in the Municipal Engineers Association (MEA) guidelines (October 2000, as amended in 2007, 2011 and 2015).

This Environmental Study Report (ESR) documents the Schedule ‘C’ Municipal Class EA process completed for the Clark Boulevard Extension and Eastern Avenue Improvements EA study, summarizing Phases 1 through 4 of the MCEA process.

Study Area

The Clark Boulevard / Eastern Avenue EA study corridor spans approximately 900m, bounded by Rutherford Road to the east and Kennedy Road to the west. The EA study corridor is located in the City of Brampton and is shown in **Figure 1-1.**

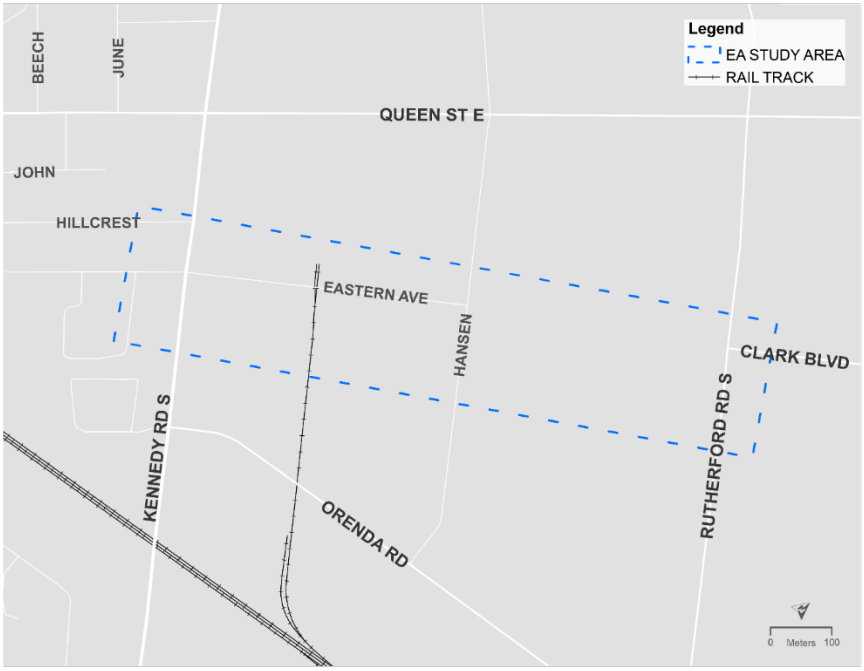


Figure 1-1. Clark / Eastern EA Study Area

1.1 Study Process

An overview of the Environmental Assessment Act of Ontario (EAA), the Municipal Class Environmental Assessment (MCEA) process, and the Canadian Environmental Assessment Act, 2012 (CEAA 2012) is provided in this section as they relate to the Clark Boulevard / Eastern Avenue EA.

1.1.1 Municipal Class Environmental Assessment Process

The Environmental Assessment Act of Ontario (EAA) provides for the protection, conservation, and management of the environment in Ontario. The EAA applies to municipalities and to activities including municipal road projects. Activities with common characteristics and common potential effects may be assessed as part of a “class”, and are therefore approved subject to compliance with the pre-approved Class EA process.

The Municipal Class Environmental Assessment (MCEA) process is an approved Class EA process that applies to municipal infrastructure projects including roads, water, and wastewater. This process provides a comprehensive planning approach to consider alternative solutions and evaluate their impacts on a set of criteria (e.g. technical, environmental, social, cost) and determine mitigating measures to arrive at a preferred alternative for addressing the problem (or opportunity). The Class EA process involves a rigorous public consultation component that includes various provincial and municipal agencies, Indigenous communities, and the public, at each of the project stages.

The Clark Boulevard / Eastern Avenue EA study was undertaken in accordance with the guidelines of the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). Due to the type of project, anticipation for

potential effects, and estimated capital costs, the Clark Boulevard / Eastern Avenue EA is defined as a Schedule 'C' project. A Schedule 'C' project involves either the construction of new facilities or major modifications to existing facilities. Modifications to existing facilities could include road widening, adjustments, and/or operational improvements.

The phases for the sequence of activities within the approved Class EA process leading to project implementation are described as follows and illustrated in **Figure 1-2**.

- **Phase 1 (Problem and Opportunity)** – Identify the problem (deficiency) or opportunity;
- **Phase 2 (Alternative Solutions)** – identify alternative solutions to address the problem or opportunity considering the existing environment, and establish the preferred solution taking into account public and review agency input;
- **Phase 3 (Alternative Design Concepts for Preferred Solution)** – Examine alternative methods of implementing the preferred solution, based on the existing environment, public and review agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects;
- **Phase 4 (Environmental Study Report)** – Document in an Environmental Study Report (ESR) a summary of the study background, problem statement, alternative solutions, alternative designs, and the public consultation process. Place the ESR on public record for a minimum 30 calendar days for review, and notify completion of the ESR and opportunity for Section 16 Order (previously known as Part II Order) requests; and,
- **Phase 5 (Implementation)** involving detailed design and the preparation of contract/tender documents followed by construction, operation, and monitoring, is not within the scope of the Clark Boulevard / Eastern Avenue EA study.

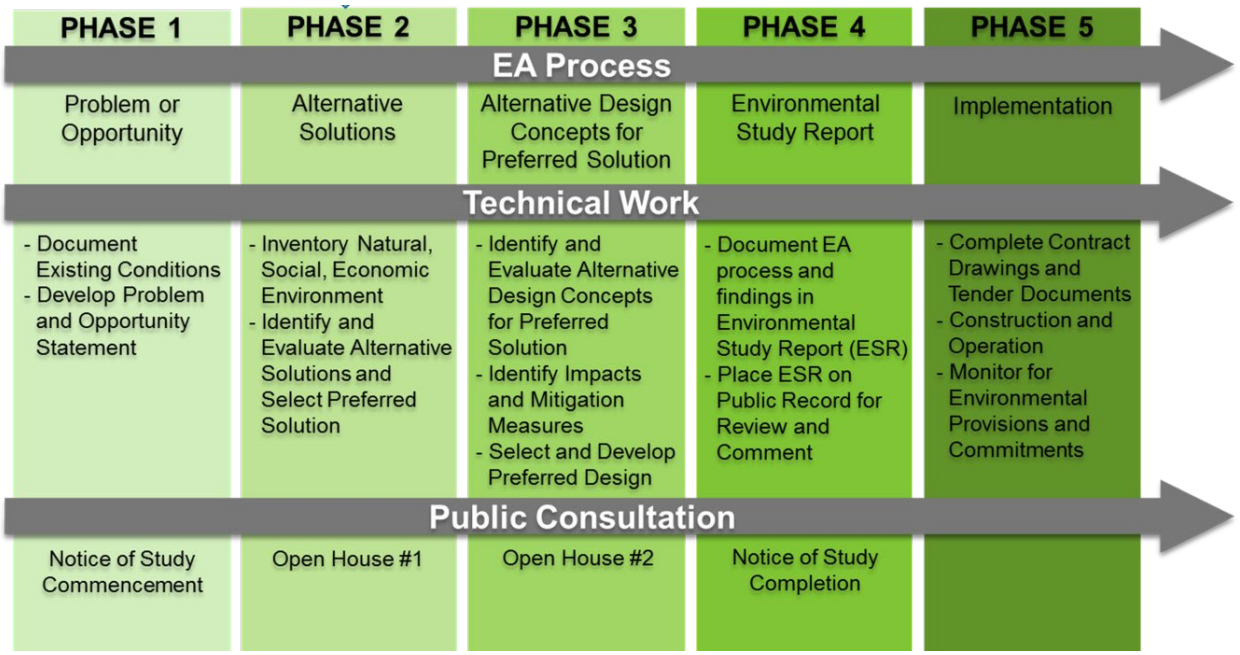


Figure 1-2. Municipal Class Environmental Assessment Process

1.1.2 Section 16 Order

The ESR is finalized, and is filed and placed on public record for a minimum of 45 calendar days for review by the public and review agencies. At the time the report is filed, a Notice of Study Completion is advertised, to advise the public and other stakeholders where the ESR may be seen and reviewed, and how to submit public comments. The Notice also advises the public and other stakeholders of their right to request a Section 16 Order (previously known as Part II Order Request), and how and when such a request should be submitted.

On July 21, 2020, the Ontario province passed the COVID-19 Economic Recovery Act, which included important amendments to the Environmental Assessment (EA) Act. The amendments to the EA Act included changes to the Section 16 Order (previously known as Part II Order Request) process and sets up the authority of the Ministry of Environment Conservation and Parks (MECP) to create new regulations that would replace all Class EAs, including the Municipal Class Environmental Assessment (MCEA) process.

1.1.2.1 NEW APPEAL PROCESS

As part of the new appeal process, implemented by the amendments to the EA, proponents will continue to issue a Notice of Study Completion and place the EA documentation/ Environmental Study Report (ESR) on the public record for 45-days; however, instead of concerns being filed with the Ministry, concerns will be addressed to the proponent. The Section 16 Order process will only apply if the objective deals with aboriginal or treaty rights. For all other concerns, the Section 16 Order process has been replaced with an additional 30-day window for the Ministry to decide if the Minister should take any action. Regional coordinators from the Ministry of Environment, Conservation and Parks (MECP) will continue their role of monitoring MCEA projects. During the additional 30 days the Minister will decide if the project will be elevated (Section 16 Order granted) or if it will be approved with conditions. If the Minister advises the

proponent that the project will be approved but with conditions, the Minister has more time to draft these conditions. If there is no response from the Minister within the additional 30-days, the proponent may proceed with the project

1.1.3 Canadian Environmental Assessment Act (CEAA)

Under the Canadian Environmental Assessment Act, 2012 (CEAA 2012), a federal environmental assessment study may be required to the physical activities that constitute a "designated project", under the project list identified in the Regulations Amending the Regulations Designating Physical Activities, 2013. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts to matters of federal jurisdiction.

The Clark Boulevard / Eastern Avenue EA does not constitute a "designated project" and therefore does not require an environmental assessment under the CEAA, 2012. However, the Minister of the Environment, Conservation and Parks may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

1.2 Planning and Policy Context

A summary of the Provincial, Regional, and Municipal planning and policy context as they relate to the Clark Boulevard / Eastern Avenue EA study is provided.

1.2.1 Provincial Planning Context

Provincial planning policies were reviewed to identify their relevance in the Clark Boulevard / Eastern Avenue EA study. Provincial plans are identified and summarized in **Table 1-1**.

Table 1-1. Provincial Planning Policies

Provincial Planning Document	Directions
Provincial Policy Statement (2020)	The Provincial Policy Statement offers direction on land use and transportation planning and development, including: • Providing appropriate development while protecting resources, public health and safety, and the natural and built environments • Building strong, healthy communities by supporting density and land uses which support active transportation, are transit-supportive, and are freight-supportive • Developing safe and energy efficient transportation systems that move people and goods • Integrating transportation and land use considerations at all stages of the planning process • Considering land use patterns, density, and mix of uses to minimize length and number of vehicle trips, support current and future use of transit and active transportation It is a key document outlining provincial objectives and informing the long-term vision for growth within Ontario.

Provincial Planning Document	Directions
Places to Grow Act / Growth Plan for the Greater Golden Horseshoe (2020)	The Growth Plan for the Greater Golden Horseshoe (GGH), 2017 was prepared and approved under the Places to Grow Act, 2005. The Plan provides a framework for growth in the GGH that supports the development of complete communities, a thriving economy, a clean and healthy environment and social equity. There has been a 2017 update and a 2020 consolidation to the Growth Plan. The updates revise growth targets but do not change the mandate to intensify Urban Growth Centres, Major Transit Station Areas, and Intensification Corridors The Growth Plan envisions an integrated regional transportation network allowing easy travel within and between the GGH's urban centres, supported by fast, convenient, and affordable transit and active transportation. Integrating transportation and land use planning, the plan prioritizes intensification, setting population and employment growth targets for all Upper- and Single-Tier Municipalities in the GGH. The Plan's updated forecasts show Peel Region is projected to have a population of 1,970,000 residents and employment of 970,000 jobs by 2041. The Clark Blvd / Eastern Ave corridor is located within the Provincial designated Queen Street East Urban Growth Centre "UGC", a focal area for investment, employment and residential growth. Brampton UGC is required to intensify to reach residential and jobs target by 2031.
Greenbelt Plan (2017)	Updated in 2017 as a result of the Co-ordinated Land Use Planning Review, the Greenbelt Plan identifies environmentally and agriculturally protected lands within the GGH, where urbanization should not occur, in order to protect ecological features. The 2017 Greenbelt Plan also introduced a designation for 'Urban River Valleys'. Public lands in Etobicoke Creek, located west of the study area, are considered a part of the Greenbelt under this designation in the updated plan. No part of the study area falls within the Greenbelt Plan designated areas.

1.2.2 Regional Planning Context

Regional planning policies were reviewed to identify their relevance in the Clark Boulevard / Eastern Avenue EA study. Regional plans are identified and summarized in **Table 1-2**.

Table 1-2. Regional Planning Policies

Regional Planning Document	Directions
Peel Region Official Plan (PR-OP) (Office Consolidation, 2018)	The Official Plan provides direction to guide economic, environmental, and community-building decisions to manage growth. The Region of Peel completed the Peel Regional Official Plan Review (February 2013 Draft) to bring its Official Plan policies into conformity with provincial requirements. The main objectives of the PR-OP is to recognize the urban and rural natures of Peel Region, protect the natural and cultural environment, manage resources, direct sustainable growth and set the basis for providing Regional services in an efficient and effective manner. The Official Plan establishes a framework for future planning activities and for public and private initiatives aimed at improving the existing physical environment. Under the Peel Region Official Plan, the study area is considered to be part of an urban system.
Peel Region Long Range Transportation Plan (PR-LRTP) (2012)	The Peel Long Range Transportation Plan (LRTP), last updated in 2012, identifies major transportation challenges that the Region of Peel expects over the next several decades, as well as policies, strategies and planned road improvements to address these challenges.
Region of Peel Road Characterization Study (RCS) (2013)	Completed in 2013, the Road Characterization Study provides guidelines for future regional roadways that accommodate multiple transportation modes and ensures that the regional arterial transportation network considers all road users, transportation options, health impacts, and local context.
Region of Peel Active Transportation Study (2012)	In 2012, Peel Regional Council approved Peel Region's first Active Transportation Plan. The Plan provides a framework for how the Region will increase the share of walking and cycling trips, improved links with transit, and create a pedestrian and cycling friendly environment. It also sets out policies, recommends active transportation improvements and outlines strategies and programs to shift travel behaviour. The Region of Peel Active Transportation Study identifies the Clark Boulevard / Eastern Avenue study area as being part of an Urban Growth Centre within commercial or industrial area.
Region of Peel Strategic Goods Movement Network Study (SGMNS) (2013)	The Region of Peel Strategic Goods Movement Network Study (SGMNS) identifies potential truck priority routes for goods movement to develop a hierarchical truck route network throughout Peel Region. The goal of the SGMNS is to improve, prioritize and preserve goods movement corridors through the Region.

Regional Planning Document	Directions
	The SGMNS identifies the study area as being located within Brampton's major business cluster with a connector truck route running north-south within the study area.

1.2.3 Municipal Planning Context

Municipal planning policies were reviewed to identify their relevance in the Clark Boulevard / Eastern Avenue EA Study. These policies were of particular relevance to the EA study as Eastern Avenue and Clark Boulevard are municipal roads and as such, incorporating direction from these documents is an objective of the EA study. Municipal plans are identified and summarized in **Table 1-3**.

Table 1-3. Municipal Planning Policies

Municipal Planning Document	Directions
City of Brampton Official Plan Update (2015 Consolidation)	The Official Plan provides guidance on responsible future development in the City of Brampton through several guiding principles, including: growth management, environmental stewardship, economic prosperity, and transportation/transit development. It provides a framework for decision-making regarding land-use planning and required municipal services to support growth. The Official Plan identifies the proposed road extension and widening of Clark Boulevard / Eastern Avenue as a minor arterial road with a 26-30 metre right-of-way (ROW) as shown in **Figure 1-3** and **Figure 1-4**. The general land use designation for the study area is identified as Central Area as identified in **Figure 1-5**. As discussed in the Official Plan, the Central Area is a major location for a number of important civic, institutional, cultural and entertainment facilities as well as major commercial, retail, and employment activities. The City of Brampton identifies Natural Heritage Features and Areas on Schedule "D" of the official plan. The watercourse within the study area is not identified as a natural heritage feature. However, Appendix C: *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation Mapping* of the Official Plan identifies part of the watercourse as part of the Toronto and Region Conservation Authority (TRCA) Regulation (Ontario Regulation 166/06) Area. The main objectives of Ontario Regulation 166/06 are to ensure public safety and protect property with respect to natural hazards and to safeguard watershed health by preventing pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses.
City of Brampton Transportation Master Plan Update (2015)	The City of Brampton Transportation Master Plan (TMP) addresses existing challenges and makes recommendations for sustainable

Municipal Planning Document	Directions
	transportation solutions to manage the transportation impacts and address travel demand associated with future growth. The TMP identifies that the proposed road extension of Clark Boulevard and widening of Eastern Avenue within the study area should be to four lanes as shown in **Figure 1-6**. Future active transportation (AT) facilities are recommended along the study corridor, as shown in **Figure 1-7**. No transit improvements are identified for the study area in the TMP, as shown in **Figure 1-8**.
City of Brampton Active Transportation Master Plan (2019)	The City of Brampton Active Transportation Master Plan (ATMP) provides the network plan, policies, and programs to support Brampton's 2040 Vision for a mosaic of safe, integrated transportation choices and new modes, contributions to civic sustainability, and emphasizing walking, cycling, and transit. The ATMP focuses on the implementation strategy for building a connected cycling and pedestrian network across the City (and connecting to neighbouring municipalities) to enable safer, more convenient travel by non-motorized modes, and to encourage cycling as a viable means of transportation for both recreational and utilitarian purposes for the general public. Within the study corridor, future active transportation facilities (multi-use path / boulevard path) for pedestrians and cyclists are identified along Eastern Avenue / Clark Boulevard, as shown in **Figure 1-9.**
Brampton 2040 Vision (2018)	The Brampton 2040 vision is an aspirational document to guide what Brampton will become over the next quarter century. It's about environment, transportation, jobs, recreation, health, social issues, and arts and culture. The vision identified growth and intensification at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard. This area is envisioned as a major hub of growth and activity with about 18,000 households and 24,000 jobs in the next 25-30 years. The proposed land use includes residential (town house apartment, mid-rise apartment, and high-rise apartments), hotels, offices, civic, and mixed use. Two rapid transit stations are planned for Bramalea New Town.
Queen Street Corridor Secondary Plan (SP36) (2013 Consolidation)	The Queen Street Corridor secondary plan sets out the policy framework for the eastern portion of the Brampton Central Area which incorporates the Highway 410 and Queen Street Primary Office Node. These functions together with the overall Central Area as the major location for higher order uses in Brampton. The Secondary Plan identified the study area as a mixed-use area that will function as an urban district. The plan includes a Special Policy Area on the north side of Eastern Avenue.

Municipal Planning Document	Directions
	Lands north of the potential Eastern Avenue/Clark Boulevard missing link are designated 'Central Area Mixed Use'. Lands south of the missing link is designated 'Industrial'. Special Policy Area 1 affects lands immediately north of the missing link that will act as a transition between the industrial uses to the south and the full range and higher intensity and mix of uses (i.e. high-rise commercial and residential buildings). Sensitive uses such as residences, schools, places of worship, and daycares are some uses that are not permitted within the transition area. The boundaries of City of Brampton's Secondary Plans are located in **Figure 1-10**. The Queen Street Corridor Secondary Plan and Special Policy Area 1 are shown in **Figure 1-11** and **Figure 1-12.** The Queen Street East Precinct Plan identifies: a 60,000 resident and 83,000 job, vibrant, urban, and mixed-use community; enhanced pedestrian and cyclist movement, and embracing human-scaled streets; and wide pedestrian sidewalks and connections that integrate with urban greenway. The Clark Boulevard / Eastern Avenue EA study area falls within the boundaries of the Queen Street East Precinct Plan.
By-law 270-2004	By-law 270-2004, as amended by City of Brampton, is the City's zoning by-law. The zoning by-law designates the study area as mostly industrial (zone code M2) use, with some land being zoned as commercial (zone codes SC-3474 and QMUT). The portion of land surrounding the watercourse is zoned as flood-plain (zone code F) Furthermore, the Zoning By-Law contains provisions for buildings and structures in the event that land acquisition by the City is required as part of the preferred alignment: • Where, by expropriation or highway widening or other land acquisition by the City, the Regional Municipality of Peel or the Crown in Right of Ontario or Canada, a lot is caused to have less lot width, less lot area or less lot depth than that required by this by-law, a building or structure may be erected or used on such a lot if all other requirements of this by-law are complied with, notwithstanding anything to the contrary in this by-law. Similarly, where, by expropriation or highway widening or other land acquisition by the City, the Regional Municipality of Peel or the Crown in Right of Ontario or Canada, the yards or building setbacks are reduced to less than the requirements of this by-law, an existing building or 'structure may be repaired, renovated or altered as long as the setbacks or yards are not further reduced by such repair, renovation or alteration, and as long as all other requirements of this by-law are complied with, notwithstanding anything to the contrary in this by-law.

Municipal Planning Document	Directions
Brampton Human Health and Sciences Cluster Development Strategy, 2017	This document focusses on how the City of Brampton can develop a "cluster" or expanding hub of economic activity, investment, and job created in the human health and life science industries. The immediate trigger for this strategy is the completion of Phase One of the Peel Memorial Centre for Integrated Health and Wellness (PMC). As the City and its various partners and stakeholders begin to consider Phases Two and Three of PMC development, this strategic plan serves to provide a roadmap. Linking Eastern Avenue to Clark Boulevard and planning for new local north-south streets is identified as an initiative which will improve access to the future campus area.

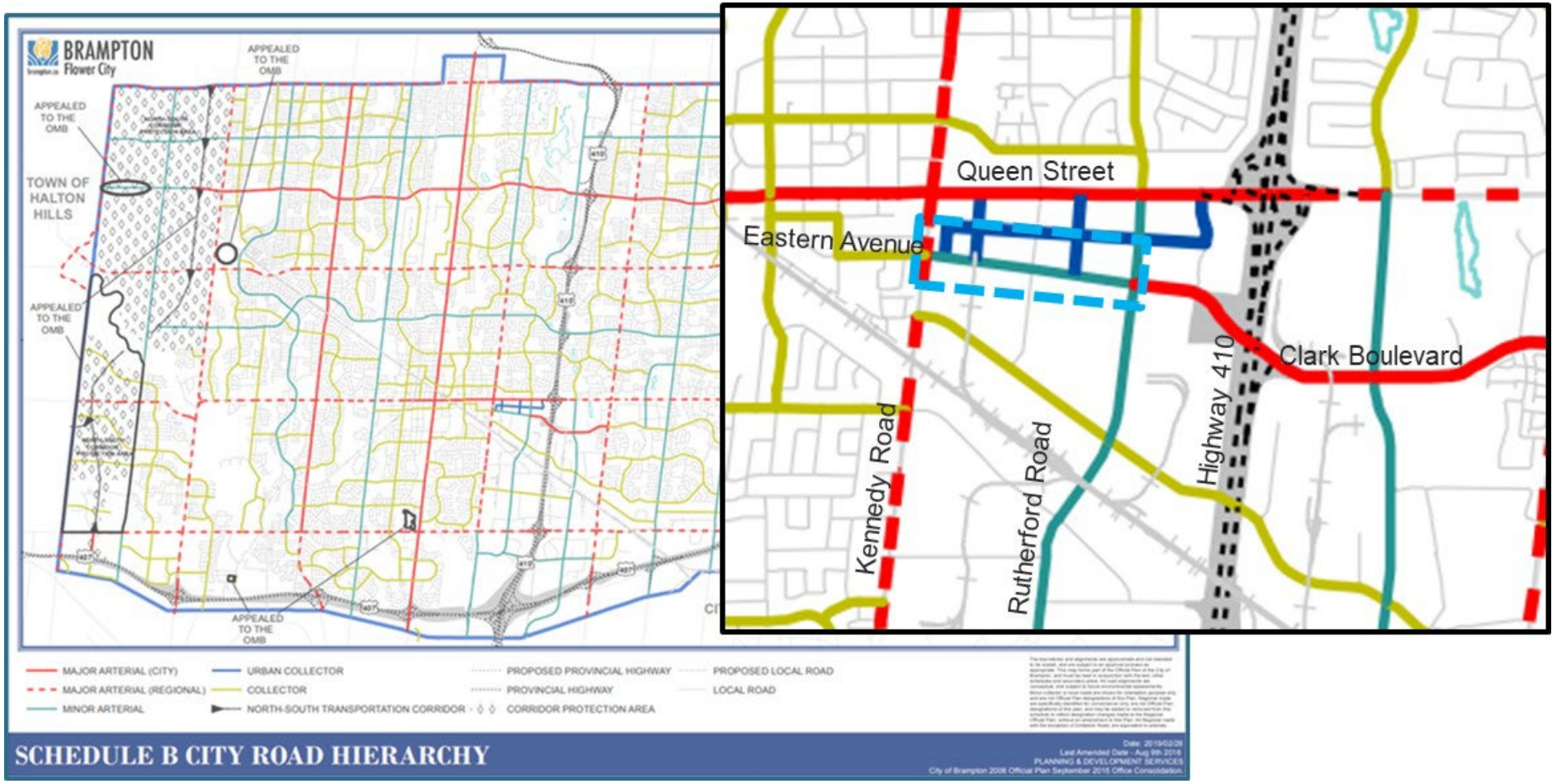


Figure 1-3. City of Brampton Official Plan, 2015 – Schedule B City Road Hierarchy

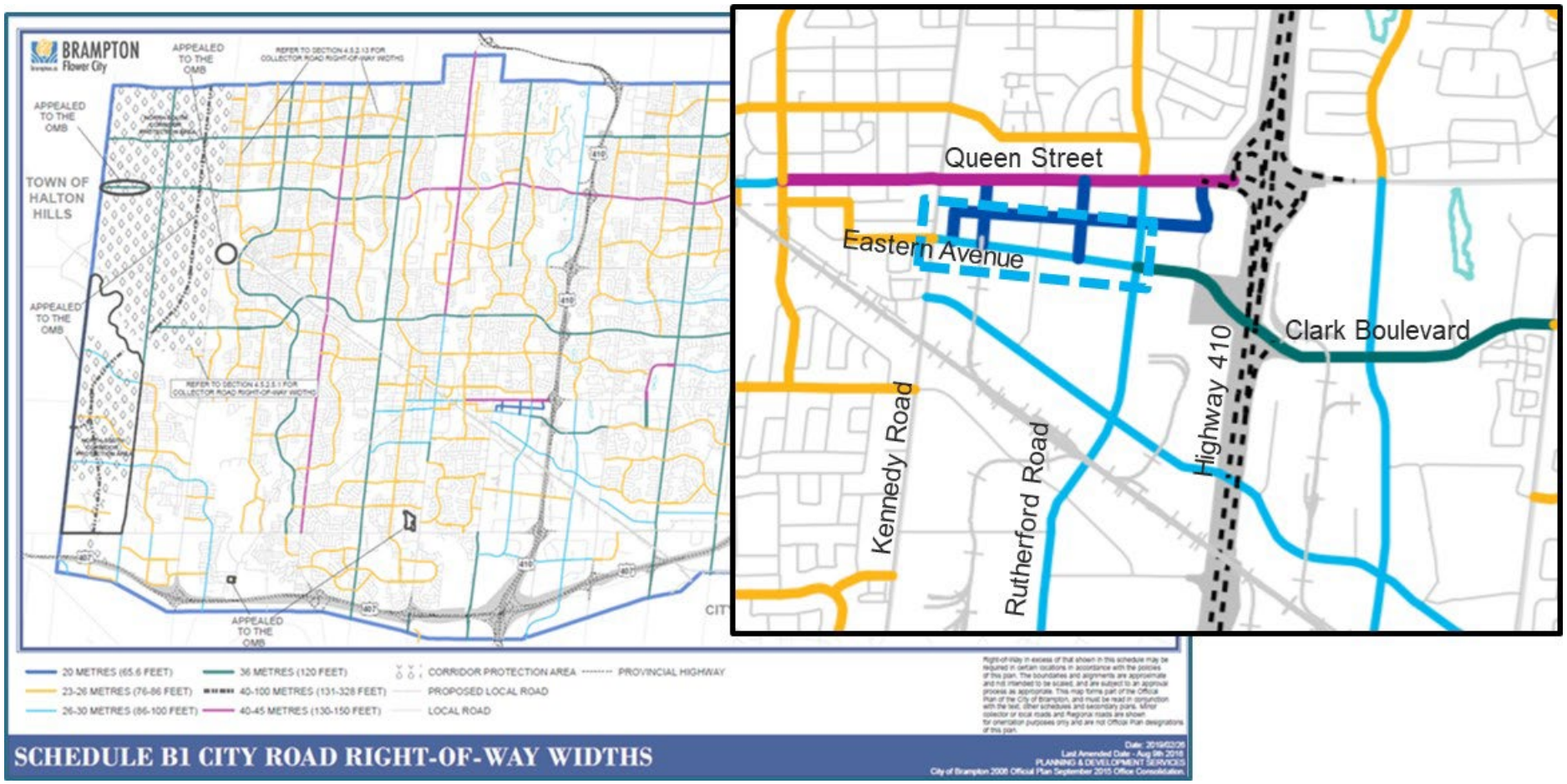


Figure 1-4. City of Brampton Official Plan, 2015 – Schedule B1 City Road Right-of-Way Widths

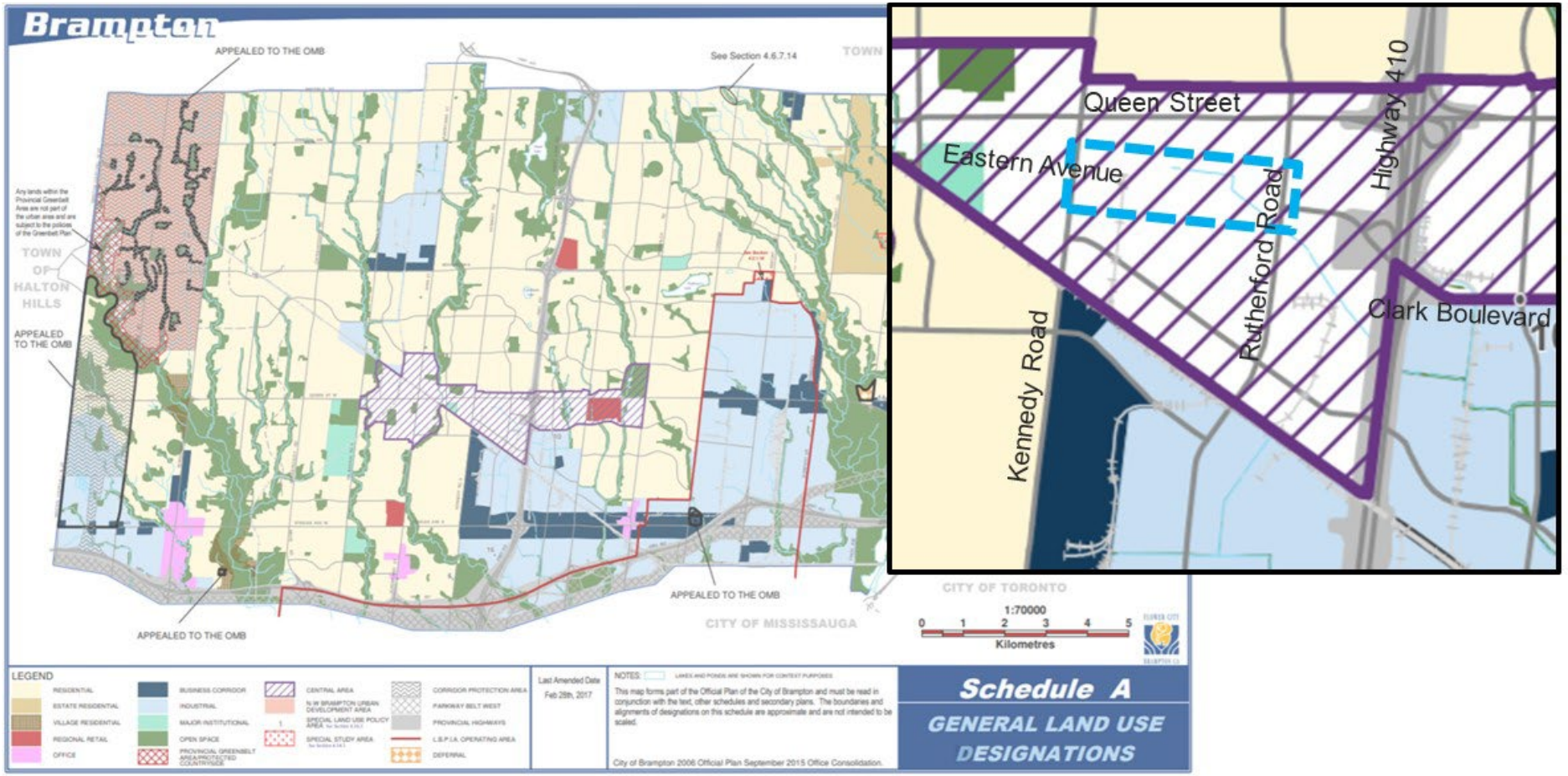


Figure 1-5. City of Brampton Official Plan, 2015 – Schedule A General Land Use Designation

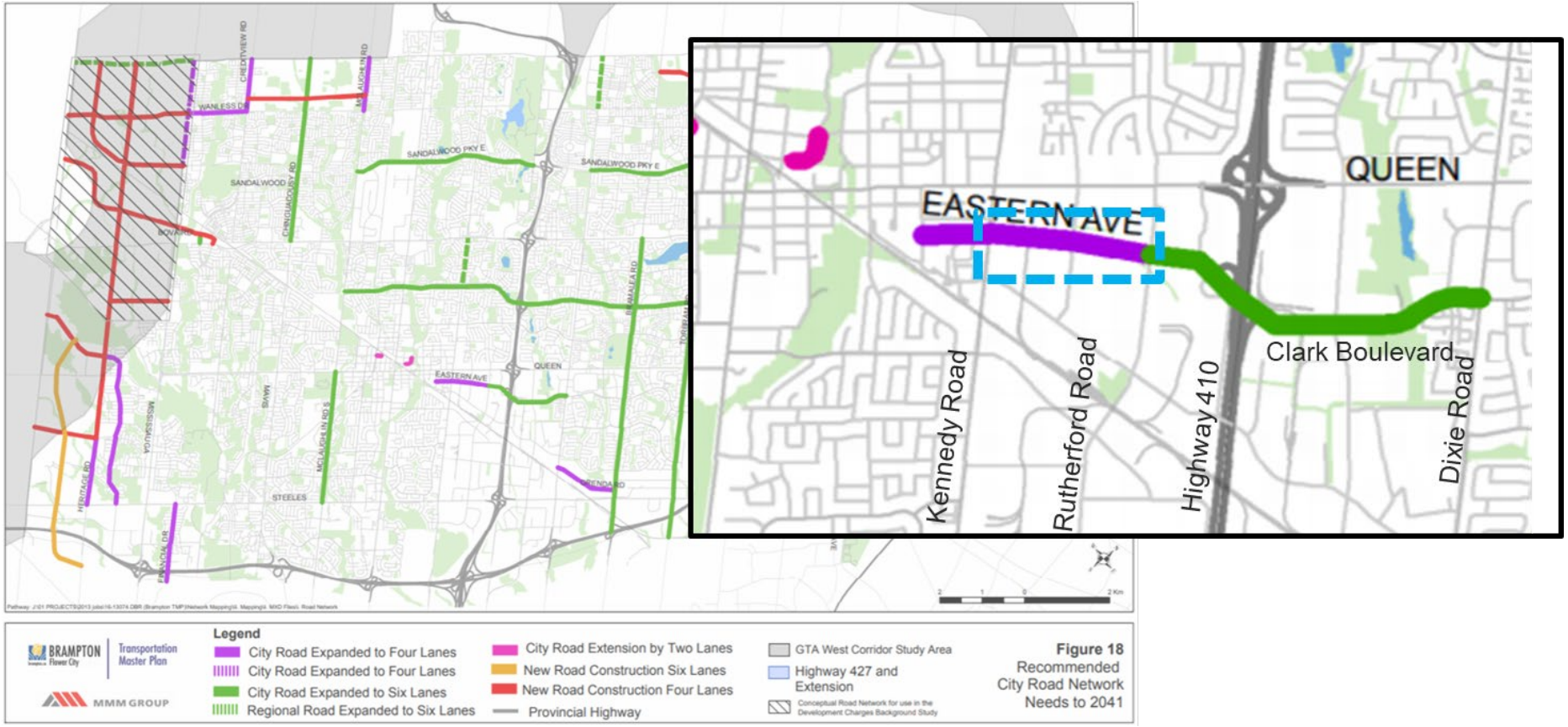


Figure 1-6. City of Brampton Transportation Master Plan, 2015 – 2041 Road Network

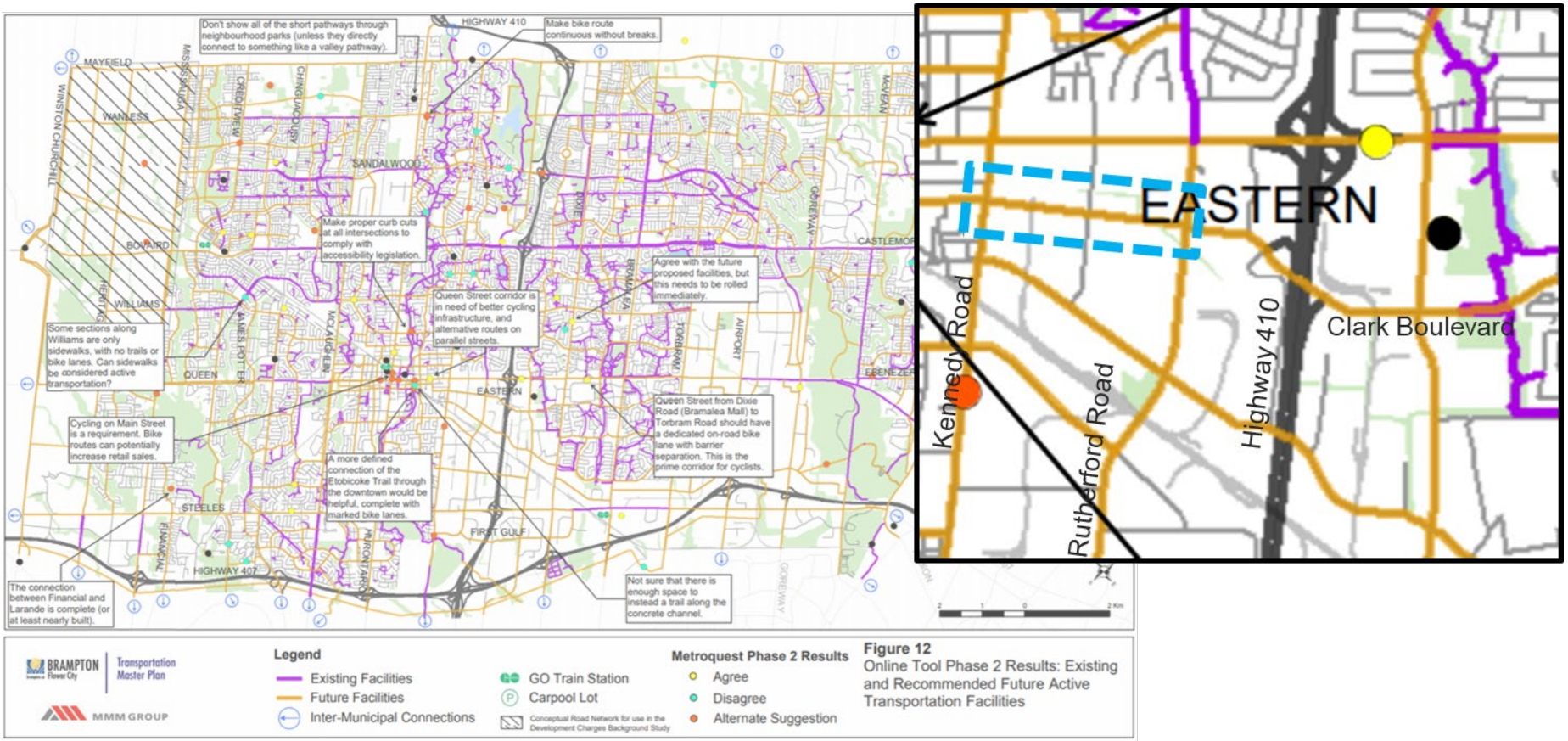


Figure 1-7. City of Brampton Transportation Master Plan, 2015 – Future Active Transportation Facilities

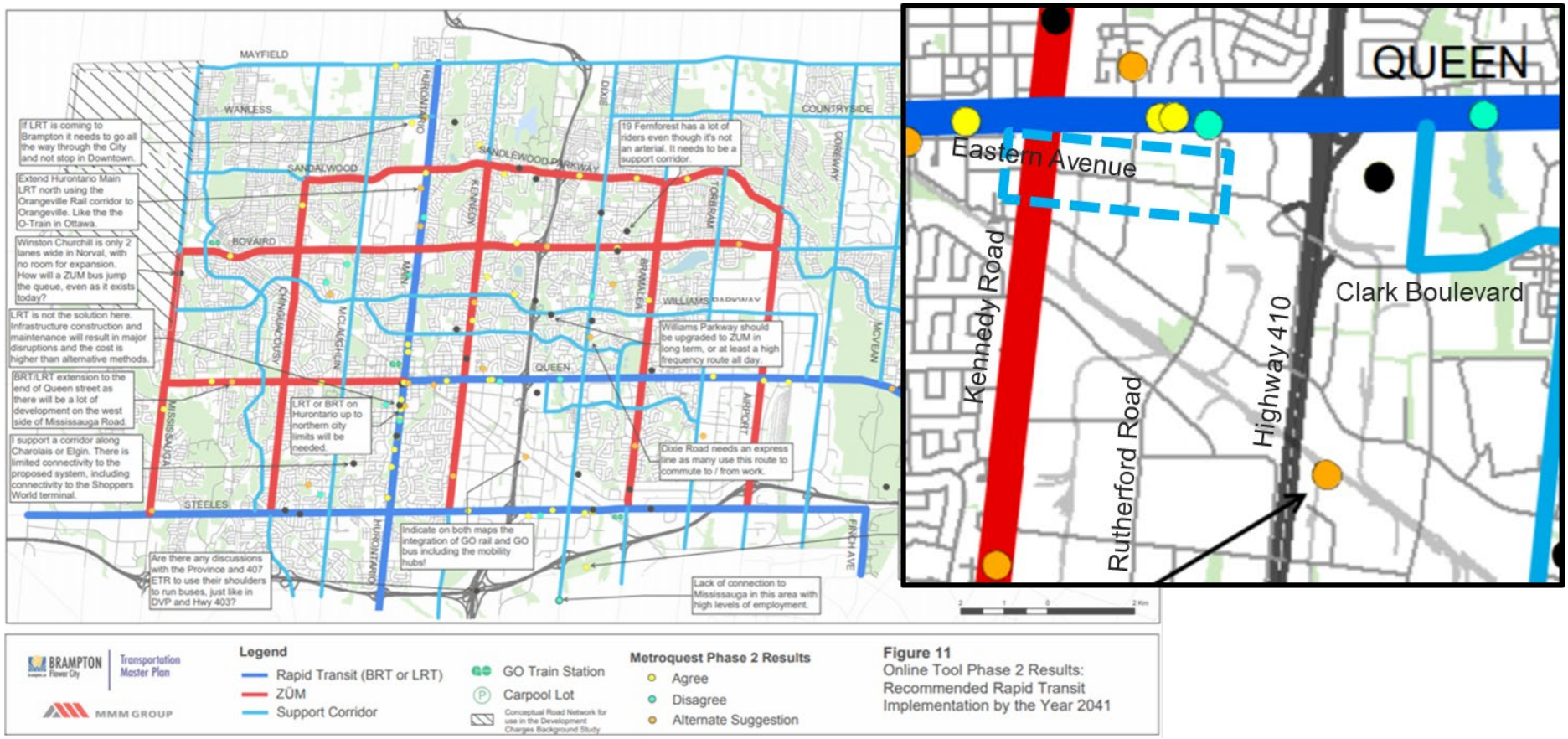


Figure 1-8. City of Brampton Transportation Master Plan, 2015 – 2041 Transit Network

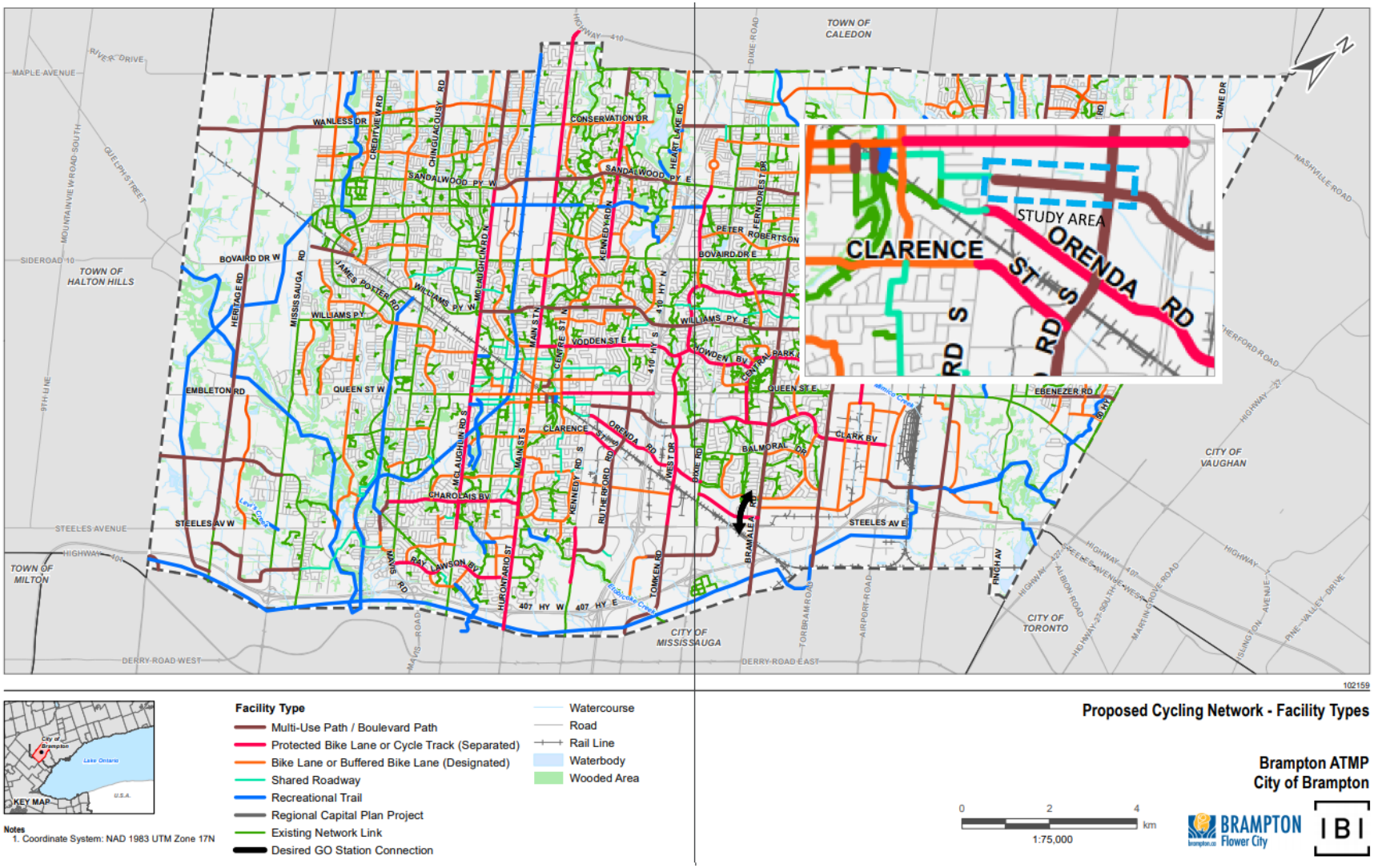


Figure 1-9. Active Transportation Master Plan (2019)

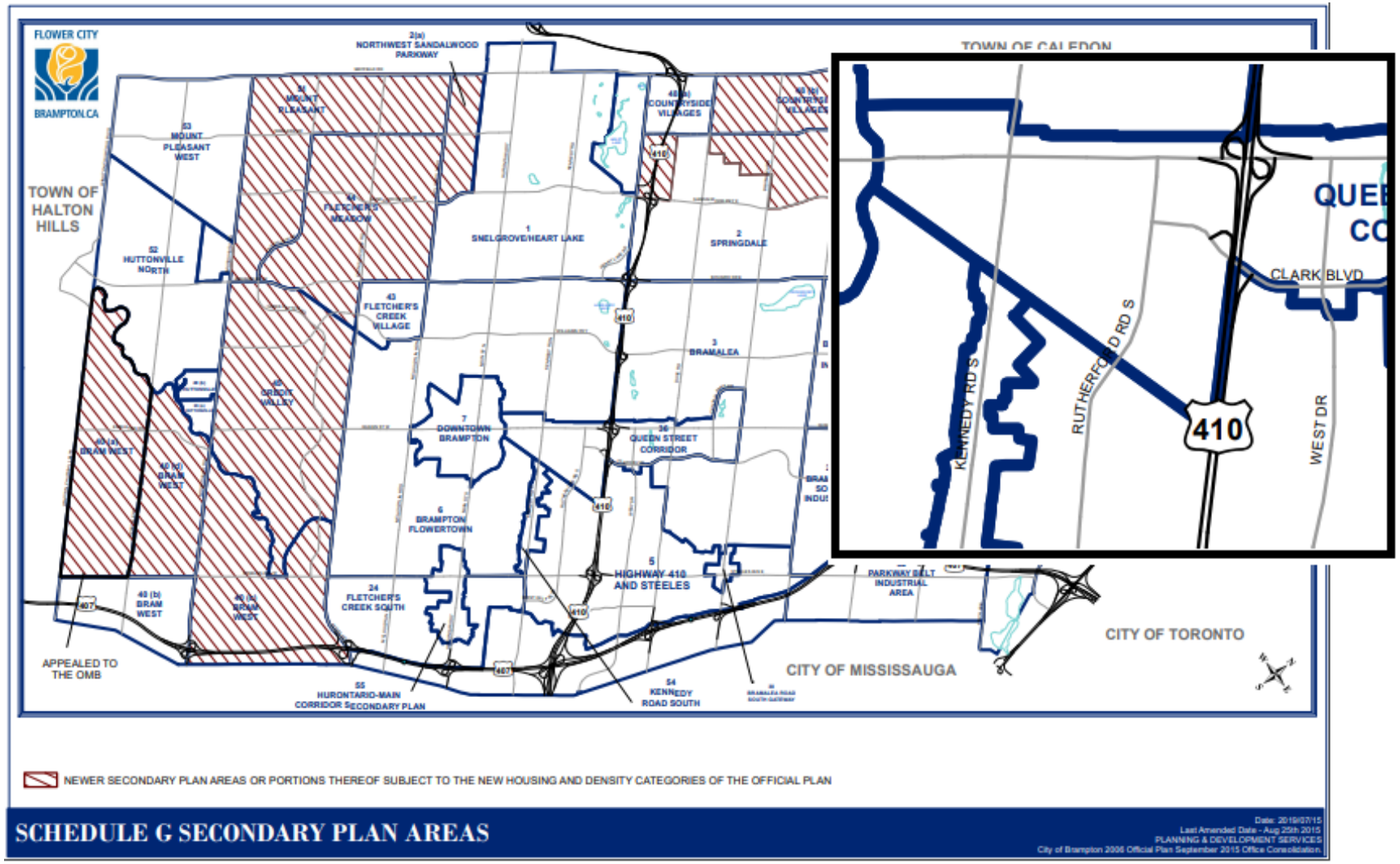


Figure 1-10 City of Brampton Official Plan, 2015 – Schedule G Secondary Plan Areas

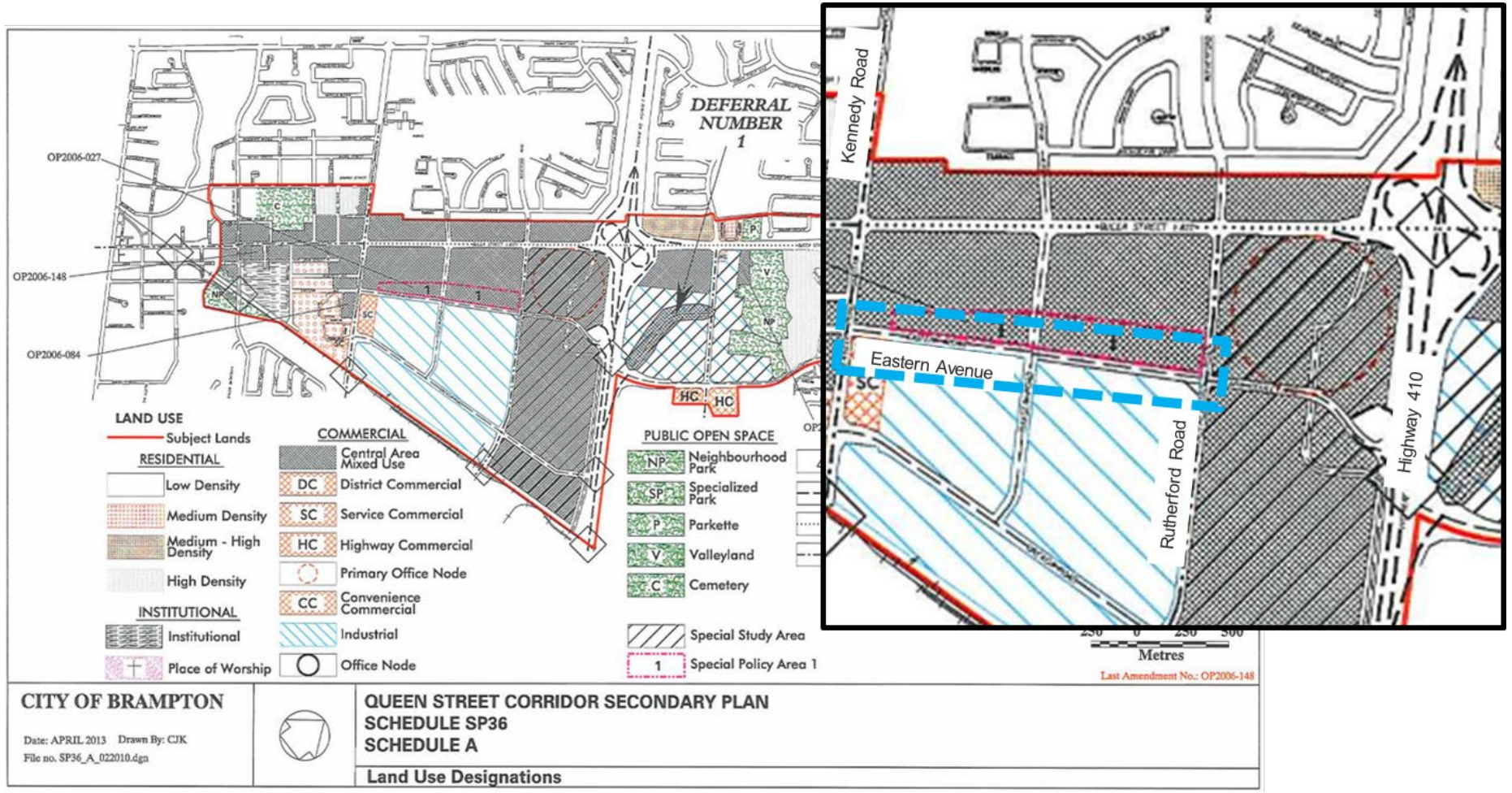


Figure 1-11. Queen Street Corridor Secondary Plan (SP36) and Special Policy Area 1

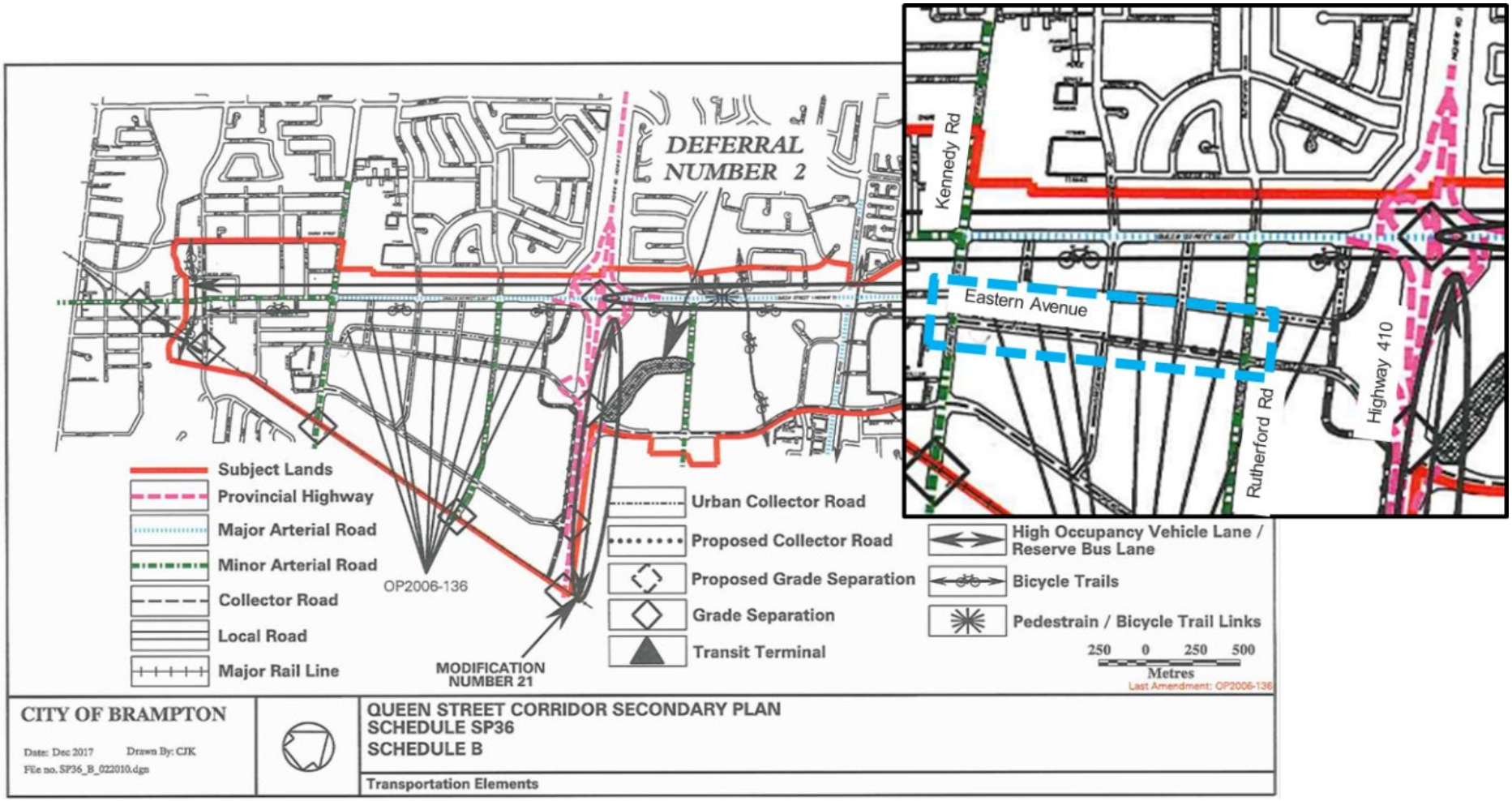


Figure 1-12. Queen Street Corridor Secondary Plan (SP36) and Special Policy Area 1

2 Public and Stakeholder Consultation Process

2.1 Public Consultation Approach

Public input is an important part of the Class EA and the public was presented opportunities to participate in the planning process through a number of public and stakeholder consultation activities. The consultation requirement ensures that interested persons have an opportunity to voice their concerns on projects that may impact them or their environment.

The consultation undertaken for the Class EA Study is outlined herein and supporting materials for consultation with the public, agencies and Indigenous Communities are provided in **Appendix A**, **Appendix B** and **Appendix C** respectively.

A variety of stakeholder groups were identified, including the individual agencies and utilities, Indigenous communities, specific interest groups, and the general public. The stakeholders were contacted throughout the study and encouraged to provide input. Communication with agencies, stakeholders, Indigenous communities and the public took place through:

- Letters
- Emails
- Phone calls
- Notices
- Newspaper advertisements
- City of Brampton project website (http://www.brampton.ca/ClarkBlvdExt)
- Meetings
- Public Information Centres (PICs)

The communication and consultation was conducted in compliance with the Accessibility for Ontarians with Disabilities Act (AODA).

A mailing list of all residents in the study area was kept up-to-date throughout the study. Both resident mailing lists and email lists were revised based on feedback received, including Public Information Centre participant requests to be added to the mailing lists, and those who submitted comments or expressed an interest in the study.

A stakeholder contact list was developed and updated regularly based on responses and comments submitted. New additions to the contact list were sent project notifications. All individuals and agencies on the contact lists were contacted at appropriate stages to inform them of study updates and events, as required.

An overview of the key consultation milestones is provided in **Table 2-1.**

Table 2-1. Key Consultation Milestones

Engagement Strategy	Date
Notice of Commencement	January 24, 2019 – Notice Issued January 24 2019 and January 31, 2019 – Published in the Brampton Guardian Newspaper, newspaper with local circulation
Notice of Online Public Information Centre #1	September 9, 2020 – Notice Issued September 10, 2020 and September 17, 2020 – Published in the Brampton Guardian Newspaper, newspaper with local circulation
Online Public Information Centre #1	September 10, 2020 to October 7, 2020
Notice of Online Public Information Centre #2	October 7, 2021 – Notice Issued October 7 2021 and October 14, 2021 – Published in the Brampton Guardian Newspaper, newspaper with local circulation
Online Public Information Centre #2	October 7, 2021 to November 5, 2021
Notice of Study Completion	December 1, 2022 – Notice Issued December 1, 2022 and December 8, 2022 – Published in the Brampton Guardian Newspaper, newspaper with local circulation

2.2 Study Notifications

2.2.1 Notice of Commencement

The notice of study commencement was published in the Brampton Guardian Newspaper on January 24, 2019 and January 31, 2019. The notice was mailed to contacts on the mailing list including properties within the study corridor, stakeholders and agencies, and indigenous communities. The notice was also placed on the City's EA webpage on January 24, 2019.

2.2.2 Notice of Online Public Information Centre #1 (PIC 1)

The notice of online PIC 1, which detailed the context of the EA study, the virtual nature of the PIC, and the duration of the PIC, was published in the Brampton Guardian Newspaper on September 10, 2020 and September 17, 2020. The notice was mailed by post to members of the public on the mailing list, including properties within the study corridor. The notice was e-mailed to stakeholders, agencies, and indigenous communities on September 10, 2020. The notice was also placed on the City's EA webpage on September 10, 2020.

2.2.3 Notice of Online Public Information Centre #2 (PIC 2)

The notice of online PIC 2, which detailed the context of the EA study, the virtual nature of the PIC, and the duration of the PIC, was published in the Brampton Guardian Newspaper on October 7, 2021 and October 14, 2021. The notice was mailed by post to members of the public on the mailing list, including properties within the study corridor on October 7, 2021. The notice was e-mailed to stakeholders, agencies, and indigenous communities on October 7, 2021. The notice was also placed on the City's EA webpage on October 7, 2021.

2.2.4 Notice of Study Completion

The notice of study completion was published in the Brampton Guardian Newspaper on December 1, 2022 and December 8, 2022. It was mailed by post to members of the public on the mailing list, including properties within the study corridor. The notice was also e-mailed to stakeholders, agencies, and indigenous communities on December 1, 2022 and placed on the City's EA webpage on December 1, 2022.

2.3 Public Information Centres

2.3.1 Online Public Information Centre #1

The first online PIC ran from September 10, 2020 to October 9, 2020 and was organized as a virtual event posted on the project website. The purpose of Public Information Centre #1 was to present the preliminary findings of Phases 1 and 2 (Problem and Opportunity and Alternative Solutions) for the study area to the public and stakeholders and request their feedback.

Members of the public, agencies, and stakeholders were invited to visit the project website at their leisure to review PIC display materials which introduced the study, and provided an opportunity to review the project background, a summary of the needs assessment, alternative solutions, evaluation and the preferred solution. The display boards (pdf) and a video presentation (voiceover format on the display boards) were posted on the project website. Individuals also had the opportunity to leave questions, comments, and concerns by October 9, 2020 through an online survey provided on the project website.

There were 24 slides in the virtual presentation that conveyed the following:

- Overview of the Environmental Assessment process
- Background plans and policies driving the study
- An overview of the corridor characteristics, including land use and the existing physical and environmental features along the corridor
- The walking, cycling, transit and traffic conditions of the corridor
- Problem and Opportunity Statement
- Alternative solutions and evaluation criteria
- Evaluation of alternative solutions, identifying the preferred solutions to be carried forward through the next phase of the EA
- Introduction to roadway cross-section elements that will be considered in the next phase of the study
- Project timelines / next steps and project team contact information

The members of the public who participated in the virtual PIC had comments about the existing conditions of the study corridor, transportation recommendations, drainage concerns and types of solutions that would be considered. A total of sixteen (16) surveys were completed. The following is a synthesis of comments and key messages heard:

- General agreement with the Problems and Opportunities identified on the display boards
- Strong support for continuous cycling and pedestrian facilities along the entire study corridor
- General agreement with the Preferred Solution to address travel demand management, localized intersection and operational improvements, active transportation facilities and widen/construct to four lanes extending Clark Boulevard for a new crossing of the Etobicoke Creek Tributary
- A mixed response for the need to widen the road to accommodate an additional lane in each direction for vehicles

Survey questions also asked about preferences regarding active transportation facility types, treatments of pedestrians and cyclists at intersections and streetscaping opportunities. In general there was a preference for: street trees / landscaping, new traffic signals (where warranted), crossrides and crosswalks at intersections to provide dedicated crossing space for cyclists and pedestrians, multi-use paths, vehicular lanes, and transit amenities / improvements.

Individual responses were issued to those that shared comments and are documented in the comment-response tracking log. The summary of PIC#1 feedback received and responses is provided in **Appendix A.**

2.3.2 Online Public Information Centre #2

The second online PIC ran from October 7, 2021 to November 5, 2021 and was organized as a virtual event posted on the project website. The purpose of Public Information Centre #2 was to present the preliminary findings of Phases 3 (Alternative Designs) for the study area to the public and stakeholders and request their feedback.

Members of the public, agencies, and stakeholders were invited to visit the project website at their leisure to review PIC display materials which introduced the study, and provided an opportunity to review the project background, a summary of the needs assessment, alternative solutions, evaluation and the preferred solution. The display boards (pdf) and a video presentation (voiceover format on the display boards) were posted on the project website. Individuals also had the opportunity to leave questions, comments, and concerns by November 5, 2021 through an online comment form provided on the project website.

There were 24 slides in the virtual presentation that conveyed the following:

- Overview of the Environmental Assessment process
- Summary of the previous PIC and its findings
- A list of in-progress and completed technical studies

- An overview of the alternative widening, active transportation, and road alignment design concepts for the study corridor
- Evaluation criteria
- Evaluation of alternative design concepts, identifying the preferred alternative design
- An overview of the preliminary preferred design
- Project timelines / next steps and project team contact information

The members of the public who participated in the virtual PIC had comments about traffic signals, the proposed active transportation facilities to be implemented, and traffic congestion. A total of ten (10) surveys were completed. The following is a synthesis of comments and key messages heard:

- Strong belief that the proposed changes will help alleviate congestion along the corridor and surrounding streets (Queen Street)
- General agreement with the recommendation to widen Eastern Avenue on both the north and south sides to balance and minimize impacts
- General agreement with the recommendation to align the extension of Clark Boulevard about a more direct alignment curving east of the tributary
- A mixed response for the recommendation of dual boulevard cycle tracks on the north side and sidewalks on both sides

Individual responses were issued to those that shared comments and are documented in the comment-response tracking log. The summary of PIC#2 feedback received and responses is provided in **Appendix A.**

2.4 Agency Consultation

Agencies including federal departments, provincial ministries, and municipalities were contacted for information, comments, and input to the study. The list of agencies contacted includes:

- Department of Fisheries and Oceans Canada
- Transport Canada
- Environment Canada
- Indigenous and Northern Affairs Canada
- Ministry of Environment, Conservation and Parks (MECP)
- Ministry of Indigenous Relations and Reconciliation
- Ministry of Community Safety and Correction Services
- Ministry of Housing, Sport, Tourism, and Culture Industries (MHSTCI)
- Ministry of Economic Development and Trade
- Ministry of Health and Long-Term Care
- Ministry of Municipal Affairs
- Ministry of Transportation (MTO)
- Ministry of Natural Resources and Forestry (MNRF)
- Toronto and Region Conservation Authority (TRCA)
- Peel Region
- Peel Region Public Health
- Peel Region District School Board
- Dufferin Peel Roman Catholic Separate School Board
- Brampton Historical Society
- CN Rail

The following agencies requested to be removed from the mailing list:

- Ministry of Transportation (MTO)

Further information can be found in **Appendix B.**

2.4.1 Technical Advisory Committee (TAC)

A Technical Advisory Committee (TAC) was formed consisting of select agency representatives who expressed an interest in actively participating in the study. The TAC included representatives from:

- Peel Region
- Peel Public Health
- CN Rail
- Toronto and Region Conservation Authority (TRCA)

The first TAC meeting was held on August 20, 2020 prior to the first Public Information Centre to introduce the study, present the existing and future conditions of the study corridor, problem and opportunity statement, alternative solutions, and evaluation and identification of the preferred solution. Representatives from CN Rail, TRCA and Region of Peel participated.

The second TAC meeting was held on September 24, 2021 in advance of the second PIC to present the evaluation of the preferred alternative designs for Active Transportation (AT) facilities, widening, and alignment of the Clark Boulevard extension from Hansen Road to Rutherford Road, and preliminary preferred design of the study corridor.

Individual meetings were held with agencies as required.

TAC and key agency meeting minutes are provided in **Appendix B.**

2.5 Stakeholder Consultation

Stakeholders including adjacent landowners, residents, ratepayer groups, and business associations were identified through the Stakeholder Sensitivity Analysis and/or by requests submitted to the Project Team. The list of stakeholders consulted during the study includes:

- Brampton Cycling Advisory Committee
- Canadian Association of Retired Persons
- Building Industry and Land Development Association (BILD)
- Brampton Board of Trade
- Environmental Advisory Committee
- Heritage Board
- Accessibility Advisory Committee
- Economic Development Committee
- Community and Public Services Committee

- Planning and Infrastructure Services Committee
- Corporate Services Committee
- Brampton-Caledon Smart Commute
- Smart Commute
- West Brampton Church of God
- Student Transportation of Peel Region (STOPR)
- Peel Senior Link
- Peel Environmental Youth Alliance
- Fight Gridlock
- One Brampton

2.5.1 Stakeholder Group (SHG)

A Stakeholder Group (SHG) was formed consisting of select members of the public who expressed an interest in actively participating in the study. The SHG included representatives from the following:

- Arcam Holdings Inc.
- Peel Plastic Products Limited
- Kallo Developments
- Mt. Zion Fellowship
- API Solutions
- Brookfield

The first SHG meeting was held on August 25, 2020 prior to the first Public Information Centre to introduce the study, present the existing and future conditions of the study corridor, problem and opportunity statement, alternative solutions, and evaluation and identification of the preferred solution and to collect feedback. Ten (10) SHG members were invited and three (3) participated in the meeting.

The second TAC meeting was held on October 1, 2021 in advance of the second PIC to present the evaluation of the preferred alternative designs for Active Transportation (AT) facilities, widening, and alignment of the Clark Boulevard extension from Hansen Road to Rutherford Road, and preliminary preferred design of the study corridor. Nine (9) SHG members were invited and six (6) participated in the meeting.

SHG meeting minutes are provided in **Appendix A.**

2.6 Indigenous Consultation

The Indigenous consultation program for the EA study involved representatives from the following groups. The list of representatives who may have an interest in the study was identified from the January 31, 2019 Ministry of Environment, Parks and Conservation (MECP)'s response letter to the Notice of Commencement. The Indigenous Communities are:

- Six Nations of the Grand River;
- Haudenosaunee Confederacy Chiefs Council;
- Mississaugas of the Credit First Nation; and

- Huron-Wendat Nation

Indigenous representatives were included in the mailing list for the project and were contacted through study notices sent via email. They were invited to participate in the study by providing input through direct correspondence with the project team and in the online Public Information Centres via the project website. Contact information from the mailing list was updated as required throughout the study. The notice of commencement was circulated with a letter and response form by email. The notice of PICs were circulated along with individually addressed letters via email. In December 2021 the project team followed up with individual phone calls to each Indigenous group to inquire about any comments or feedback on the study.

Specific comments and requests from the Indigenous groups included the following:

- In response to the Notice of Study Commencement, Huron-Wendat Nation requested an update to the project contact
- The Huron-Wendat Nation requested a copy of the Stage 1 Archaeological Assessment Report and was provided with a copy in April 2020. No comments were provided on the report
- In response to the follow-up call in December 2021 Huron-Wendat requested to continue to be kept informed on the study
- In response to the follow-up call in December 2021 Six Nations of the Grand River provided updated contact information and the project team circulated previous correspondence to the updated contact

A summary of correspondence with Indigenous Communities is provided in **Appendix C.**

3 Existing and Future Conditions

3.1 Existing Features

Key features in the vicinity of the study corridor shown in **Figure 3-1** include:

- Industrial and commercial land use with several direct accesses to Eastern Avenue that are closely spaced
- One watercourse (Tributary to Etobicoke Creek)
- Subdivisions located west of the study area which consist of low to medium density residential properties with homes fronting Eastern Avenue west of Kennedy
- CN Rail crossing that is an unprotected (without warning systems) at-grade-crossing with a CN Railway Industrial Spur Line.

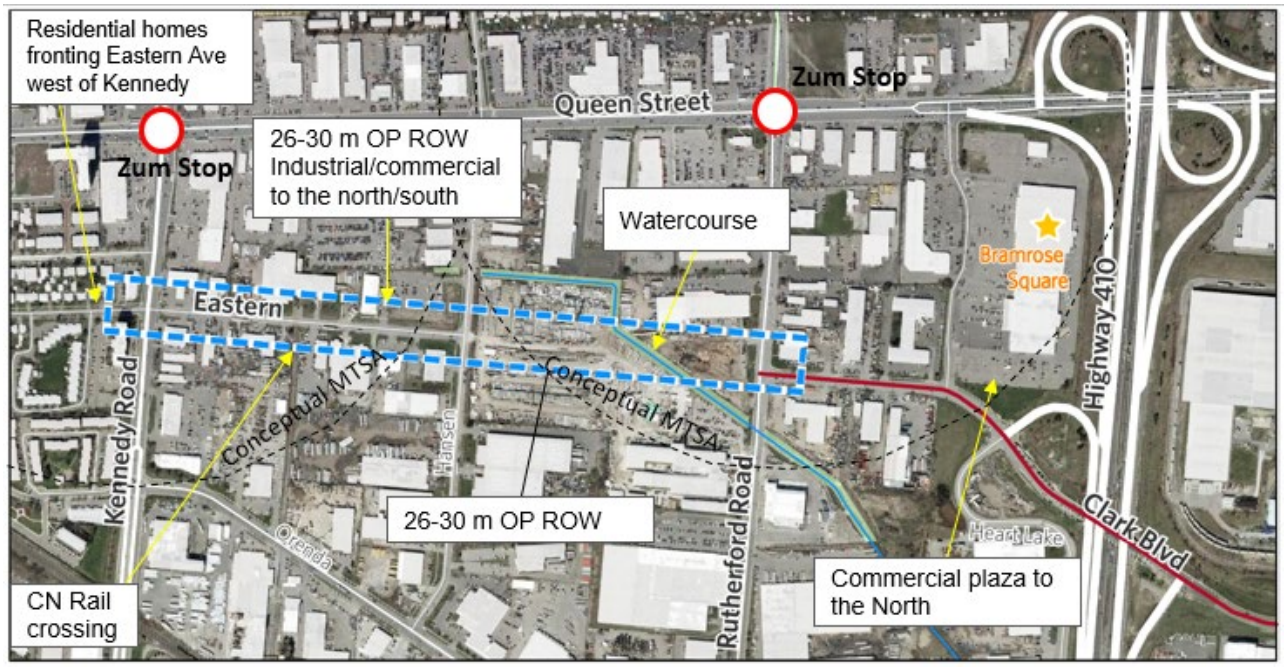


Figure 3-1. Existing Conditions in Proximity of the Study Area

3.2 Local Context and Growth

3.2.1 Population and Employment Growth

The City of Brampton's growth is increasing and expected to continue to grow. As such, the transportation system and other infrastructure must be prepared to accommodate future growth.

According to forecasts documented in the City of Brampton's Transportation Master Plan, 2015, the City's population is expected to grow from 523,900 people in 2011 to 899,500 people in 2041. Meanwhile, employment is projected to increase from 182,000 in 2011 to approximately 325,200 in 2041. This results in growth in Brampton of approximately 72% increase in population and 79% increase in employment from 2011 to 2041. The projected population and employment growth is shown in **Figure 3-2**.

Figure 3-2. City of Brampton Population and Employment Growth between 2011 and 2041

3.2.2 Land Use

The existing land uses adjacent to the Clark Boulevard / Eastern Avenue EA study corridor are generally industrial, commercial and residential. Surrounding facilities include a concrete plant, auto parts shop, collision centre, and dental office. There are no institutional areas within direct access of the study area. An inventory of the businesses along the study corridor can be found in **Appendix D.**

The future land use designations along the corridor and surrounding area near the study corridor are shown in **Figure 1-5** and are identified as Central Area as per the City's Official Plan. The study area also falls within the boundaries of a Special Policy Area where it will become a transition area between industrial land use and mixed land use.

As per the City's Queen Street Secondary Plan 36 (see **Figure 1-11**), the corridor is served as a dividing line between lands designated as Central Area Mixed Use to the North and Industrial to the South. In addition, there are opportunities for development and intensification of the employment lands, including Peel Memorial Centre for Integrated Health and Wellness and Bramalea City Centre.

The City of Brampton Council endorsed the Preliminary Queen Street East Precinct Plan in January 2020, as framework to advance public and private investments in the area. The plan

includes 60,000 residential and 83,000 employment targets in a vibrant, urban, and mixed-use community; enhanced pedestrian and cyclist movement that embraces human-scaled streets, and wide pedestrian sidewalks and connections that integrate with an urban greenway.

At the time of writing of this report the City of Brampton is investigating the potential for a new fire hall with direct access to Rutherford Road and potential for direct access to the new Clark Boulevard Extension. The site configuration and layout is under study.

3.3 Transportation Conditions

A summary of the transportation and traffic analysis completed for the study is documented in the following section. The discussion addresses the existing and future transportation network needs with respect to accommodating all users (vehicles, transit, pedestrians, cyclists, and trucks), network capacity, and traffic safety. Additional details are provided in the Transportation Analysis Report in **Appendix E**.

3.3.1 Study Area and Existing Road Network

The Clark Boulevard / Eastern Avenue EA study corridor is comprised of two sections:

- Existing Eastern Avenue from Kennedy Road to Hansen Road South
- Clark Boulevard-Eastern Avenue Extension from Hansen Road South to Rutherford Road

In addition to the EA study area, a broader transportation modelling focus area was identified to undertake the transportation analysis. The broader area was used to assess network impacts and benefits of the missing link between Eastern Avenue and Clark Boulevard. The broader transportation modelling focus area is bounded by Queen Street, Steeles Avenue, Kennedy Road, and Bramalea Road. The EA Study Area and Modeling Focus Study Area are illustrated in **Figure 3-3.**

Figure 3-3. Study Area and Modelling Focus Area

Within the EA study corridor the existing 450m portion of Eastern Ave is a two lane rural minor arterial road between Kennedy Road and Hansen Road South. The posted speed limit is 50km/h and the road is under the jurisdiction of the City of Brampton. Eastern Avenue then terminates at its intersection with Hansen Road and approximately 450m east, is an intersection of Clark Boulevard and Rutherford Road. As per the City of Brampton Official Plan (2015 Office Consolidation), the EA study corridor is classified as a minor arterial road with an ultimate right-of-way (ROW) of 26-30 metres.

West of the study corridor, Eastern Avenue continues as a two lane minor collector road with posted speed limit of 50km/h under the City of Brampton jurisdiction.

East of the study corridor, Clark Avenue continues as a four lane major arterial road with posted speed limit of 50km/h under the City of Brampton jurisdiction.

There are three intersecting roads within the EA study corridor. Ordered from west to east they are:

Kennedy Road:

- Regional arterial road that provides north-south access to the study area
- Posted Speed Limit of 50 km/h
- Stop-controlled on Eastern Avenue
- Peel Region jurisdiction (Regional Road 16)

Hansen Road

- A 2-lane rural local road that provides north-south access to the study area
- Posted Speed Limit of 50 km/h
- Stop-controlled on Eastern Avenue

- City of Brampton jurisdiction

Rutherford Road

- A 4-lane urban collector road that provides north-south access to the study area
- Posted Speed Limit of 60 km/h
- Signalized intersection with Clark Boulevard
- City of Brampton jurisdiction

Immediately north of the study corridor Queen Street is an east-west roadway under Peel Region jurisdiction. Immediately south of the study corridor is Orenda Drive which is a four lane minor arterial with posted speed of 50km/h under the City of Brampton jurisdiction.

East of the study corridor an Environmental Assessment Study was completed by the City of Brampton in 2012 for Clark Boulevard Improvements from Rutherford Road to east of Dixie Road (referred as the 2012 EA study). The 2012 EA study recommended widening Clark Boulevard to five through lanes (three westbound and two eastbound) from Rutherford Road to Highway 410 east ramp and six through lanes from Highway 410 east ramp to the easterly project limit. At the time of writing of this report the City is reassessing the 2012 EA recommendations referred to as the Traffic Reassessment (TR) study. Improvements to the Eastern Avenue / Clark Boulevard EA study corridor between Kennedy Road and Rutherford Road (subject of this EA) were assessed in parallel to alternatives considered for the TR Study.

3.3.2 Auto

3.3.2.1 EXISTING TRAFFIC CONDITIONS

The existing vehicular level of service (VLOS) for the corridor between Kennedy Road and Rutherford Road was assessed using results from the travel demand (2011) model and the existing conditions (2018) Synchro and VISSIM model. The travel demand model assessed the broader transportation modelling focus area, using the City's travel demand model which was calibrated for the study area. Several screenlines on parallel roads next to the study corridor were used to understand the overall traffic conditions as shown in **Figure 3-4**. Synchro and VISSIM models were developed for the study corridor to examine the existing intersection operations in both AM and PM peak hours. Synchro is used to estimate the volume to capacity (v/c) ratio for individual intersection movements. VISSIM (microsimulation software) is used to analyze existing vehicle delay, Level of Service (LOS), and queue length (95th percentile).

Based on the intersection capacity analyses results, all of signalized and unsignalized intersections within the study area are operating well with overall v/c ratio of less than 1 with reserved capacity during both the AM and PM peak hours. Between Kennedy Road and Hansen Road, users are expected to experience very little delay. The congested speed is the same as the free-flow speed. The segment has a good VLOS.

The detailed assessment is provided in the Transportation Analysis Report in **Appendix E.**

Figure 3-4: Screenline V/C Ratio, 2011 Peak Hour, Peak Direction

3.3.2.2 FUTURE CONDITIONS

Future traffic demands were studied for the horizon years 2031 and 2041 to understand future conditions for the corridor. In the future Do Nothing scenarios, no roadway improvements for the study corridor were assumed relative to the existing conditions for Eastern Avenue / Clark Boulevard between Kennedy Road and Rutherford Road.

Traffic volumes along the study corridor were developed for the future 2031 and 2041 Do Nothing scenarios. In the 2041 Do Nothing scenario, most segments are expected to operate with traffic volumes exceeding the road capacity. At a screenline level (shown in **Figure 3-5**), all screenlines are either approaching capacity or exceeding capacity, clearly indicating the need for transportation improvements .

Synchro and VISSIM models were developed for the study corridor to examine future intersection operations in both AM and PM peak hours. Based on the intersection capacity analyses, the following individual movements are operating at V/C ratio 1.00 or worse in the PM Peak Hour for the Do Nothing scenario:

- Eastern Avenue at Kennedy Road – eastbound left/thru/right, westbound left, westbound thru/right
- Clark Boulevard at Rutherford Road – westbound right, northbound left/thru, northbound/right, southbound left

The following individual movements are operating at LOS E or worse in the PM peak hour in the Do Nothing scenario:

- Eastern Avenue at Kennedy Road South – westbound left, westbound thru
- Clark Boulevard at Rutherford Road South – northbound thru, northbound right

The 2041 Do Nothing vehicular LOS (VLOS) for the study corridor is summarized in **Figure 3-6**. In the Do Nothing scenario, Clark Boulevard between Kennedy Road and Rutherford Road are expected to experience some delay (approximately one minute of delay), mainly due to turning movements at the intersection of Eastern Avenue and Kennedy Road. The congested travel speed is approximately 50% compared to the free flow speed. The vehicular level of service is E, which still meets the minimum level of service target. However traffic is congested on a screenline level. The east-west screenlines between Kennedy and Rutherford are expected to be operating over capacity (v/c>1), and significant congestion is expected for Queen Street and Steeles Avenue. This indicates the need for the missing link between Hansen Road and Rutherford Road to provide additional east-west capacity.

The detailed assessment is provided in the Transportation Analysis Report in **Appendix E.**

Screenline Volume / Capacity Ratio

<0.85 | 0.85-1.0 | >=1.0

Figure 3-5: Screenline V/C Ratio, 2041 Do Nothing Peak Hour, Peak Direction

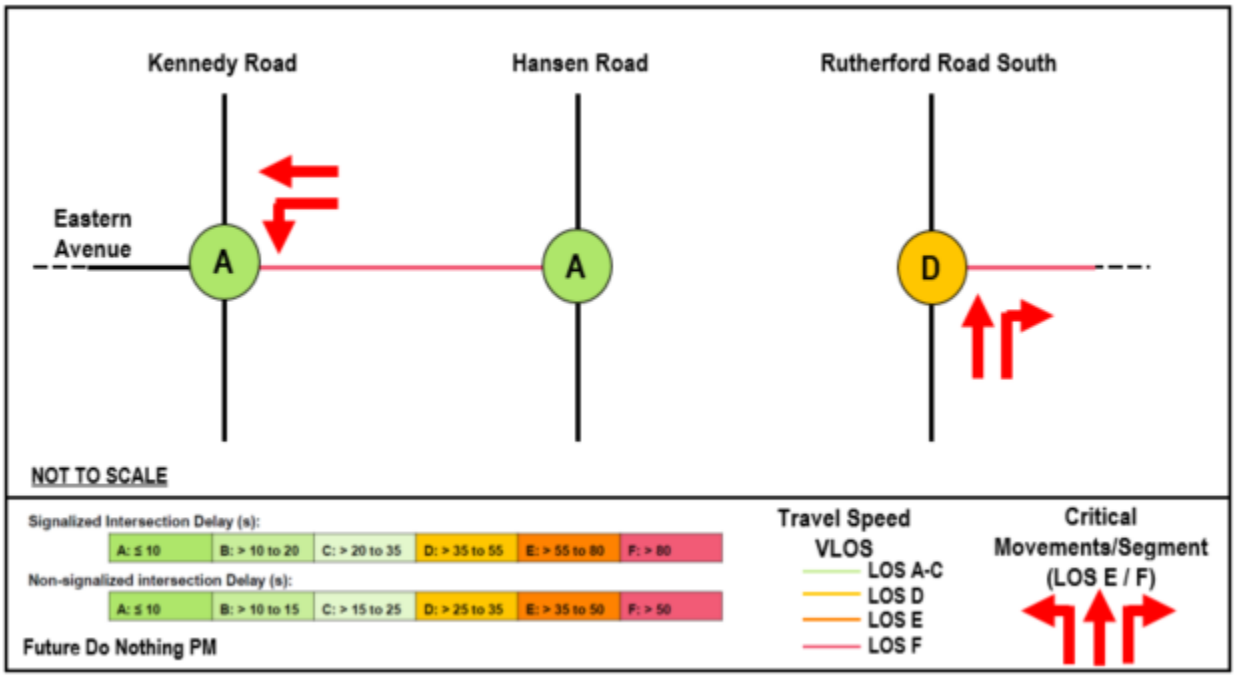


Figure 3-6. Future Do Nothing (EA) VLOS and Critical Movements Diagram

3.3.3 Walking

The existing pedestrian environment does not include pedestrian facilities with the exception of the discontinuous sidewalks at 80 Eastern Avenue. Along the corridor there are open ditches and an existing uncontrolled rail crossing east of Kennedy Road. There are no pavement markings at the Eastern Avenue intersection with Hansen Road.

The pedestrian analysis considered the pedestrian environment at intersections and mid-block, given a pedestrian's experience is determined by the conditions between crossings and at the crossing itself. The analysis followed the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines [1] modified based on available information and the specific context of this study. Additional details on the analysis and methodology are documented in **Appendix E.** The existing pedestrian level of service (PLOS) at roadway segments and signalized intersections is illustrated in **Figure 3-7.**

There are opportunities to improve the existing walking conditions of the study area.

[1] Multi-Modal Level of Service (MMLOS) Guidelines, City of Ottawa, 2015
http://app05.ottawa.ca/sirepub/cache/2/pdwh4kw1cx5zejkujpxihx3q/31504612102017052352250.PDF

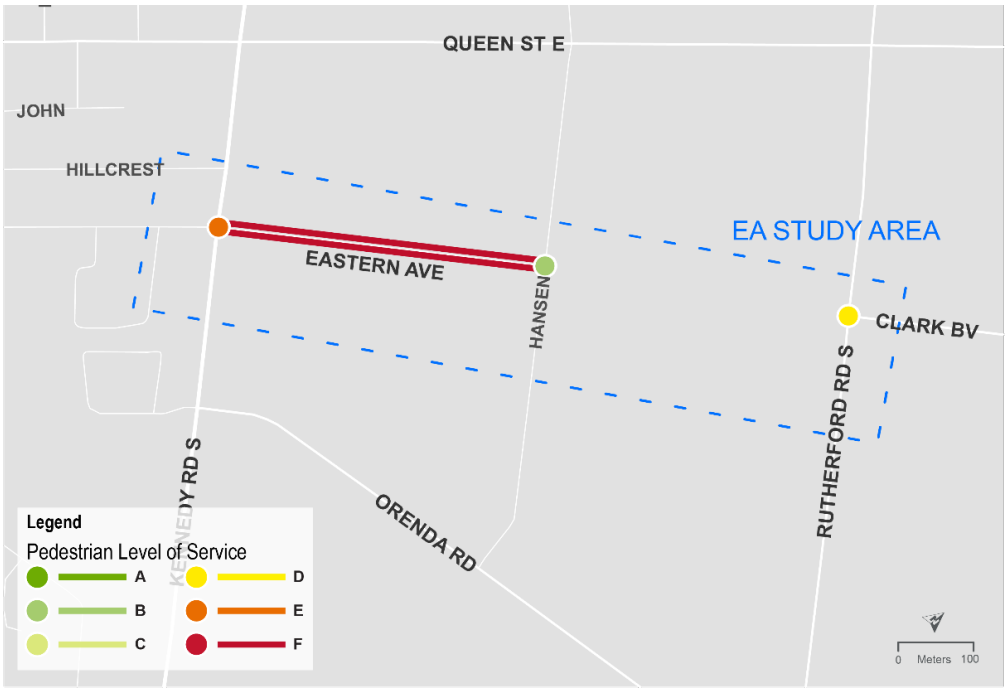


Figure 3-7: Pedestrian Level of Service (PLOS)

3.3.4 Cycling

The existing cycling environment does not include any dedicated bicycle facilities along the corridor. As noted previously, along the corridor there are open ditches, an existing uncontrolled rail crossing east of Kennedy Road, and no pavement markings at the Eastern Avenue intersection with Hansen Road.

The cycling analysis considered the cycling environment at intersections and mid-block, given a cyclist's experience is determined by the conditions between crossings and at the crossing itself. The analysis followed the City of Ottawa MMLOS Guidelines modified based on available information and the specific context of this study. Additional details on the analysis and methodology are documented in **Appendix E.** The existing bicycle level of service (BLOS) at roadway segments and signalized intersections is illustrated in **Figure 3-8.**

There are opportunities to improve the existing cycling conditions of the study area.

Figure 3-8: Bicycle Level of Service (BLOS)

3.3.5 Transit

There are no transit routes that currently operate on Eastern Avenue.

Routes 7 and 7A MiWay transit service currently operate along Kennedy Road within the study area. North of the study area Zum stations and stops provide transit service along Queen Street East. Refer to **Figure 3-9** for City of Brampton's Transit Network.

There are opportunities to provide transit service along the study corridor and implement efficiencies in transit routes and transit connections in the overall network.

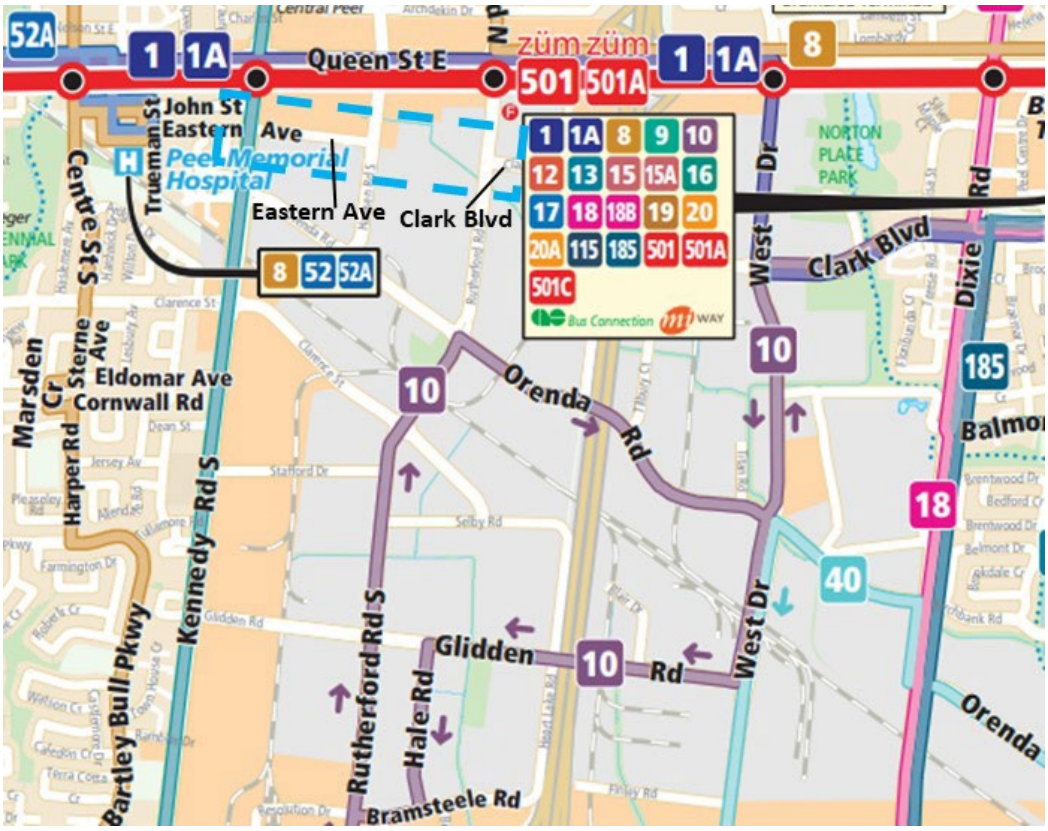


Figure 3-9. 2018 City of Brampton Transit Network

3.3.6 Truck

The truck level of service (TkLOS) analysis followed the City of Ottawa MMLOS Guidelines and focused on how the street layout facilitates efficient and safe truck operation. The segment level considered street width and curb lane width, and the signalized intersection level considered the effectiveness of the turning radius and number of receiving lanes on the departing leg of each turn. Additional details on the analysis and methodology are documented in **Appendix E.** The existing truck level of service (TkLOS) at roadway segments and signalized intersections is illustrated in **Figure 3-8.**

Overall the corridor has good truck level of service, due to wide curb lane width and large corner radii at intersections.

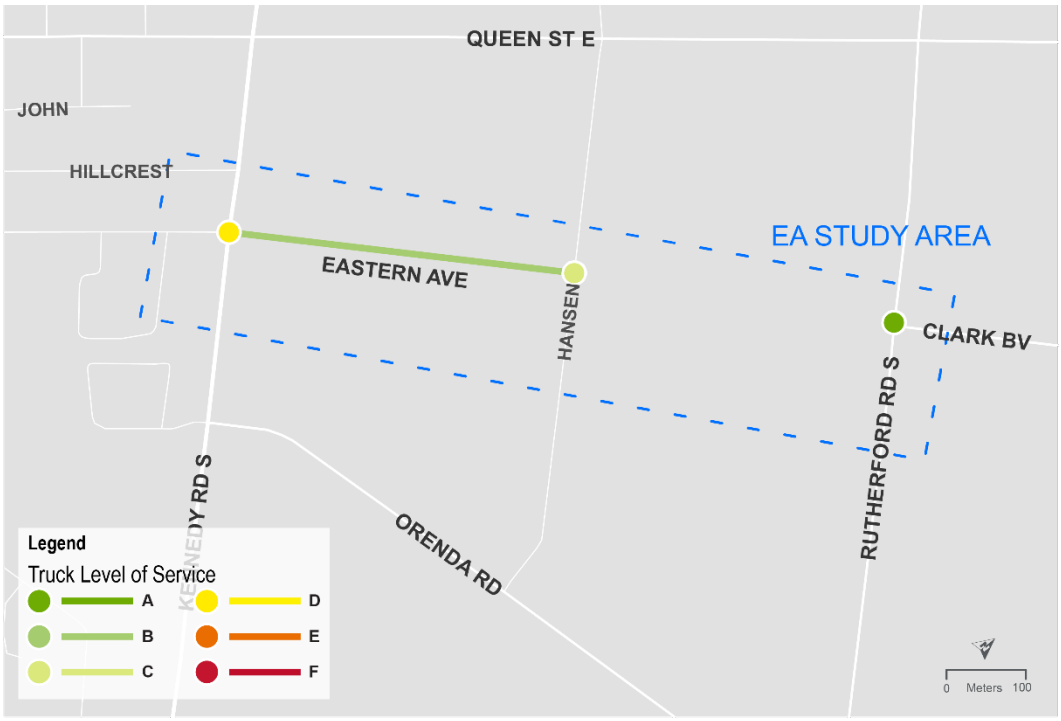


Figure 3-10: Truck Level of Service (TkLOS)

3.3.7 Traffic Safety

The City of Brampton provided collision records for the most recent 5 years between 2014 and 2018. The majority of the collision data observed during this period were attributed to the intersections at Eastern Avenue / Kennedy Road, Eastern Avenue / Hansen Road and Clark Boulevard/ Rutherford Road.

At the intersection of Eastern Avenue / Kennedy Road the analysis showed 12 collisions within the 5-year period with 50% of the collisions occurring in 2017. The majority of the collisions occurred during daylight (60%) and clear (83%) conditions. Property Damage (PD) collisions accounted for 75% of the collisions, while non-fatal injury accounted for 25% of the collisions. The relatively high number of angle collisions may indicate the users' disregard of stop control intersection rules.

An additional two collisions were reported on Eastern Avenue between Kennedy Road and Hansen Road and at the intersection of Eastern Avenue at Hansen Road. Both collisions were classified under the category of clear environmental conditions. The collision on Eastern Avenue between Kennedy Road and Hansen Road occurred in July 2013 and was classified as PD Only, while the collision on Eastern Avenue at Hansen Road occurred in May 2017 and was classified as PD Only

At the intersection of Clark Boulevard/ Rutherford Road the analysis showed 25 collisions within the 5-year period. The majority of the collisions occurred during daylight (84%) and clear (72%)

conditions. Property Damage (PD) collisions accounted for 92% of the collisions, while non-fatal injury accounted for 4% of the collisions. The relatively high number of rear end collisions at a signalized intersection may indicate disregard for safe distance between vehicles.

A breakdown of the collisions for the intersections as well as the full collision analysis is provided in **Appendix F**.

A geometric review was carried out to examine the existing geometric elements against applicable design standards. This included a review of horizontal and vertical alignments, minimum stopping sight distance, lane widths, pavement crossfall, clear zone, street lighting, intersections, driveways, pavement markings and signage, the existing at-grade crossing and the observation of on-street parking. Some design parameters did not meet the current design standards and identify opportunities to improve the design of the corridor with the identified improvements.

In particular access spacing and sight distances for driveways and intersections along Eastern Ave were reviewed and the existing layout for driveway accesses are shown in **Figure 3-11.** The spacing between accesses was analyzed based on Transportation Association Canada (TAC) Driveway Spacing Guidelines (Section 3.2.9.8).

The general spacing of accesses meet the minimum spacing requirements for the commercial / industrial land use, with the exception of the two accesses shown in red circle in **Figure 3-11** which are adjacent to one another. Several accesses along Eastern Avenue present opportunities for consolidation. Consolidation of accesses would reduce conflict points which will in turn enhance safety along the corridor.

Sightlines were also analyzed based on TAC guidelines for departure sight. Accesses along Eastern Ave generally don't have any slight line obstruction from on-coming vehicles, as there are very few signs or roadside obstructions along the corridor. Accesses generally have wide radii with no curb lines, which were designed to accommodate commercial vehicles. Thus it was concluded that the intersections within the study area are compliant with the TAC sightline guidelines.

Approximately 200m east of Kennedy Rd on Eastern Ave is an existing rail crossing that leads to a maintenance and service facility. The rail track currently services low volumes, however, the need for potential upgrades to the existing crossing should be considered for future alternatives where increased traffic and active road users are expected and to meet current and applicable crossing guidelines in consultation with the rail.

The details of the geometric review are provided in **Appendix F**.

Figure 3-11. Existing Driveway Access – Eastern Avenue

3.3.8 Summary of Multi-modal Level of Service

The methodology employed for this study to assess the existing transportation environment is primarily based on the City of Ottawa MMLOS Guidelines, modified based on available information and the specific context of this study. The methodology included LOS for all modes of travel: vehicle (VLOS), transit (TLOS), bicycle (BLOS), walk (PLOS), and truck (TkLOS). Rather than examining the ability of a road to “move vehicles”, the methodology recognizes the mobility, comfort, safety, and convenience of all modes with an emphasis on “moving people”.

The minimum level of service (LOS) targets were identified for the different modes (vehicle, transit, pedestrian, bicycle, truck) in the study corridor. The minimum level of service targets for different modes were based on land use and planning context including the City’s Transportation Master Plan (TMP), Official Plan (OP), Secondary Plan (SP) and City’s 2040 Vision. Based on the City’s Secondary Plan 36 the corridor is served as a dividing line between lands designated as Central Area Mixed Use to the North and Industrial to the South. There are opportunities for development and intensification of the employment lands, including Peel Memorial Centre for Integrated Health and Wellness and Bramalea City Centre.

The existing levels of service for each mode (vehicle, transit, pedestrian, bicycle, truck) were assessed based on existing conditions. The existing LOS conditions was then compared with the minimum LOS targets. The vehicular LOS and truck LOS satisfied the target, and the transit LOS slightly fell below the LOS target. On the other hand, the pedestrian and bicycle LOS were much worse than the minimum targets, indicating the needs for improvements.

In the future 2041 conditions the transit, pedestrian, and cycling LOS are noted as the same as the existing conditions in the Do Nothing scenario. The vehicular LOS and truck LOS satisfy the target, although there is the need to improve the east-west movement capacity on a screenline level. The pedestrian and bicycle LOS are much worse than the minimum targets, indicating the needs for improvements.

The detailed MMLOS assessment is documented in **Appendix E.**

3.4 CN Rail Crossing

The Eastern Avenue rail crossing between Kennedy Road South and Hansen Road South is an unprotected (without warning systems) at-grade-crossing with a CN Railway Industrial Spur Line. The crossing is located at Mile 0.45 of the Industrial Spur, which branches off the North Main track of the CN Halton Subdivision at Mile 14.10. It was considered a low rail volume, low rail frequency Spur Line off the Halton Subdivision serviced by local work trains during non-peak hours.

The existing roadway carries 2 lanes of traffic (without a median), gravel shoulders and an existing drainage ditch running beneath the tracks on both north and south boulevards with concrete culverts. North of Eastern Avenue is an existing rail garage where two tracks service the garage and converge into one track just south of Eastern Avenue. The industrial rail track is restricted to a maximum of 10MPH.

The crossing is without warning systems such as gates and signals. There are faded pavement markings east and west of the crossing along with small rail crossing signage, located immediately east and west of the crossing. There is no rail crossing ahead signage nor advanced pavement markings to denote a rail crossing, nor stop signs. There are no sidewalks. Hydro poles and illumination are located on the south boulevard.

At the time of writing of this report it is noted that the City has retains ownership of the Rail Spur Line in its entirety, the northerly spur line (Orenda to Eastern) is not in use and the portion of the spur line south of Orenda is being used by IKO Industries Ltd., which borders it on both sides.

3.5 Natural Environment

A high level summary of the natural environment can be found in the following section. For a more comprehensive assessment of the natural environment within the study corridor, please refer to the Natural Environment Assessment Report in **Appendix G.**

3.5.1 Aquatic Environment

The engineered drain in the study area is characterized by a relatively shallow channel flowing through a heavily disturbed industrial area within the vicinity of Clark Boulevard and Eastern Avenue. The watercourse, which is a tributary to the Spring Creek, and its associated floodplain are regulated under the TRCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 166/06).

No aquatic vegetation was observed. The engineered drain is lined with cement block, and east of Rutherford Road is perched. Extensive debris is present throughout, with glass and barbed wire found throughout.

During the field assessment (June 25, 2019), no fish or other aquatic organisms were observed during the field survey.

Numerous barriers to fish movement are potentially present in the vicinity of the study area, suggesting poor connectivity for fish species. The watercourse was not found to support any fish species during the fish community assessment completed in 2019, although the channel is likely to provide indirect fish habitat as it provides flow to fish habitat downstream.

3.5.2 Vegetation

The majority of the surrounding land is comprised by industrial properties with associated parking lots and roadways. Vegetation communities are described in **Table 3-1**:.

Table 3-1: Vegetation Communities Identified within the Study Area

ELC Ecosite Type	ELC Description	Environmental Characteristics
FOD7	Fresh-Moist Lowland Deciduous Forest	This lowland deciduous forest community is associated with the riparian area along the watercourse. Within the canopy, it is dominated by Manitoba Maple (*Acer negundo*), Green Ash (*Fraxinus pensylvanica*), and Crack Willow* (*Salix fragilis*). The sub-canopy is dominated by Common Buckthorn* (*Rhamnus cathartica*), Little-leaf Linden (*Tilia cordata*), and Manitoba Maple. Understorey vegetation is comprised of Common Buckthorn, Tartarian Honeysuckle* (*Lonicera tatarica*), and Choke Cherry (*Prunus virginiana*). The groundcover layer is dominated by Garlic Mustard* (*Alliaria petiolate*), Tall Goldenrod (*Solidago altissima*), Spiked Sedge (*Carex spicata*), and Dame's Rocket* (*Hesperis matronalis*). Soil sampling within this assessment unit resulted in a soil moisture regime of 6, which is representative of wetland but does not function as such due to channelization and the surrounding impermeable surfaces. Anthropogenic litter, debris and dense fill provide little ecological integrity within the riparian edge of the FOD7 community. *Highly invasive, non-native species.
CV	Constructed	This constructed site contains marginal open space and lacks any significant natural features. Few natural features are present beyond planted roadside trees and the area is indicative of highly anthropogenic disturbances.

A tree inventory was completed in July 2019 by a certified arborist. The Tree Inventory documented 274 trees consisting of 22 species, of which 32 trees are within or near the right of way and the remaining 242 are in the channel corridor of the watercourse. No Species At Risk (SAR) or Species of Conservation Concern were inventoried. A high proportion of inventoried trees are non-native species (~42%) dominated by European Ash and Norway Maple that have naturalized the channel corridor. The majority of the native trees (60%) are Manitoba Maple which is a fast growing tree that colonizes disturbed areas. Nearly all of the Green Ash trees inventoried displayed evidence of infestation by Emerald Ash Borer.

A bat habitat assessment was also completed within the Study Area. The findings identified 71 candidate bat roost trees for Little Brown Myotis and Northern Myotis and 108 candidate foliage bat roost trees for Tri-colored Bat (Maples and Oaks).

3.5.3 Wildlife

In total, 106 bird species have been reported from the vicinity of the study area. Thirteen (13) of these species were documented within the study area during field surveys, of which 8 species displayed evidence of possible, probable or confirmed breeding within the study area. A total of 9 Species At Risk (SAR) / Species of Conservation Concern (SCC) birds are reported from the background review data. Additionally, 36 bird species of regional concern are reported from background review data .

Based on various background data sources, the following have been reported in the vicinity of the study area: 9 reptile and amphibian species, 15 odonata species, 23 butterfly species and 27 mammal species.

A complete list of all species reported from the study area is provided in **Appendix G.**

3.5.4 Designated Natural Areas

There are no designated natural areas within the study corridor. No wetlands, significant wildlife habitats (SWH), and habitats of endangered and threatened species were round within the study corridor. Aquatic habitat within the study area includes a small engineered drain tributary of Spring Creek and Etobicoke Creek that does not provide fish habitat.

3.6 Built Heritage and Cultural Landscape Features

The results of background historical research and a review of secondary source material revealed a study area with a rural land use history dating back to the early nineteenth century, with commercial and industrial development and land use emerging in the mid-twentieth century. A field review was conducted for the entire study area to document any additional potential cultural heritage resources.

Background research, data collection, and field review was conducted for the study area and it was determined that there are no identified cultural heritage resources located within and/or adjacent to the study area. Based on the results of the assessment, the following recommendations have been developed:

1. The study area does not retain any potential cultural heritage resources, and as a result does not require further heritage assessment;
2. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources; and,
3. This report should be submitted to heritage planning at the City of Brampton, the Ministry of Tourism, Culture and Sport, and any other relevant stakeholders that may have an interest in the project.

The Built and Cultural Heritage Report is provided in **Appendix H.**

3.7 Archaeology

The Stage 1 Archaeological Assessment study determined that there are no previously registered archaeological sites are located within one kilometre of the Study Area. The property inspection determined that the Study Area does not exhibit archaeological potential.

In light of these results, the following recommendations are made:

1. The Study Area does not retain archaeological potential on account of deep and extensive land disturbance. These lands do not require further archaeological assessment; and,
2. Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

The Stage 1 Archaeological Assessment Report is found in **Appendix I.**

3.8 Fluvial Geomorphology

The Geomorphological Assessment Report is provided in **Appendix J.**

An extension of Clark Boulevard will require one to cross a minor Tributary of Etobicoke Creek, which runs diagonally across the study limits. As such, geomorphological services were required to assess the erosion hazard associated with the watercourse, inform future crossing requirements (e.g., crossing size and configuration), and evaluate the need for erosion protection and channel realignment in the vicinity of the Clark Boulevard extension.

Upstream (west) of Hansen Drive, field observations revealed multiple roadside drainage pathways. The ditch along Eastern Avenue was predominantly lined with sod. The ditch along Hansen Road consisted of a linear swale overgrown with cattails, which fed into an elevated catch-basin at the Tributary of Etobicoke Creek crossing. The drainage pathway opposite the Hansen crossing (eastward) was piped within ~20 m of the roadway. The flow pathways ultimately converged within a 2100 mm concrete culvert below Hansen Road.

The culvert discharged into a 10 m wide, steep-walled, linear valley. The valley was heavily forested and littered with debris (e.g., trash, rubble, etc.), which had become entangled in the dense network of overhanging branches. The debris line extended to approximately 2 m in

height, which was suggestive of past high-flow conditions. The entire length of channel was reinforced with an interlocking grid of enlarged concrete blocks / bricks. The protective treatment extended partially up the channel banks to a height of approximately 0.75 m. The treatment was generally exposed throughout, aside from several short stretches of channel that were inundated with sediment due to the occurrence of litter-based debris jams. A significant portion of the treatment had failed. For instance, a significant portion of the bricks were dislodged or had become outflanked due to overbank scouring. Additionally, numerous trees were documented to have grown into or over the treatment, further exacerbating its structural integrity. The presence of the erosion-resistant treatment inhibited scouring and the formation of any variable channel bed morphology (e.g., riffles and pools). Erosional forces were instead directed towards the banks, which displayed indications of widening.

Channel substrates consisted predominantly of fine materials and small gravels, which occupied the interstitial space between bricks. Fresh deposits of sand were also observed in the overbank. Sediment input was likely driven by bank erosion and inputs from urban sources.

The channel bent sharply southward 200 m from Hansen Road, where an adjoining culvert contributed a trickle of flow into the creek. Multiple culverts stemming from the adjacent industrial / commercial lots were observed throughout the study reach. One such culvert, located approximately 100 m from Rutherford Road, discharged a concentrated, light, odorous slurry, which blanketed the channel bed. The slurry of unknown substance was eventually filtered through a woody-based obstruction.

The Rutherford Road crossing consists of a 1.9 m concrete culvert enveloped in slumping gabion basket. Downstream of Rutherford Road, the culvert is joined by two others, which fed into an oversized pool. All three culverts are perched. The channel reach downstream of Rutherford Road followed a step-pool morphology. Aerial imagery revealed the reach was realigned in 2016. The “steps” were armourstone-based and were separated by overwidened pools. The first armourstone step was relatively elevated, limiting fish passage upstream.

The low flow channel of the study reach of the Tributary to Etobicoke Creek ranged from 1.6 m to 5.0 m in width, and 0.40 m to 1.15 m in depth. However, true bankfull parameters were significantly larger, estimated in the range of 6 m in width and 2 m in height (approximately equivalent to the debris line). Bankfull indicators were difficult to discern with accuracy due to the heavily-modified nature of the channel.

3.9 Drainage and Stormwater Management

The project study area is located within the watershed of Etobicoke Creek. The Toronto and Region Conservation Authority has jurisdiction with respect to drainage and stormwater management of the Etobicoke Creek Watershed. Within the study area is an engineered drain connected to a tributary to Spring Creek.

Within the study limits, Eastern Avenue west of Kennedy Road has an urban cross-section with a storm sewer system discharging to the storm system along Kennedy Road. Eastern Avenue from east of Kennedy Road to Hansen Road has a rural cross-section with ditches and culverts conveying flow in an easterly direction towards the ditch on the northeast corner of the Eastern

Avenue and Hansen Road intersection. The ditch conveys flows towards the north and ultimately outfalls to the engineered drain connected to Spring Creek Tributary.

Eastern Avenue and Clark Boulevard is discontinuous between Hansen Road and Rutherford Road. In this location there is an existing manufacturing plant at 35 Rutherford Road. The manufacturing plant lands drain to the engineered drain via ditch inlet catchbasins that discharge directly to the drain through several concrete pipe outlets.

At the eastern study limits, Clark Boulevard east of Rutherford Road has an urban cross-section with a storm sewer system discharging to the trunk storm system along Rutherford Road. The trunk system outfalls to the tributary to Spring Creek.

There is no transverse drainage crossing of Eastern Avenue / Clark Boulevard for the engineered drain. The watercourse crossing at Rutherford Road is outside of the study limits.

The Drainage and Stormwater Management Report is found in **Appendix K.**

3.10 Geotechnical Investigations

The detailed Geotechnical Investigations Report can be found in **Appendix L.** The borehole investigation field program was carried out between August 16 and September 23, 2021 and consisted of drilling and sampling a total of twenty five (25) boreholes. Groundwater conditions were observed in the open boreholes throughout the drilling operations. Monitoring wells were installed in selected boreholes to permit monitoring of the groundwater levels at the site. The monitoring wells consisted of 50 mm diameter PVC pipe with a slotted screen sealed at a selected depth within the borehole

Eastern Avenue is currently a two-lane rural cross section. The existing travel lanes comprise a flexible pavement, with unpaved gravel shoulders. Drainage of surface water along the existing corridor is managed through open ditches on both sides of the roadway. The ditches direct drainage towards the east and Hansen Road where it is directed into the Etobicoke Creek tributary located approximately 85 m north of Eastern Avenue. The tributaries of Etobicoke Creek represent the major drainage features in the area and flow southerly into Lake Ontario.

The current condition of the pavement surface on Eastern Avenue is considered **Good**, with predominant pavement distresses consisting of few, low severity longitudinal wheel path cracking; few, low severity longitudinal joint cracking; and few, low severity transverse cracking.

The existing pavement structure encountered in the boreholes on Eastern Avenue generally consisted of 160 mm to 300 mm of asphalt overlying 440 mm to 790 mm of granular base. The granular road base generally consisted of gravelly sand to sand and gravel, with trace to some silt. In the Boreholes drilled through the unpaved shoulders of Eastern Avenue, the granular road base was encountered at the surface and was approximately 0.7 m thick.

Boreholes were drilled along Eastern Avenue between Kennedy Road and Hansen Road. The boreholes were located within the paved travelled lanes of Eastern Avenue as well as the gravel shoulders and ditches.

The subsurface stratigraphy encountered in these boreholes generally consisted of a pavement structure or topsoil overlying silty clay to clayey silt fill or native clayey silt which was further underlain by silty sand till. Further descriptions of the individual strata are presented below.

Four boreholes were drilled in the proposed general location for the Clark Boulevard creek crossing. Two boreholes were drilled on the west side of the creek and two boreholes were drilled on the east side of the creek. The subsurface stratigraphy encountered in these boreholes generally consisted of mixed fill which was generally underlain by native sands and silts soils and sand and silt tills, over shale bedrock in two of the boreholes.

3.11 Hydrogeology

The purpose of the hydrogeological investigation was to conduct a preliminary assessment of hydrogeological conditions, evaluation of potential construction dewatering requirements and methods, anticipated methods, Permit To Take Water (PTTW) requirements, discharge requirements, and disposal of options for groundwater collected from dewatering operations and mitigation options.

The Study Area is located within the Peel Plain physiographic region. The Peel Plain is characterized by a level to undulating topography gradually sloping towards Lake Ontario with surficial soil comprising a thin lacustrine clay underlain by till. The predominant physiographic landform within the study area is comprised of Bevelled Till Plains. The surficial geology of the Study Area generally comprises of fine textured glaciolacustrine deposits of silt and clay and interbedded flow till composed of rainout deposits and silt and clay.

Groundwater quality samples were collected from selected wells for the purpose of considering disposal options and potential treatment needs at a preliminary level. The results provided are representative of the water sampled from the selected wells at the time of sampling and provide a general understanding of groundwater quality under those conditions; however, the water quality may vary significantly from the results obtained based on location, time, meteorological conditions, and in particular based on construction and dewatering methods.

The existing groundwater levels taken at monitoring wells are provided in **Table 3-2**. The measurements were taken manually and reflect the groundwater conditions on the dates they were measured and are anticipated to fluctuate within seasonal variations in precipitation and snow melt.

Table 3-2: Measured Groundwater Levels

Borehole	Date	Measured Water Level	
		Depth (mbgs)	Elevation (masl)
BR-03	October 27, 2021	1.91	213.27
	November 4, 2021	1.46	213.73
	November 23, 2021	1.52	213.66
BR-04	October 27, 2021	2.24	213.43

Borehole	Date	Measured Water Level	
		Depth (mbgs)	Elevation (masl)
	November 4, 2021	2.09	213.58
	November 23, 2021	2.13	213.54
EA-05	November 4, 2021	1.09	221.33
	November 23, 2021	1.21	221.21
EA-14	November 23, 2021	0.54	217.54

Notes: mgbs – metres below ground surface
masl – metres above sea level

The groundwater chemical testing results of both the field filtered sample and the unfiltered sample are presented in the report. The concentrations of several parameters in the unfiltered groundwater samples collected exceeded the Bylaw limits for discharge to a storm sewer including: Fecal Coliform, Phenols, Total Arsenic, Total Chromium, Total Copper, Total Manganese, Total Nickel, Total Suspended Solids and Total Zinc. The concentrations of parameters are greatly reduced in the filtered samples but Phenols and Total Manganese still exceed the Bylaw limits for discharge to a storm sewer. It is expected that groundwater would require treatment prior to discharge into surface water or any storm sewers. Treatment to remove suspended sediment and associated metals, and possible adjustment of the temperature if discharging to surface water, would likely be the minimum requirements

The detailed hydrogeological Investigations can be found in **Appendix M.**

3.12 Overview Phase 1 Environmental Site Assessment (ESA)

An Overview Phase One ESA was prepared in general accordance with Ontario Regulation (O. Reg.) 153/04 in respect of the records review, Site Reconnaissance, and evaluation of information. However, interviews were not included in the scope of this Overview Phase One ESA. The purpose of the study was to determine the likelihood for the presence or absence of areas of potential environmental concern (APECs) where one or more contaminants of concern may have impacted the land, in or under the Project Alignment through an evaluation of the contributions of potentially contaminating activities (PCAs) in the Phase One Study Area; and to determine if a Phase Two ESA is necessary, and if so, to provide a basis for carrying out the Phase Two ESA.

The findings of the Overview Phase One ESA identified a number of PCAs along the Project Alignment and in the Phase One Study Area. In general, the PCAs located at and upgradient to the Project Alignment, and proximal to the Project Alignment at cross-gradient or down-gradient locations, were considered to have a potential to impact the soil and groundwater, and therefore, contribute to APECs within the Project Alignment. A total of seven APECs were identified along the Project Alignment.

The PCAs identified on the Phase One Property included fill materials that are anticipated to exist beneath Eastern Avenue and on the industrial properties developed at 25 and 35

Rutherford Road South, railway sidings with associated stained soils, manufacturing of cardboard containers and mattresses at 25 Rutherford Road South, and manufacturing of concrete products, preserved wood products and structural metal products at 35 Rutherford Road South. An autobody shop, and a private fuel outlet with storage tanks were also reported at 35 Rutherford Road South, as well as a spill of 400 L of diesel and 150 L of coolant in 2019.

The PCAs identified in the Phase One Study Area that were considered to contribute to APECs on the Project Alignment included various manufacturing activities; metal fabrication, plating, treatment and coating; dry cleaners; autobody shops; fuel storage tanks, trucking terminals, Brampton Hydro, waste generators and spills.

The Contaminants of Potential Concerns (COPCs) identified within the Project Alignment include metals and inorganics, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, xylene (BTEX), volatile organic compounds (VOCs), acid/base/neutral compounds (ABNs), organochlorine pesticides (OCs), chlorophenols (CPs), 1,4-dioxane, and polychlorinated biphenyl's (PCBs).

Based on an evaluation of the information obtained during the Overview Phase One ESA, a Phase Two ESA involving an intrusive investigation is required to confirm or refute the presence of the COPCs in the soil and groundwater in relation to the PCAs and associated APECs.

Phase One and Two ESAs are also recommended for each conveyance involving property acquisition to accommodate the proposed road widenings and extension. In consideration of the era of the existing buildings in the Study Area, Designated and Hazardous Substance Surveys are recommended for the properties along Eastern Avenue where the Right of Way (ROW) required to widen the road includes a portion(s) of existing buildings(s), if any. In addition, asbestos may be present in the road which should be verified prior to disturbance during construction.

The detailed Overview Phase One Environmental Site Assessment report is provided in **Appendix N**.

Following completion of the Phase One Environmental Assessment, a shallow soil remediation was completed at 25 Rutherford Road to support a Record of Site Conditions (RSC) that was submitted on November 16, 2021. Phase Two Investigations at 25 Rutherford will need to take into consideration the recent remediation completed on the property.

3.13 Source Water Protection

The Clean Water Act, 2006 ensures communities protect their drinking water supplies through prevention – by developing collaborative, watershed-based source protection plans that are locally driven and based on science. As confirmed in correspondence with TRCA in June 2020, the MECP Source Protection Information Atlas indicates that part of the study area is located on land designated as Highly Vulnerable Aquifer (HVA) (Score 6). Refer to **Figure 3-12**.

A Highly Vulnerable Aquifer can be easily changed or affected by contamination from both human activities and human process as a result of its intrinsic susceptibility (as a function of the

thickness and permeability of overlaying layers), or by preferential pathways to the aquifer. As the vulnerability score of the HVA area is only 6, TRCA confirmed there can be no significant drinking water threats. There are no mandatory policies within HVAs.

Where the application of road salt would be a moderate or low drinking water threat, it is encouraged to require a salt management plan, which includes a reduction in the future use of salt, as part of a complete application for development which includes new roads and parking lots.

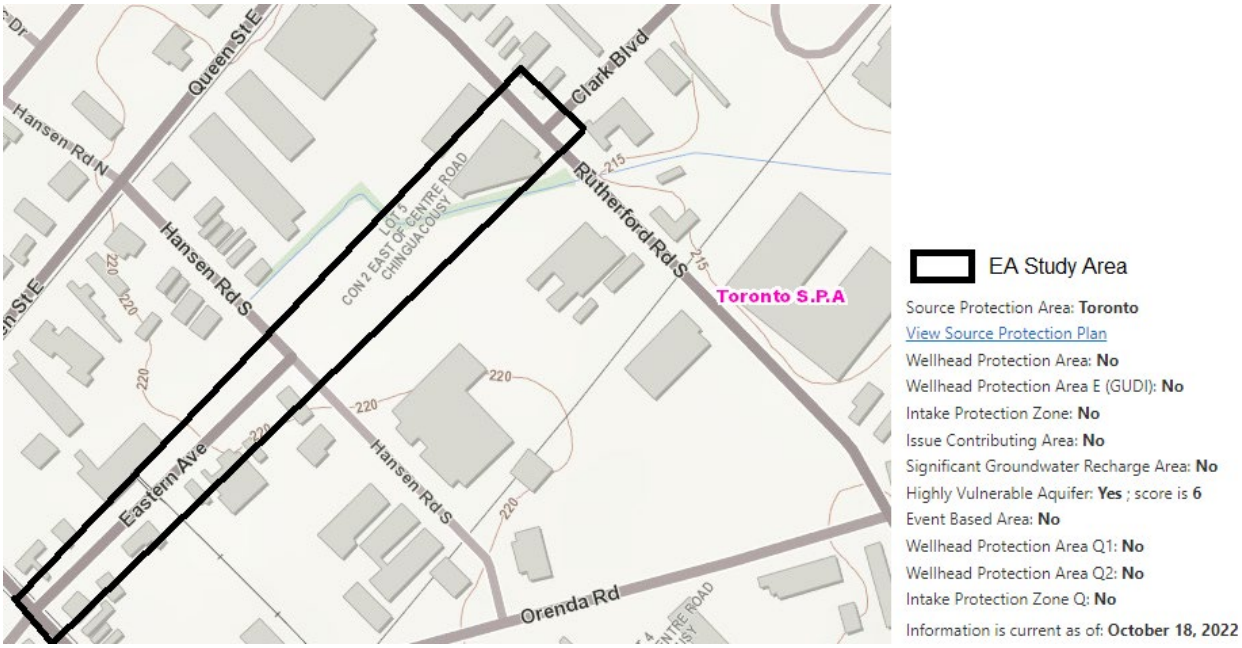


Figure 3-12: MECP Source Protection Information Atlas

3.14 Utilities and Other Services

The following utilities are identified within the study area. A utility investigation (level D) was undertaken during the EA Study. During Detailed Design the location and alignment of existing utilities and municipal services are to be confirmed.

3.14.1 Gas

Enbridge Gas Inc. distributes natural gas through pipes in the study area and adjacent lands. Details regarding infrastructure owned and operated by Enbridge, their characteristics and location are summarized as follows:

- A pipe (NPS 4 SC IP) runs on the south side of Eastern Avenue, crossing Kennedy Road, but does not connect to pipe (NPS 4 ST HP).
- A pipe (NPS 4 ST HP) runs on the south side of Eastern Avenue from Kennedy Road to Hansen Road.
- A pipe (NPS 4 SC HP) runs on the east side of Hansen Road and a pipe (NPS 6 SC HP) runs on the west side of Hansen Road

3.14.2 Telecom

Bell Canada owns and operates telecommunication infrastructure in the study area and adjacent lands. They are composed of the following:

- Conduits on the north side of Eastern Avenue, between Kennedy Road and 120m east of Kennedy Road.
- Conduits on the south side of Eastern Avenue, between Kennedy Road South and 185m east of Kennedy Road.
- Conduits on the south side of Eastern Avenue from 73 Eastern Avenue, crossing over to the north side to 80 Eastern Avenue and running 30m east of Eastern Avenue.
- Conduits on the west side of Hansen Road.

Rogers Canada also owns telecommunications infrastructure in and around the study area, including:

- Buried fiber cables on the north and south side of Eastern Avenue between Kennedy Road and Hansen Road.
- Aerial coaxial cables on the south side of Eastern Avenue between Kennedy Road and Hansen Road.

3.14.3 Hydro

Alectra Utilities (formerly Hydro One Brampton) infrastructure in the study area and adjacent lands is composed of:

- Overhead line crossing Eastern Avenue at 67 Eastern Avenue
- Buried ducts crossing Eastern Avenue at 73 Eastern Avenue
- Buried ducts crossing Eastern Avenue at 79 Eastern Avenue

3.14.4 Water

Region of Peel supplies adjacent properties with freshwater through a watermain along the northside of Eastern Avenue between Kennedy Road and Hansen Road. There is a future waterman through the Clark Boulevard extension area that is scheduled for detailed design in 2020 and construction in 2022.

3.14.5 Storm Water

There are existing ditches on both sides of Eastern Avenue from Kennedy Road to Hansen Road. These ditches drain easterly of Eastern Avenue into a storm sewer ditch inlet located on the northwest corner of Eastern Avenue and Hansen Road. A 525mm CSP pipe crosses Eastern Avenue on the east side of Hansen Road to drain existing ditches on the south side.

3.14.6 Sanitary

Region of Peel has an existing sanitary trunk sewer running along Eastern Avenue from 245m east of Kennedy Road to Hansen Road.

3.14.7 Illumination

There are 11 streetlights attached to existing wooden hydro poles on the south side of Eastern from Kennedy Road to Hansen Road. A map of light poles and utility poles is shown in **Figure**

3-13, and a map of infrastructure, utilities, and resources from the Official Plan (Schedule F) can be found in **Figure 3-14**.

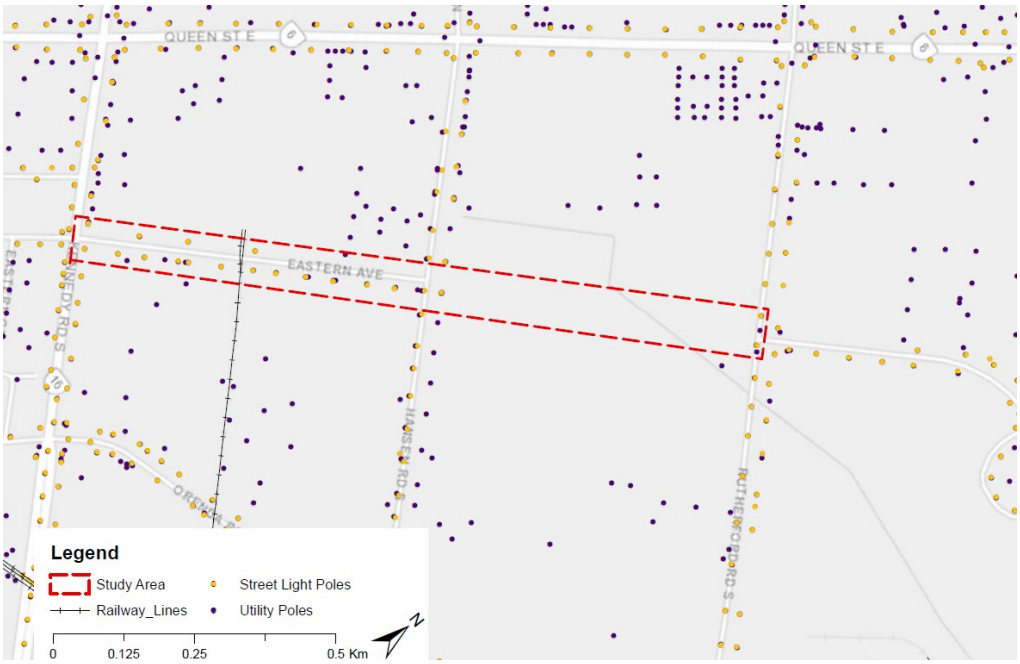


Figure 3-13: Map of Street Light Poles and Utility Poles

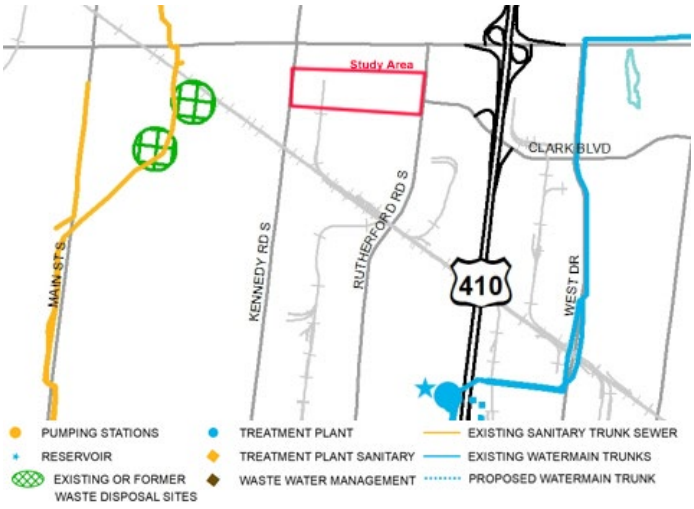


Figure 3-14: Infrastructure Around the Study Corridor

4 Problem and Opportunity Statement

The Clark Boulevard / Eastern Avenue EA study presents an opportunity to improve the study corridor for motorists, pedestrians, cyclists, transit and trucks. The transportation assessment identified the need for the following:

- Provide an east-west link between Hansen Road and Rutherford Road from Eastern Avenue to Clark Boulevard to provide connectivity in the broader road network as recommended in the City of Brampton's Official Plan, 2015. An east-west connection would relieve congestion identified along Queen Street by providing an alternate route on a parallel road.
- Pedestrian and cyclist facilities to accommodate growth and provide connectivity in the larger network as recommended in City of Brampton's Transportation Master Plan, 2015. The lack of active transportation facilities results in low level of service which could be improved if facilities were provided.
- Evaluate opportunities to improve operations at the at-grade CN rail crossing as there are currently no warnings to on-coming vehicles, pedestrians or cyclists.

5 Identification and Evaluation of Alternative Solutions

Alternative solutions (planning alternatives) are functionally different ways of approaching and addressing a problem or opportunity. The Class EA process requires documentation and examination of all reasonable alternatives to address the problem; these are referred to as alternative solutions. A variety of alternative solutions were developed for the Clark Boulevard / Eastern Avenue EA study area. The alternatives range in complexity, cost, and their ability to address the study area issues.

5.1 Development and Evaluation of Alternative Solutions

Each of the planning alternatives considered present a different approach to address the problems and opportunities identified for this study. To determine the most appropriate functional solution for the corridor, the advantages and disadvantages of each alternative solution were evaluated using the information collected from the review of existing and future conditions. This process is outlined below.

5.1.1 Development of Alternative Solutions

The following alternative solutions were considered:

- No-build “Do nothing”
- Limit Development
- Travel Demand Management Initiatives
- Improve Other Roadways
- Localized Intersection and Operational Improvements
- Active Transportation Improvements
- Widen/Construct to Four Lanes by Extending Clark Boulevard and Building a New Crossing of Etobicoke Creek

Each alternative solution is described in further detail as follows:

1. No-build “Do nothing”

The No-build “Do Nothing” alternative provides a benchmark against which the other alternatives could be compared. This alternative solution represents a continuation of existing conditions and would involve no changes or improvements to the existing study corridor, but includes all planned improvements to the City transportation network.

2. Limit Development

This alternative minimizes study area growth by limiting/managing development potential in the area. No improvements to the study corridor is considered in this alternative. Limiting development would potentially reduce the need for improvements and additional infrastructure.

3. Travel Demand Management (TDM) Initiatives

Similar to Alternative 2 to limit development, this alternative focuses on managing travel demand rather than infrastructure improvements. This alternative applies TDM strategies and policies to reduce travel demand or redistribute travel in the surrounding transportation system.

4. Improve Other Roadways

This alternative focuses on improving other roadways, instead of Clark Boulevard / Eastern Avenue, to improve transportation in the study area. Roads considered in this alternative include parallel roads such as Queen Street that are identified in the 2015 Transportation Master Plan for road improvements.

5. Localized Intersection and Operational Improvements

This alternative focuses on increasing capacity of the existing road network through changes to signal timings and phasing, intersection geometric improvements, and / or new traffic signals, if warranted.

6. Active Transportation Improvements

This alternative involves constructing new active transportation facilities to improve pedestrian and cyclist connectivity in the network. Potential active transportation facilities include sidewalks, cycle tracks, multi-use paths or bike lanes on the existing road network and/or a new active transportation-only link between Eastern Avenue and Clark Boulevard.

7. Widen/Construct to Four (4) Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary

This alternative provides a continuous route through the study area by widening the existing segment of Eastern Avenue in the study area to four lanes to increase capacity and constructing a new corridor, including a new bridge over Etobicoke Creek Tributary, to connect Clark Boulevard at Rutherford Road to Eastern Avenue. This alternative can be considered in combination with Alternative 6.

5.1.2 Evaluation Criteria

The evaluation of alternative solutions includes the formulation of evaluation criteria against which the advantages and disadvantages of each planning alternative can be evaluated following the clear, traceable and reproducible methods. The evaluation criteria include technical and engineering considerations, meeting planning objectives, as well as impacts to the cultural, natural, and socio-economic environments. The alternative solutions were evaluated against the criteria listed in **Table 5-1.**

Table 5-1 Evaluation Criteria

Consideration	Criteria
Technical and Engineering	• Accommodate Future Travel Demands • Provide Connectivity and Compatibility with Road Network • Improve Public Transit Service • Create a Pedestrian-Friendly Environment • Create a Cyclist-Friendly Environment • Improve Safety for All Travel Modes • Improve Mode Choice • Accommodate Emergency Services • Potential to Impact Utilities in the Corridor
Planning Objectives	• Consistent with Provincial Plans and Policies • Consistent with Regional Plans and Policies • Consistent with Municipal Plans and Policies
Social and Cultural Environment	• Minimize Access Impacts • Minimize Traffic Noise • Preserve Archaeological and Cultural Heritage Features • Improve Visual Aesthetics • Improve Community Character and Public Realm • Minimize Disruption due to Construction
Economic Environment	• Improve Access to Businesses and Key Employment Areas • Minimize Operating and Maintenance Costs • Minimize Capital and Construction Costs ,and Maximize Construction Value • Minimize Property Requirements
Natural Environment	• Minimize Impacts to Designated Natural Areas • Minimize Impacts to Vegetation • Minimize Impacts to Wildlife • Minimize Impacts to Aquatic Habitat • Minimize Impacts to Surface Water and Groundwater Management • Minimize Impacts to Potentially Contaminated Lands • Improve Air Quality • Minimize Effects on Climate Change

5.1.3 Evaluation of Alternative Solutions

The planning alternatives were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, and environmental impacts. Each category that was evaluated was then summarized using the following rankings from Not Preferred to Most Preferred:

Not Preferred (Does not meet objectives)	**Less Preferred** (Partially meets objectives)	**Most Preferred** (Meets objectives)

Following the evaluation, a recommendation was made on which alternative solution would be carried forward to the next stage. The evaluation of the alternative solutions is shown in **Table 5-2**.

Table 5-2. Evaluation of Alternative Solutions

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	Maintain existing conditions to the study corridor, but includes all planned improvements to the City's transportation network.	**Restrict future land development in the area.**	**Apply TDM strategies and policies to reduce travel demand or redistribute travel in the surrounding transportation system.**	**Widen/improve other parallel roadways per recommendations in the Transportation Master Plan.**	**Improvements to increase throughput at intersections only.**	**Implement sidewalks, multi-use paths (MUPs) or bike lanes to address gaps in connectivity.**	**Provide two continuous lanes in each direction that connects Clark Boulevard to Eastern Avenue.**
Technical and Engineering							
Accommodate Future Travel Demands	Traffic congestion will continue to increase within the study corridor with insufficient capacity to meet future demands, resulting in longer delays.	Potential to marginally limit increase in traffic congestion by limiting growth in trip making.	Minor capacity improvements as mode choice improvements result in a lower reliance on single occupancy vehicles. However TDM measures alone are insufficient to accommodate all future travel demands,	Does not accommodate future travel demand in the study corridor, causing increased congestion and longer delays.	Minor localized capacity improvements only that are insufficient to accommodate all future travel demands.	Minor capacity improvements as mode choice improvements result in a lower reliance on single occupancy vehicles that are insufficient to accommodate all future travel demands.	Improves corridor capacity and reduces delays and queuing.
Provide Connectivity and Compatibility with Road Network	Does not improve network connectivity. Eastern Avenue / Clark Boulevard continues to be discontinuous between Hansen Road and Rutherford Road.	Does not improve network connectivity. Eastern Avenue / Clark Boulevard is discontinuous between Hansen Road and Rutherford Road.	Does not improve network connectivity. Eastern Avenue / Clark Boulevard is discontinuous between Hansen Road and Rutherford Road.	May improve network connectivity, but Eastern Avenue / Clark Boulevard is discontinuous between Hansen Road and Rutherford Road.	May improve network connectivity, but Eastern Avenue / Clark Boulevard is discontinuous between Hansen Road and Rutherford Road.	Improves connectivity for cyclist and pedestrian facilities. Potential to connect Eastern Avenue and Clark Boulevard using active transportation facilities.	Improves network connectivity by providing sufficient capacity along the study corridor and connecting the missing link between Eastern Avenue and Clark Boulevard.
Improve Public Transit Service	Currently no transit service is provided along the existing corridor and the discontinuous section between Hansen Road and Rutherford Road provides limited opportunities to introduce new and efficient routing to the surrounding transportation network.	Does not provide opportunities to improve the existing transit network.	Does not provide opportunities to improve the existing transit network.	Opportunities to enhance transit service routing and efficiencies in the surrounding network but with limited opportunities to create new routes due to discontinuous section along the study corridor between Hansen Road and Rutherford Road.	Does not provide opportunities to improve the existing transit network as there are no existing routes along the study corridor.	Does not provide opportunities to improve the existing transit network but this alternative in combination with Alternative 7 will provide opportunities to make transit more accessible by other modes (pedestrians and cyclists).	Opportunities to enhance transit service routing and efficiencies in the surrounding network, as connecting the missing link between Eastern Avenue and Clark Boulevard offers new routing alternatives along the study corridor and accessible transit to land uses in the study corridor.
Create a Pedestrian-Friendly Environment	Existing corridor is inadequate as it does not provide continuous dedicated pedestrians	No change to existing corridor.	No change to existing corridor.	No change to existing corridor.	Potential to improve crossings at intersections, but no change to pedestrian	Provides opportunities for continuous dedicated pedestrian facilities in one or both boulevards	Provides opportunities to accommodate continuous dedicated pedestrian facilities

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	facilities nor visible crossings at intersections.				connections and facilities throughout the corridor.	to provide access to adjacent lands, increased visibility at intersection crossings, and opportunities for extending the pedestrian connectivity of the corridor with other adjacent corridor.	when considered in combination with Alternative 6.
Create a Cyclist-Friendly Environment	Existing corridor does not provide any dedicated cyclist facilities	No change to existing corridor.	No change to existing corridor.	No change to existing corridor.	Potential to improve crossings at intersections, but no change to cyclist connections and facilities throughout the corridor.	Provides opportunities for dedicated cyclist facilities to provide access to adjacent lands, connectivity with other adjacent corridors.	Provides opportunities to accommodate dedicated cyclist facilities when considered in combination with Alternative 6.
Improve Safety for All Travel Modes	Does not address existing or potential safety concerns. Higher potential for collisions as congestion increases. No change to open ditches. No improvements to at-grade rail crossing.	Does not address existing safety concerns. No improvements to at-grade rail crossing.	Does not address existing safety concerns. No improvements to at-grade rail crossing.	Does not address existing or potential safety concerns along the study corridor. No improvements to at-grade rail crossing.	Minor localized improvements to safety for all road users including opportunities to provide additional protected crossings (where signals are warranted), increased visibility at intersections with enhanced pavement markings and AODA compliant intersections. No improvements to at-grade rail crossing.	Moderate improvements to safety, in particular for cyclists and pedestrians if dedicated facilities are provided, as they minimize conflicts with motorized vehicles. Opportunities to provide additional protected crossings (where signals are warranted), increased visibility at intersections with enhanced pavement markings and AODA compliant intersections when considered in combination with Alternative 5. Opportunities for improvements to at-grade rail crossing for pedestrian and cyclists with separated facilities.	Potential improvements to vehicular safety as a result of reduced congestion and urbanization to remove open ditches. Opportunities for improvements to at-grade rail crossing for all users when considered in combination with Alternative 6.
Improve Mode Choice	Does not improve mode choice as pedestrian facilities are discontinuous, no dedicated cycling	Does not improve mode choice from existing conditions.	Policies may encourage alternative modes to driving.	Does not improve mode choice along the study corridor.	Does not improve mode choice from existing conditions.	Significant opportunities to improve mode choice by providing infrastructure to support	Significant opportunities to improve mode choice for all modes (pedestrian, cyclists, transit users and

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	facilities and no transit routes operate along the corridor					active transportation modes.	motorists) with additional connection in the road network and elimination of a physical barrier (crossing of Etobicoke Creek) when considered in combination with Alternative 6.
Accommodates Emergency Services	No change to emergency services.	No change to emergency services.	No change to emergency services.	No change to emergency services along the study corridor.	Minor improvements to emergency services.	No change to emergency services.	Significant improvement to emergency services due to higher road capacity reducing potential congestion, and the implementation of a new direct and continuous route.
Potential to Impact Utilities in the Corridor	No change in road infrastructure, therefore no anticipated utility relocations required.	No change in road infrastructure, therefore no anticipated utility relocations required.	No change in road infrastructure, therefore no anticipated utility relocations required.	No change in road infrastructure along the study corridor, therefore no anticipated utility relocations required.	Potential for localized utility relocations.	Minor potential for utility relocations required to implement new active transportation infrastructure.	New utility corridor along extension, and potential for significant utility relocation when widening to four lanes.
Technical and Engineering Evaluation Summary	Not Preferred	Not Preferred	Less Preferred	Not Preferred	Less Preferred	Preferred	Preferred
Planning Objectives							
Consistent with Provincial Plans and Policies *(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)*	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in *A Place to Grow: Growth Plan for the Greater Golder Horseshoe*. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement. The study area does not fall within the Greenbelt Plan designated areas.	Not consistent with provincial plans and policies. This alternative does not meet density targets outlined in *A Place to Grow: Growth plan for the Greater Golden Horseshoe*. This alternative does not adhere to the direction on land use and transportation planning and development outlined in the Provincial Policy Statement.	This alternative is consistent with meeting some objectives and direction outlined in provincial plans and policies. However TDM measures alone are insufficient to meet objectives.	This alternative is consistent with meeting the objectives and direction outlined in provincial plans and policies for other corridors, but does not provide opportunity along study corridor.	This alternative is consistent with meeting some objectives and direction outlined in provincial plans and policies. However localized and operation improvements alone are insufficient to meet objectives.	This alternative is consistent with meeting some objectives and direction outlined in provincial plans and policies. However AT improvements alone are insufficient to meet objectives.	This alternative is consistent with meeting the objectives and direction outlined in provincial plans and policies when considered in combination with Alternative 6.

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
Consistent with Regional Plans and Policies *(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)*	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; this alternative does not develop and promote a sustainable, safe, efficient, effective and integrated multi-modal transportation system. This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets (such as active transportation making up 6% of all trips) outlined in the Active Transportation Study.	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; the alternative does not enhance economic vitality and growth in the region. This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets (such as active transportation making up 6% of all trips) outlined in the Active Transportation Study.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective and integrated multi-modal transportation system. However TDM measures alone are insufficient to meet objectives.	Not consistent with regional plans and policies. This alternative does not meet the objectives outlined in the Peel Regional Official Plan; the alternative does not enhance economic vitality and growth in the region. This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets (such as active transportation making up 6% of all trips) outlined in the Active Transportation Study for the study corridor.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective and integrated transportation system. However localized and operation improvements alone are insufficient to meet objectives. This alternative does not meet the goal of improving the safety of walking and cycling, and active transportation trip targets (such as active transportation making up 6% of all trips) outlined in the Active Transportation Study.	This alternative is consistent with meeting some objectives and direction outlined in regional plans and policies. This alternative promotes a sustainable, safe, efficient, effective and integrated multi-modal transportation system as outlined in Regional plans. However AT improvements alone are insufficient to meet objectives.	This alternative is consistent with meeting the objectives and direction outlined in regional plans and policies when considered in combination with Alternative 6. When considered in combination with Alternative 6, this alternative promotes a sustainable, safe, efficient, effective and integrated multi-modal transportation system as outlined in Regional plans.
Consistent with Municipal Plans and Policies *(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton Human Health and Sciences Cluster Development Strategy, City of Brampton Active Transportation Master Plan)*	Not consistent with municipal policies. This alternative does not implement the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. This alternative does not implement the recommended active transportation facilities identified in the Transportation Master Plan and Active Transportation Master Plan. No infrastructure	Not consistent with municipal policies. This alternative does not implement the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. This alternative does not implement the recommended active transportation facilities identified in the Transportation Plan and Active Transportation Master Plan. Does not align with the growth and	Partially consistent with municipal policies. This alternative provides limited improvements but does not implement the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. This alternative does not implement the recommended active transportation facilities identified in the Transportation Plan and Active Transportation Master Plan. Limited	Not consistent with municipal policies. This alternative does not implement the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. This alternative does not implement the recommended active transportation facilities identified in the Transportation Plan and Active Transportation Master Plan. No infrastructure	Partially consistent with municipal policies. This alternative provides improvements to the corridor but does not implement the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. This alternative does not implement the recommended active transportation facilities identified in the Transportation Plan and Active Transportation	Some consistency with municipal policies is achieved. This alternative implements active transportation improvements as recommended by the Transportation Master Plan and Active Transportation Master Plan, but not the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. Some opportunities to support the growth and	Consistent with municipal policies when considered in combination with Alternative 6. This alternative implements the proposed road extension and widening of Clark Boulevard/Eastern Avenue as a minor arterial road as identified in the Official Plan and Transportation Master Plan Update. However, this alternative does not implement the recommended active transportation facilities identified in the Transportation Plan and

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	improvements to support the growth and intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard.	intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard.	opportunities to support the growth and intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard through TDM initiatives	improvements along the study corridor to support the growth and intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard with TDM initiatives	Master Plan. Limited opportunities to support the growth and intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard through this alternative.	intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard through active modes but insufficient to meet the overall growth through active modes alone.	Active Transportation Master Plan. Aligns with the growth and intensification identified in the Vision 2040 at the eastern end of the study corridor, at Bramalea New Town centered on the existing Bramalea City Centre between Queen Street and Clark Boulevard which is further enhanced with the inclusion of active modes in combination with Alternative 6.
Planning Objectives Evaluation Summary	Not preferred	Not preferred	Less Preferred	Not preferred	Less Preferred	Less Preferred	Preferred
Social and Cultural Environment							
Minimize Access Impacts	Negative impact to accesses due to increased congestion.	Negative impact to accesses due to increased congestion.	Policies may reduce congestion. Potential for minor improvements to accesses.	Potential impacts or improvements to accesses on other corridors; however, no impacts or improvements along the study corridor.	Potential for moderate localized improvements to accesses.	Improved multimodal infrastructure improves access for active transportation users only.	Increased road capacity improves access due to less congestion.
Minimize Traffic Noise	Anticipated increase in noise levels with future traffic growth and increased congestion.	Anticipated increase in noise levels with future traffic growth and increased congestion.	Potential for marginal reductions in noise levels. Policies that encourage transit, carpooling or active transportation can reduce congestion and consequently traffic noise within the study corridor.	Potential for marginal reductions in noise levels along the study corridor if road users choose to use improved roadways adjacent to study corridor.	Potential for marginal localized reduction in noise levels	Potential for reduction in noise levels from reduced reliance on automobiles.	Anticipated increase in noise levels with future traffic growth and lanes in closer proximity to properties.

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
Preserve Archaeological and Cultural Heritage Features	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.	Potential impacts to archaeological or cultural heritage resources along other roads.	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.	No archaeological impacts as the study area does not retain archaeological potential. No heritage impacts as the study area does not retain any potential cultural heritage resources.
Improve Visual Aesthetics	No change to the visual aesthetics; however, no opportunities for improvements to visual aesthetics.	No change to the visual aesthetics; however, no opportunities for improvements to visual aesthetics.	No change to the visual aesthetics; however, no opportunities for improvements to visual aesthetics.	Opportunities to improve the visual aesthetics along other roads; however, no opportunities for improvements to visual aesthetics along the study corridor.	Limited opportunity for aesthetic improvements.	Moderate opportunity for aesthetic improvements with streetscaping and active transportation facilities.	Significant opportunity for aesthetic improvements with streetscaping in highly industrialized area and new crossing and potential for enhancements to tributary to Etobicoke Creek.
Improve Community Character and Public Realm	Does not improve community character and public realm.	Does not improve community character and public realm.	Does not improve community character and public realm.	Does not improve community character and public realm.	Limited and localized improvements to community character and public realm.	Moderate opportunity for improvements to community character and public realm.	Moderate opportunity for improvements to community character and public realm.
Minimize Disruption due to Construction	No construction required.	No construction required.	No construction required.	No construction required.	Minimal construction at localized locations required.	Moderate construction required.	Major construction required.
Social Environment Evaluation Summary	Not Preferred	Not Preferred	Preferred	Not Preferred	Less Preferred	Preferred	Preferred
Economic Environment							
Improve Access to Businesses and Key Employment Areas	Negative impact to businesses due to increased congestion.	Negative impact to businesses due to increased congestion.	Potential for minor improvements to businesses.	Potential impacts or improvements to businesses on other corridors; however, no impacts or improvements along the study corridor.	Potential for moderate localized improvements to businesses.	Improved multimodal access to local businesses.	Increased road capacity significantly improves access to local businesses.
Minimize Operating and Maintenance Costs	Moderate increase in operating costs; as traffic volumes accelerate road deterioration, City would need to resurface road more often.	No anticipated change in operating costs; limiting development will maintain current traffic volumes.	Minor increase to operating costs depending on policies implemented to manage transportation demand within the study corridor.	Moderate increase in operating costs; improving other roadways will maintain or potentially increase traffic volumes. This will accelerate road	Minor increase in operating cost if localized improvements include additional turning lanes, additional signals, etc.	Moderate increase in operating cost to maintain additional facilities and snow clearing costs.	Highest increase in road maintenance and snow clearing costs due to additional lane-km (road widening and road extension).

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
				deterioration, City would need to resurface road more often.			
Minimize Capital and Construction Costs, and Maximize Construction Value	No capital costs as no construction required However, no improvements to network connectivity.	No capital costs as no construction required. However, no improvements to network connectivity.	No capital costs as no construction required. However, minor improvements to traffic operations.	High capital costs for improvements to other roads. No capital costs as no construction required for study corridor.	Minor capital and construction costs while providing minor improvements for reduction in traffic congestion along the corridor.	Moderate-high capital costs with improvements to active modes when considering extension of corridor, for minor reduction in traffic congestion along the corridor.	High capital costs, with greatest improvements to vehicular traffic. When considered in combination with Alternative 6 construction value of the new corridor is maximized.
Minimize Property Requirements	No property acquisition.	No property acquisition.	No property acquisition.	Anticipated moderate to high property acquisition along other corridors. No property acquisition along the study corridor.	Potential for localized property acquisition only.	Moderate to high potential for property acquisition to accommodate continuous and dedicated AT facilities through new corridor.	Highest potential for property acquisition to accommodate road widening, new crossing of Etobicoke Creek and road extension.
Economic Environment Evaluation Summary	Not Preferred	Not Preferred	Preferred	Not Preferred	Less Preferred	Preferred	Preferred
Natural Environment							
Protect Designated Natural Areas	No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), no fish species are present in the study area. There is a single occurrence of regionally significant species (Larger Straw Sedge). No impacts to designated natural areas.	No impacts to designated natural areas.	No impacts to designated natural areas.	Significant potential impacts to other road corridors. No impacts to designated natural areas in the study corridor.	No impacts to designated natural areas.	Limited potential to impact one regionally significant species (Larger Straw Sedge) pending preferred alignment but can be mitigated by transplanting.	Limited potential to impact one regionally significant species (Larger Straw Sedge) pending preferred alignment but can be mitigated by transplanting.
Minimize Impacts to Vegetation	The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within	No impacts. However, no opportunities to enhance vegetation.	No impacts. However, no opportunities to enhance vegetation.	Significant potential impacts to other road corridors with potential opportunities to enhance vegetation. No impacts in the study corridor. However, no	No potential/limited localized impacts to vegetation as study corridor is heavily industrialized.	Anticipated impact to vegetation required to be removed for pedestrian and cyclist corridor extension between Hansen and Rutherford. Limited potential to	Anticipated impact to vegetation required to be removed for road extension between Hansen and Rutherford. Limited potential to impact one regionally

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	the study area. Lowland deciduous forest (FOD07) is associated with the watercourse habitat. No impacts. However, no opportunities to enhance vegetation.			opportunities to enhance vegetation in the study corridor.		impact one regionally significant species (Larger Straw Sedge) pending preferred alignment but can be mitigated by transplanting. The extension provides opportunities for new tree plantings along an otherwise heavily industrialized corridor	significant species (Larger Straw Sedge) pending preferred alignment but can be mitigated by transplanting. The road extension provides opportunities for new tree plantings along an otherwise heavily industrialized corridor and significant opportunities for enhancements to the tributary.
Minimize Impacts to Wildlife	No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts.	No impacts.	No impacts.	Significant potential impacts to other road corridors .No impacts to the study corridor.	No potential/limited localized impacts to wildlife as study corridor is heavily industrialized.	Limited/no potential impact to wildlife as study corridor is heavily industrialized. However tree removals have potential to disrupt wildlife (for example nesting /breeding birds, fur-bearing mammals) but can be mitigated through following tree removal timing windows and completing nesting surveys.	Limited/no potential impact to wildlife as study corridor is heavily industrialized. However tree removals have potential to disrupt wildlife (for example nesting /breeding birds, fur-bearing mammals) but can be mitigated through following tree removal timing windows and completing nesting surveys.
Minimize Impacts to Protect Aquatic Habitat	A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. No impacts. However, no opportunities to enhance aquatic habitat.	No impacts. However, no opportunities to enhance aquatic habitat.	No impacts. However, no opportunities to enhance aquatic habitat.	Significant potential impacts to other road corridors. No impacts to study corridor. However, no opportunities to enhance aquatic habitat along study corridor.	No impacts. However, no opportunities to enhance aquatic habitat.	Limited potential to improve aquatic habitat with new AT crossing of Etobicoke Creek Tributary.	Greatest potential to improve aquatic habitat with new road corridor crossing of Etobicoke Creek Tributary.

LEGEND		
Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
Minimize Impacts to Surface Water and Groundwater Management	No change to existing conditions.	No change to existing conditions.	No change to existing conditions.	Anticipated impacts to other road corridors from road widening. No change to existing conditions along existing corridor.	Minor impact with increased roadway width and hard surface area at intersections. Minor increase in storm water quantity and quality mitigation may be required; however can be addressed through design. Negligible impact to shallow groundwater system due to anticipated negligible increase in contaminants related to hard surface (i.e. road salt)	Minor impact with increased hard surface area for AT facilities and potential urbanization. Minor increase in stormwater quantity and quality mitigation may be required; however can be addressed through design Minor impact to shallow groundwater system due to potential increase in contaminants related to hard surface (i.e. road salt)	Moderate impact with urbanization, increased roadway width and hard surface area. Stormwater quantity will increase and quality mitigation will be required; however can be addressed through design Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width and extension (i.e. road salt, etc.)
Minimize Impacts to Contaminated Properties	No change.	No change.	No change.	Potential for impacts to contaminated properties along other road corridors. No change to study corridor.	Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. This option has the potential for impacts as it may require lands beyond the existing right-of-way.	Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. This option has a moderate potential for impacts as it has the second largest design footprint.	Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. This option has the greatest potential for impacts as it has the largest design footprint.
Improve Air Quality	No improvements; reliance on automobile deteriorates air quality.	No improvements; reliance on automobile deteriorates air quality.	Policies discourages the use of single occupancy vehicles, however TDM measures alone cannot reduce congestion. Partial improvement to air quality.	No improvements; reliance on automobile deteriorates air quality.	Marginal localized improvements; reliance on automobile deteriorates air quality.	Multimodal improvements provides alternative to reliance on automobile. Promotes improvements to air quality.	Additional capacity may result in decreased congestion, thus reducing vehicle emissions and improving air quality. Promotes improvements to air quality.
Minimize Effects on Climate Change	High reliance on automobiles and increased congestion will result in increased vehicle emissions and worsen effects on climate change.	High reliance on automobiles and increased congestion will result in increased vehicle emissions and worsen effects on climate change.	Lower reliance on automobiles through policies that promote other modes can decrease congestion and reduce vehicle emissions, however TDM measures	High reliance on automobiles and increased congestion will result in increased vehicle emissions and worsen effects on climate change.	Localized improvements to decrease congestion can reduce vehicle emissions and provide some reduction of effects on climate change.	Active transportation improvements can reduce dependence on automobiles and provide minor improvements to effects on climate change.	Additional capacity will increase vehicle volumes for a short corridor, but result in decreased congestion overall reducing vehicle emissions from idling

LEGEND

Not Preferred	Less Preferred	Not Preferred

Evaluation Criteria and Sub-Factors	1. No-Build "Do Nothing"	2. Limit Development	3. Travel Demand Management (TDM) Initiatives	4. Improve Other Roadways	5. Localized Intersection and Operational Improvements	6. Active Transportation Improvements	7. Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek Tributary
	No improvements to study corridor resiliency to climate change.	No improvements to study corridor resiliency to climate change.	alone cannot reduce congestion. Partial improvement to the corridor resiliency to climate change.	No improvements to study corridor resiliency to climate change.	Limited improve the study corridor resiliency to climate change.	Opportunities for implementation of tree plantings as part of active transportation improvements can improve the study corridor resiliency to climate change.	and reduce effects on climate change. Opportunities for implementation of tree plantings as part of road improvements and road extension can improve the study corridor resiliency to climate change.
Natural Environment Evaluation Summary	Less Preferred	Less Preferred	Less Preferred	Not Preferred	Less Preferred	Most Preferred	Most Preferred
Summary of Evaluation	Not Recommended	Not Recommended	Recommended in combination with alternatives 5, 6, and 7	Not Recommended	Recommended in combination with alternatives 3, 6, and 7	Recommended in combination with alternatives 3, 5, and 7	Recommended in combination with alternatives 3, 5, and 6

LEGEND

Not Preferred	Less Preferred	Not Preferred

5.2 Preferred Alternative Solution

The preferred alternative solution consists of the combination of the following alternatives:

- Alternative 3 – Travel Demand Management (TDM) Initiatives
- Alternative 5 – Localized Intersection and Operational Improvements
- Alternative 6 – Active Transportation Improvements
- Alternative 7 – Widen/Construct to Four Lanes, Extend Clark Boulevard and Build a New Crossing of Etobicoke Creek

The recommended solution (combination of alternatives) was carried forward to the next phase of the EA for the development of alternative design options. A summary of the potential road cross-section improvements in the preferred solution is shown in **Figure 5-1.** Placement of elements within the cross-section (including street trees, active transportation facility types, light / hydro poles, vehicle lanes, etc.) was reviewed and assessed in the next stage of the study, Phase 3 – Alternative Design Concepts

Figure 5-1. Summary of Improvements - Preferred Solution

6 Alternative Design Concepts

The Preferred Solution as determined in Phase 2 of the Clark Boulevard / Eastern Avenue EA includes multi-modal improvements along the corridor, widening the road from two to four lanes, travel demand management, and localized and intersectional improvements. The following documents the alternative design concepts developed and assessed to address the Preferred Solution.

6.1 Development of Alternative Design Concepts

6.1.1 Design Parameters

The following design parameters were used as a starting point to guide the development of the Alternative Design Concepts. It is noted that these design parameters were presented, reviewed and revised as applicable to inform the Project Design Criteria established later in the study to inform the development of the Preferred Design as documented in **Table 7-1**.

- **Designated Official Plan Right-of-Way:** 26 – 30 m
- **Active Transportation Facility Types:**
  - **Multi-Use Path:** 2.4 – 3.0 m
  - **Boulevard Cycle Track:** 1.8 – 2.0 m
  - **On-Street Bike Lanes:** 1.8 m
  - **Sidewalk:** 1.8 m
- **Through Lane:** 3.50 – 3.75 m
- **Curb Lane:** 3.75 m

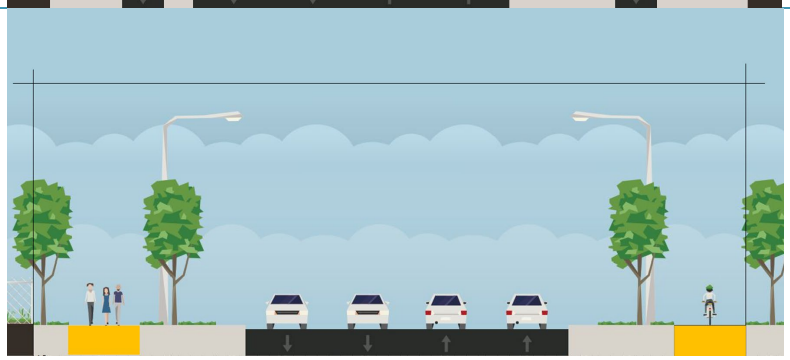
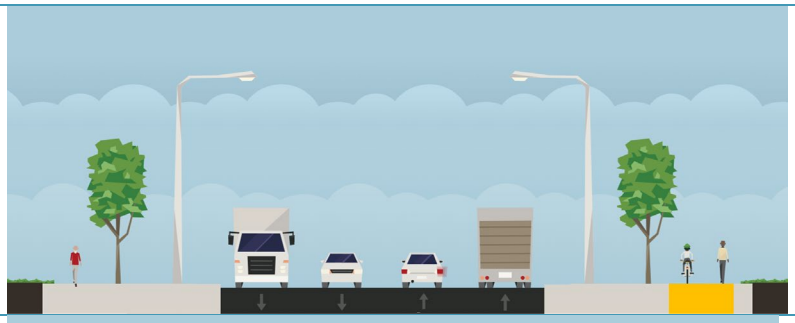
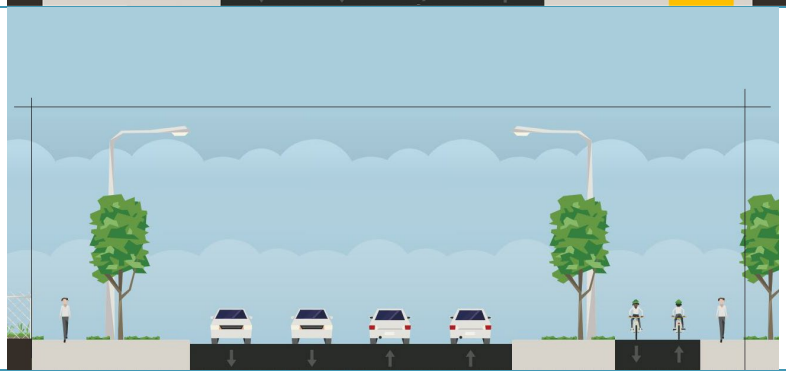
6.1.2 Identification of Alternative Design Concepts

The following alternative design concepts were developed to address the preferred solution to provide continuous and dedicated active transportation facilities and accommodate a 4-lane roadway. Separate alternatives were designed to address active transportation, widening, and the Clark Boulevard extension. Thus, the recommended design concept consists of a combination of the recommended alternative for active transportation, the recommended widening alternative, and the recommended alignment for the Clark Boulevard Extension.

6.1.2.1 ACTIVE TRANSPORTATION FACILITY ALTERNATIVES

The following alternative design concepts were developed to address the Preferred Solution to provide continuous and dedicated active transportation facilities. All alternatives accommodate a 4-lane roadway. The alternative concepts are listed in **Table 6-1.**

Table 6-1: Active Transportation Alternatives

Alternative	Conceptual Cross Section
Alternative 1 **Boulevard One-Directional Cycle tracks and sidewalks on both sides**	
Alternative 2 **Multi-use paths on both sides**	
Alternative 3 **Sidewalk on south side and multi-use path on north side**	
Alternative 4 **Sidewalk on south side, and dual boulevard cycle tracks and sidewalk on north side**	

Alternative 5 **Sidewalk and boulevard one-directional cycle track on south side, and multi-use path on north side**	
Alternative 6 **On-Road Bike Lanes and Sidewalks**	

6.1.2.2 ACTIVE TRANSPORTATION SCREENING

A high-level screening of Active Transportation was conducted and a discussion of the screening is provided in **Table 6-2**. The screening provided consideration to the alignment with the City's Active Transportation Master Plan (2019) and future Greenway proposed on the north boulevard which resulted in the elimination of Alternatives 5 and Alternative 6.

Table 6-2: High Level Discussion for Carrying Forward Active Transportation Facility Alternatives

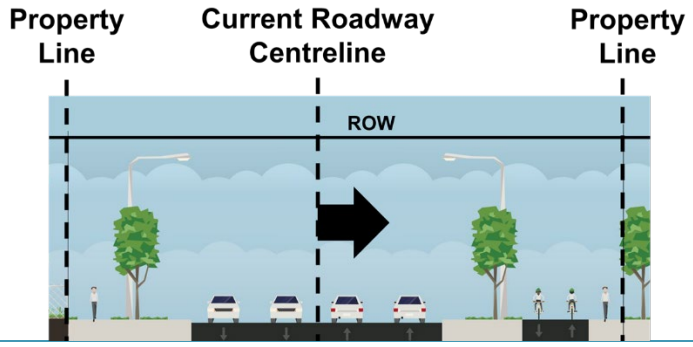
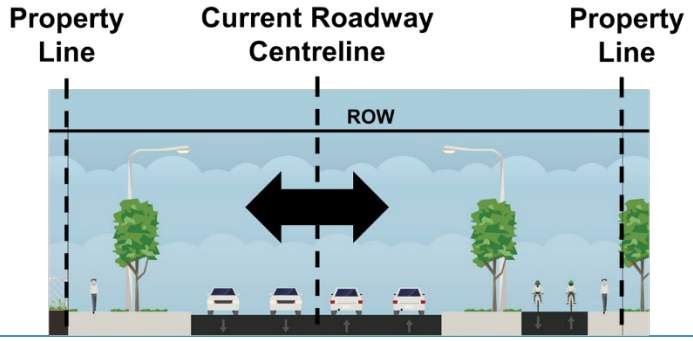
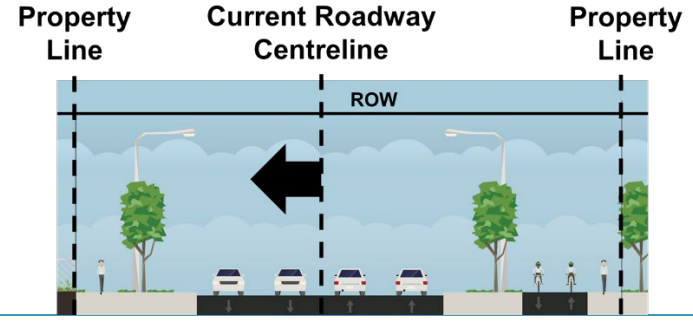
Alternative	Discussion	Recommendation
Alternative 1 Boulevard Cycle Tracks and Sidewalks, both sides	• Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians on both sides • Provides pedestrian and cycling access on both sides	**Carry forward for evaluation using evaluation criteria**
Alternative 2 Multi-use Path (two-way shared facility), both sides	• Provides grade separation and horizontal distance from vehicular traffic • Does not provide separation between cyclists and pedestrians • Provides pedestrian and cycling access on both sides	**Carry forward for evaluation using evaluation criteria**

Alternative	Discussion	Recommendation
Alternative 3 Sidewalk South Side and Multi-use Path North Side	• Provides grade separation and horizontal distance from vehicular traffic • Does not provide separation between cyclists and pedestrians on north side • Does not provide cycling access on south side of the corridor. Provides pedestrian access on both sides	**Carry forward for evaluation using evaluation criteria**
Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side	• Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians • Does not provide cycling access on south side of the corridor	**Carry forward for evaluation using evaluation criteria**
Alternative 5 Sidewalk and boulevard one-directional Cycle Track South Side, and Multi-use Path on North Side	• Provides grade separation and horizontal distance from vehicular traffic • Provides separation between cyclists and pedestrians. Provides pedestrian access on both sides • Cycling access on south side is limited to one-direction only	**Screened out – Do not carry forward for evaluation**
Alternative 6 On-road Bike Lane and Sidewalks	• Does not provide grade separation from vehicular traffic for cyclists • Provides separation between cyclists and pedestrians • Not supported/ aligned with City of Brampton's Active Transportation Master Plan (2019) or future Greenway.	**Screened out – Do not carry forward for evaluation**

6.1.2.3 WIDENING ALTERNATIVES

Along with the development of active transportation facilities for the corridor, three options were identified for widening the existing Eastern Avenue between Kennedy Road and Hansen Road. The three alternatives are identified in **Table 6-3**.

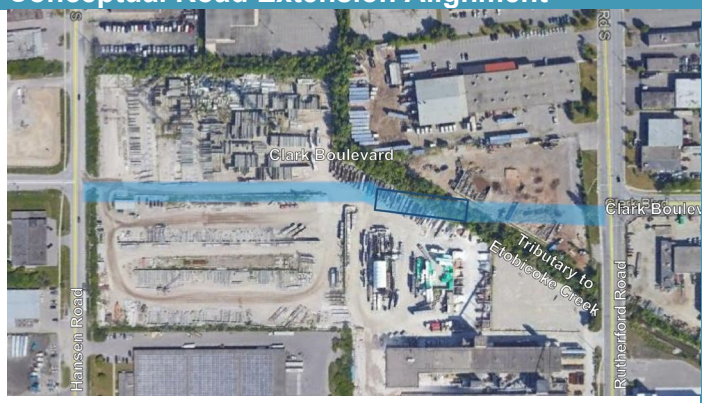
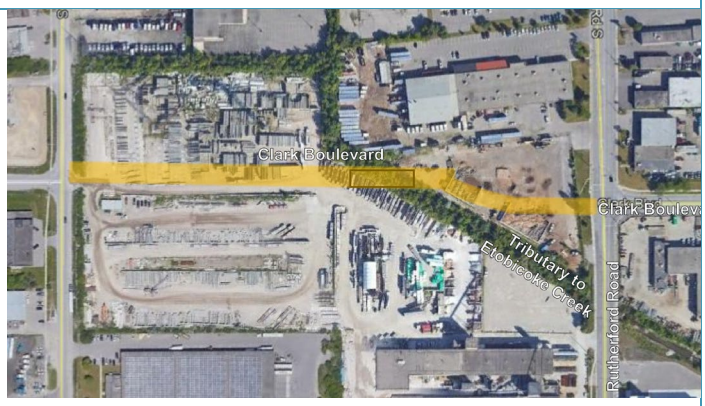
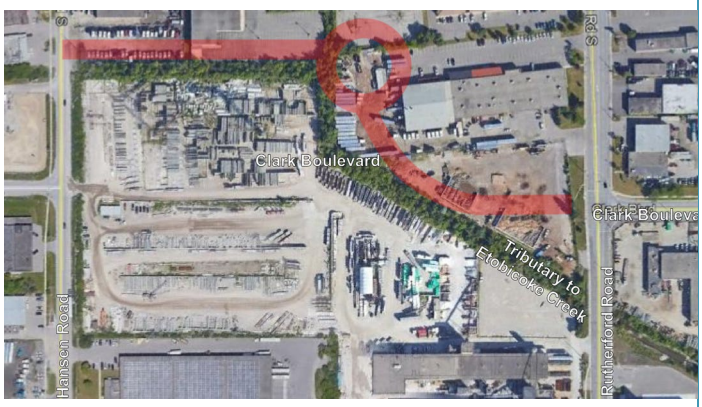
Table 6-3: Widening Alternatives

Alternative	Conceptual Widening
Alternative 1: Widening to the North **Additional lanes and associated impacts occur on the north side of Eastern Avenue**	
Alternative 2: Widening about the Centreline **Provide additional lanes to both sides of the street to balance the impacts on both sides of Eastern Avenue**	
Alternative 3: Widening to the South **Additional lanes and associated impacts occur on the south side of Eastern Avenue**	

6.1.2.4 ROAD ALIGNMENT ALTERNATIVES FOR CLARK BOULEVARD EXTENSION

One of the recommendations of the Preferred Solution is the extension of Clark Boulevard from Rutherford Road to meet Hansen Road. Three alignment alternatives were identified and are listed in **Table 6-4**.

Table 6-4: Clark Boulevard Road Extension - Alignment Alternatives

Alternative	Conceptual Road Extension Alignment
Alternative 1: Road alignment curved at watercourse The proposed road alignment for the extension connects Eastern Avenue at Hansen Road to the Clark Boulevard intersection at Rutherford Road with a new crossing of Tributary to Etobicoke Creek bisecting 35 Rutherford Road (concrete plant). The horizontal road alignment is approximately 430m in length and gradually curves as it crosses the watercourse.	
Alternative 2: Road alignment curved east of watercourse The proposed road alignment for the extension connects Eastern Avenue at Hansen Road to the Clark Boulevard intersection at Rutherford Road with a new crossing of Tributary to Etobicoke Creek bisecting 35 Rutherford Road (concrete plant). The horizontal road alignment is approximately 430m in length, but unlike Alternative 1, the curvature of the road alignment is east of the watercourse crossing.	
Alternative 3: Road alignment north of Tributary to Etobicoke Creek and jogged at Hansen Road The proposed road alignment for the extension connects Eastern Avenue at Hansen Road to Clark Boulevard at Rutherford with the introduction of a second jogged intersection on Hansen Road and horizontal road alignment north of the Tributary to Etobicoke Creek but does not cross the watercourse. A roundabout is also introduced approximately 200m east of Hansen Road to provide an entrance to the adjacent property as a third leg.	

6.2 Evaluation of Alternative Design Concepts

6.2.1 Evaluation Criteria

To determine the most appropriate design concept for the Eastern Avenue and Clark Boulevard corridor, the same evaluation framework used for evaluating the alternative solutions was used to evaluate the active transportation, widening, and alignment alternatives. This framework includes criteria that addresses the transportation needs and the broader social, economic, environmental, and placemaking contributions to ensure the alternative designs are compatible with, and supportive of, existing and planned land uses. The list of criteria was used to compare alternatives and the measure the alternative's success was its ability to correct, minimize or mitigate impacts and / or meet the study goals. The evaluation criteria are shown in **Table 6-5.**

Table 6-5: Evaluation Criteria for Alternative Design Concepts

Consideration	Criteria
Technical and Engineering	• Accommodate Future Travel Demands • Provide Connectivity and Compatibility with Road Network • Improve Public Transit Service • Create a Pedestrian-Friendly Environment • Create a Cyclist-Friendly Environment • Improve Safety for All Travel Modes • Improve Mode Choice • Accommodate Emergency Services • Potential to Impact Utilities in the Corridor
Planning Objectives	• Consistent with Provincial Plans and Policies • Consistent with Regional Plans and Policies • Consistent with Municipal Plans and Policies
Social and Cultural Environment	• Minimize Access Impacts • Minimize Traffic Noise • Preserve Archaeological and Cultural Heritage Features • Improve Visual Aesthetics • Improve Community Character and Public Realm • Minimize Disruption due to Construction
Economic Environment	• Improve Access to Businesses and Key Employment Areas • Minimize Operating and Maintenance Costs • Minimize Capital and Construction Costs, and Maximize Construction Value • Minimize Property Requirements
Natural Environment	• Minimize Impacts to Designated Natural Areas • Minimize Impacts to Vegetation • Minimize Impacts to Wildlife • Minimize Impacts to Aquatic Habitat • Minimize Impacts to Surface Water and Groundwater Management • Minimize Impacts to Potentially Contaminated Lands • Improve Air Quality • Minimize Effects on Climate Change

6.2.2 Active Transportation Facility Alternatives Evaluation

As detailed in Section **6.1.2.2**, the active transportation facility alternatives include:

- Alternative 1- Boulevard Cycle Tracks and Sidewalks, both sides
- Alternative 2 - Multi-use Path (two-way shared facility), both sides
- Alternative 3 - Sidewalk South Side and Multi-use Path North Side
- Alternative 4 - Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side

The detailed evaluation for the Active Transportation Alternatives is presented in **Table 6-6** using the evaluation criteria identified in **Table 6-5.** Each category that was evaluated was summarized using the following rankings from Not Preferred to Preferred:

Not Preferred (Does not meet objectives)	**Less Preferred** (Partially meets objectives)	**Preferred** (Meets objectives)

Table 6-6: Evaluation of Active Transportation Facility Alternatives

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
Technical and Engineering				
Accommodate Future Travel Demands Provide Connectivity and Compatibility with Road Network Improve Access to Public Transit Service	• Alternative encourages active modes of transportation which support trips by walking, cycling and transit thus reducing congestion and accommodates emergency services. • AT facilities provide access to transit on **both boulevards** for pedestrians and cyclists.	• Same as Alternative 1	• Alternative encourages active modes of transportation which support trips by walking, cycling and transit thus reducing congestion and accommodate emergency services. • AT facilities provide access to transit on **both boulevards** for pedestrians, and on **north boulevard only** for cyclists	• Same as Alternative 3
Create a Pedestrian-Friendly Environment Create a Cyclist-Friendly Environment • *Separation for pedestrians from cyclists* • *Compatible with adjacent land uses / destinations and access* • *Direct, Continuous, and Convenient Connections*	• Cyclists and pedestrians are in **separated dedicated space eliminating potential conflicts** • Cycle tracks and sidewalks provide **direct access on both boulevards** for pedestrians and cyclists to existing and planned adjacent land uses / destinations • Cycle tracks are **one-directional** resulting in potentially **longer cyclist travel distance** (depending on origin and destination) due to the inability to travel eastbound in the north boulevard and westbound in the south boulevard • Boulevard cycle tracks (1.8m each) and sidewalks (1.8m each) on both sides take up a combined **7.2m of the ROW**	• Cyclists and pedestrians are in **shared space** on both sides resulting in **potential conflicts** • MUPs provide **direct access on both boulevards** for pedestrians and cyclists to existing and planned adjacent land uses / destinations • MUPs allow for **two-way travel** which **minimizes cyclist travel distance** to destinations on either boulevard • MUPs (3.0m each) on both sides take up a combined **6.0m of ROW**	• Cyclists and pedestrians are in **shared space** resulting in **potential conflicts** on **north side** and pedestrians are in **separated space** on **south side eliminating potential conflicts** • Sidewalk and MUP provide **direct access on both boulevards** for pedestrians to existing and planned adjacent land uses / destinations • MUP provides **direct access on north boulevard only** for cyclists to existing and planned adjacent land uses / destinations • MUP allows for **two-way travel** which **minimizes cyclist travel distance** to destinations on north boulevard • Facilities on both sides (1.8m sidewalk south side and 3.0m MUP north side) take up a combined **4.8m of ROW**	• Cyclists and pedestrians are in **separated dedicated space** on north side and pedestrians are in **separated space** on south side **eliminating potential conflicts in both boulevards** • Dual Cycle tracks provide **direct access on north boulevard only** for cyclists to existing and planned adjacent land uses / destinations • Sidewalks provide **direct access on both boulevards** for pedestrians to existing and planned adjacent land uses / destinations • Dual cycle tracks offer a **two-directional** cycling facility on the north side, resulting in potentially shorter **cyclist travel distance** • Facilities on both sides (1.8m sidewalks on both sides and 3.6m dual cycle track on north side) take up a combined **7.2m of ROW**
Improve Safety for All Travel Modes Improve Mode Choice • *Separation/ Protection for pedestrians and cyclists from vehicular lanes* • *Opportunity to provide safe facilities that accommodates different cyclist users and pedestrians*	• Pedestrians and cyclists will be separated from vehicular lanes**.** • Separated cycle tracks and sidewalks provide dedicated space to **eliminate conflicts** between pedestrians and cyclists, and between cyclists traveling in opposing directions. • One-directional cycling facilities **minimize potential conflicts** at adjacent driveways and intersections, based on driver expectation of one-way cyclist travel on both boulevards	• Pedestrians and cyclists will be separated from vehicular lanes**.** • MUPs have **potential conflicts** between pedestrians and cyclists due to shared facilities in shared space, and between cyclists traveling in opposing directions, on both sides. • Bi-directional facilities for cyclists **increase potential conflicts** at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel on both boulevards	• Pedestrians and cyclists will be separated from vehicular lanes**.** • MUP has **potential conflicts** between pedestrians and cyclists due to shared facilities in shared space, and between cyclists traveling in opposing directions, on north boulevard. • Bi-directional facilities for cyclists **increase potential conflicts** at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel on north boulevard.	• Pedestrians and cyclists will be separated from vehicular lanes**.** • Separated cycle tracks and sidewalks provide dedicated space to **eliminate conflict** between pedestrians and cyclists, and between cyclists traveling in opposing directions. • Bi-directional facilities for cyclists **increase potential conflicts** at adjacent driveways and intersections, based on driver expectation of two-way cyclist travel but are limited to conflict points on the north boulevard only.

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
	• **Minimize potential conflicts** between cyclists and transit riders with transit rider expectation of one-way cyclist travel, however there is **potential conflict** for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections • Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crossrides on north and south approaches • Pedestrians and cyclists will cross railway tracks on both boulevards • **All alternatives** improve mode choice though the provision of dedicated and continuous active transportation facilities	• **Increase potential conflicts on both boulevards** between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is **potential conflict** for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. • Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crossrides on north and south approaches • Pedestrians and cyclists will cross railway tracks on both boulevards • **All alternatives** improve mode choice though the provision of dedicated and continuous active transportation facilities	• **Increase potential conflicts on north boulevard** between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is **potential conflict** for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. • Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crosswalk on south approach and crossride on north approach • Pedestrians will cross railway tracks on both boulevards and cyclists will cross railway tracks on north boulevard only • **All alternatives** improve mode choice though the provision of dedicated and continuous active transportation facilities	• **Increase potential conflicts on north boulevard** between cyclists and transit riders with transit rider expectation of two-way cyclist travel, however there is **potential conflict** for boarding/alighting at transit shelters/pads due to limited available right-of-way at intersections. • Potential to accommodate east-west pedestrian and cyclist crossing at intersections with crosswalk on south approach and crossride on north approach • Pedestrians will cross railway tracks on both boulevards and cyclists will cross railway tracks on north boulevard only • **All alternatives** improve mode choice though the provision of dedicated and continuous active transportation facilities
Accommodates Emergency Services Potential to Impact Utilities in the Corridor	• All alternatives include road widening and intersection improvements which reduce congestion and can improve the efficiency of travel and direct access to accommodate emergency services • New utility corridors will be required on both sides of Eastern Ave to accommodate illumination for cyclists and pedestrians			
Technical and Engineering Evaluation Summary	**Preferred**	**Less Preferred**	**Least Preferred**	**Preferred**
Planning Objectives				
Consistent with Provincial Plans and Policies *(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)*	• **All alternatives** have the ability for the road to accommodate future travel demands due to implementation of AT facilities supports the density targets set out by **Provincial Plans and Policies** for the City of Brampton.			
Consistent with Regional Plans and Policies *(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)*	• **All alternatives** have the ability for the road to accommodate future travel demands and improve modal choices due to implementation of AT facilities is **consistent with Regional Plans and Policies**. All alternatives accommodate planned development and growth by providing additional capacity on the road for pedestrians and cyclists			
Consistent with Municipal Plans and Policies	• The ability for the road to accommodate future travel demands and improve modal choices from implementing AT facilities is	• The ability for the road to accommodate future travel demands and improve modal choices from implanting AT	• The ability for the road to accommodate future travel demands and improve modal choices from implanting AT	• The ability for the road to accommodate future travel demands and improve modal choices from implanting AT

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton Human Health and Sciences Cluster Development Strategy, City of Brampton Active Transportation Master Plan, Queen Street East Precinct Plan)	**consistent with Municipal Plans and Policies**. • All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. • The City of Brampton Active Transportation Master Plan identifies MUP or bike boulevard along the study corridor. All options fall within the category of **MUP or bike boulevard.** • North boulevard **accommodates dedicated one-directional cycling and separated pedestrian space**, which accommodates the urban greenway identified in the Queen Street East Precinct Plan but **limits cyclists travel to one-direction (westbound) travel only.**	facilities is **consistent with Municipal Plans and Policies**. • All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. • The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of **MUP or bike boulevard.** • North boulevard **accommodates bi-directional cycling and pedestrians in shared space**, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan	facilities is **consistent with Municipal Plans and Policies**. • All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. • The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of **MUP or bike boulevard.** • North boulevard **accommodates bi-directional cycling and pedestrians in shared space**, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan	facilities is **consistent with Municipal Plans and Policies**. • All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users. • The City of Brampton Active Transportation Master Plan identifies for MUP or bike boulevard along the study corridor. All options fall within the category of **MUP or bike boulevard.** • North boulevard **accommodates dedicated bi-directional cycling space and separated pedestrian space**, which is consistent with the urban greenway identified in the Queen Street East Precinct Plan
Planning Objectives Evaluation Summary	**Least Preferred**	**Less Preferred**	**Less Preferred**	**Preferred**
Social-Environmental				
Minimize Access Impacts	• Having cycling and pedestrian facilities on the north and south side of the study corridor will enable **pedestrians and cyclists to use accesses on both sides of the study corridor.** • Potential delays when turning into accesses on north and south side for motorists due to cyclists using cycling facilities on both sides of the corridor.	• Having cycling and pedestrian facilities on the north and south side of the study corridor will enable **pedestrians and cyclists to use accesses on both sides of the study corridor.**	• Pedestrian facilities on both sides of the study corridor will enable pedestrians to use accesses on **both sides of the study corridor.** • Cyclists are **limited to using accesses on the north side** only due to the cycling facility (MUP) being located on the north side of the study corridor only.	• Pedestrian facilities on both sides of the study corridor will enable pedestrians to use accesses on **both sides of the study corridor.** • Cyclists **are limited to using accesses on the north side** only due to the cycling facility (cycle tracks) being located on the north side of the study corridor only.
Minimize Traffic Noise	• **No difference in alternatives** as all alternatives encourage active modes of transportation, including walking, cycling and transit thus reducing traffic noise.			
Minimize Disruption due to Construction	• **No difference in alternatives** as all alternatives are anticipated to have the same utility relocation requirements and require similar construction techniques and level of disruption.			
Preserve Archaeological and Cultural Heritage Features	• The study area does not retain any cultural heritage resources. • The study area does not retain archaeological potential on account of deep and extensive land disturbance.			
Improve Visual Aesthetics	• All options have the opportunity to provide planting and improvement to visual aesthetics on both sides of the study corridor.			
Improve Community Character and Public Realm	• Implementation of active transportation facilities, tree plantings, and other boulevard treatments will improve community character and public realm.			
Social Environment Evaluation Summary	**Preferred**	**Preferred**	**Less Preferred**	**Less Preferred**

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
Economic Environment				
Improve Access to Businesses and Key Employment Areas	• Cycle tracks and sidewalks provide **direct access** for pedestrians and cyclists to existing and planned businesses on **both boulevards**. • Cycle tracks are **one-directional** resulting in potentially **longer cyclist travel distance** (depending on origin and destination) to access businesses due to the inability to travel eastbound in the north boulevard and westbound in the south boulevard.	• MUPs provide **direct access** for pedestrians and cyclists to existing and planned businesses on **both boulevards**. • MUPs allow for **two-way travel** which **minimize cyclist travel distance** to access businesses on either boulevard	• MUP on the north side and sidewalk on the south side provides **direct access** to existing and planned businesses for **pedestrians on both the north and south sides** and for **cyclists on the north side** of the study corridor only. • MUPs allow for **two-way travel** which **minimize cyclist travel distance** to accesses on the north side.	• Dual cycle track on the north side provides **direct access** for **cyclists** to existing and planned businesses on the **north side** of the study corridor only. Sidewalks provides direct access to existing and planned businesses for **pedestrians on both boulevards**. • Dual cycle tracks allows for **two-way travel** which **minimize cyclist travel distance** to accesses on the north side.
Minimize Operating and Maintenance Costs\ Minimize Capital and Construction Costs, and Maximize Construction Value	• **Greatest capital cost** to accommodate widest footprint of all alternatives (sidewalks and cycle tracks on both boulevards) in new structure over Tributary • Potential for **increased capital costs** if varying materials are required for sidewalk and cycle track (asphalt vs concrete) and if pavement markings and signage to delineate facility types and direction is required • **Moderate operating and maintenance costs** to maintain two AT facility types in both boulevards and winter operations	• **Moderate capital cost** to accommodate wider footprint (MUP on both boulevards) in new structure over Tributary • **Lower capital costs** than other alternatives with consistent material • **Lower operating and maintenance costs** to maintain one AT facility type and winter operations	• **Least capital cost** to accommodate narrowest footprint (MUP on north and sidewalk on south) in new structure over Tributary • Potential for **increased capital costs** if varying materials are required for sidewalk and MUP (asphalt vs concrete) • **Lowest operating and maintenance costs** to maintain two AT facility types and winter operations	• **Greatest capital cost** to accommodate widest footprint of alternatives (dual cycle tracks and sidewalk on north and sidewalk on south boulevard) in new structure over Tributary • Potential for **slightly increased capital costs** if varying materials are required for sidewalk and dual cycle track (asphalt vs concrete) • **Moderate operating and maintenance costs** to maintain two AT facility types in both boulevards and winter operations
Minimize Property Requirements	• Property acquisition / requirements to acquire official plan right-of-way of 30m is the same for all alternatives.	• Same as Alternative 1	• Same as Alternative 1	• Same as Alternative 1.
Economic Environment Evaluation Summary	**Less Preferred**	**Preferred**	**Preferred**	**Less Preferred**
Natural Environment				
Protect Designated Natural Areas	• No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), no fish species are present in the study area. There is a single occurrence of regionally significant species (Larger Straw Sedge). No impacts to designated natural areas.			
Minimize Impacts to Vegetation	• The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. Lowland deciduous forest (FOD07) is associated with the watercourse habitat. No impacts. However, all alternatives offer opportunities to enhance vegetation.			
Minimize Impacts to Wildlife	• No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts.			

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
Minimize Impacts to Protect Aquatic Habitat	• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same **opportunity to improve the existing aquatic habitat** with a new watercourse crossing structure anticipated to require channel realignment. **Greatest structure footprint** to accommodate the widest AT facilities	• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same **opportunity to improve the existing aquatic habitat** with a new watercourse crossing structure anticipated to require channel realignment. **Similar structure footprint** to Alternative 1 to accommodate AT facilities.	• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same **opportunity to improve the existing aquatic habitat** with a new watercourse crossing structure anticipated to require channel realignment. **Smallest stricture footprint** to accommodate AT facilities	• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. All alternatives provide the same **opportunity to improve the existing aquatic habitat** with a new watercourse crossing structure anticipated to require channel realignment. **Similar structure footprint** to Alternative 1 to accommodate AT facilities.
Minimize Impacts to Surface Water and Groundwater Management	• Moderate impact with urbanization, implementation of AT facilities with **greatest footprint will increase hard surface area**. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design	• Moderate impact with urbanization, implementation of AT facilities with **similar footprint to Alternative 1 will increase hard surface area.** Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design	• Moderate impact with urbanization, implementation of AT facilities with **smallest footprint will increase hard surface area**. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design	• Moderate impact with urbanization, implementation of AT facilities with **similar footprint to Alternative 1 will increase hard surface area.** Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design
Minimize Impacts to Contaminated Properties	• Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study. Impacts anticipated to be the same amongst all alternatives to accommodate official plan 30m right-of-way.			
Improve Air Quality	• All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality.			
Minimize Effects on Climate Change	• All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and addition of infrastructure to support active transportation modes can decrease vehicle greenhouse gases that contribute to climate change. • **Greatest hard surface area results in least opportunities** for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements to improve the study corridor resiliency to climate change	• Similar to Alternative 1	• All alternatives include implementation of AT facilities which may increase traffic mobility and reduce traffic congestion and delays due to individuals switching from single occupancy vehicles to cycling or walking. This reduction in congestion and addition of infrastructure to support active transportation modes can decrease vehicle greenhouse gases that contribute to climate change. • **Least hard surface area of all alternatives results in greatest opportunities** for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements to improve the study corridor resiliency to climate change	• Similar to Alternative 1
Natural Environment Evaluation Summary	**Less Preferred**	**Less Preferred**	**Preferred**	**Less Preferred**

Evaluation Criteria and Sub-Factors	Alternative 1: Boulevard One-Directional Cycle Tracks and Sidewalks, both sides	Alternative 2: Multi-use Path (two-way shared facility), both sides	Alternative 3 Sidewalk South Side and Multi-use Path North Side	Alternative 4 Sidewalk South Side, and Dual Cycle Track and Sidewalk North Side
Summary of Evaluation	**Not Recommended** This alternative is <u>not recommended</u> as although this option provides the great separation of pedestrians and cyclists minimizing conflicts between both users and bi-directional cyclists, and provides pedestrian and cyclists access on both the north and south boulevards, this alternative limits cyclist travel direction in the north boulevard to westbound travel only which can limit the potential of the future greenway. This option also requires additional capital costs to accommodate the widest structure footprint at the new Tributary crossing, higher maintenance costs and additional hard surface area thus reducing available planting area and opportunities for LID treatments.	**Not Recommended** This alternative is <u>not recommended</u> as although this option has lower financial costs to construct and maintain, has pedestrian and cycling access on both sides of the study corridor and accommodates bi-directional cycling on the north boulevard to support the future greenway, this alternative does not separate pedestrians and cyclists in either boulevard as they share the same space travelling in both directions resulting in potential conflicts in both boulevards. This alternative also results in additional conflict points for cyclists at driveways on both boulevards.	**Not Recommended** This alternative is <u>not recommended</u> as although this option has lower financial costs to construct and maintain, provides the greatest opportunities for plantings and LID treatments, pedestrian access on both sides and accommodates bi-directional cycling on the north boulevard to support the future greenway, this alternative does not separate pedestrians and cyclists on the north boulevard as the share the same space travelling in both directions resulting in potential conflicts in the north boulevard. This alternative limits additional conflict points for cyclists at driveways to the north boulevard only.	**Recommended** This alternative is **<u>recommended</u>** as although this option requires additional capital costs to accommodate the widest structure footprint at the new Tributary crossing, higher maintenance costs, additional hard surface area thus reducing available planting area and opportunities for LID treatments, this alternative provides the greatest separation of pedestrians and cyclists minimizing conflicts between both users and bi-directional cyclists. Although this option only provides cyclist access in the north boulevard to support the future greenway, cyclists are provided with separated space from pedestrians and dedicated space for each direction. This alternative also limits additional conflict points for cyclists at driveways to the north boulevard only.

6.2.3 Widening Evaluation

As detailed in Section **6.1.2.3** , the road widening alternatives along Eastern Avenue from Kennedy Road to Hansen Road include:

- Alternative 1 – Widen to the north of the road
- Alternative 2 – Widen about the centreline of the road
- Alternative 3 – Widen to the south of the road

The detailed evaluation for the Road Widening Alternatives is presented in **Table 6-7** using the evaluation criteria identified in **Table 6-5.** Each category that was evaluated was summarized using the following rankings from Not Preferred to Preferred:

Not Preferred (Does not meet objectives)	**Less Preferred** (Partially meets objectives)	**Preferred** (Meets objectives)

Table 6-7: Evaluation of Road Widening Alternatives

Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Technical and Engineering			
Accommodate Future Travel Demands	• All alternatives include road widening, intersection improvements and continuous and dedicated active transportation facilities. Road improvements will increase traffic mobility and reduce traffic congestion and delays, thus accommodating future travel demands.		
Provide Connectivity and Compatibility with Road Network	• Widening the existing road and adding a new connection to Clark Boulevard will provide connectivity and compatibility with the Road Network.		
Improve Public Transit Service	• Although no public transit service currently runs along the study corridor, the road widening and intersection improvements along the study corridor can provide opportunities for transit service to be implemented.		
Create a Pedestrian-Friendly Environment	• All alternatives will implement continuous and dedicated active transportation facilities.		
Create a Cyclist-Friendly Environment	• All alternatives will implement continuous and dedicated active transportation facilities.		
Improve Safety for All Travel Modes	• All alternatives provide widening and intersection improvements including potential crossrides/crosswalks which have the potential to reduce sudden stops to make turns and rear-end collisions, accommodate safe passage of pedestrians and cyclists at intersections, and a provided dedicated space in boulevards to increase pedestrian and cyclist comfort, and increase separation with vehicles to minimize conflicts.		
Improve Mode Choice	• All alternatives improve mode choice though the provision of dedicated and continuous active transportation facilities, and road widening and intersection improvements to improve transit.		
Accommodates Emergency Services	• All alternatives include road widening and intersection improvements which reduce congestion and can improve the efficiency of travel and direct access to accommodate emergency services		
Potential to Impact Utilities in the Corridor	• Existing utility poles are generally located along the north side of Eastern Avenue and would require relocation. Additional utility impacts anticipated and extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro.	• Existing utility poles are generally located along the north side of Eastern Avenue and would require relocation. Additional utility impacts anticipated and extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro.	• Utility poles may not have to be relocated as they are located on the north side of the road. However, additional utility impacts are anticipated; extent to be determined at a later stage. New utility corridors will be required on both sides of Eastern Ave to accommodate illumination and hydro.
Technical and Engineering Evaluation Summary	Preferred	Preferred	Preferred
Planning Objectives			
Consistent with Provincial Plans and Policies *(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)*	• The ability for the road to accommodate future travel demands due to widening supports the density targets set out by Provincial Plans and Policies for the City of Brampton.		
Consistent with Regional Plans and Policies *(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)*	• The ability for the road to accommodate future travel demands and improve modal choices due to widening is consistent with Regional Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users.		
Consistent with Municipal Plans and Policies *(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton*	• The ability for the road to accommodate future travel demands and improve modal choices due to widening is consistent with Municipal Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users.		

Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Human Health and Sciences Cluster Development Strategy, City of Brampton Active Transportation Master Plan)			
Planning Objectives Evaluation Summary	Preferred	Preferred	Preferred
Social-Environmental			
Minimize Access Impacts	• Major impact to accesses of businesses on the north side of the study corridor during construction.	• Minor impact to accesses of businesses on both the north side and south side of the study corridor during construction.	• Major impact to accesses of businesses on the south side of the study corridor during construction.
Minimize Traffic Noise	• Traffic noise anticipated to increase based on additional traffic from additional road capacity which is equal for all alternatives. However, no additional impact is identified as there no outdoor living areas (OLAs) within the study corridor for noise mitigation.		
Preserve Archaeological and Cultural Heritage Features	• The Study Area does not retain any potential cultural heritage resources. No impact. • The Study Area does not retain archaeological potential on account of deep and extensive land disturbance. No impact.		
Improve Visual Aesthetics	• Visual aesthetics will be slightly reduced due to increased pavement width for road widening and active transportation facilities but can be improved through tree plantings and other boulevard treatments within available ROW. No change in impact amongst the alternatives.		
Improve Community Character and Public Realm	• Implementation of active transportation facilities, tree plantings, and other boulevard treatments will improve community character and public realm. No change amongst the alternatives		
Minimize Disruption due to Construction	• Major impact to businesses on the north side of the study corridor during construction.	• Minor impact to businesses on both the north side and south side of the study corridor during construction.	• Major impact to businesses on the south side of the study corridor during construction.
Social Environment Evaluation Summary	Less Preferred	Preferred	Less Preferred
Economic Environment			
Improve Access to Businesses and Key Employment Areas	• Moderate impact to businesses on the north side during construction, as well as railway service at the rail crossing. • Property acquisition to widen on the north side will reduce parking and access length of businesses on the north side. Road will be in closer proximity to the termination of the rail line and train storage building and may reduce available track length on the subject site. • Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening.	• Minor impact to businesses on the north and south side during construction, as well as railway service at the rail crossing. • Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening.	• Moderate impact to businesses on the south side during construction, as well as at the railway service at the rail crossing. • Property acquisition to widen on the south side will reduce parking and access length of businesses on the south side. Road will be in closer proximity to the convergence point for two rail tracks to one rail track. • Accesses will benefit from pedestrian and cycling access in addition to vehicle traffic following the road widening.
Minimize Operating and Maintenance Costs	• Comparable operation/maintenance cost for all options		
Minimize Capital and Construction Costs, and Maximize Construction Value	• Higher capital and construction costs due to implementing mitigation measures for affecting businesses (property and access) on the north side and the rail crossing	• Lower capital and construction costs due to construction taking place generally within the right-of-way	• Higher capital and construction costs due to having to implementing mitigation measures for affecting businesses (property and access) on the south side and the rail crossing
Minimize Property Requirements	• Property acquisition of existing businesses is anticipated on the north side of the study corridor	• Minor to no property acquisition anticipated as widening would generally fit within the current right-of-way of 30m.	• Property acquisition of existing businesses is anticipated on the south side of the study corridor.
Economic Environment Evaluation Summary	Least Preferred	Preferred	Least Preferred

Evaluation Criteria and Sub-Factors	1. Widen to the North of the Road	2. Widen about the Centreline of the Road	3. Widen to the South of the Road
Natural Environment			
Protect Designated Natural Areas	• No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), and no impacts to designated natural areas.		
Minimize Impacts to Vegetation	• The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. No impacts. However, all alternatives offer opportunities to enhance vegetation with street tree plantings.		
Minimize Impacts to Wildlife	• No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts.		
Minimize Impacts to Protect Aquatic Habitat	• No impact as there are no watercourses within the existing Eastern Avenue segment from Kennedy Road to Hansen Road..		
Minimize Impacts to Surface Water and Groundwater Management	• Moderate impact with urbanization, increased roadway width and hard surface area. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design. No change in impact amongst the alternatives • Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width and extension (i.e. road salt, etc.)		
Minimize Impacts to Contaminated Properties	• Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study.		
Improve Air Quality	• All alternatives include road widening and intersection improvements which will increase traffic mobility and reduce traffic congestion and delays as well as improvements to support active transportation modes and transit. This reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality. No change in impact amongst the alternatives		
Minimize Effects on Climate Change	• All alternatives include road widening and intersection improvements which will increase traffic mobility and reduce traffic congestion and delays as well as support active transportation modes. This reduction in congestion, infrastructure to support active transportation modes, and improved transit operations can decrease vehicle greenhouse gases that contribute to climate change. No change in impact amongst the alternatives • Opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies as part of road improvements can improve the study corridor resiliency to climate change. No change in impact amongst the alternatives		
Natural Environment Evaluation Summary	Preferred	Preferred	Preferred
Summary of Evaluation	**Not Recommended** This alternative is not recommended because it requires additional property acquisition, impacts to businesses on the north side (property, access and parking), potential impact to the rail crossing and higher capital and construction costs.	**Recommended** This alternative is recommended due to balancing impacts to businesses and accesses, minor to no anticipated property acquisition, and low capital and construction costs	**Not Recommended** This alternative is not recommended because it requires additional property acquisition, impacts to businesses on the south side (property, access and parking), potential impact to the rail crossing and higher capital and construction costs.

6.2.4 Evaluation of Road Alignment Alternatives for the Clark Boulevard Extension

As detailed in Section **0**, the evaluation of road alignment alternatives for Clark Boulevard extension between Hansen Road and Rutherford Road are:

- Alignment 1 - Road alignment curved at watercourse
- Alignment 2 - Road alignment curved east of watercourse
- Alignment 3 - Road alignment north of Tributary to Etobicoke Creek and jogged at Hansen Road

The detailed evaluation for the Road Widening Alternatives is presented in **Table 6-8** using the evaluation criteria identified in **Table 6-5.** Each category that was evaluated was summarized using the following rankings from Not Preferred to Preferred:

Not Preferred (Does not meet objectives)	**Less Preferred** (Partially meets objectives)	**Preferred** (Meets objectives)

Table 6-8: Evaluation of Road Alignments

Evaluation Criteria and Sub-Factors	Alignment 1- Road alignment curved at watercourse	Alignment 2 - Road alignment curved east of watercourse	Alignment 3 - Road Alignment runs north of Tributary to Etobicoke Creek and jogged at Hansen Road
Technical and Engineering			
Accommodate Future Travel Demands	• Alternative will increase road capacity, thus increasing traffic mobility, reduce traffic congestion and delays, and accommodate future travel demands in the overall network.		• Alternative will increase road capacity, thus increasing traffic mobility, reduce traffic congestion and delays, and accommodate future travel demands in the overall road network. However, this alternative results in a **discontinuous road and requires a jogged intersection at Hansen Road** and roundabout to accommodate the proposed alignment which may result in additional delays and travel time in comparison to Alternatives 1 and 2.
Provide Connectivity and Compatibility with Road Network	• Adding a new connection between Hansen Road and Rutherford Road will provide connectivity and compatibility with the overall Road Network. • Road extension will provide a **direct connection** of Clark Boulevard with Eastern Avenue, thus providing compatibility with the Road Network		• Adding a new connection between Hansen Road and Rutherford Road will provide connectivity with the overall Road Network. • Road extension requires the introduction of a **jogged intersection at Hansen Road** and will be **discontinuous** reducing the connectivity of the corridor in comparison to Alternatives 1 and 2.
Improve Public Transit Service	• Although no public transit service currently runs along the study corridor, the **direct road extension** from Hansen Road to Rutherford Road can provide opportunities for transit service to be implemented and increase efficiencies in routing.		• Although no public transit service currently runs along the study corridor, the **discontinuous road extension** from Hansen Road to Rutherford Road can provide opportunities for transit service to be implemented but may result in delays from increased travel time and inefficiencies in future transit routing in comparison to Alternatives 1 and 2 based on the introduction of the jogged intersection at Hansen Road and roundabout.
Create a Pedestrian-Friendly Environment	• Alternative will implement **continuous and dedicated** active transportation facilities and **direct access** to adjacent lands. • Pedestrians will cross the corridor at protected signalized intersections.		• Alternative will implement dedicated active transportation facilities but will be **discontinuous** at the jogged intersection at Hansen Road resulting in **increased travel distance** • Pedestrians will have **a second intersection** to cross at the **jogged intersection at Hansen Road** and **an unprotected crossing** at the roundabout in comparison to Alternatives 1 and 2.
Create a Cyclist-Friendly Environment	• Alternative will implement **continuous and dedicated** active transportation facilities and **direct access** to adjacent lands. • Cyclists will cross the corridor at protected signalized intersections.		• Alternative will implement dedicated active transportation facilities but will be **discontinuous** at the jogged intersection at Hansen Road and result in **increased travel distance.** • Cyclists will have **a second intersection** to cross at the **jogged intersection at Hansen Road** and **an unprotected crossing** at the roundabout in comparison to Alternatives 1 and 2.
Improve Safety for All Travel Modes	• Road geometry meets 60km/h design speed (50km/h posted speed), which meets the design criteria outlined for the study corridor.		• Road geometry requires reduction of design speed to 50km/h (and subsequent posted speed of 40km/h tbc), which would not meet the design criteria outlined for the

Evaluation Criteria and Sub-Factors	Alignment 1- Road alignment curved at watercourse	Alignment 2 - Road alignment curved east of watercourse	Alignment 3 - Road Alignment runs north of Tributary to Etobicoke Creek and jogged at Hansen Road
	• Alternative will implement the improvements identified in the preferred solution, including: four drive lanes, intersection improvements and cross rides/crosswalks which have the potential to reduce sudden stops to make turns and rear-end collisions, accommodating safe passage of pedestrians and cyclists at intersections, and providing dedicated space in boulevards to increase pedestrian and cyclist comfort, and increase separation with vehicles to minimize conflicts.		study corridor. Road geometry has curvilinear alignment and increased conflict points with introduction of roundabout and jogged intersection at Hansen Road. • Pedestrians and cyclists will be required to cross at a roundabout through gaps.
Improve Mode Choice	• Alternative improves mode choice though the provision of dedicated and continuous active transportation facilities, four drive lanes, and intersection improvements to improve transit routing.		• Alternative improves mode choice though the provision of dedicated active transportation facilities, four drive lanes, and intersection improvements to improve transit routing, however the connection is discontinuous for all users at Hansen Road.
Accommodates Emergency Services	• Alternative includes increased connectivity in the network, which can improve the efficiency of travel and direct access to accommodate emergency services		• Alternative includes increased connectivity in the network; however, this alternative results in a **discontinuous road and requires a jogged intersection at Hansen Road** and roundabout which may result in additional delays / increased travel time to emergency vehicles in comparison to Alternatives 1 and 2.
Potential to Impact Utilities in the Corridor	The road extension is for a new road corridor and utility impacts and requirements are considered to be equal amongst the alternatives.		
Technical and Engineering Evaluation Summary	**Preferred**	**Preferred**	**Least Preferred**
Planning Objectives			
Consistent with Provincial Plans and Policies *(Provincial Policy Statement, Places to Grow Act, Greenbelt Plan)*	• The ability for the road to accommodate future travel demands due to the extension of a road supports the density targets set out by Provincial Plans and Policies for the City of Brampton.		
Consistent with Regional Plans and Policies *(Peel Region Official Plan, Peel Region Long Range Transportation Plan, Region of Peel Road Characterization Study, Region of Peel Active Transportation Study, Region of Peel Strategic Goods Movement Network Study)*	• The ability for the road to accommodate future travel demands and improve modal choices due to a road extension is consistent with Regional Plans and Policies. All alternatives accommodate planned development and growth by providing additional capacity to accommodate all road users.		
Consistent with Municipal Plans and Policies *(City of Brampton Official Plan, City of Brampton Transportation Master Plan Update, Brampton Vision 2040, Queen Street Corridor Secondary Plan, Brampton Human Health and*	• The ability for the road to accommodate future travel demands and improve modal choices due to a road extension is consistent with Municipal Plans and Policies. Alternative accommodates planned development and growth by providing additional capacity to accommodate all road users and improving connectivity in the Road Network. • Alternative is compatible with the urban greenway identified in the Queen Street East Precinct Plan through provision of continuous facilities along the corridor.		• The ability for the road to accommodate future travel demands and improve modal choices due to a road extension is consistent with Municipal Plans and Policies. Alternative accommodates planned development and growth by providing additional capacity to accommodate all road users and improving connectivity in the Road Network although discontinuous.

Evaluation Criteria and Sub-Factors	Alignment 1- Road alignment curved at watercourse	Alignment 2 - Road alignment curved east of watercourse	Alignment 3 - Road Alignment runs north of Tributary to Etobicoke Creek and jogged at Hansen Road
Sciences Cluster Development Strategy, City of Brampton Active Transportation Master Plan)			• Alternative is less compatible with the urban greenway identified in the Queen Street East Precinct Plan through discontinuous corridor at Hansen Road.
Planning Objectives Evaluation Summary	**Preferred**	**Preferred**	**Less Preferred**
Social & Cultural Environment			
Minimize Access Impacts	• No change to existing accesses to lands north of the Tributary to Etobicoke Creek. • Significant impact to existing access point at Hansen Road to 35 Rutherford Road (concrete plant) as road extension will require business displacement. • Opportunities to provide direct access to potential reconfigured lands at 35 Rutherford Road (north and south of new road corridor) • Opportunity to provide direct access to future Fire Hall from new corridor located off Rutherford Road.		• Significant impact to several existing business accesses north of the Tributary to Etobicoke Creek to accommodate new corridor location. • No change to existing access point at Hansen Road to 35 Rutherford Road (concrete plant). • Opportunity to provide direct access to future Fire Hall from new corridor located off Rutherford Road.
Minimize Traffic Noise	• Noise impacts due to additional traffic from additional road capacity are equal for all alternatives and absence of noise sensitive areas in the study area.		
Preserve Archaeological and Cultural Heritage Features	• The study area does not retain any potential cultural heritage resources. • The Study Area does not retain archaeological potential on account of deep and extensive land disturbance.		
Improve Visual Aesthetics	• Visual aesthetics will be slightly reduced due to increased pavement width for the road extension, but can be improved through tree plantings and other boulevard treatments within available ROW		
Improve Community Character and Public Realm	• Implementation of active transportation facilities, tree plantings, and other boulevard treatments will improve community character and public realm.		
Minimize Disruption due to Construction	• Construction of this alignment will cease operations at 35 Rutherford Road South (concrete plant) requiring business displacement. • Construction of a new curved structure over the Tributary to Etobicoke Creek with channel re-alignment will be more complex then Alternative 2.	• Construction of this alignment will cease operations at 35 Rutherford Road South (concrete plant) requiring business displacement. • Construction of a new structure over the Tributary to Etobicoke Creek will be required with channel re-alignment.	• Construction of this alignment will significantly disrupt many businesses located north of the Tributary to Etobicoke Creek (requiring potential full business displacement in some properties and temporary and permanent displacement of parking on other properties).
Social & Cultural Environment Evaluation Summary	**Less Preferred**	**Less Preferred**	**Least Preferred**
Economic Environment			
Improve Access to Businesses and Key Employment Areas	• Improves access to businesses along Eastern Avenue and Clark Boulevard by providing a direct connection between Clark Boulevard and Eastern Avenue.		• Limited opportunity to improve access to businesses with discontinuous connection between Clark Boulevard and Eastern Avenue at Hansen Road.
Minimize Operating and Maintenance Costs	• Highest operating and maintenance costs due to potential curved structure over the Tributary to Etobicoke Creek although road alignment is shorter and has fewer intersection control requirements in comparison to Alignment 3.	• Less operating and maintenance costs in comparison to Alternative 1 due potential straight structure crossing over the Tributary to Etobicoke Creek although road alignment is shorter and has fewer intersection control requirements in comparison to Alignment 3.	• Lowest maintenance and operation costs as no new structure crossing of the Tributary to the Etobicoke Creek, although longer alignment and additional intersection requirements as Hansen Road jogged intersection and roundabout.
Minimize Capital and Construction Costs, and Maximize Construction Value	• Highest capital and construction costs due to potential curved structure over the Tributary to Etobicoke Creek although road alignment is shorter and has fewer intersection control requirements in comparison to Alignment 3.	• Less capital and construction costs in comparison to Alternative 1 due potential straight structure crossing over the Tributary to Etobicoke Creek although road alignment is shorter and has fewer intersection control requirements in comparison to Alignment 3.	• Lowest capital and construction costs as no new structure crossing of the Tributary to the Etobicoke Creek, although longer alignment and additional intersection requirements as Hansen Road jogged intersection and roundabout.

Evaluation Criteria and Sub-Factors	Alignment 1- Road alignment curved at watercourse	Alignment 2 - Road alignment curved east of watercourse	Alignment 3 - Road Alignment runs north of Tributary to Etobicoke Creek and jogged at Hansen Road
Minimize Property Requirements	• 35 Rutherford Road existing concrete plant operations will require displacement and full buy-out of site to accommodate road extension and channel re-alignment. Opportunities to redevelop lands for other use to be explored.		• Significant impacts to businesses located north of the Tributary to Etobicoke Creek (requiring potential full business displacement in some properties and temporary and permanent displacement of parking on other properties). Opportunities to redevelop lands to be explored.
Economic Environment Evaluation Summary	**Least Preferred**	**Less Preferred**	**Preferred**
Natural Environment			
Protect Designated Natural Areas	• No identified wetlands, no significant wildlife habitat (SWH), no Species At Risk (SAR), no fish species are present in the study area. There is a single occurrence of regionally significant species (Larger Straw Sedge). No impacts to designated natural areas.		
Minimize Impacts to Vegetation	• The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. Lowland deciduous forest (FOD07) is associated with the watercourse habitat. No impacts. • Alternative provides opportunity to enhance vegetation through channel re-alignment and associated plantings.		• The study area is highly disturbed and heavily industrialized. No significant tree species or federally or provincially significant vascular flora are within the study area. Lowland deciduous forest (FOD07) is associated with the watercourse habitat. No impacts. • No opportunity to enhance vegetation in the existing channel as channel re-alignment would not be required with this alternative.
Minimize Impacts to Wildlife	• No suitable habitat for Species At Risk (SAR), Species of Conservation Concern (SCC) nor suitable Significant Wildlife Habitat (SWH) in the study area. Study area is highly developed and disturbed and does not provide important habitat functions. No impacts.		
Minimize Impacts to Protect Aquatic Habitat	• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. • Alternative requires a new crossing of the Tributary to Etobicoke Creek and accommodates channel re-alignment. Significant opportunity to improve and enhance the aquatic habitat.		• A single engineered drain is present east of Hansen Road and is a tributary to the Etobicoke Creek. Numerous barriers to fish movement are present and aquatic habitat is poor. • Alternative does not provide opportunity to enhance aquatic habitat as a new crossing is note required.
Minimize Impacts to Surface Water and Groundwater Management	• Moderate impact with new roadway connection. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design. • Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width and extension (i.e. road salt, etc.) • Opportunities to improve flooding conditions with channel re-alignment.		• Greater impact with new roadway connection in comparison to Alternative 1 and 2 with additional length of road extension and roundabout. Stormwater quantity will increase, and quality mitigation will be required, which can be addressed through design • Moderate impact to shallow groundwater system due to potential increase in contaminants related to increased roadway width and extension (i.e. road salt, etc.) which is greater in comparison to Alternative 1 and 2 with increased length of road extension. • No change to address flooding with existing channel alignment
Minimize Impacts to Contaminated Properties	• Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study.		• Potential for impacts to contaminated properties along study corridor to be determined through completion of Contamination Overview Study.
Improve Air Quality	• Alternative includes increased connectivity which will increase traffic mobility and reduce traffic congestion and delays as well as improvements to support active transportation modes and transit in the broader network. This		• Alternative includes increased connectivity which will increase traffic mobility and reduce traffic congestion and delays as well as improvements to support active

Evaluation Criteria and Sub-Factors	Alignment 1- Road alignment curved at watercourse	Alignment 2 - Road alignment curved east of watercourse	Alignment 3 - Road Alignment runs north of Tributary to Etobicoke Creek and jogged at Hansen Road
	reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality.		transportation modes and transit in the broader network. This reduction in congestion and associated idling can reduce emissions and have potential for improvements to air quality. This alternative however will result in increased travel time and congestion in comparison to Alternatives 1 and 2 with the introduction of the second jogged intersection at Hansen Road and roundabout.
Minimize Effects on Climate Change	• This alternative connects Clark Boulevard with Eastern Avenue and will improve connectivity in the network, thus, increasing traffic mobility and reducing traffic congestion and delays. It will also support active transportation modes. This reduction in congestion, infrastructure to support active transportation modes, and improved transit operations can decrease vehicle greenhouse gases that contribute to climate change. • Opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies during road construction can improve the study corridor resiliency to climate change		• This alternative will improve connectivity in the network but is discontinuous and requires additional intersection control. Traffic mobility, congestion and delays can be improved in the overall network but to a lesser extent than Alternative 1 or Alternative 2 • Opportunities for implementation of tree plantings and Low Impact Development stormwater management strategies during road construction can improve the study corridor resiliency to climate change
Natural Environment Evaluation Summary	**Preferred**	**Preferred**	**Less Preferred**
Summary of Evaluation	**Not Recommended** This alternative is <u>not recommended</u>. Although it is shorter in length than Alternative 3, it has slightly greater construction, capital, and maintenance costs in comparison to Alternative 2 with a potential new curved structure over the Tributary to Etobicoke Creek. It provides good connectivity to existing businesses for all users (pedestrians, cyclists, transit and motorist), and is compatible with the future greenway as it supports continuous, direct and dedicated facilities for pedestrians and cyclists. This alternative will improve traffic mobility and decrease congestion, having less negative impacts on climate change and air quality. This alternative provides an opportunity to re-channelize the Tributary to Etobicoke Creek and significantly enhance the aquatic habit and natural environment. This alternative will require full displacement to 35 Rutherford Road (concrete plant). Opportunities to redevelop the site if displaced, require further study.	**Recommended** This alternative is **<u>recommended</u>.** It is shorter in length than Alternative 3, and although it has a higher construction, capital, and maintenance costs in comparison to Alternative 3, it is less than Alternative 1 as the new structure over the Tributary to Etobicoke Creek is not anticipated to be curved. It provides good connectivity to existing businesses for all users (pedestrians, cyclists, transit and motorist), and is compatible with the future greenway as it supports continuous, direct and dedicated facilities for pedestrians and cyclists. This alternative will improve traffic mobility and decrease congestion, having less negative impacts on climate change and air quality. This alternative will require full displacement to 35 Rutherford Road (concrete plant). Opportunities to redevelop the site if displaced, require further study.	**Not Recommended** This alternative is <u>not recommended</u> Although it has a lower construction, capital, and maintenance costs in comparison to Alternatives 1 and 2 as it does not require a crossing of the Tributary to Etobicoke Creek, it results in a discontinuous alignment and jogged intersection at Hansen Road and an additional roundabout. The discontinuity of the alignment results is less connectivity and is less compatible with the future greenway. This option also does not provide an opportunity to re-channelize the Tributary to Etobicoke Creek nor enhance its aquatic habit. This alternative will also impact many businesses located north of the Tributary to Etobicoke Creek requiring potential displacement of businesses (in some properties) and temporary/ permanent loss of parking in other properties.

6.3 Overall Recommended Design

Based on the findings of the Active Transportation Alternatives Evaluation, **Alternative 4- Sidewalk on south side, and dual boulevard cycle tracks and sidewalk on north side** is recommended as the preferred active transportation alternative. Based on the findings of the Roadway Widening Evaluation, **Alternative 2- Widening from the centreline** was the recommended widening alternative. Based on the findings of the Road Alignment Evaluation, **Alignment 2 - Road alignment curved east of watercourse** is the recommended road alignment for the Clark Boulevard extension. The conceptual typical section reflecting the overall recommended design can be found in **Figure 6-1.**

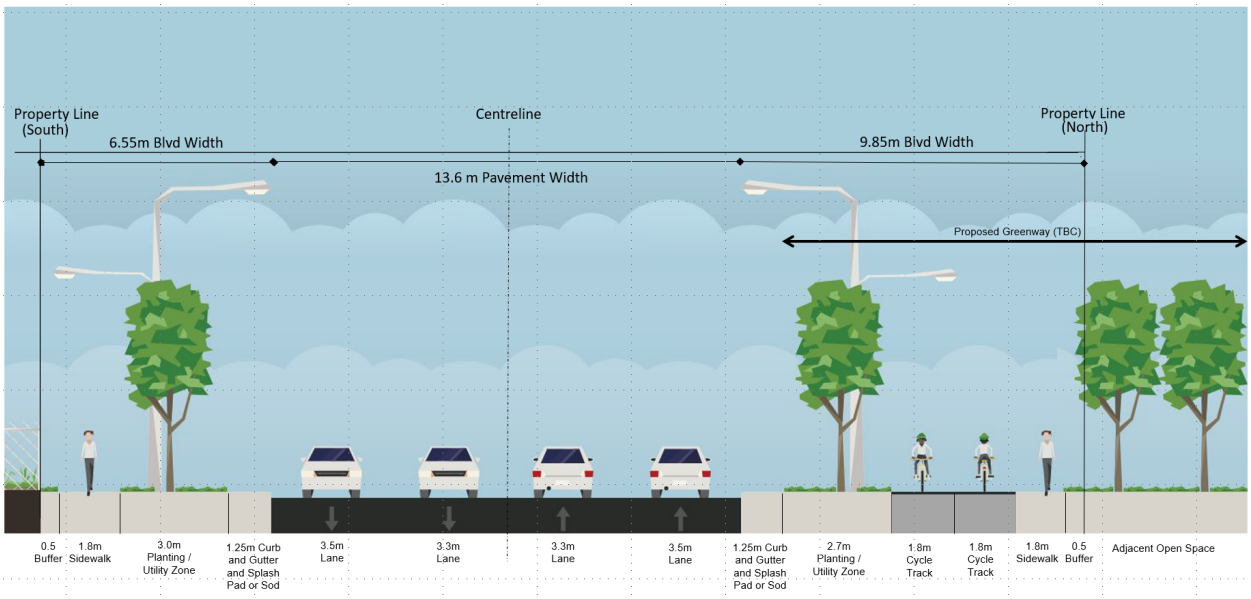


Figure 6-1: Conceptual Typical Section of the Study Corridor

7 Recommended Design Concept

7.1 Description of the Recommended Design Concept

The recommended design of Clark Boulevard Extension and Eastern Avenue Improvements was chosen with consideration of transportation service for all road users (pedestrians, cyclists, transit riders, and motorists) and potential impacts to the natural environment, community, cultural heritage, operations, aesthetics, driveway access, property requirements, and capital construction and maintenance costs. It best meets the goals of the project with regards to transportation service improvements, while also considering the overall impact of the project and mitigation measures.

The recommended design for Clark Boulevard Extension and Eastern Avenue Improvements is illustrated in the preliminary design drawings in **Appendix R** and includes the following elements:

- Four general purpose lanes (two in each direction). Through lanes will be 3.3m and curb lanes will be 3.5m
- Separated 1.8m east-bound and 1.8m west-bound cycle tracks on the north side of the road
- Separated 1.8m sidewalks on both sides of the road
- Urbanized section with 1.25m curb and gutter and splash pad / sod
- Accessibility for Ontarians with Disabilities (AODA) compliant intersections with crossrides and crosswalks at intersections
- New traffic signals proposed at Kennedy Road, Hansen Road and Rutherford Road
- Extension of Clark Boulevard from Rutherford Drive to Hansen Road
- Channel realignment of the Tributary to Spring Creek at its crossing with Eastern Avenue / Clark Boulevard and new culvert crossing
- Illumination along the corridor
- Opportunities for streetscaping in the boulevards
- Utility relocations
- Property requirements

7.1.1 Design Criteria

The geometric design for this road project is in accordance with the approved design criteria, standards and manuals. If there is any difference between the approved design criteria and standards and manuals, the following shall apply in descending order of precedence:

1. The approved design criteria for this road design;
2. City of Brampton Engineering & Design Standard Drawings (October 2013 to February 2019);
3. Region of Peel Roads and Traffic Standard Drawings (Date varies);
4. TAC Geometric Design Guidelines (June 2017);
5. OTM Book 18 (2015);

6. MTO Design Supplement for TAC Geometric Design Guidelines (June 2017)

The Design Criteria developed for the project is summarized in **Table 7-1.**

As per TAC standards, a clear zone of 5.5m to 8.4m from back-of-curb is recommended along Eastern Avenue and Clark Boulevard. However, to conform with the clear zone requirements from TAC, it would limit the desired design elements of the urbanized corridor such as active transportation facilities, boulevard features, and incorporating Complete Street design. As such, achieving the clear zone design criteria may be impractical in such urban environments. Given the corridor characteristics and community, the City provided direction on the agreement of moving forward with the lateral clearance criterion of 3.15m on the south side and 2.85m on the north side from face-of-curb to face-of-pole. Opportunities to install utility poles within the planting zone and/or in grading slopes are to be considered and finalized during detailed design.

Table 7-1: Design Criteria

Classification	Existing Conditions	Design Standards	Proposed Standards	Reference
General				
Road Classification	Rural	UAU60 (Minor Arterial)	UAU	
Design Speed (km/h)	NA	60	60	City of Brampton
Posted Speed (km/h)	50	50	50	City of Brampton
Right-of-Way (ROW) Width (m)	30.5	26-30	Eastern Ave 30.5m Clark Blvd extension 30m At intersections 33.2m max	City of Brampton Official Plan Schedule B (August 2020)
Design Vehicle	NA	WB-20	WB-20	TAC 2017 Chapter 2 Page 54, Table 2.6.5
Jurisdiction	City of Brampton	City of Brampton	City of Brampton	
Maximum Rate Of Superelevation (%)	NA	Urban = 4.0	2% (Reverse Crown)	TAC 2017 Chapter 3

				Page 8, Section 3.2.2.4
Normal Crown (-0.02 m/m) R_{min} (m)		200	1290	1290	TAC 2017 Chapter 3, Page 14, Table 3.2.4
Curve Radius with Superelev. R_{min} for e=0.04 (m)		NA	130	NA	TAC 2017 Chapter 3, Page 23 Table 3.2.8
Reverse Crown (+0.02 m/m) R_{min} for e = 0.04 (m)		NA	185	185	TAC 2017 Chapter 3, Page 23, Table 3.2.8
Min. Stopping Sight Distance (m)		123	85	>85	TAC 2017 Chapter 2, Page 38, Table 2.5.2
Right Turn Taper Ratio		NA	14:1 – 17:1	15:1	TAC 2017 Chapter 9, Page 101, Table 9.14.2
Left Turn Taper Ratio		NA	15:1 – 36:1	15:1 – 36:1	TAC 2017 Chapter 9, Page 123, Table 9.17.1
Min. Left & Right Turn Storage (m)		NA	40 – 90 (RT) 80 (LT)	20 (RT) 15-95 (LT)	TAC 2017 Chapter 9, Page 101, Table 9.14.2 & City of Brampton Standard 244
Min. Tangent Length at Intersections (m)		NA	20	50	TAC 2017 Chapter 9, Page 43
Cross Section Elements					
Lane Widths (m)	Through Lane Width	NA	3.50 – 3.75	3.3m	City of Brampton Standard 241 – 244

					City Direction
	Left Turn Lane Width	NA	3.50		City of Brampton Standard 241 - 244
	Right Turn Lane Width	NA	3.50		City of Brampton Standard 241 - 244
	Curb Lane Width	5.0	3.75	3.5m	City of Brampton Standard 241 – 244 City Direction
Pavement Width (m) [2]		Varies (9.0 – 10.0)	14	13.6	City of Brampton Standard 203
Raised Median Width at Intersections (m)		NA	1.5	1.5	City of Brampton Standard 241 – 244, and 230
Concrete Barrier Curb with Standard Gutter (m)			0.5	0.5	OPSD 600.040
Flush Median Width (m)		NA	1.0 – 4.0	NA	TAC 2017 Chapter 4 Page 33, Section 4.5.3.1
Kill Strip (m)		NA	1.0	0.75	City of Brampton Standard 205
Boulevard Width (m)		NA	2.0 – 3.0 1.5 (min)	1.8 - 3.0	TAC 2017 Chapter 4

[2] City of Brampton measures pavement width from edge-of-pavement (EOP) to EOP.

				Page 39, Figure 4.6.1
Property Line Buffer (m)	NA	Varies (0.75 – 1.68)	0.5	City of Brampton Standard 203
Clear Zone (m)	Varies (5.5 – 8.4)	Design ADT > 6,000 6:1 or flatter = 4.5 – 5.0	Not practical from the perspective of the street character and context to achieve. Refer to Lateral Clearance	TAC 2017 Chapter 7 Page 12, Table 7.3.1
Lateral Clearance (m)	NA	Min. Lateral Clearance = 0.5 m from face-of-curb to face-of-pole	From face of curb to face of pole: -south side = 3.15m -north side= 2.85m	TAC 2017 Chapter 7 Page 76-77, Section 7.7.1 – 7.7.2
Tangent Section Cross Fall (%)	NA	3.0	2.0	City of Brampton Standard 203
Bridge Clearance for Short Overpass (Horizontal) (m)	NA	Right Clearance = 1.4	NA	TAC 2017 Chapter 4, Page 54, Table 4.10.1 TAC 2017 Chapter 4, Page 57, Table 4.10.3
Vertical Alignment				
Maximum Grade (%)	4.36	6.0	1.7	TAC 2017 Chapter 3, Page 55, Table 3.3.1
Minimum Grade (%)	0.31	0.5	0.5	TAC 2017 Chapter 3, Page 56, Section 3.3.2.5

Sag Vertical Curve K_{min}	2	Sight 18 Comfort 8 – 9	44	TAC 2017 Chapter 3, Page 62, Table 3.3.4
Crest Vertical Curve K_{min}	1	11	51	TAC 2017 Chapter 3, Page 59, Table 3.3.2
Intersection				
Radius of Curbs at Intersections				
Arterial to Collector	15	18	15	City of Brampton Standard 245
Arterial to Arterial	11	18	18	City of Brampton Standard 245
Day Lighting for Arterial to Local/Collector/Arterial	0	15	15	City of Brampton Standard 245
Day Lighting for Minor Collector to Local	Hansen Road and Eastern Avenue NW Corner (15m)	7.5	15	City of Brampton Standard 245
Active Transportation				
Sidewalk Width (m)	1.46	1.8	1.8	City of Brampton Standard 203
Cycling Facility Type and Width	NA	One-Way In-Boulevard Bicycle Facilities Desired = 2.0 m Suggested = 1.8 m	1.8m	OTM Book 18 (Table 4.7)
Multi-Use Pathway Width (m)	NA	3.0 (min)	NA	City of Brampton Standard 203

Sidewalk Cross Fall (%)	NA	2.0 – 6.0	2.0	City of Brampton Standard 203
Signalized Intersection for Crossing (Pedestrians and Cyclists)	NA	Combined Crossride = 5.0 m min	5.0	OTM Book 18 (Figure 4.101 and 4.102)
Unsignalized Intersection for Crossing (Pedestrians and Cyclists)	NA	Mixed Crossride = 4.0 m min	NA	OTM Book 18 (Figure 4.103)
Driveway Entrances				
Driveway Grades (max %) B/W Curb and Sidewalk	NA	8.0	8.0 max	City of Brampton Standard 239
Commercial/Industrial Driveway Minimum Width	4.60	9.0 – 11.0	9.0 - 11.0	City of Brampton Standard 237
Commercial/Industrial Driveway Radius	Varies 3.7 – 11.5	6.0 – 9.0	NA	City of Brampton Standard 237
Commercial/Industrial Driveway Grades (max %) Behind Sidewalk	NA	7.5	7.5 max	City of Brampton Standard 237

7.1.1.1 ROAD GEOMETRY

7.1.1.2 HORIZONTAL ALIGNMENT

The horizontal alignment for the preferred design (with a 60km/h design speed) generally follows the existing centreline of Clark Boulevard between Kennedy Road and Hansen Road. For the new alignment for the extension from east of Hansen Road to Rutherford Road, it generally shifts further south to align with the existing Rutherford Road / Clark Boulevard intersection. However, there are locations where the centreline is shifted slightly to the north or south to provide a 'best fit' for the ultimate design of Clark Boulevard / Eastern Avenue within the existing and proposed right-of-way and minimize impacts to adjacent properties and features. Minor adjustments in the horizontal alignment are proposed at some locations in order

to address geometric deficiencies and ensure that minimum design standards are met. The proposed horizontal alignment is illustrated on the preliminary design drawings in **Appendix R.**

7.1.1.3 VERTICAL ALIGNMENT

The proposed vertical alignment accommodates a 60 km/h design speed. Along the existing portion of Eastern Avenue the vertical alignment was chosen to match the existing road profile where possible, with minor adjustments proposed at some locations to address geometric deficiencies and meet the geometric standards required for the class of the road, as per the design criteria identified in **Section 7.1.1**. The proposed roadway profile for the Clark Boulevard Extension will generally remain consistent with existing conditions, with the exception of the segment from approximately 100m west of Hansen Road to 70m west of Rutherford Road. This segment will be raised to accommodate the proposed roadway corridor and channel realignment and slopes in an easterly direction.

The vertical alignment aims to minimize impacts to existing entrances and driveways and reduce grading impacts to adjacent properties and features. The proposed vertical alignment is illustrated on the preliminary design drawings in **Appendix R.**

7.1.2 Typical Cross-Section

Using the City's Official Plan right-of-way of 26-30m for the study corridor, the EA Study approved design criteria, and feedback from the public, the following midblock typical section was developed for the preferred design as presented in **Figure 7-1.**

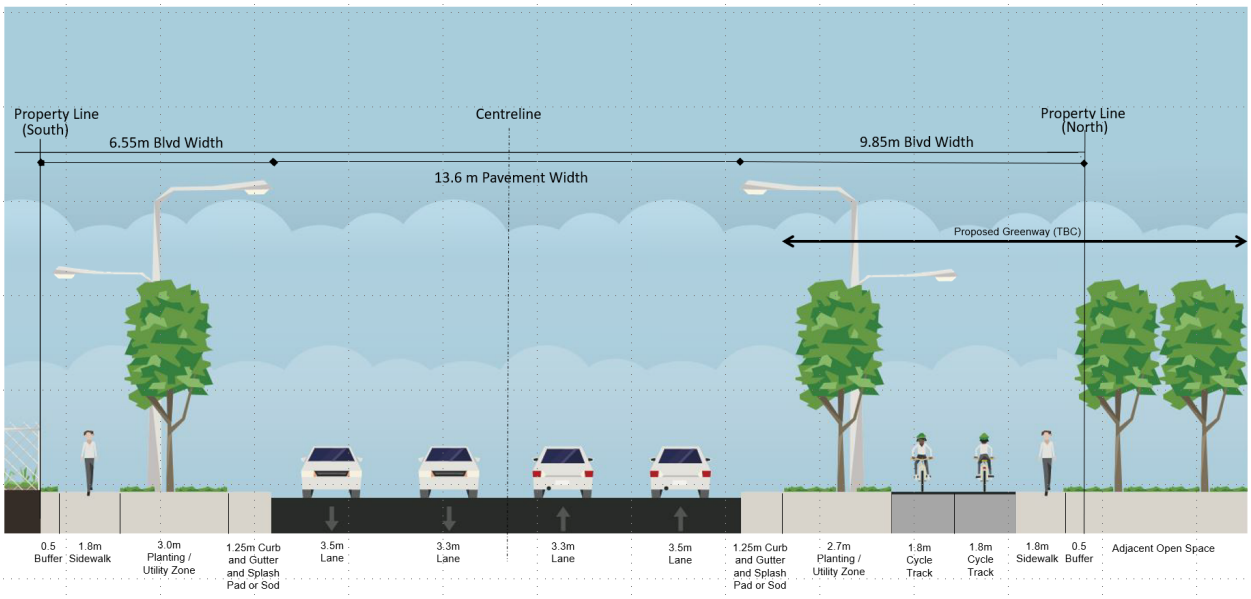


Figure 7-1: Typical Cross-Section

Key features of the cross-section include:

- Four general purpose lanes, two lanes in each direction (3.3m inner lanes and 3.5m curb lanes)
- Two 1.8m Boulevard Cycle Tracks on the north side of the road, one in each direction

- 1.8m Sidewalks on both sides
- Landscaping within the boulevards' planting zones (where feasible), generally allocated between active transportation facilities and the roadway where available right-of-way exists.
- Utility zones for overhead utilities (streetlights and hydro poles) designated either between active transportation facilities and the curb, within the planting zone, and underground utility corridors
- Fully urbanized and illuminated corridor
- 0.75m splash pad or sod
- 0.5m curb and gutter

As discussed in the design criteria presented in **Section 7.1.1** the City provided direction on the agreement of the lateral clearance criterion of 3.15m on the south side and 2.85m on the north side from face-of-curb to face-of-pole. Opportunities to install utility poles within the planting zone and/or in grading slopes are to be considered and finalized during detailed design.

Grading will be contained within the proposed right-of-way (where feasible). In areas where grading extends beyond the proposed right-of-way, grading easements or property acquisition may be required as discussed in **Section 7.1.13.**

7.1.3 Cycling and Pedestrian Facilities

Continuous pedestrian and cycling facilities are proposed in the north boulevard, consisting of two adjacent 1.8m boulevard cycle tracks (one in each direction) along with a 1.8m sidewalk. This configuration is in support of the future Urban Greenway proposed for the area. In addition a 1.8m sidewalk is proposed in the south boulevard.

Generally, the proposed active transportation facilities are located as close to adjacent properties as possible to maximize the separation between pedestrians and cyclists and the roadway vehicles and to promote comfort, maximize tree planting opportunities in the boulevard, and allow for sufficient space for utilities.

Crossride and crosswalk treatments to provide increased visibility and dedicated space to accommodate pedestrians and cyclists are proposed at all signalized and unsignalized intersections as reflected on the preferred design plan in **Appendix R**.

The material type, treatment and pavement markings / signage for the sidewalks and cycle tracks will be confirmed during Detailed Design.

7.1.4 Transit

There are no existing transit stops in the corridor and at the time of writing of this report no planned transit routes. During Detailed Design, transit stop locations and transit infrastructure requirements will be reviewed, identified and confirmed in consultation with the City and the respective transit authority. If transit infrastructure is envisioned, at locations where the cycle track and sidewalk intersect with bus pads it is recommended that passenger standing areas with shelters be placed behind the cycle track and sidewalk.

7.1.5 Streetscaping and Landscaping

A context-sensitive and thoughtful streetscape is integral to promote high-quality urban design, serve as community entrances, and encourage pedestrian-friendly and transit-oriented neighbourhoods. Opportunities for streetscaping are identified on the preliminary design of Eastern Avenue and Clark Boulevard and may include elements such as plantings in boulevards, street lighting, street furnishings, and public art.

The preferred cross-section for Eastern Avenue / Clark Boulevard corridor promotes safe, separated, and continuous facilities for pedestrians and cyclists along the entire length of the corridor. The streetscape should also contribute to the safety and accessibility of the street through lighting and barrier-free access along the corridor. The streetscape for Eastern Avenue and Clark boulevard should be designed according to current best practices for accessibility and compliance with the City of Brampton's Facility Accessibility Technical Standards and the accessibility for Ontarians with Disabilities Act (AODA).

The preferred design considers maximizing the available boulevard space for plantings and streetscaping between the roadway, active transportation facilities, and property line. In general, the space in the boulevard between the active transportation facilities and the roadside curb is dedicated for landscaping and utility poles.

Areas identified as opportunities for street tree planting are shown on the preliminary design drawings in **Appendix R**. A Tree Inventory and Tree Protection Plan identifying Tree Protection Zones is provided in **Appendix G**. During Detailed Design streetscaping opportunities will be confirmed and a streetscaping planting plan, including individual tree planting locations, will be developed.

7.1.6 Intersection Design, Access and Traffic Signals

New traffic signals are proposed at Kennedy Road, Hansen Road and Rutherford Road. Crossrides and crosswalks are proposed at these intersections to accommodate pedestrians and cyclists crossings. Intersections will be designed in accordance with Accessibility for Ontarians with Disabilities standards and to facilitate the movement of all road users, including pedestrians and cyclists. Details regarding intersection designs are to be developed during Detailed Design

Some driveways along the Eastern Avenue / Clark Boulevard corridor will need to be re-graded to accommodate the proposed road improvements. Property owners will be notified of any temporary impacts to driveway access prior to construction and/or in advance of work related to their access. Details will be confirmed during detailed design.

7.1.7 Tributary to Etobicoke Creek

As part of the recommended improvements Clark Boulevard is proposed to be extended across an existing manufacturing plant at 35 Rutherford Road to connect Hansen Road and Rutherford Road. The road cross-section is proposed to be urbanized and accommodate two traffic lanes in each direction, boulevard cycle tracks and a sidewalk on the north side and a sidewalk on the south side, illumination, utilities and streetscaping. This proposed extension of Clark Boulevard also requires a new crossing of the Tributary to Etobicoke Creek. Crossing alternatives of the

watercourse considered fluvial geomorphology, hydraulics and opportunities to enhance the natural environment. The watercourse was recommended to be realigned to accommodate the road extension as it provides opportunities to rehabilitate a degraded section of engineered channel with a hybrid natural / engineered solution, improved geomorphological conditions, improved conveyance and containment of flood events, provision of a functional floodplain in the overbank area, opportunities for perpendicular crossing of the future roadway (reducing crossing span), and enhanced aesthetic appeal. The proposed channel realignment is approximately 245m in length and includes a 90-degree bend in the channel downstream of the new perpendicular Clark Boulevard crossing and channel widening as per the recommendations in the Fluvial Geomorphological Report in **Appendix J.** The recommended culvert for the new crossing is an 8.535 x 2.44 m Conspan arch culvert.

The preliminary design drawings in **Appendix R** illustrate the recommended channel re-alignment and footprint.

Structural Design

The 8.535m x 2.44m x 36.1m Con/Span pre-cast arch culvert is an appropriate solution for the Tributary Crossing due to it relatively thin top of slab thickness since there is limited height spacing between the roadway and channel invert elevation. This pre-cast arch culvert requires less concrete per open area than other precast bridge and culvert structures and is an ideal combination of hydraulic efficiency and structural capacity. The clear span and clear distance between footings is maximized with this arch culvert structure. Installation of the Con/Span arch culvert is rapid, compared to conventional cast in place culverts, consequently the Clark Boulevard extension can be opened to traffic sooner. Installation cost is also reduced by way of reduced forming and grouting, a shorter construction window, less construction complications, a more fixed construction scheduling and higher quality control of the pre-cast concrete components. Cost to maintain the Con/Span arch culvert is lower due to higher concrete quality and better-quality control of precast factory produced products. The three-sided structure provides a natural bottom for environmental applications. The arch culvert panels can be manufactured well in advance and installed within environmental windows if required. In addition, the Con/Span arch culvert is aesthetically pleasing.

During the detailed design of the Tributary Crossing structure, a detailed structural analysis and structural design will need to be performed to confirm the suitability of the Con/Span arch culvert for this crossing, culvert size, culvert location and the need for wing walls for soil retention as necessary.

The design of the culvert will be undertaken in accordance with the latest Canadian Highway Bridge Design Code (CHBDC), Ministry of Transportation of Ontario's "Structural Manual", Ministry of Transportation of Ontario's "Concrete Culvert Design and Detailing Manual" and all other current directives and standards. A general arrangement drawing of the proposed structure is provided in the Structural Design Report provided in **Appendix Q.**

7.1.8 Pavement Design

The preliminary pavement investigation recommendations are documented in **Appendix L.** The pavement design recommendations need to be confirmed during detailed design by a geotechnical engineer.

Pavement Structural Requirements

A pavement design analysis was carried out for the road widening of Eastern Avenue and new road construction of Clark Boulevard following AASHTO methodology to determine the structural requirements for the pavement for this project. For additional details refer to **Appendix L.** It was found that the minimum pavement design for Eastern Avenue should consist of 105 mm of new hot mix asphalt, and 400 mm of granular Base/Subbase. The minimum pavement design for Clark Boulevard should consist of 120 mm of new hot mix asphalt, and 450 mm of Base/Subbase. Both designs were based on the use of Granular 'B' Type II Subbase material.

City of Brampton Design Requirements

The results of the AASHTO pavement design analysis were then compared to the City of Brampton Road Design Standards for Arterial Roads (Drawing No. 205 - Arterial Road 15.0 m Pavement on 36.0 m ROW) The City of Brampton design standard exceeds the new pavement design developed for pavement widening areas and thus should be used for new pavement areas. It is provided as follows:

40 mm HL3 HS Asphalt
85 mm HL8 Asphalt
150 mm Granular A
450 mm Granular B

Recommended Pavement Design

Based on the design input parameters and the calculated design ESALs, the City of Brampton minimum thickness design is considered appropriate for the Eastern Avenue road widening and Clark Boulevard Extension, with a minimum Granular Sub-Base thickness of 525 mm.

All Hot Mix Asphalt (HMA) materials should meet the requirements of OPSS 310, OPSS 1150 and City of Brampton Specifications, and be compacted to at least 92 percent for HL1 material, and 91 percent for HDBC, of the MRD. An asphalt cement binder grade of PG 64-28 is required for all asphalt mixes. A tack coat shall be utilized between all asphalt lifts, all vertical faces, and at all tie-ins to existing locations. Recycled Asphalt Pavement (RAP) material should not be used in either asphalt mix. Aggregates for the asphalt mixes should be in accordance with OPSS.MUNI 1003.

Should the City opt for Superpave asphalt mixes on this project, the 20-year design ESALs for Eastern Avenue and Clark Boulevard was estimated to be 642,167 and 1,115,406, respectively,

thus a Traffic Category B designation should be used in preparing all Superpave asphalt mix designs.

All new granular subbase material should consist of OPSS Granular B Type II, while the granular base material should consist of OPSS Granular A. All new granular material should meet the requirements of OPSS.MUNI 1010,and be compacted to 100 percent of the Standard Proctor Maximum Dry Density (SPMDD) within 2 percent of Optimum Moisture Content (OMC). All granular material should be compacted in accordance with the requirements of OPSS.MUNI 501.

Smooth transitions are required in all areas where the new pavement meets the existing asphalt surface at the limits of the project. All longitudinal and transverse joints should meet the requirements of OPSS 310. All longitudinal joints should be staggered between the asphalt lifts, accomplished by offsetting the paving edge and the upper asphalt course by a minimum of 150 mm. At all transverse tie-ins to existing pavements, the top lift of asphalt should extend a minimum of 5 m in length beyond the transverse joint in the upper binder lift. Tie-ins between new and existing granular material should be carried out over a distance of at least 10 m to minimize the potential for differential frost action along the road.

In any pavement widening areas, any surficial topsoil should be stripped to expose the underlying soils. The underlying subgrade soils should be removed and graded as required to accommodate the new pavement platform. The exposed top of subgrade should be graded to a 3 percent crossfall toward the subdrains installed at the outer pavement edge.

The subgrade shall be compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD), within 2 percent of optimum moisture content (OMC). The exposed subgrade should be compacted and proof-rolled with a heavy roller and examined to identify areas of unstable subgrade. Any soft/wet areas identified should be sub-excavated and replaced with approved material.

Standard side slopes of 2H:1V or flatter should be suitable for embankment construction. For erosion control and maintenance activities, provision of a 2 m wide mid-height bench is recommended for fill slopes greater than 8 m in height. Exposed embankment surfaces should be provided with a vegetation cover or otherwise protected against erosion in accordance with OPSS 804.Proper drainage of the pavement structure must be provided by way of curb and gutter and use of subdrains to ensure optimal pavement performance. Pavement design thicknesses in widening areas are based on the pavement structure thicknesses recorded in the boreholes. It is cautioned that actual existing pavement thicknesses may fluctuate between borehole locations. The actual thickness of the new granular subbase layer may need to be increased during construction to ensure that the total thickness of the pavement in the widening area match, or exceed, the thickness of the existing pavement.

7.1.9 Hydrogeology

The findings of the Hydrogeological Study is provided in **Appendix M**.

The proposed water taking will be temporary in nature (less than one year) for the purpose of construction of the culvert crossing and channel realignment. It is assumed that all excavations would be open cut. The excavation and dewatering methods that will be used in the field will be determined by the selected contractor.

Dewatering rates and a radius of influence for the water taking were estimated. The methods and means of dewatering will be determined by the contractor and its subcontractors. The base groundwater flow is estimated to be approximately 19,000 L/day. With a safety factor of three on groundwater flow, the estimated peak flow rate flow is approximately 57,000 L/day. The radius of influence is estimated to extend less than 15 m from the edge of the excavation. Considering the estimated peak water taking rate is greater than 50,000 L/day, but less than 400,000 L/day, registration on the EASR will be required and will require the preparation of a Water Taking Report and Discharge Report in accordance with the regulations.

A dewatering estimate has not been completed for the utility installations or storm drainage infrastructure for Eastern Avenue or the Clark Boulevard Extension, and if additional dewatering is required for those structures, then the dewatering estimate and permitting requirements may be required to be updated. It is anticipated that some dewatering will be required for the construction of any utility installations or storm drainage infrastructure for Eastern Avenue or the Clark Boulevard Extension. Groundwater flow rates through the predominantly native silty clay soils would be low due to the relatively low hydraulic conductivity of that soil. However, water may be perched locally within the sandy fill soils, though it would be of limited volume, and water taking estimates must include rainfall and surface water if they cannot be kept separate from groundwater. Thus, depending on the number and size of the excavations, the need for some form or water taking permit may be required. The radius of influence from the edge of any excavations for utility installations, drainage infrastructure along Eastern Avenue, and the Clark Boulevard extension, is anticipated to be localized and less than 15 m.

Water that is removed from excavations for dewatering must be discharged or disposed of in accordance with current regulations, whether to the natural environment or to a sewer system. The Water Discharge Plan in the case of an EASR registration or the Permit to Take Water (PTTW) and associated Hydrogeological Study will specify conditions on the discharge of the groundwater to the environment.

7.1.10 Drainage / Stormwater Management Plan

7.1.10.1 ROADWAY DRAINAGE

The proposed roadway profile to accommodate the road widening and road extension will generally remain consistent with existing conditions, with the exception of the segment from approximately 100 m west of Hansen Road to 70 m west of Rutherford Road. This segment will be raised to accommodate the proposed roadway corridor and channel realignment, and slopes in an easterly direction. Overall, the existing drainage patterns and discharge locations will not be altered as per the proposed roadway improvements, with the exception of minor localized changes as a result of the proposed roadway profile.

For areas where Eastern Avenue / Clark Boulevard is higher than the existing ground (fill sections), a continuous slope to direct runoff from external drainage areas to their existing outlets will be provided. For areas where Eastern Avenue / Clark Boulevard is lower than the existing ground (cut sections), the runoff from external areas will be captured into the future storm sewer system by ditch inlet catchbasins, maintaining the existing drainage pattern. The conveyance of external flows will be further investigated as part of detailed design. Additional details are included in Drainage and Stormwater Management Report in **Appendix K**.

The study area is within the area regulated by the TRCA, and a new 8.535 x 2.44 m Conspan arch culvert crossing with channel realignment and widening for the engineered drain, which connects to a tributary of Spring Creek, is proposed under the Clark Boulevard extension alignment. A preliminary hydraulic assessment, including the downstream improvements at Rutherford Road, was conducted to determine the upstream impact as a result of the proposed works. The hydraulic assessment confirmed that there would be no increase in upstream flood levels and the proposed crossing meets the MTO Drainage Design freeboard criteria. A detailed hydraulic assessment should be conducted during detail design to confirm the hydraulic impacts in consideration with the proposed downstream channel improvement works.

As a Low Impact Development measure, it is recommended that the boulevard and median areas outside of the active transportation facilities be covered with permeable material (e.g. grass, permeable pavement, etc.) to minimize the overall increase in impervious area along the Clark Boulevard corridor.

Stormwater best management practices, including catchbasin inserts, bioretention systems, and online storage pipes, are proposed to provide stormwater quality treatment, water balance, erosion control, and quantity control of the increased runoff from the roadway right-of-way. The proposed road improvements, including consideration of the naturalized realigned channel, will result in a net decrease in pavement area of 0.22 ha. As part of the stormwater management strategy, a total of 2.15 ha of pavement area will receive quality treatment through the proposed bioretention cells, which exceeds the MECP requirement of providing treatment to the increased pavement area. The bioretention cells will also provide 234 m3 of water balance storage and 858 m3 of water quality and erosion control storage volume, which exceeds the required volumes determined by the MECP and TRCA. Oil-grit separator units are proposed for the catchments that are not treated by the bioretention facilities as an additional quality control measure. A total of 0.46 ha of pavement area, which is the increase in pavement area from Drainage Areas A-1, A-2, and A-3, will receive quantity control through the proposed online storage pipes. Opportunities to implement supplemental BMP measures to provide additional water quality control, water temperature mitigation, and support a treatment train approach will be considered during the next phases of design in series with the proposed measures to enhance the overall water quality objectives.

7.1.11 Utilities

Existing utilities along the corridor were identified based on available information provided by the utility companies at the time of the EA study. Existing utilities along the Eastern Avenue / Clark Boulevard corridor, will be relocated as necessary to accommodate the preferred design.

The existing utilities and the identified conflicts of the proposed improvements are documented on the Utility Composite and Conflict Plan provided in **Appendix O.**

The location and alignment of existing municipal services is to be confirmed during Detailed Design, which may result in changes to the identified utility impacts. Formal definition of impacts on utilities will be determined during Detailed Design, in consultation with individual utility companies. All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary. During Detailed Design, meetings will be held with utility companies as required where potential impacts to existing or future services are identified.

7.1.12 Illumination

A preliminary street lighting design was prepared and is provided with the preliminary design drawings in **Appendix R.** Illumination along the study corridor considers the roadway profile, the urban cross-section, and active transportation requirements.

The proposed illumination include continuous roadway lighting along Eastern Ave and Clark Blvd between Kennedy Rd and Rutherford Rd, additional continuous sidewalk/cycle track lighting and pedestrian luminaires installed on the back of roadway luminaire poles. ANSI/IES RP-8-21 design standard was used to determine the light level criteria per City's input. The following tables and notes provide the design direction confirmed by the City that informed the preliminary street lighting design:

- For intersection lighting use Table 12-1, RP-8-21.
- For sidewalk lighting, pedestrian luminaires are placed only on roadway luminaire poles and no dedicated pedestrian poles are required.
- For lighting standards use RP-8-21.
- For vertical illuminance at intersection, average vertical illuminance for a series of points 5', along the centreline of the crosswalk, and spaced at 1.65' for each driving direction, be equal to the required horizontal illuminance.
- Per City use same mounting height as existing lights on Clark Blvd.
- Use 400W HPS equivalent LED on 50' and on utility pole use 250W HPS equivalent LED
- Typical arm length to be used varies as 4', 6', 8' and 10' (max)
- Light loss factor to be used per manufacturer recommendation. Per RP-8-21 Dirt depreciation for 2 year cleaning is above 0.9 and LLD per manufacturer is 0.93 at 100K hours which results in 0.84 total LLF.
- Color temperature for luminaires on Major & Collection -4000K, and Residential (Local) – 3000K.

Table 7-2: Roadway Lighting Light levels per RP-8-21

Street Name	Street classification	Pedestrian classification	Average Luminance (cd/m2)	Avg. Uniformity Ratio (Avg/Min)	Maximum Uniformity Ratio (Max/Min)	Max. Veiling Luminance Ratio (Lv,max/Lavg)
Kennedy Rd	Major	Medium	0.9	3.0	5.0	0.3
Eastern Ave	Collector	Medium	0.6	3.5	6.0	0.4
Hansen Rd	Local	Medium	0.5	6.0	10.0	0.4
Clark Blvd	Major	Medium	0.9	3.0	5.0	0.3
Rutherford Rd	Collector	Medium	0.6	3.5	6.0	0.4

Table 7-3: Intersection Lighting Light levels per RP-8-21

Street Name	Street classification	Pedestrian classification	Average Illuminance Lux/fc	Avg. Uniformity Ratio (Avg/Min)
Kennedy Rd/Eastern Ave	Major/ Collector	Medium	22/2.0	3.0
Clark Blvd/Hansen Rd	Major/Local	Medium	20/1.9	3.0
Clark Blvd/Rutherford Rd	Major/ Collector	Medium	21/2.0	3.0

The preliminary street lighting design was also developed with the following design assumptions:

- Roadway luminaire are mounted on 40’ poles with 10’ mast arm which results in mounting height of 43’ per manufacturer cutsheet for mast arm.
- ATB0_P303_R3_4K.IES file is used for roadway lighting.
- ATBMIC_P102_R2_4K.IES file is used for sidewalk lighting with 43’ mounting height and 4’ arm. Roadway light pole is used to mount both roadway luminaire and sidewalk luminaire. Sidewalk luminaires are installed between Kennedy Rd and Hansen Rd where sidewalk and cycle track exist.
- LLF for all luminaires is assumed to be 0.84.

During Detailed Design the pole locations and spacing will be reviewed and lighting analysis updated as needed to accommodate modifications to the final design.

7.1.13 Property Requirements

Based on the City’s Official Plan, the City of Brampton may acquire up to 26-30m right-of-way for improvements to the Clark Boulevard / Eastern Avenue corridor. Additional land may be acquired to accommodate intersection requirements, culvert crossings, etc. The proposed design attempts to minimize property requirements.

Proposed property acquisition resulting from the proposed design is summarized in **Table 7-4.**In general, grading will be contained within the proposed right-of-way where feasible. Temporary and permanent easements will be considered for construction, maintenance, and grading purposes. During detailed design, opportunities to reduce property requirements and for the use of temporary or permanent grading easements instead of permanent property takings should be reviewed where feasible.

Property requirements summarized below are preliminary and will be finalized during Detailed Design.

Table 7-4: Property Acquisition Requirements

PIN	Property Address	Type	Location	Approximate Area Required (m2)	Temp/Perm Grading Easement (m2)
198010000	49 Hillcreset Ave	Property Requirement	N	129	59
198160000	33 Kennedy Rd	Property Requirement	S	430	97
140340040	N/a	Property Requirement	S	25	57
140320016	20 Kennedy Rd	Property Requirement	S	206	28
140320017	22 Kennedy Rd	Property Requirement	S	160	121
140330090	38 Eastern Ave	Property Requirement	N	14	51
140330091	40 Eastern Ave	Property Requirement	N	18	90
140330092	42 Eastern Ave	Property Requirement	N	17	106
140320015	60 Eastern Ave	Property Requirement	N	42	37
140320018	25 Kennedy Rd	Grading	S	-	84
140320023	63 Eastern Ave	Grading	S	-	84
140320025	67 Eastern Ave	Grading	S	-	58
140320163	68 Eastern Ave	Grading	N	14	268
140320024	69 Eastern Ave	Grading	S	-	341
140320357	68 Eastern Ave	Grading	N	-	256
140320028	73 Eastern Ave	Grading	S	-	88
140320029	75 Eastern Ave	Grading	S	-	208
140320030	79 Eastern Ave	Grading	S	-	165
140320364	Unassigned	Grading	N	-	201
140320031	25 Hansen Rd	Grading	S	113	101
140320049	Tributary to Etobicoke Creek	Property Requirement	S & N	3794	-
140320050	0 Rutherford Rd	Property Requirement	S & N	7700	1519
140320061	35 Rutherford Rd	Property Requirement	S & N	12682	360
140320340	32 Rutherford Rd	Property Requirement	N	31	167
140320090	36 Rutherford Rd	Property Requirement	S	611	38
140320335	12 Clark Blvd	Property Requirement	N	63	91

7.1.14 Preliminary Cost Estimate

Based on preliminary cost estimates, the cost of the recommended improvements is estimated at **$18.3M**. This preliminary cost estimate includes costs for road work, culvert construction, channel re-alignment, utility relocation, addition of streetlights, storm sewers and traffic signals, landscaping, traffic control, and engineering services; however, property acquisition costs are not included in the estimate.

The breakdown of the preliminary cost estimate is provided in **Appendix S**. The estimated costs are preliminary only and would be reviewed and confirmed during Detailed Design.

7.2 Constructability, Staging and Detour Considerations

Construction staging for Clark Boulevard / Eastern Avenue improvements will attempt, where feasible, to maintain one lane of traffic in each direction and pedestrian movements equal to pre-construction levels during construction. However, the nature of the required work is such that traffic disruption and delays cannot be entirely avoided.

Impacts will be temporary in nature and the City will attempt to mitigate impacts as much as possible. During Detailed Design, a traffic management plan will be developed to determine how traffic and pedestrian access will be accommodated during construction and how access to properties adjacent to Eastern Avenue will be maintained.

7.3 Construction Monitoring and Maintenance Considerations

The reconstruction of Eastern Avenue should be staged to maintain both local and through traffic within the study area. Any necessary interruptions to traffic should be kept brief and to a minimum. There should be close coordination with the City to minimize impacts on traffic, including EMS operations.

Property owners and tenants may experience temporary interruptions to their property access during construction. To reduce this impact, all property owners should be notified prior to construction and in advance of work related to their access. Detailed design plans should include details to describe how temporary accesses will be maintained, and contract specifications should specify the allowable lengths of closures and the notification requirements to property owners.

Construction of the improvements has the potential to create noise and dust for the adjacent property owners. Construction noise is temporary noise and will vary periodically during the construction depending on the specific activities being performed. Contract specifications will include provisions to define the allowable work hours, in accordance with local ordinances, to minimize impacts to the adjacent landowners in the evenings. However, some considerations will be given to the ability of completing the work in a lesser duration by allowing longer work hours. The impact of construction noise will vary based on the type of equipment used, number of pieces of equipment, time and duration of operation, and the proximity to noise sensitive receivers in question. Construction noise will be kept to a minimum through the use of well-maintained equipment with appropriate noise controls by the contractors.

Removal of existing paved surface and existing landscaping will expose native soils to wind and rain erosion, and result in a temporary increase in dust in the project area. This dust can become airborne as construction traffic runs on the exposed ground and may be noticeable by the adjacent property owners. This increase in dust levels will be temporary, and the application of best management practices, including the application of non-chloride dust suppressants, by the contractor during normal operations can help minimize the exposure of native soils to wind and rain erosion.

All waste generated during construction must be disposed of in accordance with ministry requirements and best management practices. Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met.

Communication protocols for construction will be developed during Detailed Design. Generally, if a resident has a concern during construction, they can typically contact either the Construction Administrator (CA) or the Communications and Community Engagement Specialist (CCES). A Notice of Construction distributed prior to the start of construction lists the contact information for the applicable CA (for construction related inquiries) and CES (for general inquiries) on the project.

Construction and post-construction monitoring plans should be developed during Detailed Design in consultation with MECP and other regulatory agencies.

8 Potential Impacts and Mitigation

8.1 Climate Change

The Ministry of the Environment, Conservation and Parks (MECP) guide, Consideration of Climate Change in Environmental Assessment in Ontario, sets out ministry expectations and supports the province's Climate Change Plan by outlining climate change considerations for EA study. The guide notes "climate consideration" within a project means that consideration has been given methods to reduce greenhouse gas emissions and developing a design that is more resilient to future changes in climate and helps maintain the ecological integrity of the local environment in the face of a changing climate.

Climate change impacts related to this study are related to operations and maintenance as the transportation sector is one of the biggest contributors to CO2, a key greenhouse gas. Climate Change will also impact the study area in the future as extreme weather conditions will affect the conditions of the roadways and will require more frequent repairs and updates as time passes.

8.2 Anticipated Impacts and Mitigation Measures

A summary of the potential impacts to natural, social/economic and cultural environments, together with recommended mitigation measures, is provided in **Table 8-1.**

Table 8-1: Summary of Anticipated Impacts and Proposed Mitigation Measures

Factor	Details/Anticipated Impact	Proposed Mitigation
Social Environment		
1. Land Use and Socio-Economic Impacts	a. Impacts on businesses and residents during construction, including increased travel time or possible detours. b. Impacts to driveway access during construction. c. Some driveways will need to be re-graded.	i. Prior to construction, specific notices and contact information will be delivered to area residents and property owners informing them of construction details, including temporary impacts to driveway access prior to construction and in advance of work related to their access. ii. Maintain access to individual driveways during construction.
2. Archaeology	a. There are no previously registered archaeological sites located within one kilometer of the Study Area. The property inspection determined that entire Study Area has been subjected to deep soil disturbance events and does not exhibit archaeological potential.	i. Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.
3. Cultural Heritage	a. The study area does not retain any potential cultural heritage resources, and as a result does not require further heritage assessment	i. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources

Factor	Details/Anticipated Impact	Proposed Mitigation
4. Noise	a. Construction noise impacts are temporary in nature but may be noticeable at times	i. Methods to minimize construction noise impacts should be included in the contract documents: a. Construction hours should abide by City of Brampton noise control by-law. If construction activities are required outside of these hours, the Contractor should minimize the amount of noise being generated to not be clearly audible in any noise sensitive areas. b. Provide explicit indication that the Contractor is expected to comply with all applicable requirements of the contract. c. Maintain all equipment to limit noise emissions and operate with effective muffling devices that are in good working order.
5. Property Requirements	a. Potential property acquisition and construction easements are anticipated at some locations as a result of the proposed design. Details are provided in **Section 7.1.13**	i. Formal definition of property requirements to be confirmed during Detailed Design ii. Temporary or permanent easements, modifications to grading slopes (in accordance with geotechnical recommendations) to reduce the amount of area required, or in some cases considering a retaining wall or other type of soil retention feature to minimize grading footprint

6. Climate Change	a. Increased CO2 levels	The project specific recommendations directly support climate change policies: i. Opportunities for tree planting within the boulevard and minimizing adverse impacts the existing tree line where feasible ii. Provision of dedicated active transportation improvements (boulevard cycle tracks, sidewalks, crossrides and crosswalks at intersections) iii. Intersection improvements and the road extension creating new routing alternatives to minimize idling and delays in the overall network iv. The proposed improvements make use of an existing transportation route and create a new road connection creating new route alternatives to accommodate all road users in such a way that minimizes impacts to surrounding areas including residences, businesses, and the natural environment. v. Channel realignment To mitigate potential effects during the construction phase of the project, the following best practices will be implemented: i. Develop and implement detailed erosion and sediment control measures to be carried out during all construction phases in order to limit the amount of sediment/ laden material entering receiving drainage systems ii. Dust suppression techniques to be employed for the duration of construction activities iii. A traffic staging plan to be developed during Detailed Design to accommodate local access and through traffic during construction to minimize excessive detouring and congestion in alternate routes. Further opportunities to reduce idling to be considered during Detailed Design. iv. Potential effects to consider pertaining to construction include the greenhouse gas (GHG) emissions associated with the construction period, including the physical machinery and equipment, travel distance and time for

Factor	Details/Anticipated Impact	Proposed Mitigation
		construction workers to get to and from the site, and the sourcing of building materials. Movement and access to the site for construction vehicles are to be described in the contract documents to be prepared at the time of Detailed Design. Conditions within the contract documents related to idling and hours of work should also be considered. To mitigate potential effects during the operational phase of the project, aligning with best practices for infrastructure design, practices such as the improvement of hydrological data collection, use of models and monitoring localized effects, more frequent monitoring and maintenance and improvement of road design to be more climate change resistant are recommended. In addition, measures to adapt to climate change impacts and minimize impacts to individuals using Clark Boulevard / Eastern Avenue in the future may include (but are not limited to): i. Updating plans for weather emergencies, closures and rerouting during severe weather conditions/events, and traveler information systems to include future climate change projections ii. As the amount of impervious surface areas will increase, appropriate stormwater capacity should be considered to mitigate additional runoff, climate change and the likelihood of extreme precipitation, as described in **Section 7.1.9** iii. Exploring opportunities of using LID treatment to store drainage during storm events beyond the minimum requirements will be reviewed during Detailed Design

Factor	Details/Anticipated Impact	Proposed Mitigation
7. Air Quality	a. Construction activities have the potential to create temporary, localized effects on air quality in the immediate vicinity of the project. Emissions from construction are primarily comprised of fugitive dust and combustion products from the movement and operation of construction equipment and vehicles	i. Best Management Practices should be followed during construction to reduce any air quality impacts such as material wetting, use of chemical suppressants, use of non-chloride dust suppressants to reduce dust, use of wind barriers, planting of additional vegetation and limiting exposed areas which may be a source of dust, and equipment washing.

8. Source Water Protection	a. The study corridor, based on the MECP Source Protection Information Atlas and correspondence with TRCA, is located on land designated as Highly Vulnerable Aquifer (HVA) (Score 6). b. A Highly Vulnerable Aquifer can be easily changed or affected by contamination from both human activities and human process as a result of its intrinsic susceptibility (as a function of the thickness and permeability of overlaying layers), or by preferential pathways to the aquifer. As the vulnerability score of the HVA area is only 6, TRCA confirmed there can be no significant drinking water threats. There are no mandatory policies within HVAs. c. Where the application of road salt would be a moderate or low drinking water threat, it is encouraged to require a salt management plan, which includes a	i. The additional impervious surface associated with the roadway improvements would reduce the amount of groundwater infiltration from the surface. To offset these impacts and balance water quantity, the stormwater management strategy described in **Section 7.1.9** addresses infiltration of stormwater runoff from the road right-of-way. In addition, the implementation of Low Impact Development (LID) measures will be considered during Detailed Design. ii. Additional road salt associated with winter maintenance for the proposed roadway improvements and snow storage in the boulevards may increase impacts to source water protection areas. The City will prepare Salt Management Plans for effective winter maintenance while striving to minimize the amount of salt entering the environment and at the same time meeting Provincial legislation related to road maintenance standards for winter services. Reduction in the amount of salt that is applied during winter maintenance activities will reduce the amount of salt present in roadside snowbanks

Factor	Details/Anticipated Impact	Proposed Mitigation
	reduction in the future use of salt, as part of a complete application for development which includes new roads and parking lots. d. Potential threats associated with the improvements include: • The establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage (limited to stormwater runoff) • The application of road salt • The storage of snow (limited to roadway clearing operations only)	
9. Streetscaping/ Urban Design	a. Impact to existing trees and landscaped features in the boulevard	i. Where impacts to trees cannot be avoided, compensation will be provided as per a compensation strategy developed during Detailed Design. ii. Impacted features will be restored or relocated, where feasible iii. Increased opportunity for aesthetics throughout the corridor with the provision of landscaped boulevards where feasible to be implemented within the right-of-way.

Factor	Details/Anticipated Impact	Proposed Mitigation
10. Utilities	a. Existing utilities in conflict with proposed improvements.	i. A utility composite and conflict plan is provided in **Appendix O.** A formal relocation plan will be developed during Detailed Design when impacts are formalized, as required. ii. All utility information will be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary, in consultation with utility companies.
11. Construction Detours/ Temporary Lane Restrictions	a. Inconvenience during construction	i. Impacts will be temporary in nature. The City will attempt to mitigate impacts as much as possible. ii. During Detailed Design, a traffic management plan will be developed to determine how traffic will be accommodated during construction and how access to properties adjacent to the corridor will be maintained.

Natural Environment		
12. Vegetation and Vegetation Communities	a. Impacts to 237 inventoried trees and approximately 0.38ha of Fresh-Moist Lowland Deciduous Forest community for the proposed road extension and re-aligned watercourse as documented in Appendix G. b. No impacts to federally or provincially significant vegetation species. c. No impact to regional significant vegetation species Larger Straw Sedge d. Potential suitable candidate roosting habitat for 3 species at risk bats in the fresh-moist lowland deciduous forest (FOD7) community e. Potential for indirect disturbance including noise, vibrations, human presence, dust, and artificial lighting from construction activities.	i. Tree Removals to be confirmed during Detailed Design and recommendations identified in the EA study's Tree Preservation Plan to be confirmed. ii. Clearly define construction limits using tree protection fencing to avoid unnecessary vegetation removal where tree protection measures are recommended**.** iii. Timing of construction activities, especially vegetation clearing and site grading, must have consideration for the Migratory Birds Convention Act (MCBA). Habitat removal to occur outside of peak breeding bird window (April 1st – August 31st). Habitat removal in simple habitat may occur within peak breeding bird window, where nest clearances conducted by a qualified avian biologist confirm no breeding bird activity. Tree removal may occur if no active nests are present. iv. Approximately 0.81ha of forest habitat is proposed to be restored / created along the re-aligned watercourse and southwest of the Rutherford Road / Clark Boulevard intersection. v. Where impacts to vegetation cannot be avoided, compensation will be provided as per a compensation strategy developed during Detailed Design at a rate determined with agencies. Compensation for loss of vegetation communities will be in accordance with the City of Brampton and TRCA guidelines. Suitable regionally-native species should be selected and maintained appropriately. vi. Prior to construction commencing examine the work area by a qualified biologist and relocate any wildlife as required. vii. During Construction erect Sediment and Erosion Control Fencing to prohibit encroachment and minimize external inputs. viii. Tree Protection Fencing and Erosion and Sediment Control measures to be removed after completion of construction activities

13. Fisheries and Aquatic Habitat	a. No fish were documented within the watercourse however the watercourse provides indirect fish habitat through flow provided to downstream habitats. Potential to cause the Harmful Alteration, Disruption or Destruction (HADD) to fish habitat due to proposed channel realignment is anticipated to be avoided b. Potential for in-water works c. Sedimentation and erosion during construction activities d. Temporary changes to water quality e. Temporary disruption or permanent loss of site-specific habitat f. Accidental spills in watercourses during construction	i. Complete a screening to determine whether a DFO Request for Review under the Fisheries Act is required during Detailed Design. It is anticipated a request for review will be required based on the proposed channel realignment. ii. Complete in-water works in isolation between July 1 to March 31 to have the least impact to aquatic systems. Minimize duration of in-water works where possible iii. Temporary stockpiles to be at least 30m from the watercourse and properly contained iv. No storage of equipment, materials or fill is to occur within the natural areas v. Maintain flow of the watercourse upstream and downstream during construction vi. Although no fish were observed, as a precaution, any hoses conveying water should be screened as per the DFO Interim Code of Practice. vii. A fish salvage should be completed prior to in-water works occurring. viii. Maintain riparian vegetation and an undisturbed vegetation buffer where possible. ix. A robust Erosion and Sediment Control (ESC) Plan should be developed at the detailed design stage and implemented throughout construction. Disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation. Appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse. All ESC measures are to be inspected and monitored, and repairs are to be completed immediately, as required x. The watercourse should be monitored regularly during all phases of work. xi. Develop an Emergency Spill Response Plan to be implemented in the event of a spill of a deleterious substance. During Construction spills will be reported and documented to MECP's Spill Response Hotline. Efforts will be made to contain a spill if it is safe to do so.

		xii. Good housekeeping practices related to materials storage/stockpiling, equipment fueling/maintenance, etc. will be implemented during construction xiii. Changes to water quality will be mitigated through the deployment and maintenance of erosion and sediment controls to prevent sediments from reaching the watercourses from exposed soils upslope xiv. The use of road salt during winter should be minimized, or alternatives to road salt should be used to avoid water contamination in the watercourse and downstream aquatic habitats xv. Natural Channel Design principles will be incorporated into detailed design to avoid new barriers
14. Wildlife and Wildlife Habitat	a. Potential removal of candidate bat roosting habitat and suitable foraging habitat, including habitat for Species at Risk (SAR) to be confirmed. b. Barrier effects on wildlife passage c. Wildlife/vehicle conflicts d. Human Encroachment and wildlife movement disturbance. Increased potential for rubbish in the watercourse and associated riparian area due to the proposed road crossing. e. Temporary construction disturbance to wildlife from noise, dust, vibrations, light, and visual intrusion will be	i. The proposed watercourse re-alignment and new Clark Boulevard extension crossing will promote wildlife movements along the watercourse, which is an improvement over current conditions. ii. Mitigate dust by moistening areas of bare, dry soil with water during construction to reduce the amount of dust produced. iii. Topsoil stockpile locations should be in areas of lesser wind exposure and away from natural features and their buffers. iv. Proper ESC measures should be employed. Areas of bare soil that will not be touched for several weeks should be seeded with Annual Rye (Lolium multiflorum) or equivalent to reduce erosion. v. The culvert crossing installed on the re-aligned watercourse channel should be designed to promote the movement of wildlife and should be designed following the guidelines provided in the Ontario Ministry of Transportation's Environmental Guide for Mitigating Road Impacts to Wildlife (MTO 2017). vi. Lighting designs should consider directional lighting for areas that are within 30m of natural features to eliminate lightwash. vii. Noise mitigation measures (e.g., baffles, sound barrier walls, or additional tree and shrub plantings) should be considered for installation along the section of road that crosses the re-aligned watercourse and its associated riparian areas. viii. Rubbish bins should be placed along the sidewalk and multi-direction cycle track in the areas adjacent to the re-aligned

	temporary, minimal, and localized.	watercourse and its associated riparian areas to encourage proper disposal. ix. Chain-link fences should be installed on the outside of the naturalized channel, especially in the vicinity of the road crossing, to help prevent rubbish from blowing into the channel. This will also help prevent people from entering the natural area. x. Consultation with MECP regarding candidate SAR bat roost trees and habitat if removals are confirmed in Detailed Design. Consultation will determine appropriate actions in accordance with the ESA, including appropriate timing window to avoid bat active season (outside April 1 to Sept 30), and potential requirement for updated leaf-off and leaf-on bat habitat assessment and / or acoustic bat surveys. Correspondence with MECP to be shared with other reviewing agencies xi. Compensation plantings and Ecological Habitat Enhancements as per **Appendix G.**
15. Groundwater	a. Estimated peak water taking rate is 57,000 litres per day which is greater than 50,000 litres per day but less than 400,000 L/day, based on the preliminary dewatering estimate for the box culvert crossing structure and channel realignment. No dewatering estimate has been completed for the utility installations or storm drainage infrastructure for Eastern Avenue, or the	i. Registration of an Environmental Activity and Sector Registry (EASR) is required and will require preparation of a Water Taking Report and Discharge Report to permit the construction dewatering as stipulated by MECP. Depending on the outcome of further analysis and potential additional investigation following detailed design, registration on the EASR and preparation of a Water Taking Plan and Water Discharge Plan in the case of peak water taking rates between 50,000 and 400,000 litres per day or application for a Category 3 PTTW and required Hydrogeological Study for water taking rates exceeding 400,000 litres per day, may be required. ii. An experienced dewatering contractor and water treatment contractor are recommended to be retained to design and operate dewatering and treatment operations as required. Pre-treatment of dewatering discharge would be the responsibility of the contractor to ensure that the quality of the dewatering discharge effluent meets the PWQOs or Peel Region Sewer Use By-Law No. 53-2010 as applicable and determine if more extensive or specific treatment measures are required. Should the dewatering discharge be contaminated such that the groundwater cannot be treated to the appropriate water quality

	Clark Boulevard Extension b. Lowering of the shallow groundwater level could potentially reduce the groundwater discharge to nearby natural environmental features and groundwater users, and could potentially result in settlement or ground loss, although the likelihood of significant impacts is low due to the low hydraulic conductivity of the silty clay. Any potential impacts during construction dewatering are expected to be temporary in nature. These potential impacts, however, need to be monitored and managed to minimize impact c. Groundwater of the quality that was encountered in Borehole EA-05 could not be discharged to the natural environment or a storm sewer without pre-treatment due to exceedances of the Bylaw limits (for storm	criteria, the contractor would be responsible for managing the water, including potentially storage and further treatment or transporting the contaminated groundwater off-site for disposal at an appropriate licensed facility. iii. A discharge permit would be required from the Region of Peel to discharge to a Region of Peel sewer. Discharge to the natural environment may require consultation with MECP, and potentially TRCA and MNRF depending on the discharge location. iv. Monitoring program to include: a. Water levels in the monitoring wells prior to, during, and following construction b. Water quality for groundwater collected within the excavation dewatering systems to confirm the water quality is appropriate for the selected discharge option. c. Visual observations for contamination such as sheen or pure product, as well as for excessive sediment in the discharge, which could be an indication of ground loss. v. Where possible, it is recommended that groundwater should be discharged at least 30 m away from any water bodies including streams. vi. If discharge to sewers or surface water bodies is proposed, treatment of groundwater to meet acceptable levels is required. Suitable treatment would likely include measures to address suspended sediment and associated metals and is anticipated to require additional treatment based on findings to date. The operation and monitoring of discharge facilities should be carried out by an experienced dewatering contractor and water treatment contractor familiar with fisheries and water quality requirements. vii. Where discharge is to ground surface or water course, temporary erosion control measures should be developed and installed to control erosion at the discharge points. viii. Conduct a MECP well record search within the radius of influence during detailed design to determine whether a private well survey is warranted. ix. Conduct an assessment of the settlement potential due to dewatering for construction of the bridge or culvert structure for the creek crossing

	sewer discharge). Water quality observed during construction will vary from the results obtained during this assessment based on a number of factors..		of the Clark Boulevard Extension once final design and locations have been determined.
		x.	Long-term impacts will need to be addressed through the implementation of best management practices to help increase the amount of infiltration to the aquifer system and minimize the environmental impacts of the development.
		xi.	Installation of clay plugs or similar are recommended for any open cut trenches to limit the preferential movement of groundwater along the trench.
		xii.	Additional water quality requirements may be imposed by MECP, TRCA and MNRF. Additional groundwater level monitoring should be conducted to capture further seasonal variation, and additional groundwater sampling may be warranted depending on potential discharge location. Infiltration testing may also be advisable depending on infiltration concepts that may be developed.
		xiii.	If groundwater is planned to be discharged to surface water, additional groundwater samples should be collected and analyzed in comparison to PWQOs to assess treatment and groundwater disposal options.
		xiv.	During the detailed design stage, it will be necessary to refine the analysis of the hydrogeological conditions along the Site to estimate the radius of influence and dewatering rates for the utility installations or storm drainage infrastructure for Eastern Avenue or the Clark Boulevard Extension. Based on the detailed design, additional drilling of boreholes and installation of shallow and deep monitoring wells will be required. Consideration should be given to installing monitoring wells approximately 1 m below the proposed depths of excavation. These findings will be used to confirm the water takings requirements and the appropriate approvals from the MECP prior to commencement of construction. They will also assist in determining whether a private well survey is warranted.
		xv.	Monitoring wells should be decommissioned in accordance with O. Reg. 903 if they are no longer in use to prevent the creation of vertical conduits for contaminant transport

16. Surface Water	a. Impacts resulting from any excavating, or cut and fill operations, will be temporary in nature b. Changes to the existing pavement area may result in an increase in quantity runoff c. Excavations for the box culvert crossing structure and channel realignment will be located within the Etobicoke Creek watershed and likely be carried out adjacent to the stream channel. Groundwater recharge conditions are likely to exist where flow is generally from channel bed into the subsurface. d. Dewatering in the vicinity of a watercourse has some potential to temporarily decrease the surface water flow in the watercourse if excavations are open for extended periods, since the watercourse is within the radius of influence. Considering the dewatering will be temporary in duration and the peak estimated dewatering rate for the creek crossing structure was 57,000 L/day with a radius of influence of	i. Erosion and sedimentation mitigation measures will be implemented prior to the construction phase. Control measures will include, but not be limited to: limiting the geographical extent and duration soils are exposed to the elements; implementing standard erosion and sediment control measures in accordance with Ontario Provincial Standard Specification (OPSS); and managing surface water outside of work areas to prevent water from coming in contact with exposed soils. ii. Monitoring of erosion and sediment control measures during and after construction will be implemented to ensure their effectiveness. These environmental measures should reduce/ minimize adverse environmental impacts iii. Erosion and sedimentation control (ESC) plans will be prepared in accordance with applicable City and TRCA guidelines iv. A preliminary drainage/stormwater management plan has been prepared to mitigate potential changes to the existing pavement area resulting from potential increase in quantity runoff. This plan will be reviewed and finalized in Detailed Design. v. The watercourse should be temporarily diverted around excavations during construction if required to keep the excavation dry. Watercourses could be diverted from upstream to the downstream channel using cofferdams and diversion pipes, or equivalent.

	less than 10 m, any decrease of flow in the watercourse is anticipated to be negligible.	
17. Soil Removal and Contaminants	e. Management of excavated soil must not result in the discharge of a contaminate into the natural environment that causes or may cause an adverse effect. Should this occur, appropriate mitigation measures are required. f. Excavated materials may be managed by reuse in engineering applications on site (i.e. site grading fill or backfill), subject to the geotechnical considerations documented in **Appendix L** g. Potential impacts to properties associated with issues of potential environmental concern and spill locations as per the Overview Phase 1 ESA in **Appendix N**. There are seven APECs within the project alignment	i. Excess excavated material should not be used within 1.5 m of the soil surface in landscaped areas with sensitive vegetation and plant species and may be subject to the restrictions outlined in MECP's Rules for Excess Soil Management under O. Reg. 406/19 (e.g. more than 30 m from a water body, more than 100 m from a potable or supply well, etc.). ii. As the salt-associated parameter exceedances are non-health related, excess excavated soils may also be suitable for reuse at other sites that require fill for a beneficial use, contingent on meeting all requirements of O.Reg. 406/19, as amended iii. Complete Phase Two Environmental Site Assessment involving an intrusive investigation to confirm or refute the presence of the COPCs in the soil and groundwater in relation to the PCAs and associated APECs. iv. Phase One and Two ESAs are also recommended for each conveyance involving property acquisition to accommodate the proposed road widenings and extension. v. In consideration of the era of the existing buildings in the Study Area, Designated and Hazardous Substance Surveys are recommended for the properties along Eastern Avenue where the Right of Way (ROW) required to widen the road includes a portion(s) of existing buildings(s), if any asbestos may be present in the road which should be verified prior to disturbance during construction.

9 Timing of Implementation and Future Commitments

9.1 Project Schedule

As part of the Environmental Assessment process, this Environmental Study Report is to be filed and placed on the public record for a minimum 45 calendar days for review by the public and review agencies.

As per the recently amended through Bill 197, Covid-19 Economic Recovery Act, 2020, the City cannot proceed with the Clark Boulevard / Eastern Avenue project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the City may not proceed after this time if:

- a Section 16 Order (previously known as Part II Orders) request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed Order regarding the project

If after 30 days following the public review period, provided that no Section 16 Order are received regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights and a Notice of Proposed Order regarding the project is not issued, the City may proceed to Phase 5 of the Class EA process – design and construction. Property acquisition and utility relocation will then be scheduled, followed by construction.

9.1.1 Lapse of Time

According to the Municipal Class EA, “If the period of time from the filing of the Notice of Completion of ESR in the public record or the MECP’s denial of a Section 16 Order (previously known as Part II Orders) request(s), to the proposed commencement of construction for the project exceeds ten (10) years, the proponent shall review the planning and design process and the current environmental setting to ensure that the project and the mitigation measures are still valid given the current planning period. The review shall be recorded in an addendum to the ESR which shall be placed on the public record.”

Notice of Filing of Addendum shall be placed on the public record with the ESR and shall be given to the public and review agencies, for a minimum 30-day public review period. The notice shall include the public’s right to request a Section 16 Order during the 30-day review period. If no Section 16 Order request is received the proponent is free to proceed with implementation and construction.

9.2 Commitments of Future Work

The ESR identifies specific items to be reviewed and confirmed during Detailed Design. Some of these commitments will address specific concerns raised by stakeholders and review agencies during the EA process. Items of particular interest to be addressed include:

1. Property Requirements
    a. Review design opportunities to minimize property acquisition requirements at constrained locations.
    b. Property requirements identified in this report and shown on the preliminary design drawings are preliminary and will be finalized during Detailed Design. Where feasible, review opportunities for easements instead of property acquisition.
    c. Obtain Permission to Enter Agreements from landowners where access to their property is required.
    d. Obtain construction easements as required.
    e. Consult with property owners during the development of construction staging plans to maintain access to properties and minimize impacts as feasible.
2. Archaeology
    a. Should future work require an expansion of the study area, complete Stage 1 Archaeological Assessment (AA) to confirm presence / absence of archaeological potential.
    b. Findings from subsequent archaeological assessments (if required) are to be filed with the Ministry of Sport, Tourism and Culture Industries (MSTCI) for review and entry into the Ontario Public Register of Archaeological Reports.
    c. Should any archaeological resources be unexpectedly encountered during construction, all activities impacting archaeological resources will cease immediately. MSTCI will be notified, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists.
    d. If human remains are encountered, all activities will cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services will be contacted. In situations where human remains are associated with archaeological resources, MSTCI will also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.
3. Cultural Heritage

a. Should future work require an expansion of the study area, then a qualified heritage consultant will be contacted in order to confirm the impacts of the proposed work on potential heritage resources.

4. Noise

    a. Construction practices to abide by construction code of practice and City Noise Control By-Law to minimize temporary construction noise impacts.

5. Natural Environment

    a. A TRCA permit under *Ontario Regulation 166/06- Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* will be required for all works within regulated areas.

    b. Opportunities to reduce the design footprint and minimize impacts to natural features will be reviewed during Detailed Design

    c. Tree Removals to be confirmed during Detailed Design and recommendations identified in the EA study's Tree Preservation Plan to be confirmed. Where impacts to vegetation cannot be avoided, compensation will be provided as per a compensation strategy developed during Detailed Design at a rate determined with agencies. Confirm compensation plantings and Ecological Habitat Enhancement recommendations as per Appendix G.

    d. Channel realignment of the Tributary to the Etobicoke Creek should follow natural channel design principles in consultation with the TRCA.

    e. The culvert crossing installed on the re-aligned watercourse channel should be designed to promote the movement of wildlife and should be designed following the guidelines provided in the Ontario Ministry of Transportation's Environmental Guide for Mitigating Road Impacts to Wildlife (MTO 2017).

    f. Lighting designs should consider directional lighting for areas that are within 30m of natural features to eliminate lightwash.

    g. Prior to construction commencing examine the work area by a qualified biologist and relocate any wildlife as required.

    h. Clearly define construction limits using tree protection fencing to avoid unnecessary vegetation removal where tree protection measures are recommended.

    i. Complete a screening to determine whether a DFO Request for Review under the Fisheries Act is required during Detailed Design. It is anticipated a request for review will be required based on the proposed channel realignment.

    j. Timing of construction activities, especially vegetation clearing and site grading, must have consideration for the Migratory Birds Convention Act (MCBA). Habitat removal to occur outside of peak breeding bird window (April 1st – August 31st). Habitat removal in simple habitat may occur within peak breeding bird window, where nest clearances conducted by a qualified avian biologist confirm no breeding bird activity. Tree removal may occur if no active nests are present.

k. Consult with MECP regarding candidate SAR bat roost trees and habitat if removals are confirmed in Detailed Design. Consultation will determine appropriate actions in accordance with the ESA, including appropriate timing window to avoid bat active season (outside April 1 to Sept 30), and potential requirement for updated leaf-off and leaf-on bat habitat assessment and / or acoustic bat surveys. Correspondence with MECP to be shared with other reviewing agencies

l. Complete in-water works in isolation between July 1 to March 31 to have the least impact to aquatic systems. Minimize duration of in-water works where possible. Maintain flow of the watercourse upstream and downstream during construction

m. A robust Erosion and Sediment Control (ESC) Plan should be developed at the detailed design stage and implemented throughout construction. All ESC measures are to be inspected and monitored, and repairs are to be completed immediately, as required

n. Develop an Emergency Spill Response Plan to be implemented in the event of a spill of a deleterious substance. During Construction spills will be reported and documented to MECP's Spill Response Hotline. Efforts will be made to contain a spill if it is safe to do so.

o. Good housekeeping practices related to materials storage/stockpiling, equipment fueling/maintenance, the deployment and maintenance of erosion and sediment controls, etc. will be implemented during construction

p. Mitigate dust by moistening areas of bare, dry soil with water during construction to reduce the amount of dust produced.

q. Although no fish were observed, as a precaution, any hoses conveying water should be screened as per the DFO Interim Code of Practice.

r. A fish salvage should be completed prior to in-water works occurring.

s. Rubbish bins should be placed along the sidewalk and multi-direction cycle track in the areas adjacent to the re-aligned watercourse and its associated riparian areas to encourage proper disposal.

t. Chain-link fences should be installed on the outside of the naturalized channel, especially in the vicinity of the road crossing, to help prevent rubbish from blowing into the channel. This will also help prevent people from entering the natural area.

6. Roadway Design

a. The City will address design requirements through the preparation of contract drawings and specifications.

b. Consider feasibility and location of retaining walls to minimize grading impacts.

c. Proposed re-grading at driveways to be confirmed during Detailed Design once each driveway design is developed.

d. Signage and pavement markings to be confirmed during Detailed Design.

e. At the time of Detailed Design, any changes to design standards and/or industry best practices compared to those available at the time of the EA are to be considered.

7. Active Transportation Facilities
    a. Material type and treatment for cycle track and sidewalk to be confirmed
8. Intersection Design, Signals, and Illumination
    a. During Detailed Design consult with Peel Region to confirm modifications to Kennedy Road intersection.
    b. During Detailed Design coordinate hydro design and relocations with Alectra Utilities and update the lighting analysis as needed to accommodate the modifications to hydro pole spacing if above-ground hydro is proposed.
9. Streetscaping and Landscaping
    a. Streetscaping opportunities as identified in the preliminary designs to be confirmed. A streetscaping plan, including individual tree planting locations, is to be developed during Detailed Design.
10. Geotechnical Investigations
    a. During Detailed design prepare culvert design and all engineering drawings for the culvert for TRCA review.
    b. During Detailed design prepare drawings for the channel realignment as reviewed and approved by a fluvial geomorphologist showing all necessary details, dimensions and specifications for TRCA review.
    c. During Detailed design prepare engineering drawings for the proposed grading and earthworks at appropriate intervals showing the proposed grade vs. existing grade as well as the side slopes for the earth works for TRCA review.
    d. During Detailed Design the pavement design recommendations are to be confirmed by a geotechnical engineer.
    e. Management of excess excavated soils including ability for re-use subject to geotechnical considerations in **Appendix L** and in accordance with MECP's Rules for Excess Soil Management under O. Reg. 406/19
    f. All footing excavations must be inspected by qualified geotechnical personnel prior to placing concrete to confirm that the soil conditions exposed at the founding level are consistent with the design assumptions and that the base has been adequately cleaned of disturbed material. The footing bases should be kept free of water and a 75 mm skim slab provided over the founding surface if structural concrete cannot be placed within 24 hours of excavation.

g. All excavations should be carried out in accordance with the requirements of the Occupational Health and Safety Act (OHSA). The excavation and backfilling for culverts should be carried out in accordance with OPSS 902

h. Temporary shoring, if required, should be designed by a licensed Professional Engineer experienced in design of shoring systems

i. Materials testing and inspection by qualified personnel to be provided during construction. The inspection and testing should include observation and inspection of asphalt paving and sampling, concrete testing, subgrade inspection as well as onsite recommendation and coordination

11. Contamination

a. Complete a Phase Two ESA involving an intrusive investigation to confirm or refute the presence of the COPCs in the soil and groundwater in relation to the PCAs and associated APECs
b. Phase One and Two ESAs are recommended for each conveyance involving property acquisition to accommodate the proposed road widenings and extension
c. Designated and Hazardous Substance Surveys are recommended for the properties along Eastern Avenue where the Right of Way required to widen the road includes a portion(s) of existing building(s), if any. In addition, asbestos may be present in the road which should be verified prior to disturbance during construction.
d. Phase Two Investigations at 25 Rutherford will need to take into consideration the shallow soil remediation completed on the property.

12. Hydrogeological Investigations

a. During detailed design, based on the final design plot the sub surface geology in a cross sectional view with groundwater levels and respective borehole/monitoring well.

b. During the detailed design stage, it will be necessary to refine the analysis of the hydrogeological conditions along the Site to estimate the radius of influence and dewatering rates for the utility installations or storm drainage infrastructure for Eastern Avenue or the Clark Boulevard Extension. Based on the detailed design, additional drilling of boreholes and installation of shallow and deep monitoring wells will be required. Consideration should be given to installing monitoring wells approximately 1 m below the proposed depths of excavation. These findings will be used to confirm the water takings requirements and the appropriate approvals from the MECP prior to commencement of construction. They will also assist in determining whether a private well survey is warranted.

c. Conduct a MECP well record search within the radius of influence during detailed design to determine whether a private well survey is warranted.

d. Confirm requirements and complete a registration of an Environmental Activity and Sector Registry (EASR) and preparation of a Water Taking Report and Discharge Report to permit the construction dewatering as estimated construction dewatering rates fall within the 50,000 and 400,000 litres per day threshold. Depending on the outcome of further analysis and potential additional investigation following detailed design, application for a Category 3 PTTW and required Hydrogeological Study for water taking may be required if rates exceed 400,000 litres per day.

e. Where possible, groundwater should be discharged at least 30 m away from any water bodies including streams.

f. If discharge to sewers or surface water bodies is proposed, treatment of groundwater to meet acceptable levels is required. Operation and monitoring of discharge facilities should be carried out by an experienced dewatering contractor and water treatment contractor familiar with fisheries and water quality requirements.

g. If groundwater is planned to be discharged to surface water, additional groundwater samples should be collected and analyzed in comparison to PWQOs to assess treatment and groundwater disposal options.

h. Should the dewatering discharge be contaminated such that the groundwater cannot be treated to the appropriate water quality criteria, the contractor would be responsible for managing the water, including potentially storage and further treatment or transporting the contaminated groundwater off-site for disposal at an appropriate licensed facility. A discharge permit would be required from the Region of Peel to discharge to a Region of Peel sewer. Discharge to the natural environment may require consultation with MECP, and potentially TRCA and MNRF depending on the discharge location.

i. During construction employ temporary ESC measures at discharge points

j. Conduct an assessment of the settlement potential due to dewatering for construction of the culvert structure for the creek crossing of the Clark Boulevard Extension once final design and locations have been determined.

k. Implement best management practices to address long-term impacts to help increase the amount of infiltration to the aquifer system and minimize the environmental impacts of the development.

l. Install clay plugs or similar for any open cut trenches to limit the preferential movement of groundwater along the trench.

m. Additional water quality requirements may be imposed by MECP, TRCA and MNRF. Conduct additional groundwater level monitoring to capture further seasonal variation, and additional groundwater sampling may be warranted depending on potential discharge location. Infiltration testing may also be advisable depending on infiltration concepts that may be developed.

n. Develop and conduct a groundwater monitoring program consisting of:

    a. monitoring of water levels in the monitoring wells prior to, during, and following construction.

    b. monitoring of water quality for groundwater collected within the excavation dewatering systems to confirm the water quality is appropriate for the selected discharge option.

    c. visual observations for contamination such as sheen or pure product, as well as for excessive sediment in the discharge, which could be an indication of ground loss.

o. Monitoring wells should be decommissioned in accordance with O. Reg. 903 if they are no longer in use to prevent the creation of vertical conduits for contaminant transport

13. Drainage and Stormwater Management

During Detailed Design:

a. Complete in-situ measurements at all proposed LID locations to confirm the soil infiltration rates and groundwater levels.

b. Confirm the contributing external areas to ensure that the proposed storm sewer system within the right-of-way has sufficient capacity.

c. Investigate conveyance of external flows

d. Conduct a hydraulic grade line analysis, considering the water surface elevations in the engineered drain as the downstream boundary condition, for the storm sewer to demonstrate that the hydraulic grade line is at minimum 0.3 m below the footing elevation of any adjacent dwelling units under the 100-year design storm event.

e. Conduct a detailed hydraulic assessment to confirm the hydraulic impacts in consideration with the proposed downstream channel improvement works.

f. Complete a more detailed analysis using a 2-dimensional hydraulic model to assess the impact upstream and downstream of the crossing. Additional coordination with both the City of Brampton and the TRCA shall be carried out to finalize the detail design of the culvert and minimize the potential for flooding within the study area

g. Complete a spread analysis to ensure ponding at low points does not exceed criteria documented in **Appendix K**.

h. Review and verify the design flows to confirm any changes to the land-use and associated hydrologic information that may affect the peak flows presented in **Appendix K.**

i. Review additional details and specifications for the permeable material.

j. Confirm the location and performance characteristics of the bioretention cell design criteria can be met.

k. Design online storage pipes in combination with surface ponding to provide the required storage. The location, pipe sizing, and orifice sizing of the online storage pipes will need to be determined to ensure that the water quantity control criteria can be met.

l. Consider implementation of the potential LID measures and BMP to support the treatment train approach

14. Utilities

m. Location of existing utilities and resulting impacts and required relocations are to be confirmed.

n. Coordination of utilities, including hydro pole relocation and overhead wiring, is to be reviewed during Detailed Design.

o. Formal definition of impacts on utilities will be determined during Detailed Design, in consultation with individual utility companies.

p. All utility information will be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary.

q. During Detailed Design, meetings will be held with utility companies as required where potential impacts to existing or future services are identified.

15. Constructability, Staging and Detours

a. Develop a traffic management plan and staging concept to determine how vehicular (maintain one lane in each direction) and pedestrian traffic will be accommodated during construction and how access to properties adjacent will be maintained.

16. Additional Consultation and Coordination

a. Consult with affected property owners including those where property is required or where access to their property will be impacted.

b. Consult with regulatory agencies and individual municipalities as required.

c. Coordinate with developers as required to determine their status, timelines, and any impacts to the study corridor.

17. Summary of Anticipated Permits and Approvals

    a. TRCA permit under *Ontario Regulation 166/06- Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

    b. Environmental Activity and Sector Registry (EASR) and/or Permit to Take Water (PTTW) under the *Ontario Water Resources Act* based on the required water takings.

    c. Environmental Compliance Approval (ECA) will be required from MECP for stormwater management facilities and storm sewers.

    d. Permission to Enter Agreements.

    e. Submit additional built heritage resources and cultural heritage landscapes assessments and archaeology assessments (where required) to MSTCI.

9.3 Timing of Improvements

Timing of improvements will be confirmed during Detailed Design. Currently the City's 10-Year Roads Capital Program identified construction to start in 2027. However, construction timing is subject to annual Council review and prioritization.