



CITY OF BRAMPTON TRANSPORTATION MASTER PLAN UPDATE

FINAL REPORT

SEPTEMBER 2015



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Technical Reports

- 1 Model Validation Technical Report
- 2 2041 Road Network Strategy Technical Report
- 3 Existing Transit Conditions
- 4 Future Transit Provisions
- 5 Active Transportation
- 6 Transportation Demand Management
- 7 Goods Movement
- 8 Planning and Policy Context



1. INTRODUCTION

1.1 Purpose of the 2015 Update

The purpose of this study is to update the City of Brampton's Transportation Master Plan (TMP) simultaneously with a review of the transportation component of the City's Development Charges Bylaw. The study will address existing transportation challenges and will provide strategic solutions to help facilitate the population and employment growth that the city is anticipated to experience to 2041. The TMP Update (TMPU) will provide the City with creative and realistic solutions based on input from the public, private sector and government agencies. The TMPU will establish a transportation system to better serve residents, employers, employees and tourists while accommodating all modes of transportation (e.g. public transit, commuter travel, commercial vehicles and active transportation). The study is being conducted in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment, which is an approved process under the Environmental Assessment Act.

1.2 Objectives of the Study

The two key objectives of the TMPU are:

1. Assess the City's 2009 Transportation and Transit Master Plan (TTMP) and revise the assumptions based on new population and employment forecasts, planning directives from the Province and the City's own Strategic and Official Plans; and
2. Prepare the transportation component of the City's Development Charges By-law Update.

Other objectives that support these two key objectives include:

- Ensure that continuing transportation decisions and investments for an integrated transportation network can be made with confidence and with regard to current best practices for sustainable transportation and land use planning;
- Plan for a coordinated and comprehensive approach in dealing with multimodal transportation issues in Brampton; and
- Review of the strategy to optimize the role of transit and active transportation and update the transportation network needs to the year 2041.

1.3 Study Process and Public Consultation

The TMPU has followed the Municipal Class Environmental Assessment process for master plans. In order to reach as many people as possible, an innovative approach was taken to the consultation process whereby an interactive online tool was established to garner public feedback on existing conditions and future transportation initiatives. Through this tool, thousands of residents were reached over the course of the project. The public consultation process and outcomes are provided in **Section 4**.

1.4 Problem and Opportunity Statement

The issues and opportunities facing the City of Brampton to the year 2041 and beyond from a transportation perspective include:

1. Population and Employment Growth

Population and employment are expected to continue to grow through the year 2041, from present levels of over 523,000 people and 182,000 jobs to almost 900,000 people and over 325,000 jobs in the year 2041.

2. Brampton's Important Role in Goods Movement

The City of Brampton as part of the Region of Peel is the goods movement hub for all of Canada. The largest Canadian National intermodal facility is located in Brampton, with the largest Canadian Pacific intermodal facility immediately to the east in the City of Vaughan and the busiest airport in Canada immediately to the south in the City of Mississauga. These, combined with numerous highways, warehouses and distribution centres, have made Brampton a focal point for goods movement. Traffic volumes from the goods movement industry in addition to commuter traffic volumes are expected to continue to grow. This growth is expected to add traffic to the City road network in addition to the Regional and Provincial road networks.

3. Economic Impact of Traffic

As traffic increases in the City, it could affect the City's attractiveness for business and could negatively impact the goods movement industry. Select road links and intersections already are approaching capacity, with congestion experienced at several intersections in the peak commuter periods.

4. Traffic Management

Ongoing traffic issues, such as major commuter travel flows combined with truck movements, can be better managed through new transit opportunities and more diverse network improvement strategies, including transportation demand management measures.

5. Evolving Urban Fabric

Brampton is planning for intensified urban development along major transit corridors to support the planning and development of provincial/regional and local rapid transit along major travel corridors such as Hurontario/Main Street, Queen Street, Steeles Avenue and Bovaird Drive. These areas are opportunities for more sustainable development, with enhanced roles for pedestrian, cycling and transit mobility.

1.5 TMPU Goals

With these challenges in mind as well as understanding existing and future travel demand, the following goals have been set for the TMPU:

- Assess the transportation strategy and overall transportation network recommendations identified in the 2009 TTMP;
- Review the strategy to optimize the role of transit, active transportation and transportation demand management to achieve the following modal splits in the peak travel periods by the year 2041;
 - 16% Brampton Transit;
 - 6% active transportation;
 - 28% auto passenger.
- Support the introduction of two-way, all-day GO train service to Brampton;
- Update road networks for horizon years to the year 2041; and
- Incorporate policy components that would enhance efficiency and usage of the existing transportation system and increase the attractiveness of alternative modes.

Meeting these modal split goals would result in 50% of trips in the a.m. and p.m. peak periods being by modes other than the single occupancy vehicle. The transit and active transportation goals represent doubling current usage of these modes, and the auto passenger goal represents an increase of 55% over current levels.

The goals incorporate key sustainable transportation planning principles, as identified by Transport Canada:

Sustainable Communities & Transportation Systems	Sustainable & Effective Transportation Planning
Principle 1: Integration with land use planning	Principle 7: Strategic approach
Principle 2: Environmental health	Principle 8: Implementation guidance
Principle 3: Economic and social objectives	Principle 9: Financial guidance
Principle 4: Modal sustainability	Principle 10: Performance measurement
Principle 5: Transportation demand management	Principle 11: Public involvement
Principle 6: Transportation supply management	Principle 12: Plan maintenance

All of these principles have been addressed in the development of the TMP Update, with specific chapters focusing on many of the principles directly. The organization of the report is described in the next subsection.



1.6 TMP Update Report Organization

The TMPU tells the story of how the City of Brampton will continue to move forward toward a more sustainable, multimodal transportation system. The TMPU is organized into the following chapters:

- **Chapter 1: Introduction:** Sets the stage for the TMPU by outlining the purpose and objectives of the study;
- **Chapter 2: Progress Since the 2009 TTMP:** Compares peak period travel behavior for the years 2001, 2006 and 2011, to observe trends;
- **Chapter 3: Planning Context:** Identifies Federal, Provincial, Regional and City documents that shape the TMPU;
- **Chapter 4: Public Consultation Summary:** Describes the innovative approach to online consultation that generated thousands of responses and summarizes input received throughout the course of the study;
- **Chapter 5: Existing Conditions:** Reports existing population, employment and travel trends;
- **Chapter 6: Transportation Alternatives Generation and Assessment:** Describes the process to generate alternative transportation scenarios for the year 2041 and analyzes the alternative future transportation scenarios using a number of metrics in order to arrive at the preferred alternative. Reports the forecast performance of the preferred alternative road network for the year 2041;
- **Chapter 7: Transit Planning:** Describes the existing Brampton Transit system and ridership, plans for the system's expansion to the years 2021, 2031 and 2041, and advocates for two-way, all-day GO Train service to Brampton;
- **Chapter 8: Active Transportation Planning:** Presents policies to encourage active transportation and ways to integrate active transportation with other travel modes;
- **Chapter 9: Goods Movement Planning:** Describes the existing truck route network in the City, identifies safety and efficiency opportunities and presents the freight audit as a next step in goods movement planning;
- **Chapter 10: Transportation Demand Management:** Provides a toolkit of measures to support transportation demand management and sets forth the resources needed to implement the measures;
- **Chapter 11: Phasing and Implementation Plan:** Organizes transportation improvement projects into short, medium and long term horizons;
- **Chapter 12: Air Quality:** Considers the impact of the 2041 preferred alternative on air quality, in relation to a "Do Nothing" alternative and other 2041 alternatives;
- **Chapter 13: Financing:** Identifies financing options to help fund multi-modal transportation projects;
- **Chapter 14: Monitoring the TMPU:** Provides a two-pronged framework to track progress toward multi-modal performance goals and track progress toward implementing specific projects nominated in the TMPU; and
- **Chapter 15: Summary of Recommendations:** Lists the multi-modal recommendations made throughout the report in order to determine the action plan for next steps.

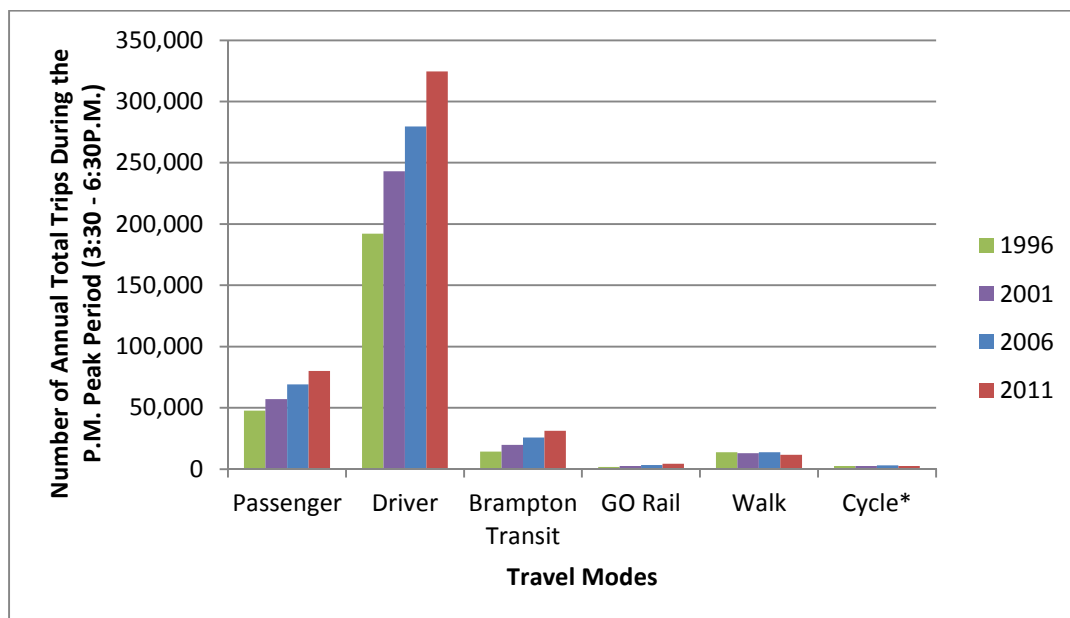
2. PROGRESS SINCE THE 2009 TTMP

The City of Brampton has made significant progress in implementing the road, transit and active transportation projects and initiatives recommended in the 2009 Transportation and Transit Master Plan (TTMP). Looking as far back as 1996, transit ridership has been increasing, and in the 2006 to 2011 period, transit ridership increased faster than the City’s population has increased, with rides per person also increasing.

GO Rail ridership is increasing, as is carpooling, which, from the data, is interpreted as a passenger in a personal automobile. Active transportation, such as walking and cycling, has remained fairly constant.

Even with increases in transit and carpooling, the single occupant automobile remains the dominant form of travel, and trips by this mode outweigh the other modes, as shown in **Figure 1**.

Figure 1: Commuting Travel Behaviour, 1996 to 2011



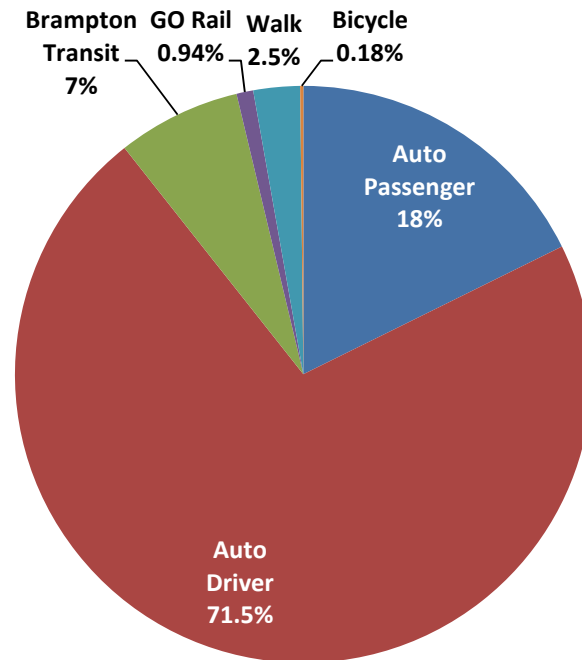
Source: Source: Transportation Tomorrow Survey (1996, 2001, 2006 & 2011)

*Bars shown for illustrative purposes only; the reported number of cyclists is below 1,000.

Continued efforts are needed to provide alternatives to the automobile. As dominant as the personal automobile is perceived to be, almost 30% of trips in the p.m. peak period (3:30 to 6:30p.m.) in 2011 were by carpool or alternative modes of transportation, as shown in **Figure 2**. These trips would be difficult to accommodate on the current road network if they all switched to the personal automobile. As the population and employment in the city continues to grow, it will become more imperative to shift trips to transit and active transportation.



Figure 2: Travel Mode during the PM Peak Period, Year 2011



Recognizing the continued importance of transit and active transportation, progress in these two areas are highlighted in the following subsections.

2.1 Advances in Transit

Brampton Transit has experienced significant ridership increases and service expansion in recent years. Since the last Transportation and Transit Master Plan (TTMP) in 2009, there has been a 49% increase in transit ridership. Growth in transit has exceeded the 20% growth in population that has been realized in the same timeframe resulting in an improved per capita ridership.

The increase in transit ridership comes with the improvements in the provision of transit services, particularly the ZÜM corridor implementation and associated route structure and improved service frequencies. Since the 2009 TTMP, four ZÜM routes have been introduced, including:

- ZÜM Queen Street from downtown Brampton to York University;
- ZÜM Main Street from Sandalwood Parkway to Mississauga City Centre;
- ZÜM Steeles Avenue from Brampton Gateway Terminal to Humber College; and
- ZÜM Bovaird Drive from Mount Pleasant GO Station to Queen Street / Goreway Drive.



The forecast growth in population and employment from 2011 to 2031 will have an impact on the transportation network and there will be an opportunity for transit to play a greater role as part of the overall transportation system. In particular, the limited available growth in auto roadway capacity will result in the need for people to find alternative modes of travel.

A full report and analysis of transit ridership is available in **Technical Report #3: Existing Transit Conditions**.

2.2 Advances in Active Transportation

Considerable progress has been made by both the City of Brampton and the Region of Peel in implementing and planning a network of Active Transportation facilities. Following the 2009 TTMP, the City prepared a Pathways Routing Plan in 2010. At its meeting of April 13, 2011, City Council directed staff to proceed with the development of a strategy for implementing bicycle facilities within the existing road allowance. This led to the initiation of the Bicycle Facility Implementation Program (BFIP). A report entitled “Strategy for Implementing Bicycle Facilities within City of Brampton Road Rights-of-Way” was presented to Council on May 15, 2013. The City continues to implement active transportation facilities and is planning for additional facilities. More information on active transportation is available in **Technical Report #5: Active Transportation**.



3. PLANNING CONTEXT

Development of the TMP Update is shaped by policies and plans prepared by multiple levels of government. Descriptions of three of the most important plans and policies from the Federal, Provincial, Regional City, and neighbouring jurisdiction levels are documented in this section. A complete summary of applicable plans and policies is provided in **Technical Report #8: Planning and Policy Context**.

3.1 Federal Planning Documents

Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
Federal Sustainable Development Act (2008)	The Federal Sustainable Development Act (FSDA) requires the development of a federal sustainable development strategy. The FSDA will strengthen sustainable development practices within the federal government. It is a positive step towards being more accountable to Canadians in the implementation of sustainable environmental practices.	<p>This policy allows the government to set environmental sustainability policies more effectively and to align the work of other federal departments with these sustainable policies.</p> <p>The federal strategy includes goals and targets for sustainable development along with an implementation strategy for each.</p> <p>These sustainable strategies have been reviewed and considered and will be included in the Integrated Transportation Master Plan Update as appropriate.</p>
National Vision for Urban Transit to 2020	The report, commissioned by Transport Canada, supports the concept that public transit has numerous benefits to the environment beyond the reduction in greenhouse gas (GHG) emissions.	<p>The benefits which have been identified and considered when developing the Brampton TMP include:</p> <ul style="list-style-type: none"> • A reduced need for new road construction; • Improved air quality due to fewer vehicles on the road; • Reduced traffic congestion; • Healthier downtowns; • Improved social mobility; and • Positive impacts on economic sectors such as tourism and export development.



3.2 Provincial Planning Documents

Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
<p>Provincial Policy Statement (2014)</p>	<p>The Provincial Policy Statement (PPS) is currently under review and will include a greater focus on healthy communities. The PPS sets the foundation for regulating land use and development within the province and supports Provincial goals. The PPS provides for appropriate development and protects resources of provincial interest. The vision of the land use planning system in the PPS is that the “long-term prosperity and social well-being of Ontarians depend on maintaining strong communities, a clean, healthy environment and a strong economy.”</p>	<p>The PPS promotes transportation choices that increase the mobility for all modes of travel. Contained in the PPS are policies pertaining to cycling, pedestrians and transit, which will be used to inform that development of similar policies and recommendations in the Transportation Master Plan Update.</p>
<p>Growth Plan for the Greater Golden Horseshoe (2013)</p>	<p>The plan aims to promote dense, mixed-use communities that support public transit, walking and cycling as viable transportation options for people. These mixed-use communities should have a traditional main street feel, which feature inviting commercial centres that serve surrounding communities. If this built form is achieved, transportation demand may be lowered as more people may choose to leave the car at home in favour of taking public transit, walking or cycling to their destination.</p>	<p>The plan directs future growth to communities where a reduced reliance on the single occupant motor vehicle as the mode of transportation is achievable. New development will be less automobile-oriented and more pedestrian friendly. The TMP Update will provide recommendations on how residents of Brampton can make alternative transportation choices such as taking public transit, walking or cycling in favor of using a car. Downtown Brampton is identified as one of two Urban Growth Centres in Peel Region.</p>



Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
The Big Move (2009)	<p>The Big Move is the third piece in a three-part approach by the provincial government to prepare the GTHA for growth and sustainability. It builds on the Greenbelt Plan and the Growth Plan for the Greater Golden Horseshoe. Together these three initiatives will lead to development of more compact and complete communities that make walking, cycling and transit part of everyday life. The goal of the Big Move is to create a long-term strategic plan for an integrated, multi-modal, regional transportation system. It serves as a blueprint for a more sustainable transportation future. With a 25 year time horizon, it reaches into the future to guide and direct decision making. Priorities, policies and programs are set for a future with complete mobility.</p>	<p>The Brampton TMP Update will reference the specific guidelines of the Big Move when developing a transportation network which considers all modes of transportation, promotes integration of transit systems and aims to reduce congestion, commuting times and transportation-related emissions. The Big Move improvements that will benefit mobility in Brampton include:</p> <ul style="list-style-type: none"> • Express rail connection to Union Station and regional rail improvements to Georgetown; • Rapid transit service on Highway 407, Highway 10, Main Street, Hurontario Street and Steeles Avenue; and • An extension of Highway 410 to the North.

3.3 Regional Planning Documents

Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
Peel Region Long Range Transportation Plan (LRTP) Update (2012 Draft)	<p>The LRTP Update identifies the transportation challenges anticipated by the Region over the next 20 years, as well as appropriate policies, strategies and a road improvement plan to address these challenges.</p>	<p>The TDM initiatives found in this plan will be reviewed and considered in the development of TDM policies and recommendations for the Brampton TMP Update.</p> <p>The road improvements identified on Regional roads in the City of Brampton will be incorporated in the development of the future transportation network.</p>



Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
<p>Halton-Peel Boundary Area Transportation Study (HPBATS) (2010)</p>	<p>The HPBATS is a joint study undertaken by the Region of Peel, Halton Region, City of Brampton, Town of Caledon and Town of Halton Hills. The objective of the study is to identify a long term transportation network solution including:</p> <ul style="list-style-type: none"> • Current and future municipal planning objectives; • Develop a coordinated interconnected roadway network; • Identify opportunities for TDM measures; • Identify solutions to long-distance, cross-boundary truck traffic; • Improvements to serve inter-regional traffic; • Potential improvements of connections to the 400-series highways; • Minimize vehicle emissions; • Encourage economic development; • Provide costs effective transportation solutions; and • Minimize impacts to the natural environment. 	<p>The Brampton TMP Update will incorporate transit and road network recommendations from the Halton-Peel Boundary Area Transportation Study that connect to the City of Brampton.</p>
<p>Peel Region Active Transportation Study (2011)</p>	<p>The Active Transportation Plan outlines Peel Region’s short, medium and long term goals for and increased share of trips using active transportation, enhancing modal integration and creating an attractive, safe, accessible and integrated walking and bicycle friendly environment.</p>	<p>The Brampton TMP Update will incorporate elements of the cycling network identified on City roads (Map R-3) including:</p> <ul style="list-style-type: none"> • Bike lanes on Queen Street and Mississauga Road; and • Multi-use trails on Steeles Avenue and Airport Road.



3.4 City Planning Documents

Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
City of Brampton Official Plan	The Brampton Official Plan establishes a set of policies and land use designations that are meant to guide the physical development and redevelopment of Brampton. The intent of the Official Plan is to build upon the sense of civic pride in Brampton and to move more aggressively towards a sustainable community that caters to the needs and desires of its residents now and in the future.	The overall development pattern set by the Official Plan will be considered in the development of the future transportation network, policies and guidelines.
Brampton Transportation & Transit Master Plan – Sustainable Update (2009)	The TTMP Sustainable Update is a platform to move forward with the implementation of the transportation vision defined in the 2004 TTMP. The 2004 TTMP developed an integrated and balanced transportation system incorporating all travel modes. It focused on enhancing transit accessibility, improving air quality, and ensuring a healthy, active community. The plan provides a guide for implementing transportation investments, policies and actions to the year 2031.	In preparation of the future transportation network for the Brampton TMP Update, the improvements and recommendations of the Recommended Road Network from the TTMP will be considered.
Hurontario-Main Street Corridor Master Plan (2010)	This report documents a master plan for the Hurontario / Main Street corridor, integrating planning for rapid transit, intensified land use and enhanced urban design. The Hurontario/Main Street Corridor will link the Urban Growth Centres in Brampton and Mississauga, while traversing five Mobility Hubs – which are identified locations for future inter-regional transit connections and enhanced transit-oriented development, as defined by the Big Move. The corridor has a distinctive urban character that varies from stable residential communities to areas with great potential for intensification and/or redevelopment.	The Brampton TMP Update will incorporate the recommended Light Rail Transit option into the development of the future transportation network.



3.5 Planning Documents from Bordering Jurisdictions

Policy Document	Policy Description	Relevance to the Transportation Master Plan Update
Halton Region Transportation Master Plan (2011)	The Halton TMP provides the strategies, policies and tools for the development of a balanced and sustainable transportation system that will support the objectives of Sustainable Halton and meet the Region's transportation needs safely, effectively, and cost efficiently to the year 2031.	Connections to the proposed transportation and transit networks in Halton Region will be considered as a similar network is developed for the City as part of the Brampton TMP Update.
York Region Transportation Master Plan (2009)	This plan serves as the “blueprint” for all major transportation initiatives in the Region through the year 2031. The TMP addresses transportation challenges and strategies that will promote sustainable development in York Region. It complements other initiatives in the Region including Regional goals of Sustainable Natural Environment, Economic Vitality and Healthy Communities.	Connections to the proposed transportation and transit networks in York Region will be considered as part of the Brampton TMP Update.
Mississauga Interim Transportation Strategy (2011)	The City of Mississauga produced the Interim Transportation Strategy as a first step towards the development of a Transportation Master Plan (TMP). The strategy sets out the transportation challenges and issues facing Mississauga, provides a summary of current initiatives the City is undertaking to advance the transportation network and sets out 46 actions to be pursued over five years.	The Brampton TMP Update will ensure that the appropriate connections to current transportation network initiatives in Mississauga are considered in the development of the future transportation network.
Caledon Transportation Needs Study Update (2009)	The Caledon Transportation Needs Study Update is a project conducted jointly by the Town of Caledon and the Region of Peel to assess and identify the potential transportation improvements to accommodate future transportation demand within the Town.	Connections to the proposed transportation network in Caledon will be considered as part of the Brampton TMP Update.



4. PUBLIC CONSULTATION SUMMARY

Developing a long-range Transportation Master Plan Update (TMPU) for the City of Brampton requires an understanding of the wants and needs of those that will ultimately be using the system. For a master plan of this scope and scale, a robust consultation and engagement strategy was needed to engage key members of the community.

Effective, accessible and efficient communications were used as the cornerstones of public and stakeholder consultation. They were also further shaped by the study objectives and consultation goals. They built on existing City and Regional communication and outreach techniques while identifying and initiating, where possible, more innovative / context-specific opportunities.

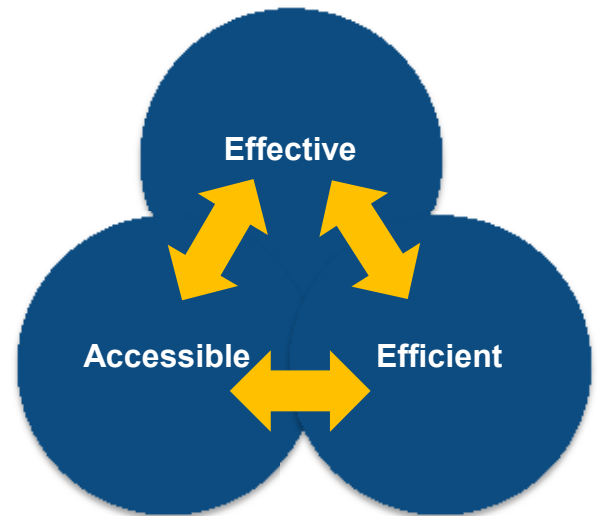


Figure 3: Cornerstones of Brampton TMPU Consultation / Engagement

4.1 What were the Objectives?

The process of updating the TMP for the City of Brampton, in accordance with the Class Environmental Assessment (EA) process, required creative consultation efforts. Consistent with a Schedule B Class EA, the City was required to have two distinct points of contact with members of the public. The points of contact were developed to give the public the opportunity to provide and document their input on key study deliverables which shaped TMP Update outcomes. Building on the requirements set out by the Municipal Class EA process, the study team identified other key objectives that were used to guide the consultation activities undertaken over the course of the study including:

- 1 Develop awareness within the community about the TMP Update and maintain momentum following the plan's completion
- 2 Collect feedback at key locations throughout the study process to inform the development of study deliverables and master plan outcomes
- 3 Connect interested parties and develop a network of contacts to improve future communication and facilitate implementation
- 4 Provide a menu of consultation alternatives and opportunities based on different target audiences

4.2 Considering the Differing Audiences

Identifying activities that engage and build upon the knowledge of the people who live, work and play within the City as well as those who will be responsible for implementing the TMP Update was an integral component of the study. Public, private, political and technical representatives were identified and engaged through a wide range of consultation and engagement activities.

The following are some of the groups that were engaged over the course of the development of the master plan:

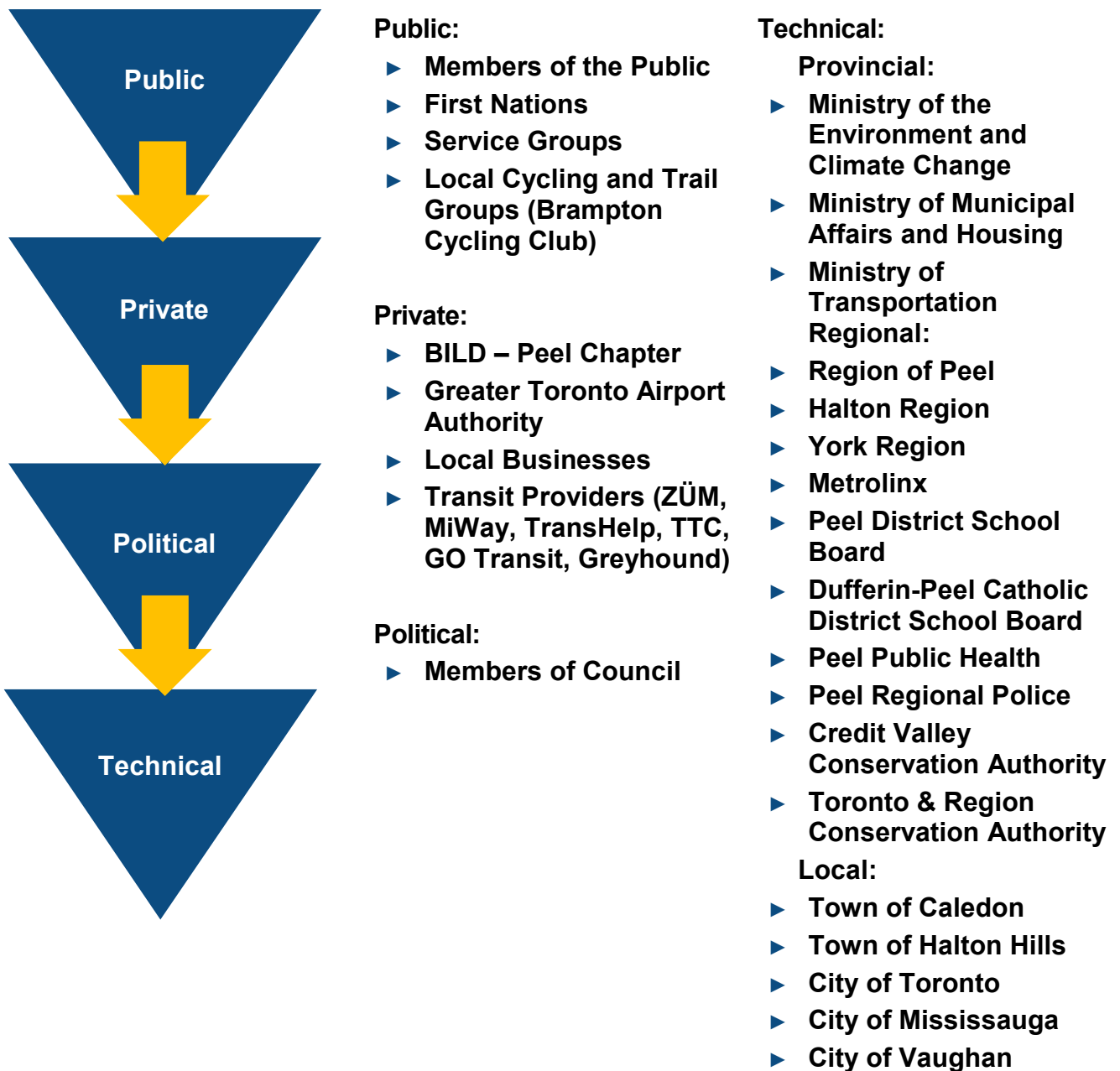




Figure 4: International Association of Public Participation (IAP2) Consultation Principles

4.3 Scope of the Consultation

Consultation and engagement comes in many different forms. For the TMP Update, the consultation and engagement initiatives were crafted to achieve the five principles of the International Association of Public Participation (IAP2) – see the principles noted in **Figure 4**. Building on these principles, the activities were further organized into internal and external (public / stakeholder) efforts. Each of the activities was structured to engage a different target audience.

The activities were broken into two categories – **public / stakeholder consultation** and **technical consultation**. The public / stakeholder consultation activities were undertaken in two rounds consistent with Phases 1 and 2 of the TMP Update study process. The public / stakeholder consultation process is illustrated in **Figure 5**.

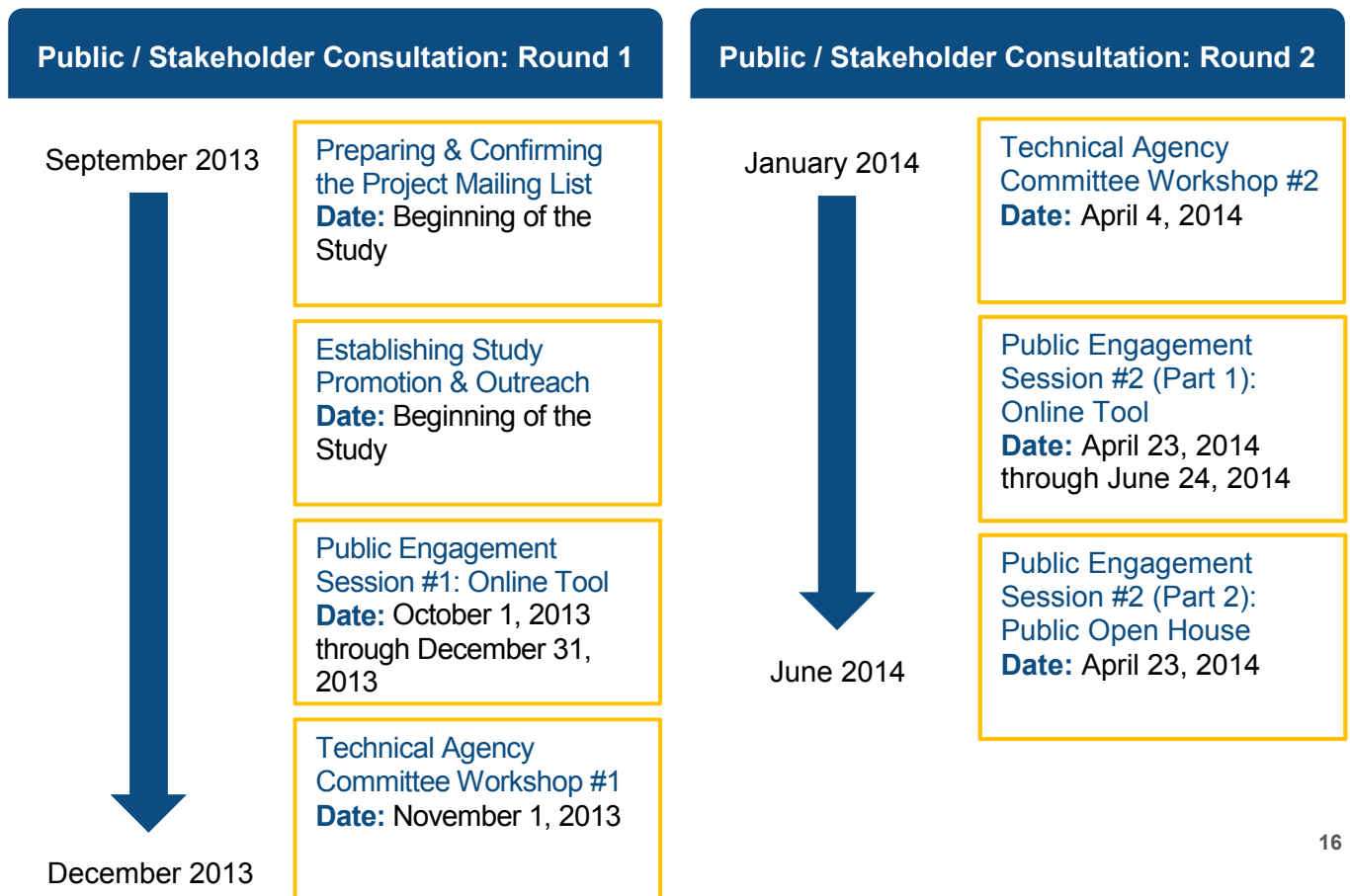


Figure 5: Overview of External (Public & Stakeholder) Consultation Activities & Timeline

4.4 Who Responded?

There were varying response rates for each of the consultation activities undertaken. It can be concluded that the most success was realized when the City and consultant team used additional promotion techniques e.g. online social media blasts and other promotional materials to further promote and encourage participation. The following table provides a summary of the responses to online engagement tools and turn-out to the public open house. It also indicates where additional promotion and outreach techniques were used.

Please note that only the “formal” consultation events where responses can be tracked have been highlighted in the table. This does not include all study team meetings, promotion and outreach initiatives (study business cards and mobile display boards) at local events and other means of outreach over the course of the study.

Table 1: Summary of Formal Engagement Activity Response Rate

Activity	# Respondents	Promotion
Public Engagement Session #1: Online Tool	1,767 visits to the webpage and 407 responses	<ul style="list-style-type: none"> ▶ Notice placed on the project webpage ▶ Study contacts emailed with link to the webpage and social media was used to further promote ▶ Link included on the study promotional business card and mobile display board ▶ Additional information included in local newspaper (Brampton Guardian)
Technical Agency Committee Workshop #1	All Members	<ul style="list-style-type: none"> ▶ Letter invitation provided to attendees via email
Public Engagement Session #2 (Part 1): Online Tool	1,162 visits to the webpage and 316 responses	<ul style="list-style-type: none"> ▶ Additional information included in local newsletters and publications ▶ Notice placed on the project webpage ▶ Study contacts emailed with link to the webpage
Public Engagement Session #2 (Part 2): Public Open House	15	<ul style="list-style-type: none"> ▶ Notice of public open house published in local newsletters and media ▶ Information included on the project webpage about date and location of the open house
Technical Agency Committee Workshop #2	All Members	<ul style="list-style-type: none"> ▶ Letter invitation provided to attendees via email

4.5 What did we Hear?

At each of the consultation events, the study team aimed to gather as much relevant input / commentary as possible to inform the development of key study outcomes and deliverables. Both the public events and stakeholder sessions were designed to be as interactive as possible to facilitate discussion between the attendees and members of the study team.

At each of the sessions the input received was documented and used, where appropriate, to identify existing and future trends / opportunities and ultimately helped to inform the development of the TMP Update recommendations and proposed transportation solutions.

Key information for each of the consultation activities is presented below including the overall objectives of the activity, how respondents were engaged and highlights from the input received.

4.5.1 Public Engagement Session #1: Online Tool

Objective:

To engage members of the public using the study webpage as an interactive online hub. Embedded onto the webpage was a robust questionnaire tool used to **gather information** about existing transportation habits, **identify** current transportation **issues** throughout Brampton and **generate ideas** and potential network opportunities about future improvements to the system. As responses were provided, real-time comparison was available to indicate how one's response related to others that had been completed previously. Results were compared and contrasted to indicate current trends.

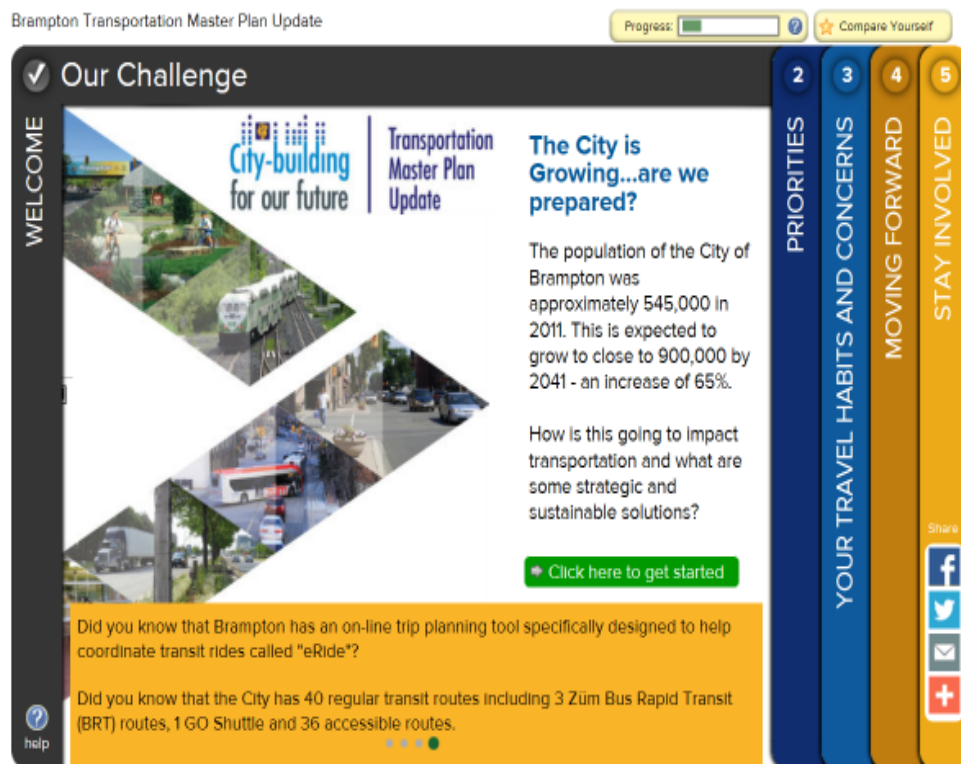


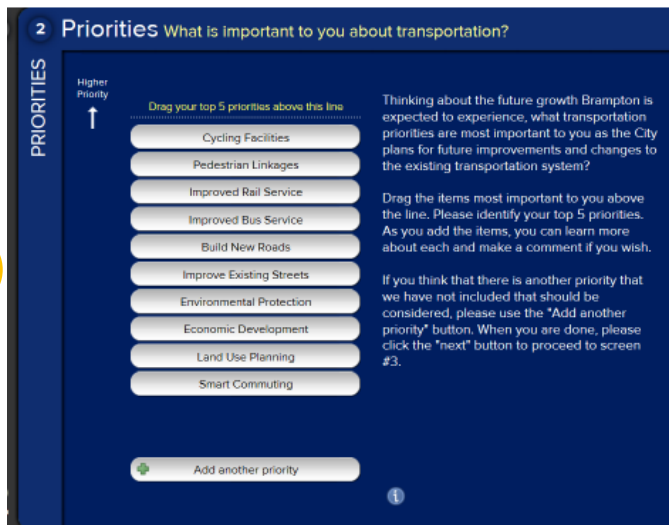
Figure 6: Screen Capture of Phase 1 Online Engagement



Engagement Tools:

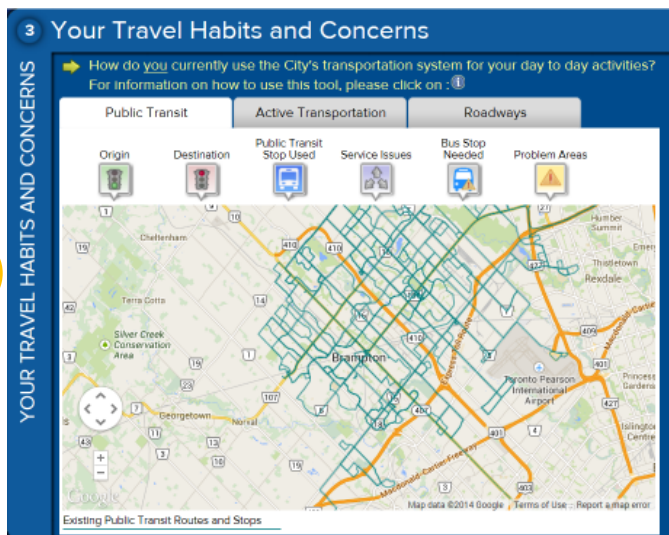
Respondents were asked to participate in three key activities:

1



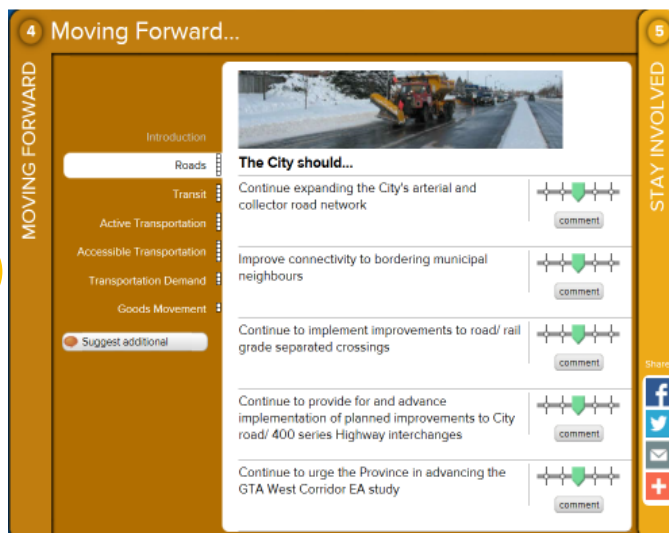
Respondents were asked to review high level priorities pertaining to transportation to assess their level of importance related to the future of the City.

2



Respondents were asked to review the existing transportation network and provide areas of opportunity as well as challenges / barriers. Responses were documented on an interactive map.

3



Respondents were asked to review some of the key priorities identified in the 2009 TMP to assess their relevance when preparing the updated TMP.



Response Highlights:

- ▶ The majority of the respondents live in Brampton; however, some participants provided input from outside of the City e.g. Burlington, Thunder Bay, Toronto, and elsewhere (Figure 7).

- ▶ **Active Transportation (Figure 8) –**
 - ▶ Respondents indicated areas of improvement, high use and suggested routes in the downtown core with a centralization of comments found within the Main Street and Queen Street area.
 - ▶ Respondents indicated a number of challenging crossings at major intersections e.g. Sandalwood Parkway and Chinguacousy and along the major arterial roadways.
 - ▶ A number of trail amenities were suggested for consideration within the downtown and surrounding areas with a high response rate along McLaughlin Road. There are a number of existing trail systems within the City which are well used; however, additional amenities may lead to increased use due to a greater sense of comfort and safety.
 - ▶ There were few comments noted about road repair. Respondents identified a number of proposed routes within the downtown core as opposed to the surrounding areas.

- ▶ **Transit (Figure 9) –**
 - ▶ The least number of responses were provided regarding the existing transit network with the majority of responses provided regarding problem areas and traffic congestion along existing bus routes.
 - ▶ The majority of responses regarding problem areas for current transit were provided along the 410 as well as Hurontario St. / Main St. with a buildup of responses provided at Main St. and Queen St. Problem areas may be considered areas where there is existing transit service, however, barriers or challenges may be present including a lack of connectivity or conflicts with other modes.
 - ▶ Existing bus service issues – including slow service or congestion - were not indicated in the downtown core but more frequently within the outlying suburban areas e.g. west of McLaughlin Road north and south of Queen Street.

- ▶ **Congestion (Figure 10) –**
 - ▶ The busiest intersections noted by respondents were found along Main Street / Hurontario St. and Highway 410 for the N/S connections and Queen Street, Bovaird Drive and Williams Parkway for the E/W connections.
 - ▶ Build-up of comments was found within the downtown core or south of the downtown at Steeles Avenue and Hurontario Street.
 - ▶ There were a number of responses which indicated the need for road repair with the majority of comments provided along Credit View Road.

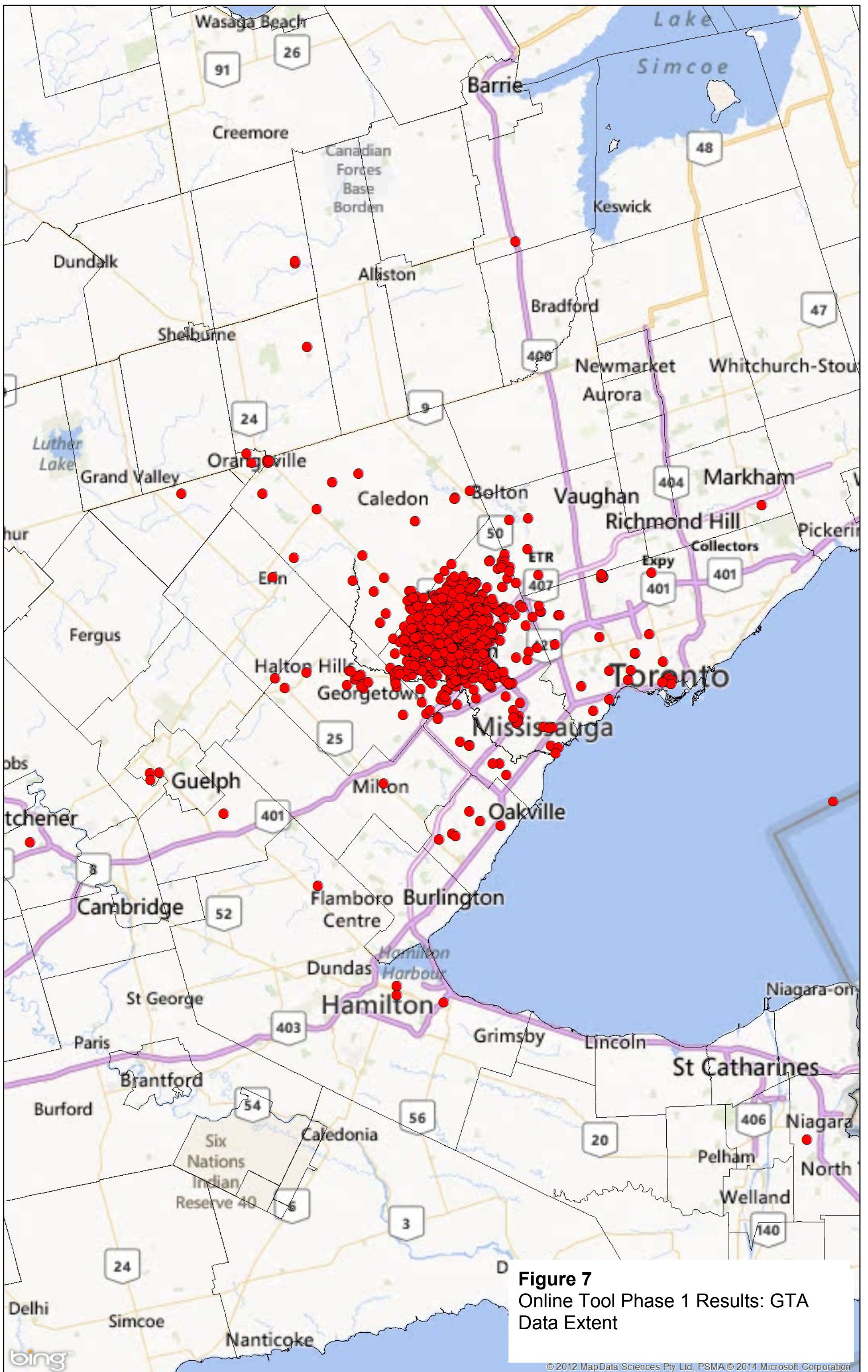
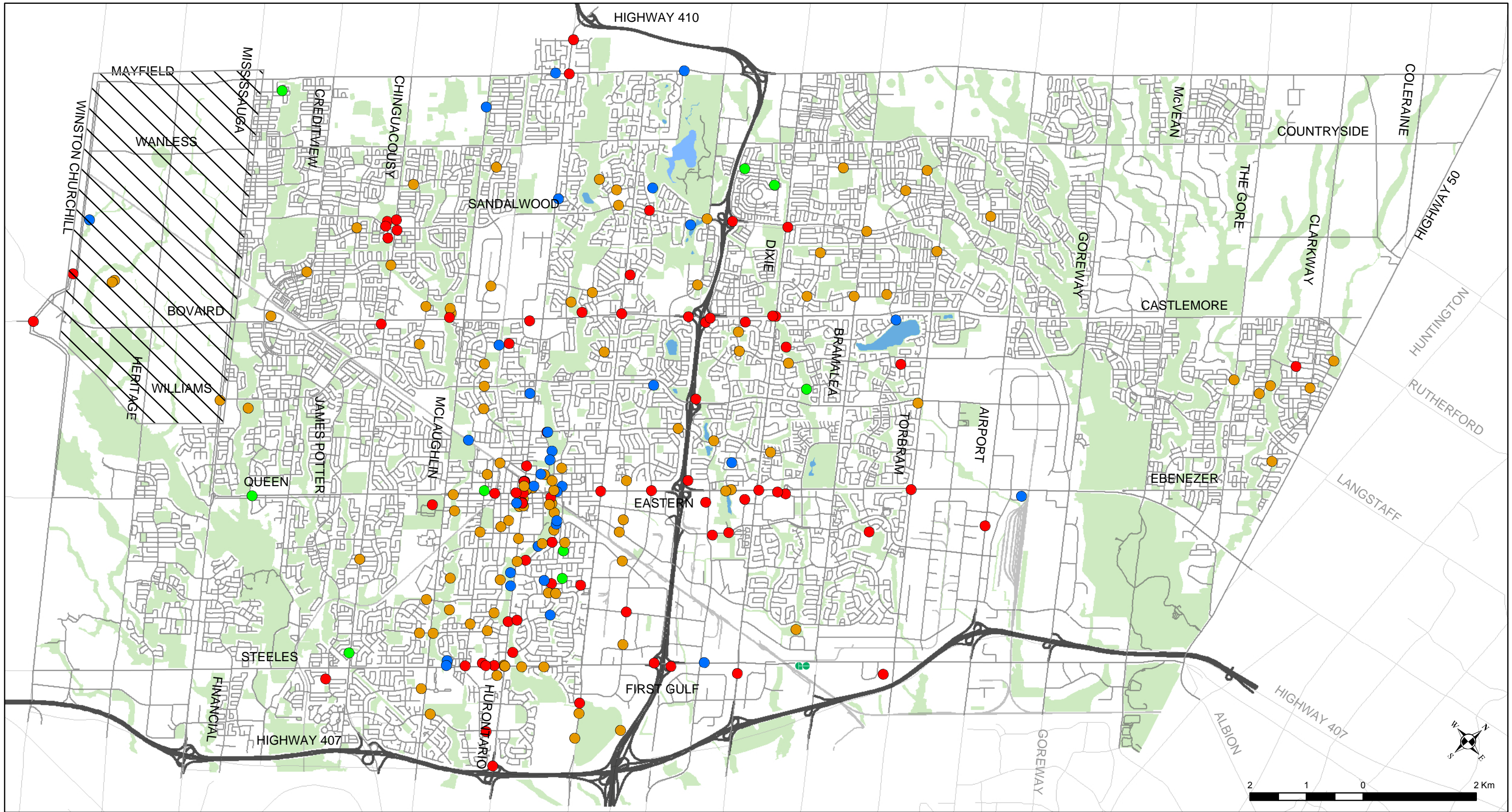


Figure 7
 Online Tool Phase 1 Results: GTA
 Data Extent

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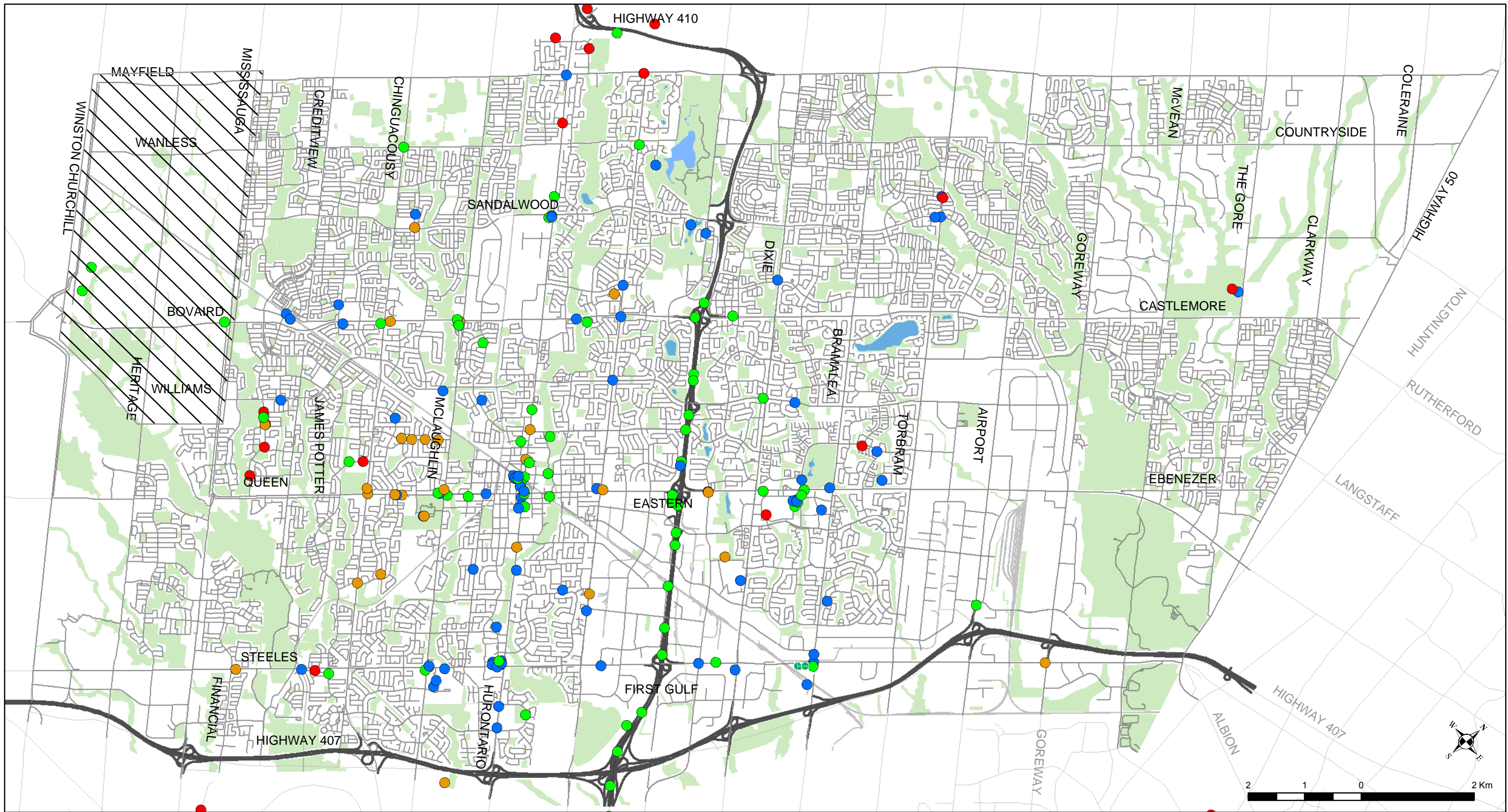


Legend

- Challenging Crossings
- Roadway Repairs Needed
- Recommended Routes
- Trail Amenities Needed

▨ Conceptual Road Network for use in the Development Charges Background Study

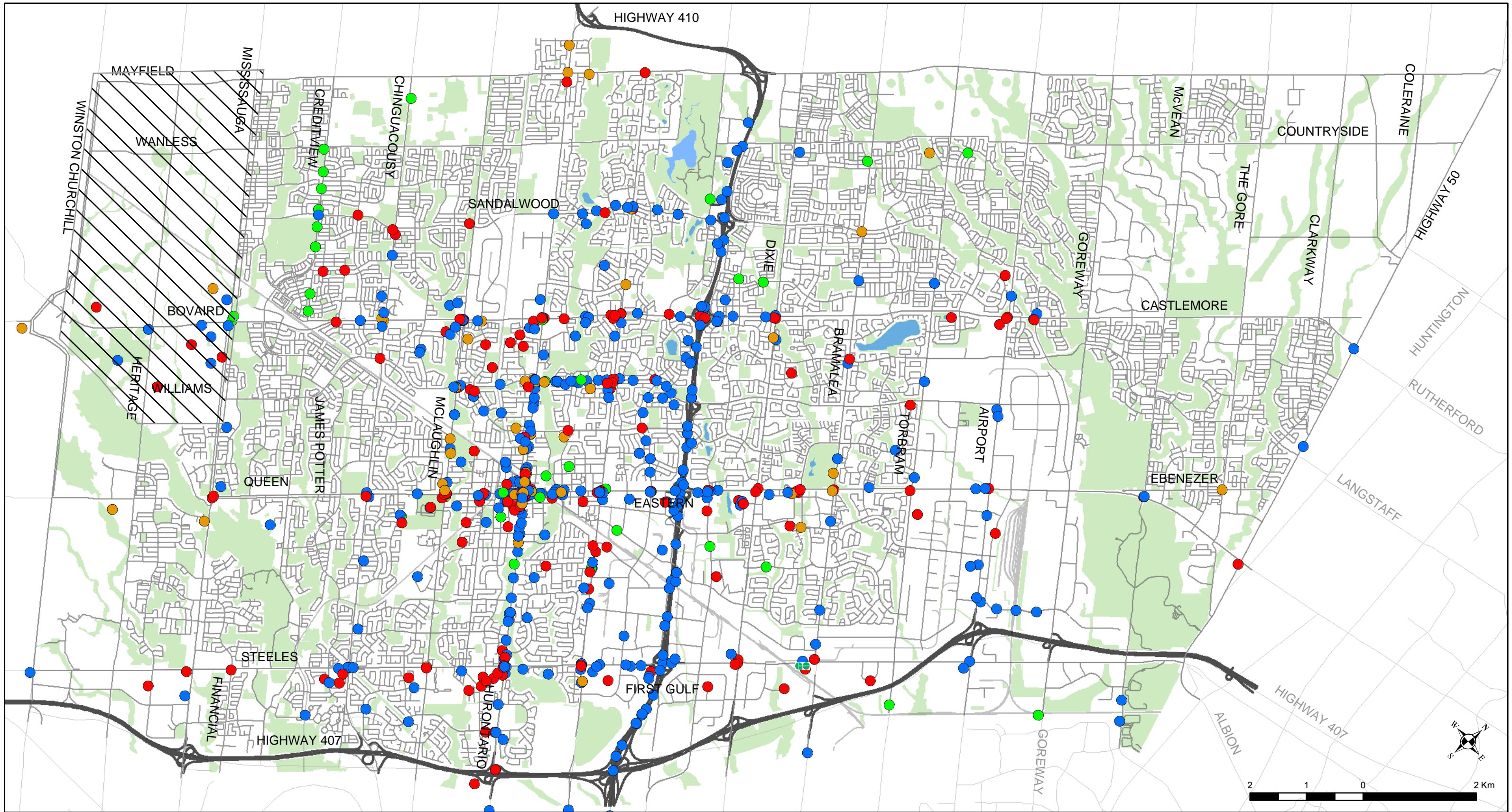
Figure 8
 Online Tool Phase 1 Results: Active Transportation



Legend

- Bus Stop Needed
- Too Much Congestion
- Problem Area
- Service Issue
- Conceptual Road Network for use in the Development Charges Background Study

Figure 9
 Online Tool Phase 1 Results: Transit



Legend

- Busy Intersection
- Too Much Congestion
- Roadway Repairs Needed
- Turning Lane Needed
- Conceptual Road Network for use in the Development Charges Background Study

Figure 10
 Online Tool Phase 1 Results:
 Congestion



- ▶ **Moving Forward** – when asked to provide comments on the 2009 Transportation and Transit Master Plan (TTMP) recommendations a number of themes were raised for roads, transit, active transportation, accessible transportation, transportation demand and goods movement. The themes with the highest score and relevant comments have been summarized in **Table 2**.

Table 2: Summary of Support for 2009 TTMP Recommendations

Roads	Transit	Active Transportation
<p>Highest score: <i>Continue to provide for and advance implementation of planned improvements to City roads and 400 series highways.</i></p> <p>Comment Highlights: More roads are not needed. Strategic use of existing roads should be the focus with alternate routes to remove vehicles from congesting the downtown.</p>	<p>Highest score: <i>consider implementing LRT on Hurontario / main street corridor as number of riders grows and funding becomes available.</i></p> <p>Comment Highlights: Very essential service but needs to be expanded in a consistent way that is clear to users and creates a continuous system of routes and stops.</p>	<p>Highest score: <i>continue to implement the on and off-road trails and cycling network in the Pathways Master Plan.</i></p> <p>Comment Highlights: should focus on developing off-road trails including other complementary amenities. Cycling facilities should integrate with the rest of the urban transportation system.</p>
Accessible Transportation	Transportation Demand	Goods Movement
<p>Highest score: <i>work with the Province, Metrolinx and the Region to ensure that funding is in place to develop facilities and supportive infrastructure to support mobility for all.</i></p> <p>Comment Highlights: Education and public information regarding accessible transportation options is needed and barriers should be minimized where possible.</p>	<p>Highest score: <i>provide additional queue jump lanes and bus bays on ZÜM and primary transit corridor.</i></p> <p>Comment Highlights: additional TDM measures require education and reinforcement for their use through Smart Commute, the City or the Region.</p>	<p>High score: <i>identify truck routes in Brampton to connect to Regional and Provincial goods movement networks.</i></p> <p>Comment Highlights: Trucks should be deterred from using minor industrial roads. There should be a more strategic approach to trucks on roads during rush hours.</p>

4.5.2 Technical Agency Committee Workshop #1

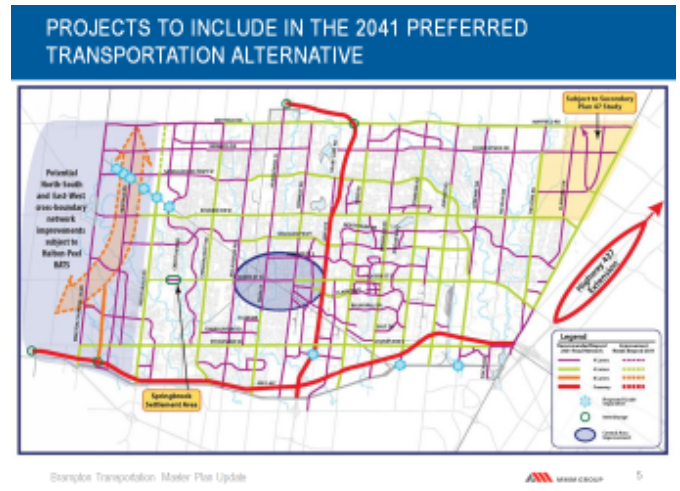
Objective:

To engage key study stakeholders through an interactive committee workshop. Relevant study materials and deliverables were presented and discussed at the session. The initial session was

used to **gather information** about existing transportation trends and practices within the surrounding municipalities, **identify** current transportation **issues** from a network development, management and operations perspective and **generate ideas** about future infrastructure and programming initiatives which could be explored throughout the TMP Update.

Engagement Tools:

- ▶ A presentation of the online tool was provided
- ▶ A roundtable discussion was undertaken to review current transportation initiatives for each stakeholder, and how they might impact the City of Brampton
- ▶ A workshop session was used to review and comment on the City’s existing transportation network and linkages to neighbouring municipalities



Response Highlights:

Attendees reported on current and recent transportation initiatives being undertaken by their agency – information presented indicates a wide range of initiatives currently being undertaken which will require significant coordination on behalf of the City, Region and partners.

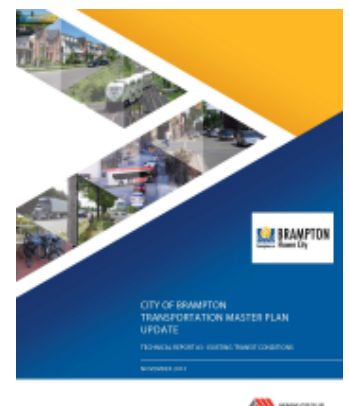
4.5.3 Technical Agency Workshop #2

Objective:

To meet with members of technical agencies to present the draft transportation network and to **generate ideas** and **input** regarding the network and master plan recommendations. It was also used to **gather information** from staff about potential priorities and phasing as the study team proceeded with the development of the implementation plan.

Engagement Tools:

- ▶ A roundtable discussion was used to review public consultation activities completed to date including responses gathered from the first round of online engagement. Opportunities for future consultation were discussed including PIC #2 presentation and future online engagement.
- ▶ Attendees were engaged in a workshop to review the technical reports completed and submitted to date and to discuss the preliminary draft plans for roads, transit and active transportation.





Response Highlights:

- ▶ Attendees were supportive of the consultation and engagement completed to date and were happy with the results of the online engagement vs. an in-person public information centre for the first phase of the project.
- ▶ Comments regarding the second phase of public engagement materials were positive. Some revisions and additions were provided and the display boards / mapping were updated accordingly.

4.5.4 Public Engagement Session #2 (Part 1): Online Tool

Objective:

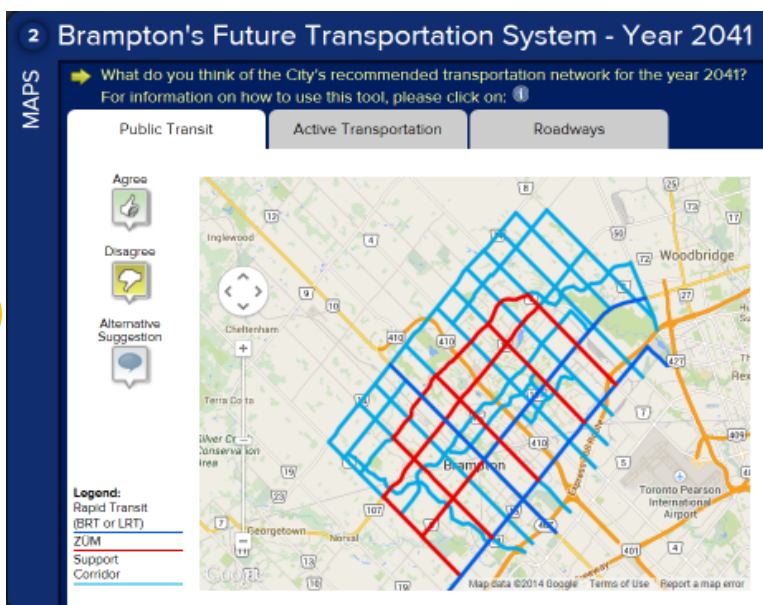
To engage members of the public using the study webpage as an interactive online hub. A second online tool was used to **generate ideas** and **input** regarding proposed network improvements and TMP Update recommendations. It was also used to **establish support** for suggested next steps and the prioritization of future transportation improvements by residents and stakeholders.



Engagement Tools:

Respondents were asked to participate in three key activities:

1



Respondents were asked to provide their **comments on the proposed transportation network** based on three forms of transportation – public transit, roadways and active transportation.



2

Respondents were asked to rank the **transportation recommendations proposed for inclusion in the TMP Update.**

They were organized by transportation mode.

3

Respondents were asked to help **select the preferred priorities identified in the TMP Update.**

A set of 10 priorities were identified and respondents were asked to allocate points to those they supported.

Response Highlights:

- ▶ The number of response to the second round of online engagement was fewer than the first; however, the 150 respondents provided substantial information regarding the network, recommendations and priorities.
- ▶ **Proposed Public Transit Network (see Figure 11)** – respondents provided a high number of comments on rapid transit routes identified along Main Street / Hurontario as well as the ZÜM and rapid transit routes along Queen Street. The majority of the comments provided support for the proposed routes identified; however, additional routes were also identified for future consideration. Comments provided indicated a need for increased connectivity through the strategic implementation of transit not only within the

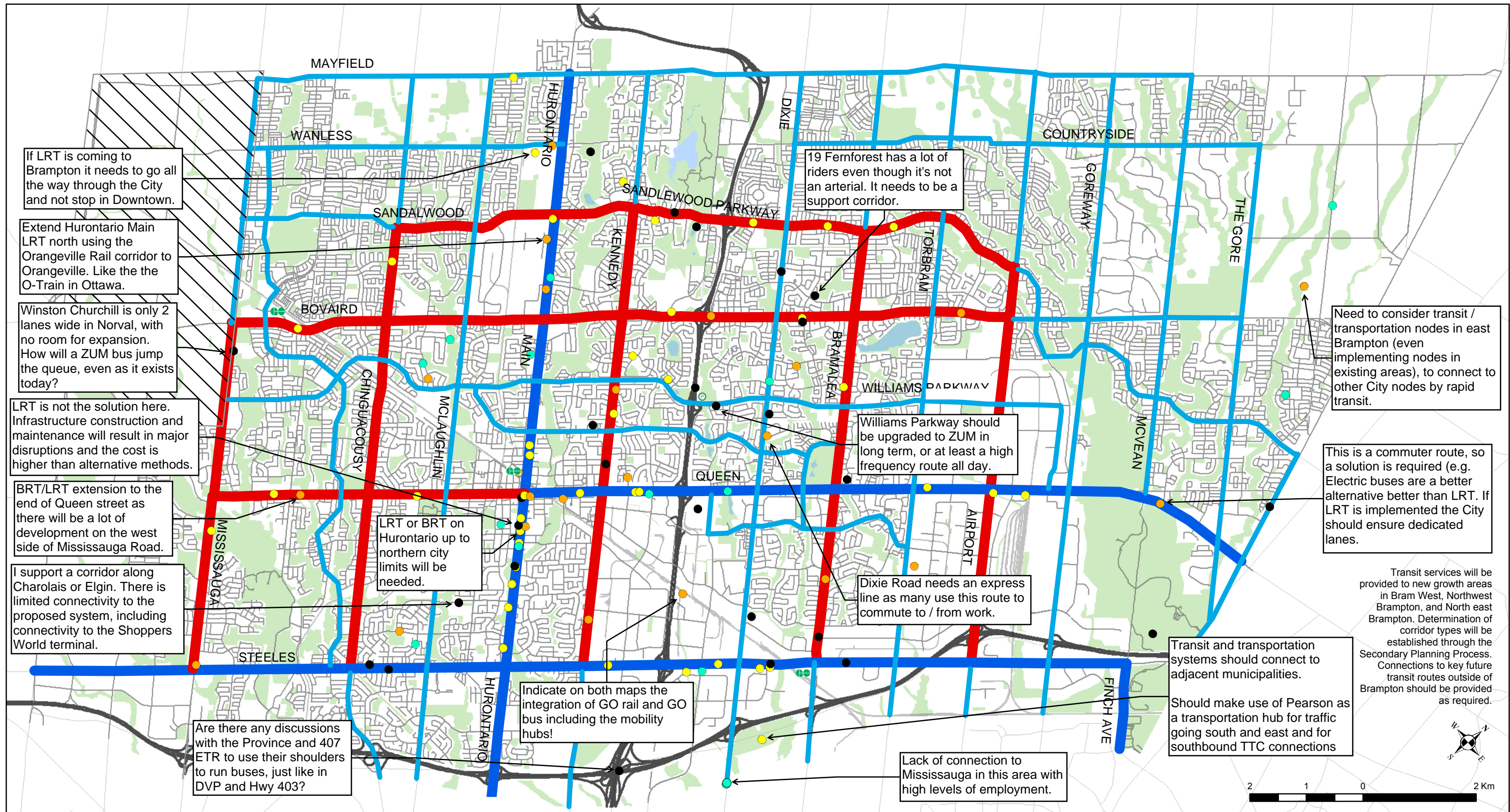


City but to surrounding communities. Some of the comments noted have been provided on **Figure 11**.

- ▶ **Proposed Active Transportation Network (Figure 12)** – respondents provided comments to a number of proposed active transportation routes within the City. The majority of the comments received indicated support for the proposed routes, however, a high number of alternative suggestions were proposed at Queen Street and Main Street. Respondents felt that due to the high density of traffic within this area, further improvements to the pedestrian and cycling facilities / realm are required. Some refinements / clarifications to the existing network were also noted which were reviewed and used as the basis to update the existing and proposed mapping. Some of the comments have been provided on **Figure 12**.
- ▶ **Proposed Roadways Network (Figure 13)** – the proposed roads network received the fewest comments compared to transit and active transportation. Some comments were provided on proposed routes with the majority of comments identifying alternative suggestions. Few trends in comments can be identified as there proved to be a conflicting opinion between widening roadways vs. not widening roadways. In general, respondents indicated the need for roads that are more effectively designed including the inclusion of walking and cycling facilities as well as strategic consideration for goods movement. Some of the comments have been included on **Figure 13**.
- ▶ **Potential Solutions** – respondents were asked to rank the proposed recommendations in the areas of transit, roads / goods movement, active transportation and transportation demand management. In **Table 3**, the top two potential solutions have been identified based on the responses that were received.

Table 3: Summary of Ranking of Potential Transportation Solutions

Transit	Roads / Goods Movement
<ol style="list-style-type: none"> 1. Provide an exclusive lane for the use of transit / high occupancy vehicles when roads designed for rapid transit are widened 2. Increase funding to improve the rapid transit network 	<ol style="list-style-type: none"> 1. Construct infrastructure to maintain the safety of pedestrians, cyclists and transit vehicles along truck routes 2. Study existing and forecast freight activities in the City to establish priorities to support safe and efficient freight movement
Active Transportation	Transportation Demand Management
<ol style="list-style-type: none"> 1. Ensure connectivity by developing east-west routes, links over provincial highways and direct routes to key connections 2. Select suitable facility types for confirmed active transportation routes 	<ol style="list-style-type: none"> 1. Partner with Smart Commute Brampton-Caledon and post-secondary institutions to develop additional TDM Programs 2. Prepare a transportation demand management plan that focuses on expanding the commitment, planning, services and promotion for modes of travel other than the personal automobile



Transit services will be provided to new growth areas in Bram West, Northwest Brampton, and North east Brampton. Determination of corridor types will be established through the Secondary Planning Process. Connections to key future transit routes outside of Brampton should be provided as required.



BRAMPTON
Flower City

Transportation
Master Plan

Legend

- Rapid Transit (BRT or LRT)
- ZUM
- Support Corridor

- GO Train Station
- Carpool Lot
- Conceptual Road Network for use in the Development Charges Background Study

Metroquest Phase 2 Results

- Agree
- Disagree
- Alternate Suggestion

Figure 11
Online Tool Phase 2 Results:
Recommended Rapid Transit
Implementation by the Year 2041

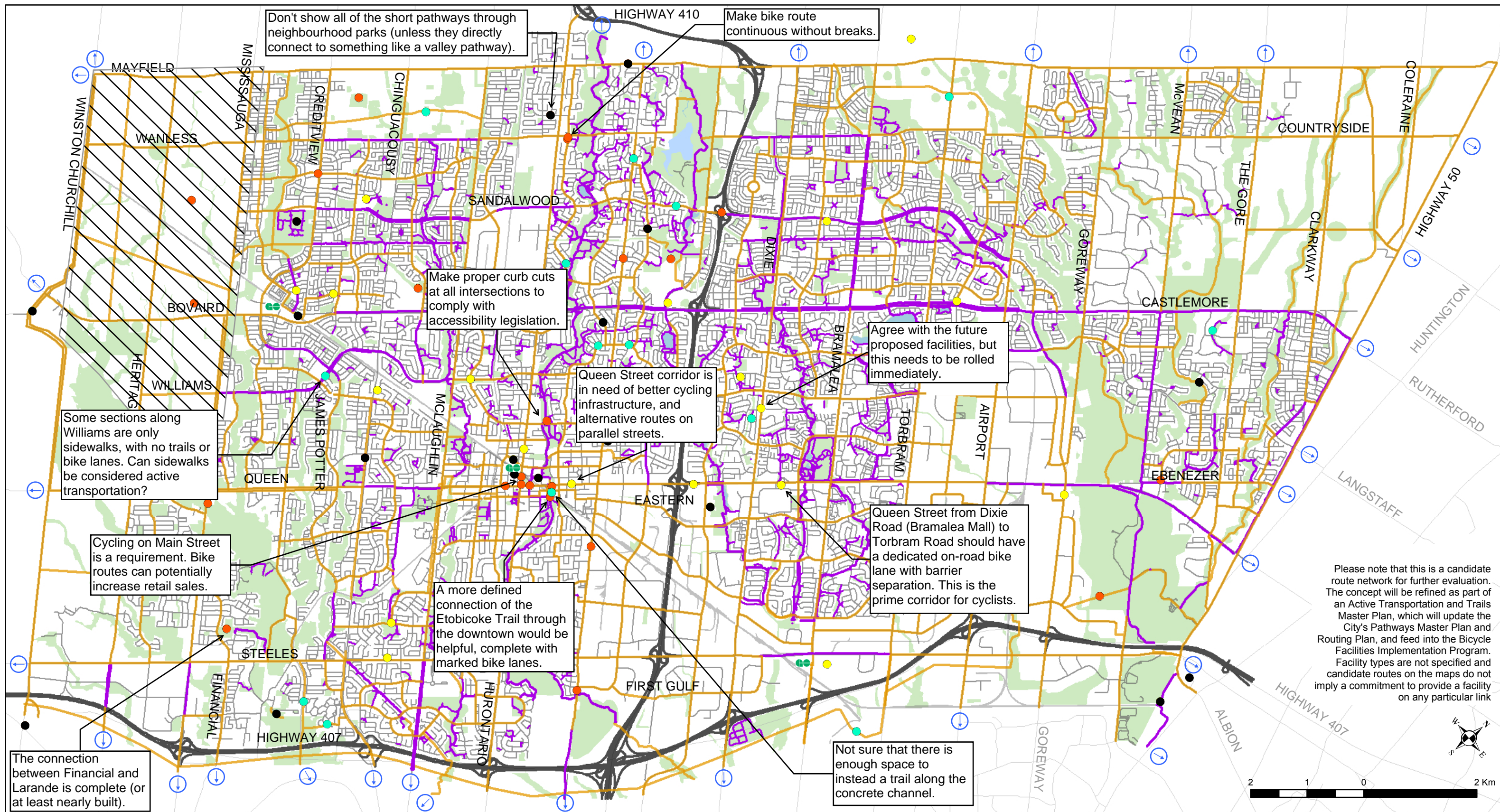
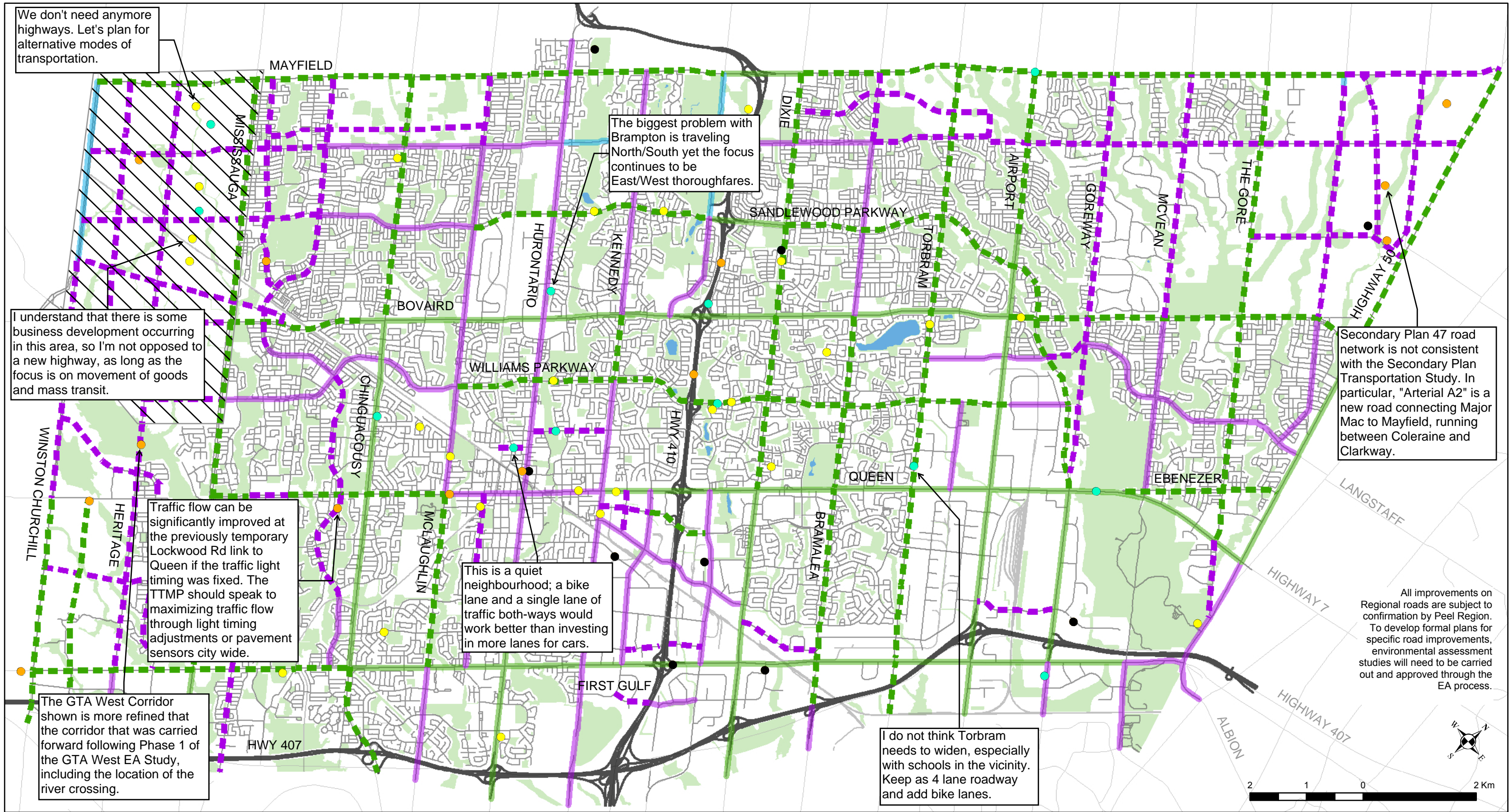


Figure 12
 Online Tool Phase 2 Results: Existing and Recommended Future Active Transportation Facilities



We don't need anymore highways. Let's plan for alternative modes of transportation.

The biggest problem with Brampton is traveling North/South yet the focus continues to be East/West thoroughfares.

I understand that there is some business development occurring in this area, so I'm not opposed to a new highway, as long as the focus is on movement of goods and mass transit.

Secondary Plan 47 road network is not consistent with the Secondary Plan Transportation Study. In particular, "Arterial A2" is a new road connecting Major Mac to Mayfield, running between Coleraine and Clarkway.

Traffic flow can be significantly improved at the previously temporary Lockwood Rd link to Queen if the traffic light timing was fixed. The TTMP should speak to maximizing traffic flow through light timing adjustments or pavement sensors city wide.

This is a quiet neighbourhood; a bike lane and a single lane of traffic both-ways would work better than investing in more lanes for cars.

The GTA West Corridor shown is more refined that the corridor that was carried forward following Phase 1 of the GTA West EA Study, including the location of the river crossing.

I do not think Torbram needs to widen, especially with schools in the vicinity. Keep as 4 lane roadway and add bike lanes.

All improvements on Regional roads are subject to confirmation by Peel Region. To develop formal plans for specific road improvements, environmental assessment studies will need to be carried out and approved through the EA process.

BRAMPTON
Flower City

Transportation
Master Plan

Legend

- Two Lanes
- Four Lanes
- Six Lanes
- Provincial Highway

Planned by 2041

- - - Four Lanes
- - - Six Lanes

Metroquest Phase 2 Results

- Agree
- Disagree
- Alternate Suggestion

- Conceptual Road Network for use in the Development Charges Background Study

Figure 13
Online Tool Phase 2 Results: New Road Projects Included in the 2041 Preferred Alternative



- ▶ **Selecting Priorities** – Moving forward, the City will need to prioritize the different transportation solutions. As a result, respondents were asked to assess 10 areas of focus which reflected study objectives to identify their importance when determining priorities for implementation. Of all responses received, **Table 4** shows the responses that were listed the most often as a priority. As shown below, transit was the area of highest priority among respondents.

Table 4: Selection of Future Transportation Priorities

Suggested Master Plan Priorities	Average Response Rate per Priority
Improved GO Transit / Rapid Transit Network	13.92
Expand Brampton Transit & ZÜM Service	12.76
Improve Congestion & Traffic Flow	10.14
Improve Bike & Pedestrian Infrastructure	9.72
Build Sustainable Communities	9.67
Improve Existing Roads	9.29
Serve Youth / Elderly Populations	6.70
Enhanced Safety	6.51
Build New Roads	6.14
Expand Sustainable Modes	6.05

4.5.5 Public Engagement Session #2 (Part 2): Public Open House

Objective:

To complement and formally launch the second round of public engagement including the second phase of online engagement. The public open house was used to **generate ideas** and **input** regarding proposed network improvements and master plan recommendations. Through one-on-one discussions with the consultant team and City staff, attendees were able to **generate ideas** about potential priorities moving forward.

Engagement Tools:

- ▶ The Public Open House was held at the City’s municipal offices the evening of Wednesday, April 23, 2014, and was a drop-in style session where attendees were asked to review the materials presented and discuss with the study team next steps and potential revisions / additions to the network and recommendations proposed. The display materials that were prepared were interactive – attendees were able to draw / write their comments directly on the display boards.
- ▶ The session also included a table with two computers which could be used to complete the online tool. Anyone who had issues with the questions or required support to complete the activities was able to liaise with the study team.

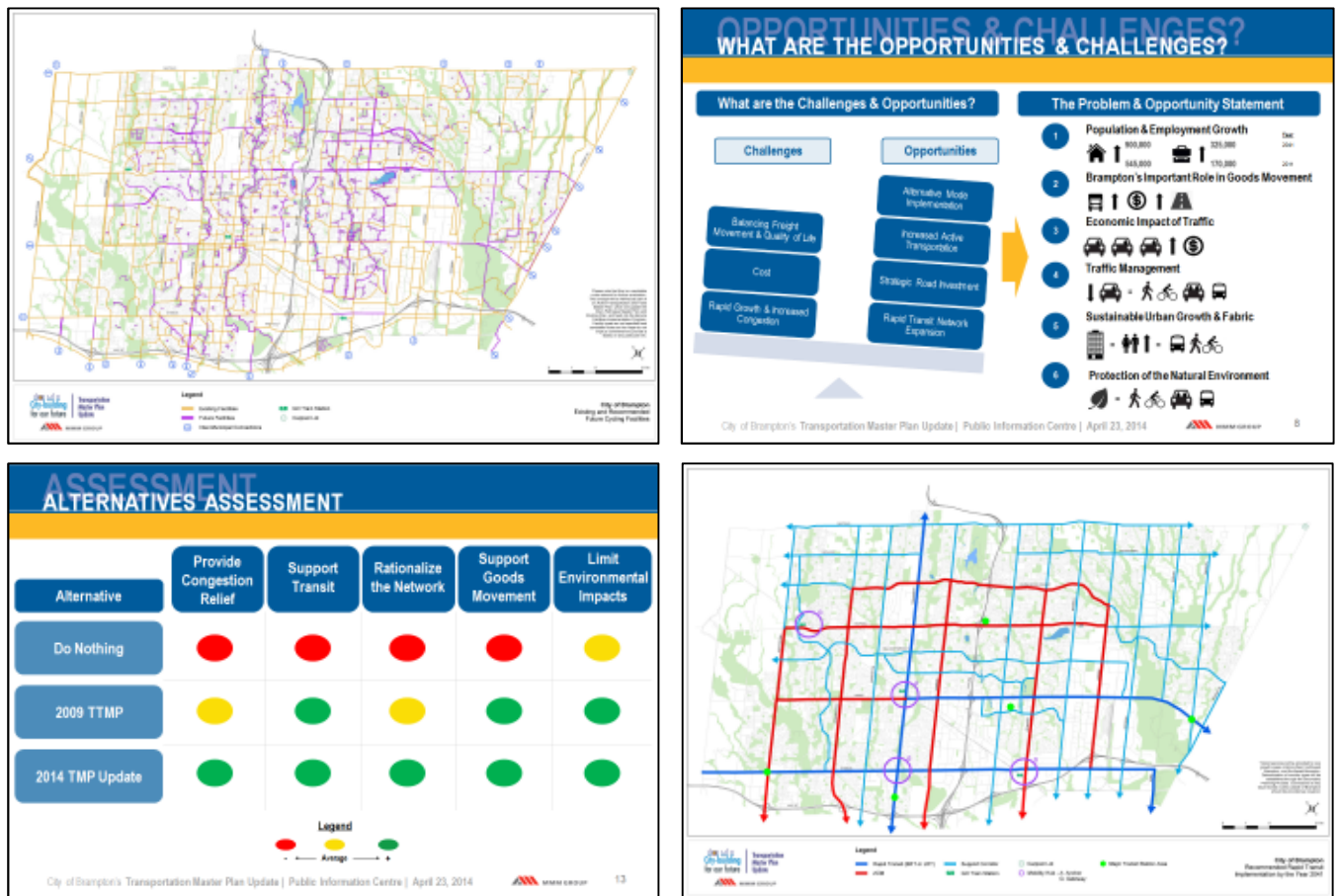


Figure 14: Sample Display Boards from the Public Information Centre



Response Highlights:

- ▶ A significant amount of support was indicated for the development of the active transportation network – additional suggested linkages were indicated on the mapping including a potential route along the existing rail line through downtown which has low speeds and infrequent train traffic.
- ▶ There was interest expressed in the future alignment of the Highway 427 extension
- ▶ The greatest number of recommendations which were reviewed and commented on provided support for additional utilitarian active transportation connections through increased implementation of infrastructure
- ▶ Transit was another area of focus for attendees. Many were supportive of expansions to the transit system but in appropriate locations which provided connectivity to key destinations outside of the City.
- ▶ A number of attendees encouraged increased connectivity between alternative modes of transportation e.g. walking, cycling and transit routes in a safe and efficient way

4.6 Conclusion

The public and stakeholder consultation undertaken for the City of Brampton Transportation Master Plan Update was a truly collaborative effort between the City, local stakeholders and interest groups, the consultant team and members of the public. It was important to identify a set of consultation activities that respond to current socio-demographic trends within the City while being interesting and engaging. Without effective communication and promotion people can tend to feel too busy or not informed enough to provide their input on studies of this scope and scale. For these reasons, a more creative and web-based engagement and communication strategy was prepared which used innovative techniques to engage the public at key stages of the study process. By using these tools, the study team was able to gather a greater number of responses from varying geographic locations throughout the City. In Phase 1, the tool was viewed by over 1,700 people, with over 400 responses entered. In Phase 2, the tool garnered considerable interest with over 1,100 webpage viewings and over 300 responses. Each phase received over 1,000 data points on the interactive maps with hundreds of additional data points entered through the other activities.

This innovative approach to collecting data online and in person resulted in exponentially greater participation from the general public than was seen in the 2009 TTMP process and what is typically seen when undertaking a typical transportation master plan.

For these reasons, it can be concluded that the results generated from the public and stakeholder consultation not only influenced but shaped the transportation solutions identified in the TMPU which will, in turn, help to determine the future of transportation City-wide.

5. EXISTING CONDITIONS

5.1 Population and Employment

With a population of over 520,000, Brampton is the ninth largest city in Canada, fourth largest in Ontario, and third largest in the Greater Toronto Area (GTA). The existing 2006 and 2011 population and employment for the City of Brampton are presented in **Table 5**.

Since the last update to the Official Plan, there have been large increases in population and jobs in the city. Not only has the population increased by approximately 90,100, the number of households has increased by 23,900, translating into a tremendous amount of development in the city over the five year period. The number of jobs also increased between 2006 and 2011 by 27,200. Rapid growth is forecast to continue, which will require improved access to all modes of transportation to ensure that the quality of life is maintained for the existing and new residents.

Table 5: Brampton’s Population and Employment Growth, 2006 – 2011

	2006	2011	Growth
Population	433,800	523,900	+ 90,100 (+20.8%)
Housing	130,800	154,700	+23,900 (+18.2%)
Employment	154,800	182,000	+27,200 (+17.6%)

Source: 2006 and 2011 Census

The City of Brampton is expected to continue its rapid growth between 2011 and 2041. As shown in **Table 6**, the population is expected to increase by 72% (approximately 375,000 additional people) and employment by 79%, adding 143,000 jobs by the year 2041.

Table 6: Brampton’s Forecast Population and Employment Growth

	2011	2016	2021	2026	2031	2041
Population	523,900	627,500	701,600	771,300	842,800	899,500
Employment	182,000	207,800	238,100	264,000	291,400	325,200

Source: City of Brampton, TAZ projections (population and employment) and Economic Development

5.2 Land Use and Population Distribution

5.2.1 Age Distribution

The City of Brampton is a young city, with the median age of the population in 2011 being the youngest of all the large cities in Canada. The median age in 2011 was 34.7 years, up from 33.7 in 2006 and 32.9 in 2001. This compares with 38.6 years for the City of Toronto.

The age distribution in the City of Brampton between 2001 and 2011 is shown in **Table 7** and indicates that there was a decrease in the percentage of children under the age of 10 as well as in the number of adults between the ages of 20 and 39 in this period. While Brampton does not face the challenges of an aging population to the extent that many Canadian cities do, the 75+ age group grew by more than 100% over the last ten years.

Table 7: Brampton Population Age Distribution and Change

Age	Population Distribution by Age						% Change		
	2001	%	2006	%	2011	%	2001-2006	2006-2011	2001-2011
0-9	50,740	15.6	65,335	15.1	75,485	14.4	-0.5	-0.7	-1.2
10-19	47,885	14.7	64,770	14.9	78,090	14.9	0.2	n/c	0.2
20-29	47,605	14.6	61,225	14.1	71,520	13.7	-0.5	-0.4	-0.9
30-39	58,955	18.1	71,955	16.6	80,370	15.3	-1.5	-1.3	-2.8
40-49	49,845	15.3	69,595	16	82,530	15.8	0.7	-0.2	0.5
50-59	36,530	11.2	50,260	11.6	63,655	12.1	0.4	0.5	0.9
60-74	25,415	7.8	37,615	8.7	42,225	8.1	0.9	-0.6	0.3
75 +	8,455	2.6	13,055	3	17,820	3.4	0.4	0.4	0.8
Totals	325,428		433,806		523,910				

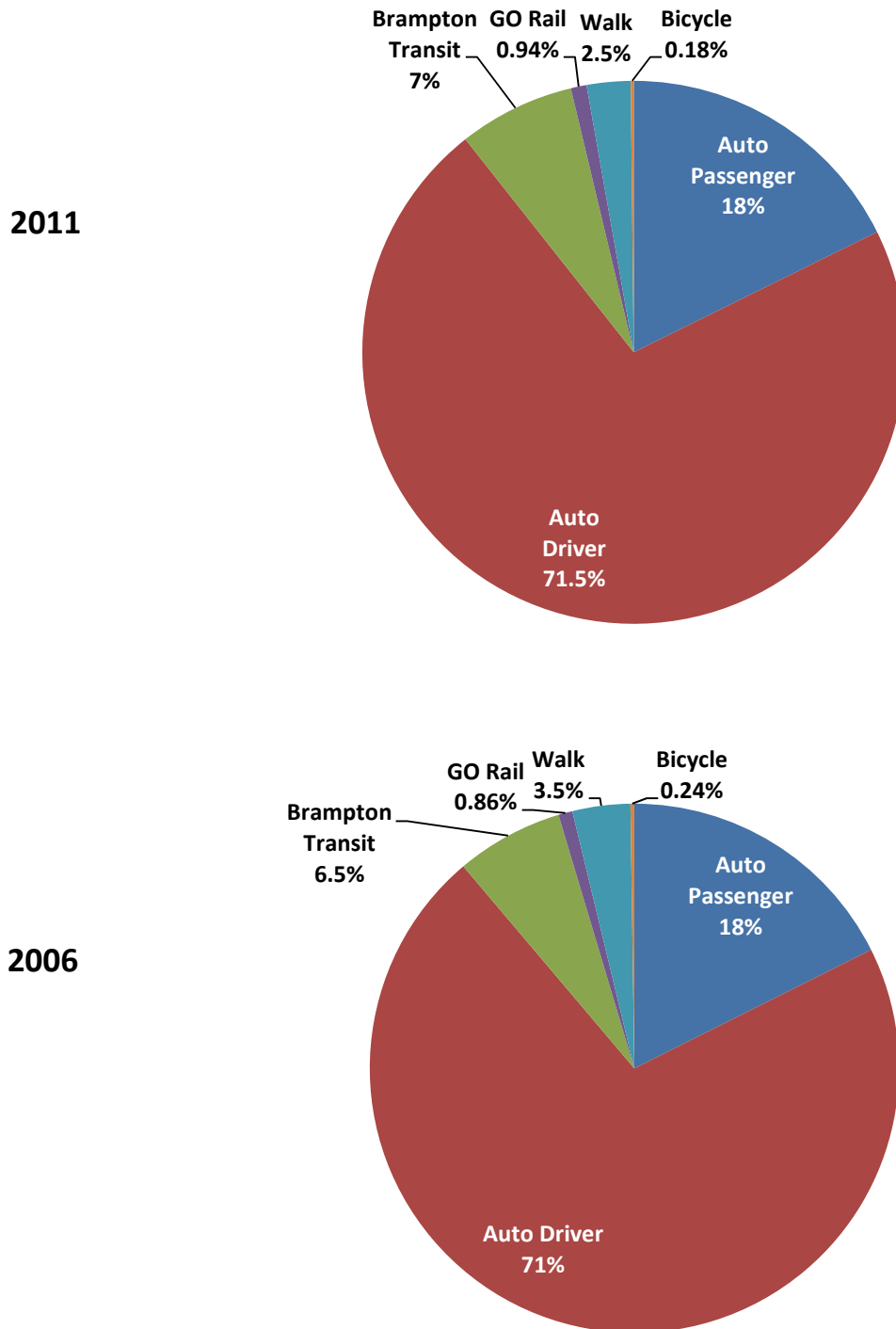
Source: City of Brampton Census Bulletins, 2001, 2006 and 2011

5.3 Current Travel Patterns

The vast majority of trips in the p.m. peak period (3:30 to 6:30 p.m.) in Brampton are car trips. Auto driver or auto passenger encompasses 90% of trips, with only 10% of trips by modes other than the automobile. The travel modes for existing (year 2011) conditions as well as historic (year 2006) conditions are shown in **Figure 15**. There has been very little change in travel mode choice detected by the two surveys.



Figure 15: Travel Mode during the PM Peak Period, Years 2011 and 2006

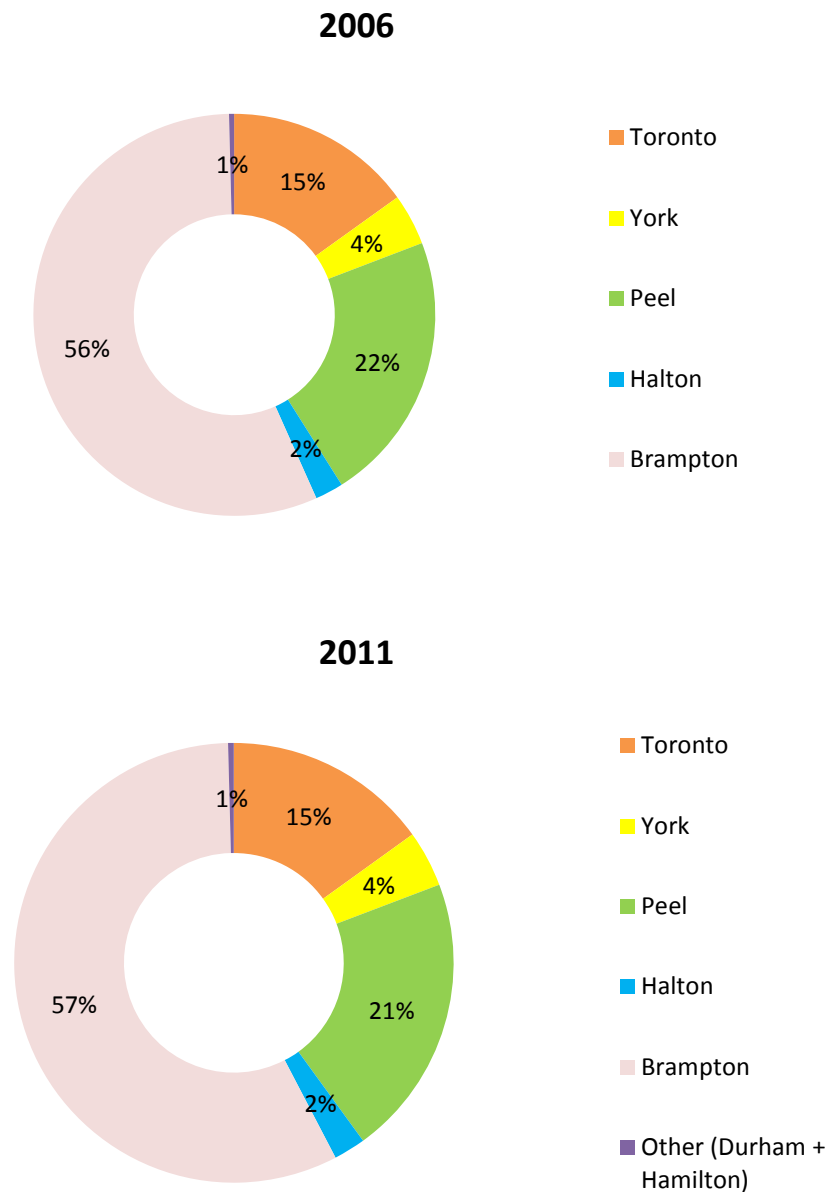


Source: Transportation Tomorrow Survey, 2011 and 2006



The breakdown of trip origins for Brampton residents travelling during the peak p.m. period is shown in **Figure 16**. The percentage of those whose trip originates and ends in Brampton is 57% for 2011. The other major origins of travel outside of Brampton are Peel Region (Mississauga and Caledon) (21%) and Toronto (15%). Some of these trips may reflect commuters returning home from employment centres outside of the City of Brampton. The TTS data do not show any appreciable change between 2006 and 2011 for the origin of p.m. peak period trips.

Figure 16: Origins of Travel for Trips Destined to Brampton: PM Peak Period



Source: Transportation Tomorrow Survey, 2011 and 2006



5.4 Current Travel Demand

The City's EMME travel demand forecasting model was used to analyze existing (year 2011) and ultimate year (year 2041) travel conditions in the p.m. peak hour. The calibration and validation process to prepare the model for forecasting is detailed in **Technical Report #1: Model Calibration**.

While it is recognized that there are heavy traffic volumes on select roads in the city during the p.m. peak hour, the analysis of screenlines shows generally adequate capacity in the peak northbound and westbound directions in the p.m. peak hour. One screenline that is beginning to show capacity concerns is the northbound screenline at Highway 410 and Bovaird Drive. This reflects the commuter traffic returning home from work.

Five overarching evaluation accounts were selected for use in the analysis of existing and future conditions, including:

- Integrated land use and transportation planning;
- Environmental consciousness;
- Economic viability;
- Mobility; and
- Energy efficient transportation system.

Metrics were taken from the travel demand model, with the results for the p.m. peak hour reported in **Table 8**. Additional details on the analysis of existing conditions, including screenline figures, are provided in **Technical Report #2: 2041 Road Network**.

The metrics show considerable travel on roads in Brampton, with average auto trip times of slightly less than 30 minutes. Kilometres traveled in congestion are estimated at 17%, and 20% of those traveling during the peak hour are stuck in traffic. 6% of the trips are on Brampton Transit (either local service or ZÜM).



Table 8: Analysis of Existing Conditions (Year 2011) Model Results

Evaluation Accounts	Metrics	2011 Results
Integrated Land Use and Transportation Planning	Average Auto Times (min)	27
	Average Transit Times per Ride (min)	11
Environmental Consciousness	% of Congested VKT	17%
	% of Congested VHT	20%
Economic Viability	% of Congested Roads (lane-kms)	8%
	Travel Time Index (congested / free flow)	1.32
	Annual Delay Cost of Congestion	\$342 Million
	Lane-kms per 1,000 people	4.66
	Modal Split (City-wide / ZÜM)	6%
Mobility	Annual Transit Rides per Capita	52
	Transit Boardings (peak period)	42,743
	Boardings over 75% of Line Capacity	45%
Energy Efficient Transportation System	Daily VKT	10,195,670
	Daily VHT	192,790

6. TRANSPORTATION ALTERNATIVES GENERATION AND ASSESSMENT

An understanding of the existing travel conditions provides a basis for forecasting future travel demand to the year 2041. The City’s forecast population and employment data for the year 2041 exhibit rapid growth, as previously documented in **Section 5.1**. These forecasts were used in the travel demand model to develop transportation alternatives for the ultimate year 2041 horizon.

6.1 Forecasting Future Travel Demand

To begin, Alternative 1: “Do Nothing” was analyzed. Alternative 1 assumes that forecast population and employment occurs but that no further investment in transportation infrastructure takes place. This scenario is analyzed in order to establish a foundation for comparison purposes and to identify areas where the existing road network may not be able to accommodate forecast future volumes; indicating some type of improvements should be considered.

The same evaluation accounts and metrics used in the existing conditions analysis were used again to analyze Alternative 1. The screenline analyses are reported in **Technical Report #2: 2041 Road Network**, with the metrics reporting for the p.m. peak hour tallied in **Table 9**.

Table 9: Analysis of Alternative 1: Do Nothing

Evaluation Accounts	Metrics	Alternative 1: Do Nothing
Integrated Land Use and Transportation Planning	Average Auto Times (min)	82
	Average Transit Times per Ride (min)	12
Environmental Consciousness	% of Congested VKT	65%
	% of Congested VHT	79%
Economic Viability	% of Congested Roads (lane-kms)	47%
	Annual Delay Cost of Congestion	\$ 2.06 Billion
	Lane-kms per 1,000 people	2.64



Evaluation Accounts	Metrics	Alternative 1: Do Nothing
	Modal Split (City-wide / ZÜM)	6%
Mobility	Annual Transit Rides per Capita	48
	Transit Boardings (peak period)	68,878
	Boardings over 75% of Line Capacity	47%
Energy Efficient Transportation System	Daily VKT	17,328,150
	Daily VHT	583,240

If population increases as forecast from 523,000 people today to 899,500 people by 2041 and no investment is made to the transportation network, there will be serious ramifications for travel times and costs of congestion. Under this scenario, average auto trip times would skyrocket from 27 minutes presently to 82 minutes. The percentage of travel on congested lanes would rise from 17% today to 65%. The annual cost of congestion would exceed \$2 billion. Clearly, transportation investment is needed to keep Brampton moving.

The existing transportation system in Brampton does not have adequate capacity to accommodate forecast growth in population and employment when considering likely travel patterns in the p.m. peak hour. Additional investment in transportation infrastructure is required.

The analysis of Alternative 1: Do Nothing revealed that transportation improvements will need to be made to accommodate forecast growth in travel demand. An iterative process was undertaken to generate additional alternative 2041 road networks and then analyze their performance.

6.2 Alternatives Generation

In total, seven unique alternatives were assessed. The alternatives assessed included:

1. **Alternative 1: Do Nothing:** This alternative included no further transportation investment to the existing road network in Brampton. Population and employment numbers would grow, but no further transportation projects would be constructed.



2. **Alternative 2: Base Case:** The likelihood that absolutely no transportation improvements would be constructed to the year 2041 is low. A number of projects are included in the City's Capital Improvement Plan (CIP) and have funding identified for construction. This second alternative includes the existing road network with the projects listed in the CIP.
3. **Alternative 3: All Projects in the 2009 TTMP:** This current report is an update to the 2009 TTMP. The planned road network from the 2009 TTMP document was assessed for the year 2041, given the new population and employment forecasts, to determine whether or not it still meets transportation needs.
4. **Alternative 4: Modifications to Alternative 3:** A multiple account evaluation (MAE) framework was used to analyze the recommended improvements in the 2009 TTMP. Strategic modifications were made to this network based on the 2041 population and employment forecasts.

Additional Modifications to Alternative 3:

5. **Alternative 5: Consisting of Alternative 3 plus New Projects (assuming a 16% local transit mode split):** The prior alternatives (2, 3, and 4) did not include any new improvements outside of what was shown in the 2009 TTMP. Beginning with this alternative, additional road improvements were recommended to accommodate population and employment forecasts to the year 2041. This alternative assumed that local transit would account for 16% of peak hour trips.
6. **Alternative 6: Consisting of Alternative 3 plus New Projects (assuming a 16% local transit mode split in dedicated lanes):** Similar to the previous alternative, this alternative included new road improvements and assumed that the local transit mode split would reach 16%. Dedicated transit lanes on select roads in the city would be in place in order to help reach this local transit mode split goal.
7. **Alternative 7: Consisting of Alternative 3 plus New Projects (assuming a 16% local transit mode split in mixed traffic):** The final alternative considered a 16% mode split with local transit operating in mixed traffic. This alternative included considerable dialogue with City staff and building industry stakeholders to identify needed projects to support ongoing development. This alternative was developed concurrently with the Development Charges Study to coordinate TMP Update and Development Charges recommendations on the future road network.

6.3 Analysis of Initial 2041 Alternatives

The first four alternatives noted in Section 6.2 were analyzed in the travel demand model with the same evaluation accounts and metrics as were used to analyze existing conditions. The metrics for these four alternatives are shown in **Table 10**. Screenline analyses also were prepared for each scenario. These are included in **Technical Report #2: 2041 Road Network**.



Table 10: Metrics for Initial 2041 Alternatives

Evaluation Accounts	Metrics	Alternatives			
		Alternative 1: Do Nothing	Alternative 2: Base Case	Alternative 3: 2009 TTMP	Alternative 4: Modifications to 2009 TTMP
Integrated Land Use and Transportation Planning	Average Auto Times (min)	82	41	32	32
	Average Transit Times per Ride (min)	12	11	11	13
Environmental Consciousness	% of Congested VKT	65%	56%	33%	34%
	% of Congested VHT	79%	69%	44%	44%
Economic Viability	% of Congested Roads (lane-kms)	47%	36%	16%	18%
	Annual Delay Cost of Congestion	\$2.06 Billion	\$1.64 Billion	\$987 Million	\$935 Million
	Lane-kms per 1,000 people	2.64	3.05	3.59	3.59
	Modal Split (City-wide / ZUM)	6%	6%	9%	9%
Mobility	Annual Transit Rides per Capita	48	52	83	79



Evaluation Accounts	Metrics	Alternatives			
		Alternative 1: Do Nothing	Alternative 2: Base Case	Alternative 3: 2009 TTMP	Alternative 4: Modifications to 2009 TTMP
	Transit Boardings (peak period)	68,878	74,123	118,932	113,794
	Boardings over 75% of Line Capacity	47%	52%	47%	48%
Energy Efficient Transportation System	Daily VKT	17,328,150	17,705,830	17,676,570	17,561,310
	Daily VHT	583,240	517,920	398,880	389,190

It is clear from the model results that additional transportation projects would have a positive impact on the evaluation accounts. The introduction of transportation projects would be expected to reduce auto travel times, reduce congestion, reduce the costs of congestion and reduce the amount of time spent travelling, when compared to Alternative 1: Do Nothing. The progressive increase in investment from Alternative 1 to Alternative 2 and then on to two variations of the 2009 TTMP (Alternatives 3 and 4) show a marked improvement in the evaluation metrics.

Transit metrics also improve in Alternatives 2 through 4 compared to Alternative 1. Rides per capita and transit boardings both are forecast to increase. In some alternatives, these increases lead to a higher modal split for transit.

6.4 Refinements to Help Determine a Preferred Alternative

After analyzing the first four alternatives, the question turned to whether or not these alternatives would be sufficient to meet the City’s needs to the year 2041. The previous alternatives included road projects that had been planned based on 2031 population and employment projections. With another ten years of forecast population and employment growth added, additional road improvements were considered for the year 2041. Factors that influenced the analysis of the final three alternatives included:

- **Horizon Year 2041:** The first four scenarios included the planned road improvements identified in the 2009 TTMP and did not include any additional improvement not identified in the 2009 document. The modelling confirmed the 2031 TTMP recommendations and, by extending the horizon year from 2031 to 2041 and including the forecast additional population and



employment growth, it became apparent that additional transportation projects needed to be considered;

- **Development Charges Study work:** The multiple account evaluation approach is based on system optimization. However, this approach can also lead to a system that operates at a high degree of efficiency, but very limited redundancy. Given the limited opportunity to include projects in the Development Charges By-law, it would be imprudent of the City to limit the road network at this time in the face of the forecast population growth;
- **Need for Transit:** Transit will need to play a larger role as a mobility solution in Brampton. The existing Development Charges By-law is limited in its ability to collect for transit improvements. Roads have been widened to four or six lanes in order to better accommodate transit and also to give the City flexibility in the future to consider converting lanes to high occupancy vehicle lanes or even transit-only lanes;
- **Capacity:** Capacity concerns are prevalent throughout the City. While a multi-modal future with a more balanced mode split is desired, the City must acknowledge the role of automobiles and trucks and the need for adequate vehicular capacity; and
- **Connectivity:** Some roads may need to be widened to complete the travel grid and provide receiving lanes for left-turn lanes.

With these factors in mind, the final three alternatives considered what transportation projects would be needed in addition to those identified in the 2009 TTMP. Rather than try to rationalize each and every project in the 2009 TTMP, the 2009 TTMP projects were accepted as valid and any additional projects were identified.

No lanes presently operate in the City as transit only, so a final alternative, Alternative 7, was devised to set as a goal a 16% local transit mode split with transit operating in mixed use lanes. It was understood that achieving this transit goal would be more difficult in mixed use lanes than in transit-only lanes. A decision to convert any arterial lanes from mixed traffic lanes to dedicated transit lanes was postponed to the future, when the appropriate policies are in place at the City-level. The evaluation accounts and metrics for these final three alternatives are presented in **Table 11**. Additional analyses, including screenline analyses, are provided in Technical Report #2: 2041 Road Network.



Table 11: Evaluation of Final Three 2041 Alternatives

Evaluation Accounts	Metrics	Alternative 5: Alternative 3 Plus New Projects (assuming a 16% local transit mode split)	Alternative 6: Alternative 3 Plus New Projects (assuming a 16% local transit mode split in dedicated lanes)	Alternative 7: Alternative 3 Plus New Projects (assuming a 16% local transit mode split in mixed traffic)
Integrated Land Use and Transportation Planning	Average Auto Times (min)	32	30	31
	Average Transit Times per Ride (min)	10	11	13
Environmental Consciousness	% of Congested VKT	28%	31%	29%
	% of Congested VHT	34%	41%	37%
Economic Viability	% of Congested Roads (lane-kms)	12%	14%	14%
	Annual Delay Cost of Congestion	\$728 Million	\$860 Million	\$757 Million
	Lane-kms per 1,000 people	3.59	3.45	3.62
	Modal Split (City-wide / ZUM)	16%	16%	16%



Evaluation Accounts	Metrics	Alternative 5: Alternative 3 Plus New Projects (assuming a 16% local transit mode split)	Alternative 6: Alternative 3 Plus New Projects (assuming a 16% local transit mode split in dedicated lanes)	Alternative 7: Alternative 3 Plus New Projects (assuming a 16% local transit mode split in mixed traffic)
Mobility	Annual Transit Rides per Capita	124	121	117
	Transit Boardings (peak period)	178,045	174,154	169,100
	Boardings over 75% of Line Capacity	63%	61%	62%
Energy Efficient Transportation System	Daily VKT	16,693,750	16,522,650	16,661,940
	Daily VHT	340,980	361,600	345,460

Additional transportation projects would be expected to further reduce travel times, congestion and the costs of congestion plus help address capacity concerns on congested screenlines. A strong policy as well as infrastructure investments for transit will be needed to achieve the 16% mode split for Brampton Transit. Doing so would be expected to result in increased ridership. Overall, these final three alternatives best address the evaluation accounts of integrated land use and transportation planning, environmental consciousness, economic viability, mobility and an energy efficient transportation system.

6.5 Analysis of the Preferred Alternative

Alternative 7 was selected as the preferred alternative for the 2041 road network. This alternative provides flexibility for the City road network by allowing future conversion of travel lanes into high occupancy vehicle or transit only lanes. The assumptions and detailed analysis of this preferred alternative are provided in this section.

6.5.1 Assumptions

The following network assumptions were made and incorporated into the travel demand model for the year 2041 preferred alternative:

- **Construction of the GTA West Corridor:** The GTA West corridor will be constructed and operational. This highway will have a beneficial impact on arterial roads in Brampton, diverting some inter-city trips that would have been on arterial roads to the highway;
- **Highway 427 Extension:** Highway 427 will be extended to the north and will connect with the GTA West highway;
- **Highway 410 Widening:** The section of Highway 410 between Highway 401 and Bovaird Drive will be widened to 8 lanes. North of Bovaird Drive, the highway will be 6 lanes;
- **Construction of East-West Corridor based on Halton Peel Boundary Area Transportation Study (HPBATS):** The east-west connection between Highway 7/Bovaird Drive and Winston Churchill Boulevard at 10 Side Road was assumed in the 2041 model as proposed in the HPBATS study;
- **BRT/LRT Corridors:** BRT/LRT lines will be implemented by 2041 on the following six corridors with reduced lane capacity (by 100 vehicles per hour per lane): Bovaird Drive from Mississauga Road to Airport Road, Queen Street from Mississauga Road connecting to Highway 7 VIVA BRT, Steeles Avenue from Lisgar GO station to Humber College, Mississauga Road from Bovaird Drive to Erin Mills Parkway, Hurontario Street from Mayfield Road to Port Credit, Airport Road from Bovaird Drive to Pearson Airport; and
- **Number of Lanes:** Road widening will be capped at six through lanes for all roads in the City.

The following modelling assumptions were considered during modelling process:

- **Local Transit Mode Split:** It was assumed that a 16% local transit mode split could be achieved by the year 2041. This assumption has been carried through the transit planning undertaken in this project, and summarized in **Technical Report #4: Future Transit Provisions**.
- **BRT/LRT Operation:** BRT/LRT lines were assumed to operate at 20 km per hour with 5 minutes' headway during peak period.

6.5.2 Multiple Account Evaluation Criteria

The assessment of 2041 preferred alternative included analysis of model output and an additional multiple account evaluation (MAE) of other factors. The MAE was created recognizing that traditionally, road network performance was formally evaluated almost exclusively from the perspective of the private automobile. Recommendations formally involved widening roads on which congestion was predicted. Such improvements had the effect of attracting greater numbers of vehicles, filling the extra capacity generated by the widening and increasing congestion on connecting roads. This approach encouraged drivers to travel greater distances, thus promoting urban sprawl, and discouraged consideration of more sustainable travel modes such as transit and active transportation.

Among the City of Brampton's goals for this TMPU is to continue to establish and expand a sustainable, integrated multi-modal transportation system that reduces reliance upon any single mode, particularly the automobile, and promotes walking, cycling and transit. In line with this, potential road improvements have been filtered using a Multiple Account Evaluation (MAE) approach. Benefits of this approach include:

- Identifying road network benefits for active transportation, transit and goods movement;
- Recognizing the need for appropriate network connectivity for effective routing choices;
- Supporting congestion relief in a sub-area of the City; and
- Protecting the natural environment through limiting further transportation impacts to natural areas.

The accounts are described as follows:

- **Rationalizes Network:** Rationalization stands for ensuring that lane-cross sections across the corridor are consistent with the intent to improve traffic operations and not create pinch-points. This applies to projects that fill gaps in the City road network and thus have the potential to shorten the distance travelled between origins and destinations.
- **Support for Transit:** Assumption is that a 6-lane widening even though not along a BRT corridor will improve transit operations by reducing congestion in the corridor. Further, the usage of the 6-lane corridors can be adjusted to allow 2 lanes to be used for HOV/Buses only in the future. Further, consideration was given to the density and intensification targets highlighted in the City's Official Plan, which should be supported by transit. This account also recognizes improvements to the higher order transit network and transit access to mobility hubs will help support land intensification.
- **Goods Movement:** This account recognizes where improvements are proposed on roads that are identified in the Peel Region Strategic Goods Movement Network and roads that link these corridors to major employment areas. An effective goods movement network is essential to the City maintaining and enhancing its leading position in the goods movement industry in Canada. If a corridor improvement lies in a proposed freight corridor, the road improvement would be given a positive score on this evaluation criterion.
- **Congestion Relief:** Volume-to-capacity plots (scenario with a 16% mode split and mixed BRT) at the link level were used to visually identify congestion in the corridor under question and in

corridors parallel to itself. If the v/c ratio exceeds 0.85 along a number of links in the corridor and its parallel routes then this proposed improvement would be beneficial.

- **Environmental Impact:** This assessment identifies the natural areas adjacent to the proposed road improvements. Road projects that avoid infringement on natural areas are scored higher than those that do infringe.

The MAE framework was used to assess the road improvement projects to be included in the preferred alternative.

6.5.3 New Road Projects Tested for the Preferred Alternative

There were 12 new road projects considered for inclusion in the 2041 preferred alternative, in addition to those projects already identified in the 2009 TTMP. As the Region’s current Transportation Master Plan only extends to the year 2031, Regional roads were considered in this analysis in order to create an interconnected road network through the city. Regional improvements will need to be reconfirmed by Peel Region when the Regional TMP is updated for the 2041 horizon year. Further, the analysis focused on the 2031 proposed First Gulf Crossing of Highway 410 in order to confirm its importance to the road network. The transportation projects are listed in **Table 12**.

Table 12: New Road Projects Tested for Inclusion in the Preferred Alternative

Road	Jurisdiction	From	To
Mayfield Road	Peel Region	Winston Churchill Boulevard	Mississauga Road
Chinguacousy Road	City of Brampton	Wanless Drive	Mayfield Road
Conservation Drive	City of Brampton	Hurontario Street	Kennedy Road
Kennedy Road	Peel Region	Williams Parkway	Bovaird Drive
Dixie Road	Peel Region	Countryside Drive	Mayfield Road
Torbram Road	City of Brampton	Countryside Drive	Mayfield Road
Airport Road	Peel Region	Stonecrest Drive	Mayfield Road
The Gore Road	Peel Region	Countryside Drive	Mayfield Road
Ebenezer Road	City of Brampton	Queen Street	Highway 50
Confirm First Gulf Crossing	City of Brampton	Across Highway 410	
McLaughlin Road	City of Brampton	Steeles Avenue	Queen Street
Mississauga Road	Peel Region	Sandalwood Parkway	Mayfield Road

Projects identified in northwestern Brampton that are subject to area-specific studies also were incorporated into the final 2041 network.

6.5.4 Technical Analysis

Each of the road projects was analyzed using the multiple account evaluation (MAE) framework. Volume to capacity ratios on individual road segments and on adjacent road segments were analyzed to determine the effectiveness of the proposed new road projects. Analysis of northbound screenlines with these projects in place shows capacity pressure in the southern portion of the city. Westbound screenline analysis shows capacity pressures in the central portion of the city, extending to the southeastern corner. The complete spreadsheet showing the evaluation of each road project given the two analytical approaches is provided in **Technical Report #2: 2041 Road Network**. The summary of the analysis is included in **Table 13**.

Table 13: Technical Analysis of New Road Projects for Inclusion in 2041 Preferred Road Network

Road	From	To	Improvement	Meets Multiple Account Evaluation Threshold	Meets Capacity Threshold
Mayfield Road	Winston Churchill Boulevard	Mississauga Road	6 lanes	Yes	No
Chinguacousy Road	Wanless Drive	Mayfield Road	6 lanes	Yes	No
Conservation Drive	Hurontario Street	Kennedy Road	4 lanes	No	Yes
Kennedy Road	Williams Parkway	Bovaird Drive	6 lanes	Yes	Yes
Dixie Road	Countryside Drive	Mayfield Road	6 lanes	Yes	Yes
Torbram Road	Countryside Drive	Mayfield Road	6 lanes	Yes	No
Airport Road	Stonecrest Drive	Mayfield Road	6 lanes	Yes	No
The Gore Road	Countryside Drive	Mayfield Road	6 lanes	No	No
Ebenezer Road	Queen Street	Highway 50	6 lanes	No	Yes
First Gulf Crossing	Across Highway 410		0 to 4 lanes	No	Yes
McLaughlin Road	Steeles Avenue	Queen Street	6 lanes	No	Yes
Mississauga Road	Sandalwood Parkway	Mayfield Road	6 lanes	Yes	Yes



All road projects with the exception of the Gore Road between Countryside and Mayfield met at least one of the two thresholds.

6.5.5 Road Projects Included in the Preferred Alternative

At the conclusion of the technical analysis, the project team undertook detailed review of the results. Through dialogue, it was concluded that even though Conservation Drive between Hurontario Street and Kennedy Road met the capacity threshold, it should not be widened due to natural environment concerns. These concerns were part of the reason that the project did not meet the natural environment criterion in the multiple account evaluation.

First Gulf Crossing of Highway 410 meets the capacity threshold but does not meet the multiple account evaluation threshold. A major concern with the crossing is the financial cost of construction. The cost to build this crossing would take away funding from other needed projects. The project team concluded that this crossing should not be included in the 2041 preferred alternative because the cost would exceed the benefits.

Even though the Gore Road did not meet the multiple account evaluation threshold or the capacity threshold, it was decided to include the widening of the Gore Road between Countryside Drive and Mayfield Road, as this was seen as an important link in the arterial road network and would be needed for adequate connectivity.

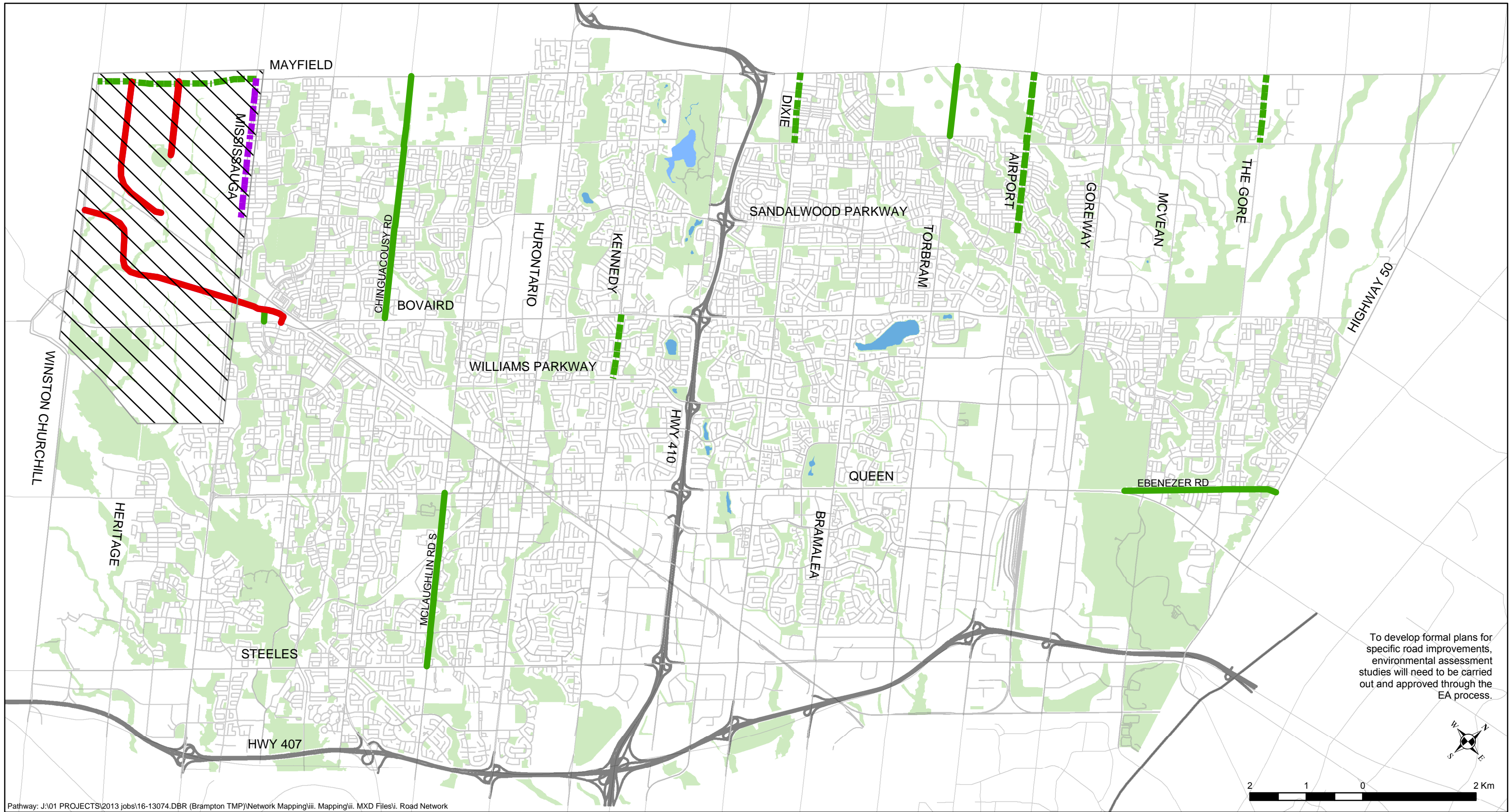
Further review of the model output revealed that Williams Parkway should be widened between Highway 410 and Torbram Road due to capacity constraints on this road and collector roads such as Howden Boulevard and Park Drive. Even though the GTA West highway was assumed to be constructed for the year 2041, it will be located about 8 kilometres north of Williams Parkway and would have less influence on Williams Parkway traffic volumes.

The new road projects included in the 2041 preferred alternative are summarized in **Table 14**. The location of these road projects are highlighted in **Figure 17**. All road projects included in the preferred alternative are shown on **Figure 18**. The phasing of these road projects is described in the Phasing and Implementation Plan in **Section 11**.

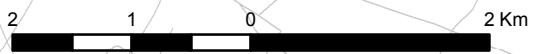


Table 14: New Road Projects Included in the 2041 Preferred Alternative

Road	From	To	Improvement
Mayfield Road	Winston Churchill Boulevard	Mississauga Road	6 lanes
Chinguacousy Road	Wanless Drive	Mayfield Road	6 lanes
Kennedy Road	Williams Parkway	Bovaird Drive	6 lanes
Dixie Road	Countryside Drive	Mayfield Road	6 lanes
Torbram Road	Countryside Drive	Mayfield Road	6 lanes
Airport Road	Stonecrest Drive	Mayfield Road	6 lanes
The Gore Road	Countryside Drive	Mayfield Road	6 lanes
Ebenezer Road	Queen Street	Highway 50	6 lanes
McLaughlin Road	Steeles Avenue	Queen Street	6 lanes
Mississauga Road	Sandalwood Parkway	Mayfield Road	6 lanes
Williams Parkway	Highway 410	Torbram Road	6 lanes



To develop formal plans for specific road improvements, environmental assessment studies will need to be carried out and approved through the EA process.

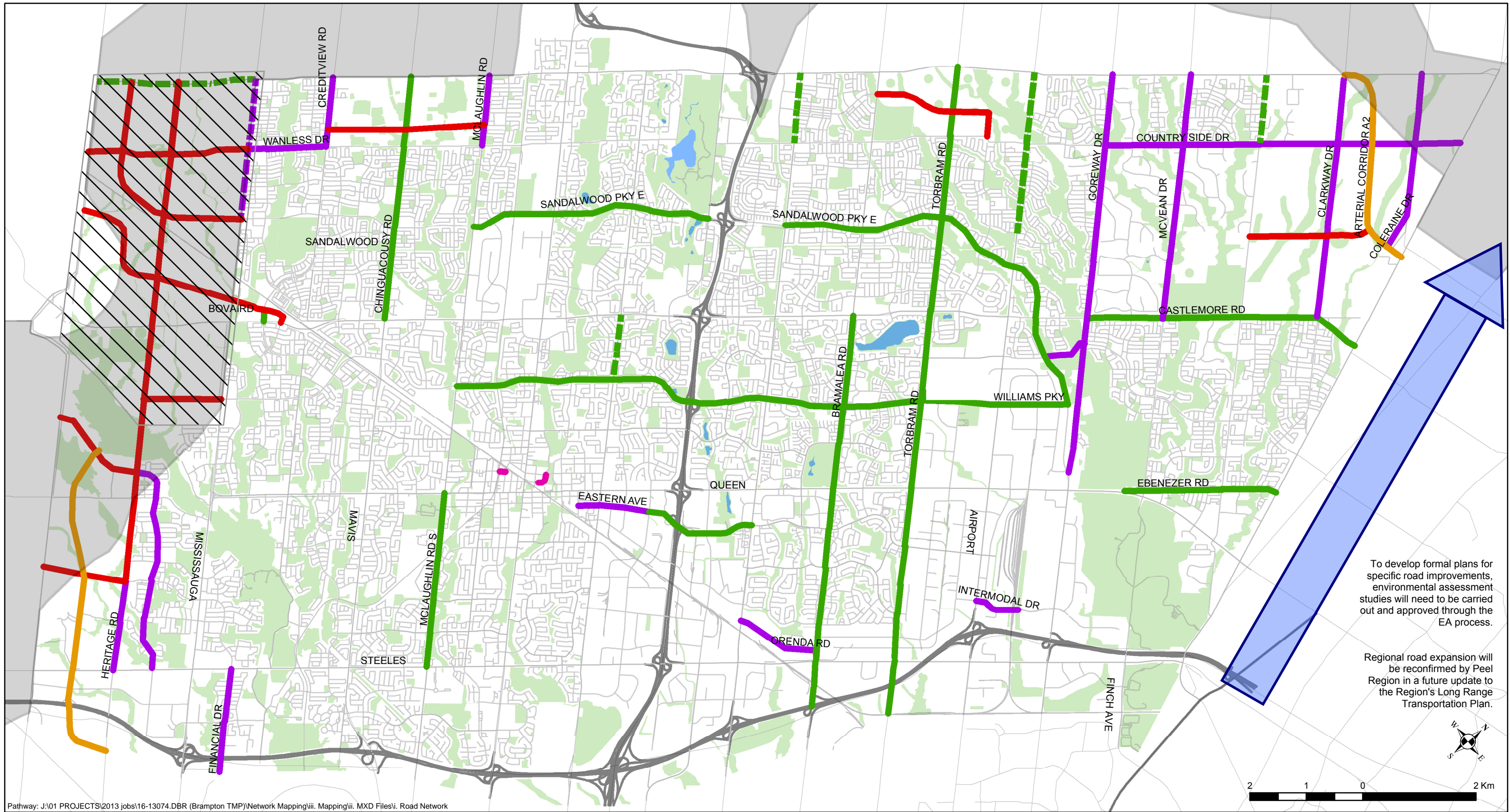


Pathway: J:\01 PROJECTS\2013 jobs\16-13074.DBR (Brampton TMP)\Network Mapping\iii. Mapping\ii. MXD Files\i. Road Network

Legend

- City Road Expanded to Four Lanes
- - - Regional Road Expanded to Four Lanes
- Provincial Highway
- City Road Expanded to Six Lanes
- - - Regional Road Expanded to Six Lanes
- Conceptual Road Network for use in the Development Charges Background Study

Figure 17
New Road Projects Included in the 2041 Preferred Alternative



	Transportation Master Plan	Legend	<ul style="list-style-type: none"> City Road Expanded to Four Lanes City Road Expanded to Four Lanes City Road Expanded to Six Lanes Regional Road Expanded to Six Lanes 	<ul style="list-style-type: none"> City Road Extension by Two Lanes New Road Construction Six Lanes New Road Construction Four Lanes Provincial Highway 	<ul style="list-style-type: none"> GTA West Corridor Study Area Highway 427 and Extension Conceptual Road Network for use in the Development Charges Background Study 	<p>Figure 18 Recommended City Road Network Needs to 2041</p>
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7. TRANSIT PLANNING

Brampton Transit has experienced significant ridership increases and service expansion in recent years. Since the 2009 TTMP, there has been a 49% increase in transit ridership. Growth in transit has exceeded the 20% growth in population that has been realized in the same timeframe, resulting in an improved per capita ridership.

Brampton Transit currently carries 6% of peak period trips in the city. The goal is to increase this percentage to 16% of peak period trips by the year 2041. This chapter summarizes existing ridership and outlines plans for future transit provision by the City. A key element of the future transit service is expansion of existing GO Train services to encompass two-way, all-day service to the three GO Train stations in Brampton.

7.1 Existing Transit Ridership

Brampton Transit has reported a total of over 18 million passenger trips in 2012. As presented in **Figure 19**, transit ridership has increased considerably in the last 10 years with nearly a doubling of passenger trips. This is partially due to the 50% population growth experienced in this period. When reviewing the passenger trips per capita as presented in **Figure 20**, there is still a noticeable growth since 2009 signifying the increase in transit share that has resulted with the capital investment and expanded services since the last TMP. Transit ridership growth includes:

- 49% increase in transit ridership since 2009 (149% since 2002); and
- 37% increase in transit ridership per capita since 2009 (58% since 2002).

Figure 19: Brampton Regular Service Passenger Trips

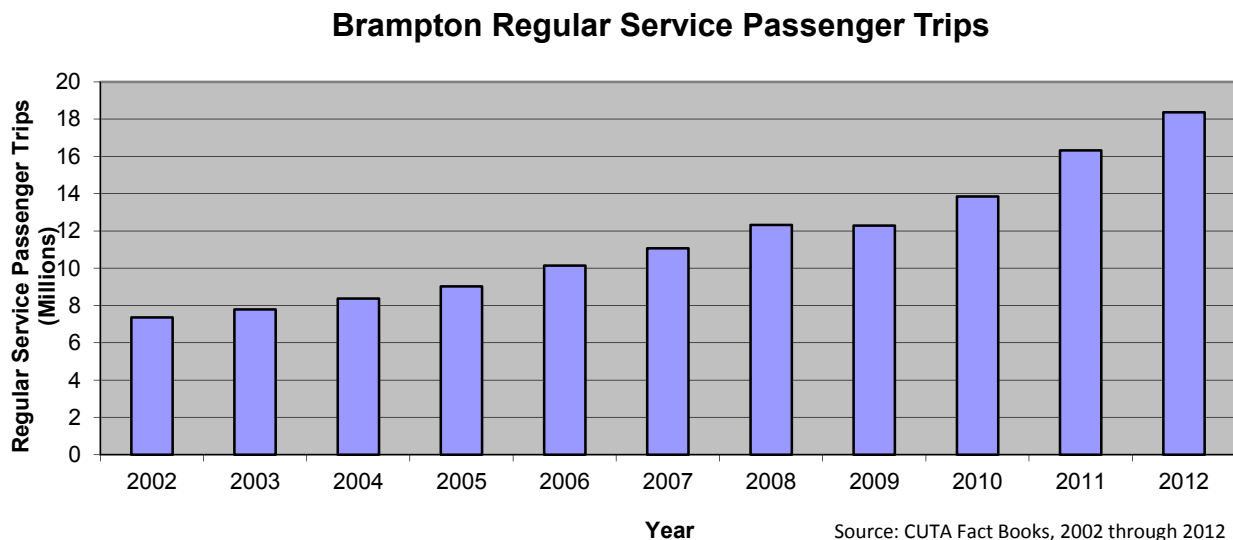
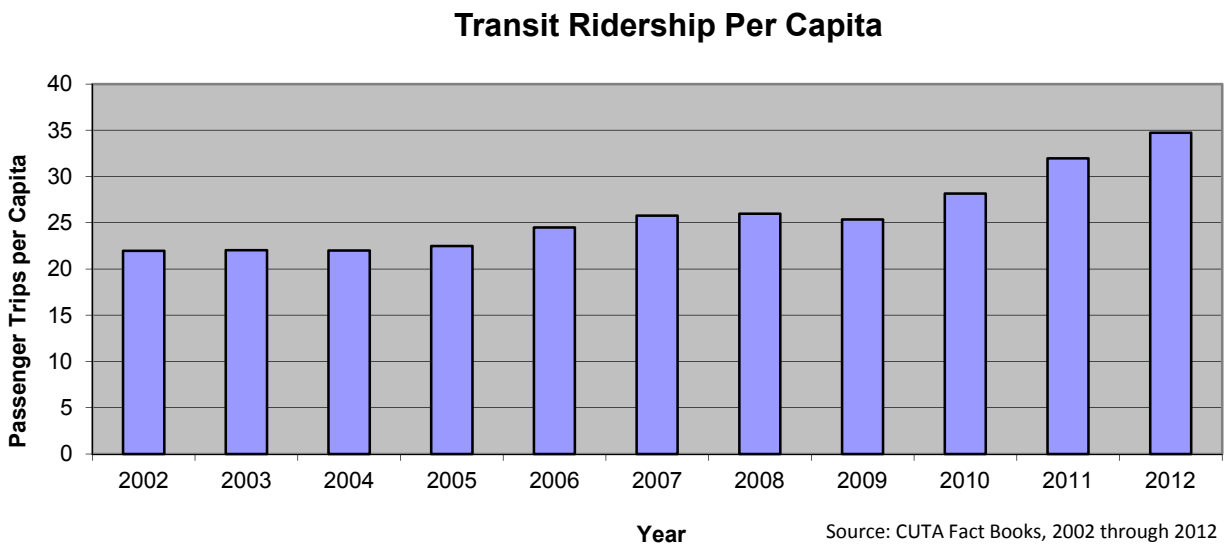




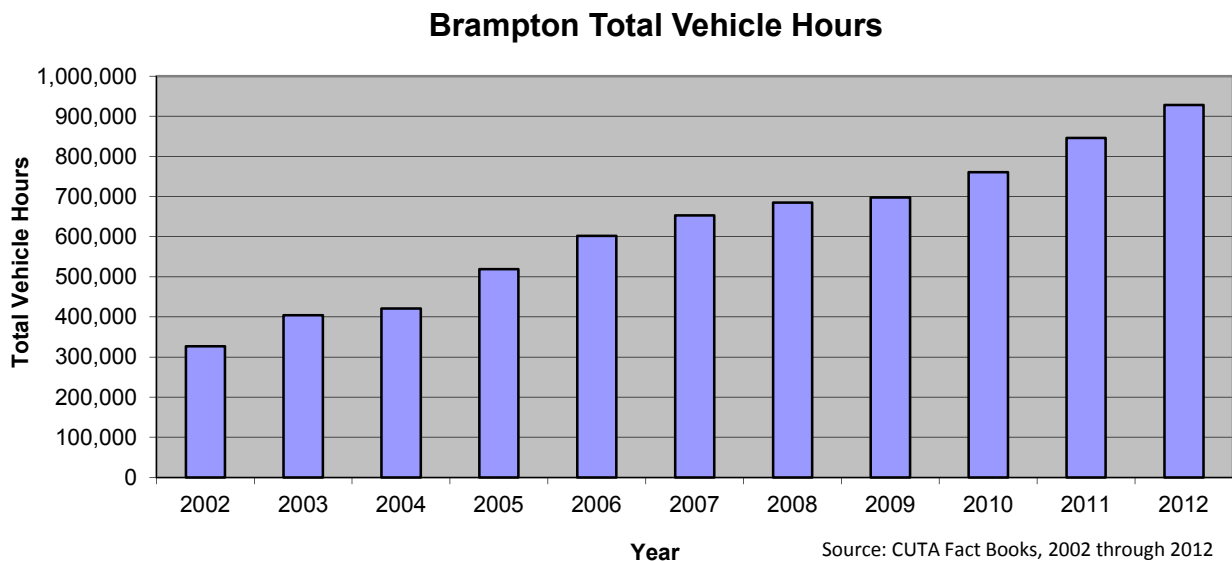
Figure 20: Brampton Transit Ridership Per Capita



7.2 Existing Transit Service and Route Efficiency

With increases in transit service area, service frequency and the number of in-service buses, total vehicle hours have tripled over the past decade, as shown in **Figure 21**.

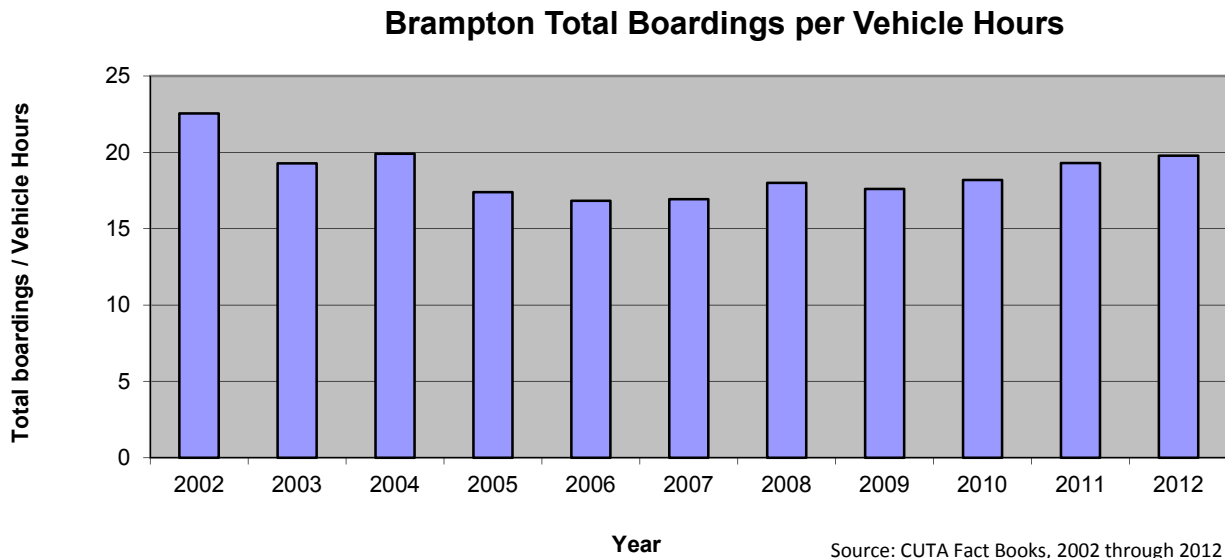
Figure 21: Brampton Total Vehicle Hours



With the increased service there are additional passenger boardings. **Figure 22** indicates that the boardings per vehicle hour have been increasing since about 2005 signifying that the service delivery is effective and that there are on average more passengers being serviced per bus.



Figure 22: Brampton Total Boardings / Vehicle Hour



Detailed information on the capital and operating costs and service efficiency of the existing transit network, as well as revenue to cost ratio and passenger costs, are provided in **Technical Report #3: Existing Transit**.

7.3 The Future Transit Network

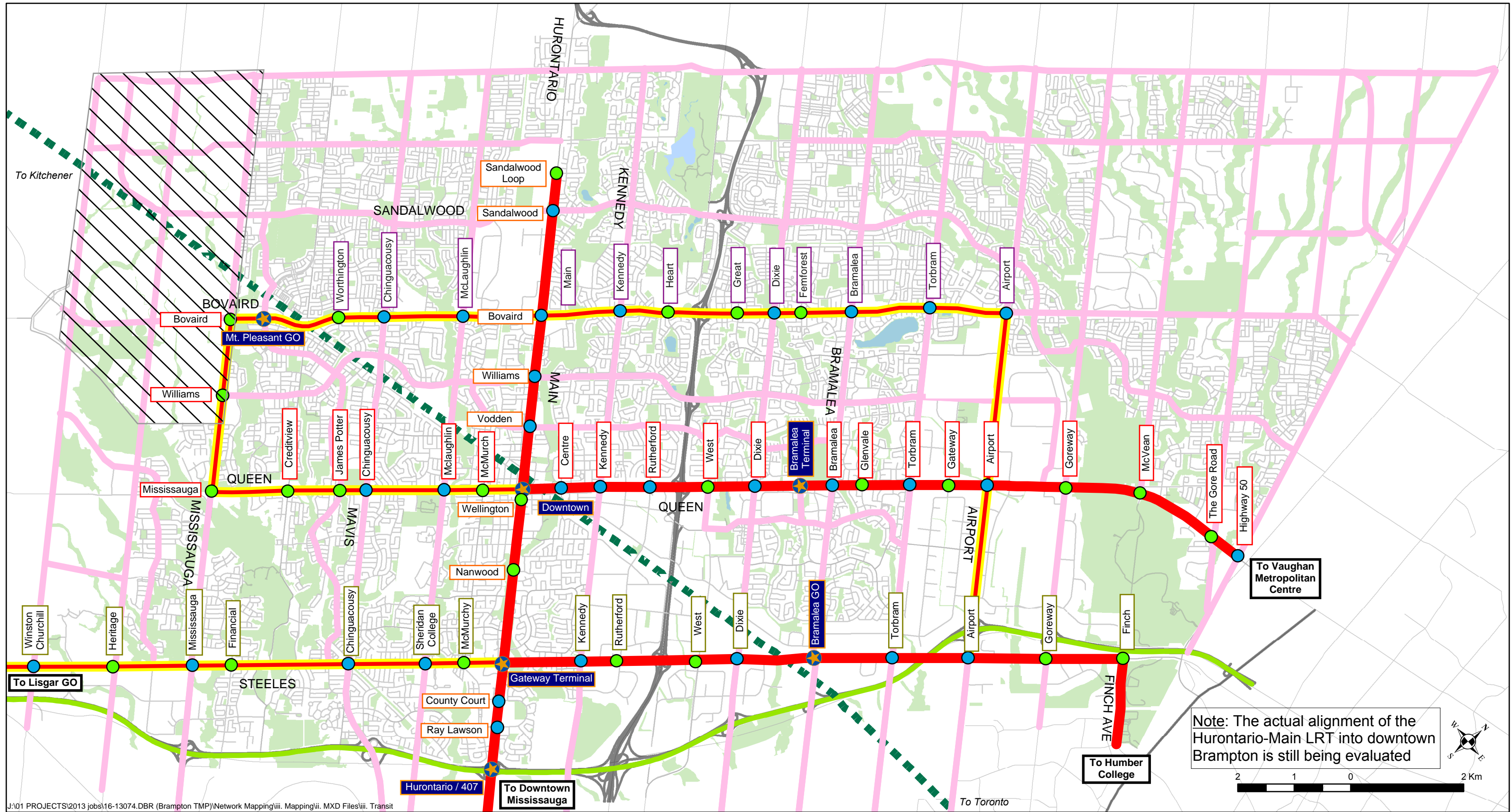
The plan for future transit is intended to encourage transit ridership and to address deficiencies in network capacity. The transit plan recognizes that rapid population growth will require additional transit services, especially when the City’s goal is to increase Brampton Transit ridership from 6% of peak hour trips to 16% of peak hour trips. Another important transit goal is the provision of two-way, all-day GO Train service to the three GO Train stations within Brampton.

The remainder of this section describes the recommended transit network for the years 2021, 2031 and 2041. Further details are provided in **Technical Report #4: Future Transit Provisions**.

7.3.1 Recommended Network by 2021

To support the continued development of the ZÜM Network, it is proposed that the Airport Road corridor (between Bovaird Drive and Steeles Avenue), which was identified in the five year business plan as a potential BRT corridor, be implemented by 2021.

The transport demand model identified the Airport Road corridor as one of the corridors that attracts a higher volume of transit riders (over 2,000 passengers / direction) in the peak periods. The transit demand forecast for this corridor is higher than that identified on Bovaird Drive which has already been included in the ZÜM network. The corridor also provides a strategic link connecting the ZÜM corridors on Bovaird Drive, Queen Street, and Steeles Avenue on the east side of Brampton. **Figure 23** presents the existing and proposed ZÜM corridors that are to be implemented by 2021.



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- Legend**
- Existing ZUM (2013)
 - New ZUM
 - Major Station
 - Minor Station
 - - - GO Rail
 - Support Corridor
 - ★ Intermodal Terminal
 - GO BRT (Hwy 407)

/ Conceptual Road Network for use in the Development Charges Background Study

Figure 23
Recommended Rapid Transit Implementation by 2021

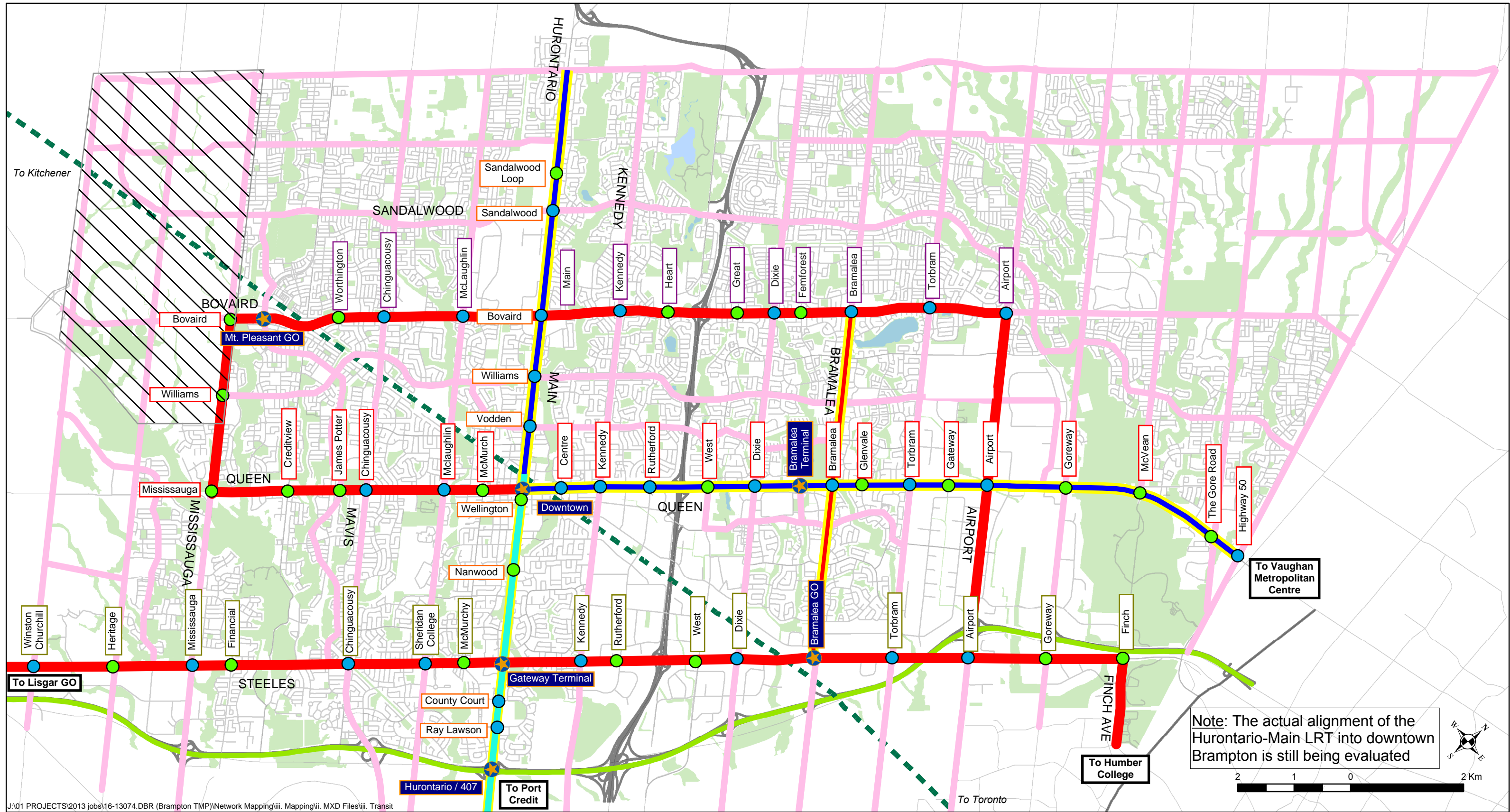


7.3.2 Recommended Network by 2031

To achieve the identified transit mode share target of 16% by 2031, it is recommended that higher order transit facilities be implemented in strategic locations. The existing ZÜM facility largely operates in mixed traffic with transit priority measures at intersections. By contrast, higher order transit (Rapid Transit) facilities, that could be bus or rail, operate in their own exclusive lanes with minimal impact from general auto traffic. Planning has been underway for the Main/Hurontario LRT which will travel from Mississauga to Downtown Brampton and the early implementation of this facility is recommended. The current study also recommends the addition of two Rapid Transit corridors connecting to the planned LRT terminus in downtown Brampton:

- Main Street Rapid Transit (Queen Street to Mayfield Road); and
- Queen Street Rapid Transit (Main Street to Vaughan Metropolitan Centre).

These facilities represent the graduation from the existing ZÜM network to a true Rapid Transit facility. Roadway widening should not be undertaken along these roadways without the consideration of transit exclusivity, or transit/HOV designation. In addition to the Rapid Transit projects, an additional ZÜM corridor is proposed for implementation on Bramalea Road by 2031 as shown in **Figure 24**.



Note: The actual alignment of the Hurontario-Main LRT into downtown Brampton is still being evaluated

2 1 0 2 Km

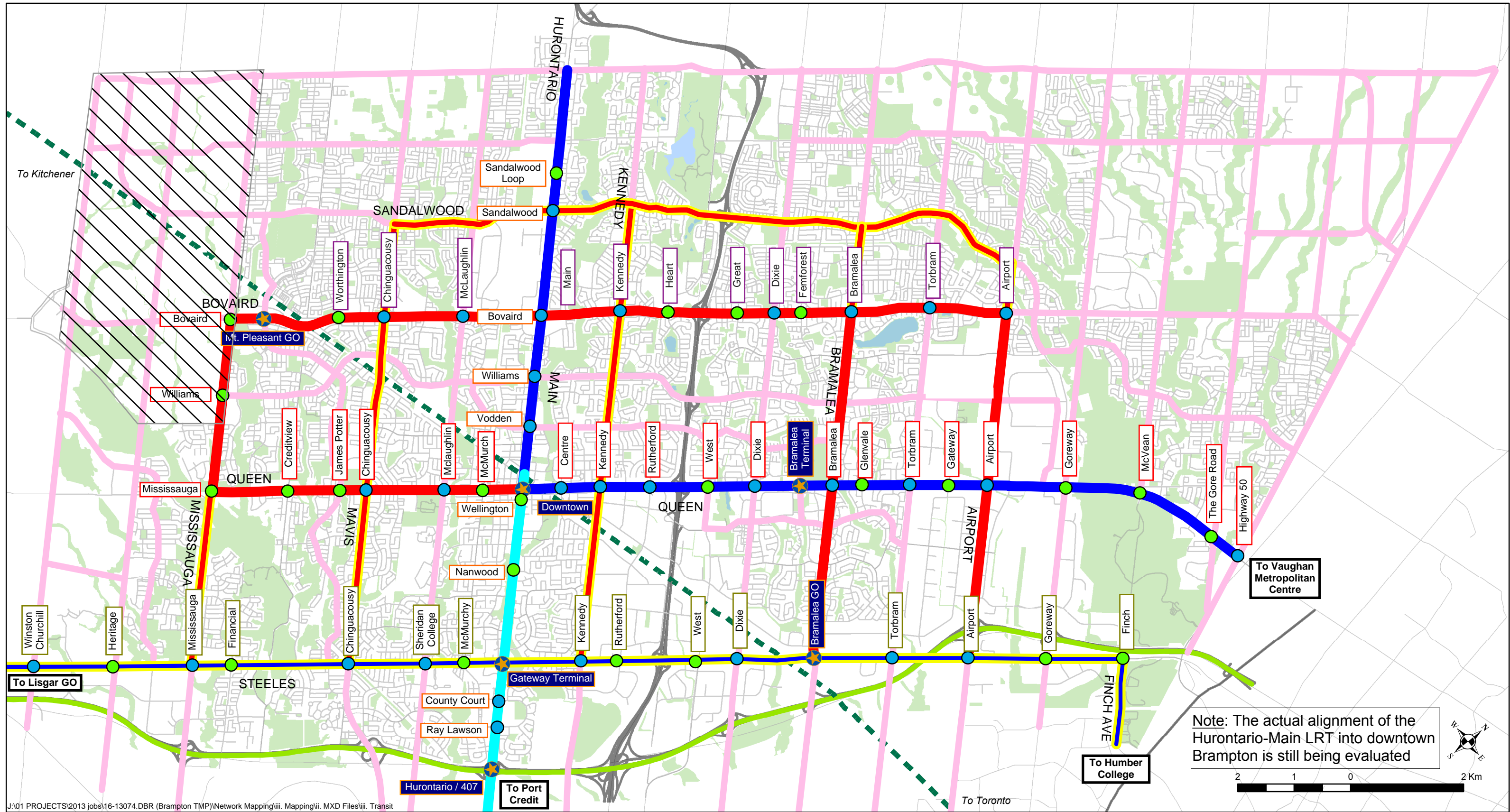
Figure 24
Recommended Rapid Transit
Implementation by 2031

7.3.3 Recommended Network by 2041

The 2041 transit plan includes an additional Rapid Transit corridor on Steeles Ave as well as numerous additional ZÜM corridors that are required to support the increased transit growth in the northern areas. The Steeles Avenue Rapid Transit corridor would operate between the Lisgar GO Terminal (off Winston Churchill Boulevard in the west) and Humber College (off Finch Avenue West in the east). This could be in the form of a rail or bus service operating in its own exclusive lanes and would intersect with the Main/Hurontario LRT.

By 2041, additional corridors are identified for ZÜM transit facilities as shown in **Figure 25**. The growth in the north of Brampton calls for the inclusion of Sandalwood Parkway as a ZÜM corridor, with connections to the Airport Road ZÜM and a Bramalea ZÜM. Two additional ZÜM corridors have been identified which connect from the Sandalwood Parkway ZÜM to Steeles Avenue; Chinguacousy Road and Kennedy Road. While Kennedy Road is in close proximity to the Main Street corridor, there is potential for a transit technology other than buses to operate on Main Street, therefore Kennedy Road was included to support the bus operations through the core. A ZÜM facility has been included on Mississauga Road connecting the Queen West ZÜM to Steeles Avenue. The Airport Road corridor is also identified for improved transit priority south of Steeles Avenue connecting to Pearson Airport.

Although the modeling supports the implementation of these various ZÜM corridors after 2031, the City may consider implementing them before 2031 in order to help attract more transit ridership and help achieve the desired modal share for transit.



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- Legend**
- Existing ZUM (2031)
 - GO Rail
 - GO BRT (Hwy 407)
 - New ZUM
 - Existing LRT (2031)
 - Existing Rapid Transit
 - Support Corridor
 - Conceptual Road Network for use in the Development Charges Background Study
 - Major Station
 - Minor Station
 - ★ Intermodal Terminal

Figure 25
Recommended Rapid Transit
Implementation by 2041



7.4 Transit Recommendations

Introduction of two-way, all-day GO train service to the three GO train stations in Brampton is important to achieving mobility goals set forth in the TMP Update. Brampton Transit routes will service the GO train stations to distribute passengers to and from the stations, which will extend the reach of transit in the city by providing convenient connections to other origins and destinations.

Implementation of near term transit improvements that have been identified in the previous 2009 TTMP have already been included and budgeted in the 5 year Business plan (2013-2017). These ZÜM corridors have been carried forward as part of the TMP Update as follows:

- Bovaird ZÜM from Mount Pleasant GO to Queen Street (in 2014)
- Steeles West ZÜM from Main Street to Lisgar GO (in 2015)
- Queen West ZÜM from Main Street to Mississauga Road. and to Mount Pleasant GO (in 2016)

To support the growth that is identified, an additional ZÜM corridor is recommended by 2021 as follows:

- Airport ZÜM from Steeles Avenue to Bovaird Drive

In view of the very rapid growth of the City to 2031, the plan includes the early implementation of Light Rail Transit (LRT) and expansion of the ZÜM network in line with Metrolinx' 'Next Wave' of the 'Big Move' projects. In particular the plan includes the following for implementation by 2031:

- Hurontario-Main Street LRT: from southerly boundary to Downtown Brampton
- Hurontario-Main Street Rapid Transit: from Downtown Brampton to Mayfield Road
- Queen Street Rapid Transit: from Downtown Brampton to Airport Road - the timing again should be well before 2031 as it is part of Metrolinx' Next Wave of Big Move Projects
- Bramalea ZÜM: from Steeles Avenue to Bovaird Drive

From 2031 to 2041 the plan includes an additional rapid transit facility and numerous ZÜM corridors as follows:

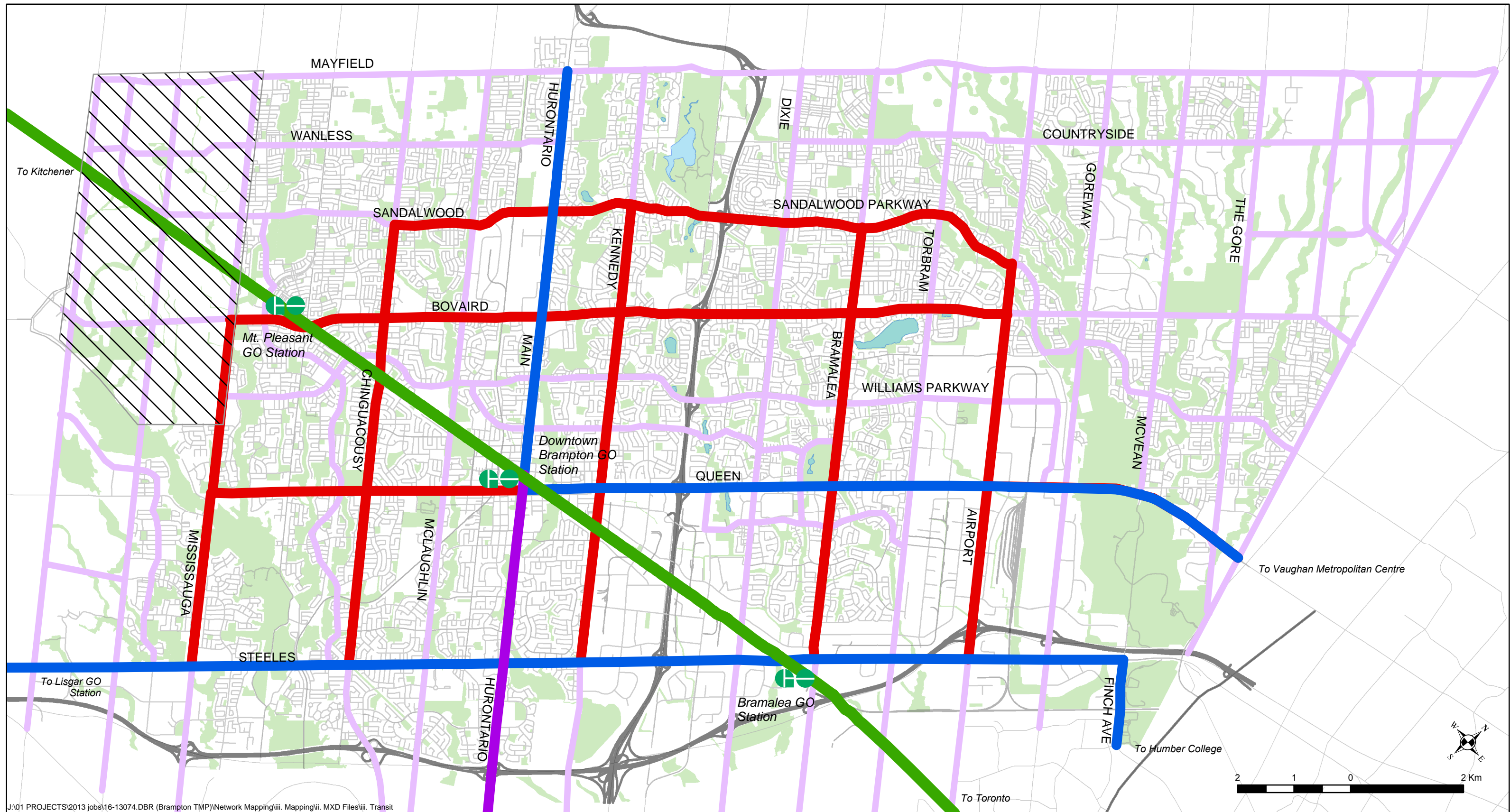
- Steeles Rapid Transit: between Lisgar GO and Highway 427 (Humber College)
- Sandalwood ZÜM from Chinguacousy to Airport Road
- Chinguacousy ZÜM from Sandalwood Drive to Steeles Avenue West
- Kennedy ZÜM from Sandalwood Drive to Steeles Avenue West
- Mississauga ZÜM from Queen Street West to Steeles Avenue West
- Airport ZÜM from Steeles Avenue to Pearson Airport



While this technical report has established a timeframe for the implementation of various ZÜM corridors, the City may consider implementing them ahead of schedule in order to help attract more transit ridership and help achieve the desired modal share for transit.

The ultimate transit map for 2041 is shown in **Figure 26**. In addition to the identified facilities, growth in transit ridership and improved transit mode share will require additional resources including vehicles, stops and shelters, and increased operational costs. These elements, among others, have been identified for each of the planning horizons including their associated costs.

In addition to the network facilities, there will be costs for two major maintenance facilities and systems upgrades and the net operating costs will grow in concert with ridership growth.



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Legend

- Higher Order Rapid Transit
- ZUM
- Hurontario / Main LRT
- GO Rail
- Support Corridor
- GO Train Station
- Conceptual Road Network for use in the Development Charges Background Study

Notes:

1. All routes running outside of the City of Brampton will be determined through additional detailed service planning on strategic corridors.
2. Transit services will be provided to new growth areas in Bram West, Northwest Brampton, and Northeast Brampton. Determination of corridor types will be established through the Secondary Planning Process. Connections to key future transit routes outside of Brampton should be provided as required.
3. "Higher Order Transit" are projects identified by Metrolinx in the Big Move.

Figure 26
Recommended Transit Network Needs to 2041



8. ACTIVE TRANSPORTATION PLANNING

Over the years, the City of Brampton has established a number of major linear trail systems which facilitate City-wide and localized Active Transportation (AT) for recreational as well as utilitarian purposes. One of the primary objectives of Brampton's 2002 Pathways Master Plan was to suggest how to connect these linear systems while identifying a network of on-road facilities. The Master Plan also identified a strategic policy and design framework to support both the on and off-road elements of the overall system.

Building on the work completed for the 2002 study, City Staff developed a revised network concept in 2010, the Pathways Routing Plan. The intent of the update was to develop a continuous and connected system of AT routes by identifying missing links. In 2011, the Region of Peel undertook an Active Transportation Study, which recommends additional opportunities to increase connectivity throughout the Region, including Brampton, along Regional roads. Through partnerships with the Federal government, Province, Region and its local municipalities, an inter-connected and continuous system of on and off-road AT routes can be realized.

Technical Report #5: Active Transportation responds to the growing demand for sustainable transportation alternatives for recreational as well as utilitarian purposes in Brampton. It builds on what has already been done by the City and the Region of Peel in terms of implementing active transportation facilities and planning for the future. It also takes into account consultation feedback received from those members of the public that have first-hand experience or an opinion of cycling, walking and trails in Brampton.

The following approach was applied to develop the proposed active transportation network and associated recommendations:

- Review of the Active Transportation Context – Background information on Active Transportation provided by the City and Region has been reviewed. This includes the existing network, proposed and candidate routes, as well as previous studies and relevant guidance documentation.
- Identification of Barriers and Opportunities in the AT Network – Barriers include physically constrained crossings over freeways, railways and waterways. However, each barrier presents opportunities to improve the AT network. Responses from our online consultation tool were reviewed to find opportunities to improve the AT system for the benefit of its users.
- Integration of the AT Network in Brampton – A review was undertaken of the existing, previously proposed and candidate routes already being considered. Based on the opportunities previously listed and a set of selection criteria, additional candidate routes have been recommended to fill gaps in the network. The result is an expanded candidate route network, which feeds into the recommended AT network concept.
- Policies and Initiatives – A set of AT related policies and recommendations have been formulated to provide strategic direction for the City regarding future AT development, design and implementation. This section also highlights the initiatives that the City of Brampton and others are already taking to achieve those goals.

- AT Performance Indicators – In order to assess the current and future state of AT in Brampton, a set of performance indicators has been developed. These indicators are based on experience gained from similar Master Plans but tailored specifically for Brampton’s unique AT conditions. They can be used to inform the development of future routes and network links.
- Moving Forward – This final section discusses how other aspects of the Transportation Master Plan Update interact with the Active Transportation component, and how they will be integrated into the final TMP report. It also outlines the subsequent steps to be undertaken with regard to the selection of facilities and the associated update to the City of Brampton Pathways Master Plan and Routing Plan. Relevant design guidelines and considerations from ‘Ontario Traffic Manual Book 18 – Cycling Facilities’ are presented here for reference.

8.1 Existing, Proposed and Candidate Cycling Network

The resulting existing, proposed and candidate cycling network is shown on **Figure 27**. The details in how this network was developed are provided in Technical Report #5: Active Transportation. Active transportation policy support, ways to integrate active transportation with other modes of travel, facility type selection and active transportation recommendations are provided in the remainder of this chapter.

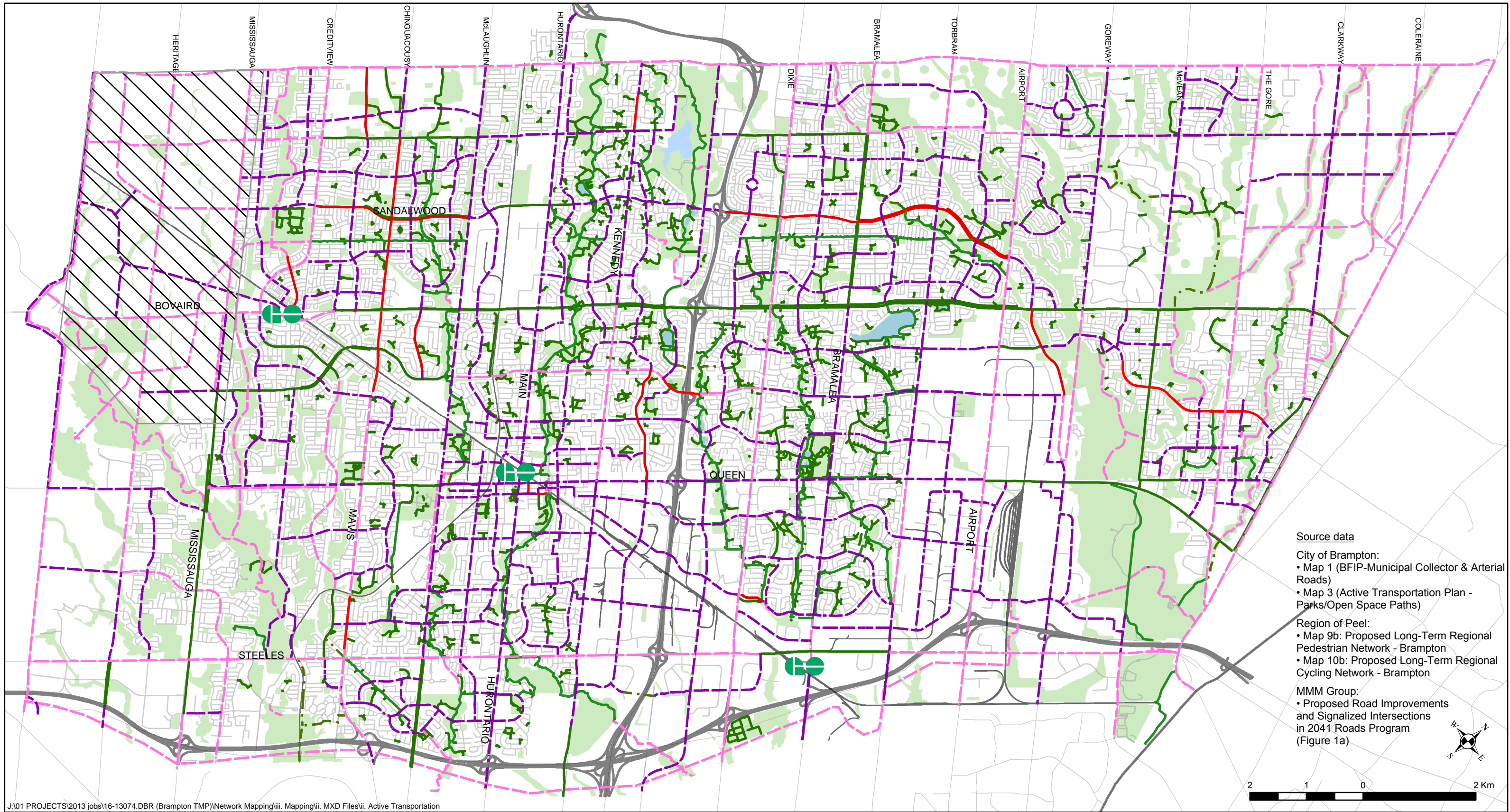
8.2 Active Transportation Policies

The City of Brampton has the opportunity to create an environment that is supportive of all modes of transportation including walking and cycling. Infrastructure such as sidewalks, trails, bike lanes, benches and sign treatments all contribute to an improved active transportation (AT) system, but these alone will not produce a fully supportive system for the City.







A set of AT related policies and recommendations have been developed to provide strategic direction for the City regarding future AT development, design and implementation. They are grouped into the following components:

- Education;
- Encouragement;
- Engineering and Enforcement;
- Partnerships; and
- Design and Support Features.

The policies are described in more detail in **Table 15**.



Legend

Existing Routes		In Right-of-Way (on-road or in-boulevard)	Future Routes		In Right-of-Way (on-road or in-boulevard)		GO Train Station	
		Off-road trail			Off-road trail			Conceptual Road Network for use in the Development Charges Background Study

Note:
Future Proposed Routes are subject to further detailed planning.

Figure 27
Existing, Proposed and Candidate Cycling Network



Table 15: Recommendations for Supporting Active Transportation (AT) in Brampton

COMPONENT	OBJECTIVES
EDUCATION	Consider utilizing educational programming and promotional materials to encourage and inform people of the benefits of AT as it relates to community health and fitness, transportation, environment and sustainability, economy and tourism.
	Develop and distribute newsletters and educational materials to promote and educate the public on AT opportunities, recommendations for routes and destinations and updates on available routes.
	Consider the implementation of educational programs on walking and cycling such as the Active and Sustainable Routes to School Travel Program administered by the Metrolinx Smart Commute program. The City should also partner with Peel Region in offering programs like School Travel Planning, the Bicycle Parking Lot Program and the STEPS to School pilot program, as well as other interested agencies, not-for-profit organizations and school boards.
ENCOURAGEMENT	Explore community-based social marketing as a means of encouraging people to adopt more sustainable transportation habits, including walking and cycling.
	Develop, together with local organizations, a comprehensive approach to encouraging students and employees to walk or cycle to school or work and combine these modes with public transit for longer distance trips.
	Explore partnerships with local public and private organizations and integrate end-of-trip facilities into AT and trail promotional strategies and initiatives.
	Further promote multimodal trips through the integration of AT and transit maps. City staff should continue to work with local cycling and hiking groups and update the maps at least every two years to ensure new routes and connections are shown. The Bike & Ride program should be expanded along with the City's transit infrastructure.
ENGINEERING & ENFORCEMENT	Consider transportation operational measures in the future as part of the transportation system management to support safe and convenient AT movement and trail use. These measures may include: <ul style="list-style-type: none"> • Exempting cyclists from turn prohibitions at intersections, except where the restrictions are in place for safety reasons; • Expanding the installation of bicycle detection at intersections such that traffic signals recognize and react to cyclists on sideroads; and • Enforcing speed limits on roadways where observed speeds exceed acceptable levels.
	Focus enforcement activities from Peel Regional Police on issues related to the misuse of bicycle and pedestrian facilities, particularly sidewalk obstruction and the inappropriate use of trails.
	Work with Peel Regional Police in the development and delivery of cycling and walking-related safety programs.
PARTNERSHIPS	Continue to develop partnerships with Peel Region, outside agencies, volunteer groups, individuals as well as regional representatives to promote and educate residents on AT use throughout the City. This includes participation in coordination committees such as the AT Leadership Group and the Senior Management Steering Committee.
DESIGN & SUPPORT FEATURES	Support 'Complete Streets', which are accessible to all users, regardless of their chosen mode of transportation. The street network should be planned, designed, constructed and maintained to support transit, cyclists and pedestrians in addition to automobile traffic. The elderly, adults, young and disabled should all be able to safely use the streets in a municipality.
	Consider the application of the Greenroads™ sustainability rating system for roadway design and construction. This concept can be combined with that of Complete Streets, as it is focused on the physical make up and construction of the street.
	Work with partners to make the provision of support facilities such as rest areas, washrooms and waste receptacles a priority during the planning and implementation of AT facilities. New developments should be required to incorporate bicycle parking, showers and change rooms through the site plan application process. Bicycle and pedestrian-friendly principles should also be applied to the design and retrofit of roadways and transitions.

8.3 Integrating an AT Strategy into the TMPU

Integrating active transportation (AT) with other travel modes is important to overall mobility and travel safety in Brampton. Integrating active transportation with transit can help extend the reach of both of these modes and can help to maximize the role that AT can play in improving mobility. It is necessary to recognize that the presence of heavy goods vehicles can pose a safety risk to the cyclists and pedestrians with whom they share the right-of-way. The selection of AT facilities should aim to mitigate that risk by considering alternative AT routes or off-road routes on main corridors used by heavy goods vehicles.

8.3.1 Transit Connections

Utilitarian cyclists travelling to work, to school or to run errands may combine AT with transit. Given the planned expansion of the ZUM Bus Rapid Transit (BRT) network, Light Rail Transit (LRT) and GO bus and rail services, good intermodal connectivity will expand the range of travel choices available. This will lead to reduction in auto modal share and therefore less congestion, along with other benefits.

There are several proposed and candidate active transportation facilities around the Mount Pleasant GO station, with direct connections proposed for review in **Technical Report #5: Active Transportation**. Additional candidate routes to improve access to the Downtown GO station are also identified. Proposed trail connections along Avondale Boulevard and Bramalea Road will link the Etobicoke Creek, Chinguacousy and Don Doan Trails to the Bramalea GO Rail station. Bramalea Road south of the station is a candidate City road and there are existing in-boulevard facilities on part of Steeles Avenue.

The Metrolinx Mobility Hub Guidelines make several recommendations with regard to the integration of AT facilities. The layout of existing and proposed transit stations should be reviewed in closer detail to ensure that the following guidelines are being followed to the maximum extent possible:

- Provide secure and plentiful bicycle parking at station entrances with additional cycling amenities at high volume locations;
- Provide clearly marked and protected access for pedestrians and cyclists at station areas to minimize conflicts, particularly at passenger pick-up and drop-offs (PPUDO), bus facilities, and parking access points;
- Build or retrofit a network of complete streets to create a balance between the movement of pedestrians, cyclists, transit, and vehicles. Adopt road design standards that ensure safe movement of all road users;
- Provide an attractive pedestrian environment with a high level of priority, safety and amenities;
- Create cycling-supportive streets and communities;
- Adopt goods movement strategies within mobility hubs that support complete streets, while ensuring the efficient delivery of goods and services;

- Create understandable and accessible transit stations through consistency and clarity in station entrances and interfaces, spaces, layout, and visual cues connected by barrier-free movement spaces; and
- Develop wayfinding and signage to support the efficient navigation of the transit station and station area.

The GO Transit Rail Parking and Station Access Plan also provides opportunities for the City to work with Metrolinx to maximize the potential to attain the plan's objectives by improving the accessibility of transit stations by bicycle and on foot. The plan recommends the development of station-specific plans to direct the delivery of AT access improvements and promote AT, transit and carpooling. In particular, it highlights that stations with less extensive active travel facilities may have a high opportunity for improvements. The document also states that AT modes (walking and cycling) and public transit will have priority access to stations and terminals, with dedicated access provided where appropriate, and that GO Transit will identify opportunities to separate parking charges from transit fares at selected locations to encourage walking, cycling, and taking transit to the station.

Technical Report #4: Future Transit Provision details the proposed 2041 transit network. With the exception of Mississauga Road between Queen Street and Steeles Avenue, and Hurontario Street north of the Sandalwood terminal, all of these routes are planned to have at least local bus services that support BRT in place by 2021. Where candidate routes on these corridors have been successfully evaluated for the provision of cycling facilities, these should be prioritized for implementation. Cyclists may then use any connecting AT facility and cycle along it to reach the major stations where connectivity is maximized and parking facilities should be most readily available.

8.3.2 Interaction with Heavy Goods Vehicles

Goods movement in Brampton is focused primarily on regional roads, as identified in the Peel Region Strategic Goods Movement Network. Some City roads are designated as connector truck routes, in most cases within designated industrial zones. Others are frequented by goods vehicles accessing particular industrial and office sites.

The Freight-Supportive Guidelines is a document aimed at helping municipalities, planners, engineers, developers and other practitioners create safe and efficient freight-supportive communities. Currently in draft form pending its formal release by MTO, it recommends that cyclists should have designated or separated facilities on routes that are also designated for trucks.

The guiding principles for facility selection recommend that, in retrofit scenarios, in-boulevard facilities should be provided along industrial collector roads. In most cases, these roads have boulevards that are sufficiently wide for cycling facilities to be provided alongside existing sidewalks, or for such an AT path to be implemented. **Technical Report #7: Goods Movement** identifies industrial areas and the collector roads that run through them, as well as other roads where goods vehicles may be expected.

8.4 Facility Selection

Selecting an appropriate facility for each candidate route should be done as part of the Bicycle Facilities Implementation Program (BFIP) and the future update to the City of Brampton PathWays Master Plan and Routing Plan. This should be revised as part of an Active Transportation and Trails Master Plan Update using the AT network concept resulting from this study as the basis and applying the guidelines and network development approach in Ontario Traffic Manual (OTM) Book 18.

Where there is insufficient right-of-way to accommodate a separated facility, alternate routes should be considered. Alternative candidate routes have been identified for the sections of the Queen Street and Main Street corridors where available right-of-way is limited. Constraints on implementing facilities on the arterial corridors may also be time-related if their implementation phasing is tied to that of a transit improvement along the same corridor. For this reason, and the recommendation from OTM Book 18 that routing options be varied to cater for the needs of all types of cyclists, these candidate routes should be considered in their own right.

The update to the City of Brampton PathWays Master Plan and Routing Plan should include a review of the City of Brampton's Engineering and Design Standard Drawings, in particular drawings 200 to 219 inclusive which show cross sections for different classifications of road. The standard drawings should be reviewed and updated to make sure that City roadways are designed for all transportation users and all modes of transportation. Ontario Traffic Manual Books 15 and 18 should be used as a reference in this work.

8.5 Active Transportation Recommendations

The key recommendations to emerge from the AT component of this TMPU are as follows:

- The City should review and revise its roadway design standards to make sure that City roadways are designed for all transportation users and all modes of transportation. Ontario Traffic Manual Books 15 and 18 should be used as a reference in this work.
- The candidate route network, including the additional candidates identified by this study, should be evaluated through a more detailed Active Transportation and Trails Master Plan. This would form part of the proposed update to the PathWays Master Plan. An Active Transportation and Trails Master Plan will include more detailed information and recommendations on policies, programming, design standards and infrastructure, and will identify shorter term priorities and longer term goals.
- The suitability of the existing bridge over Highway 410 between Bovaird Drive and Williams Parkway for conversion to a dedicated AT crossing should continue to be investigated with MTO.
- Opportunities to implement off-road multi-use trails along railway lines and waterways, along with the appropriate natural or artificial protection, should be explored.
- The proposed update to the PathWays Master Plan should pay particular attention to accommodating AT facilities near schools. Where there are a number of schools in a given



area, improvements to AT infrastructure will help to reduce congestion at pick-up and drop-off times.

- Where a neighbouring jurisdiction has an existing or proposed facility and there is no current provision on the Brampton side of the municipal boundary, potential connections should be investigated and prioritized.
- Consistent with 'Complete Streets' policies, roadways should be configured to accommodate cyclists, pedestrians, heavy goods vehicles and other modes in a way that maximizes safety for all users. To achieve this, in-boulevard facilities or sidewalks should be provided on both sides of links where heavy goods vehicles are expected, such as those in industrial areas or the Peel Region Strategic Goods Movement Network. Where separated facilities are implemented, conflict points that would otherwise be on-road are sometimes transferred to accesses and side roads. Such conflicts should be identified and mitigated where possible.
- The integration of AT and transit facilities should be maximized, and the AT-related elements of the Big Move, Metrolinx Mobility Hub Guidelines and GO Transit Rail Parking and Station Access Plan should be followed.



9. GOODS MOVEMENT PLANNING

Goods movement is an integral part of the transportation system in the City of Brampton. Efficient and effective goods movement is important to keep retail stores stocked, receive components needed for manufacturing and to deliver finished products to markets. **Technical Report #7: Goods Movement** identifies the existing goods movement infrastructure in the city and:

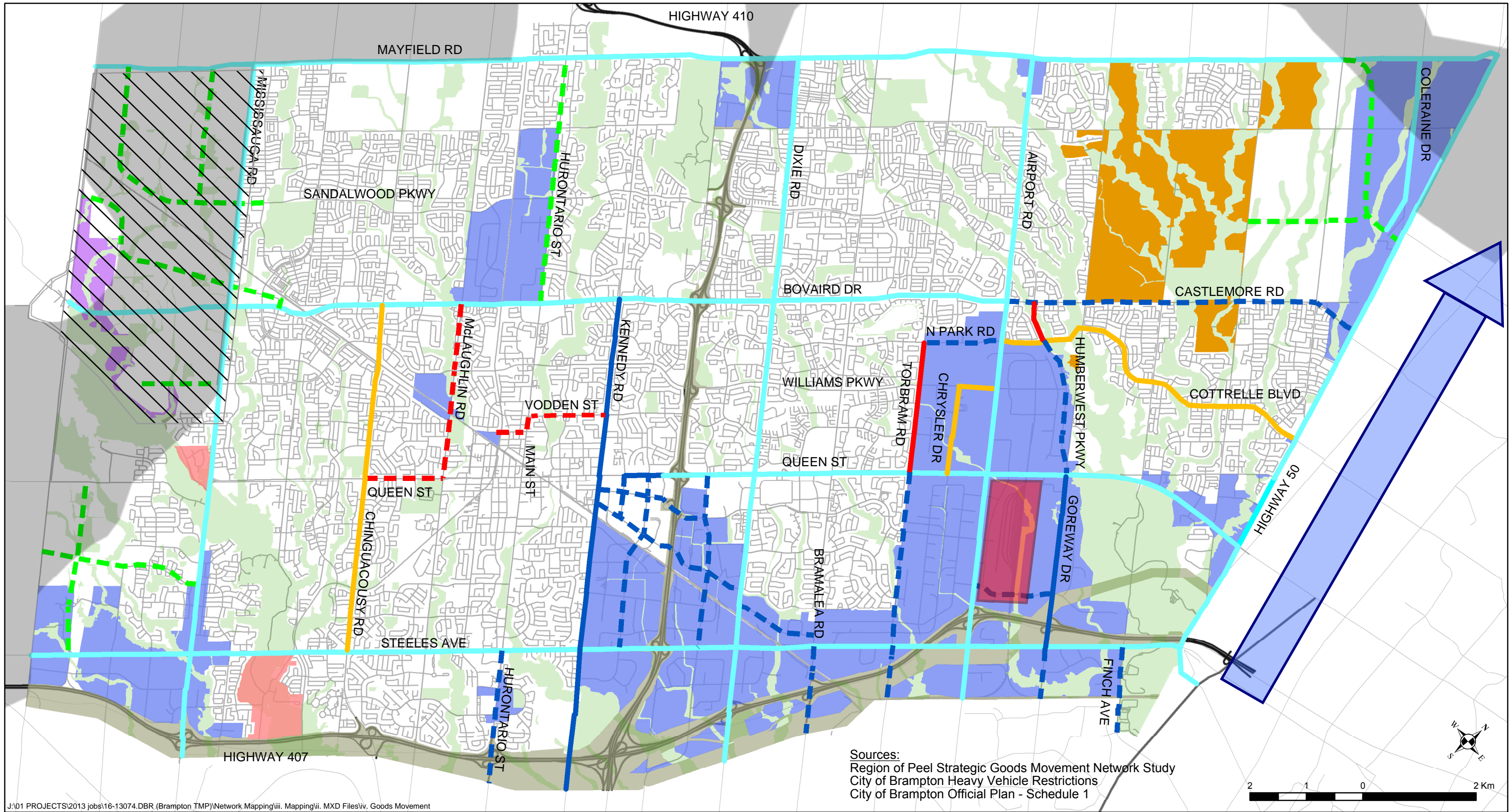
- Summarizes and refines how the Region of Peel's Strategic Goods Movement Network relates to City roads;
- Identifies employment areas and freight hubs, and their accessibility via the Region's Strategic Goods Movement Network and City roads that allow the through movement of heavy goods vehicles;
- Identifies existing conditions of Goods Movement Infrastructure in Brampton;
- Looks at rationalizing the City's truck route network; and
- Plans a goods movement network that balances efficiency and safety for all road users.

This chapter focuses on a review of the City's truck route network, considers issues related to safety and efficiency, describes a freight audit and provides goods movement recommendations. Further details are available in **Technical Report #7: Goods Movement**.

9.1 Rationalizing the City's Truck Route Network

Although the City of Brampton does not have a defined truck network as such, heavy vehicle restrictions limit the routes via which truck through traffic can travel. The goods movement network in Brampton is shown in **Figure 28**. The various coloured links may be rationalized into a formal Goods Movement network taking into account the following:

- Orange links show City truck through routes, i.e. passages through the network between the Region's Strategic Goods Movement Network (SGMN) links on City roads that have no 24-hour restrictions on such movements. These should either be considered de facto City truck routes or the need to impose a City heavy vehicle restriction should be evaluated.
- Solid red lines indicate links that are primary truck routes or connectors on the Region's SGMN but do not permit any heavy vehicles at any time unless they are making deliveries. Consideration should be given to either reviewing the need for the City restriction or replacing the link in the SGMN with the applicable alternative City truck through route.
- The dashed red lines are used by vehicles under the exemption to the heavy vehicle by-law regarding delivery. While this does not require amendments to City restrictions or the SGMN, the use of these corridors for this purpose should be noted.
- The previous TMP recommended higher order Goods Movement corridors in west Brampton to support existing and future employment areas, link to aggregate extraction areas in Halton Hills and to the future GTA West corridor. The proposed links shown in green should be assessed for their ability to meet these objectives and the roads should be constructed so as to meet that purpose.



J:\01 PROJECTS\2013 jobs\16-13074.DBR (Brampton TMP)\Network Mapping\iii. Mapping\ii. MXD Files\iv. Goods Movement

Legend

- Employment Area
- Estate Residential
- Village Residential
- Open Space System
- Provincial Greenbelt / Protected Countryside
- Provincial Highway Corridor
- Brampton CN Rail Yard
- GTA West Corridor
- Highway 427 and Extension

- SGMN Primary Truck Route on Regional road
- SGMN Primary Truck Route on City road
- SGMN Connector Truck Route
- Conceptual Road Network for use in the Development Charges Background Study
- SGMN Route with City Heavy Vehicle Restriction
- Access Route to Industrial Area
- City truck through route
- Potential City Truck Route

Figure 28
Goods Movement Network in Brampton

Across the boundary with the City of Vaughan, Cottrelle Boulevard links to Langstaff Road. This is a four-lane road with marked bike lanes. Alternatively, Goods Movement vehicles may be directed along Highway 50, which is on the SGMN, north towards Rutherford Road or south towards Fogal Road and Highway 427. In the west end of Brampton, the evaluation of the proposed roads for Goods Movement purposes should consider linkages to the proposed GTA West corridor.

Overall, the employment areas located within the City of Brampton appear to be well served by the Peel Region Strategic Goods Movement Network. Consequently, there is no need to formally designate any City roads as forming part of a Brampton goods movement network.

9.2 Safety and Efficiency

Roads that are likely to experience significant volumes of trucks should include design features that mitigate the risk of conflicts with pedestrians, cyclists and transit vehicles.

Technical Report #5: Active Transportation outlines the active transportation strategy for this TMPU. It supports the guideline identified by the City of Brampton in the report to Committee of Council (April 2013) entitled “Strategy for Implementing Bicycle Facilities within City of Brampton Road Rights-of-Way” that, for retrofit applications, “bicycle facilities along industrial collector roads will be accommodated off the vehicle traveled portion of the road only (Active Transportation Path).” This recommendation should be extended to all of the links highlighted in **Figure 28**.

It is recommended that the following measures be implemented for the protection of cyclists:

- Regular maintenance of bike lane markings and signage;
- Provision of centre medians to assist crossing pedestrians and cyclists;
- Incorporation of setbacks between the curb and the sidewalk or Active Transportation Path to give pedestrians an extra sense of protection;
- Review of conflict points and visibility issues at intersections;
- Construction of sidewalks to an adequate width to allow two people to walk side by side. Sidewalk width should be increased if high pedestrian volumes are anticipated.
- Where justified by pedestrian, cyclist or vehicle volumes, install traffic signals and pedestrian crossing signals at accesses to sites that generate regular truck traffic in order to reduce conflicts between pedestrians and vehicular traffic; and
- Installation of road signs alerting cyclists to truck turning movements and drivers to the presence of pedestrian crossing signals at midblock locations away from intersections.

The truck routes identified in **Figure 28** and the ultimate proposed transit network overlap on several roads, particularly Bovaird Drive, Queen Street, Steeles Avenue, Kennedy Road and Airport Road. It is recommended that the following strategies be implemented for managing on-road truck and transit interactions:

- In the case of physically separate transit lanes in the median of a road, left-turn and U-turn lanes should be provided at appropriate spacing to enable trucks to cross the transit lane and access sites;



- Truck loading and parking areas should be located far enough away from transit stops to avoid conflicts between these vehicles and also with passengers boarding and alighting; and
- Travel lanes should be sufficiently wide enough to accommodate trucks. In cases where curbs separate the transit lanes, consider rolled curbs to facilitate manoeuvrability of trucks in the adjacent travel lane.

The efficiency of goods movement in Brampton may be improved by implementing Transportation Demand Management (TDM) measures specific to freight and its interaction with the road network. For example, “Last Mile” solutions may be considered, utilizing smaller vehicles for delivering goods to neighbourhoods and commercial areas. These vans would need to be sufficiently light so that Heavy Vehicle Restrictions on certain City roads do not apply to them. Although this would increase the total number of vehicles on the City network, they would be dispersed across all roads, relieving pressure on the Strategic Goods Movement Network.

A Trucking Focused Signal Priority Plan would improve operations through the use of CCTV, enhanced signalization and infrastructure changes. The Region of Peel is already considering such measures along Dixie Road, Airport Road, Steeles Avenue and Derry Road.

The aforementioned measures apply specifically to the road network. The wider TDM strategy for Brampton is outlined in **Chapter 10** of this TMPU and detailed in **Technical Report #6: Transportation Demand Management**.

9.3 Freight Audit

The truck route rationalization and the mitigation of conflicts with pedestrians, cyclists and transit can be enhanced by the preparation of a freight audit. A freight audit is a planning and economic development tool used to assist municipalities, planners and engineers in making informed decisions to enable the safe and efficient movement of freight. The objectives of a freight audit include identifying locations where freight activities are generated or attracted (currently or in the future), operating constraints and stakeholder dialogue. One recommendation of this report is to conduct a freight audit in order to identify issues affecting local freight movements in Brampton and help establish priorities to support the safe and efficient movement of freight.

A freight audit is a first step that can be taken by a municipality to establish a better understanding about freight movement and the needs of the freight industry. The freight audit can be conducted independently, or as part of a wider transportation study to understand contextual solutions and the needs of all modes of transportation. The freight audit will provide valuable information that will guide policy and decision making to help support the goods movement industry in Brampton.

A freight audit involves the following components:

- Set-up: Problem definition, identification of staff and financial resources, and project planning;
- Data collection and management: Quantitative data collection, intelligence gathering and stakeholder consultation, and site visits;



- Analysis: Infrastructure, applicable policies, regulations and by-laws, and enforcement practices; and
- Communication of the process and outcomes via a freight audit report.

The City of Brampton should undertake a freight audit to provide the City with a firm understanding of its freight-related assets and to help the City leverage these assets by identifying opportunities, constraints and next steps needed to support goods movement. The components of the freight audit are described in more detail in the Ministry of Transportation's *Freight-supportive Guidelines*. The conclusions and recommendations of the freight audit should then be applied to the City's planning and operations processes in order to implement improvements to make Brampton more freight-supportive.

City engineers and planners should use the *Freight-supportive Guidelines* as a supplementary reference for land use and transportation planning decisions, site plan reviews and City road design. The *Freight-supportive Guidelines* consider the global nature of freight transportation, including the use of multiple transportation modes to connect producers and consumers of goods, and will help the City facilitate efficient transport of goods between modes.

9.4 Goods Movement Recommendations

Goods movement recommendations are made related to road infrastructure, safety and efficiency, and a freight audit.

9.4.1 Road Infrastructure Recommendations

- Re-examine the following two road links to determine if the truck prohibitions remain appropriate. If so, work with Peel Region to remove these links from the SGMN and designate alternative road links for truck movement.
 - Torbram Road between Queen Street and North Park Drive; and
 - Humberwest Parkway between Castlemore Road and Williams Parkway.
- Conduct an engineering assessment on the section of McLaughlin Road between Bovaird Drive and Queens Street, and particularly the CN railway bridge, to confirm its suitability for truck movement.
- Conduct an engineering assessment of the appropriateness of the Rosedale Avenue, Main Street and Vodden Street truck connection to the SGMN link on Kennedy Road.

9.4.2 Safety and Efficiency Recommendations

- Ensure that, for retrofit applications, bicycle facilities along industrial collector roads will be accommodated off the vehicle traveled portion of the road only (Active Transportation Path).
- Implement the following measures on City roads to mitigate conflicts between trucks and cyclists or pedestrians:
 - Regular maintenance of bike lane markings and signage;
 - Provision of centre medians to assist crossing pedestrians and cyclists;



- Incorporation of setbacks between the curb and the sidewalk or Active Transportation Path to give pedestrians an extra sense of protection;
- Review of conflict points and visibility issues at intersections;
- Construction of sidewalks to an adequate width to allow two people to walk side by side. Sidewalk width should be increased if high pedestrian volumes are anticipated.
- Where justified by pedestrian, cyclist or vehicle volumes, install traffic signals and pedestrian crossing signals at accesses to sites that generate regular truck traffic in order to reduce conflicts between pedestrians and vehicular traffic; and
- Installation of road signs alerting cyclists to truck turning movements and drivers to the presence of pedestrian crossing signals at midblock locations away from intersections.
- Implement the following strategies for managing on-road truck and transit interactions:
 - In the case of physically separate transit lanes in the median of a road, left-turn and U-turn lanes should be provided at appropriate spacing to enable trucks to cross the transit lane and access sites;
 - Truck loading and parking areas should be located far enough away from transit stops to avoid conflicts between these vehicles and also with passengers boarding and alighting; and
 - Travel lanes should be sufficiently wide enough to accommodate trucks. In cases where curbs separate the transit lanes, consider rolled curbs to facilitate manoeuvrability of trucks in the adjacent travel lane.
- Identify and implement transportation demand management measures specific to freight movement.
- Prepare a Trucking Focused Signal Priority Plan to improve traffic operations through the use of CCTV, enhanced signalization and infrastructure changes.

9.4.3 Freight Audit Recommendation

- Conduct a freight audit to develop a complete picture of freight movement in Brampton and to identify critical next steps to create a freight-supportive city.
- Utilize the *Freight-supportive Guidelines* as a supplementary reference for land use and transportation planning decisions, site plan reviews and City road design.



10. TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a multi-faceted and multi-modal approach to reducing and managing travel demand through the use of sustainable modes and the distribution of trips beyond traditional peak travel periods. This increases the efficiency and effectiveness of the available transportation infrastructure, through the implementation of strategies that influence travel choice and behaviour to reduce reliance on the single-occupant vehicle trips.

The City of Brampton is looking toward TDM to provide techniques to alter travel behaviour; assist in the management of transportation impacts; and address travel demand associated with the anticipated population growth of the City over the next 30 years. This chapter provides a toolkit of possible TDM programs, identifies resources to implement TDM plans and makes recommendations for TDM. Further details on these items, in addition to background information on TDM and examples of other TDM programs are provided in **Technical Report #6: Transportation Demand Management**.

10.1 Toolkit of TDM Programs

There are a number of components to a TDM program. Below are a number of initiatives that could be considered in Brampton.

10.1.1 Brampton Work Place Commuter Program

The City of Brampton will show its commitment to the development of a TDM program by revising a workplace program it had initiated for its staff. Representatives from Smart Commute Brampton – Caledon (SCBC) have met with senior staff to reinvigorate the program and obtain support. The re-launch of the program will be an important catalyst to encouraging further TDM initiatives.

The City relies upon the programs offered through SCBC for their internal work place travel program. However, the City should be able to build upon these programs that will provide other employers with incentives to provide their staff. Prior to the initiation of any programs, a survey of City staff should be undertaken to understand travel behaviour and determine the measures that will support staff and encourage sustainable travel behaviour.

To ensure that the program will be successful and continue to grow, the City requires a champion to work with SCBC as well as City staff and promote the use of sustainable transportation modes. The champion should be the Sustainable Mobility Coordinator, which is recommended below.

The components of the City TDM program for staff should include:

- Finalizing the Telework policy and develop an implementation program;
- Continuing to participate in the Emergency Ride Home program through Smart Commute and promote it to employees;



- Continuing the corporate transit pass program and work with Smart Commute Brampton – Caledon as the City transitions from paper passes to the Presto Card. The City should also promote the transit trip planner (e-Ride) to staff;
- Providing incentives to staff such as work day travel options which can include a carshare service (City or from private provider) or fleet vehicles that are available to all staff to use for meetings or site visits. Another option would be to provide transit maps and tickets / passes to staff;
- Encouraging the use of active modes of transportation to travel to work and provide sufficient end-of-trip facilities (such as sufficient secure bicycle parking, showers and locker rooms). The City should also develop a Bicycle User Group (BUG) for city staff; and
- A Sustainable Mobility Coordinator, who would be the champion for staff to contact with questions, suggestions, requests for information and to provide promotion, education and programs to encourage sustainable behaviour.

10.1.2 TDM and Transit

For each new service that is added, staff in the Planning & Infrastructure Services Department and the Sustainable Mobility Coordinator should work with Brampton Transit staff to develop marketing and promotional materials to encourage residents and workers to use the new services and be early adopters. This will therefore further encourage the use of transit and reduce automobile reliance. The Region of Peel recently endorsed the creation of an individualized TDM marketing campaign which could be aimed at residents in proximity to major transportation infrastructure networks. Brampton has an opportunity to partner with the Region to bring added value to this initiative.

New rapid transit services are recommended for implementation over the lifetime of the TMPU. These services are outlined in the **Technical Report #4: Future Transit Provisions**, with mapping showing the routes and types of services that will be available and recommendations on policies, tools and further actions for the City to take to encourage transit usage. The services, which include additional ZUM routes as well as BRT and LRT routes, will form the basis of the future network. Transit staff and the Sustainable Mobility Coordinator should work together to develop marketing and outreach programs that will encourage substantial uptake in the use of these services.

Particular attention should be given to the developments in and near the stations that will be upgraded or added to the network. These are prime areas for intensification and mixed use developments. The developers of new residential buildings along the corridors and located at stations should encourage the use of transit by including a year-long transit pass with the sale of the unit. As well, developers should unbundle parking, meaning they should not include parking with the unit but offer it as an additional feature, at the full cost of construction.

The City has created an environment in which transit is not only important but a priority. In the Five-year Service Plan, it is stated that as new communities are developed, transit will be provided at the early stages and will be in place to encourage the uptake of transit service. This will work to increase the modal split and reduce single occupant vehicle travel and car ownership. This has already proven to be successful with the Mount Pleasant Village development, which had the

involvement of the developer in providing the transit station from the very beginning of the occupancy of the development. Concurrent delivery of a new community and transit service is significant and should be further encouraged, even in areas that are not located along GO train lines.

To access transit stations and terminals, commuters are required to find their way to the terminals. Many commuters often encounter issues with traveling to and from the transit stations. Therefore, it is important to address the infrastructure and services that lead to transit stations and provide convenient and direct links so that transit is seen as a viable alternative to the single occupant vehicle trip. The “first mile / last mile” concept, which addresses the travel to and from transit stations, should be developed further as it will allow improved access and increased use of rapid transit services. Many people will travel further to rapid transit stations and stops than to local transit services but it must be easy to do so. For pedestrians and cyclists, routes need to be direct, pedestrian and cycling-friendly and with easy access to the station. Cyclists also require secure bicycle parking. Local transit routes need to be convenient and coordinated with the rapid transit schedules. Parking and drop off areas need to be available and well-signed. Registered carpools should have priority parking provided to them. If the “first mile / last mile” is looked after, not only will there be an increase in the use of transit services, there will also be an increase in the overall use of sustainable mobility.

10.1.3 TDM and Active Transportation

Active Transportation modes are important components to any TDM program. While Active Transportation, like transit, often has its own plan and implementation strategy, it is important to incorporate active modes into TDM plans. Cycling and walking are prime travel modes for short trips to work as well as for personal trips (including running errands, shopping, and appointments, as well as being a prime mode of travel to transit services). **Technical Report #5: Active Transportation** sets the context for active transportation in Brampton, outlines barriers and opportunities to promoting active transportation, identifies missing pedestrian and cycling links and presents policies and initiatives that can be used as tools to support active transportation.

10.1.4 Ridesharing

Ridesharing, or carpooling as it is more commonly referred to, has been a long-standing method to encourage increased auto-occupancy and the reduced number of single occupant vehicle trips. The use of on-line ridematching programs has taken the place of other methods such as the use of maps and bulletin boards. These programs enable more people to find carpool matches and now include finding “buddies” to encourage commuters to take transit, ride their bikes or walk to work by pairing up with others.

However, as will be discussed later, the programs need to be promoted and the benefits of ridesharing need to be provided. It is not a matter of “if it is there, they will use it”. Why is this? A lot of commuters will not be aware of the program unless they are told about it and how it works.

Brampton will need to provide their staff with information about the ridematching program available through SCBC as well as work with staff at SCBC to promote the use of the program further, even with the work places that are already participating in the program.

10.1.5 Carshare

Carsharing is becoming more common and popular as people look for more sustainable transportation options and reduce their reliance upon single occupant vehicle trips. Car sharing has been seen as an urban option for city-dwellers who do not want to own a car or have limited if any parking options. Joining a carshare can have financial benefits as the cost of owning a car can range from \$7,000 to \$15,000 (including car payments) per year depending upon the type of vehicle (CAA: Driving Costs - Beyond the Price tag: Understanding your vehicle's expenses, 2012 edition). On the other hand, carshare programs are much more economical with the costs tied to the amount that a member drives. Therefore, the costs are considerably lower than owning a car. One Toronto-area company has membership rates that vary from \$6 / month to \$65 / year depending on the plan chosen. The cost per hour will vary according to time of day and the type of plan selected.

Carsharing is moving into the suburban areas of Canada and could be an option for Brampton. Not only could there be access to carshare vehicles for residents but it could also be an option for City staff to use for work day travel (for example, the City of Gatineau has three Communauto cars on site for use by City staff). The use of carsharing for daytime work-related travel will benefit employees who require transportation to conduct their jobs. This can either be carried out directly by the City with its own vehicles or through a carsharing program.

Mississauga has signed an agreement with a carsharing company for a 2 year pilot program that will be finished this year. Brampton should discuss the results of the pilot with Mississauga once it has been completed. However, this pilot should be carried out after a survey is carried out with City staff and the interest is shown. As well, it should be considered as part of a larger project that will enable staff to use the cars during the weekdays and during evenings and weekends, the cars are available to the community – who have become members of the carshare.

10.1.6 Emergency Ride Home Programs

Many commuters will state that they need their cars in case of emergencies or having to work late and not being able to get home safely. While this is a concern, the actuality is that the emergencies do not occur very frequently. As well, unplanned overtime is not as common as people fear. However, to ease the concerns, emergency ride home (ERH) programs need to be developed and promoted to staff.

Currently, there is an emergency ride home program promoted by the SCBC which is only available to employees of member employers of SCBC. It should be promoted as a benefit to the use of sustainable modes. Some of the conditions are:

- Commuters may use ERH for any distance, routing and stops they prefer, but will only be reimbursed to a maximum of \$75 per ride, which may include a tip of up to 20 per cent.



- Commuters are responsible for initial payment of all costs, and are responsible for costs exceeding the maximum.
- Commuters may use ERH for unplanned reasons. Smart Commute reserves the right to track individual usage and verify the reason for rides. The following situations qualify for ERH coverage:
 - Personal or family illness, accident, injury or emergency situation;
 - Unscheduled overtime, approved by a supervisor; and
 - Unplanned absence of a carpooling partner due to his or her having to leave early or stay late unexpectedly.

10.1.7 Outreach, Marketing and Incentives

To be successful, a TDM program must include outreach, marketing and education elements. These elements are needed to provide information to commuters that will encourage them to use sustainable modes of transportation rather than the single occupant vehicle trip. However, producing posters or developing websites are only a small part of an outreach program. Organizations cannot just advertise a TDM program, they need to reach the community directly using a number of initiatives such as individual marketing programs, information booths at community events and meetings with community organizations. As the City develops its TDM program, the City will need to evaluate the type of initiatives to undertake to promote sustainable transportation and influence travel behaviour.

Successful TDM programs also include the use of incentives to encourage changes in travel behaviour. The following are some of the most common incentives:

- Carsharing opportunities for City staff and residents and employees in the downtown;
- Discounted transit passes;
- Bicycle parking;
- Car pool parking and reduced parking rates for carpools;
- Carshare parking; and
- Prizes for taking part a TDM program which could be applied to both internal (City of Brampton staff) and SCBC members and for completing travel surveys.

10.2 TDM in Planning and Development Applications

Encouraging and implementing TDM through planning and development process can occur in several ways. One way is to develop policies related to TDM to be incorporated into planning policy documents. The policies will provide the framework within which TDM will become part of community development. This section describes in detail how the City of Brampton can partner with its regional colleagues by developing TDM guidelines and tools related to planning and development applications.

During the approval process, traffic impact studies (TIS) are undertaken to determine the impact of the development on traffic levels and the transportation network. Currently, the TIS process does not include the impact of shifting travel to more sustainable options. The City must develop a set of

guidelines that will take sustainable travel options into account. The City should refine these guidelines and implement these guidelines as part of the development approvals process as a way to promote TDM in new developments. As well, to ensure that the sustainable travel continues to be part of the development, the City should develop conditions to be included in development agreements to support TDM.

The City should continue to support the development of new communities which are based on similar principles as Mount Pleasant Village. Communities such as Mount Pleasant are intrinsically supportive of sustainable mobility and are more sustainable overall. The use of the Peel Healthy Development Index should be applied to new developments and redevelopments in order to continue to develop communities based on a model of sustainable land use and transportation planning.

The mitigation of traffic impacts should include the use of TDM initiatives in order to show that if they are present, they can reduce traffic volumes. However the type and rate of implementation will be dependent upon location, transit service, Active Transportation infrastructure, parking regulations and surrounding land uses.

Parking is a key component in the implementation of sustainable transportation through the development process. Traditionally the amount of parking available needs to be sufficient to meet the requirements of the development, often providing more than the minimum required and reinforces the culture of driving. Alternatively parking regulations should be reduced to maximums or not even be mandatory in areas near transit nodes, as a means of controlling the number of cars in an area. Parking exemption for non-residential uses is already in place in the core of the Central Area and while not formalized, exemption sought by applicants (subject to submission, review and approval of parking rationale) have been extended to development outside of the area. Providing opportunities for car pool parking and supportive policies will also reduce the need not only for parking spaces but also for road expansion.

It is important that there are internal work place policies and residential programs in areas where developments can potentially lead to increases in traffic that the existing road network cannot support. The introduction of one aspect of a TDM program cannot occur without others, there will need to be compensation and a sense of equilibrium within the transportation network. For example, if the concern over traffic leads to a reduction in parking requirements to mitigate traffic volumes, then there will need to be transit stops / stations nearby as well as car pool parking and at the same time, support for the development of a program to encourage the use of these sustainable modes and reduce the reliance upon the single vehicle car trip. Incentive as well as marketing and educational materials will be needed as well as a well-supported carpool program.

The TDM-related recommendations for developments will depend upon where they are located, the land uses that are within the development and the types of transportation services and facilities that are available. Suburban areas will be more focused on transit services and facilities, park and ride availability, and ridesharing availability, as well as car trips. Higher density, urban areas will also focus on transit services and ridesharing as well as walking and cycling trips and the provision of infrastructure to safely support these modes.

10.3 Resources

A successful TDM program is one that has a dedicated budget and staff resources. While it is recommended in this plan that both financial resources and staffing be implemented in the short term, a more detailed plan will be required.

10.3.1 Staff

A staff position is required in order for a sustainable mobility program to be developed and maintained. This position would be ideally located within Transportation Planning, Planning and Infrastructure Services. This is due to the focus of the department on long-range planning and the understanding that transportation is evolving and requires increasing emphasis on sustainability and linkages to the overall development and future growth of the City. Ideally the staff position should be termed Sustainable Mobility Coordinator and would be responsible for not only the programs recommended in this strategy but working on active transportation programs and infrastructure as well as acting as a liaison and partner with SCBC staff. This position can also assist with development-related TDM review and develop guidelines for planning applications.

10.3.2 Financial

An annual budget for both TDM programs and staff is required for the program to be implemented. The budget will grow as the program grows and prospers. The budget should include the salary and benefits for a full-time position for the first two years and funds to initiate the internal TDM program and programs. The initial annual funding should be \$150,000 which includes the TDM position and initial activities, and should increase as the program grows over time.

10.4 Recommendations

The following recommendations will assist in the implementation and long-term success for the TDM program. The recommendations have been grouped: all of the policy recommendations should be considered for inclusion in the Official Plan and the Transportation Master Plan Update. The City of Brampton shall:

10.4.1 TDM Recommendations for the Official Plan

1. Ensure, as part of the development process, that information is provided to new owners, residents, tenants and leaseholders related to the adjacent sustainable transportation services and infrastructure being implemented within the project and available throughout the City, such as transit stops and schedules, and Active Transportation facilities on and off street;
2. Develop a partnership with Peel Public Health to further explore the health development index and further integrate transportation and public health policies and programs;
3. Develop a more detailed TDM Plan and Action Plan that has contextual Brampton solutions and that includes the exploration of monitoring and evaluation tools to ensure that there is sufficient support and funding for the duration of the TMP and the TDM Strategy. The key component to both the TDM Plan and the Action Plan will be the hiring



- of a Sustainable Mobility Coordinator and situating the position within the Transportation Planning team. Champions from senior staff will also be needed to provide continuity of support and be a voice for the program;
4. Incorporate TDM policies related to the development and implementation of TDM into the Transportation Master Plan, the Official Plan and all Secondary Plans. The policies should include developing a comprehensive TDM Plan and TDM Action Plan; creating TDM-based development guidelines for development applications including site plans and guidelines for traffic impact study reports; and
 5. Develop parking regulations that support TDM programs. This will require a Parking Study to be developed, which should be undertaken within 2 years of the Sustainable Mobility Coordinator being hired.

10.4.2 TDM Recommendations for the TMP Update

1. Hire a staff member whose role will be to lead the TDM program for the City of Brampton and work with Smart Commute Brampton – Caledon and other stakeholders;
2. Work with the Region of Peel TDM staff to provide assistance in the development of engagement techniques, develop partnerships and coordinate TDM programs and policies;
3. Continue to work with Smart Commute Brampton – Caledon to promote TDM internally and be a partner in the development of other TDM programs such as marketing for ridematching services and the emergency ride home program;
4. Work with Brampton Transit to promote new and expanded transit services as outlined in the Transit Service Plans. Programs should be coordinated as new services are implemented such as new ZUM Corridors, new Light Rapid Transit (LRT) and BRT services and services to new communities, as shown in the Future Transit Services Plans; Continue, as stated in the Brampton Transit Five Year Business Plan (2013-2017), Service Plan Working Paper, to establish transit service early in the development process, including new or extended routes into new areas. The new service should be preceded by information to developers and new residents about the service. Residential outreach programs, once established by the City should be included in these areas;
5. Develop a detailed action plan that is in line with the phasing of the TMP Update. This should occur after the initial short term actions are initiated – staff and budget and initial partnerships. As well, the implementation of the development check list for new developments should be outlined;
6. Engage appropriate partners and stakeholders to undertake residential travel planning programs and develop a funding source;
7. Work with post-secondary institutions such as the Sheridan College campus to develop campus-based TDM programs; and
8. Carry out the implementation and monitoring of the TDM program. As the program matures, the City should further expand both programs. Both will need to be adaptable to new initiatives and population and employment growth.



10.4.3 TDM Toolkit Recommendations

1. Revise the Brampton Work Place Commuter Program;
2. For each new transit service that is added, the Sustainable Mobility Coordinator should work with Brampton Transit staff to develop marketing and promotional materials to encourage residents and workers to use the new services and be early adopters;
3. Continue to require the concurrent delivery of transit service with new developments; and
4. Develop and promote an emergency ride home program for those who use sustainable modes to travel.

10.4.4 TDM in Planning and Development Applications Recommendations

1. Develop customized tools to incorporate TDM into development applications;
2. Refine a TDM checklist for use in the development application review process;
3. Develop conditions for the inclusion of TDM in development approvals;
4. Support the development of new communities which are based on similar principles as Mount Pleasant Village;
5. Reduce parking regulations to maximums and consider minimal or zero parking requirements in areas near transit nodes, as a means of controlling the number of cars in an area.

11. PHASING AND IMPLEMENTATION PLAN

The phasing of the road network improvements considers the forecast growth in population and employment developed through this TMP Update and the Development Charges Study, and associated travel demand, and attempts to link the supply of additional road facilities with the forecast travel demand. The road projects were classified in three phases:

- Short term, generally considered appropriate for implementation by the year 2021;
- Medium term, considered to be needed by the year 2031; and
- Long term, considered to be needed for implementation by the year 2041.

11.1 Short Term Horizon

Road projects recommended for implementation in the short term horizon generally are considered needed by the year 2021 in order to respond to the continued rapid growth of population and employment, and associated growth of travel demand, in the city and surrounding municipalities. The short term road improvements are shown in **Figure 29** and listed in **Table 16**. Indicative costs for the short term, as well as the medium and long term road projects, all come directly from the Development Charges study undertaken concurrently with the preparation of this TMPU.

Table 16: Road Projects for Implementation in the Short Term Horizon

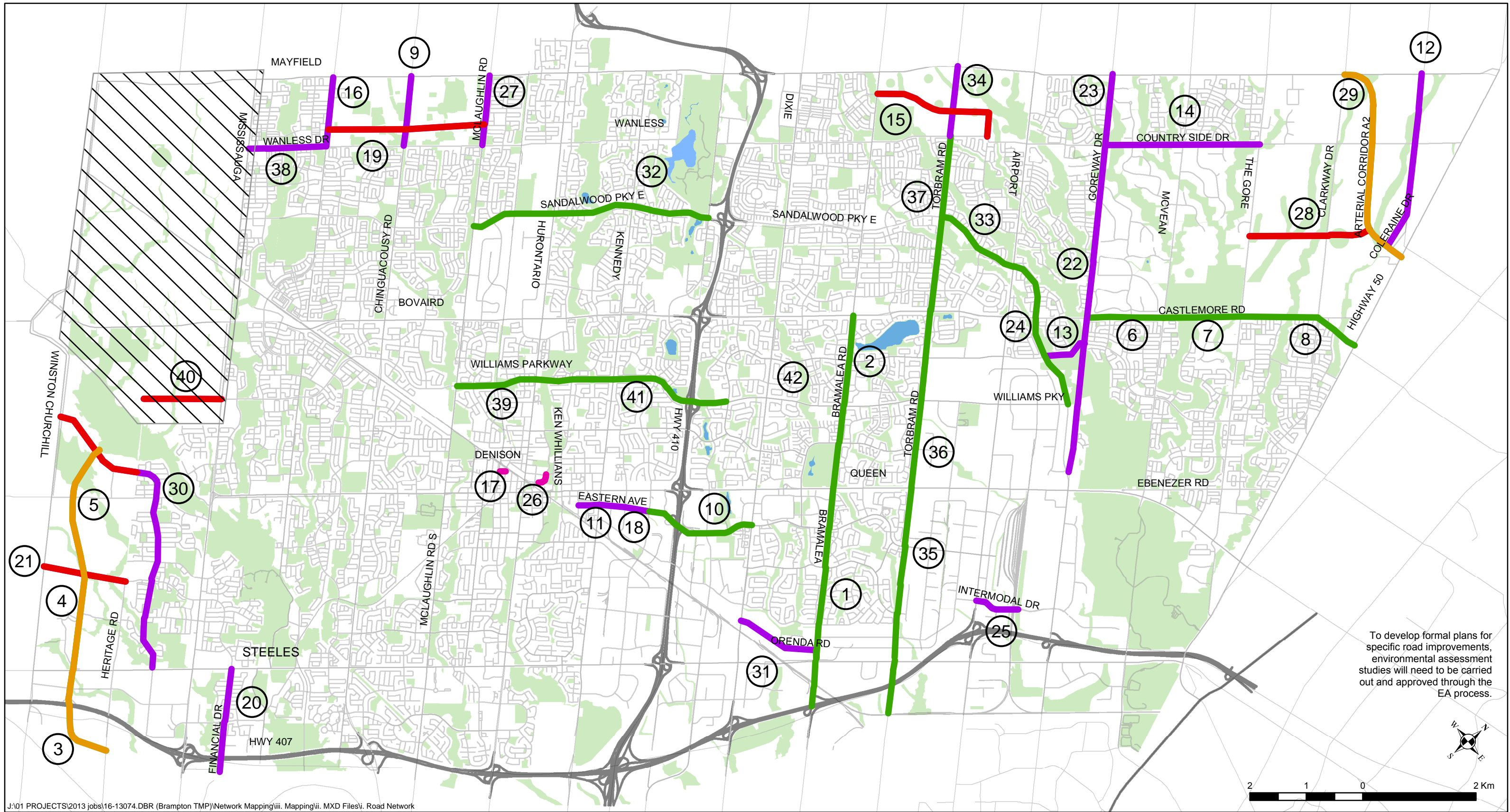
No.	Road	From	To	Type of Improvement	Indicative Cost (\$M)
1	Bramalea Road	Southern Boundary	Queen Street	Widen 4 to 6 lanes	\$35.02
2	Bramalea Road	Bovaird Drive	Queen Street	Widen 4 to 6 lanes	13.42
3	Bramwest Parkway / NSTC	Heritage Road	Steeles Avenue	New 6 lane road	\$33.10
4	Bramwest Parkway / NSTC	Steeles Avenue	Financial Drive	New 6 lane road	\$13.28
5	Bramwest Parkway / NSTC	Financial Drive	North of Embleton Road	New 6 lane road	\$7.72
6	Castlemore Road	Goreway Drive	McVean Drive	Widen 4 to 6 lanes	\$5.15
7	Castlemore Road	McVean Drive	The Gore Road	Widen 4 to 6 lanes	\$12.53
8	Castlemore Road	The Gore Road	Highway 50	Widen 4 to 6 lanes	\$7.77
9	Chinguacousy Road	Wanless Drive	Mayfield Road	Widen 2 to 4 lanes	\$6.53



No.	Road	From	To	Type of Improvement	Indicative Cost (\$M)
10	Clark Boulevard	Rutherford Road	Dixie Road	Widen 4 to 6 lanes	\$20.80
11	Clark Boulevard Extension	Rutherford Road	Hansen Road	New 4 lane road	\$4.95
12	Coleraine Drive	Highway 50	Mayfield Road	Widen 2 to 4 lanes	\$12.55
13	Cottrelle Parkway	Humberwest Parkway	Goreway Drive	New 4 lane road	\$14.70
14	Countryside Drive	Goreway Drive	The Gore Road	Widen 2 to 4 lanes	\$22.94
15	Countryvillage Collector	Bramalea Road	Countryside Drive	New 4 lane road	\$13.77
16	Creditview Road	Wanless Drive	Mayfield Road	Widen 2 to 4 lanes	\$6.51
17	Denison Street Extension	Park Street	Mill Street N	New 2 lane road	\$1.37
18	Eastern Avenue	Hansen Road	Kennedy Road	Widen 2 to 4 lanes	\$1.78
19	East-West Spine Road (Remembrance Road)	Creditview Road	McLaughlin Road	New 4 lane road	\$13.26
20	Financial Drive	Southern Boundary	Steeles Avenue	Widen 2 to 4 lanes	\$13.75
21	Financial Drive	Heritage Road	Winston Churchill Boulevard	New 4 lane road	\$6.68
22	Goreway Drive	Humberwest Parkway	Countryside Drive	Widen 2 to 4 lanes	\$36.53
23	Goreway Drive	Countryside Drive	Mayfield Road	Widen 2 to 4 lanes	\$23.35
24	Humberwest Parkway	Airport Road	Williams Parkway	Widen 4 to 6 lanes	\$10.21
25	Intermodal Drive	Airport Road	CNR Bridge	Widen 2 to 4 lanes	\$15.38
26	Ken Whillans Drive	Church Street	Nelson Street	New 2 lane road	\$3.68



No.	Road	From	To	Type of Improvement	Indicative Cost (\$M)
27	McLaughlin Road	Wanless Drive	Mayfield Road	Widen 2 to 4 lanes	\$6.51
28	New East/West Road (Major MacKenzie extension)	New North/South Road (Major MacKenzie extension)	The Gore Road	New 4 lane road	\$11.33
29	New North/South Road (Major MacKenzie extension)	Highway 50 / Coleraine	Clarkway Drive	New 4 lane road	\$7.88
30	New Road A	Steeles Avenue	Winston Churchill Boulevard	New 4 lane road	\$30.11
31	Orenda Road	Dixie Road	Bramalea Road	Widen 2 to 4 lanes	\$9.75
32	Sandalwood Parkway	McLaughlin Road	Heart Lake Road	Widen 4 to 6 lanes	\$39.45
33	Sandalwood Parkway	Torbram Road	Airport Road	Widen 4 to 6 lanes	\$6.55
34	Torbram Road	Countryside Drive	Mayfield Road	Widen 2 to 4 lanes	\$6.36
35	Torbram Road	Southern Boundary	Queen Street	Widen 4 to 6 lanes	\$24.61
36	Torbram Road	Queen Street	Bovaird Drive	Widen 4 to 6 lanes	\$16.71
37	Torbram Road	Bovaird Drive	Countryside Drive	Widen 4 to 6 lanes	\$13.23
38	Wanless Drive	Creditview Road	Mississauga Road	Widen 2 to 4 lanes	\$7.71
39	Williams Parkway	McLaughlin Road	Kennedy Road	Widen 4 to 6 lanes	\$23.63
40	Williams Parkway	Mississauga Road	Heritage Road	New 4 lane road	7.86
41	Williams Parkway	Kennedy Road	North Park	Widen 4 to 6 lanes	\$21.00
42	Williams Parkway	North Park Drive	Torbram Road	Widen 4 to 6 lanes	\$12.78



To develop formal plans for specific road improvements, environmental assessment studies will need to be carried out and approved through the EA process.

J:\01 PROJECTS\2013 jobs\16-13074.DBR (Brampton TMP)\Network Mapping\iii. Mapping\ii. MXD Files\i. Road Network

Legend

- Expanded to Two Lanes
- Expanded to Four Lanes
- Expanded to Six Lanes
- New Road Construction Four Lanes
- New Road Construction Six Lanes
- Provincial Highway
- GTA West Corridor Study Area
- Conceptual Road Network for use in the Development Charges Background Study

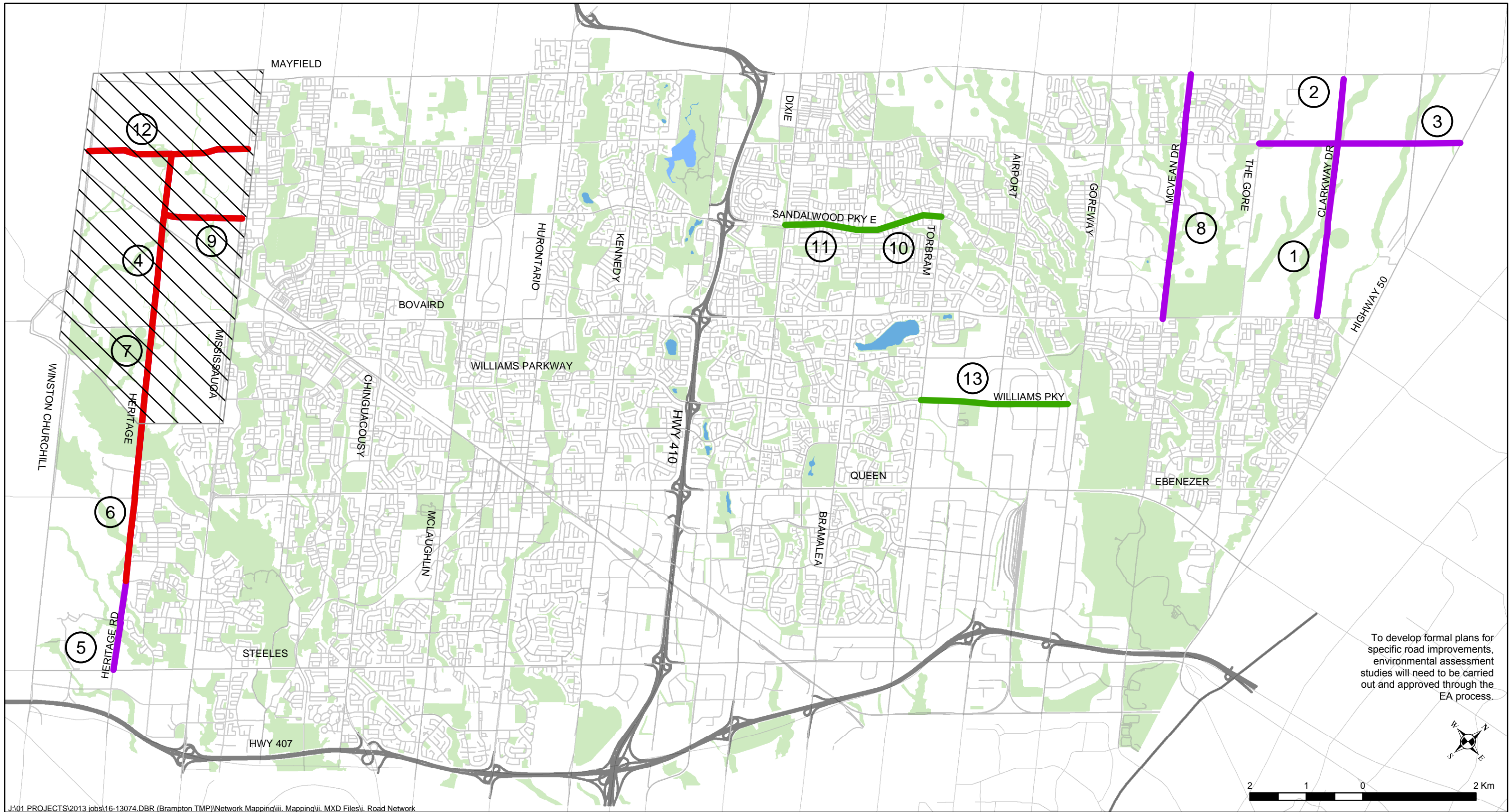
Figure 29
Road Projects Recommended for Implementation in the Short Term Horizon

11.2 Medium Term Horizon

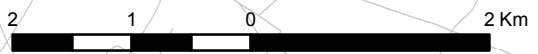
The medium term horizon has been designated as the year 2031. Projects in the Development Charges Study were considered and reconfirmed to be necessary for implementation by this year. Road projects for implementation by the 2031 horizon year are shown graphically in **Figure 30** and listed in **Table 17**.

Table 17: Road Projects for Implementation in the Medium Term Horizon

No.	Road	From	To	Type of Improvement	Indicative Cost (\$M)
1	Clarkway Drive	Castlemore Road	Countryside Drive	Widen 2 to 4 lanes	\$16.88
2	Clarkway Drive	Countryside Drive	Mayfield Road	Widen 2 to 4 lanes	9.91
3	Countryside Drive	The Gore Road	Highway 50	Widen 2 to 4 lanes	\$23.85
4	Heritage Road	Bovaird Road	Wanless Drive	Widen 2 to 4 lanes	14.59
5	Heritage Road	Steeles Avenue	Financial Drive	Widen 2 to 4 lanes	\$14.68
6	Heritage Road	Financial Drive	New Road A	Widen 2 to 4 lanes	\$14.79
7	Heritage Road	New Road A	Bovaird Drive	Widen 2 to 4 lanes	\$30.31
8	McVean Drive	Castlemore Road	Mayfield Road	Widen 2 to 4 lanes	\$38.44
9	Sandalwood Parkway	Mississauga Road	Heritage Road	New 4 lane road	6.44
10	Sandalwood Parkway	Bramalea Road	Torbram Road	Widen 4 to 6 lanes	\$7.27
11	Sandalwood Parkway	Dixie Road	Bramalea Road	Widen 4 to 6 lanes	\$4.88
12	Wanless Drive	Winston Churchill Boulevard	Mississauga Road	Widen 2 to 4 lanes	15.41
13	Williams Parkway	Torbram Road	Humberwest Parkway	Widen 4 to 6 lanes	\$12.81



To develop formal plans for specific road improvements, environmental assessment studies will need to be carried out and approved through the EA process.



J:\01 PROJECTS\2013 jobs\16-13074.DBR (Brampton TMP)\Network Mapping\iii. Mapping\ii. MXD Files\i. Road Network

Figure 30
Road Projects Recommended for Implementation by the Medium Term Horizon

11.3 Long Term Horizon

A main focus of this TMPU has been on the long term horizon, year 2041. With new population and employment forecasts for this year, the City wanted to begin to plan for the necessary transportation network to accommodate travel demand by this new horizon year that was not included in the 2009 TTMP. By the year 2041, the City's population is expected to reach approximately 900,000, a growth of 350,000 people from existing population estimates. Employment is expected to grow by 155,000 to 325,000. This 64% growth in population and 91% growth in employment in the timeframe covered by this TMPU elicit the need for multi-modal transportation improvements to keep people and goods moving.

While the analysis of the preferred alternative for 2041 included Regional roads, this phasing and implementation plan only documents City roads and the indicative cost to construct these roads. Regional roads will be confirmed and costed through an update of the Regional TMP. The long term road network improvements for City roads are displayed graphically on **Figure 31**, and listed in **Table 18**.

Table 18: Road Projects for Implementation by the Long Term Horizon

No.	Road	From	To	Type of Improvement	Indicative Cost (\$M)
1	Chinguacousy Road	Bovaird Drive	Wanless Drive	Widen 4 to 6 lanes	16.24
2	Chinguacousy Road	Wanless Drive	Mayfield Rd.	Widen 4 to 6 lanes	5.21
3	Creditview Road	Bovaird Drive	Mt. Pleasant Transit Spine	Widen 4 to 6 lanes	6.89
4	East-west Connection	Mount Pleasant GO Station	Winston Churchill Boulevard	New 4 lane road	23.40
5	Ebenezer Road	Queen Street	Highway 50	Widen 4 to 6 lanes	15.16
6	Heritage Road	Wanless Drive	Mayfield Road	Widen 2 to 4 lanes	6.50
7	McLaughlin Road	Queen Street	Steeles Avenue	Widen 4 to 6 lanes	14.88
8	Sandalwood Parkway	Heritage Road	Winston Churchill Boulevard	New 4 lane road	8.30
9	Torbram Road	Mayfield Road	Countryside Drive	Widen 4 to 6 lanes	5.06



To develop formal plans for specific road improvements, environmental assessment studies will need to be carried out and approved through the EA process.

J:\01 PROJECTS\2013 jobs\16-13074.DBR (Brampton TMP)\Network Mapping\iii. Mapping\ii. MXD Files\i. Road Network

Legend

- Expanded to Four Lanes
- Expanded to Six Lanes
- Conceptual Road Network for use in the Development Charges Background Study
- Provincial Highway

Figure 31
 Road Projects Recommended for Implementation by the Long Term Horizon

12. AIR QUALITY

The City of Brampton desires a more sustainable transportation system in order to help produce a more sustainable overall environment in the city and the surrounding area. Air quality is an area of particular concern in this regard, since motor vehicles produce a variety of emissions that may reduce air quality or contribute to climate change, including carbon dioxide (CO₂), carbon monoxide (CO), particulate matter (PM), oxides of nitrogen (NO_x), oxides of sulphur (SO_x), and volatile organic compounds (VOCs). Among these compounds, CO₂ is the most significant in terms of amount produced and it also plays a critical role in climate change. This chapter of the TMPU focuses specifically on CO₂ emissions, recognizing that other emissions may also influence air quality. The influence of transportation on air quality is outlined at a high level in **Section 12.2**. Strategic directions that would allow the city to manage the air quality impacts associated with transportation are identified in **Section 12.3**.

12.1 How Does Air Quality Affect Brampton?

Air quality has an impact on the lives of Brampton residents in a number of ways. Poor air quality negatively affects individuals' health, and research from the Ontario Medical Association indicates that each year there are approximately 6,000 premature deaths in Ontario that are attributable to air pollution. Transportation related air pollution is also a contributing factor to climate change, which may have long-term impacts both locally and globally. Finally, a healthy environment with clean air will contribute to Brampton residents' ability to enjoy their communities and participate in outdoor activities, helping to maintain the high quality of life in the city.

12.2 Emissions Analysis

The results of a high level emissions analysis are shown in **Table 19**. The purpose of this analysis is to understand and compare the air quality implications of the future transportation scenarios that were modelled for the TMPU. This analysis focuses specifically on CO₂ emissions during peak hour travel. Emission estimates are calculated based on the Natural Resources Canada 2014 Fuel Consumption Guide estimates for mid-sized vehicles. Since fuel efficiency decreases under congested conditions, CO₂ emissions are calculated separately for congested and uncongested vehicle kilometres travelled (VKT). The fuel consumption rate for congested VKT is based on average consumption for "City" driving, whereas fuel consumption rate for uncongested VKT is based on 50% "Highway" driving and 50% "City" driving.¹ These fuel consumption estimates are converted to CO₂ emissions using a conversion factor of 2.4 kilograms of CO₂ emissions per litre of fuel.

¹ Average "City" fuel consumption for mid-size vehicles is 6.7 L / 100 km; average fuel consumption for 50% "City" driving and 50% Highway driving is 8.4 L / 100 km.



Table 19: Comparison of Environmental and Energy-Efficient Factors for the TMPU 2041 Alternatives

Alternative	Peak Hour VKT	% of Peak Hour VKT Congested	Total Emissions (tonnes CO ₂ per peak hour)
2011 Existing Conditions	1,019,567	17%	171
Alternative 1: Do-Nothing (6%)	1,732,815	65%	325
Alternative 2: Base Case (6%)	1,770,583	56%	325
Alternative 3: 2009 TTMP (10%)	1,767,657	33%	308
Alternative 4: 2009 TTMP (10%) with mixed traffic	1,756,131	34%	307
Alternative 5: Transit Scenario (16%)	1,669,375	28%	287
Alternative 6: Transit Scenario (16%) with 4-lane BRT corridor	1,652,265	31%	287
Preferred Alternative 7: Transit Scenario (16%) with 6-lane BRT corridor and lower BRT speed	1,666,194	29%	288

The results of the emission analysis indicate that the predicted growth in population and associated growth in travel demand will invariably lead to an increase in CO₂ emissions. However, the alternative scenarios analysed show a range of respective emission levels. The 2041 Base Case and 2041 Do Nothing scenarios result in the highest emission outputs, as well as the highest levels of congestion. The three scenarios with a 16% transit mode share, including the Preferred Alternative, result in the lowest emission levels with approximately 287-288 tonnes of CO₂ being produced per peak hour of travel.

The emission forecasts presented in **Table 19** do not consider the impacts of any specific policies or programs that aim to reduce emissions. A number of initiatives could potentially reduce emissions below the forecasted levels if they were implemented in Brampton. An overview of these strategies is presented in the following section.

12.3 Strategic Directions

Transportation emissions are shaped by a number of factors, including the need to travel, mode of transportation, driving behaviour, and vehicle characteristics. For each of these factors, a range of strategies exist that can potentially reduce emissions. These strategies include policies, programs and initiatives that could be implemented by the City of Brampton. The following subsections highlight some of these strategies which could be considered in greater detail for implementation.

12.3.1 Trip Length and Frequency

The most fundamental factor affecting transportation emissions is the amount of travel required for individuals to reach key destinations such as employment, recreation and retail. The more travel that is required for individuals to move between the locations where they live, work and play the more pollutants will be released through transportation. Land use patterns such as density and land use mix are therefore one of the most important factors determining trip length and frequency. Well-planned communities where a variety of uses and amenities can be reached without using an automobile are associated with a reduction in the length and frequency of trips needed to reach common destinations.

A secondary benefit arising from shorter and less frequent trips is a potential reduction in congestion, which may further enhance air quality. Congestion negatively affects air quality by increasing travel time, adding to the emissions that would be needed to make a trip under free flow conditions. Congestion may also be reduced in some cases by increasing roadway capacity on strategic links in the network, which is a measure that is already included in the preferred alternative. The reduction in emissions associated with these improvements can be seen in **Table 19**.

12.3.2 Travel Modes

Beyond reducing the overall amount of travel undertaken by each individual, efforts to improve air quality may involve shifting travel toward transportation modes that produce fewer emissions per passenger kilometre (km). Emphasis should be placed on shifting travel from single occupancy vehicles, which typically have comparatively high emissions, to active transportation, transit and car-pooling.

Active transportation produces negligible emissions, and therefore has a positive impact on air quality, among other benefits. The potential for shifting trips toward active modes is particularly strong for trips of 5 km or less in the case of cycling and 2 km or less with respect to walking. In order to achieve this shift, however, a number of important barriers must be addressed. First, active transportation must be perceived as safe, even by relatively inexperienced users. This requires an investment to build a network that connects origins and destinations with facilities that are safe, comfortable and direct, as discussed in detail in **Technical Report #5: Active Transportation**. End-of-trip facilities such as bicycle parking and shower facilities must also be available in order for cycling to be seen as a convenient travel option.

While the negative impact of active transportation users on air quality is negligible, active transportation users experience greater exposure to emissions and poor air quality than travellers on other modes. This is particularly true for active transportation users travelling on on-road facilities with high volumes of motor vehicle traffic. Since poor air quality may be a deterrent to using active transportation, efforts to improve air quality and to increase the use of active transportation are therefore mutually supportive.

Beyond active transportation, the motorized transportation mode with the lowest emissions per passenger kilometre is typically transit. Since buses and diesel trains can carry a large volume of

passengers, the emissions from these vehicles per passenger km are typically much lower than the emissions for single occupancy vehicles. Electric trains including most light rail vehicles have zero point-source emissions, further improving their air quality performance. While these vehicles may be associated with emissions through electricity consumption, these can either be reduced by relying on non-emitting generating sources or mitigated through advanced pollution control measures at the source.

The 2041 preferred scenario results are contingent upon attaining a 16% mode split for Brampton Transit. To achieve this, the City should continue to aggressively promote and expand Brampton Transit's services, as outlined in **Technical Report #4: Future Transit Provisions**. Building on the success of the ZÜM rapid bus service, the City of Brampton should continue to be a strong supporter of higher order transit on major arterial corridors. Supporting the plan to add electrified Light Rail Transit (LRT) along the Hurontario corridor, and supporting all day, two-way electrified GO Train service are two particularly important strategies that could significantly reduce emissions. As transit mode share increases, air quality is improved not only by reducing the single occupancy vehicle mode share, but also by increasing the feasibility of low-emitting, rapid transit technologies such as LRT.

12.3.3 Driving Behaviour

While increasing the convenience of active transportation and transit will shift mode share away from single occupancy vehicles, many individuals will continue to rely on automobiles to reach their destinations. The final two strategic directions therefore focus on how the negative air quality impacts of motor vehicle use can be mitigated.

From a behavioural perspective, the greatest gains in air quality can be achieved through increased car-pooling. This strategic direction can involve a range of initiatives and partnerships, such as increasing the number of high-occupancy vehicle lanes on highways and arterial roads, providing more car-pool parking lots, supporting Smart Commute programming, implementing social marketing campaigns, and providing other incentives such as preferential employee parking for car-pool participants.

Other opportunities to affect driving behaviour could also be explored, such as social marketing campaigns that encourage emission-reducing driving habits. Support for car-share programs, which provide individuals with access to motor vehicles when they need to drive, and an incentive to use other modes when they don't need to drive should also be considered.

12.3.4 Vehicle Characteristics

A number of vehicle-related factors also affect air quality, and there are opportunities for the City of Brampton to address these factors as well. Over the past several decades, significant gains have been made in reducing the amount of emissions produced by individual vehicles. This trend is likely to continue, particularly as hybrid vehicles, and more recently fully electric vehicles, become more common. The City of Brampton can encourage this trend by providing electric vehicle infrastructure, such as charging stations. Hybrid and electric vehicles should also be given consideration for fleet purchases by the City, including the transit fleet which already contains some



hybrid vehicles. Another strategy may be to selectively restrict truck traffic through time or lane based restrictions, where appropriate.

12.3.5 Overview of Strategic Directions

A number of the measures introduced above are often implemented through transportation demand management (TDM) programs. The Region of Peel has had a TDM plan in place since 2004, and Smart Commute has also been actively implementing TDM measures in Brampton for several years. As discussed in **Technical Report #6: Transportation Demand Management**, the City of Brampton should consider expanding its own TDM initiatives and increasing its support for partner initiatives such as Smart Commute. The expansion of City Hall in Brampton is also an important opportunity to integrate TDM into the design and construction of the facility by including bicycle parking and shower facilities, preferential car-pool parking, and other measures. The City of Brampton should become a leader in TDM and demonstrate a model that can be adopted by other organizations.

The specific air quality implications of the measures introduced above could be analyzed in greater detail by developing an Air Quality Strategic Plan, as was recommended in the 2009 TTMP. This plan could examine a broader range of emissions beyond CO₂, and provide detailed emission reduction estimates for various strategies. Based on this information, funding and other resources could be invested in the strategies that were found to be most effective.

Many of the strategic directions for air quality included in this report have synergistic effects with each other. For example, increasing the use of active transportation not only reduces emissions directly, but may also lead to a reduction in congestion, and have secondary air quality benefits. As population growth generates increasing demand for travel, such synergistic strategies that can have a positive impact on air quality should be given greater consideration.

13. FINANCING

The TMPU recommends numerous transportation improvements to keep pace with the forecast growth in travel demand. Funding opportunities should be reviewed in order to maximize the ability of the City to construct the proposed improvements in line with the implementation phasing plan. Several funding alternatives have been identified and are summarized in this section.

13.1 Federal Programs

As part of the New Building Canada Plan, the New Building Canada Fund was established in 2014 to fund projects from 2014 to 2024. There is \$2.7 billion designated for Ontario projects in the New Building Canada Fund, and an estimated \$8.12 billion under the federal Gas Tax Fund. There are two major components under the New Building Canada Fund:

- The National Infrastructure Component (NIC) which provides funding for projects of national significance, with a focus on projects that have broad public benefits, and that contribute to long-term economic growth and prosperity.
- The Provincial-Territorial Infrastructure Component (PTIC) which supports infrastructure projects of national, regional and local significance that contributes to economic growth, a clean environment, and stronger communities. The PTIC is divided into two sub-components:
 - National and Regional projects (PTIC–NRP); and
 - Projects located in communities of fewer than 100,000 residents through the Small Communities Fund (PTIC–SCF).

Under the PTIC, each province and territory will receive a base amount of \$250 million plus a per capita allocation over the 10 years of the program. The per capita amount is based on the Statistics Canada Final 2011 Census figures.

Cities such as Brampton typically explore federal programs on a regular basis to identify any funding opportunities for local transportation projects.

13.2 Province of Ontario Programs

Infrastructure Ontario's Loan Program provides long-term financing to eligible public sector clients to help renew infrastructure and deliver value to customers and residents. Infrastructure Ontario (IO) advertises the loan program as benefiting from:

- Affordable rates;
- Access to capital market financing without any fees or commissions;
- Longer loan terms designed to match the life of the asset;
- No need to refinance over the life of the loan;
- Eligibility for any depreciable capital expenditure; and
- Online application with access to dedicated and experienced staff.



IO loans can be used for any capital investment including roads, bridges and other projects that enhance mobility for all transportation users.

13.3 Development Charges

The City's Development Charges By-law has been updated concurrent with the preparation of the TMPU. The City uses development charges to recover some of the capital cost expenditures necessary to service new developments. The Development Charges Study identifies projects and costs eligible for collection through development charges.

13.4 Provincial Cycling Funding

The Province announced at the 2014 Ontario Bike Summit that it will provide \$25 million for cycling facilities on provincial highways and municipal roads over the next three years in an effort to make Ontario Canada's premier cycling province. The City should consider applying for some of these funds and should recognize that the Provincial government seeks to fund "quick wins" and pilot projects as they consider which cycling projects to put forward for funding.

13.5 Other Alternative Infrastructure Funding Mechanisms

Other alternative funding mechanisms that could be considered by the City in order to fund transportation infrastructure projects include private sector sponsorship and focused advertising. Brampton Transit already allows advertising on buses and at bus stops and stations. Revenues could continue to be used to maintain, enhance or expand transit services as well as cycling and walking linkages to transit stops.



14. MONITORING THE TMPU

Tracking progress on implementing transportation studies, initiatives and physical projects should go hand-in-hand with measuring progress toward mobility goals. Together, this monitoring will help validate the transportation projects included in the TMPU and will also help identify where modifications or updates to the TMPU are needed in order to better meet the set performance goals.

14.1 Progress toward Performance Goals

Transportation investments identified in the TMPU are designed to improve mobility in the City. The performance goals set forth in this TMPU are listed in **Table 20**. These are ambitious goals that represent a 100% increase in local transit mode split, a 100% increase in walking and cycling and a 56% increase in carpooling by the year 2041.

Table 20: Performance Indicators and Measures

Indicator	Measure	Data	Year	Goal
Local transit mode split of 16%	Modal share of transit trips during the PM peak period	TTS Survey, Brampton Transit Ridership data, City / Regional traffic counts	2016	8%
			2021	10%
			2026	12%
			2031	14%
			2041	16%
Walking and Cycling	Modal share of walking and cycling during the PM peak period	TTS Survey, City counts	2016	5%
			2021	6%
			2026	7%
			2031	8%
			2041	10%
Road Network Congestion	Volume to capacity ratios on screenlines during the PM peak period	Cordon count program or City / Regional counts, as available	2016	0.76
			2021	0.82
			2026	0.82
			2031	0.83
			2041	0.85
Transportation Demand Management	Modal share of auto passenger during the PM peak period	TTS Survey	2016	20%
			2021	22%
			2026	24%
			2031	26%
			2041	28%

Data is critical for being able to measure performance. The Transportation Tomorrow Survey (TTS) is the most comprehensive survey available in the Greater Toronto Area. It is conducted every five years, with the most recent year being the 2011 survey. Data typically are not available for use until

two years after the survey, so there likely will be a lag in the reporting time to measure progress. The City could conduct its own household survey if more frequent updates were desired.

Brampton Transit regularly collects transit ridership data and reports these data on a yearly basis. These data should be reviewed to observe any trends in increasing ridership and should be considered in light of population and employment increases and traffic count data.

Active transportation is seen as an important mode of travel. With a focus on taking active transportation to the next level in Brampton through the development of an Active Transportation Master Plan, the impact of investments in active transportation should be monitored through the TTS data. The City may also consider surveys to gauge the public's interest in active transportation as well as to measure any change in the public's attitudes towards using active transportation for everyday travel needs. Cycling counts could be conducted on select routes to begin to build a database of cycling data, which will help quantify usage of facilities.

Vehicle traffic in Brampton also should be measured. The Cordon Count Survey is conducted every five years in line with the TTS. In addition, Peel Region conducts regular traffic counts on Regional roads within Brampton. The City should establish an annual traffic counting program on City roads. Data from such a program could be used to help monitor road network congestion. The performance goal is to manage traffic volumes to ensure mobility but not to overbuild roads at the expense of other funding priorities. The performance measures indicate that a level of roadway congestion is acceptable.

14.2 Progress toward Project Implementation

A second facet of monitoring is to gauge the progress of implementing the projects, plans and strategies recommended in the TMPU. An electronic monitoring plan can be prepared with links to related documents or files, such as approval authority for individual projects. The elements of the monitoring plan could include the:

- Monitoring Plan Report;
- Timing; and
- Staffing.

14.2.1 Monitoring Plan Report

A sample monitoring plan checklist is shown in **Figure 32**. This checklist can be used for road projects as well as other types of transportation improvements, such as the construction of new active transportation facilities. The type of information that would be expected to be entered into each column of the spreadsheet is described below:

- Project ID
 - A unique identification number should be assigned to each project
- Project Name
 - The projects listed in the TMPU would be input into this column



- Project Description
 - A brief description of each project should be provided
- Implementation Year
 - Beginning with the most current and extending to the ultimate horizon, the implementation year as set forth in the TMPU would be listed in this column
- Budget
 - The initial budget would be taken directly from the Development Charges Study. As the project gets closer to the implementation date, a more detailed budget should be developed by the City. This section could be expanded to include the source(s) of funds (City, Region, Province or other) and the status (approved or proposed). Monitoring would entail checking budget demands and draws in order to determine how much of the budget has been spent.
- Status
 - Projects would be classified as On Schedule, Delayed, Postponed, Terminated or Complete. The City may modify these terms, however, a set list of terms is recommended for consistency and a clear understanding
- Department Lead
 - City department responsible for the project implementation
- Staff Lead
 - Staff person within the City department who is the project manager for the project implementation
- Issue Resolution
 - This section is the most important part of the monitoring plan, since it clearly defines the issues that may hinder implementation. It also requires an action plan with a person responsible, and a date for the action to be taken
 - Issue: Summary of the issue preventing implementation
 - Resolution: Proposed solution to be adopted
 - By Whom: Staff assigned to carry out the solution
 - Completion Date: Deadline for issue resolution



Figure 32: Sample Monitoring Plan Checklist

Project Name: Sample Name			
Project Description:	A brief description of each project should be provided.	Project ID:	123456789
		Implementation Year:	20??-20??
		Budget:	\$\$\$
		Status:	Complete
		Department Lead:	Mr. John Doe
		Staff Lead:	Ms Jane Doe
Issue Resolution:			
Issue:	Defines the issues that may hinder implementation. Requires an action plan with a person responsible and a date for the action to be taken.	By Whom:	Mr. John Doe
Resolution:	Proposed solution to be adopted.	Completion Date:	January-01-15

14.2.2 Timing

Timing has been recommended for project monitoring and is related to the expected implementation date of the project. The closer the project gets to its implementation deadline, the more often the project should be monitored, as shown in **Table 21**. If automated, notifications could be sent via e-mail to the implementation coordinator and any project managers, alerting them of the need to update the project monitoring plan. Automation could be used for routine monitoring and also could be used for risk management as part of the issue identification process.

Table 21: Project Monitoring Frequency

Project Implementation Date	Frequency of Monitoring
Within the next two years	Quarterly
Greater than two years but less than five years	Bi-annually
Five years or greater	Annually

14.2.3 Staffing

The City should assign a staff person to the role of TMPU implementation coordinator. This person would be responsible for preparing regular reports on the implementation progress. The person would liaise with the various project managers assigned to implement the projects in order to understand the project status. The report issued would be a completed monitoring plan spreadsheet. This spreadsheet could be submitted to City general managers or Council, as appropriate.



15. SUMMARY OF SHORT TERM RECOMMENDATIONS

Multi-modal recommendations have been made throughout this report. This chapter groups all of the short term recommendations in one place and acts as the action plan for the City for the next five years, until such time as the TMP is reviewed and updated again. City actions to be undertaken in the next five years in the areas of road, transit, active transportation, transportation demand management and goods movement are summarized in the following subsections of this chapter.

15.1 Road Short Term Actions

Chapter 11 provides a detailed listing of future road projects for construction. These have been grouped by 2021, 2031 and 2041 horizon years. As part of the short term action plan for roads, the City should:

- Conduct a review of the City's Engineering and Design Standard Drawings to make sure that they conform to best practices for multi-modal travel; and
- Begin to implement the road projects contained within the short term horizon (year 2021).

15.2 Transit Short Term Actions

Building upon the success of the ZÜM network, four additional corridors have been identified for implementation by the year 2021. These include:

- Bovaird ZÜM from Mount Pleasant GO to Queen Street (in 2014)
- Steeles West ZÜM from Main Street to Lisgar GO (in 2015)
- Queen West ZÜM from Main Street to Mississauga Road and to Mount Pleasant GO (in 2016)
- Airport ZÜM from Steeles Avenue to Bovaird Drive (in 2018)

Additionally, introduction of two-way, all-day GO train service to the three GO train stations in Brampton is critical to the City's ability to achieve mobility goals set forth in the TMP Update. The City should strongly advocate for this expansion of GO train services in Brampton.

Recommendations for longer term additional network expansion and related transit facilities are provided in **Technical Report #4: Future Transit Provisions**.

15.3 Active Transportation Short Term Actions

The City of Brampton should prepare its own Active Transportation Master Plan, which would be an update to the City's Pathways Master Plan. The work in this TMP Update has laid the ground for such a plan by identifying candidate active transportation routes to complement the City's existing network of on- and off-road facilities. The next step in the process, which would be the critical main step in the ATMP, is the identification of facility types for the candidate routes. Detailed site investigations are needed to determine the most appropriate routes and the most appropriate types of facilities.



15.4 Transportation Demand Management Short Term Actions

There are a series of 14 recommended actions listed in the TDM Strategy Technical Report. These recommendations are focused on enhancing the City's existing TDM efforts. First and foremost among the recommendations is to hire a staff person that could be dedicated to lead the TDM program for the City. This person would work with Peel Region and Smart Commute Brampton – Caledon and would be able to develop and implement a detailed TDM action plan that would build upon and enhance the City's existing TDM efforts. Details regarding all of the TDM recommendations are included in **Technical Report #6: Transportation Demand Management**.

15.5 Goods Movement Short Term Actions

Goods movement generally is directed to Regional roads in the city; however, many industries use City roads to access Regional roads. To further develop and support the freight industry, the Goods Movement Review Technical Report recommends that the City conduct a freight audit. A freight audit is a planning and economic development tool that would assist the City in making informed decisions to enable the safe and efficient movement of freight. The objectives of a freight audit include identifying locations where freight activities are generated or attracted (currently or in the future); operating constraints; and stakeholder dialogue. It is necessary to conduct a freight audit in order to identify issues affecting local freight movements and help establish priorities to support the safe and efficient movement of freight.

A freight audit involves the following components:

- Set-up
 - Problem definition
 - Identification of staff and financial resources
 - Project planning
- Data collection and management
 - Quantitative data collection
 - Intelligence gathering and stakeholder consultation
 - Site visits
- Analysis
 - Infrastructure
 - Applicable policies, regulations and by-laws
 - Enforcement practices
- Communication
 - Freight audit report

A freight audit will provide the City with a firm understanding of its freight-related assets and will help the City leverage these assets by identifying opportunities, constraints and next steps needed to support goods movement. More details regarding the freight audit are provided in **Technical Report #7: Goods Movement**.