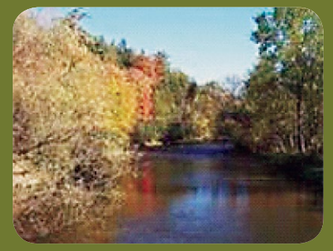
GTA West

GTA West Corridor Environmental Assessment Study

Transportation Development Strategy Report - November 2012



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1 Introduction

1.1. STUDY BACKGROUND

Over the last several decades South-Central Ontario has evolved from a Toronto-based employment centre to a large geographic region with many centres of economic activity, employment and population. Travel demand is increasingly dispersed, with travel occurring between many employment and residential areas within and outside the Greater Toronto Area (GTA). Future population and employment growth in major urban centres will result in an increase in travel demand for both people and goods movement between the centres that are spread across the Greater Golden Horseshoe (GGH).

One of the Ontario government's efforts to deliver a long-term sustainable plan for transportation and better transit in the GTA-Hamilton area is through Metrolinx, a Provincial agency that has been established to create a seamless, integrated transportation network.

In June 2006, the then Minister of Public Infrastructure Renewal (now split into the Ministry of Energy and Ministry of Infrastructure) released the *Growth Plan* for the Greater Golden Horseshoe (the *Growth Plan*). The *Growth Plan* outlines a set of policies for managing growth and development and guiding planning decisions in the GGH, and represents a planning "vision" for the province. It is accompanied by the Places to Grow Act (2005) which requires that planning decisions made by the province, municipalities and other authorities conform to the policies contained in the *Growth Plan*.

The province also established the *Greenbelt Plan* (2005) through the Greenbelt Act 2005. Together, the *Greenbelt Plan* and the *Growth Plan* provide clarity and certainty about urban structure, where and how future growth should be accommodated, and what must be protected for current and future generations in the GGH area. The *Growth Plan* and the *Greenbelt Plan* build on the Provincial Policy Statement, 2005 (PPS, 2005) and are to be read in conjunction with the PPS.

The *Growth Plan*'s policy directions include transportation improvements to accommodate intended growth. To realize these policy directions, the Ontario Ministry of Transportation (MTO) has commenced an Environmental Assessment (EA) study to examine long-term multi-modal transportation needs for moving people and goods in the GTA West Corridor, including parts of the regions of York, Peel and Halton, the County of Wellington and City of Guelph. The study identifies and validates the transportation problems and opportunities within the preliminary study area, and evaluates a variety of alternatives to address them, culminating in an integrated, multi-modal Transportation Development Strategy (Strategy) that offers choice for the efficient movement of people and goods. MTO is co-ordinating with Metrolinx, other ministries and municipalities as the EA study moves forward, as well as working with transportation service providers where MTO has limited ability to make changes (e.g. rail, air and marine).

Prior to approval of the province's *Growth Plan* a number of studies, including MTO's Central Ontario Strategic Transportation Directions (Draft 2002) indicated that MTO should examine long-term transportation needs to address a number of areas including future growth in the GTA from Highway 400 westerly to the Guelph area. The GTA West Corridor, identified in the *Growth Plan* as a "Future Transportation Corridor", represents a strategic link between the Urban Growth Centres in the west of the GTA including Downtown Milton, Downtown Brampton, Vaughan Metropolitan Centre (formerly known as Vaughan Corporate Centre) and Downtown Guelph.

1.2. STUDY PURPOSE

As economic activities in the GGH evolve from a Toronto-based platform to an economy of multiple centres, the Guelph-Kitchener/Waterloo-Cambridge triangle is becoming an important economic area in addition to Toronto's downtown and the several economic centres that surround it. The concentration of population and employment in the Guelph-Kitchener/Waterloo-Cambridge triangle introduces new transportation challenges in the western portion of the GGH as it is important that these economic centres are adequately linked. This is true for the continuing needs of commuter travel that provide the economic workforces and also for the increasing needs of goods movement between these centres.

In meeting these challenges, MTO is committed to taking a comprehensive and long-term approach in planning for future transportation infrastructure. The GTA West Corridor Planning and EA Study reflects the government policy objectives as outlined in the *Growth Plan, Greenbelt Plan and Provincial Policy Statement*. These policy objectives include a transportation network that links Urban Growth Centres through an integrated system of transportation modes characterized by efficient public transit, a highway system for moving people and goods with improved access to inter-modal facilities, international gateways (e.g. border crossings), airports and transit hubs.

The purpose of the GTA West study is to address long-term inter-regional transportation problems and opportunities and consider alternative solutions to address these issues as part of developing an integrated, multi-modal transportation system that enables the efficient movement of people and goods, and provides better economic and transportation linkages between Urban Growth Centres in the GTA West preliminary study area (as shown in **Exhibit 1-1**).

Stage 1 of the GTA West study was initiated according to the process outlined in the Environmental Assessment Terms of Reference (EA ToR) – depicted in **Exhibit 1-2**. This includes:

- Identifying the specific transportation problems and opportunities within the preliminary study area
- Developing, assessing and evaluating a range of Area Transportation System Alternatives to address the identified transportation problems and opportunities within the preliminary study area
- Recommending a Transportation Development Strategy based on the Area Transportation System Alternatives carried forward from the evaluation.

The Transportation Development Strategy is documented in **Chapter 6** and makes recommendations for transportation improvements required throughout the preliminary study area.

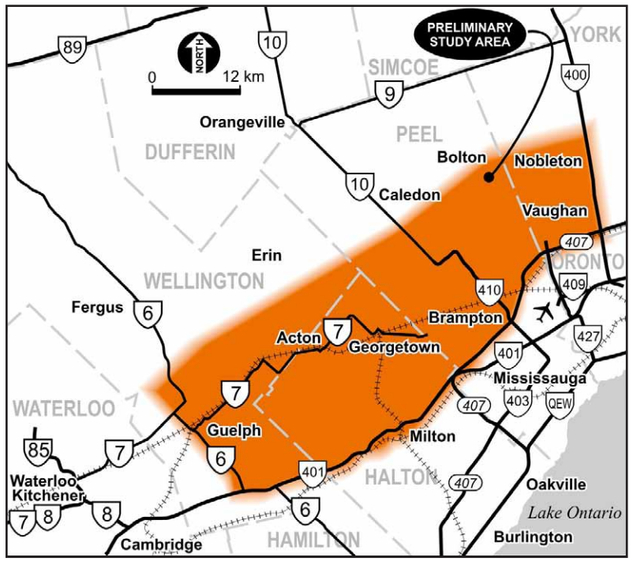


Exhibit 1-1: GTA West Preliminary Study Area

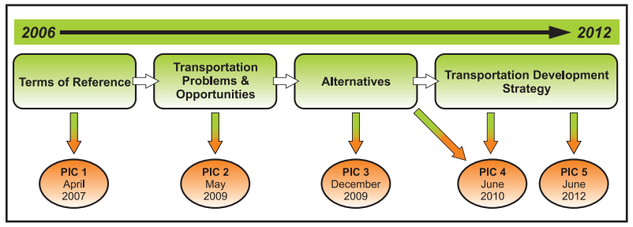


Exhibit 1-2: Study Schedule

1.3. STUDY PROCESS AND SCHEDULE

1.3.1. Planning and Environmental Assessment Process

Planning for all major infrastructure projects in Ontario is conducted in accordance with the requirements of the Ontario Environmental Assessment Act (OEAA) (R.S.O. 1990) unless otherwise exempted. The GTA West study is following the requirements of the OEAA under the Individual Environmental Assessment (Individual EA) process (Section 6.1 (2) of the OEAA).

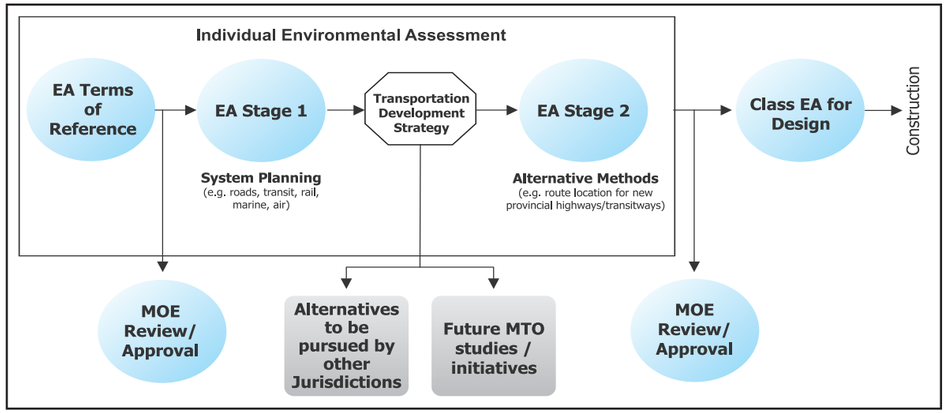


Exhibit 1-3: Environmental Assessment Process

Under the Individual EA process, the first step in an application for approval to proceed with the planning of an Individual EA study under the OEAA is the submission of a Terms of Reference (ToR) for the EA. A ToR sets out a framework that guides the preparation of the EA. The approval of the ToR is the first statutory decision made by the Minister of the Environment and Cabinet in the EA planning and approval process. The Ontario Minister of the Environment (MOE) approved the ToR for this study on March 4, 2008.

The overall EA process for the GTA West Corridor is outlined in **Exhibit 1-3**. Two formal MOE approvals are required: for the ToR and at the conclusion of the EA study.

As per the OEAA, Stage 1 of this EA study has been undertaken to be consistent with the requirements set out in Section 6.1 (2) of the OEAA, addressing the following components:

- A description of the purpose of the undertaking;
- A description and statement of the rationale for the proposed undertaking, Alternatives to the Undertaking, and Alternative Methods of Carrying Out the Undertaking;
- A description of:
  - The environment that will be affected or might reasonably be anticipated to be affected, directly or indirectly, by the undertaking, the Alternatives to the Undertaking, and the Alternative Methods of Carrying Out the Undertaking;
  - The effects that will be caused or that might reasonably be expected to be caused to the environment, by the undertaking, the Alternatives to the Undertaking, and the Alternative Methods of Carrying Out the Undertaking;
  - The actions necessary or that might reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking, the Alternatives to the Undertaking, and the Alternative Methods of Carrying Out the Undertaking;
  - An evaluation of the advantages and disadvantages to the environment of the undertaking, the Alternatives to the Undertaking, and the Alternative Methods of Carrying Out the Undertaking; and
  - A description of the consultation undertaken by the proponent and the results of the consultation.

As discussed above, Stage 1 of the GTA West study includes the following steps, as outlined in the study ToR:

- Identifying the specific transportation problems and opportunities within the preliminary study area.
- Developing, assessing and evaluating a range of area transportation system alternatives to address identified transportation problems and opportunities within the preliminary study area.
- Recommending a Strategy based on the area transportation system alternatives carried forward from evaluation.

The schedule for the study has been designed to allow the various technical and management teams adequate time to undertake thorough data collection and technical work, while providing adequate time for extensive consultation with stakeholders. Stage 1 of the GTA West Corridor Planning and EA Study has included the following key steps, as shown in **Exhibit 1-2**:

- Develop a Terms of Reference that guides the study (Public Information Centre #1 – April 2007)
- Identify transportation problems and opportunities (Public Information Centre #2 – March 2009)
- Identify and assess transportation alternatives that address the problems and opportunities (Public Information Centre #3 – November / December 2009)
- Select preferred transportation alternative(s) and recommend a multi-modal Strategy for the preliminary study area (Public Information Centre #4 – June 2010)
- Present findings of additional analysis in Halton Area per comments received on the Draft Strategy Report, February 2011, and the updated multi-modal Strategy for the preliminary study area (Public Information Centre #5 – June 2012)

Each round of public consultation included a number of consultation events, including Public Information Centres (PICs) at a minimum of four locations (PIC #1 to PIC #4) and two locations for PIC #5, and meetings with municipalities, regulatory agencies, First Nations and other stakeholders. Additional information on the study's consultation activities is provided in **Chapter 7**.

1.4. PURPOSE, RELEVANCE AND POSITION OF REPORT WITHIN STUDY PROCESS

The purpose of this report is to document the decision-making process in development of the Strategy, including assessment and evaluation of the area transportation system alternatives, and recommendations of alternatives to carry forward. This report represents the conclusion of this stage of the GTA West Corridor Planning and EA study, and a foundation for the next stage. All of the recommendations that fall within the jurisdiction of MTO (e.g. provincial highways and transitways) will be reviewed and the ministry will decide whether to proceed to Stage 2 of the study. Stage 2 will involve the assessment and evaluation of alternative methods corresponding to the recommended new corridor elements of the Strategy (i.e. route planning). All other recommendations that fall within MTO's jurisdiction, such as highway widening, will be pursued within the Provincial EA process. Recommendations that fall outside of MTO's jurisdiction will be forwarded to the relevant agencies and authorities for further review and action. **Chapter 6** describes the elements of the Strategy and the intent in furthering those initiatives outside of its jurisdiction.

As is featured in **Chapter 2**, a number of draft study reports have been prepared and circulated to date, leading up to this Transportation Development Strategy Report:

- Transportation and Economic Conditions Overview Report (July 2008, Updated December 2010)
- Environmental Conditions and Constraints Overview Report (July 2008, Updated December 2010)
- Overview of Corridor Protection and Development Issues Paper (June 2009)
- Area Transportation System Problems and Opportunities Report (July 2009, Updated December 2010)
- Area Transportation System Alternatives Report (April 2010, Updated January 2011)
- Draft Transportation Development Strategy Report (February 2011)

1.5. STUDY AREA AND AREAS OF INFLUENCE

The GTA West preliminary study area is presented in **Exhibit 1-1**. This area includes parts of York Region, Region of Peel, Halton Region, County of Wellington and City of Guelph. The preliminary study area includes the Urban Growth Centres of Downtown Brampton (Peel), Downtown Milton (Halton), Vaughan Metropolitan Centre (York) and Downtown Guelph (Guelph). It also includes areas designated under the Greenbelt Act and *Greenbelt Plan*.

It is recognized that transportation issues in the preliminary study area are related to and influenced by a much broader area. Therefore, inter-regional travel demand analysis has been carried out in a much broader context, including the consideration of major transportation infrastructure in proximity to the preliminary study area and linkages to / from other regional transportation services, hubs and gateways. These "Areas of Influence" include much of southern and central Ontario and allow for consideration of transportation connectivity to the international borders and the GTA. **Exhibit 1-4** highlights this relationship.

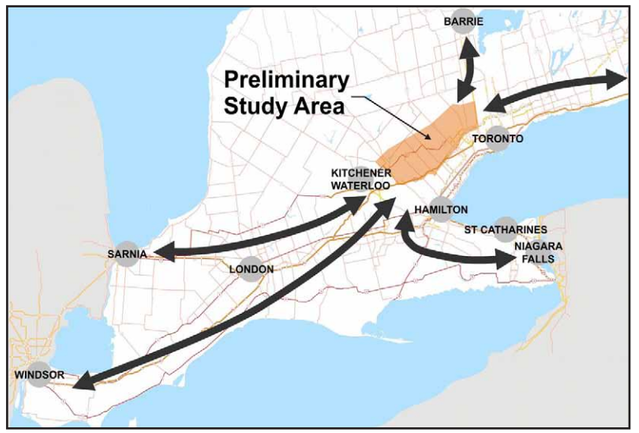


Exhibit 1-4: GTA West Areas of Influence

1.6. STUDY AREA TRANSPORTATION SYSTEM OVERVIEW

The "Area Transportation System" is comprised of transportation facilities that have the primary function of providing transportation linkages for the movement of people and goods by all modes between regions, cities and other major population and employment centres. The transportation system provides primary transportation linkages with an emphasis on connections to: cities and other centres of population and employment, including designated Urban Growth Centres; major transit service areas; and inter-regional facilities for goods movement, such as inter-modal facilities, airports and ports.

Several natural environmental features influence the provision of transportation services and mobility in the preliminary study area. These include the Niagara Escarpment, the designated Greenbelt Area, Credit River Watershed, Humber River Watershed, and the Oak Ridges Moraine. Currently, a limited number of road and rail corridors cross these existing natural constraints. The presence of sensitive natural habitat

or geographic conditions such as wide river valleys has an influence on the provision of transportation facilities.

1.6.1. Transportation Demand Management / Smart Commute

Smart Commute is an initiative of Metrolinx (an agency of the Ontario government) and the municipalities in the Greater Toronto and Hamilton Area (GTHA). It is currently the key Transportation Demand Management (TDM) co-coordinator / operator in the area and has been in operation in some form since 2004. Smart Commute's goal is essentially to ease gridlock, improve air quality and reduce greenhouse gas emissions. It offers an array of services across the GTHA, including; carpooling and vanpooling: exclusive ridematching programs for carpooling and vanpooling; site assessments and surveys to understand employee commute behaviour; shuttle programs; Emergency Ride programs; support for employee work arrangement solutions (telework, compressed work weeks and flex hours, workshops, lunch and learns and seminars); incentives and promotions; and Clean Air Commute and other events. As of March 2011, there were eleven Smart Commute offices in the GTHA, serving approximately 430,000 employees and post-secondary students (source: www.smartcommute.ca).

1.6.2. Transit

Existing Bus / Rail Passenger Transit System

Transit services are provided throughout much of the preliminary study area; the municipalities of York Region, Mississauga, Brampton, Milton, Waterloo Region and Guelph operate transit systems within or directly adjacent to it. These systems use local bus routes to provide access to a large coverage area of their respective jurisdictions, primarily in urban / suburban environments. Brampton and York also operate bus rapid transit along high-demand corridors.

Inter-regional transit systems provide service between urban centres. Major stops on these systems are typically transit hubs, such as bus terminals or train stations, often providing connections to different transit systems and serving key trip generators such as universities, shopping centres and highway commuter / carpool lots. Inter-regional transit services in the GTA West preliminary study area are illustrated in **Exhibit 1- 5**.

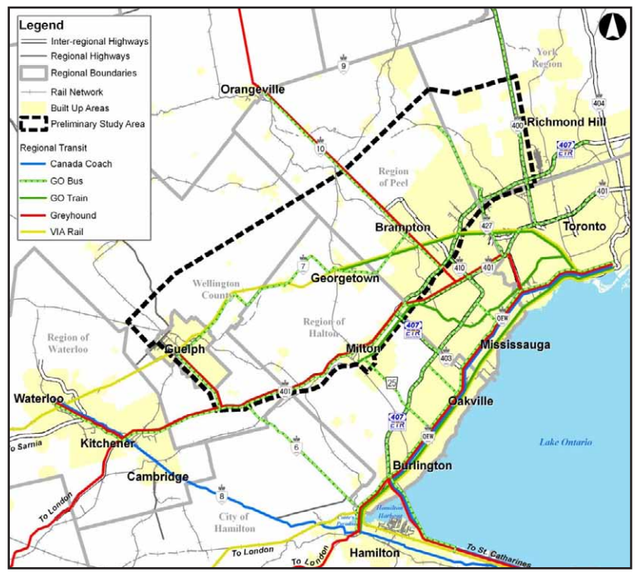


Exhibit 1-5: GTA West Area Inter-Regional Transit Services

These services include:

- Peak period GO train service from Toronto to Kitchener on the Kitchener Line;
- Peak period GO train service from Toronto to Milton on the Milton Line;
- GO bus service from Mississauga to Guelph;
- GO bus service from Mississauga to Kitchener-Waterloo;
- GO bus service from Toronto to Brampton;
- GO bus service from North York to Bolton;
- GO bus and train service from Toronto to Barrie;
- 407 ETR GO Bus services from York University to Guelph (407 West) and to Oshawa (407 East);
- Local GO Bus routes, including, Bronte GO Station to Milton and Brampton to Orangeville; and
- Greyhound Bus and VIA Rail provide scheduled services to London, Toronto, Hamilton and points beyond. Greyhound stops within the preliminary study area include: Brampton, Guelph, Georgetown, Bolton, Caledon and Milton. Coach Canada has numerous stop locations just outside of the study area and one in Guelph, and Abouttown operates a Saturday coach service from Guelph to Brantford. VIA Rail operates two trains daily each way along the Toronto – Sarnia route. VIA stations in the study area include: Brampton, Georgetown and Guelph.

Metrolinx Regional Transportation Plan (RTP)

Metrolinx was created by the Ontario government to develop and implement an integrated multi-modal transportation plan for the GTHA. In Spring 2009, Metrolinx merged with GO Transit. Its mandate includes providing seamless, coordinated transportation throughout the GTHA, which is Canada's largest and among North America's most rapidly growing region. Metrolinx plays an important role in developing a plan to resolve congestion problems, coordinate and improve transit systems, and create a more sustainable economy, environment and quality of life.

As referenced earlier in **Section 1.6.1**, a significant part of its mandate has been the creation of *The Big Move*, the Regional Transportation Plan (RTP) for the GTHA that includes a comprehensive regional transit network, as shown in **Exhibit 1-6** and **Exhibit 1-7**.

In addition to the transit-related strategies and priority items identified in the RTP, the following projects identified in the RTP have provincial funding committed and are within the GTA West preliminary study area:

- Upgrading York Region's VIVA BRT network;
- BRT investments complementary to the Mississauga Transitway; and
- The Spadina subway extension to the Vaughan Metropolitan Centre.

Future GO Transit projects were also documented as follows:

- GO rail service expansion to all-day, two-way service from Union Station to Milton;
- GO rail service expansion to all-day, two-way service from Union Station to Georgetown; and
- Peak period GO rail service to Bolton on a new line.

Metrolinx completed a study of the electrification of the GO rail system in January 2011.

Source: Metrolinx – The Big Move (2008)

Exhibit 1-6: The Big Move, Quick Wins for Regional Rapid Transit

Source: Metrolinx – The Big Move (2008)

Exhibit 1-7: The Big Move, 25 Year Plan for Regional Rapid Transit

GO Transit 2020 Strategic Plan

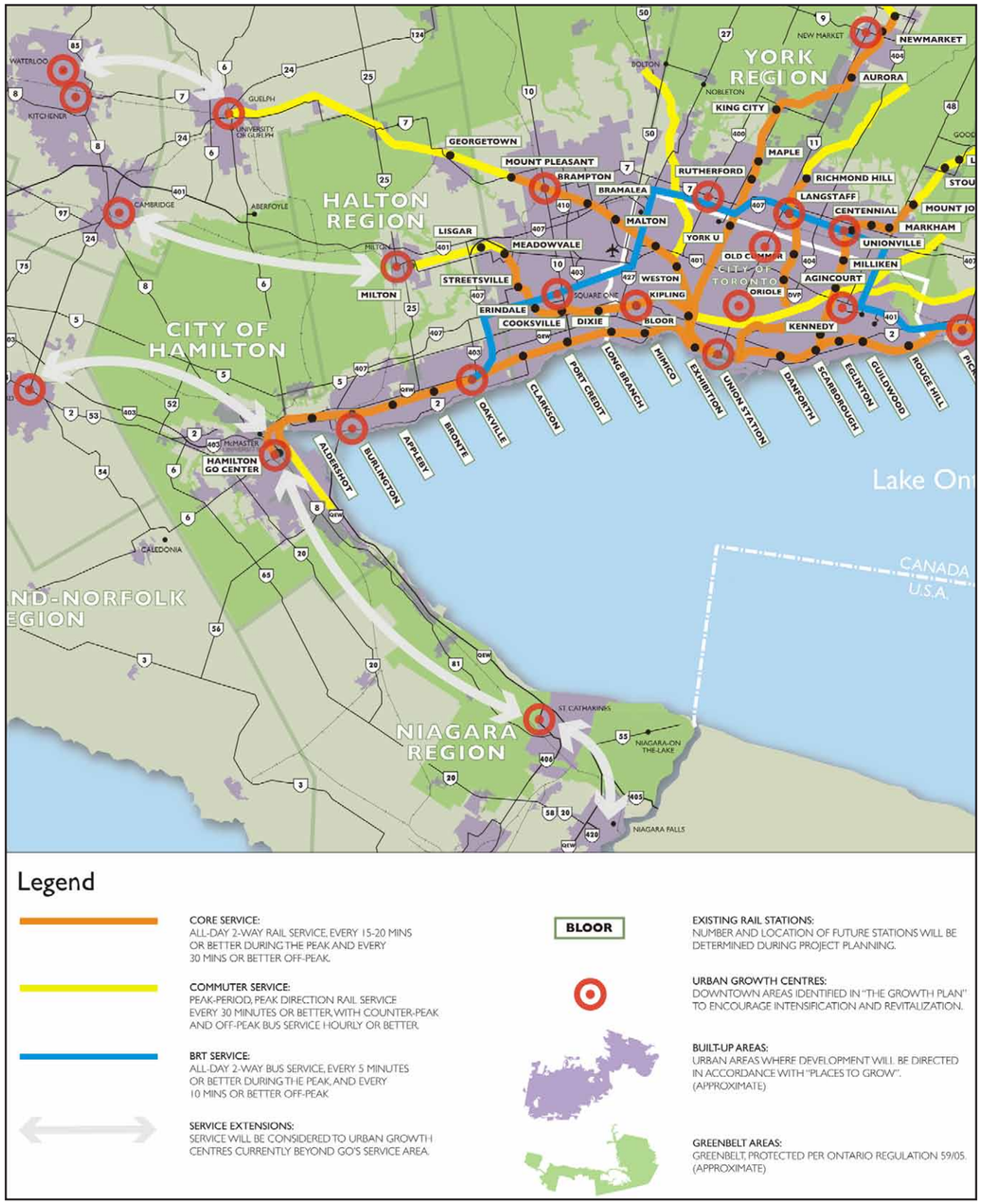
GO Transit provides regional bus and rail service in the Greater Toronto Area and beyond. Its service area was recently expanded to include a larger portion of the GGH, including the regional municipalities of Dufferin, Durham, Halton, Niagara, Peel, Peterborough, Simcoe, Waterloo, Wellington and York; and the municipalities Barrie, Guelph, Hamilton, Kawartha Lakes, Peterborough and Toronto.

GO Transit has developed the *GO 2020 Strategic Plan* (see **Exhibit 1- 8**) with a horizon year of 2020. The plan anticipates GO ridership to the Toronto core, served by Union Station, to more than double and GO ridership outside the Toronto core to triple. The number of riders travelling outside the Toronto core will grow from 12% to 16% of the increased total GO ridership. The *GO 2020 Strategic Plan* identifies the following improvements within the GTA West preliminary study area:

- Georgetown line: Peak period headway of 15 minutes from Toronto to Brampton, with some trips serving Georgetown and Guelph, and a 30-minute counter-peak headway; all day off-peak service to Mount Pleasant with bus service connections to Georgetown and Guelph;
- Milton Line: Maximum headway of 15 minutes from Toronto to Meadowvale, with express service during peak periods and counter-peak headways of 30 minutes; all day off-peak 30 minute headways to Meadowvale with bus service to Milton; and
- Bolton Line: Peak period headways of 30 minutes to Bolton with all-day service as warranted by demand.

Other potential GO Transit initiatives within the preliminary study area include:

- An EA to investigate the potential for full rail service along the Toronto-Milton corridor;
- An EA to investigate rail capacity improvements on the Georgetown North line between Mount Pleasant and Georgetown;
- Station improvements to accommodate longer trains, improve access for riders, facilitate transfers between GO lines and municipal transit services, and increase available commuter parking spaces; and
- Improve signal systems along rail lines used by GO Transit.



Source: GO Transit GO 2020

Exhibit 1-8: GO Transit 2020 Strategic Plan

1.6.3. Freight Rail

Canada's two major freight railway companies operate within the GTA West preliminary study area: the Canadian National (CNR) and Canadian Pacific (CPR) Railways. Typically, the bulk commodities moved by rail include grain and coal, and merchandise freight includes finished vehicles, automotive parts, and forest and industrial products. Containerized goods make up a significant proportion of rail cargo.

Both CNR and CPR have primary rail corridors linking the GTA with the Niagara frontier and on to the US Eastern Seaboard, and through Southwestern Ontario to Chicago and the central US. CNR has over 30,000 route-kilometres of track in Canada and the US and operates in eight Canadian provinces and 16 US states. CNR's study area corridor runs through the middle of the GTA West preliminary study area to Georgetown; then it travels south to Burlington and splits to Southwestern Ontario and the Niagara frontier. CPR operates over 20,000 kilometres on a network extending from the Port of Vancouver to the Port of Montreal, and to US industrial centers including Chicago, Philadelphia, New York City and Buffalo. The CPR mainline runs along the southern edge of the study area and then just west of Milton. The line then splits to Southwestern Ontario and the Niagara frontier.

Class 1 railway markets are based on these primary routes through the GTA, and their efficiencies are based on long-haul shipments between terminals in a just-in-time delivery manner. These rail corridors are essential for economic and industrial growth and are increasingly used for passenger services. A balance must be found between protecting freight rail capacity and accommodating the need for improved passenger rail services.

Three shortline (Class 2) railways also exist within the preliminary study area (shortlines operate in a limited geographical area and focus on local interests and flexibility of service, forming an important link in the short-haul, door-to-door movement of goods). The Goderich and Exeter Railway (GEXR) services areas of Southwestern Ontario including London, Stratford, Goderich, Kitchener, Guelph and Cambridge, and interchanges with CNR. The Orangeville Brampton Railway (OBRY) serves the Orangeville, Brampton and Streetsville area and connects to CPR in Streetsville /

Mississauga. The Ontario Southland Railway (OSR) operates between Guelph and Campbellville, functioning with and connecting to CPR.

Freight inter-modal terminals generally refer to facilities where traffic consists largely of goods in overseas containers that can be transported by train, ship and truck and in domestic containers and trailers that can be moved by train and truck. Other similar facilities typically serve one type of traffic or commodity, such as lumber, coal, iron ore, etc. These types of commodities generate enough traffic to warrant a dedicated site to handle the trans-shipping between road, rail or ship. CPR operates inter-modal facilities at the Vaughan Inter-modal Terminal, Obico Inter-modal Terminal and the Trafalgar Road-Rail Terminal. CNR's inter-modal facility in Brampton and the CNR MacMillan Yard Road-Rail Terminal are also located in the GTA West preliminary study area.

It should be noted that Metrolinx completed the Urban Freight Study in February 2011 to review urban freight within the GTHA in order to identify challenges and opportunities in the freight industry (http://www.metrolinx.com/en/regionalplanning/goodsmovement/urban_freight.aspx). Peel Region also formed a Goods Movement Task Force (http://www.peelregion.ca/pw/roads/goodsmovement/), which included development of an Action Plan and a conference in partnership with the private sector.

An overview of rail corridors and facilities within the preliminary study area is provided in **Exhibit 1-9**.

Exhibit 1-9: GTA West Area Rail Corridor Locations

1.6.4. Air

Although there are no significant air transportation facilities within the GTA West preliminary study area, the largest international airport in Canada, Toronto Pearson International Airport, is located approximately three kilometres southeast of the study area boundary. As the major international airport in the region, Toronto Pearson serves over 180 domestic and international destinations.

Canada's busiest airport served over 32 million passengers in 2008[1] and is projected to accommodate 66 million passengers per year by 2030[2]. Toronto Pearson is also the dominant Canadian airport for air cargo, which is expected to continue into the future. In 2006, 517,000 metric tons of cargo were moved through the airport, positioning the airport in the top 30 busiest cargo airport in the world. Cargo volumes are projected to reach 1.27 million tons by 2030[3].

Air demand forecasts suggest that the practical capacity of the Toronto Pearson's five runways will be reached by approximately 2013, while maximum capacity, with significant airside congestion and delay, will be reached around 2019[4]. The 2008 Airport Master Plan includes discussion of current and future transportation connections to the airport, including the effects of increasing road congestion and support for the Air Rail Link to Toronto Union Station.

The Air Rail Link (ARL) is a planned public transport rail service to operate from Toronto Pearson along a dedicated spur line, then along the existing CNR Weston Subdivision line and connect onto GO Transit's Union Station Rail Corridor to Union Station. In July 2010 Metrolinx announced that it is will build, own and operate the ARL, assuming responsibility for the project including design, construction and operations and will incorporate the work that has already been done to date. Construction of the ARL began in 2012.

The Guelph Airfield is located to the north east of the City of Guelph but does not provide significant passenger or cargo travel services. Other airports in the vicinity of the preliminary study area include Waterloo International, Hamilton International, Buttonville Municipal and Toronto City Centre. Each of these airports moves people and goods. **Exhibit 1-10** shows the airports that influence the travel patterns within the preliminary study area.

Exhibit 1-10: GTA West Area Air Transportation Facilities

1.6.5. Marine

There are no significant marine transportation facilities located within the GTA West preliminary study area. Key marine facilities in the vicinity of the study area include the Port of Toronto, Port of Hamilton and the Great Lakes St. Lawrence Seaway System. The major marine facilities in the vicinity of the preliminary study area are identified in **Exhibit 1-11**.

The Great Lakes St. Lawrence Seaway System lies to the northeast of the preliminary study area and is comprised of the St. Lawrence River, St. Lawrence Seaway and the Great

[1] *GTAA Passenger Traffic Statistics (http: //www.gtaa.com /local/files/en/Corporate/Statistics/PassengerTraffic-200908.pdf*
[2] *Taking Flight: The Airport Master Plan 2008-2030, Chapter 3, GTAA, December 2007*
[3] *Taking Flight: The Airport Master Plan 2008-2030, Chapter 3, GTAA, December 2007*
[4] *Taking Flight: The Airport Master Plan 2008-2030, Chapter 15, GTAA, December 2007*

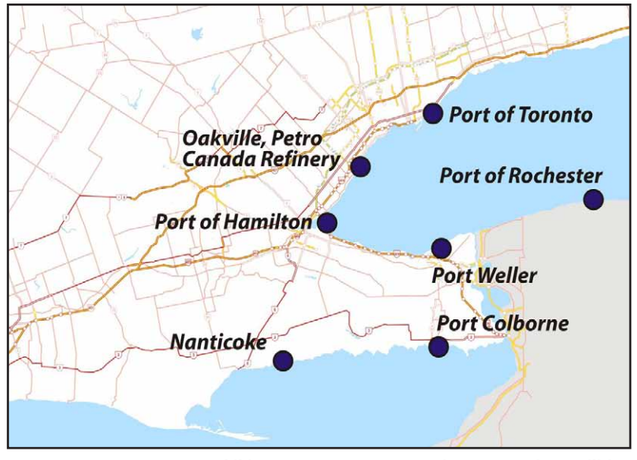


Exhibit 1-11: GTA West Area Major Area Marine Facilities

Lakes, running over 3,700 kilometres through Canada and the US. The Great Lakes St. Lawrence Seaway operates as a bi-national partnership between Canada and the US, and the shipping season generally extends from mid March to late December. Between Montreal and Lake Ontario there are two US locks and five Canadian locks.

The Port of Toronto is located to the east of the preliminary study area and handled over 2 million tonnes of cargo and more than 70,000 TEU (20-foot equivalent unit) containers in 2007[5]. Most of its domestic tonnage is comprised of cement, asphalt, salt, aggregate and stone, as well as project cargo, including imported wind turbines, natural gas turbines and exported locomotives. Additionally, the International Marine Passenger Terminal opened in 2005 to handle visiting cruise ship traffic on 10 acres of the marine terminals site. It also has a full complement of harbour tour and charter boats.

The Port of Hamilton handles the largest volume of cargo and shipping traffic of all the Canadian Great Lakes ports (over 11 million tonnes in 2008[6]) . In July 2009, a new container feeder service launched between Montreal and Hamilton, which provides weekly fixed day transport for more than 250 TEU per sailing, driven by the Hamilton Port Authority subsidiary, Sea 3 Inc.

1.6.6. Roadways

Provincial, regional and municipal roads in southern Ontario service an ever increasing demand of road transportation by providing an inter-city network of links used for the transport of goods and people. The automobile continues to be the preferred mode of travel in southern Ontario. Auto ownership rates have been growing at a rate faster than population growth over the previous decades with the popularity of suburban life being a major contributor.

Trucks are a principal means of goods transport in Southern Ontario with highways linking to all major manufacturing centres and international border crossings. The demand for truck transport remains a competitive mode of goods distribution. Trucking provides inter-modal goods transport connectivity between rail and marine transport facilities and provincial freeways.

The provincial highway network within the GTA West preliminary study area is presented in **Exhibit 1-12**, and includes Provincial Highways 400, 401, 410, 427, 6, 7, and 10, as well as the 407 ETR.

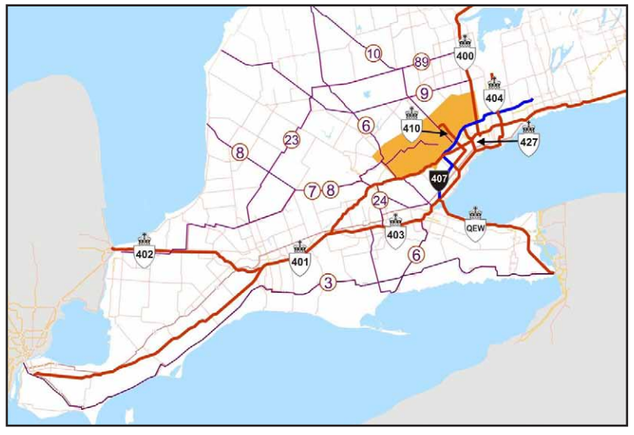


Exhibit 1-12: GTA West Area Provincial Highway Network

Highway 400 is a north-south, 10-lane provincial freeway on the east boundary of the preliminary study area, extending from within the City of Toronto north through York Region and Simcoe County. This freeway provides an important link between Highways 401 and 407 ETR corridors to Simcoe County, Northern Ontario and Western Canada.

Highway 401 is a major six-lane provincial freeway extending across the south end of the preliminary study area through the County of Wellington and Regions of Halton and Peel. This freeway extends between the Quebec border through to the US border at Windsor and provides for significant goods movement, tourism and connections across the province. Presently, a significant component of travel through the GTA West preliminary study area is accommodated by Highway 401. Planning is underway to widen several sections of the highway, to include provision for HOV lanes in some areas.

407 ETR is a privately owned and operated toll facility that provides east-west travel opportunities across the south end of the preliminary study area from the east boundary of the Halton Region through the Regions of Peel and York. It has a six-lane cross-section, expanding to ten lanes in some sections, and provides an alternate to Highway 401.

Highway 410 is a north-south provincial freeway extending from the City of Mississauga into the City of Brampton and connects directly to Highway 10 in the Town of Caledon. The highway provides network connectivity with links between Highways 403, 401, 7 and 407 ETR, with a current cross-section upwards of four lanes in each direction.

Highway 427 is a north-south provincial freeway in the vicinity of the boundary between the Cities of Mississauga and Toronto, and provides freeway connections between the Queen Elizabeth Way (QEW), Highway 401 and 407 ETR with direct access to Toronto Pearson International Airport. Extension north to Major Mackenzie Drive has received EA approval.

Highway 6 is a north-south rural highway located along the western boundary of the preliminary study area connecting Highway 401, Highway 403 at Hamilton and the City of Guelph. Highway 6 ("Hanlon Expressway" north of Highway 401) has a four-lane cross-section and at-grade connections

[5] *Toronto Port Authority web site (http: / / www.torontoport.com / PortAuthority / media_facts.asp)*

[6] *Hamilton Port Authority web site (http: / / www.hamiltonport.ca / commercial / default.aspx)*

to crossing arterials. It is not aligned north and south of Highway 401 and currently requires the use of Highway 401 as a connecting link.

Highway 7 provides relatively direct connections between the urban areas of Kitchener-Waterloo, Guelph, Acton, and Georgetown. It primarily serves shorter distance trips in the GTA and transitions from two lanes to four lanes in built-up urban areas.

Highway 10 is a four-lane north-south undivided highway between Brampton and Caledon Village crossing the Niagara Escarpment. It narrows to two lanes south of Caledon Village and then northerly, and extends to the City of Owen Sound. MTO is continuing with a program to reconstruct Highway 10 to a basic four-lane cross-section towards its northern boundary at Orangeville.

Highway 9 runs east-west between Highway 10 at Orangeville and Highway 400. East of County Road 12, it is a two-lane rural highway. Highway 9 connects Highways 6, 10 and 400 and provides an inter-regional route that also accommodates longer distance travel.

Other routes that are either inside the preliminary study area or important to the east-west network include Regional Road 124 / County Road 24 that was formerly Highway 24, connecting with Highway 401 at Cambridge. These roads provide key transportation linkages through and adjacent to the preliminary study area.

Municipal Network

The counties and regional municipalities are responsible for maintaining and operating the Regional Road and County Road System for the transport of goods and people in a safe and efficient manner. These road facilities serve both short distance and longer inter-regional trips by connecting rural and urban centres to each other as well as to the provincial highway system. Part of the regional / county operational and planning mandate is to provide physical improvements to the Regional Road and County Road system to meet growth needs and improve the level of service. The major municipal roads within the GTA West preliminary study area are described below.

County of Wellington
The primary east-west county roads include County Roads 30, 124, 50, 37 (Arkell Road) and 34. These County roadways serve its east-west travel demand as well as provide connections to Highway 6. The primary north-south county roads include Watson Road and County Roads 39, 38 (Victoria Road), 29, 27, 24 (Eramosa-Erin Townline) and 125. These county roadways connect towns within Wellington County and provide links to Highway 401 and Highway 7. County Road 124 is a major rural roadway in the County of Wellington.

City of Guelph
The primary east-west roadways under the jurisdiction of the City of Guelph include Woodlawn Road, College Avenue, Stone Road and Clair Road. These roadways accommodate internal municipal traffic as well as provide access to the City's Hanlon Expressway (Highway 6). The primary north-south arterial roads include Edinburgh Road, Woolwich Street / Gordon Street, Victoria Road and Watson Road, which provide both internal and north-south access to Highway 401 to the south and Highway 7, via York Road, to the north. Woodlawn Road currently connects the Hanlon Expressway with Highway 6 North, from the City of Guelph.

Halton Region
The only major continuous east-west facilities within the Halton section of the preliminary study area are Derry Road and Steeles Avenue, the others being discontinuous for reasons related to either the Niagara Escarpment or wide watercourses such as Sixteen Mile Creek and Bronte Creek. These natural corridors all generally run north-south in Halton Region. The primary north-south regional arterial roads include Guelph Line, Regional Road 25 and Trafalgar Road, which provide connections to Highways 7, 401, 407 ETR and the QEW / Highway 403.

Region of Peel
The primary east-west regional arterial roads within Peel Region include Old Baseline Road, King Street, Mayfield Road, Bovaird Drive / Castlemore Road, Queen Street, Steeles Avenue, Derry Road and Britannia Road. The primary north-south regional arterial roads include Winston Churchill Boulevard, Mississauga Road / Erin Mills Parkway, Chinguacousy Road, Main Street / Hurontario Street, Dixie Road, Airport Road and Gore Road. These roadways provide continuous arterial road connections to the Region's population and employment centres and highway network including Highways 401, 410, 403, 407 ETR and Highway 7. Main Street / Hurontario Street becomes Highway 10 north of Mayfield Road at the City of Brampton / Town of Caledon boundary, providing connections to 407 ETR and Highway 410.

York Region
The primary east-west regional arterial roads include King Road, Teston Road, Major Mackenzie Drive, Rutherford Road, Langstaff Road, Steeles Avenue and Finch Avenue. North-south regional arterial roads include Regional Roads 27 and 50 (Caledon-King Townline), Weston Road, Pine Valley Drive and Keele Street. These roadways provide connections to Highways 400, 401, 407 ETR and 7.

1.7. OVERVIEW OF RELEVANT FEDERAL, PROVINCIAL AND MUNICIPAL POLICIES

Policy documents provide direction on land use, growth, infrastructure planning, trade, tourism and recreation and environmental protection. These polices have strong potential to influence future transportation demand in the preliminary study area by shaping population and employment growth, stimulating economic and tourism growth and establishing a vision for the transportation system. The policies provide the impetus for changing travel patterns, modes and volumes in the preliminary study area, as well as shape the strategies developed to address these transportation needs.

This study is being carried out within a policy framework that includes all relevant approved provincial planning policies, including the key principles, themes and directions embodied within them, as well as approved municipal official plans and transportation master plans of the preliminary study area upper tier municipalities. The study has proceeded with the intent of accommodating the future transportation and land use visions embodied in these documents.

The policies developed by various levels of government are consistent with respect to the direction on land-use planning and transportation to promote strong communities, a clean

and healthy environment, and a strong economy. The policies recognize the complex inter-relationships among economic, environmental and social factors in planning. The *Area Transportation System Problems and Opportunities Report*, available on the study website (www.gta-west.com) provides detailed descriptions of each policy and document.

The Study Team reviewed numerous polices and documents that form the policy framework for this study, including the following:

- *Provincial Policy Statement*, Ministry of Municipal Affairs and Housing, March 2005
- *Growth Plan for the Greater Golden Horseshoe*, former Ministry of Public Infrastructure Renewal (now Ministry of Energy and Ministry of Infrastructure), June 2006
- *Greenbelt Act and Greenbelt Plan*, Ministry of Municipal Affairs and Housing, February 2005
- *Niagara Escarpment Plan*, June 2005
- *Oak Ridges Moraine Conservation Act*, 2001 and *Plan*, April 2002
- *Metrolinx Regional Transportation Plan*, November 2008
- *GO Transit's Strategic Plan – GO 2020*, December 2008
- *National Policy Framework for Strategic Gateways and Trade Corridors*, July 2007
- *Ontario-Quebec Continental Gateway and Truck Corridor*, July 2007
- *Discovering Ontario – A Report on the Future of Tourism*, February 2009
- *Building a National Tourism Strategy – A Framework for Federal/ Provincial/ Territorial Collaboration*, 2006
- *Go Green, Ontario's Action Plan on Climate Change*, August 2007
- *Straight Ahead – Vision for Transportation in Canada*, Transport Canada, February 2003
- *Southern Ontario Highways Program 2008 to 2012*, August 2008
- *Ontario Tourism Strategy*, June 2004
- Municipal Policies from the Halton Region, Region of Peel, York Region, City of Guelph and County of Wellington

1.7.1. Provincial Policy Statement

The Provincial Policy Statement (PPS) influences transportation primarily through municipal planning policy as the *Planning Act*, R.S.O. 1990 requires that official plans have regard for matters of provincial interest, and are consistent with the PPS. Specifically, municipalities shall include policies that integrate transportation and land use considerations at all stages of the planning process and provide the necessary infrastructure to support current and projected needs in a co-ordinated, efficient and cost-effective manner.

For the purpose of this study, the PPS requires close examination of existing infrastructure to establish the potential to expand capacity before considering the development of new infrastructure. The PPS contains various policies that provide protection for natural heritage, water, agricultural, and cultural heritage and archaeological resources for their economic, environmental and social benefits. These are vital when considering potential new infrastructure. These policies were key factors in the identification and evaluation of transportation alternatives to address the problems and opportunities in the preliminary study area.

1.7.2. Growth Plan for the Greater Golden Horseshoe

The *Growth Plan* outlines a set of policies for managing growth and development and guiding planning decisions in the GGH over the next 25 years (to 2031). This broad based plan represents a planning "vision" for Ontario. As a part of this vision, the plan outlines a strategy for "Where and How to Grow", "Infrastructure to Support Growth", "Protecting What is Valuable" and "Implementation". Municipal official plans must conform to the *Growth Plan's* population and employment intensification and density targets and growth forecasts, and to policies and targets encouraging growth within existing urban areas, and discourage urban sprawl.

The *Growth Plan* designates Urban Growth Centres, which are areas within certain municipalities (typically downtowns or other major nodes of higher density development) that will be the focus for intensification and be planned to achieve certain density targets. As noted above, there are four designated Urban Growth Centres within the GTA West preliminary study area: Downtown Brampton; Downtown Milton; Vaughan Metropolitan Centre; and Downtown Guelph, as shown in **Exhibit 1-13**. Further, the *Growth Plan* includes transportation policies to support growth and increased needs for moving people and goods.

Consistent with the anticipated growth and policies for managing it, challenges are expected on the transportation network through the preliminary study area, with increased goods movement, commuter, tourism and recreational travel. The future transportation problems, opportunities and network recommendations reflect the *Growth Plan's* substantial increase in population and employment throughout the GGH, as well as its priorities for transportation investments beginning with transit for moving people and inter-modal linkages for moving goods.

1.7.3. Greenbelt Plan

The *Greenbelt Plan* includes plans and policies to: protect against loss and fragmentation of agricultural lands; provide permanent protection to natural heritage and water resource systems; and to provide for a range of economic and social activities associated with rural communities. The goals of the Infrastructure and Natural Resources policies of the Plan are to support infrastructure that is consistent with the aim of the *Greenbelt Plan* and *Growth Plan*, while seeking to minimize the impact on the environment.

Similar to the PPS and *Growth Plan*, the *Greenbelt Plan* policies influence transportation primarily through municipal planning policy as the Greenbelt Act requires that official plans conform to the policies of the Plan. The *Greenbelt Plan* has strict policies that address how transportation infrastructure will be constructed and mandates the needs and justification that the provincial and municipal government must provide in proposing improvements to existing facilities or new facilities through the Greenbelt planning area. The *Greenbelt Plan* sets out policies for how transportation infrastructure may be planned, designed and constructed.

The preliminary study area includes a large portion of Greenbelt Planning Area, primarily extending through the Regions of Peel and Halton, and the location of Greenbelt areas is a significant factor in the identification and evaluation of transportation alternatives to address the transportation

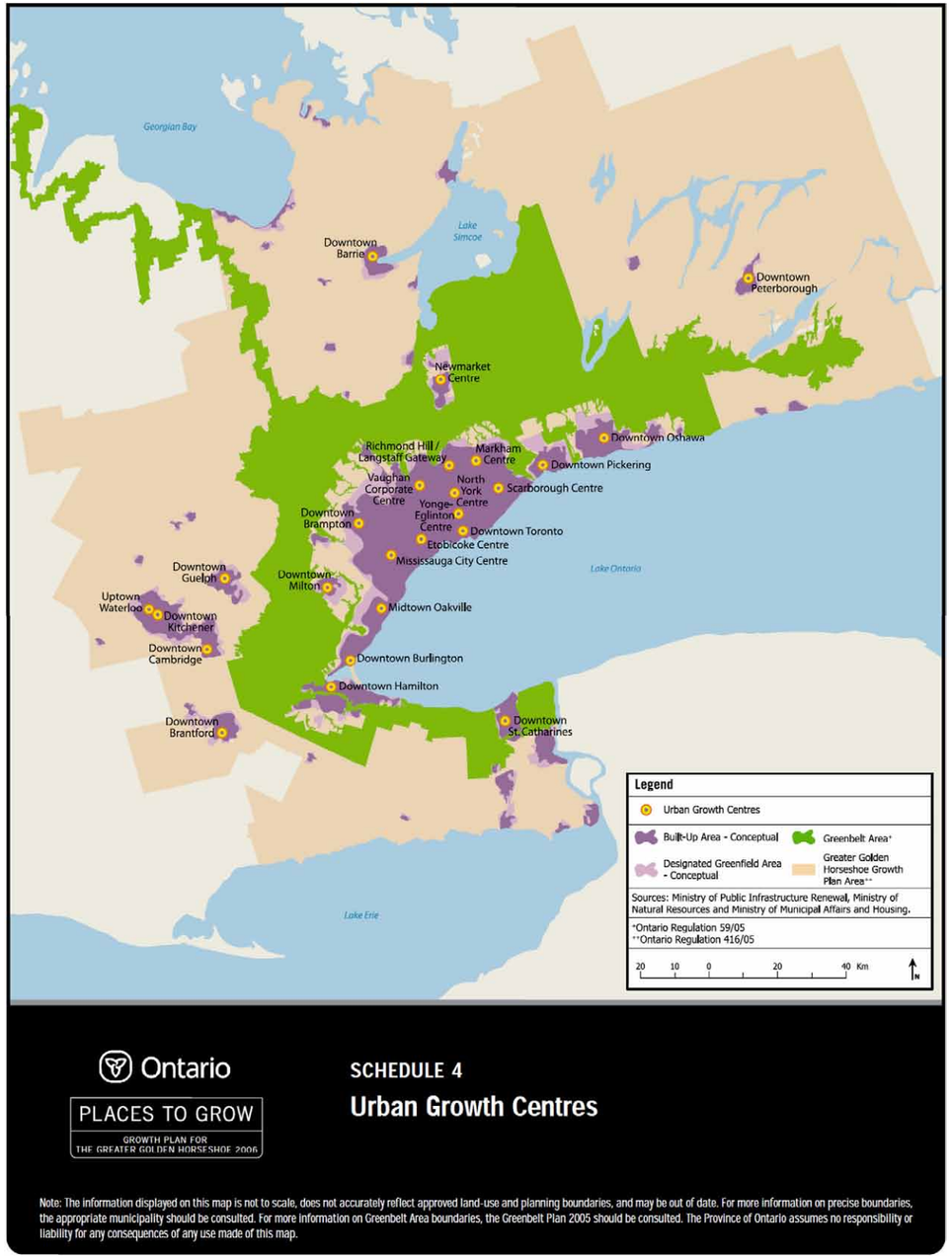


Exhibit 1-13: Places to Grow (2006) - Schedule 4: Urban Growth Centres

problems and opportunities. This study has fully integrated the goals, objectives and policy requirements of the *Greenbelt Plan*.

1.7.4. Niagara Escarpment Plan

Stretching 725 km in length from Niagara to Tobermory, the Niagara Escarpment encompasses a range of habitats, physiographic regions and land-uses. It runs parallel to the southern and western shores of Lake Ontario, ranging in distance from one to several kilometres south of the lake. Although the Niagara Escarpment Plan (NEP) permits essential transportation facilities in the Escarpment Natural Area, it must be demonstrated that any new and/or expanded facility has the least possible impact on the natural environment and be consistent with the objectives of the Plan.

The NEP guides land use within an area defined by the Niagara Escarpment, from the Bruce Peninsula in the north to the Niagara River. It limits development within the NEP area through limitations on new lot creation and limitations on permitted uses. Its intent is to balance development, preservation and public use. Official plans are required to conform to the NEP. The Plan establishes land use designations, policies and criteria for the protection of the lands within its policy area.

The NEP policies will impact where and how new transportation facilities are built to meet the increase in transportation demand in the preliminary study area. Similar to the *Greenbelt Plan*, the NEP influences where development, and to some degree infrastructure to serve development, can occur.

1.7.5. Oak Ridges Moraine Conservation Act and Plan

The *Oak Ridges Moraine (ORM) Conservation Plan* supports the *ORM Protection Act* (2001), and clarifies the long-term protection and management of the 190,000 ha that comprise the Moraine. The ORM is one of Ontario's most significant landforms – an irregular ridge stretching 160 km from the Trent River in the east to the Niagara Escarpment in the west. The ORM has a unique concentration of environmental, geological and hydrological features, including clean and abundant water resources. The southern limit of the ORM forms the approximate northern boundary of the GTA West preliminary study area through the Regions of York and Peel.

Similar to the *Greenbelt Plan* and NEP, provincial policies for the ORM influence where development, and infrastructure to serve development can occur. The Oak Ridges Moraine Conservation Plan allows only those transportation, infrastructure and utilities projects where no reasonable alternative exists and includes policies which require minimum disturbance and impact on the ecological and hydrological integrity of the ORM. The ORM requires the protection of sensitive water resources (e.g. kettle lakes, wetlands, permanent and intermittent streams, seepage areas and springs) from development.

1.7.6. Metrolinx Regional Transportation Plan

Metrolinx is a provincial crown agency established by the Ontario government in 2006, tasked to develop and implement an integrated multi-modal transportation plan for the GTHA. Its mandate includes providing seamless, co-ordinated transportation throughout the region. In November 2008, Metrolinx published its *Regional Transportation Plan (RTP): The Big Move*. The RTP is the third piece in the province's approach to prepare the GTHA for growth and sustainability, building upon the *Greenbelt Plan* and the *Growth Plan*. It reaches 25 years into the future toward a transportation system that provides connectivity among modes, encourages the most financially and environmentally appropriate modes, as well as offers multi-modal access and shapes growth by supporting intensification.

The RTP identifies three sets of priorities: for the first 15 years; years 15 to 25; and longer term. It proposes a broad range of actions and policies that may include legislative changes, the creation of new programs and / or establishment in the policy framework guiding decision making. Work is now underway toward the first transit construction projects in York Region and Toronto.

Much of the GTA West preliminary study area lies within the area covered by the RTP. The principles, priorities and planned system improvements in the RTP have been included in the GTA West Corridor Planning and EA Study.

1.7.7. GO Transit's Strategic Plan – GO 2020

GO Transit is now the province's operating arm of the Metrolinx provincial crown agency overseeing inter-regional public transportation services provided by trains and buses in the GTHA. In May 2009, GO Transit's service area was expanded to include the upper tier municipalities of Dufferin, Durham, Halton, Niagara, Peel, Peterborough, Simcoe, Waterloo, Wellington and York and the single tier municipalities of Barrie, Guelph, Hamilton, Kawartha Lakes, Peterborough and Toronto. GO Transit's Strategic Plan, *GO 2020*, presents its direction to 2020 including its vision, objectives and goals, and service strategy. Alongside the Metrolinx RTP, this document provides the basis for GO Transit's capital, operating and annual business plans.

The Strategic Plan's focus on inter-regional travel is relevant to the purpose of the GTA West study. A number of GO service improvements and extensions have recently been implemented / are planned for the GTA West preliminary study area.

1.7.8. National Policy Framework for Strategic Gateways and Trade Corridors

This policy framework, launched in July 2007 by Transport Canada, has been developed to advance the competitiveness of the Canadian economy in the rapidly changing area of global commerce. It will do so by providing focus and direction for strategies that foster further development and exploitation of the transportation systems that are key to Canada's most important opportunities and challenges in international trade. Three strategic gateways/trade corridors were identified for this approach: the Asia-Pacific Gateway and Corridor; the Ontario-Quebec Continental Gateway and Trade Corridor; and the Atlantic Gateway.

The gateway corridor strategies coming out of this framework will influence the movement of people and goods within and through the preliminary study area. The GTA West Corridor Planning and EA Study will continue to progress in the context of this framework, incorporating its integrated approach to infrastructure, policy, regulation and operational practice. The study area lies within the Ontario-Quebec Continental Gateway and Trade Corridor.

1.7.9. Ontario-Quebec Continental Gateway and Trade Corridor

The Ontario-Quebec Continental Gateway and Trade Corridor is one of the three Strategic Gateways and Trade Corridors identified in the National Policy Framework. In July 2007, the governments of Canada, Ontario and Quebec signed a Memorandum of Understanding (MOU) on the development of an Ontario-Quebec Continental Gateway and Trade Corridor. The goal of this partnership is to maintain and build upon Ontario and Quebec's world-class transportation system so that it remains a driver of international trade and economic growth for the future.

This gateway is a key component of Canada's multimodal transportation system. Its central location facilitates international trade and the domestic inputs toward foreign trade with the U.S. and other partners. The Continental Gateway initiative is focused on developing a sustainable, secure and efficient multimodal transportation system that keeps Canada's economic heartland competitive, attractive for investment and essential for trade.

Major transportation facilities in the GTA West preliminary study area such as Highway 401, CPR and CNR railways and inter-modal facilities form strategic and integral part of the Ontario-Quebec Continental Gateway. Planning for improvements to the transportation system in the study area includes close co-ordination between these initiatives. As planning for the Ontario-Quebec Continental Gateway and Truck Corridor progresses, its findings regarding infrastructure, policy and regulatory strategy have been incorporated into the GTA West study.

1.7.10. Discovering Ontario – A Report on the Future of Tourism

This report, commissioned by the Ontario government, was prepared by the Ontario Tourism Competitiveness Study and released in February 2009. Its mandate was to develop a plan, including specific steps for public and private sectors, to support the growth and long-term viability of tourism in Ontario. The Study consisted of a wide variety of research studies and a broad-based consultation process.

The importance of transportation in supporting Ontario's tourism industry is highlighted in the Discovering Ontario Report and the GTA West study has progressed in this context.

1.7.11. Building a National Tourism Strategy – A Framework for Federal / Provincial / Territorial Collaboration

The National Tourism Strategy (2006) relates specifically to the factors influencing the tourism industry, identifying challenges and setting priorities for strengthening tourism competitiveness developed by the Federal / Provincial / Territorial (FPT) governments in consultation with industry. This tourism strategy has the potential to influence transportation demand in and through the preliminary study area by promoting areas of Canada such as Toronto and Niagara as world-class tourist destinations. It emphasizes the importance of providing an efficient, integrated and secure transportation system and travel choice options to facilitate tourist travel, and recognizes the importance of transportation policies, programs and infrastructure as enablers to building a strong and sustainable tourism industry.

1.7.12. Go Green: Ontario's Action Plan on Climate Change

Go Green: Ontario's Action Plan on Climate Change includes some of the most comprehensive, forward-looking steps on the environment that Ontario has ever contemplated. It sets firm targets and goals towards making better, greener choices that will save money, help the economy and help the environment.

Go Green's MoveOntario 2020 transit projects will provide new infrastructure and influence travel patterns within and through the preliminary study area. Any new infrastructure considered to address the problems and opportunities identified in the study area will need to be evaluated in the context of the Go Green's vision and targets to reduce greenhouse gas emissions.

1.7.13. Straight Ahead – A Vision for Transportation in Canada

Straight Ahead - A Vision for Transportation in Canada is a federal government policy paper prepared by Transport Canada which covers the full spectrum of long-term transportation issues in Canada, ranging from airline and railway competition issues to critical infrastructure needs, environmental pressures and safety and security imperatives. The document provides the vision, the policy framework and principles to guide the Government of Canada's decisions in the years ahead in key areas such as marketplace policies, strategic infrastructure investments and initiatives in support of the broader government agenda on competitive cities and healthy communities, climate change and innovation and skills.

This document sets the overall context for transportation planning for all modes of travel in the preliminary study area, and the study's recommendations are made in this context. Marketplace / competition issues, infrastructure, environmental protection, security and innovation were important elements to consider in identifying alternatives to address the transportation problems and opportunities.

1.7.14. Southern Ontario Highways Program, 2011 to 2015

This document, published in August 2011, presents an annual update of the five-year construction program for Southern Ontario highways. The program lists all major highway projects already under construction or starting in 2011, as well as a five year outlook to 2015. It recognizes the importance of long-term planning to ensure first-class transportation infrastructure for the future.

The program includes current and future highway improvements in the GTA West preliminary study area, which have been included in the study's assessment of 2031 transportation conditions. The GTA West Corridor Planning and EA Study is included as a Future Southern Ontario Project.

1.7.15. Ontario's Tourism Strategy

This 2004 document provides a strategy for long-term sustainable growth of Ontario's tourism industry, including a framework identifying the areas for action through to 2010. It is to serve as a tool to bring the tourism industry and different levels of government together to focus efforts and take advantage of the assets available for tourism in Ontario. In 2007, an update report was published, highlighting the progress and achievements to date, including specific efforts related to the priorities outlined in the Strategy.

The importance of Toronto and Niagara as tourist destinations is highlighted as is the point that greater collaboration between Toronto and the Niagara Region will strengthen them as destinations and major gateways for tourism in the province. The document also recognizes the transportation issues across the province that can act as barriers to smooth travel for tourists, recognizing all modes of transportation (road, rail, air, water, transit) from a tourism perspective.

1.7.16. Municipal Policies

In addition to provincial policies, local area policy documents are considered in the context of the GTA West Corridor Planning and EA Study. At the municipal level, official plans provide the context and boundaries within which a municipality operates with regards to land use, development and growth and helps to ensure that future planning and development will meet the specific needs of the community. The Planning Act requires that an official plan conform to, or does not conflict with provincial plans, has regard for matters of provincial interest, and is consistent with the PPS.

Official plans contain policies governing various land use designations, such as residential, commercial, industrial, agricultural, open space and recreation. These designations are broadly established on a land use map. Other policies relate to environmental management, economic development, transportation and community improvement.

Municipal policies have the potential to influence transportation in the preliminary study area by shaping the patterns of demand and in turn impacting the modes of travel used. Transportation demand can be influenced by factors such as: land use patterns, service requirements and locations; order and location where development will occur; development policies; economic development policies; transportation master plans; transit strategies; and co-ordination of planning policies between regions. The official plans of the Regions of Peel, Halton and York, Wellington County and City of Guelph have been considered throughout the study.

1.8. OVERVIEW OF LINKAGES BETWEEN THE GTA WEST AND NGTA STUDIES

The Niagara to GTA (NGTA) Corridor Planning and EA Study – Phase 1 is a similar study to the GTA West Study – Stage 1. Both studies are being undertaken at the same stage of the Individual Environmental Assessment (EA) process, and both studies are being undertaken by the same Consultant Joint Venture on behalf of the Ontario Ministry of Transportation (MTO).

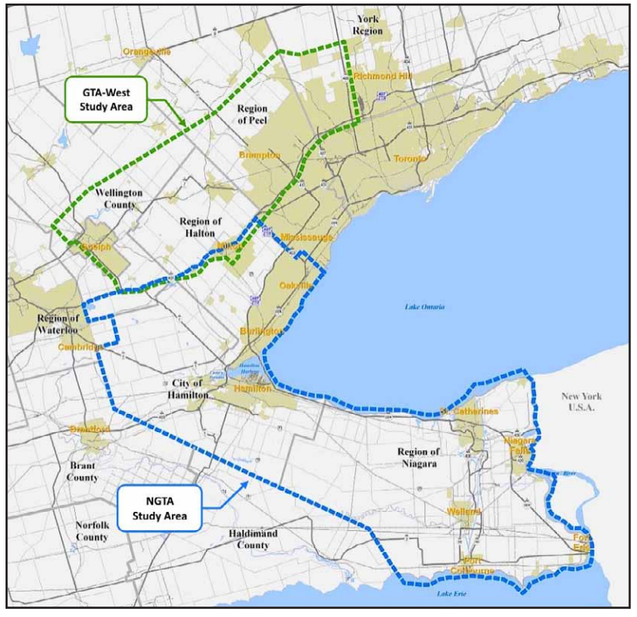


Exhibit 1-14: GTA West and NGTA Study Areas

The study areas for the GTA West and NGTA studies are shown together in **Exhibit 1-14**. The GTA West preliminary study area is described in **Section 1.5**, and borders the NGTA study area, extending from Highway 400 in Peel Region west to Highway 6 in the Guelph area. The NGTA study area includes Niagara Region, the City of Hamilton and part of Halton Region.

The NGTA and GTA West studies commenced in 2006 and 2007, respectively, and it was recognized by both Study Teams at the outset that a high degree of coordination would be vital to a successful outcome. To this end, both Study Teams established a regular meeting schedule where members of the Project Management Board from both the consultant team and MTO met to discuss coordination issues from the standpoint of technical work being undertaken, as well as consultation with stakeholders common to both studies.

Many of the technical team members involved in the transportation, economic, environmental and consultation streams of the studies were common to both Study Teams and undertook their work in a joint fashion where applicable. As an example, all of the transportation modelling completed for this study was undertaken by a team of transportation specialists common to both studies, and utilized the Greater Golden Horseshoe (GGH) Transportation Model which encompasses the GTA West and NGTA study areas, as well as other parts of the GGH.

During later phases of the study when both Study Teams tested the various highway widening and new corridor alternatives, the model runs undertaken for each study included an assumption with regard to the infrastructure improvements in the other study area. When the GTA West team was running various new corridor alternatives within the study area, various highway widening and new corridor scenarios were also assumed in the NGTA study area and vice versa.

From a consultation standpoint, joint meetings were held when possible with common stakeholders such as Niagara Escarpment Commission, Conservation Halton, Halton Region, the Mississaugas of the New Credit First Nation, the Six Nations of the Grand River Territory First Nation, Transportation Service Providers such as CN, CP, Metrolinx and GO Transit, as well as others. This was done to avoid providing repetitive information and to reduce the consultation demands on both the stakeholders and the Study Team members.

In summary, both studies have been undertaken in a parallel and integrated fashion. While the ultimate recommendations of both studies may differ, the process that has been followed in arriving at these recommendations and the technical work and underlying assumptions were well coordinated throughout both study processes. For updates on the NGTA Study, please visit the website: http://www.niagara-gta.com/.

1.9. OVERVIEW OF TRANSPORTATION DEVELOPMENT STRATEGY

This report has been structured to document the planning process followed in Stage 1 of the GTA West Corridor Planning and Environmental Assessment Study and the identification of the Transportation Development Strategy (Strategy).

- **Chapter 2:** Study Reports and Supporting Documents – a summary of the existing conditions and background reports;
- **Chapter 3:** Area Transportation Alternatives - an overview of the development and assessment of the group transportation alternatives;
- **Chapter 4:** Assessment of Group #3 and Group #4 Transportation Alternatives – high level assessment carried out in the analysis and evaluation of Group #3 (widening of existing facilities) and Group #4 (new transportation corridor) using factors socio-economic environment, cultural environment, natural environment, economic environment, transportation, constructability and cost;
- **Chapter 5:** Additional Analysis in Halton Area – following the release of the draft Transportation Development Strategy Report, February 2011, many comments were received from the Halton area. Their main concern was the need of a new transportation corridor through Halton Hills compared to the potential further widening of Highway 401, as well as potential impacts of the new transportation corridor on the rural character of the communities in Halton area and impacts on agricultural lands. In response, additional analysis was carried out and documented in this chapter;
- **Chapter 6:** Transportation Development Strategy – a description of the suite of transportation strategies for the GTA West preliminary study area; and
- **Chapter 7:** Summary of Consultation Activities – a summary of consultation activities including the general public, local community and interest groups, federal and provincial ministries and agencies, upper- and lower-tier municipalities and First Nations.

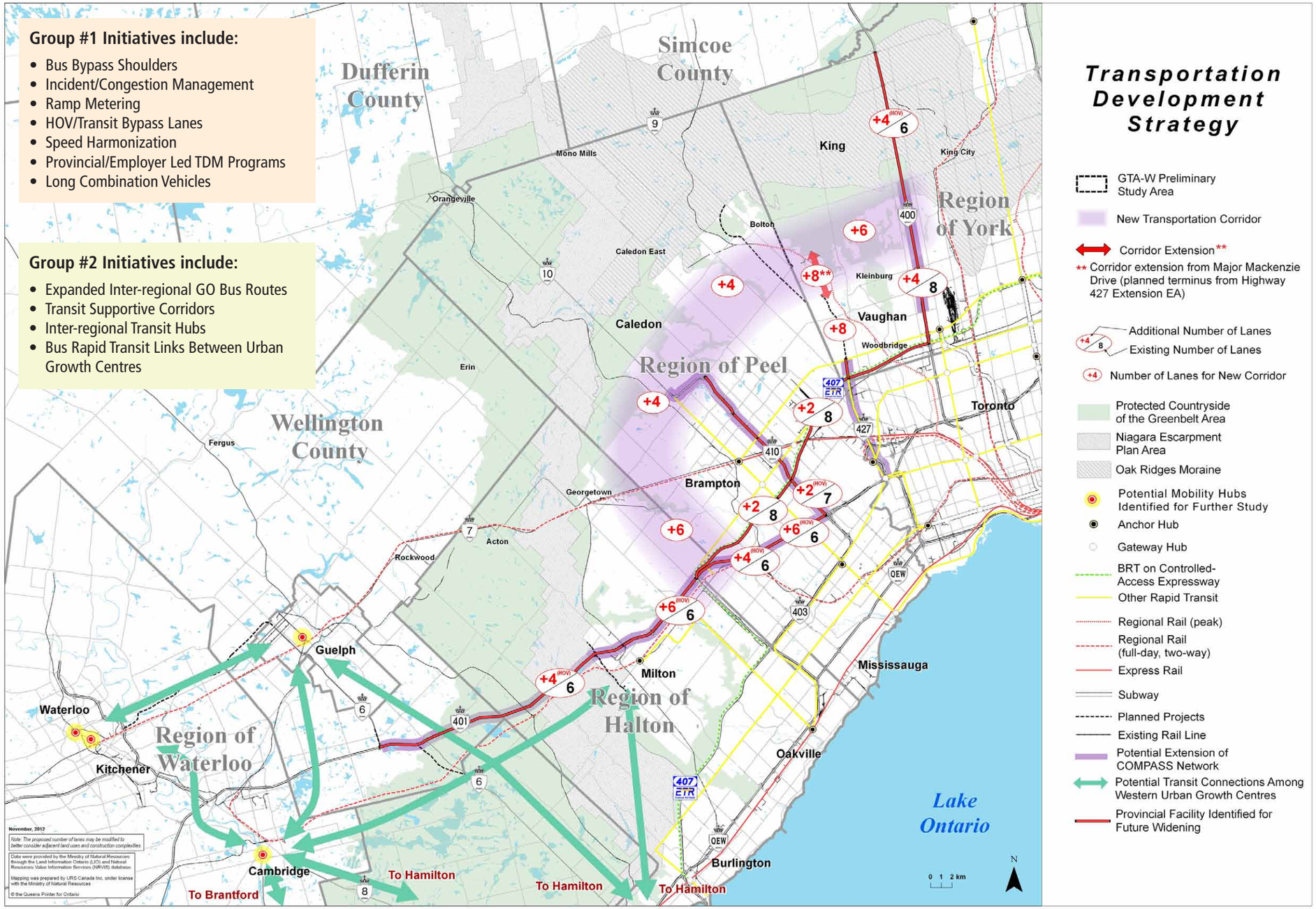
The Transportation Development Strategy (Strategy) is illustrated in **Exhibit 1-15** and represents the culmination of the "building block" approach (described in **Section 3.1**). The Strategy is comprised of the following prioritized elements:

- Group #1: Optimize Existing Networks
- Group #2: Improve Non-Road Infrastructure
- Group #3: Widen / Improve Roads
- Group #4: New Transportation Corridors and Links to the Existing Freeway Network

All of the recommendations in the Strategy will be further studied as part of the applicable future Environmental Assessment (EA) processes. For more details on the Transportation Development Strategy, refer to **Chapter 6**.

While the Transportation Development Strategy includes long-term roadway recommendations, the Ontario government's first priority will be optimization of existing infrastructure and transit improvements / expansion. It is envisioned that Group #1 will be implemented in the near-term while Group #2 will be implemented in the near- and mid-term. Widening roads and planning multi-use corridors will be part of a longer-term strategy, which will provide opportunities for transit initiatives like those in the Metrolinx RTP and *GO 2020 Strategic Plan* to grow.

Exhibit 1-15: Transportation Development Strategy



2 Study Reports and Supporting Documents

2.1. OVERVIEW

Throughout the GTA West Corridor Planning and Environmental Assessment Study, interim reports have been prepared to record critical steps in the study process, including: documentation of existing environmental, transportation and economic conditions; methodology and identification of future transportation problems and opportunities; identification of development issues and corridor protection needs; and methodology, development and assessment of alternatives to address the identified problems and opportunities. The work recorded in these interim reports has shaped the development of the GTA West Transportation Development Strategy (Strategy).

Key content of each of these reports have been presented to the public and stakeholders at Public Information Centres and meetings, and the draft reports are available on the study website (www.gta-west.com). A summary of each report is provided below, highlighting the reports' timing and role in the study, and key elements.

2.2. OVERVIEW OF TRANSPORTATION AND ECONOMIC CONDITIONS REPORT

2.2.1. Report Overview

The Overview of Transportation and Economic Conditions Report was published as a Draft for Consultation in July 2008. The draft report was subsequently updated and input received on the draft is summarized in the revised report dated December 2010. This report established baseline transportation and socio-economic data for the purpose of undertaking the Environmental Assessment Study. The report focused on documentation of historical transportation and socio-economic conditions and trends in the preliminary study area. The review of historical trends was applied to existing conditions as part of an investigation of the "Area Transportation System" needs, providing a foundation for the generation and evaluation of transportation alternatives to address future problems and opportunities, and ultimately development of the multi-modal development strategy.

The draft report included an overview of relevant federal, provincial and municipal policies, a definition and description of the "Area Transportation System", a description of current travel conditions in the system, a description of the socio-economic conditions and outlooks, and a summary of existing conditions and future trends. It can be referenced on the study web site (www.gta-west.com) or by contacting the Study Team.

2.2.2. Report Findings

The "Area Transportation System" comprised the area transportation facilities and linkages for moving people and goods by all modes and all jurisdictions. The report described the highway and municipal road network, recent studies and projects, and the transit and rail networks and airports that serve the preliminary study area.

A number of key factors that influence the "Area Transportation System" needs were identified through this preliminary assessment. Key factors driving these needs were summarized into the following themes:

- Policy Framework
- Existing Travel Characteristics
- Existing Transportation System
- Historical Traffic Flows
- Existing Traffic Flows
- Traffic Operations and Level of Service
- Demographic Growth
- Future Trends

Policy Framework

The policies developed by various levels of government are consistent with respect to the direction on land-use planning and transportation to promote strong communities, a clean and healthy environment, and a strong economy. They recognize the complex inter-relationships among economic, environmental and social factors in planning (see discussion in **Section 1.7**).

Better use of land and infrastructure can be made by directing growth to the existing urban areas. Provincial policy, including the Provincial Policy Statement and the *Growth Plan*, envisages increasing intensification of the existing built-up areas. Intensification provides a focus for transit and infrastructure investment to support future growth.

Existing Travel Characteristics

The preliminary 2006 Transportation Tomorrow Survey (TTS) database indicated that the municipalities west of the Greater Toronto Area (GTA) within and adjacent to the preliminary study area exhibit a relatively high proportion of self sufficiency and high proportion of automobile usage. The municipalities within the GTA have a higher proportion of trips leaving the municipality in the morning peak period to travel to neighbouring municipalities. The automobile is the primary mode used for the majority of these trips:

Municipal transit service is currently available within the urban areas of Waterloo Region, the Town of Milton and the cities of Brampton, Vaughan and Guelph. Transit usage in these municipalities range from 1% to 8% of the trips made in the morning peak period. The majority of the inter-regional transit trips are currently destined to downtown Toronto.

Existing Transportation System

The automobile continues to be the preferred mode of travel and auto ownership has been increasing. Inter-regional transit services are generally limited to connecting urban centres and major gateways that are either integrated with local transit service or integrated with park-and-ride facilities. A prominent example of inter-regional transit meeting these

criteria is GO Transit, which currently serves 92% of the corridor markets to downtown Toronto.

Currently, public (GO Transit) and privately controlled (Greyhound, Coach Canada, etc.) inter-regional bus services are available throughout Southern and Central Ontario, as are rail services. VIA Rail does not serve a specific origin/destination within the preliminary study area, but passes through with east-west service between Toronto and Kitchener.

Trucks are a principal means of goods transport in Central Ontario, with highways linking all major manufacturing centres and international border crossings. Truck transport remains a competitive mode of goods distribution for the majority of shippers, and it provides inter-modal goods transport connectivity using provincial freeways and arterial road networks.

Inter-modal rail terminals in Brampton and Vaughan provide rail to truck transfer locations for domestic and international freight. Toronto Pearson International Airport, Waterloo International, Hamilton International, Buttonville Municipal and Toronto City Centre airports are in the vicinity of the preliminary study area. Each of these airports serves to move people and goods. Continued expansion of the Port of Hamilton will also influence goods movement to and through the study area.

Historical and Existing Traffic Flows

Traffic volumes have grown significantly along all of the roadways within Southwestern Ontario and especially within the Greater Golden Horseshoe (GGH) over the last 45 to 50 years, particularly along the 400 series highways.

Review of daily traffic flows within and adjacent to the preliminary study area indicates that the area freeways carry significant daily traffic volumes ranging from 100,000 to 300,000 vehicles per day. Arterial and highway facilities such as Highway 6 and Regional Road 27 carry upwards of 45,000 vehicles daily. Rural arterial roadways carry daily traffic volumes ranging from less than 5,000 to upwards of 20,000 vehicles.

Truck traffic reflects a significant proportion of the daily traffic flows. Commercial vehicle demand can account for upwards of 20% of the total traffic on some highway sections; provincial 400 series highways carry the majority of the commercial vehicle traffic.

Traffic Operations and Level of Service

The review of peak hour travel demands crossing key screenlines within the GTA West preliminary study area indicate that there are good existing operating conditions crossing all analysis screenlines, with the exception of those immediately west of Winston Churchill Boulevard and immediately east of Highway 400.

Although screenline operating characteristics provide a good indication of general transportation network operations within the preliminary study area, a more in-depth review of operating characteristics for individual facilities indicates that the Highway 401 corridor experiences significant congestion in the peak travel periods. Other road corridors also experience congestion at peak travel times, including sections of Highways 400, 427 and 410, Regional Road 24 and Regional Road 50. Additionally, several major urban arterial road corridors are operating with congested conditions during the morning and afternoon peak hours.

Demographic Growth

Significant growth in population and employment is forecast within the preliminary study area, with the Regions of Waterloo, Halton, Peel, and York anticipated to experience above-average population and employment growth.

Future Trends

The Conference Board of Canada forecasts to 2030 indicated that Ontario economic growth will be slow but steady. Over the next 25 years the population within the preliminary study area is forecast to increase significantly, with a large component allocated to Urban Growth Centres. Employment opportunities within the preliminary study area are forecast to increase with the Business Services, Education, Health, Wholesale Trade and Retail Trade sectors experiencing the most growth.

The changes in employment sectors will impact transportation services. Currently, industries and services are leaving the Airport Supernode area and relocating to the west along Highway 401 to the Milton "Strip" or to the City of Guelph. The trucking logistic firms and terminals are also shifting west and relocating to the City of Guelph or Waterloo Region.

Historically, the traffic volumes on major inter-regional facilities within the GTA West preliminary study area have grown at about 1.5 to 2% per annum over the last 40 years. These historical traffic growth trends are in line with the population growth in Ontario. General traffic growth trends of approximately 2% per annum are expected over the next 25 years.

Since the signing of the North American Free Trade Agreement (NAFTA), commercial vehicle traffic has increased by upwards of 3 to 4% per annum on the provincial highway system and international border crossings. This growth appears to be levelling, indicating slightly lower growth rates over the next 25 years.

Over the past two years, transit ridership in Ontario has been increasing annually at a rate of 3.4%. Further increased growth in transit ridership is anticipated given the MoveOntario 2020 initiatives.

2.3. ENVIRONMENTAL CONDITIONS AND CONSTRAINTS OVERVIEW REPORT

2.3.1. Report Overview

The Environmental Conditions and Constraints Overview Report was prepared, and input was obtained from ministries, agencies and the public. The draft report was subsequently updated and input received on the draft is summarized in the revised report dated December 2010. The original draft report, dated July 2008, was presented at Public Information Centre #2 in March 2009.

The report documented the existing environmental conditions and constraints in the preliminary study area. In order to avoid or mitigate potential negative impacts to these features during the development and evaluation of planning alternatives, the environmental investigations identified significant and sensitive natural, socio-economic and cultural

features. The report provided a basis for analysis in two stages of evaluation to assist in the generation of "Area Transportation System Planning Alternatives" and "Preliminary Planning Alternatives" as described in **Chapter 3**.

2.3.2. Report Findings

Environmental Factors and Sub-Factors

The report structure and data inform the factors and sub-factors used in the evaluation of Area Transportation System Alternatives, as presented in the Environmental Assessment Terms of Reference (EA ToR). Public and agency input for the environmental factors and sub-factors was obtained throughout the study process as described in the study's consultation record.

Policy Context

In addition to the EA ToR, several provincial, federal, regional and local policies and plans establish the framework within which transportation issues, opportunities and potential solutions are identified and assessed. The relevant policies are summarized in the report (see discussion in **Section 1.7**).

Significant or Sensitive Natural Environmental Conditions

Legislative and Policy Protection

A summary of the environmental features and functions for the preliminary study area and their associated legislative and policy protection is provided in **Exhibit 2-1**.

FEATURE AND/OR FUNCTION	LEGISLATIVE AND POLICY PROTECTION*	
GROUNDWATER	Ontario Water Resources Act Safe Drinking Water Act Environmental Protection Requirement	PPS Niagara Escarpment Planning and Development Act
SURFACE WATER	Canada Water Act Conservation Authorities Act Planning Act PPS Lakes and Rivers Improvement Act Canada Water Act Canadian Environmental Protection Act	Ontario Environmental Protection Act Ontario Water Resources Act Conservation Authorities Act Lakes and Rivers Improvement Act Environmental Protection Requirement Niagara Escarpment Planning and Development Act
FISH AND FISH HABITAT	Fisheries Act Species At Risk Act	Environmental Protection Requirement
TERRESTRIAL ECOSYSTEMS		
Wetlands	Federal Policy on Wetland Conservation PPS Environmental Protection Requirement Conservation Authorities Act	Greenbelt Plan Niagara Escarpment Planning and Development Act
Wildlife, Habitats, and Movements	Canada Wildlife Act s.1-19 Migratory Birds Convention Act PPS	Fish and Wildlife Conservation Act Environmental Protection Requirement WLD-1 to WLD 2 and WLD-5 to WLD-9
Woodlands and Other Vegetated Areas	PPS s.2.1.2, 2.1.3 (b), 2.1.4 (d) Forestry Act Environmental Protection Requirement Niagara Escarpment Planning and Development Act	York Region Official Plan Peel Region Official Plan Halton Region Official Plan County of Wellington Official Plan
Terrestrial Species of Conservation Concern	Species At Risk Act Ontario Endangered Species Act Environmental Protection Requirement	Niagara Escarpment Planning and Development Act
DESIGNATED AREAS		
Niagara Escarpment	Niagara Escarpment Planning & Development Act Designation of Area of Development Control Designation of Planning Area	Development Within the Development Control Area Environmental Protection Requirement
Oak Ridges Moraine	Oak Ridges Moraine Conservation Act	Environmental Protection Requirement
Greenbelt	Greenbelt Act	Environmental Protection Requirement
ANSIs	Environmental Protection Requirement PPS Greenbelt Plan York Region Official Plan	Peel Region Official Plan Halton Region Official Plan County of Wellington Official Plan
ESAs	Environmental Protection Requirement York Region Official Plan Peel Region Official Plan	Halton Region Official Plan County of Wellington Official Plan

* The information is provided as a convenience only and should not be relied on as authoritative. It is intended to provide context to the type of legislation that are relevant to existing environmental conditions in the study area.

Exhibit 2-1: Summary of the Environmental Features and Functions Identified for the Preliminary Study Area and their Associated Legislative and Policy Protection

Designated Areas

The Niagara Escarpment, a recognized UNESCO World Biosphere Reserve, is the most significant natural feature in the preliminary study area from a fish and fish habitat, terrestrial ecosystem, surface water, and groundwater perspective. Evaluation of any alterations to the Niagara Escarpment should also include an evaluation of the potential visual impact on the Escarpment. In addition to the Niagara Escarpment, there are 65 Areas of Natural and Scientific Interest (ANSIs) within the preliminary study area as well as several locally or regionally designated features and areas, which typically coincide with valleys.

Groundwater

The Amabel Formation (above the Escarpment) is one of the most significant and productive bedrock aquifers in the preliminary study area and Lake Ontario basin, which is a regionally significant transmissive aquifer. Above the Escarpment, most infiltration recharges the underlying Amabel Formation aquifer. Below the Escarpment, the Amabel Formation discharges groundwater to tributaries at the face of the Escarpment, and is the likely source of most of the baseflow to surface watercourses to the east. Shallower overburden aquifers are more significant east of the Escarpment and provide the water supply for several municipalities. Wellhead Protection Zones are scattered throughout the preliminary study area.

In general terms, four hydrogeological indicators are used to determine the areas that are most sensitive to the potential impacts of transportation infrastructure:

- Proximity to groundwater recharge areas;
- Highly vulnerable aquifers;
- Proximity to groundwater discharge areas; and
- Proximity to water wells set in shallow, unconfined aquifers.

Recharge areas are the water source for the groundwater system. Therefore, the proximity of infrastructure to such areas may affect water resources that are used by humans and / or support the natural environment. Proximity to a discharge area is also significant because the infrastructure will exhibit groundwater upwelling that supports aquatic habitat. Reductions in upwelling in groundwater-fed wetlands could reduce vegetation diversity by starving species that require more water. Given the reliance of so many wildlife species on wetland habitat, wildlife may be displaced or unable to survive. Similarly, such disruption may redirect groundwater discharge, which could lead to flooding of low-lying areas. Reduced discharge into particularly sensitive reaches of streams could also impact fish habitat and spawning grounds.

Surface Water

Four watersheds comprise nearly 75% of the preliminary study area. Of these, the Humber River, and to a lesser extent the Credit River, are the most urbanized while Sixteen Mile Creek and Eramosa River are predominately agricultural and natural.

Fish and Fish Habitat

Within the GTA West preliminary study area there are seven Species of Conservation Concern as well as approximately 47 km of coldwater, 61 km of coolwater, and 117 km of warmwater habitat. Coldwater streams and their fish communities are considered the most sensitive aquatic resource in the preliminary study area. These are intolerant to disturbances such as changes in water chemistry or thermal regime, particularly when related to the loss of, or change in, the quality of groundwater discharging to the streams. Coldwater fish species are typically found where forested riparian cover is intact, water quality is good, and baseflow is sufficient to maintain flow rates and moderate stream temperatures. The absence or impairment of these conditions can undermine the viability of fish populations. In particular, coldwater fish, such as Brook Trout, are dependent on direct groundwater discharge for successful egg incubation. Therefore, groundwater that contributes functionally to these communities should be protected.

Warmwater streams and species may also be sensitive. However, they typically support fish species that are more tolerant to environmental disturbance. Common warmwater fish species, particularly in urbanized areas, can usually withstand moderate habitat changes and fluctuating environmental conditions over a short period of time without any significant influence on the community.

Terrestrial Ecosystems

Sixty-seven wetlands were evaluated, 42 of which are Provincially Significant Wetlands (PSWs). These are located predominantly west of the Niagara Escarpment, along with the three largest wetland complexes in the GTA West preliminary study area, which are each greater than 1,000 ha.

Wildlife in the preliminary study area is generally characteristic of southern Ontario and the Great Lakes-St. Lawrence Lowlands forest region. There are 78 occurrences of 42 different known Species of Conservation Concern. Eleven species are federally designated with protection under the federal Species at Risk Act (SARA).

Significant wildlife habitats include Deer Wintering Areas (approximately 6,930 ha) and Raptor Nesting Sites.

Within the preliminary study area, there are 202 Significant Wooded Areas totalling approximately 18,730 ha, and approximately 20 designated Old Growth Forests associated with the southern edge of the Oak Ridges Moraine. As well, there are over 5,200 ha of interior woodlands (3% of the study area), and approximately 1,000 ha of deep interior woodlands (< 1 % of the study area).

The Nashville Resource Management Tract is also an important conservation area in York Region, which includes over 700 ha of greenspace in York Region between the Town of Bolton and Kleinburg.

The study area also includes large tracts of land owned and managed by conservation authorities such as the Nashville Resource Management Tract in York Region.

The proximity of any of these features to infrastructure may affect the feature, species, habitat, or functions and is a high constraint to transportation development. For example, reductions in surface water or groundwater contribution to wetlands could compromise the biodiversity of both wildlife and vegetation. Fragmentation of interior forest habitat could potentially compromise the ability of certain birds and

wildlife species to carry out life processes. The removal of their habitat would lead to a reduction in abundance and biodiversity at a broader level.

Significant or Sensitive Socio-Economic Environmental Conditions

First Nations

A significant component of the socio-economic environment in the preliminary study area is of interest to Six Nations of the Grand River Territory and Mississaugas of the New Credit First Nations based on the potential impact to traditional lands used for hunting and fishing, and on potential impacts to their rural community. Continued discussions with the First Nations regarding their traditional land uses and interest in the area is important to this study. **Section 7.6** provides further information about consultation with First Nations.

Municipal Land Use Planning Goals and Development Pressures

At this stage of the study process, general and preliminary land use constraints have been identified. Potential displacement of existing residences, businesses or institutional uses is recognized as a major constraint to transportation corridor development. Consequently, existing urbanized areas pose land use constraints, as do villages and hamlets, clustered rural residential development and existing community institutional features. Isolated residences, industrial development, recreational uses and other special area uses are also recognized as land use constraints. Undeveloped, fully serviced areas and approved Plans of Subdivision are also of concern due to future infrastructure investment and anticipated development potential.

As discussed in **Section 2.5**, a number of areas within the preliminary study area are currently under considerable development pressure. Generally, they are located on the fringe of existing urban areas and north of the built-up sections of the GTA. These areas have been identified by the Study Team through discussions with municipal staff and are based on a review of the status and pace of development applications, in relation to existing built-up boundaries and designated urban boundaries.

Agriculture

The identification and protection of Prime Agricultural Lands in the GTA West preliminary study area are important, as supported by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) policies regarding agriculture. Agricultural lands are also identified in municipal official plans. Consistent with provincial policy, priority will be given to agricultural lands in order of CLI Class 1 soils, CLI Class 2 soils, CLI Class 3 soils and other soils. There are vast areas of Class 1 soils and prime agricultural lands in both Greenbelt and non-Greenbelt areas, especially in north Halton Region and Wellington County.

Tourist Areas, Recreational Land Uses and Trails

Several major tourist areas are found within the GTA West preliminary study area, including the Niagara Escarpment, and many small communities such as Terra Cotta, Erin and Kleinburg. Tourism activities include increasingly popular agri-tourism operations and enjoyment of natural areas. These types of tourism activities are spread throughout the preliminary study area and will need to be examined in more detail as the study progresses.

The preliminary study area is also crossed by numerous trail systems primarily along its north / south running river valleys (e.g. Humber River) and the Niagara Escarpment (e.g. Bruce Trail). Recreational trails pose a moderate constraint to corridor development. Potential impacts on existing or planned trails will be assessed, and mitigation measures may be available to eliminate or minimize adverse impacts.

Areas containing significant aggregate resources present a moderate constraint in terms of the potential disruption or displacement of an active extraction activity, as well as the need to protect identified areas containing this non-renewable resource. As a mitigative measure, resources can be extracted prior to implementation if required. Potential adverse impacts on active aggregate business operations will be considered.

Air Quality

Current air quality in the preliminary study area is determined through data from Ontario Ministry of Environment (MOE) and Environment Canada (EC) monitoring stations. Air quality monitoring stations within the preliminary study area are located in Guelph (Exhibition and Clark Streets) and Brampton (525 Main Street North), and surrounding the preliminary study area in Kitchener (West and Homewood Avenues) and Toronto West (125 Resources Road). Contaminants include carbon monoxide (CO), nitrogen dioxide (NO_2), respirable particulate matter ($PM_{2.5}$), benzene, and 1,3-Butadiene. Data for inhalable particulate matter (PM_{10}), formaldehyde, acetaldehyde, and acrolein were not available from published reports. These contaminants were selected because they are directly associated with transportation emissions and has been studied in the dispersion modelling when evaluating the transportation alternatives.

Transportation is not the only cause of regional air pollution. For example, elevated levels of $PM_{2.5}$ are commonly related to regional photochemical processes. According to the MOE (2005) Air Quality in Ontario – 2005 Report, EC (2004) Transboundary Air Quality in Ontario – 2005 Report, and previous studies done by EC and RWDI, transboundary air pollution (mainly from the US) is one of the largest contributors to Ontario's summer smog events.

Significant/Sensitive Cultural Environmental Conditions

The Ministry of Culture (now Ministry of Tourism, Culture and Sport) has defined a set of criteria for determining archaeological potential in the Province (MCCR, 1997). These can be organized as known archaeological resources, physiographic features and historic cultural features, and features specific to the preliminary study area. These criteria are known to have influenced past settlement and, therefore, can be used to generate a predictive model for determining where previously undocumented archaeological sites are likely to be found within a particular area.

Several factors were used to assess the potential for pre-contact First Nations sites, including well drained sandy soils, rolling topography, impressive and elevated landscape features, proximity to water and known archaeological sites. When these are considered together, much of the lands within the preliminary study area have potential for archaeological sites.

2.4. AREA TRANSPORTATION SYSTEMS PROBLEMS AND OPPORTUNITIES REPORT

2.4.1. Report Overview

The Area Transportation Systems Problems and Opportunities Report was published as a Draft for Consultation in July 2009. The draft report was subsequently updated and input received on the draft is summarized in the revised report dated December 2010. An overview of the key transportation problems and opportunities stage of the study was presented at the second round of Public Information Centres, held in March 2009.

The purpose of this report was to summarize the process and methodology used to identify transportation problems and opportunities in the GTA West preliminary study area, and to document the key findings of this work. It served as a critical stage in the study, providing a foundation for the generation and evaluation of transportation alternatives to address future problems and opportunities, and ultimately development of a technically, environmentally and economically sound multi-modal transportation development strategy.

The draft report included detailed information on the factors that influence transportation demand in the preliminary study area, forecasting of travel demand, the specific transportation problems within and outside of the study area and transportation opportunities. It can be referenced on the study web site (www.gta-west.com) or by contacting the Study Team.

2.4.2. Report Findings

Forecast of Future Travel Demands

Transportation in the preliminary study area is characterized by a high degree of reliance on the road network as the vast majority of inter-regional trips in the GTA West area are made by automobile and truck. Further, as established by analysis and stakeholder consultation, the road network is of paramount importance to the operation of all travel modes including transit and rail, and connecting to air and marine. All of these modes rely upon and connect to the road network.

Forecasts for the preliminary study area show substantial growth by 2031. Population and employment levels are expected to more than double between 2001 and 2031, with growth of over 1 million people and over 450,000 jobs. Accordingly, study area travel is expected to increase significantly, as shown in **Exhibit 2-2**.

	2001	2031	% CHANGE
POPULATION	862,000	1,912,000	122%
EMPLOYMENT	416,000	896,000	115%
TOTAL PM* PEAK PERIOD PERSON TRIPS	404,815	1,097,322	171%
PM* PEAK PERIOD AUTO TRIPS	318,000	766,800	140%
PM* PEAK PERIOD TRANSIT TRIPS	15,700	101,400	547%
PM* PEAK PERIOD TRANSIT MODE SHARE	4%	9%	125%

* refers to afternoon and evening (3 pm to 6 pm)

Source: GGH Model land use allocation and trip data, October 2008

Exhibit 2-2: Projected Growth in the GTA West Corridor, 2001-2031

Future area transit improvements are expected to result in significant increases in transit trips, varying depending on trip origins and destinations. Additionally, analysis indicates that weekday PM traffic volumes are forecast to increase by 80% to 95% east of Winston Churchill Boulevard (near the central part of the preliminary study area), and between 70% and 130% east of Guelph. In the east of the preliminary study area, west of Highway 427, volumes are projected to increase by 25% by 2031.

Canadian Pacific Railway (CPR) and Canadian National Railway (CNR) and VIA Rail operate in the preliminary study area, and rail use is anticipated to steadily increase through to 2031, driven largely by growth in volumes of containerized goods. Stakeholder consultation indicated that the existing infrastructure is anticipated to meet demand for the next 10 to 20 years.

There are no major air and marine transportation facilities directly within the preliminary study area, although Toronto Pearson International Airport lies in close proximity to the southeast. The Ports of Toronto and Hamilton are the closest marine transportation facilities. Expansion is planned to meet future demand, which will result in increased automobile and truck traffic on the preliminary study area road network.

Summary of Future Transportation Problems

The overarching problem of the inter-regional transportation system in 2031 relates to the road network. Much of the higher order road system (i.e. highways and inter-regional roads) is expected to be heavily congested during peak periods and increasingly throughout the day. Road congestion in the summer is higher due to the overlay of tourism and recreational travel. Every mode connects to and relies on the road network, creating significant issues for the efficient movement of people and goods in the future.

The transportation problems by travel markets (i.e. moving people – commuter, tourism and recreation, as well as moving goods) and modes are as follows:

Moving People - Commuter

Transit

Future inter-regional transit connections, as provided in the Metrolinx RTP, will generally be oriented toward Toronto, including radial links to Vaughan, Brampton, Milton and Guelph. However, orbital inter-regional connections are more limited and indirect, requiring transfers and indirect travel routes.

Other transit issues include the following:

- Improvements may be needed in integration between local and inter-regional transit services, particularly beyond corridors served by GO Transit, in terms of physical connections, timetables and hours of service, fare structures and payment methods.
- Roadway congestion limits the efficiency of bus transit services and increases unreliability and travel times.
- The expansion of passenger and freight rail services within existing rail corridors creates potential for conflicts, particularly during peak commuting periods, as well as issues of scheduling and integration of rail services.

Automobile

The road transportation system is the main mode for commuting in the preliminary study area, especially where trips are not served by higher order transit. As traffic volumes increase throughout the day, the traditional AM and PM peak commuting periods are becoming longer, resulting in study area highway congestion for much of the day.

Highways 401, 400, 410 and 427 are expected to experience major congestion throughout the day by 2031. The 407 ETR is expected to experience major congestion between Highways 400 and 427, and moderate congestion between Highways 427 and 401. Other major roadways such as Regional Road 124, Highway 7 and Highway 6 are also expected to experience growing congestion. Even with the planned improvements included in the Metrolinx RTP and GO Transit Strategic Plan, substantial daily congestion is forecast for 2031.

- Major congestion issues are anticipated on the preliminary study area's main highways, along Highways 401, 400, 410 and 427 within the study area's boundary.
- The expected capacity shortfall will increase automobile travel times between the preliminary study area's Urban Growth Centres. Delays that occur due to collisions, inclement weather conditions, road maintenance and construction will contribute to congested conditions.
- There is a lack of alternate higher order inter-regional routes to avoid congested conditions, particularly for travellers using the Highway 400 / Highway 401 corridors.

Moving People – Tourism and Recreation

The problems for tourism and recreation travel are somewhat similar to those for commuter travel. Summer travel, when roadway congestion is greatest, is a particular issue for tourists.

Transit

The vast majority of tourism to, from and through the preliminary study area are forecast to continue to be by automobile, as limited transit systems are in place to serve tourist destinations and travel schedules, and in many instances, there is no reasonable alternative to the automobile. Further to this:

- Improvements may be needed regarding transit connections between urban centres, tourist gateways such as Toronto Pearson International Airport and tourist destinations. Limited multi-modal connections are likely to increase car use even for those who travel to the preliminary study area by rail or air.
- Where publicly funded transit services are in place or planned, schedules tend to cater to commuters rather than tourists, with services focused on AM and PM commuting times and limited weekend services.

Automobile

The problems for road-based tourism and recreation travel include congestion, increased travel times, limited travel routes and modal options. Automobiles are used for more than 90% of visitors to the preliminary study area. In general, problems associated with tourism and recreation in terms or automobile are:

- For the most part, the preliminary study area's tourism and recreation destinations are connected to urban centres by Highway 401 and Highway 400, which regularly experience major congestion and heavy truck volumes. These trips through the preliminary study area are more likely to occur in the summer season.
- There are inadequate connections between tourist gateways (e.g. airports) and tourism and recreation destinations.
- Congestion results in increased and unpredictable travel times for tourists, and can negatively affect the tourist trip experience.
- High volumes of trucks on the major highway corridors can be a deterrent to tourist travel, especially during the summer months.

Moving Goods

The inter-regional road system is the primary distribution mode for moving goods in the area, shipping almost 70% of Canada-US trade by value and 45% by tonnage. The key collective issue for rail, air and marine modes relates to the limitations associated with the inter-regional road network from the perspective of access and/or congestion.

Truck

While the problems for goods movement by inter-regional road system are largely similar to those for automobile commuters, they can result in significant economic impacts to shippers, distributors, local businesses and industries. These problems include:

- Increased congestion and travel times.
- Unpredictable travel times.
- Inadequate connections between Urban Growth Centres, commercial centres and inter-modal facilities.
- Diversion of trucks to regional and local roads, which results in out-of-way travel with associated community, social, noise and safety concerns.

Rail

Rail services provide connections for goods movement in the preliminary study area, including inter-modal facilities with the road network. Much of the strong growth in rail and inter-modal goods movement has been driven by the growth

in marine transport of containers. The key problems for rail transportation involve inter-modal connections to higher order roadways, as well as issues relating to congestion on the area road network. Other problems include:

- Limited connectivity of inter-modal facilities, which can increase the difficulty of moving containers and other goods by rail and produce bottlenecks at the trucking interface.
- Operational constraints on the rail network, including potential conflicts between rail-based transit and freight services, especially during peak commuting periods. As growth in freight and passenger traffic occurs on existing shared infrastructure, these problems will increase, potentially causing track capacity constraints.

Air

Canada's busiest airport, Toronto Pearson International Airport, is located approximately 3 km to the southeast of the preliminary study area. Passenger and air cargo movements at this airport are expected to grow significantly over the next 25 years, which will increase runway capacity issues and pressure on the area road network.

- The key problem for air transportation as it relates to the GTA West preliminary study area is congestion on the inter-regional road network.

Marine

Marine port facilities are located to the south of the preliminary study area, in Toronto and Hamilton. Marine movement of goods can be affected by bottlenecks at inter-modal facilities and by limitations of the St. Lawrence Seaway to handle ocean vessels on a year-round basis.

- The major problem for marine transportation relates to congestion on the inter-regional roadway connections into the preliminary study area. Increased use of containers for shipping will also impose increased pressure on the road distribution network.

Summary of Future Transportation Opportunities

In addition to identifying the transportation problems, an equally important aspect of this study is the identification of transportation opportunities, referring to the "big picture" strategic benefits of an efficient transportation system. These opportunities within the GTA West preliminary study area are summarized as follows:

1. **Support Future Municipal Land Use Planning in Accordance with the** *Growth Plan* **-** The opportunity exists to co-ordinate multi-modal transportation and land use planning with municipal land use planning to support municipal growth aspirations that conform to the requirements of the *Growth Plan*, while at the same time accommodating both the local and inter-regional future travel demands.

2. **Maintain the Character and Integrity of Rural and Agricultural Lands -** There is an opportunity to avoid or minimize potential impacts to rural, agricultural and archaeological / heritage areas.

3. **Provide Transportation Choice, Improved Connections and Increased Reliability for Commuters -** The opportunity exists to build upon the Metrolinx RTP and GO Transit Strategic Plan to provide a robust transportation system that offers real alternatives to automobile travel throughout the preliminary study area.

4. **Provide Transportation Choice, Improved Connections and Increased Reliability for Moving Goods -** While trucks will continue to play an integral role in moving goods throughout and beyond the preliminary study area, there is an opportunity to encourage increased use of other modes for goods movement, including rail, marine and air, as well as to provide better connections between modes.

5. **Provide Improved Transportation Service for Tourists -** There is an opportunity to enhance the growth of tourism and recreation trips and the overall travel experience to the preliminary study area.

6. **Optimize Existing Transportation Infrastructure -** There are opportunities to use Transportation Demand Management (TDM) and Transportation Systems Management (TSM) strategies to reduce / shift trip making and automobile usage while optimizing use of the existing system.

7. **Minimize Impacts to the Natural, Social, Economic and Cultural Environments to the Extent Possible -** There is an opportunity to minimize, and potentially avoid, impacts to important natural, social, economic and cultural features at the earliest planning stages. This can be done through planning that optimizes use of existing infrastructure, and gives due regard to the requirements of approved provincial environmental protection policies, heritage resources and First Nations lands when developing and evaluating transportation alternatives.

2.5. OVERVIEW OF CORRIDOR PROTECTION AND DEVELOPMENT ISSUES PAPER

2.5.1. Report Overview

The *Overview of Corridor Protection and Development Issues Paper* was issued as a draft in June 2009, in order to capture the land development pressures and implications for transportation opportunities in the GTA West preliminary study area. The preliminary study area development pressures data have been updated throughout the study process and have been used in municipal consultation. An overview of the Areas of Interests (as defined below) and development pressures was presented at the second round of Public Information Centres in March 2009.

Development within the GTA West preliminary study area is occurring at a very fast pace. As a result, it was important to develop an approach to review development issues in order to protect corridor opportunities. The *Overview of Corridor Protection and Development Issues Paper* outlines the approach undertaken to complete this work.

At the start of the study, data on current land use designations and development applications were collected from the upper-tier regions and counties as well as all lower-tier municipalities. This information was used to assemble a comprehensive and up to date land use map of the preliminary study area. This map was continuously updated as the study progressed to reflect amendments made by upper-tier and lower-tier municipalities to implement the *Growth Plan*, in particular to designate future growth areas.

2.5.2. Report Findings

Areas of Interest

Following a review of applications and planning studies occurring within the preliminary study area, ten Areas of Interest were identified between Highway 400 in the Region of York and the Hanlon Expressway in Township of Puslinch and the City of Guelph as part of the draft paper in June 2009. These areas were identified as lands where future urban expansions or large development proposals would likely be considered by local municipalities and areas where potential connections between the growth centres may be compromised by future development plans. Areas of Interest were defined as areas where the Ontario Ministry of Transportation (MTO) should actively monitor and comment on all development applications as future urban expansions in these areas could limit corridor opportunities. These Areas of Interest as identified in 2009 are as follows:

- Area #1 - Highway 400 Corridor at Kirby Road, City of Vaughan
- Area #2 - North of Major Mackenzie Drive to Kirby Road East of Highway 50 West of Kleinburg, City of Vaughan
- Area #3 - South of Mayfield Road West of Regional Road 50, City of Brampton
- Area #4 - West of Coleraine Drive to Centreville Creek Road, North of Mayfield Road to Healey Road, Town of Caledon
- Area #5 - Mayfield West Secondary Plan Area, Town of Caledon
- Area #6 - South of Mayfield Road East of Winston Churchill Boulevard, City of Brampton
- Area #7 - West of Winston Churchill Boulevard South, Town of Halton Hills
- Area #8 - North-West Milton at Highway 401 and Tremaine Road
- Area #9 - City Of Guelph – Southerly Limit at Hanlon Expressway (Highway 6)
- Area #10 - Township Of Puslinch – North Of Aberfoyle to Guelph Boundary and Hanlon Expressway (Highway 6)

Consultation and Collaboration

Following the identification of the Areas of Interest a series of consultation meetings were held in February and March 2009, between the Study Team and upper and lower tier municipalities. The purpose of these meetings was to confirm the Areas of Interests and to develop a collaborative approach to review development applications and municipal planning studies. The municipal authorities agreed to provide information to the Ontario Ministry of Municipal Affairs and Housing (MMAH) and MTO regarding:

- municipal planning studies;
- applications for Official Plan Amendments;
- applications for Plans of Subdivision or Condominium; and,
- applications for rezoning.

In the identified Areas of Interest, the approval authorities agreed to provide the Province with all of the information identified above. Outside of the Areas of Interest, the approval authorities agreed to provide the Ministry with Official Plan Amendments and applications for Plans of Subdivision or Condominium. Less information was required outside the Areas of Interest as these lands were essentially rural areas where little or no development is anticipated as the result of the Provincial policies including the PPS, the *Greenbelt Plan* and the *Growth Plan*.

As a result of this collaborative approach, the Ministry has been able to provide comments on planning applications and municipally driven planning studies in an effort to ensure that a broad range of opportunities remained available during the course of this study.

This approach has worked to a great extent to ensure that municipal planning decisions reflect the need to provide options for a transportation corridor through the preliminary study area.

2.5.3. Development Issues Update

Since the release of the *Overview of Corridor Protection and Development Issues Paper* in June 2009, the Study Team has been reviewing and updating development information focusing in and around the Preliminary Route Planning Study Area (see **Chapter 6**). The updates (are current as of September 2012) are summarized in the section below.

York Region

400 North Employment Area - The 400 North Employment Area Secondary Plan was approved by the Ontario Municipal Board in November 2011. A "GTA West Corridor Protection Area" has been identified in the Secondary Plan. This continues to be an Area of Interest as Highway 400 will be the terminus of the proposed new transportation corridor.

North Kleinburg-Nashville Area - The North Kleinburg-Nashville Secondary Plan process began in May 2007 as part of the larger Vaughan Official Plan project. The Secondary Plan was adopted by the City of Vaughan in September 2010.

Peel Region

Bolton Residential Expansion - The Town of Caledon is planning to commence the Bolton Residential Expansion Study. The planning horizon for the study is between 2021 and 2031, and generally bounded by Mayfield Road, The Gore Road, Castlederg Sideroad and the York-Peel municipal boundary.

Brampton Area 47 – The Brampton Secondary Plan Area 47 is generally bounded by Mayfield Road, Castlemore Road, Highway 50 and The Gore Road. There are a number of studies being completed for this Secondary Plan, the subjects of the studies are: community design and open space, transportation, environmental servicing, employment, retail and institutional land use, cultural heritage, and infrastructure (servicing).

Mayfield West Phase 1 Area - Lands located in Mayfield West Phase 1 north of Mayfield Road and between Hurontario Street / Highway 10 and Dixie Road are in various stages of development approval.

Mayfield West Phase 2 Area - The study area for the Mayfield West Phase 2 Secondary Plan runs between Hurontario Street and Chinguacousy Road, north from Mayfield Road.

Heritage Heights Area - The Heritage Heights Secondary Plan area located between Mississauga Road Winston Churchill Boulevard, Mayfield Road, and Queen Street West. The City of Brampton continues to complete its community plan for this area known as "Heritage Heights" and the plan is progressing in two phases. Phase 1 consists of studies which are currently in progress. The study topics are: transportation planning, infrastructure, subwatershed and landscape analysis, shale resources update, and employment implementation. Once the studies in Phase 1 are complete, Phase 2 will begin. Phase 2 consists of the following studies: commercial, institutional, open space, and cultural land use studies and a growth sequencing study.

Ninth Line Corridor - The Ninth Line Corridor was recently annexed to the City of Mississauga and Peel Region. This area is intended to progress through a full planning process consisting of: 1) Determining the amount of developable land; 2) A municipal comprehensive review to expansion of the urban boundary; and, 3) Determining land use options for the corridor prior to adoption of an Official Plan Amendment and Zoning By-law Amendment for the area, readying the land for development.

Halton Region

Norval Area - The Town of Halton Hills has initiated work on updating the Norval Secondary Plan.

Calloway Commercial Block - The area in the northeast quadrant of Highway 401 and Trafalgar Road received site plan approval, and is currently under construction for commercial development.

2.6. AREA TRANSPORTATION SYSTEMS ALTERNATIVES REPORT

2.6.1. Report Overview

The purpose of the *Area Transportation System Alternatives Report* is to summarize the process and methodology that was used to develop a broad range of the Area Transportation System Alternatives and to document the key findings of this work. This report served as a critical stage in the study, providing a foundation for the further generation, evaluation and selection of Preliminary Planning Alternatives that have been incorporated into the ultimate Strategy for this stage of the GTA West study.

An overview of the transportation alternatives was presented at the third round of Public Information Centres (PICs), held in November and December 2009. The *Area Transportation System Alternative Report* provided further detail and background to the information presented at PIC#3. The report can be referenced on the study web site (www.gta-west.com) or by contacting the Study Team.

2.6.2. Report Findings

As discussed in detail in **Chapter 3**, a two-stage process was used for developing and assessing area transportation system alternatives. The first step involved the generation and assessment of individual alternatives and their ability to address future problems and opportunities (see **Section 2.4**). With significant stakeholder contribution and reviews of relevant practices in other jurisdictions, the following list of individual alternatives was developed:

- Transportation Demand Management (TDM) and Transportation Systems Management (TSM)
- Transit
- Freight Rail
- Marine
- Air
- Freight Inter-Modal
- Roads and Highways

The assessment of the 'long list' of individual alternatives involved assessing the degree to which each alternative could meaningfully contribute to addressing the inter-regional transportation problems and opportunities that have been identified by the Study Team. The assessment of the individual transportation alternatives is summarized in **Exhibit 2-3**.

The findings of this assessment identified numerous alternatives representing all transportation modes. One of the key findings, however, was that **no single mode of transportation is capable of fully addressing all of the transportation problems and opportunities**. As such, all of the individual transportation alternatives were carried forward for further consideration to the second stage of the process – the assembly of the "group" alternatives. Each of the group alternatives are described briefly below. Further detail with regard to the elements of each of the group alternatives are summarized in **Chapter 3**.

Based on the Study Team's assessment of the 'long list' of alternatives, the alternatives considered worthy of pursuing as part of the current study were grouped into each of the following categories:

- **Group #1: Optimize Existing Transportation Networks -** Transportation initiatives that focus on improving the performance of the existing transportation system for all modes of travel and freight transport through strategies designed to reduce automobile and truck demand and improve system operating efficiency.

- **Group #2: New/Expanded Non-Road Infrastructure -** This alternative builds upon the transportation system performance enhancements provided by Group #1 through provision of additional "non-road-based" capacity such as new air, marine, transit and freight rail infrastructure to address potential shortfalls in addressing the transportation problems and opportunities inherent in Group #1.

- **Group #3: Widen/Improve Existing Roadways -** This alternative builds upon the transportation system

enhancements and non-road capacity improvements provided by Group #2 and adds new capacity by widening existing roads or highways beyond that which is currently planned or contemplated by municipalities and the Province.

- **Group #4: New Transportation Corridors -** This alternative builds upon the transportation system enhancements and both road and non-road capacity improvements provided by Group #1 and #2, as well as some existing road widening and improvements from Group #3, and adds new road and / or highway capacity on a new corridor to address identified transportation problems and opportunities.

MODE	CARRIED FORWARD	RATIONALE
Transportation Demand Management (TDM)	✓	Is recognized as an important component of transportation networks but on its own it does not provide a significant improvement to transportation problems in the GTA West preliminary study area.
Transportation Systems Management (TSM)	✓	Is recognized as an important component of transportation networks but on its own it does not provide a significant improvement to transportation problems in the GTA West preliminary study area.
Transit	✓	Is recognized as an important component of a transportation network for the movement of people; however, on its own it does not provide a significant resolution of the full range of transportation problems in the GTA West preliminary study area.
Air	✓	Improved multi-modal connections to the Toronto Pearson International Airport have some potential to reduce dependence on the road network in the GTA West preliminary study area. Recommended to be pursued by others or are already being pursued by others.
Marine	✓	Improved multi-modal connections to Port of Toronto / Port of Hamilton have some potential to reduce congestion on the road network in the GTA West preliminary study area. Recommended to be pursued by others or are already being pursued by others.
Freight Rail	✓	Will continue to be an important aspect of goods movement in the GTA West preliminary study area, however there are no specific freight rail transportation alternatives to be pursued as part of this study.
Inter-modal	✓	Improved inter-modal facilities have some potential to address transportation problems in the GTA West preliminary study area, especially as they relate to the movement of goods (i.e., rail to truck transfers etc.).
Roads and Highways	✓	Are expected to provide significant improvement to transportation problems in the GTA West preliminary study area through widening of existing roads and / or highways and potentially introduction of a new transportation corridor.

Exhibit 2-3: Assessment of Individual Transportation Alternatives

3 Area Transportation Alternatives

3.1. OVERVIEW

This Chapter provides an overview of the process for generating and assessing the Area Transportation Alternatives. The development of the Area Transportation System Alternatives involved a unique and creative process (illustrated schematically in **Exhibits 3-1a** and **3-1b**), built upon an extensive consultation program with a wide range of stakeholders and other transportation service providers. This process followed a two-stage approach that was presented in **Exhibit 1-1** of the EA Terms of Reference. The two stage approach involves evaluating 'Alternatives to the Undertaking' and 'Alternative Methods of Carrying Out the Undertaking', where the 'Undertaking' is not fully identified until the end of the planning process.

The first stage began with the development of 'Alternatives to the Undertaking'. These Alternatives are defined as functionally different ways of addressing the identified problems and opportunities. This was followed by a comprehensive assessment of the individual transportation alternatives to assess their ability to address the future inter-regional transportation problems and opportunities identified by the Study Team. The individual transportation alternatives included:

- Transportation Demand Management (TDM);
- Transportation System Management (TSM);
- Transit;
- Marine;
- Air;
- Freight Rail;
- Inter-modal; and
- Roads and Highways

From the GTA West Environmental Assessment Terms of Reference - Amended (July 2007), the "Do Nothing" alternative is considered the status quo, where the transportation system

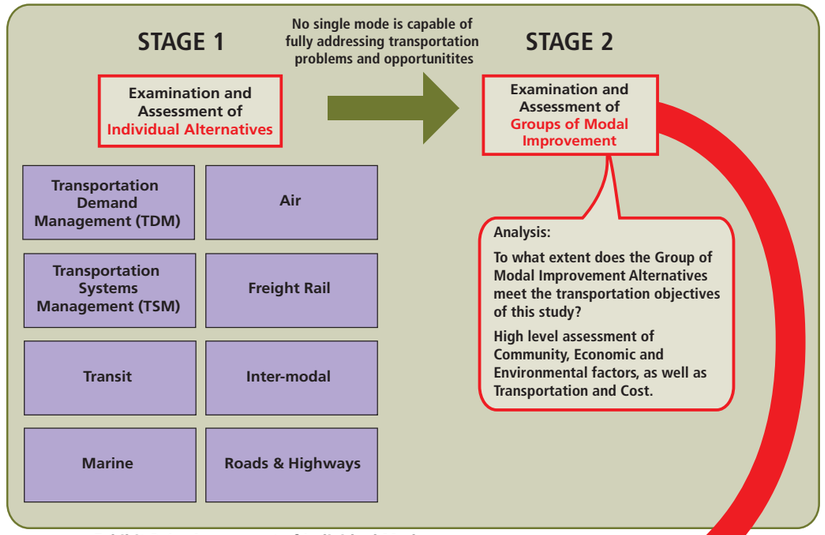


Exhibit 3-1a: Assessment of Individual Modes

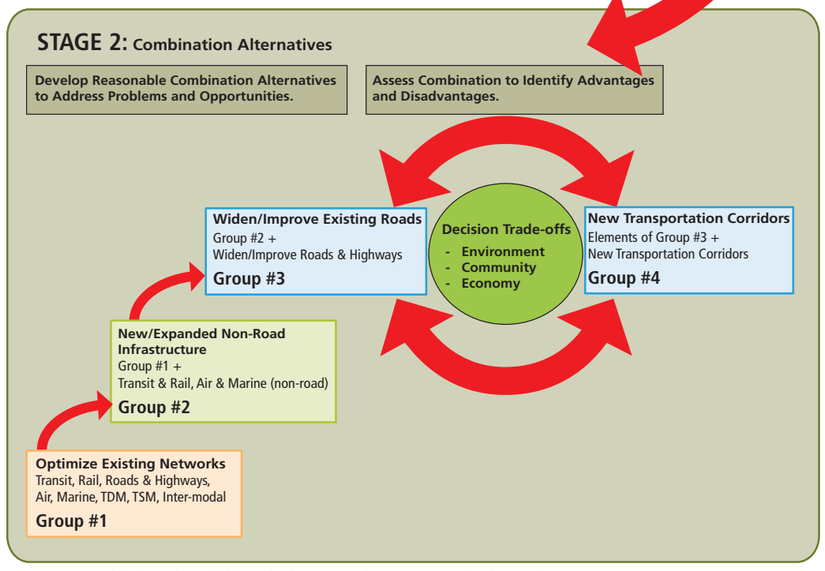


Exhibit 3-1b: Building Block Approach to Groups of Alternatives

would be limited to maintenance of current transportation infrastructure and the implementation of approved Provincial, Regional and local Municipal initiatives.

During the EA, the term "Do Nothing" was superseded by the use of the term "Base Case" as it was considered to be more meaningful in explaining the inclusion of the broad range of planned improvements and programs by 2031. The list includes:

- The Metrolinx Regional Transportation Plan (Metrolinx RTP);
- GO Transit's Strategic Plan, GO 2020;
- The Ministry of Transportation's planned highway improvement program, including highway extension and expansion plans, and High Occupancy Vehicle (HOV) systems;
- A range of municipal transportation initiatives for road, transit and active transportation programs identified through Transportation Master Plans and Official Plans; and
- Rail, air and marine transportation initiatives and programs including freight rail service enhancements.

The 'Base Case Scenario', accounts for implementation of approved Provincial, Regional and local Municipal initiatives including the full Regional Transportation Plan (by GO/Metrolinx), as well as improvements identified in Regional/municipal Transportation Master Plans (TMPs) in the study area and several approved MTO initiatives (i.e., Highway 427 extension, etc.). Based on this assessment, multi-modal alternatives considered capable of substantively contributing to addressing these problems and opportunities were carried forward, which involved assembling the multi-modal individual alternatives into group alternatives. These group alternatives (shown in **Exhibit 3-1**) included:

- Group #1 – Optimize Existing Networks
- Group #2 – New/Expanded Non-Road Infrastructure
- Group #3 – Widen/Improve Existing Roads
- Group #4 – New Transportation Corridors

The development and assessment of alternatives was undertaken at an increasing level of detail. As the range of alternatives under consideration became more focused (i.e. individual to group, and later to preliminary planning), the level of detail and range of criteria to be considered to identify potential environmental, community and economic impacts and benefits also became more detailed.

The primary focus of the process has been to assemble the group alternatives based on the 'long list' of alternatives that was generated initially by the Study Team and supplemented based on consultation with municipalities, agencies, members of the public, transportation service providers and other stakeholders. Further details on the long list of individual alternatives can be found in the *Area Transportation System Alternatives Report* available on the study website (http://www.gta-west.com/).

A "building-block" approach was used to assemble the group alternatives, based on the principle of first optimizing the existing transportation network, and then, if necessary, incorporating non-roadway infrastructure improvements and expansion before considering the provision of new roads and / or highways. This approach was developed to align with the underlying principles of the *Growth Plan* and *Greenbelt Plan*. This approach is consistent with current government policy, which talks to optimizing existing infrastructure before new infrastructure is built, and promotes transit initiatives as a priority. Moreover, the development of group alternatives at this stage of the process was inherently additive. Where a group alternative did not adequately satisfy the identified transportation objectives, it was not removed from further consideration, but rather used as a building block that the next group was built upon.

3.2. ASSESSMENT OF GROUP TRANSPORTATION ALTERNATIVES

The focus of the generation and assessment of group alternatives was to identify further enhancements needed for the transportation system to adequately address the identified problems and opportunities. In Stage 2, each group alternative was assessed based on the degree to which it achieved the transportation objectives of the study.

A high level assessment of environmental, economic and community factors was also undertaken to support the consideration of group alternatives. The level of assessment of these factors was reflective of the detail available in the group alternatives. A more detailed impact assessment was conducted subsequently. For more details, please refer to **Chapters 4 and 5**.

The assessment criteria builds upon those outlined in the GTA West Terms of Reference and reflects input received through stakeholder consultation in the development of study goals and objectives.

3.3. GROUP #1 – OPTIMIZE EXISTING NETWORKS

The Ontario government has a vision for building strong, prosperous communities by managing growth in this region to the year 2031 and beyond. The provincial government is planning for the future through policies like those contained in the Provincial Policy Statement, *The Growth Plan*, *The Greenbelt Plan* and the *Metrolinx Regional Transportation Plan (RTP)*.

These plans and policies place a strong emphasis on making the most of our existing infrastructure and focusing infrastructure development on non-roadway modes of transportation. As such, the foundation of the group alternatives (Group #1) includes strategies that are aimed at optimizing the existing transportation networks.

3.3.1. Overview of Group #1

Group #1 builds upon comprehensive optimization strategies embodied in the Metrolinx RTP, *GO 2020 Strategic Plan*, MTO's *High Occupancy Vehicle Lane Network Plan* and Carpool Lot Program, and municipal transportation plans. These strategies aim at:

- Improving access to transit stations for pedestrians and motorists and advancing the concept of mobility hubs for key stations;
- Improving integration of active transportation opportunities and transit (e.g. secure storage facilities at transit stations, bicycle storage on transit vehicles, etc.);
- Expanding use of roadway shoulders during peak travel periods;

- Improving scheduling and fare integration between inter-regional and local transit providers;
- Providing transit users and drivers with real-time trip planning information technologies; and
- Increasing / improving transit service frequency.

In addition to these strategies, the Study Team identified a number of complementary strategies, which may be further supplemented and refined. These strategies are described in further detail below:

Speed Harmonization

The concept of speed harmonization is used widely in many European jurisdictions and essentially involves adjusting the speed limit on inter-regional road facilities based on prevailing congestion levels. Changeable message speed signs that are connected through an electronic system to vehicle sensors in the pavement are used to reduce the speed limit during times of road congestion. The reduced speed limits promote a more even traffic flow which increases throughput and improves road safety.

Provincial / Employer Led TDM Programs

Currently operating Transportation Demand Management (TDM) programs could be improved by expanding the Metrolinx Smart Commute Program beyond the Greater Toronto and Hamilton Area (GTHA). In addition to providing broader coverage, this concept would also involve introducing a regional organization that would provide strategic direction and / or potentially reach out to employers. The program could be managed on a regional level.

Experience in other jurisdictions has shown that regional organization of TDM initiatives leads to operational and economic efficiencies that translate into increased awareness of the programs, a greater variety of services and higher utilization. This concept would also involve providing additional carpool parking lots at key locations.

Long Combination Vehicles (LCVs)

Long Combination Vehicles (LCVs) feature a single tractor with two 16m (53ft) trailers. MTO initiated a pilot program to allow up to 100 LCVs on the provincial highway network. This program improves fuel efficiency and traffic operations for goods movement.

Ramp Metering

Ramp metering involves the implementation of traffic signal control on freeway entrance ramps to control the platoons of vehicles entering the highway and therefore provide a smoother downstream traffic flow. Ramp metering is already operating on portions of the Queen Elizabeth Way (QEW) in the City of Mississauga and Town of Oakville.

HOV / Transit Bypass at Key Locations

This concept involves providing bypass lanes on metered ramps, ramps accessing transit stations and ramps in vicinity of carpool lots for High Occupancy Vehicle (HOV) and transit vehicles. These ramps would allow HOV and transit vehicles to bypass traffic queues and access the corresponding facilities.

Improved Incident Management

This concept involves increased utilization of emerging technologies to improve detection of incidents, improve Emergency Medical Service (EMS) response times and, as a result, reduce the amount of congestion and delays resulting from traffic incidents.

On the basis of experience with similar systems in North America, there is potential for TDM and TSM initiatives to cause inter-regional auto travel to decline by 4% in the GTA West preliminary study area.

3.3.2. Assessment of Group #1

The high level assessment of the Group #1 Alternative based on potential community, economic, environmental impacts, as well as transportation considerations and costs, is summarized below:

Community

- Supports government policy in optimizing use of existing infrastructure;
- Minimizes footprint impacts to existing residences and community features;
- Will not fully accommodate future planned population and employment growth; and
- Does not provide improved connections between Urban Growth Centres.

Economy

- Minimizes footprint impacts to existing businesses; and
- Limited ability to support future economic, trade and tourism growth.

Environment

- Minimizes footprint impacts to Niagara Escarpment and Greenbelt lands;
- Minimizes footprint impacts to other natural and cultural features;
- Minimizes air quality impacts; and
- Minimizes resource consumption.

Transportation and Cost

- Utilizes innovative approaches to make best use of existing infrastructure;
- Relative costs are low in comparison to other alternatives;
- Helps to manage future travel demands, but cannot fully address future travel demands for people and goods movement; and
- Potential for inter-regional auto travel to decline by 4% in the GTA West preliminary study area.

The Group #1 strategies represent innovative and effective ways of improving and optimizing current transportation infrastructure. While these strategies provide an important foundation for improving the transportation system and helping to manage future congestion in a relatively cost effective and low impact manner, they will not address all of the identified transportation problems and opportunities.

3.4. GROUP #2 – NEW / EXPANDED NON-ROAD INFRASTRUCTURE

The extensive transit recommendations embodied in the Metrolinx RTP and GO Transit's *GO 2020 Strategic Plan* demonstrate the government's commitment to making transit a viable alternative to the automobile. The concepts proposed by this study build upon the recommendations of the RTP and *GO 2020*.

3.4.1. Overview of Group #2

Group #2 includes significant transit, marine and air service expansion initiatives, as envisioned by many agencies, industry, Metrolinx and GO Transit. These include the following:

- Additional expanded and improved parking facilities at transit stations;
- New bus storage in Aberfoyle;
- Metrolinx RTP and GO 2020 Strategic Plan initiatives; and
- Freight rail, air and marine initiatives to be studied / pursued by others (including: grade separation of road and rail at key bottleneck locations; improved integration of rail and air transportation modes; and logistics hubs near airports / ports / rail yards / industrial parks).
- Rapid Transit along the following corridors:
  - Steeles Avenue area (Lisgar GO Station to Highway 427);
  - Highway 427 (Toronto Pearson International Airport to Queen Street);
  - Hurontario Street (Port Credit to 407 ETR);
  - Highway 10 (Mayfield West to Downtown Brampton);
  - Highway 7 (Peel-York boundary to Locust Hill / Markham);
  - 407 ETR (Halton to Durham);
  - Trafalgar Road / Main Street (downtown Milton to 407 ETR); and
  - Brampton Züm (Downtown Brampton to Peel-York Boundary).
- Regional Rail service:
  - Bolton to Union Station;
  - Toronto Pearson International Airport to Union Station;
  - Service expansion to Milton and Georgetown;
  - Potential service extension from Milton to Cambridge; and
  - Potential service extension from Georgetown to Kitchener (completed).
- Express Rail service:
  - Richmond Hill / Langstaff Gateway to Union Station;
  - Downtown Brampton to Union Station; and
  - Hamilton to Union Station along Lakeshore corridor.

In addition to these strategies, the Study Team identified a number of complementary strategies, which may be further supplemented and refined. These strategies are described in further detail below:

Expanded Inter-regional GO Bus Routes

Currently, GO Transit bus service is focused on the Toronto area and particularly Union Station. As such, the scheduling of these services is based on arrival / departure from Union Station during peak commuter times. In turn, commuters in areas west of Toronto may need to travel at less convenient times.

Improvements to the current inter-regional GO Bus service would be seamlessly integrated with the Toronto-centric services to provide expanded coverage from Toronto to areas west of Georgetown such as Guelph, Hamilton and Kitchener-Waterloo. Existing bus services to these areas would be improved by more frequent buses and better coordination with local services.

Transit Supportive Highway Corridors

This concept involves introducing reserved bus lanes, HOV lanes, bus bypass shoulders and other transit supportive measures within existing provincial facilities including Highways 400, 410, 427 and 401 that would serve to make bus transit a more reliable and viable service. While these types of improvements could result in some level of impact to properties that abut these corridors, it is envisioned that these impacts would be relatively minor in nature and could be mitigated to a significant extent.

Inter-regional Transit Hubs – where local transit and GO Transit connect

This concept involves the placement of transit hubs in Downtown Guelph, Vaughan Metropolitan Centre, Toronto Pearson International Airport, Downtown Milton and Downtown Brampton. Transit hubs can result in land use improvements as they tend to attract more accessible development patterns.

New Bus Rapid Transit links between Urban Growth Centres

This concept involves providing better transit connections between Urban Growth Centres in the GTA West preliminary study area, including Downtown Brampton, Milton, Vaughan and Guelph areas. Given that these are smaller growth centres and the potential ridership may not be significant, a potential would be to use bus rapid transit (BRT), light rail transit (LRT) or in the longer term, small train systems such as self-propelled railcars (which can be individual or clustered). Stations would be multi-modal facilities to provide for a well-connected and integrated transportation system.

Expected benefits of the Group #2 Alternatives include improved mode choice for people and goods movement, and potential shift of 10% of long distance truck traffic (more than 500 kilometres) to alternative modes if infrastructure and policy support is provided.

3.4.2. Assessment of Group #2

The high level assessment of the Group #2 Alternative (which also includes Group #1) on the basis of potential community, economic, environmental impacts, as well as transportation considerations and costs, is summarized below.

Community

- Provides greater choice for commuters and tourists;
- May provide improved connections between Urban Growth Centres to a limited extent;
- Potential for minor impacts to existing residences and community features; and
- Does not fully accommodate future planned population and employment growth.

Economy

- Provides greater choice for shippers;
- Limited impact to agriculture lands;
- Limited ability to support future economic, trade and tourism growth.

Environment

- Potential for impacts to Niagara Escarpment and Greenbelt lands;
- Potential for impacts to Oak Ridges Moraine;
- Potential for impacts to other natural and cultural features; and
- Potential for impacts to air quality in built up areas.

Transportation and Cost

- Provides greater choice and a more balanced transportation system;
- Relative costs will vary in comparison to other alternatives; and
- Cannot fully address future travel demands for commuters, goods movement and tourists.

The Group #2 strategies build on Group #1 and represent important, sustainable means of moving people and goods by non-road infrastructure. While these strategies are an important element in improving the transportation system and helping to manage future congestion, they will not address all of the identified transportation problems and opportunities.

3.5. THE NEED FOR ROADWAY BASED SOLUTIONS

By 2031, the population in the GGH is expected to increase by almost four million people. In forecasting for the transportation system that will serve this growth, the following is assumed in the transportation model:

- Land use intensification targets prescribed in the *Growth Plan* will be fully achieved;
- Urban Growth Centres will be built with transit-supportive densities and a mix of compatible land uses;
- Development of compact, vibrant and complete communities will be fostered in which people will live, work and play;
- An additional 700 million trips within the Greater Toronto and Hamilton Area will be accommodated on transit;
- All current provincial transportation plans will be in place, including transit improvements that are consistent with Metrolinx RTP and *GO 2020*;
- More commuters will switch from single occupant cars to transit and carpools;
- A significant share of goods transport will be diverted from long distance trucks to other modes;
- The existing transportation infrastructure will be optimized through implementation of the Group #1 type initiatives (optimize existing transportation network); and
- More non-road based transportation improvements, including Group #2 initiatives (improve non-road infrastructure), will be implemented.

Based on the above, the potential of all transportation modes have been explored and together with the RTP and GO Transit's *GO 2020 Strategic Plan*, the province is seeking to maximize the potential of existing infrastructure.

Even with these positive improvements, by the year 2031 significant roadway congestion will occur, particularly on inter-regional connections serving all types of travel, namely Highways 401, 400, 427 and 410.

To realize the vision of a functional transportation network that provides user choice and balance, additional inter-regional roadway capacity will be required: either by widening existing highways (Group #3) and / or protecting for new transportation corridors (Group #4). While the overall Transportation Development Strategy (Strategy) will include recommendations for Group #3 and / or Group #4 Alternatives, it is envisioned that the government's "transit first" priority will be reflected in the implementation of the Strategy.

3.6. GROUP #3 – WIDEN / IMPROVE EXISTING ROADS

The Group #3 Alternative has been developed to address the future transportation problems that have been identified within the GTA West preliminary study area. As such, the additional roadway widenings described below are based on providing adequate traffic capacity, operations and safety conditions on existing provincial facilities to the year 2031.

3.6.1. Overview of Group #3

Group #3 includes all of the elements from Group #1 and Group #2 as well as the widening of the following existing provincial inter-regional transportation facilities in various combinations:

- Highway 401
- Highway 410;
- 407 ETR;
- Highway 400;
- Highway 427;
- County Road 124 / Regional Road 24 / Highway 9;
- Highway 7;
- Highway 6;
- Mayfield Road / Kirby Road; and
- Trafalgar Road.

Roadway widening alternatives include:

- Highway widening; or
- Highway and arterial road widening.

Three alternatives were developed under Group #3 that considered the widening of existing road infrastructure

beyond the planned program. The degree of widening required under each Group #3 Alternative was based on the number and type of roadways to be widened. Under Alternative 3-1, where the preliminary study area's provincial highways only are widened, lane requirements are as follows:

- Highway 401 – additional two to four lanes;
- Highway 427 – additional two lanes;
- 407 ETR – additional two to six lanes;
- Highway 410 – up to four additional lanes; and
- Highway 400 – additional two to four lanes.

The degree of widening that would be required to address the future transportation needs forms part of the basis for comparing Group #3 and Group #4 Alternatives, as discussed further below.

3.6.2. Assessment of Group #3

It should be noted that based on a high level screening evaluation, two of the Group #3 alternatives (namely, Alternative 3-2 and Alternative 3-3) were not carried forward for the detailed assessment of alternatives (in **Chapter 4**). These alternatives were considered to be inferior when compared to other alternatives in addressing future transportation needs.

Detailed assessment of the Group #3 Alternatives was carried out on the basis of potential community, economic, environmental impacts, as well as transportation considerations and costs, and is provided in **Chapter 4**.

3.7. GROUP #4 – NEW TRANSPORTATION CORRIDORS

3.7.1. Overview of Group #4

Group #4 includes all of the elements from Group #1 and Group #2 and potentially some of the highway widening and improvements identified in Group #3, as well as the following new corridor alternatives:

- New corridor connecting either:
  - Highway 400 to Highway 410;
  - Highway 400 to Highway 401 / 407 ETR;
  - Highway 400 to Highway 401 west of Milton urban area;
  - Highway 400 to north of Guelph; or
  - Highway 400 to south of Guelph.

These selected corridors represent the introduction of major capacity improvements in areas that have been identified as having significant transportation deficiencies. The focal area for improvement is along Highway 401 between Highway 400 and Highway 427. As a result, each new corridor alternative terminates at Highway 400; it is and will continue to be the most critical section of transportation deficiency in the area north and west of Toronto. The western termini of the Group #4 Alternatives have been identified to represent significantly different points of network connection that are anticipated to attract different trucking activity and commuters throughout the area.

3.7.2. Assessment of Group #4

Detailed assessment of the Group #4 Alternatives was carried out on the basis of potential community, economic, environmental impacts, as well as transportation considerations and costs, and is provided in **Chapters 4 and 5**.

4 Assessment of Group #3 and Group #4 Transportation Alternatives

4.1. ANALYSIS OVERVIEW

4.1.1. Triple Bottom Line Approach

The evaluation of Group #3 and Group #4 alternatives was divided into work streams, based on consideration of the "triple bottom line" (i.e. Environment, Community and Economy), as well as Transportation and Engineering considerations. The approach includes consideration of:

- Environment – typically include impacts to fish and fish habitat; terrestrial ecosystems; groundwater; etc.
- Community – typically include impacts to residences; businesses; agriculture; noise; air quality; built heritage; archaeology; etc.
- Economy – typically include economic benefits of increased transportation capacity to all sectors of the GGH economy, as well as the ability of each alternative to support future employment growth (including tourism) and municipal economic development objectives.
- Transportation & Engineering – future traffic capacity, operational and safety conditions as well significant constructability issues, and costs.

The evaluation factors (and criteria) stemming from the "triple bottom line" approach (as described in greater detail in subsequent sections) included Natural Environment, Land Use / Social Environment, Cultural Environment, Area Economy, Transportation and Cost / Constructability.

The Community work stream was divided into two factor groups, namely Land Use / Social and Cultural Environments, to differentiate the unique factors / criteria that fall under this stream and therefore require a more detailed analysis. The Transportation and Engineering work stream was also divided into two factor groups, namely Transportation and Cost / Constructability, to facilitate an assessment of transportation factors and criteria separately from cost and constructability related issues. For each criterion, potential effects were measured using qualitative and quantitative measures.

It should be noted that additional analysis was carried out following the release of the draft Transportation Development Strategy Report (February 2011) in the Halton area. Findings of the additional analysis are documented in **Chapter 5** and should be read in conjunction with the evaluation results in **Chapter 4**.

4.1.2. Reasoned Argument

The environmental, community, economic, and transportation criteria to support the assessment of alternatives are outlined below. A "Reasoned Argument" method of evaluation was used to select a preferred alternative(s). The reasoned argument method highlights the differences in net effects associated with the various alternatives. Based on these differences, the advantages and disadvantages of each alternative are identified according to the evaluation of tradeoffs between the various evaluation factors, criteria and indicators. The relative significance of potential impacts is examined to provide a clear rationale for the selection of a preferred alternative(s). The rationale that favoured selection of one alternative over all others was derived from the following sources:

- Secondary source information (and mapping) of significant or sensitive environmental features;
- Government legislation, policies and guidelines;
- Municipal policy (i.e. official plans);
- Issues and concerns identified during consultation with ministries and agencies, municipalities, ratepayer and interest groups and the general public; and,
- Study Team expertise.

The reasoned argument method compares each alternative to others in each criteria and provides an overall assessment of each alternative (in all factor groups), as shown in **Exhibit 4-1**.

4.2. FACTORS AND CRITERIA

Evaluation factors and criteria used to evaluate the short-list of Area Transportation System Alternatives for Group #3 and #4 alternatives were consistent with the evaluation factor groups and assessment of the Alternatives to the Undertaking, established as part of the Terms of Reference (ToR) (July 2007, approved March 2008). The criteria in each factor group (and measures for each) were intended to assist the factor-specific environmental specialists in determining the overall impact of the various alternatives on the natural, social and cultural environments. In determining the overall impact, the specialists considered how the various factors and criteria interact and function together.

As previously noted, the evaluation factors and criteria used to assess the Group #3 and #4 alternatives at this stage of the study were divided into the following groups:

- Natural Environment;
- Land Use / Social Environment;
- Cultural Environment;
- Area Economy;
- Transportation; and
- Cost and Constructability.

Exhibit 4-2 (as presented at Public Information Centre (PIC) #4), which highlights and defines factors, sub-factors, evaluation criteria and measurements of the effects, was used for the assessment and evaluation of the short-listed Group #3 and Group #4 alternatives.

Each alternative was analyzed and evaluated on the basis of a confirmation of the following:

- Quantitative measures of potential "footprint" impacts;
- Qualitative measures of potential impacts; and
- Transportation and Economic benefits that could be anticipated.

The subsequent sections describe in further detail the evaluation process that considered the advantages and disadvantages of each alternative and the relative significance of the potential impacts, based on the following factors and criteria.

4.3. OVERVIEW OF EVALAUTION PROCESS FOR GROUP #3 AND GROUP #4 ALTERNATIVES

The evaluation of alternative corridors included three evaluation processes that are each documented in this report. The initial evaluation process of Alternatives 3-1, 4-1, 4-2, 4-3, 4-4, and 4-5 as described in Section 4.4 culminated in the decision to CARRY FORWARD Alternatives 4-2 and 4-3 since the selection process identified both alternatives to have comparable advantages and disadvantages at the level of detail that was adopted at the time.

The second evaluation process of Alternatives 4-2 and 4-3 as noted in **Section 5.1** culminated in the preference for elements of Alternatives 4-2 and 4-3 as documented in the draft Transportation Development Strategy Report (February 2011).

On the basis of public input received on the draft Transportation Development Strategy Report (February 2011), a third round of analysis and evaluation was carried out to compare a "New Corridor" through Halton Hills and "Further widening of Highway 401" as an alternative. These were representative of elements of Alternative 4-2 and Alternative 4-3 as noted above. This evaluation process is described in **Sections 5.2** to **5.8** and also as presented at Public Information Centre #5 (see **Section 7.8.3**).

4.4. ROAD BASED IMPROVEMENT ALTERNATIVES

Six alternatives (namely Alternatives 3-1, 4-1, 4-2, 4-3, 4-4 and 4-5) were evaluated as part of the initial evaluation process. All road improvement alternatives also include the Group #1 and Group #2 initiatives that would contribute to addressing the preliminary study area's transportation problems and opportunities. These alternatives are shown in **Exhibit 4-3** through **Exhibit 4-8**.

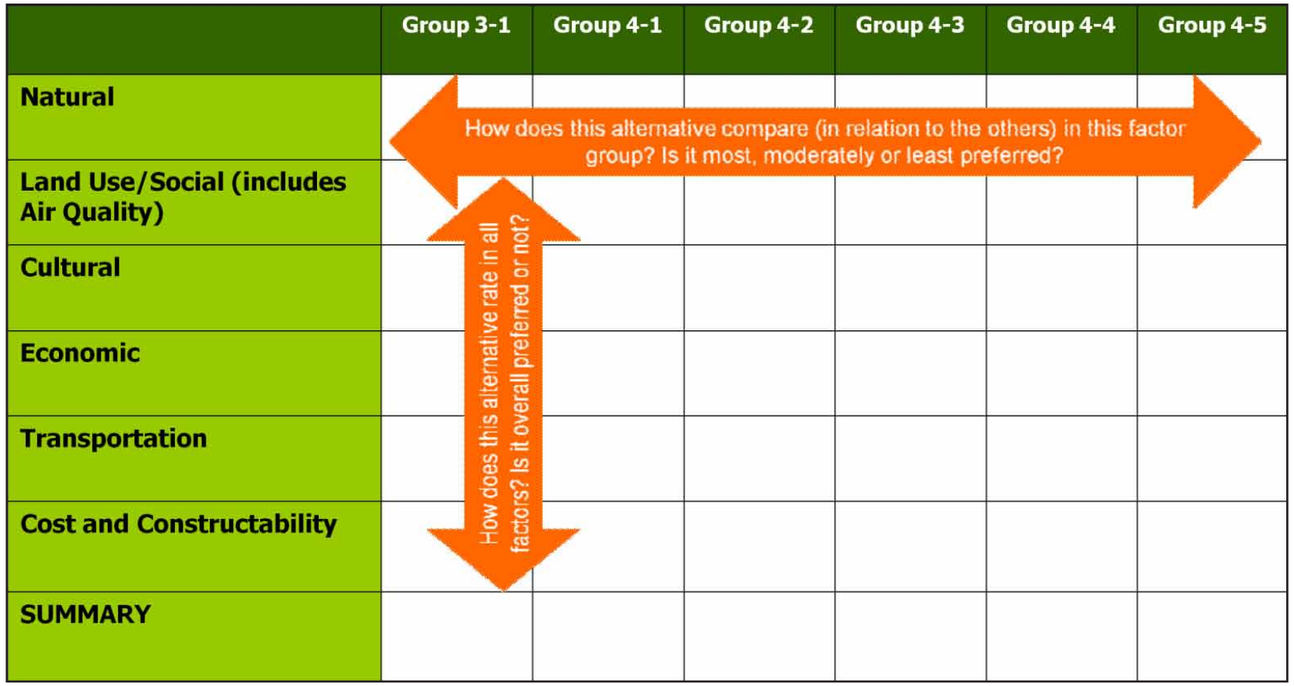


Exhibit 4-1: Rationale for Decision Making and Identification of Preferred Alternative(s)

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
Natural Environment			
1.1 Fish and Fish Habitat	1.1.1 Fish Habitat	Potential to affect sensitive fish habitat and fish community	Qualitative assessment of the nature, significance and sensitivity of fisheries and aquatic habitat using the presence and density of watercourses and aquatic Species at Risk (SAR) as indicators
	1.1.2 Fish Community		Qualitative assessment using the presence and density of watercourses and aquatic Species at Risk (SAR) as indicators
1.2 Terrestrial Ecosystems	1.2.1 Wetlands	Potential to affect provincially and locally significant wetlands	Qualitative assessment considering the nature, significance and sensitivity of wetland units based on density and classification, including qualitative assessment of potential to avoid or mitigate impacts
	1.2.2 Woodlands and Other Vegetated Areas	Potential to affect significant forest and vegetation communities	Qualitative assessment of impacts to woodlots greater than 40 ha in size using linear distance impacts as indicator
	1.2.3 Wildlife Habitats and Movements (including Species at Risk (SAR))	Potential to affect significant wildlife habitat and wildlife movement opportunities	Qualitative assessment of nature, significance and sensitivity of significant wildlife habitat and landscape connectivity based on presence and density of SAR, known wildlife use (i.e., deer wintering, waterfowl staging etc.) and landscape – level habitat connectivity
1.3 Groundwater	1.3.1 Areas of Groundwater Recharge and Discharge	Potential to affect areas of groundwater recharge and discharge	Qualitative assessment based on soil type and permeability to identify areas of high, moderate, low groundwater recharge capability, including consideration of number and location of groundwater recharge and discharge areas
	1.3.2 Groundwater Source Areas and Wellhead Protection Areas	Potential to affect groundwater source areas and wellhead protection areas	Wellhead protection areas that are potentially affected and their location
1.4 Surface Water	1.4.1 Watershed / Sub-Watershed Drainage Features / Patterns	Potential to affect existing drainage systems associated with permanent watercourses	Qualitative assessment of new pavement area, and new / existing watercourse crossings

Exhibit 4-2: Evaluation Factors and Criteria

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
1.5 Designated Areas	Designated Areas are defined by resource agencies, municipalities, the government and/or the public through legislation, policies, or approved management plans, to have special or unique value. Examples of Designated Areas include: • Niagara Escarpment; • Oak Ridges Moraine; • Greenbelt; • Bruce Trail; • TransCanada Trail; • National and provincial parks; • Designated federal wildlife/marine areas; • RAMSAR wetlands; • Remedial Action Plan (RAP) areas; • International Biological Program areas; • World Biosphere Reserves; • Designated heritage rivers; • Environmentally Sensitive Areas (ESAs); • Environmentally Sensitive Policy Areas (ESPAs); • Provincially Significant Areas of Natural and Scientific Interest (ANSIs); Conservation Authority parks/open space lands; • Stewardship lands; and • Land trust areas (such as Nature Conservancy of Canada and others).	Potential to affect designated areas	Qualitative assessment of nature, number and significance of designated areas potentially impacted, including consideration of ability to avoid designated area or mitigate impacts
Land Use / Social Environment			
2.1 Land Use Planning Policies, Plans, Goals, Objectives	2.1.1 Provincial/Federal land use planning policies/goals/objectives	Potential to support federal/provincial land use policies/plans/goals/objectives	Qualitative assessment of ability to support federal/provincial land use policies, plans, goals and objectives
	2.1.2 Municipal land use planning policies/goals/objectives	Potential to support municipal Official Plans	Qualitative assessment of potential to support municipal Official Plans

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
2.2 Land Use / Community	2.2.1 Indian Reserves	Potential to affect Indian Reserves	Qualitative assessment of potential to avoid Indian Reserves
	2.2.2 First Nations Sacred Grounds	Potential to affect First Nations Sacred Grounds	Qualitative assessment of potential to avoid First Nation Sacred grounds
	2.2.3 Residential (Urban and Rural)	Potential to affect urban and residential areas	Qualitative assessment of potential to affect urban and rural residential areas, using number of areas affected and potential to avoid or mitigate impacts as indicator
	2.2.4 Commercial / Industrial	Potential to affect commercial and industrial areas	Qualitative assessment of potential to impact commercial and industrial areas using estimated number of properties/industrial parks potentially impacted as indicator
	2.2.5 Tourism Operations	Potential to support tourist areas and attractions	Qualitative assessment of potential to impact or support tourist areas and attractions in the study area. NOTE: Potential impacts/benefits to tourism travel beyond the study area are dealt with under Area Economy
	2.2.6 Community Facilities / Institutions	Potential to affect major community facilities and institutions	Qualitative assessment of potential to affect major community facilities and institutions using approximate number and type as indicators
2.3 Noise	2.3.1 Transportation Noise	Potential for increased transportation noise in Noise Sensitive Areas (NSAs) (residential areas and sensitive institutional uses)	Qualitative description of different types of noise impacts, locations of increased noise, proximity to NSAs and magnitude/severity of impacts
2.4 Air	2.4.1 Local Air Quality	Potential for exposure of sensitive receptors to various levels of air pollution (including extent and duration of exposure)	Potential for exposure of sensitive receptors to various levels of air pollution
	2.4.2 Regional Air Quality	Incremental annual amounts of air pollutants (criteria air contaminants emitted into the region for the horizon year)	Incremental annual amounts of air pollutants (air contaminants emitted into the region for the horizon year)
	2.4.3 Greenhouse Gas Emissions	Incremental annual amounts of greenhouse gas emitted per annum for the horizon year	Incremental annual amounts of greenhouse gases emitted per annum for the horizon year

Exhibit 4-2: Evaluation Factors and Criteria

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
2.5 Land Use / Resources	2.5.1 First Nations Treaty Rights and Interests or Use of Land and Resources for Traditional Purposes	Potential to affect First Nations Treaty Rights and Interest or use of land and resources for traditional purposes	Potential to impact First Nations Treaty rights and interests or use of land and resources for traditional purposes (i.e., hunting, fishing, harvesting food and medicinal plants, etc.)
	2.5.2 Agriculture	Potential to affect specialty crop areas and/or areas of Canada Land Inventory Classes 1, 2 and 3 soils	Qualitative assessment of potential impacts to prime agricultural lands outside of future development areas and woodlots, measured by linear distance of Class 1 to 3 agricultural lands potentially impacted
	2.5.3 Recreational Lands and Natural Areas of Provincial Significance (e.g. national/provincial parks, conservation areas, major trails)	Potential to affect parks and recreational areas	Number of parks and recreational areas potentially affected
	2.5.4 Aggregate and Mines	Potential to affect aggregates and mineral resources sites	Number of pits and quarries potentially affected
2.6 Municipal Services	2.6.1 Major Utility Transmission Corridors	Potential to affect major utility transmission corridors	Number of potential major utility transmission corridors that could be potentially impacted
2.7 Contaminated Property Identification and Management	Landfills, Hazardous Waste Sites, Brownfield Areas, etc.	Potential to release existing site contamination from landfills (open and closed), hazardous waste sites and other known contaminants	Number and type of contaminated sites potentially affected
Cultural Environment			
3.1 Cultural Heritage – Built Heritage and Cultural Heritage Landscapes	3.1.1 Buildings (i.e., standing sites of architectural or heritage significance, Ontario Heritage Properties, heritage bridges, cemeteries) and Cultural Heritage Landscapes (i.e., areas of historic 19th century settlement).	Potential to affect cultural heritage areas/resources	Qualitative assessment of the potential to impact built cultural heritage areas and resources
	3.1.2 First Nations Burial Sites	Potential to affect known burial sites	Qualitative assessment of the potential to impact First Nation Burial Sites
3.2 Cultural Heritage – Archaeology	3.2.1 Pre-Historic and Historic First Nations Sites	Potential to affect significant pre-historic and historic First Nations archaeological sites of extreme local, provincial or national interest	Qualitative assessment of potential to impact archaeological sites of historical significance to First Nations
	3.2.2 Archaeological Sites or Resources	Potential to affect significant archaeological sites of extreme local, provincial or national interest	Qualitative assessment of impacts to archaeological sites or resources using impacts to undisturbed areas as indicator
Area Economy			
4.1 First Nations Industry		The potential to support First Nations industry	
4.2 Heavy Industry and Trade		Potential to support heavy industry and trade by efficient and reliable goods movement	Qualitative description of how industry and trade are supported TREDIS economic impact evaluation of alternatives

Exhibit 4-2: Evaluation Factors and Criteria

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
4.3 Tourism and Recreation Industry		Potential to support tourism and recreation industry by efficient and reliable movement of people	Qualitative description of how provincial/ regional/municipal tourism and recreation are supported TREDIS economic impact evaluation of hotel/restaurant sector
4.4 Agriculture Industry		Potential to support area agriculture industry by efficient movement of goods	A qualitative assessment of potential impacts to farming operations and fragmentation of agricultural operations
Transportation			
5.1 Traffic Operations		Potential impact on traffic operations due to factors such as design features and transportation network connections	Peak period performance of key corridors – forecast volume/capacity issues at critical screenlines Peak period performance of key inter-regional corridors – forecast volume/capacity issues at critical screenlines Potential to provide for higher order inter-regional transportation corridors (qualitative) Percentage of inter-regional trips on key corridors at critical screenlines
5.2 Commuter Travel Characteristics		Potential impact on commuter trip distribution and trip length	Percentage of peak period self-containment of trips with the municipality/region Average automobile trip length (km) Potential to support transit opportunities on a new corridor
5.3 Efficient Movement of People		Potential to support the efficient movement of people between communities and regions by road	Percentage of inter-regional network operating better than LOS D (automobile km) Percentage of local road network operating better than LOS D (automobile km) Percentage of inter-regional automobile trips using the local road network Automobile hours of delay on the inter-regional transportation network (automobile hours) Average automobile vehicle occupancy Total persons moved in study area

Exhibit 4-2: Evaluation Factors and Criteria

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
5.4 Efficient Movement of Goods		Potential to support the efficient movement of goods between communities and regions by road	Percentage of inter-regional system operating better than LOS D (truck km) Percentage inter-regional truck trips using the local road network Truck hours of delay on the inter-regional transportation network
5.5 System Reliability / Redundancy		Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions	Availability of alternate routes/facilities for inter-regional transportation between regions, communities and terminals (qualitative) Potential to improve transportation system reliability (qualitative)
5.6 Safety		Potential to improve traffic safety based on opportunity to reduce congestion on the area road network	Potential to improve response times for emergency service providers due to reduced congestion on the inter-regional road network (refer to volume-capacity ratio in Traffic Operations) Potential to reduce collisions due to improved network LOS (refer to LOS in Traffic Operations)
5.7 Modal Integration, Balance and Choice for Movement of People (commuters, recreation/tourist)		Potential to improve modal integration, balance and choice for person trips between communities, employment centres and major transit hubs	Potential to increase attractiveness/effectiveness of existing, new and improved transit services (qualitative) Peak period transit mode share (by destination) Provision of higher order inter-regional transit services (qualitative) Provision of linkages between inter-regional and regional/community (local) transit systems (qualitative) Bus operational performance on inter-regional road network (refer to LOS in Traffic Operations) Availability/provision of alternate travel modes for tourism/recreational travel (qualitative) Provision of/allowance for active transportation measures (e.g., bike lanes, bike racks on buses/trains) (qualitative)
5.8 Modal Integration, Balance and Choice for Movement of Goods		Potential to improve modal integration, balance and choice for goods movement between ports and terminals, communities and employment centres	Potential to improve accessibility of intermodal centres, ports and terminals (qualitative)

FACTOR	SUB-FACTOR	EVALUATION CRITERIA	MEASUREMENT OF THE EFFECTS
5.9 Linkages to Population and Employment Centres		Potential to improve accessibility to Urban Growth Centres, Gateway Economic Centres and Gateway Economic Zones for people and goods movement based on higher order network continuity and connectivity	Availability/provision of higher order linkages between Urban Growth Centres, Gateway Economic Centres and Gateway Economic Zones (qualitative) Accessibility of Urban Growth Centres, Gateway Economic Centres and Gateway Economic Zones (qualitative) Percentage change in peak hour travel times between Urban Growth Centres
5.10 Recreation and Tourism Travel		Potential to support recreation and tourism travel within and to/from the study area	Directness of routes between population centres, international gateways and tourist/recreation destinations (qualitative) Peak period (summer/weekend) transportation system performance on key inter-regional corridors – forecast volume/capacity issues at critical screenlines Diversion of summer recreational trips from local and regional roadways (qualitative)
6.0 Cost and Constructability			
6.1 Potential to Ease Implementation Considering Relative Cost, Relative Property Impacts, Feasibility / Difficulty and Requirements for Environmental Mitigation.	6.1.1 Cost (range)		"Order of magnitude" range of cost
	6.1.2 Feasibility of implementation (including interchange reconstruction requirements, impacts on existing schemes, etc.).		Qualitative assessment of feasibility of construction
	6.1.3 Potential transportation construction staging impacts.		Qualitative assessment of potential construction staging impacts
	6.1.4 Requirements for environmental mitigation / compensation / restoration.		Qualitative assessment of potential environmental mitigation required

Exhibit 4-3: Road Improvement Alternative 3-1 - Widening Existing Provincial Highways

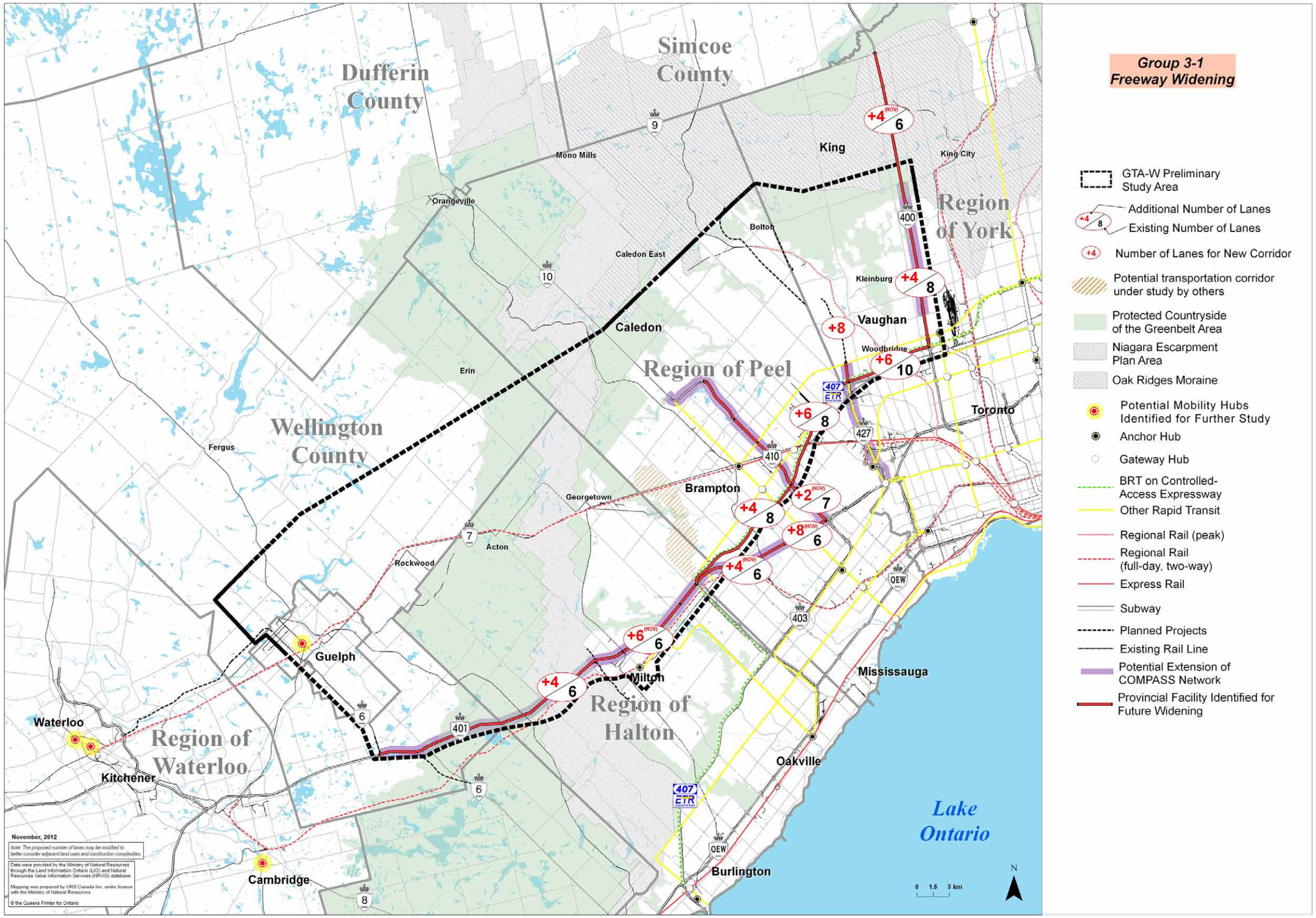


Exhibit 4-4: Road Improvement Alternative 4-1 - New Corridor from Highway 400 to Highway 410 with Provincial Highway Widening

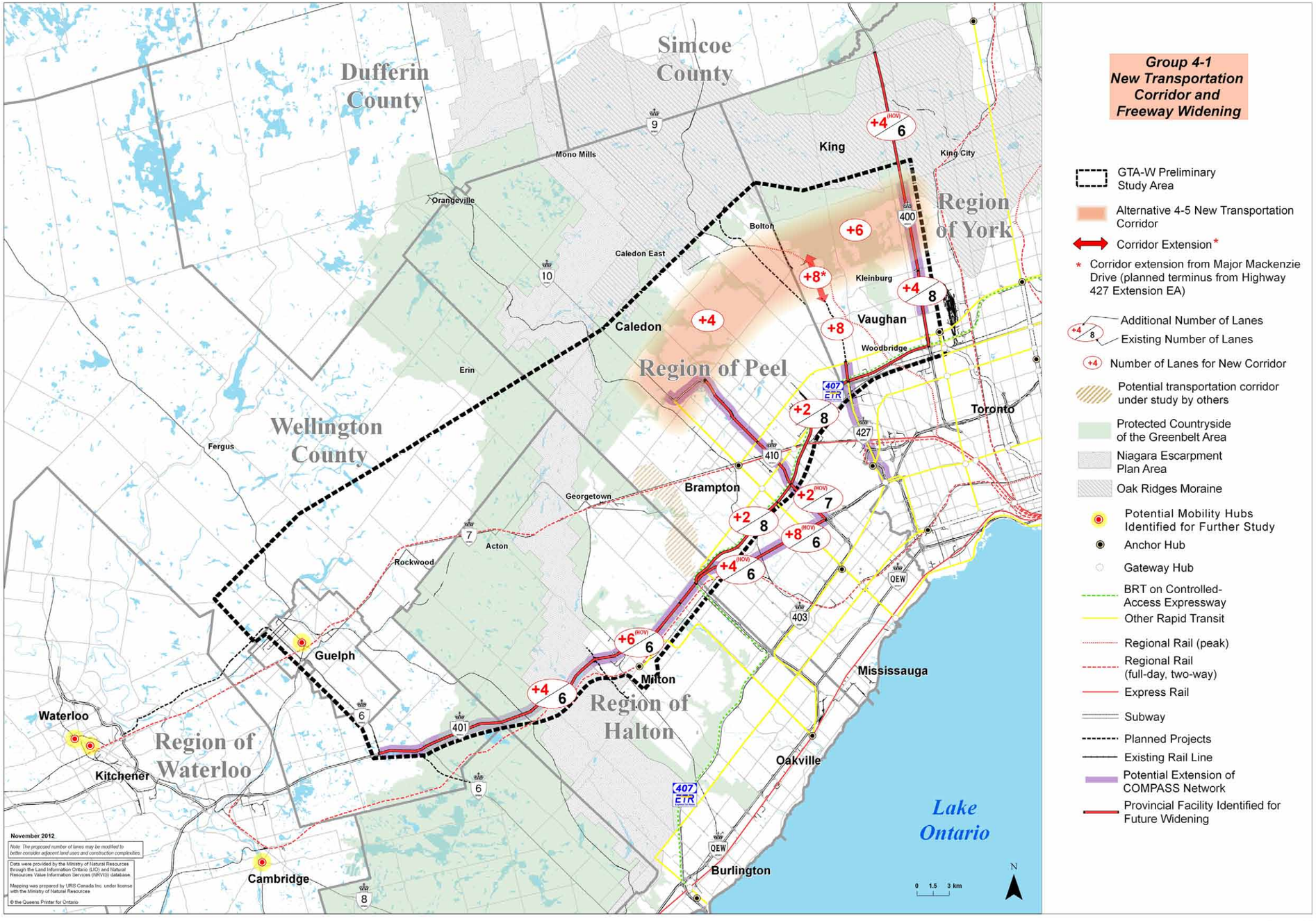
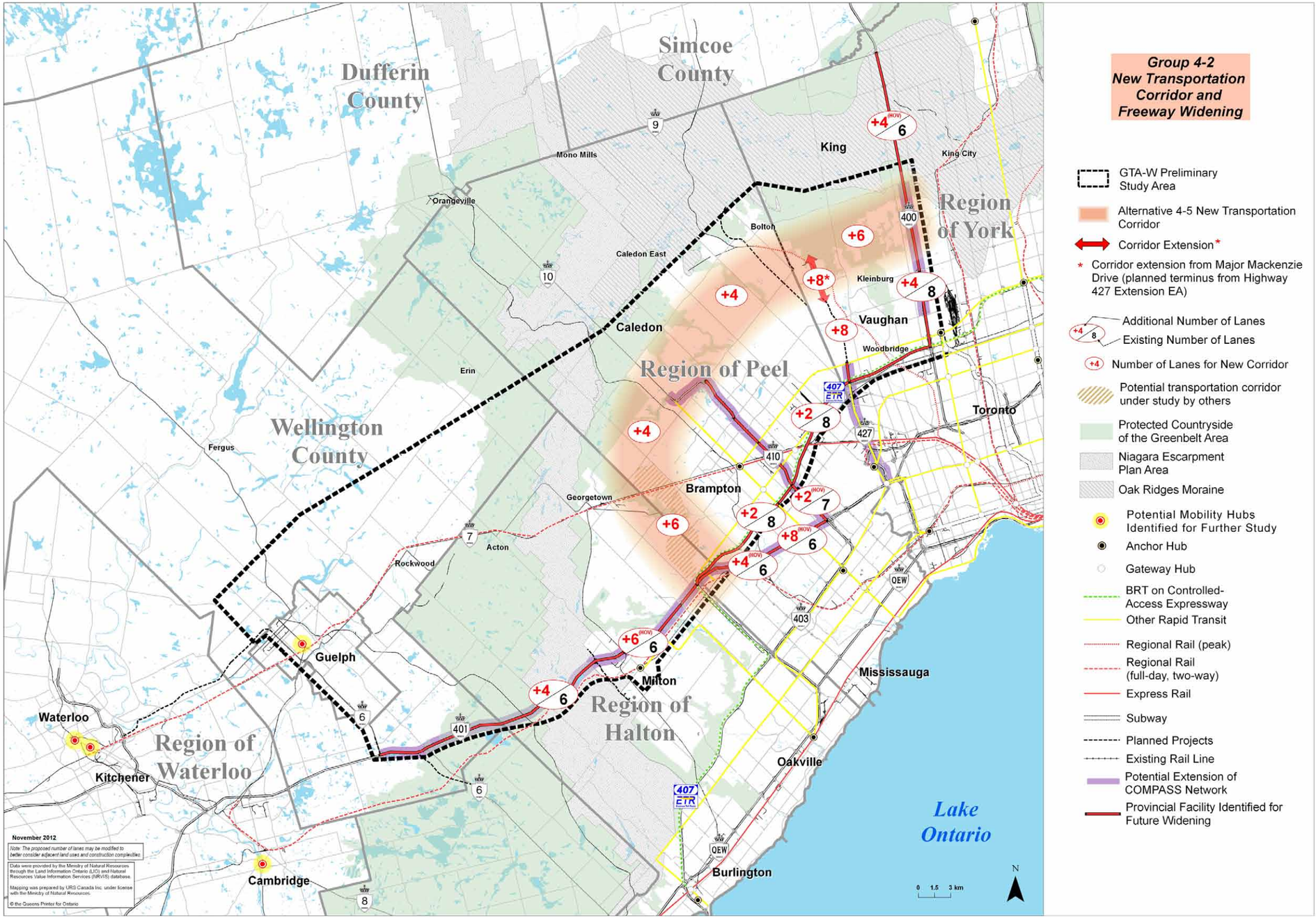


Exhibit 4-5: Road Improvement Alternative 4-2 - New Corridor from Highway 400 to Highway 401 with Provincial Highway Widening



Group 4-2
New Transportation Corridor and Freeway Widening

- GTA-W Preliminary Study Area
- Alternative 4-5 New Transportation Corridor
- Corridor Extension*
- * Corridor extension from Major Mackenzie Drive (planned terminus from Highway 427 Extension EA)
- Additional Number of Lanes
- Existing Number of Lanes
- Number of Lanes for New Corridor
- Potential transportation corridor under study by others
- Protected Countryside of the Greenbelt Area
- Niagara Escarpment Plan Area
- Oak Ridges Moraine
- Potential Mobility Hubs Identified for Further Study
- Anchor Hub
- Gateway Hub
- BRT on Controlled-Access Expressway
- Other Rapid Transit
- Regional Rail (peak)
- Regional Rail (full-day, two-way)
- Express Rail
- Subway
- Planned Projects
- Existing Rail Line
- Potential Extension of COMPASS Network
- Provincial Facility Identified for Future Widening

Exhibit 4-6: Road Improvement Alternative 4-3 - New Corridor from Highway 400 to Highway 401 West of Milton with Provincial Highway Widening

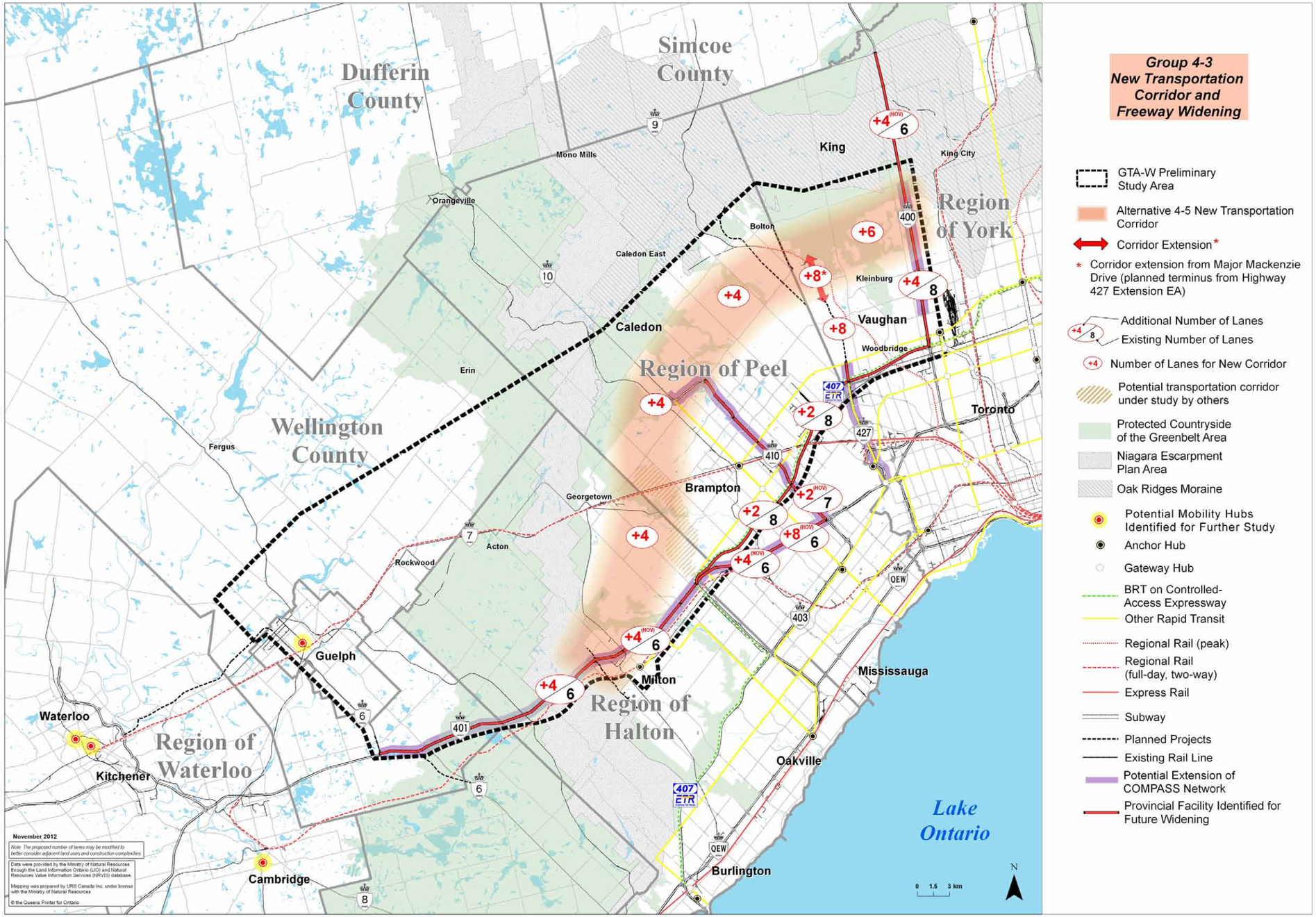
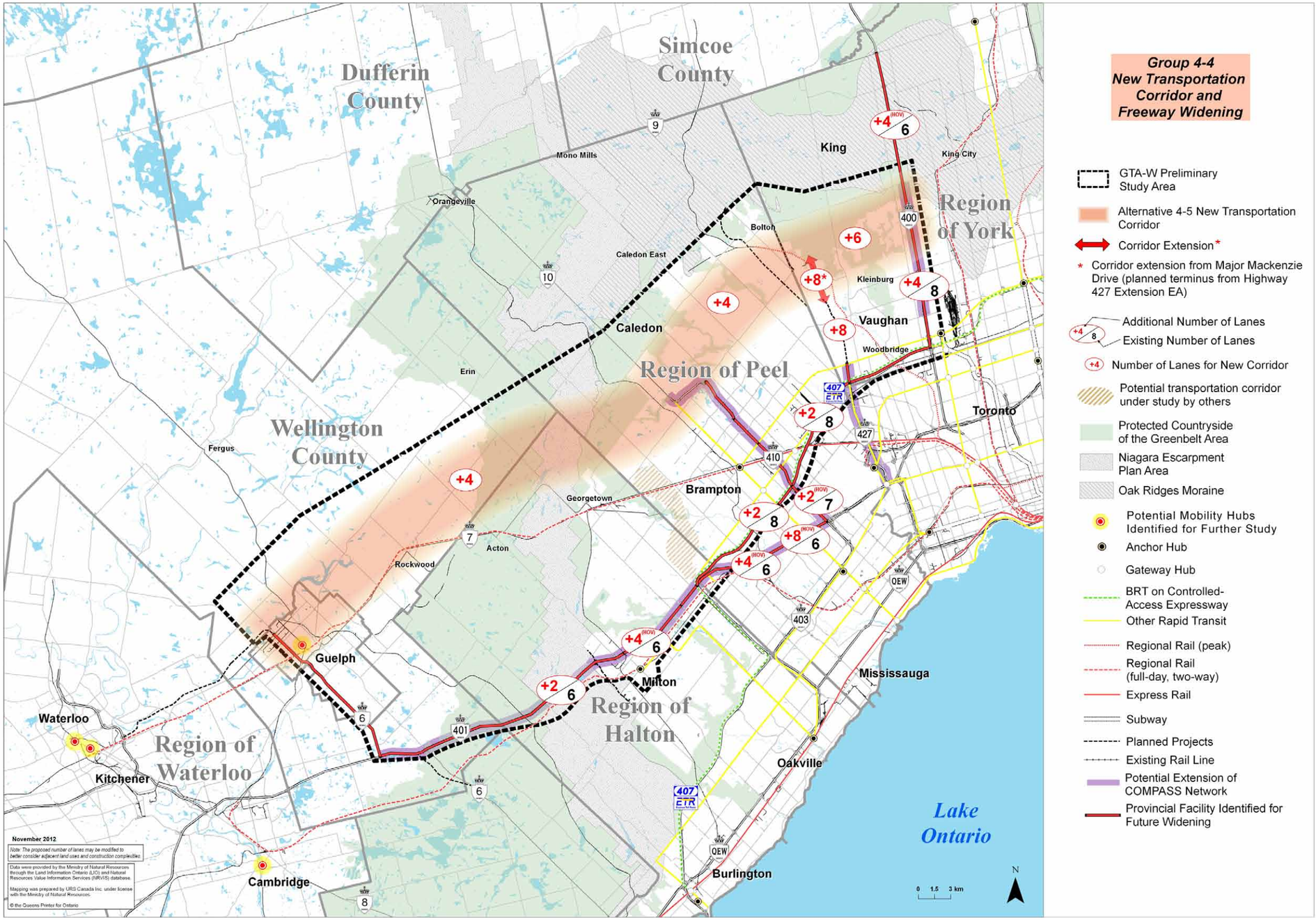


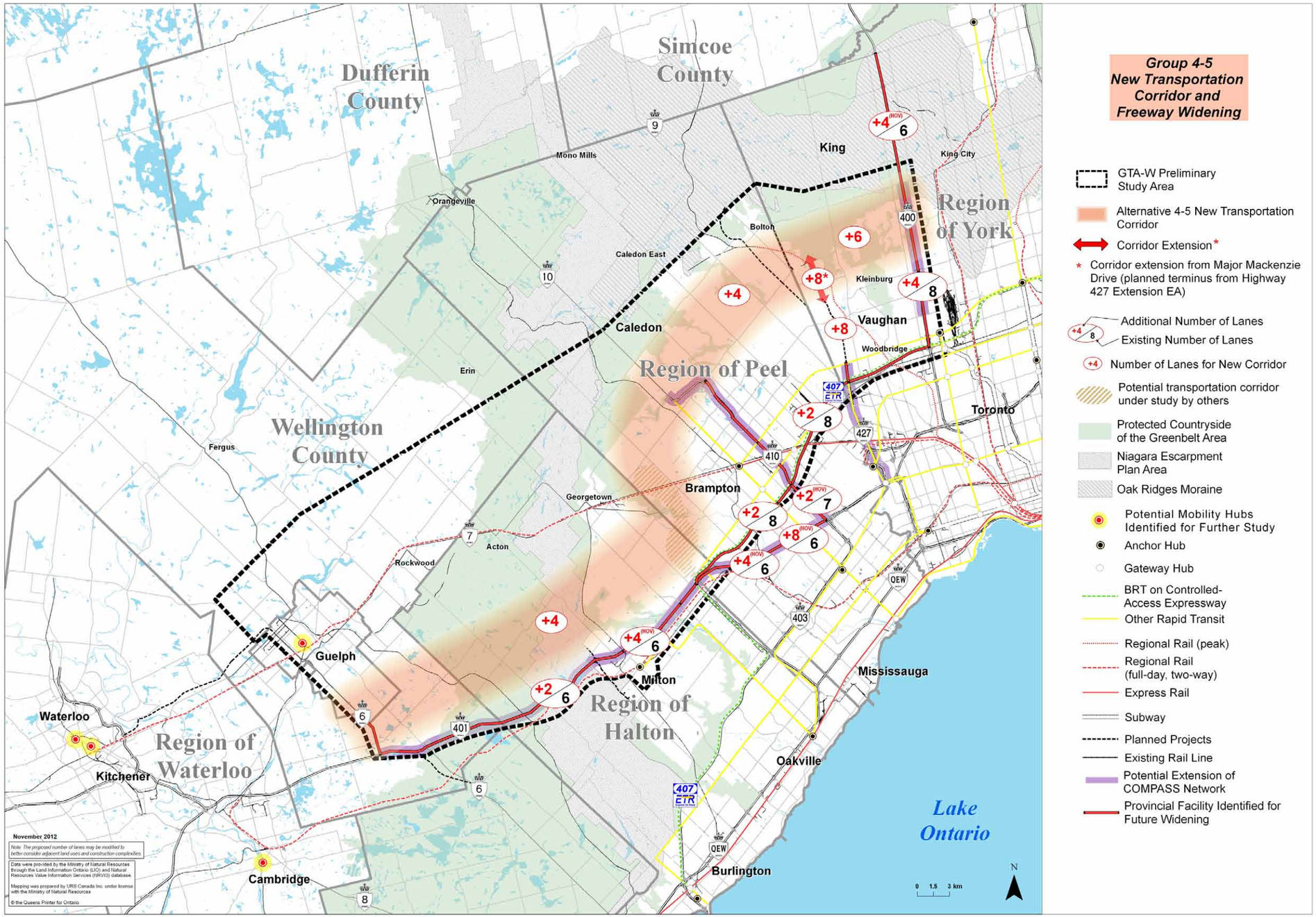
Exhibit 4-7: Road Improvement Alternative 4-4 - New Corridor from Highway 400 to Highway 6 North of Guelph with Provincial Highway Widening



Group 4-4 New Transportation Corridor and Freeway Widening

- GTA-W Preliminary Study Area
- Alternative 4-5 New Transportation Corridor
- Corridor Extension*
- * Corridor extension from Major Mackenzie Drive (planned terminus from Highway 427 Extension EA)
- Additional Number of Lanes
- Existing Number of Lanes
- Number of Lanes for New Corridor
- Potential transportation corridor under study by others
- Protected Countryside of the Greenbelt Area
- Niagara Escarpment Plan Area
- Oak Ridges Moraine
- Potential Mobility Hubs Identified for Further Study
- Anchor Hub
- Gateway Hub
- BRT on Controlled-Access Expressway
- Other Rapid Transit
- Regional Rail (peak)
- Regional Rail (full-day, two-way)
- Express Rail
- Subway
- Planned Projects
- Existing Rail Line
- Potential Extension of COMPASS Network
- Provincial Facility Identified for Future Widening

Exhibit 4-8: Road Improvement Alternative 4-5 - New Corridor from Highway 400 to Highway 6 South of Guelph with Provincial Highway Widening



4.4.1. Consideration of HP BATS

A number of separate roadway improvement initiatives are occurring in parallel with the GTA West Corridor Planning and EA Study, including the Halton-Peel Boundary Area Transportation Study (HP BATS). This is a joint study between the Region of Peel, Halton Region, City of Brampton, Town of Caledon, and the Town of Halton Hills to identify the long-term (2021 and 2031) transportation network required to support provincial and inter-municipal planning goals and to serve future transportation demands within the HP BATS study area. The GTA West Study Team worked with the HP BATS Study Team during Stage 1 of the EA process. Findings from the HP BATS process indicated that among several transportation improvements, the major road component is the Halton-Peel Freeway (HPF), to be located from approximately the Highway 401 / 407 ETR interchange to Mayfield Road. It was noted in the study report that this is required whether the GTA West transportation corridor proceeds or not.

In Alternative 4-2, it is assumed that the HP BATS freeway component would become part of the GTA West transportation corridor and therefore, would be pursued through MTO. The analysis and evaluation for Alternative 4-2 assumed that the direct physical impact and the estimated construction cost are attributed as a provincial initiative. This infrastructure was therefore included from evaluation of natural, cultural, social and cost / constructability aspects of the GTA West corridor alternatives.

In Alternatives 4-3 and 4-5, some infrastructure in the HP BATS Corridor would be a provincial initiative and some would be municipal. In Alternatives 4-3 and 4-5, the operational / transportation benefit from both the provincial portion and municipal portion of the GTA West / HP BATS corridor were accounted for in the traffic analysis. However, only impacts associated with the provincial portion of the HP BATS corridor (i.e. part of the GTA West corridor) have been accounted for in the analysis and evaluation; the potential direct physical impacts associated with the municipal portion of the HP BATS corridor, including the construction costs, were not included in the analysis and evaluation.

In Alternatives 3-1, 4-1 and 4-4, however, the HP BATS corridor would remain under the jurisdiction of the municipalities and would be a separate undertaking from the GTA West EA Study process. The operational benefit from the HP BATS corridor was taken into consideration in the traffic analysis of Alternatives 3-1, 4-1 and 4-4 (i.e. assuming that the HP BATS corridor would be pursued by the municipalities), and Alternative 4-4 would be connected to the HP BATS corridor. However, the potential direct physical impacts associated with the HP BATS corridor, as well as the construction costs of the HP BATS corridor were not included in the analysis and evaluation of Alternatives 3-1, 4-1 and 4-4; this applies to all factors and criteria in the analysis and evaluation.

The following table, presented as **Exhibit 4-9**, summarizes the proponency of the different sections of HP BATS corridor under each Group #4 alternatives, as well as whether that particular section of the HP BATS corridor was considered as part of the analysis and evaluation process in terms of transportation benefits, environmental impact and capital cost.

Recently, the Peel and Halton members of the HP BATS Study Team have finalized and agreed upon a Memorandum of Understanding (MOU) regarding the intent to pursue the HP BATS recommendations. Additionally, municipal initiatives are underway on both Peel and Halton Regions to pursue early corridor planning for the Halton-Peel Freeway that was recommended in the earlier study.

It should be noted that the above assumptions regarding the HP BATS corridor were used as part of the high-level analysis and evaluation of alternatives, as documented in **Sections 4.5** to **4.10**.

ALTERNATIVE	SECTIONS OF HP BATS CORRIDOR	
	Mayfield Road to Credit River	West of Credit River to Highway 401/407 ETR
Alternative 4-1		
Proponency	Municipal	Municipal
Transportation Benefits	✓	✓
Environmental Impact	×	×
Capital Cost	×	×
Alternative 4-2		
Proponency	Provincial	Provincial
Transportation Benefits	✓	✓
Environmental Impact	✓	✓
Capital Cost	✓	✓
Alternative 4-3		
Proponency	Provincial	Municipal
Transportation Benefits	✓	✓
Environmental Impact	✓	×
Capital Cost	✓	×
Alternative 4-4		
Proponency	Municipal	Municipal
Transportation Benefits	✓	✓
Environmental Impact	×	×
Capital Cost	×	×
Alternative 4-5		
Proponency	Provincial	Municipal
Transportation Benefits	✓	✓
Environmental Impact	✓	×
Capital Cost	✓	×

✓ - *Benefits / impacts / costs of the HP BATS corridor was assumed to be part of the GTA West transportation corridor*

× - *Benefits / impacts / costs of the HP BATS corridor was not included be part of the GTA West transportation corridor*

Exhibit 4-9: Proponency Assumed for HP BATS Corridor in GTA West Alternatives

4.5. EVALUATION OF ALTERNATIVES – NATURAL ENVIRONMENT

4.5.1. Methodology

The Study Team used secondary source information (i.e. mapping, aerial photography, documentation, other studies / reports, websites, etc.) obtained from agencies (e.g., Conservation Authorities, Niagara Escarpment Commission), ministries (Ministry of Natural Resources) and municipalities during the study to map existing natural environmental features in accordance with the factors and criteria under natural environment (as described in **Section 4.2**). Secondary source information was supplemented by local knowledge obtained through consultation with the public, agencies, municipalities and First Nations. The major environmental features were also confirmed in the field during this stage of the study. Additional, more detailed environmental field work will be carried out during the next stage of the Environmental Assessment (EA) process as part of the route planning exercise.

There are several considerations regarding potential challenges and limitations of the data and information used to support the assessment and evaluation:

- The Stage 1 assessment is based on secondary source information, which is appropriate given the broad scale and high-level strategic planning nature of this stage. Field-based data collection programs will be a major component of future stages and this more detailed information will guide the finer levels of planning and design. As such, this assessment is based on information received from the province and agencies. The scope of work in Stage 1 did not include detailed assessments by the Ontario Ministry of Transportation (MTO), for example to define significant woodlands and significant wildlife habitat using regional and provincial guidelines, wetland evaluation and species-at-risk surveys.
- The ability to incorporate more detailed local information from agencies and municipalities was limited by the fact that this information is inconsistent in its coverage on a regional level. That is, the information provided by one conservation authority, municipality or agency is not necessarily matched in other areas.
- Rare species information obtained from the Ontario Ministry of Natural Resources' (MNR) Natural Heritage Information Centre (NHIC) database was used to inform the sensitivity and significance of habitats potentially affected by the transportation planning alternatives. However, rare species information has certain limitations for use in the assessment and evaluation. Records of rare species occurrences depend greatly on where surveys are undertaken and particular survey methods. On such a broad / regional scale, high densities of rare species occurrences may be a function of surveys being preferentially targeted in certain areas (e.g. an abundance of information is available for areas of the Niagara Escarpment). The absence of rare species records does not necessarily mean that rare species are not present. Therefore, while rare species information was useful where it was present, a lack of information was not interpreted as an absence of rare species and, as such, caution was applied in using this information.

Recognizing that Stage 1 of the EA process identifies wide corridors (new corridors were presented schematically to be about 4 kilometres wide in GTA West preliminary study area), the Study Team understood that every natural feature in the corridor would not be impacted by future routes, and that some features could be avoided in the next stage of the EA, when route planning and generation of design alternatives will occur. In other instances, it was apparent that the natural feature was so large that it crossed the entire width of the corridor (or study area) and could not be avoided (i.e. Niagara Escarpment). These types of distinctions about the magnitude of potential impacts and the likelihood of avoidance or mitigation were noted in the evaluation tables (as described in **Section 4.4.2**). Although significant natural features within the Group #3 and #4 alternatives could be named and in some cases counted or "measured" to provide a comparison between alternatives, other criteria required a qualitative assessment of potential impacts or benefits at a higher level of detail. Names of the most significant / largest features potentially impacted by each alternative were documented in the evaluation tables. Additional information on the environmental features is provided in the Existing Environmental Conditions and Constraints Report, as described in **Section 2.3**.

4.5.2. Findings

Exhibit 4-10 describes the evaluation of the alternatives for the Natural Environment, as presented at PIC #4. A summary of the findings is provided below.

Fish and Fish Habitat

As shown in the table below, of the new corridor alternatives, Alternatives 4-4 and 4-5 have the highest potential to impact sensitive fisheries watercourses. These include the main Credit River branch as well as: Marden Creek, Rogers Creek and Snow Creek for Alternative 4-4, and Etobicoke Creek, Levi's Creek, Middle Sixteen Mile Creek, Mountsberg Creek and Bronte Creek for Alternative 4-5, in addition to the numerous unnamed tributaries. Alternatives 4-3 and 4-5 have moderate to high potential to impact fish species and communities. Aquatic Species at Risk found in the GTA West preliminary study area include Redside Dace, Atlantic Salmon and Lake Sturgeon.

GROUP #4 - NEW CORRIDOR SECTIONS	4-1	4-2	4-3	4-4	4-5
Potential Impact to Watercourses (number)	48	93	103	113	118
Potential Impact to Watercourses with Aquatic Species at Risk (number)	16	24	32	20	36

Terrestrial Ecosystems

The table below shows that of the new corridor alternatives, Alternatives 4-4 and 4-5 have the highest potential to impact the greatest number of evaluated wetland complexes that have been identified by MNR as significant ecological areas. Alternatives 4-4 and 4-5 will also impact the greatest linear length of woodlots over 40 ha in size. Additionally, these alternatives will impact several deer wintering areas and a number of areas where Wildlife Species at Risk (SAR) have been identified. As a result, Alternatives 4-4 and 4-5 also have a high potential to impact the SAR at the Niagara Escarpment. Alternative 3-1 has the least potential for impact to the terrestrial ecosystems.

GROUP #4 - NEW CORRIDOR SECTIONS	4-1	4-2	4-3	4-4	4-5
Potential Impact to Evaluated Wetland Complexes (number)	2	7	8	13	15
Potential Impact to Significant Woodlands (linear distance km)	4	10	13	23	24
Potential Impact to Wildlife Species at Risk (SAR) (number)	8	8	10	19	20

Groundwater

All alternatives cross through areas characterized by a moderate level of permeability for groundwater recharge. Alternatives 4-4 and 4-5 will also cross through areas that support the potential for groundwater upwelling and have high soil permeability for groundwater recharge capability.

Surface Water

Alternative 3-1 has the lowest potential impact to surface water because it results in a relatively minor amount of new pavement (when compared with new corridor alternatives). As shown below, Alternatives 4-4 and 4-5 are longer corridors, will cross the greatest number of watercourses and therefore have the highest potential to increase surface water runoff in the preliminary study area.

GROUP #4 - NEW CORRIDOR SECTIONS	4-1	4-2	4-3	4-4	4-5
Approximate Length of New Corridor (km)	27	47	53	72	76

Designated Areas

Alternative 3-1 has the least potential to impact the Greenbelt, Niagara Escarpment and designated areas and features because widening impacts will occur at the fringes of sensitive areas. As shown in the table below, Alternatives 4-4 and 4-5 have long sections through the Greenbelt and result in new crossings of the Niagara Escarpment. Some sensitive features cannot be avoided because of their size (i.e. the entire width of the new corridor crossed the designated features). Alternatives 4-4 and 4-5 have the highest potential to impact designated areas.

GROUP #4 - NEW CORRIDOR SECTIONS	4-1	4-2	4-3	4-4	4-5
Designated Features (ESAs, ANSIs, etc.)	4	7	7	14	15
Number of New Escarpment Crossings	0	0	0	1	1
Highway Length through Greenbelt (km)	15	19	21	25	31
Approximate Length of New Corridor (km)	27	47	53	72	76

A summary of the Natural Environment findings is provided in **Section 4.11**.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
1.1 Fish and Fish Habitat	1.1.1 Fish Habitat Measure: Qualitative assessment of the nature, significance and sensitivity of fisheries and aquatic habitat using the presence and density of watercourses and aquatic Species at Risk (SAR) as indicators.	Although this alternative impacts numerous watercourses (**129**), it does so at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. Mitigation should be relatively standard.	This alternative impacts numerous watercourses (**129**) at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. The new corridor section of this alternative results in new crossings of the East and Main Humber Rivers and several unnamed tributaries (**48 watercourses**). Potential impacts at the new corridor can be reduced through route selection and sensitive design of crossings. Mitigation should be relatively standard at widening locations.	This alternative impacts numerous watercourses (**129**) at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. The new corridor section of this alternative results in new crossings of the East and Main Humber Rivers and several unnamed tributaries. This alternative also impacts Levi's Creek, Mullet Creek, tributaries of the Credit River, Etobicoke Creek and Fletchers Creek (**93 watercourses**). Potential impacts at the new corridor can be reduced through route selection and sensitive design of crossings. This scenario will require a crossing of the Credit River. Mitigation measures should include open span structures where feasible including open span culverts, bridges that span the valley, siting the crossings at areas of less dense and less mature vegetation.	This alternative impacts numerous watercourses (**129**) at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. The new corridor section of this alternative results in new crossings of the East and Main Humber Rivers and several unnamed tributaries. This alternative also impacts Levi's Creek, Mullet Creek, tributaries of the Credit River, Etobicoke Creek and Fletchers Creek as well as the Main Credit River Branch, Black Creek and tributaries of Sixteen Mile Creek (**103 watercourses**). Potential impacts at the new corridor can be reduced through route selection and sensitive design of crossings – but the new corridor section is longer which results in more crossings and increased challenges with mitigation. Mitigation measures should include open span structures where feasible including open span culverts, bridges that span the valley, siting the crossings at areas of less dense and less mature vegetation.	This alternative impacts numerous watercourses (**129)** at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. The new corridor section of this alternative results in significant impacts to many sensitive fisheries watercourses including East and Main Humber Rivers, and main Credit River as well as numerous creeks and unnamed tributaries of Marden Creek, Rogers Creek, Snow Creek , Silver Creek and Black Creek (**113 watercourses**). There is some ability to mitigate impacts through design along the new corridor section but this alternative crosses the second highest number of watercourses with fish and fish habitat. Mitigation should be relatively standard at widening locations.	This alternative impacts numerous watercourses (**129**) at existing highway crossings. In some areas widening may fit on existing structures. In other areas structures (i.e., existing bridges or culverts) may require widening. The new corridor section of this alternative results in significant impacts to many sensitive fisheries watercourses including East and Main Humber Rivers, and main Credit River as well as numerous creeks and unnamed tributaries of Bronte Creek, Etobicoke Creek, Mountsberg Creek and Sixteen Mile Creek (**118 watercourses**). There is some ability to mitigate impacts through design along the new corridor section but this alternative crosses the highest number of watercourses with fish and fish habitat. Mitigation should be relatively standard at widening locations.
	1.1.2 Fish Community Measure: Qualitative assessment using the presence and density of watercourses and aquatic Species at Risk (SAR) as indicators.	This alternative has low potential to impact to fish communities because highway widening occurs at existing structures or crossings (i.e., culverts). Mitigation should be relatively standard. DFO delineates approximately **31 watercourse crossings** that have **Aquatic Species at Risk** known as Redside Dace. It is noted that watercourses near Regional Road 25 may also support Atlantic Salmon and / or Lake Sturgeon.	This alternative has slightly more potential to impact fish communities because the new corridor alignment creates new crossings of watercourses east of Highway 427. Some impacts can be dealt with through sensitive design, construction / timing restrictions, etc. The widening sections of this alternative have approximately **31 watercourse crossings** with **Aquatic Species at Risk** known as Redside Dace and some with Atlantic Salmon and Lake Sturgeon. The new corridor section has **Aquatic SAR at an additional 16 watercourse crossings**.	This alternative has moderate potential to impact fish communities because the new corridor alignment creates new crossings of watercourses from Highway 401 / 407 ETR to Highway 400. Some impacts can be dealt with through sensitive design, construction / timing restrictions, etc. The widening sections of this alternative have approximately **31 watercourse crossings** with **Aquatic Species at Risk** known as Redside Dace and some with Atlantic Salmon and Lake Sturgeon. The new corridor section has **Aquatic SAR at an additional 24 watercourse crossings**.	The longer new corridor section has moderate potential to impact fish species and communities. Some impacts can be dealt with through sensitive design, construction / timing restrictions, etc. The widening sections of this alternative have approximately **31 watercourse crossings** with **Aquatic Species at Risk** known as Redside Dace and some with Atlantic Salmon and Lake Sturgeon. The new corridor section has **Aquatic SAR at an additional 32 watercourse crossings**. It is noted that Middle Sixteen Mile Creek within the new corridor may potentially support five Species of Special Concern known as American Eel, Bridle Shiner, Deepwater Sculpin, Silver Shiner, and Upper Great Lakes Kiyi.	The second longest new corridor section has a high potential to impact many fish species and communities. Some impacts can be dealt with through sensitive design, construction / timing restrictions, etc. The widening sections of this alternative have approximately **31 watercourse crossings** with **Aquatic Species at Risk** known as Redside Dace and some with Atlantic Salmon and Lake Sturgeon. The new corridor section has **Aquatic SAR at an additional 20 watercourse crossings**.	The longest new corridor section has a high potential to impact many fish species and communities. Some impacts can be dealt with through sensitive design, construction / timing restrictions, etc. The widening sections of this alternative have approximately **31 watercourse crossings** with **Aquatic Species at Risk** known as Redside Dace and some with Atlantic Salmon and Lake Sturgeon. The new corridor section has **Aquatic SAR at an additional 36 watercourse crossings**. It is noted that Middle Sixteen Mile Creek within the new corridor may potentially support five Species of Special Concern known as American Eel, Bridle Shiner, Deepwater Sculpin, Silver Shiner, and Upper Great Lakes Kiyi.

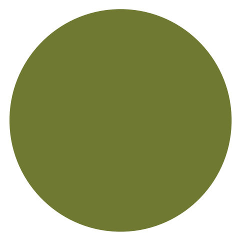
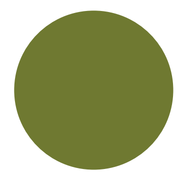
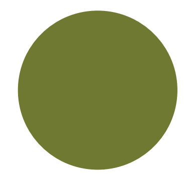
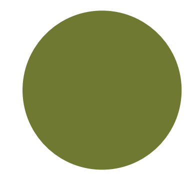
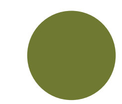
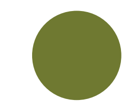
Exhibit 4-10: Natural Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
1.2 Terrestrial Ecosystems	1.2.1 Wetlands <u>Measure:</u> Qualitative assessment considering the nature, significance and sensitivity of wetland units based on density and classification, including qualitative assessment of potential to avoid or mitigate impacts.	This alternative potentially impacts **five evaluated wetlands** including Mill Creek, Badenoch-Moffat, Mountsberg Reservoir Marsh, Guelph Junction Wetland and Milton Heights Marsh.	This alternative potentially impacts **five evaluated wetlands** including Mill Creek, Badenoch-Moffat, Mountsberg Reservoir Marsh, Guelph Junction Wetland and Milton Heights Marsh in widening sections. The new corridor section also potentially impacts **two evaluated wetlands**, namely Tormore Wetland Complex and Heart Lake Wetland Complex, in addition to several unevaluated wetlands.	This alternative potentially impacts **five evaluated wetlands** including Mill Creek Wetland, Badenoch-Moffat Wetland complex, Mountsberg Reservoir Marsh, Guelph Junction Wetland and Milton Heights Marsh in widening sections. The new corridor section also potentially impacts **two evaluated wetlands**, namely Tormore Wetland Complex and Heart Lake Wetland Complex, in addition to several unevaluated wetlands. West of Highway 410, the new corridor alignment potentially impacts an additional **five evaluated wetland** complexes including Churchville-Norval, Hungry Hollow, Credit River (at Heritage Road), Levi's Creek and Norval Wetland Complexes.	This alternative potentially impacts **five evaluated wetlands** including Mill Creek Wetland, Badenoch-Moffat Wetland complex, Mountsberg Reservoir Marsh, Guelph Junction Wetland and Milton Heights Marsh in widening sections. The new corridor section also potentially impacts **two evaluated wetlands**, namely Tormore Wetland Complex and Heart Lake Wetland Complex, in addition to several unevaluated wetlands. West of Highway 410, the new corridor alignment potentially impacts an additional **six evaluated wetland complexes** including Churchville-Norval, Hungry Hollow, Credit River (at Heritage Road), Levi's Creek, Norval and Milton Heights Marsh.	This alternative potentially impacts **five evaluated wetland complexes** including Mill Creek, Badenoch-Moffat, Guelph Junction Wetland, Milton Heights Marsh and Eaton Hall-Mary-Hackett Lakes Wetland Complex in widening sections. The new corridor section also potentially impacts **two evaluated wetlands**, namely Tormore Wetland Complex and Heart Lake Wetland Complex, in addition to several unevaluated wetlands. West of Highway 410 (to Highway 6 north of Guelph), the new corridor crosses an additional **11 evaluated wetlands and numerous unevaluated wetlands**. These are significant ecological areas as identified by MNR. Because several of these wetland complexes are situated within and throughout the corridor, it is likely that several will be lost or directly impacted by this alternative.	This alternative potentially impacts **five evaluated wetland complexes** including Mill Creek, Badenoch-Moffat, Guelph Junction Wetland, Milton Heights Marsh and Eaton Hall-Mary-Hackett Lakes Wetland Complex in widening sections. The new corridor section also potentially impacts **two evaluated wetlands**, namely Tormore Wetland Complex and Heart Lake Wetland Complex, in addition to several unevaluated wetlands. West of Highway 410 (to Highway 6 south of Guelph), the new corridor crosses an additional **13 evaluated wetlands and numerous unevaluated wetlands**. These are significant ecological areas as identified by MNR. However, these wetlands are sparsely scattered throughout the corridor so it may be possible to reduce impacts through the route planning and selection process.
	1.2.2 Woodlands and Other Vegetated Areas <u>Measure:</u> Qualitative assessment of impacts to woodlots greater than 40 ha in size using linear distance impacts as indicator.	This alternative potentially impacts approximately **3.6 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25).	This alternative potentially impacts approximately **3.6 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25). The new corridor section potentially impacts an additional **4.3 km** of linear distance through woodlots over 40 ha in size.	This alternative potentially impacts approximately **3.6 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25). The new corridor section potentially impacts an additional **10.3 km** of linear distance through woodlots over 40 ha in size.	This alternative potentially impacts approximately **3.6 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25). The new corridor section potentially impacts an additional **13.3 km** of linear distance through woodlots over 40 ha in size.	This alternative potentially impacts approximately **1.7 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25). The new corridor section potentially impacts an additional **23.3 km** of linear distance through woodlots over 40 ha in size.	This alternative potentially impacts approximately **1.7 km** of linear distance through woodlots over 40 ha in size along Highway 401 between Highway 6 and Bronte Road (Regional Road 25). The new corridor section potentially impacts an additional **24.3 km** of linear distance through woodlots over 40 ha in size.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
	1.2.3 Wildlife Habitats and Movements (including Species at Risk (SAR) Measure: Qualitative assessment of nature, significance and sensitivity of significant wildlife habitat and landscape connectivity based on presence and density of SAR, known wildlife use (i.e., deer wintering, waterfowl staging etc.) and landscape –level habitat connectivity.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR.** Minimal potential for change to landscape level habitat connectivity.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR** in the widening sections. The new corridor section potentially impacts **eight SAR** and a Great Blue Heron Nesting Site / Colony north of Kirby Road. Some potential to impact habitat connectivity in vicinity of Humber Valley. However, impacts can be mitigated through long spans of valley and design features that ensure continuous movement of wildlife through valley.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR** in the widening sections. The new corridor section potentially impacts **eight SAR** and a Great Blue Heron Nesting Site / Colony north of Kirby Road. Potential impacts at major valleys (i.e., Humber River, Credit River) can be mitigated through long spans of valley and design features that provide for continuous movement of wildlife through valley.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR** in the widening sections. The new corridor section potentially impacts **10 SAR** and a Great Blue Heron Nesting Sites / Colonies north of Kirby Road and at 5th Line, north of Highway 401. Potential impacts at major valleys (i.e., Humber River, Credit River) can be mitigated through long spans of valley and design features that provide for continuous movement of wildlife through valley.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR** in the widening sections. The new corridor section potentially impacts **19 SAR**, a Great Blue Heron Nesting Sites / Colonies north of Kirby Road and west of Highway 10, waterfowl winter concentration area and deer wintering areas at Marden Creek and several hawk / owl and osprey nesting sites. There is a high probability of impacting the SAR at the Niagara Escarpment, based on density and frequency of occurrences at the corridor. Potential impacts at major valleys (i.e., Humber River, Credit River) can be mitigated through long spans of valley and design features that provide for continuous movement of wildlife through valley.	This alternative potentially impacts several deer wintering areas and **three wildlife SAR** in the widening sections. The new corridor section potentially impacts **20 SAR,** a Great Blue Heron Nesting Site / Colony north of Kirby Road and two Great Blue Heron Nesting Sites east of 5th Line. There is a high probability of impacting the SAR at the Niagara Escarpment, based on density and frequency of occurrences at the corridor. Potential impacts at major valleys (i.e., Humber River, Credit River) can be mitigated through long spans of valley and design features that provide for continuous movement of wildlife through valley.
1.3 Groundwater	1.3.1 Areas of Groundwater Recharge and Discharge Measure: Qualitative assessment based on soil type and permeability to identify areas of high, moderate, low groundwater recharge capability, including consideration of number and location of groundwater recharge and discharge areas.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability. Some areas within the corridor (in GRCA watershed) support potential for groundwater upwelling. The area immediately north of Rockwood presents the highest probability of groundwater upwelling. The route planning and selection process may enable reducing potential impacts. Soils at the escarpment are characterized by low permeability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability. West of Brookville, the soils have high permeability. Soils south of Guelph (west of Nassagaweya-Puslinch Townline) are classified as having high level of permeability for groundwater recharge capability.
	1.3.2 Groundwater Source Areas and Wellhead Protection Areas Measure: Wellhead protection areas that are potentially affected and their location.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted. The new corridor section is in proximity to wellhead protection zones in Kleinburg / Vaughan.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted. The new corridor section is in proximity to wellhead protection zones in Kleinburg / Vaughan.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted. The new corridor section is in proximity to wellhead protection zones in Kleinburg / Vaughan and in Halton north of Highway 401 at Tremaine Road.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted. The new corridor section is in proximity to wellhead protection zones in Kleinburg / Vaughan. West of Highway 10, the new corridor section potentially impacts additional wellhead protection zones in Halton Region and Wellington County. A 25-year wellhead protection zone, located north of Rockwood bisects the corridor and would therefore be directly impacted by this alternative.	Wellhead protection zones in Halton Region, along Highway 401 are potentially impacted. The new corridor section is in proximity to wellhead protection zones in Kleinburg / Vaughan. West of Highway 10, the new corridor section potentially impacts additional wellhead protection zones in Halton Region and Wellington County. There are approximately four wellhead locations within the corridor between Gordon Street (Wellington Road 46) and Victoria Street South, near Guelph.

Exhibit 4-10: Natural Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
1.4 Surface Water	1.4.1 Watershed / Sub-Watershed Drainage Features / Patterns Measure: Qualitative assessment of new pavement area, and new / existing watercourse crossings.	This alternative will result in the least amount of new pavement in the watersheds. Additional runoff will be dealt with in the MTO highway right-of-way.	This alternative will result in a relatively minor amount of new pavement in the watersheds. New corridor section crosses East and main Humber River flood plains, mapped by TRCA. Additional runoff will be dealt with in the MTO highway right-of-way.	This alternative will result in a moderate amount of new pavement in the watersheds. New corridor sections across East and Main Humber River flood plains, mapped by TRCA and the main Credit River floodplain mapped by CVC. Additional runoff will be dealt with in the MTO highway right-of-way.	This alternative will result in a moderate amount of new pavement in the watersheds. New corridor sections cross East and main Humber River flood plains, mapped by TRCA, the main Credit River floodplain mapped by CVC as well as many tributaries of Sixteen Mile Creek in Halton Region. Additional runoff will be dealt with in the MTO highway right-of-way.	This alternative will result in a significant amount of new pavement in the watersheds. New corridor sections cross East and main Humber River flood plains, mapped by TRCA, the main Credit River floodplain mapped by CVC as well as numerous other watercourses, including Marden Creek as mapped by GRCA. Additional runoff will be dealt with in the MTO highway right-of-way.	This alternative will result in a significant amount of new pavement in the watersheds. New corridor sections cross East and main Humber River flood plains, mapped by TRCA, the main Credit River floodplain mapped by CVC as well as numerous other watercourses mapped by GRCA. Additional runoff will be dealt with in the MTO highway right-of-way.
1.5 Designated Areas	Designated Areas are defined by resource agencies, municipalities, the government and / or the public through legislation, policies, or approved management plans, to have special or unique value. Examples of designated areas include ESAs, ANSIs, Bruce Trail, Niagara Escarpment, Greenbelt and Oak Ridges Moraine. Measure: Qualitative assessment of nature, number and significance of designated areas potentially impacted, including consideration of ability to avoid designated area or mitigate impacts.	This alternative crosses the Greenbelt and Niagara Escarpment lands along Highway 401 between Highway 6 and Bronte Road (Regional Road 25) and the Oak Ridges Moraine at Highway 400. There are **four ESAs** (Guelph Junction Woods, Meadowvale Station Woods, Happy Valley Infiltration Area and Kettleby Infiltration Area) and **five ANSIs** (Meadowvale Station Woods, Mountsberg Wildlife Centre, Exhumed Silurian Reef, Strange Till Plain and Happy Valley) potentially affected by this alternative. The Highway 401 widening also has potential to impact the Bruce Trail and MNR trail segments near the escarpment. Widening impacts are on the edges of designated areas. This alternative crosses approximately **14.4 km of Greenbelt**.	The widening component of this alternative crosses the **same** ESAs, ANSIs and Bruce Trail as Alternative 3-1. In addition, the new corridor section crosses **two ESAs** (Kings Creek Forest and East Humber River) and **two ANSIs** (Humber River Valley-Kleinberg and Gooseville Moraine). It is possible to avoid some of these designated areas through the route planning and selection process. This alternative crosses approximately **14.4 km of Greenbelt in widening sections** and **15 km in new corridor sections.**	The widening component of this alternative crosses the **same** ESAs, ANSIs and Bruce Trail as Alternative 3-1. In addition, the new corridor section crosses **four ESAs** (Kings Creek Forest, East Humber River Georgetown Credit River Valley and Hungry Hollow Ravine) and **three ANSIs** (Humber River Valley-Kleinberg, Gooseville Moraine and Georgetown Credit Valley). It is possible to avoid some of these designated areas through the route planning and selection process. The new corridor section west of Highway 10 also potentially impacts the Credit Valley Footpath. This alternative crosses approximately **14.4 km of Greenbelt in widening sections** and **19 km in new corridor sections.**	The widening component of this alternative crosses the **same** ESAs, ANSIs and Bruce Trail as Alternative 3-1. In addition, the new corridor section crosses **four ESAs** (Kings Creek Forest, East Humber River Georgetown Credit River Valley and Hungry Hollow Ravine) and **three ANSIs** (Humber River Valley-Kleinberg, Gooseville Moraine and Georgetown Credit Valley). It is possible to avoid some of these designated areas through the route planning and selection process. The new corridor section west of Highway 10 also potentially impacts the Credit Valley Footpath. This alternative crosses approximately **14.4 km of Greenbelt in widening sections** and **21 km in new corridor sections.**	The widening component of this alternative crosses the **same** ESAs, ANSIs and Bruce Trail as Alternative 3-1. In addition, the new corridor section crosses **six ESAs** (Kings Creek Forest, East Humber River, Caledonia Mountain, Terra Cotta Woods, Silver Creek Valley and Acton Swamp III). Given that two ESAs bisect the corridor, it is likely that a portion of the ESAs will be fragmented and directly impacted. The new corridor segment also impacts **eight ANSIs** (Humber River Valley-Kleinberg, Gooseville Moraine, Terra Cotta Forest, Silver Creek Valley, Eramosa River Valley, Amabel Formation, Guelph Drumlin Field and Eramosa Esker Channel). Three of these ANSIs cross the full width of the corridor and **cannot be avoided.** Numerous MNR trail segments are situated in the corridor at the Niagara Escarpment, as well as the Guelph Trans Canada Trail at the western end of the corridor. This alternative crosses approximately **14.4 km of Greenbelt in widening sections** and **25 km in new corridor sections.**	The widening component of this alternative crosses the **same** ESAs, ANSIs and Bruce Trail as Alternative 3-1. In addition, the new corridor section crosses **six ESAs** (Kings Creek Forest, East Humber River, Georgetown Credit River Valley, Hungry Hallow Ravine, Hilton Falls Complex and Brookville Swamp). Given that Hilton Falls Complex bisects the corridor, it is likely that a portion of the ESAs will be fragmented and directly impacted. The new corridor segment also impacts **nine ANSIs** (Humber River Valley-Kleinberg, Gooseville Moraine, Georgetown Credit Valley, Speyside Forest, Halton Forest North, Halton Forest South, Brookville Swamp, Galt Moraine and Paris Moraine). Two of these ANSIs cross the full width of the corridor and **cannot be avoided.** Numerous MNR trail segments are situated in the corridor at the Niagara Escarpment. This alternative crosses approximately **14.4 km of Greenbelt in widening sections** and **31 km in new corridor sections.**

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW COR-RIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGH-WAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGH-WAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
SUMMARY NATURAL ENVIRONMENT		**MOST PREFERRED** - because it results in the fewest impacts in most criteria. Impacts are on fringes of sensitive areas that have already been disturbed and most can be mitigated through standard mitigation measures.	**MODERATELY PREFERRED** because it results in slightly more potential impacts, but does not encroach on the most sensitive areas along and west of the escarpment. Impacts at Humber River can potentially be mitigated through design (i.e., long spans etc.) and route selection. Some impacts in new corridor section can be minimized through the route planning and selection process as well as design.	**MODERATELY PREFERRED** because it results in slightly more potential impacts, but does not encroach on the most sensitive areas along and west of the escarpment. Impacts at Humber River can potentially be mitigated through design (i.e., long spans etc.) and route selection. Some impacts in new corridor section can be minimized through the route planning and selection process as well as design.	**MODERATELY PREFERRED** because it results in slightly more potential impacts, but does not encroach on the most sensitive areas along and west of the escarpment. Impacts at Humber River can potentially be mitigated through design (i.e., long spans etc.) and route selection. Some impacts in new corridor section can be minimized through the route planning and selection process as well as design.	**LEAST / NOT PREFERRED** because it results in high potential for impacts to undisturbed sensitive areas along and west of the escarpment. Some impacts can be minimized through the route planning and selection process as well as design. However, many sensitive areas are quite large and cannot be avoided because they cross the full width of the corridor. Therefore mitigation in these areas is difficult and will likely require compensation for loss of habitat.	**LEAST / NOT PREFERRED** because it results in a high potential for impacts to undisturbed sensitive areas along and west of the escarpment. Some impacts can be minimized through the route planning and selection process as well as design. However, many sensitive areas are quite large and cannot be avoided because they cross the full width of the corridor. Therefore mitigation in these areas is difficult and will likely require compensation for loss of habitat.
							
OVERALL NATURAL ENVIRONMENT		Alternative 3-1 results in the fewest impacts in most criteria in the natural environment factor. Impacts are on the fringe of sensitive areas that have already been disturbed and most can be mitigated with standard mitigation measures. Alternatives 4-1, 4-2 and 4-3 result in more potential impacts than Alternative 3-1, because of new footprints in new corridor sections. These alternatives are considered relatively moderate and impacts can be mitigated through route location and design. Alternative 4-1 is the shortest of the new corridor sections and therefore has slightly fewer impacts than Alternatives 4-2 and 4-3. Alternatives 4-4 and 4-5 result in significantly higher impacts to natural environment because they cross many sensitive aquatic and terrestrial features and designated areas at and west of the Niagara Escarpment. These sensitive features include evaluated wetland complexes, wildlife SAR, ESAs and ANSIs that are quite large and in many cases will be difficult (if not impossible) to avoid. Therefore mitigation of the impacts to natural environment for Alternative 4-4 and 4-5 is difficult and impacts of new footprint in sensitive areas is expected to require compensation for loss of habitat etc. Overall, Alternative 3-1 is Most Preferred from a Natural Environment perspective. Alternatives 4-1, 4-2 and 4-3 all result in relatively similar moderate impacts. Alternatives 4-4 and 4-5 result in significantly higher impacts than the other alternatives.					

4.6. EVALUATION OF ALTERNATIVES – SOCIAL ENVIRONMENT

4.6.1. Methodology

The Study Team used secondary source information (i.e. mapping and content from provincial plans and local official plans, secondary plans, etc.) obtained from agencies (i.e. Niagara Escarpment Commission (NEC)), ministries (i.e. Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)), the Ministry of Energy and Ministry of Infrastructure (formerly Ministry of Energy and Infrastructure (MEI)), and municipalities during the study to map and document existing land uses and social environmental conditions in accordance with the factors and criteria under the land use / social environment. Secondary source information was supplemented by local knowledge obtained through consultation with the public, agencies, municipalities and First Nations.

In addition, the Study Team carried out an air quality analysis for this stage of the EA. The air quality analysis work was specifically initiated to provide a meaningful way of comparing the Group #3 and Group #4 alternatives, using the evaluation criteria established.

Major community features and land uses were also confirmed in the field to determine the presence / absence of small rural communities, community facilities (such as churches, schools, etc.) and to gain a general understanding of the land use characteristics of each alternative.

Similarly to the Natural Environmental analysis, recognizing that Stage 1 of the EA process identifies wide corridors (new corridors are conceptually identified with a 4 kilometre band in the GTA West Preliminary Study Area), the Study Team acknowledged that every feature in the corridor would not be impacted by future routes, and that some features (i.e. small hamlets, pockets of existing residential areas or agricultural operations, etc.) could be avoided in the next stage of the EA, when route planning and generation will occur. In other instances, it was apparent that the feature was so large that the entire width of the preliminary study area crossed it (i.e. lands designated for future urban expansion in some municipalities, Greenbelt and Niagara Escarpment Commission policy areas, etc.). Distinctions about the magnitude of potential impacts and the likelihood of avoidance or mitigation were noted in the evaluation tables (as described later in this section). Although significant features within the Group #3 and #4 alternatives could be named and in some cases counted or "measured" to provide a comparison between alternatives, other criteria required a qualitative assessment of potential impacts or benefits of the Group #3 and #4 alternatives, at a higher level of detail. The most significant or largest features potentially impacted by each alternative were documented in the evaluation tables. Additional information on land use and community features is provided in the *Existing Environmental Conditions and Constraints Report*, summarized in **Section 2.3**.

Finally, the methodology for evaluating potential impacts to residential, business and industrial properties was further supplemented by initial footprint widening analysis carried out for the widening sections of each alternative as part of the Cost and Constructability analysis (as described in **Section 4.8**). This work provided some opportunity to estimate the number of residential, commercial and industrial properties potentially impacted in widening sections of each alternative.

4.6.2. Findings

Exhibit 4-11 provides the evaluation of the alternatives for the Land Use factors, as presented at PIC #4. A summary of the findings is provided below.

Provincial / Federal Land use Planning / Goals / Objectives

Alternative 3-1 does not sufficiently support growth, especially in York and Peel Regions, because the widening improvements are too far south to effectively serve the areas identified for future growth and development. Alternatives 4-1, 4-2 and 4-3 address growth and land use pressures in York, Peel and Halton Regions because they are located closer to future growth areas.

Land Use / Community

As shown below, Alternative 3-1 has the highest potential to impact residential, industrial and commercial properties in built-up areas adjacent to existing highways, at its widest sections along Highways 401, 407 and 400. Group #4 impacts to residential, industrial, commercial and tourism properties are reduced along existing highways and can potentially be minimized through the route selection process in new corridor sections. Alternative 4-4 provides improved access to eco-tourism / recreational areas at the western end of the preliminary study area.

POTENTIAL PROPERTY IMPACTS IN HIGHWAY WIDENING SECTIONS	3-1	4-1	4-2	4-3	4-4	4-5
Residential Properties (number)	23	7	7	7	3	3
Industrial Properties (number)	22	12	12	3	1	1
Commercial Properties (number)	20	7	7	6	1	1

Note: Property impacts are approximate and based on preliminary highway widening "footprint" analysis – to be confirmed in future study process

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
2.1 Land Use Planning Policies, Plans, Goals, Objectives	2.1.1 Provincial / Federal land use planning / goals / objectives Measure: Qualitative assessment of ability to support federal/provincial land use policies, plans, goals and objectives.	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 through designated NEC and Greenbelt lands. This alternative does not sufficiently support some planned future growth areas in York and Peel regions. However, by widening existing highways, the alternative provides improvement to the connections between Urban Growth Centres (i.e., Vaughan Metropolitan Centre, Downtown Milton and Downtown Guelph). It also supports the *Growth Plan*'s focus on intensification by providing additional capacity to existing employment areas.	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 through designated NEC and Greenbelt lands. The new corridor section between Highway 400 and a N/S link to Highway 427 crosses the *Greenbelt Plan* area in the vicinity of the Humber River. Other *Greenbelt Plan* areas are crossed north of Brampton. This alternative supports planned future land use and growth as identified in the *Growth Plan* and, in conjunction with widening the existing highway system, provides an alternate indirect route connecting Urban Growth Centres (i.e., Vaughan Metropolitan Centre and Downtown Brampton).	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 through designated NEC lands. The new corridor section between Highway 400 and a N/S link to Highway 427 crosses the *Greenbelt Plan* area in the vicinity of the Humber River. Other *Greenbelt Plan* areas are crossed north of Brampton and near Georgetown. This alternative supports planned future land use and growth as identified in the *Growth Plan* and, in conjunction with widening the existing highway system, provides an alternate indirect route connecting Urban Growth Centres (i.e., Vaughan Metropolitan Centre and Downtown Brampton).	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 through designated NEC lands. The new corridor section between Highway 400 and a N/S link to Highway 427 crosses the *Greenbelt Plan* area in the vicinity of the Humber River. Other *Greenbelt Plan* areas are crossed north of Brampton, near Georgetown and Milton. This alternative supports planned future land use patterns and, in conjunction with widening the existing highway system, provides an alternate indirect route connecting several Urban Growth Centres (i.e., Vaughan Metropolitan Centre and Downtown Brampton, Downtown Milton).	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 and a new transportation corridor through designated NEC lands and the *Greenbelt Plan* area. The new corridor section between Highway 400 and a N/S link to Highway 427 crosses the *Greenbelt Plan* area in the vicinity of the Humber River. Other *Greenbelt Plan* areas are crossed north of Brampton and across the centre of the study area, north of Georgetown (near Cheltenham and Ballinafad). This alternative supports planned future land use patterns and, in conjunction with widening the existing highway system, provides an alternate indirect route connecting Urban Growth Centres (i.e., Vaughan Metropolitan Centre, Downtown Brampton, Downtown Guelph).	Widening existing freeways supports the PPS by optimizing the use of existing infrastructure. This alternative includes widening of Highway 401 and a new transportation corridor through designated NEC lands and the *Greenbelt Plan* area. The new corridor section between Highway 400 and a N/S link to Highway 427 crosses the *Greenbelt Plan* Area in the vicinity of the Humber River. Other *Greenbelt Plan* areas are crossed north of Brampton, south of Georgetown (near Norval) and in areas further west near Speyside, Scotch Block and Brookville. This alternative supports planned future land use and growth as identified in the *Growth Plan* and, in conjunction with widening the existing highway system, provides improved connections between all Urban Growth Centres an alternate indirect route connecting all Urban Growth Centres (i.e., Vaughan Metropolitan Centre, Downtown Brampton, Downtown Guelph).
	2.1.2 Municipal land use planning policies / goals / objectives Measure: Qualitative assessment of potential to support municipal Official Plans.	This alternative has limited ability to accommodate planned future growth and development pressures in Peel and York Regions. This alternative also does not serve the Milton / Halton Hills growth areas and therefore only partly addresses growth pressures and the *Growth Plan*.	This alternative accommodates planned future growth and addresses development pressures in Peel and York Regions. This alternative does not serve the Milton / Halton Hills growth areas and therefore only partly addresses growth pressures and the *Growth Plan*.	This alternative accommodates planned future growth and addresses development pressures in Peel and York. This alternative does not serve the Milton / Halton Hills growth areas and therefore only partly addresses growth pressures and the *Growth Plan*. This alternative would impact the future employment areas along Steeles Avenue and Winston Churchill Boulevard as envisioned in Halton Region's plan. However, this alternative would not impact the land use in Halton's plans south of Georgetown.	This alternative accommodates planned future growth and addresses development pressures in Peel, York and north Halton (i.e., in Milton). However, this alternative would impact the existing and future land use in Halton's plans between Georgetown and Milton.	This alternative accommodates planned future growth and addresses development pressures in Peel and York. This alternative also serves growth in Guelph.	This alternative accommodates planned future growth and addresses development pressures in Peel and York. This alternative also serves growth in Guelph.
2.2 Land Use / Comunity	2.2.1 Indian Reserves Measure: Qualitative assessment of potential to avoid Indian Reserves.	There are no First Nation Indian Reserves in the study area.	There are no First Nation Indian Reserves in the study area.	There are no First Nation Indian Reserves in the study area.	There are no First Nation Indian Reserves in the study area.	There are no First Nation Indian Reserves in the study area.	There are no First Nation Indian Reserves in the study area.
	2.2.2 First Nations Sacred Grounds Measure: Qualitative assessment of potential to avoid First Nation Sacred grounds.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.	Potential impacts to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses and study area reduces in size.

Exhibit 4-11: Land Use / Social Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
	2.2.3 Residential (Urban and Rural) <u>Measure:</u> Qualitative assessment of potential to affect urban and rural residential areas, using number of areas affected and potential to avoid or mitigate impacts as indicator.	Widening existing freeways has some potential to impact residential areas especially in urban, built up areas. This alternative has some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **23 residential properties** directly. In comparison with other alternatives Alternative 3-1 has a moderate to high potential to impact residential areas.	The widening sections of this alternative have some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **7 residential properties** directly in widening sections. The new corridor section has potential to impact rural residential areas (directly or indirectly) near Nobleton, Laskey and Kleinburg between Highways 400 and 427. In comparison with other alternatives Alternative 4-1 has a moderate to low potential to impact residential areas.	The widening sections of this alternative have some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **7 residential properties** directly in widening sections. The new corridor section has potential to impact rural residential areas (directly or indirectly) near Nobleton, Laskey and Kleinburg between Highways 400 and 427. Rural residences in southern portions of Bolton and Caledon could potentially be impacted west of Highway 427. West of Highway 10, some residential areas may be impacted on the outskirts of Brampton and in the southern rural sections of Georgetown. In comparison with other alternatives Alternative 4-2 has a moderate to low potential to impact residential areas.	The widening sections of this alternative have some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **7 residential properties** directly in widening sections. The new corridor section has potential to impact rural residential areas (directly or indirectly) near Nobleton, Laskey and Kleinburg between Highways 400 and 427. Rural residences in southern portions of Bolton and Caledon could potentially be impacted west of Highway 427. West of Highway 10, some residential areas may be impacted on the outskirts of Brampton and in the southern rural sections of Georgetown, including two rural areas known as Mansewood and Boston. In comparison with other alternatives Alternative 4-3 has a moderate to low potential to impact residential areas.	The widening sections of this alternative have some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **3 residential properties** directly in widening sections. The new corridor section has potential to impact rural residential areas (directly or indirectly) near Nobleton, Laskey and Kleinburg between Highways 400 and 427. Rural residences in southern portions of Bolton and Caledon could potentially be impacted west of Highway 427. The new corridor potentially impacts four residential areas between Highways 6 and 10, namely Terra Cotta, Ballinafad, Rockwood and Eramosa. Other residential areas potentially impacted include Cheltenham, Silver Creek, Brucedale and Everton, as well as residential sections of north Guelph. In comparison with other alternatives Alternative 4-4 has a moderate to high potential to impact residential areas.	The widening sections of this alternative have some potential to indirectly impact residential areas in Milton, Brampton, Woodridge and Vaughan. This alternative impacts approximately **3 residential properties** directly in widening sections. The new corridor section has potential to impact rural residential areas (directly or indirectly) near Nobleton, Laskey and Kleinburg between Highways 400 and 427. Rural residences in southern portions of Bolton and Caledon could potentially be impacted west of Highway 427. West of Highway 10, some residential areas may be impacted on the outskirts of Brampton and Guelph. Seven rural residential areas are potentially impacted, namely, Georgetown, Ashgrove, Brookville, Moffat, Aberfoyle, Aberfoyle Creek Estates and Fox Run Estates. In comparison with other alternatives Alternative 4-5 has a moderate to high potential to impact residential areas.
	2.2.4 Commercial / Industrial <u>Measure:</u> Qualitative assessment of potential to impact commercial and industrial areas using estimated number of properties/industrial parks potentially impacted as indicator.	This alternative potentially impacts approximately **20 commercial and 22 industrial properties directly in widening sections**. In comparison with other alternatives, Alternative 3-1 has a moderate to high potential to impact existing commercial and industries, especially in its widest sections along existing Highways 401. 407 and 400.	Widening sections of this alternative potentially impacts approximately **7 commercial and 12 industrial properties directly**. The new corridor section includes several commercial / industrial properties (approximately 50) that could potentially be impacted, east of Highway 427. It is possible to avoid some of these land uses through the route planning and selection process. In comparison with other alternatives, Alternative 4-1 has moderate potential to impact commercial / industrial areas. This alternative has moderate potential to impact existing commercial and industrial areas.	Widening sections of this alternative potentially impacts approximately **7 commercial and 12 industrial properties directly**. The new corridor section includes several commercial / industrial properties (approximately 50) that could potentially be impacted, east of Highway 427, and additional properties (approximately 10) west of Highway 410 to Highway 401. It is possible to avoid some of these land uses through the route planning and selection process. This alternative has moderate potential to impact existing commercial and industrial areas.	Widening sections of this alternative potentially impact approximately **6 commercial and 3 industrial properties directly**. The new corridor section includes several commercial / industrial properties (approximately 50) that could potentially be impacted, east of Highway 427, and additional properties (approximately 25) west of Highway 410 to Highway 401. It is possible to avoid some of these land uses through the route planning and selection process. This alternative has moderate potential to impact existing commercial and industrial areas.	Widening sections of this alternative potentially impacts approximately **1 commercial and 1 industrial properties directly**. The new corridor section includes several commercial / industrial properties (approximately 50) that could potentially be impacted, east of Highway 427. It is possible to avoid some of these land uses through the route planning and selection process. The new corridor section west of Highway 10, to Highway 6 in north Guelph has very few commercial / industrial areas. This alternative has moderate to low potential to impact existing commercial and industrial areas.	Widening sections of this alternative potentially impact approximately **1 commercial and 1 industrial properties directly**. The new corridor section includes several commercial / industrial properties (approximately 50) that could potentially be impacted, east of Highway 427. It is possible to avoid some of these land uses through the route planning and selection process. The new corridor section west of Highway 10 to Highway 6 in south Guelph crosses portions of a Dufferin Aggregates Yard in Halton Hills and the Hanlon Industrial Park south of Guelph. This alternative has moderate to high potential to impact existing commercial and industrial areas.

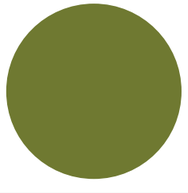
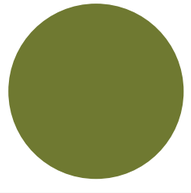
FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
	2.2.5 Tourism Operations <u>Measure:</u> Qualitative assessment of potential to impact or support tourist areas and attractions in the study area. NOTE: Potential impacts/benefits to tourism travel beyond the study area are dealt with under Area Economy.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum, as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre. The new corridor section potentially impacts Downey's Farm north of Brampton, although impacts may be minimized (and benefits maximized) through the route planning and selection process.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre. The new corridor section potentially impacts Downey's Farm (north of Brampton), and some apple orchards / tourist farms along Heritage Road (west of Highway 410). Impacts may be minimized (and benefits maximized) through the route planning and selection process.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre. The new corridor section potentially impacts Downey's Farm (north of Brampton), some apple orchards / tourist farms along Heritage Road and Scotch Block Winery (west of Highway 410). Impacts may be minimized (and benefits maximized) through the route planning and selection process.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre. The new corridor section potentially impacts Downey's Farm (north of Brampton), some apple orchards / tourist farms along Heritage Road and Scotch Block Winery (west of Highway 410). Impacts may be minimized (and benefits maximized) through the route planning and selection process. The new corridor section from Highway 10 to Highway 6 in north Guelph provides improved access to eco-recreational areas such as the Forks of the Credit, Terra Cotta, Elora Gorge, Guelph Lake and Rockwood Conservation Area.	This alternative supports travel to tourism operations close to existing Provincial highways such as Mohawk Race Track, Chudleigh's Farm, Country Heritage Park, Downey's Children's Farm, Canada's Wonderland and McMichael's Art Museum as well as Conservation Areas such as Kelso Lake, Hilton Falls, Mountsberg Reservoir (at the Niagara Escarpment), Albion Hills, and the Boyd and Kortright Centre. The new corridor section potentially impacts Downey's Farm (north of Brampton), some apple orchards / tourist farms along Heritage Road and Scotch Block Winery (west of Highway 410). Impacts may be minimized (and benefits maximized) through the route planning and selection process.
	2.2.6 Community Facilities / Institutions *<u>Measure:</u>* *Qualitative assessment of potential to affect major community facilities and institutions using approximate number and type as indicators.*	No community facilities or institutions have the potential to be directly impacted by the widening alternatives.	No community facilities or institutions have the potential to be directly impacted by the widening alternatives. The new corridor section has the potential to impact 11 schools, 7 community recreation centres/ arenas, 3 children's camps, 10 places of worship, as well as 5 clubs/meeting halls. Direct impacts can be minimized through the route planning and selection process.	No community facilities or institutions have the potential to be directly impacted by the widening alternatives. The new corridor section has the potential to impact 15 schools, 8 community recreation centres/arenas, 3 children's camps, 18 places of worship, 3 municipal facilities as well as 5 clubs/meeting halls. Direct impacts can be minimized through the route planning and selection process.	No community facilities or institutions have the potential to be directly impacted by the widening alternatives. The new corridor section has the potential to impact 15 schools, 9 community recreation centres/arenas, 3 children's camps, 15 places of worship, 3 municipal facilities as well as 5 clubs/meeting halls. Direct impacts can be minimized through the route planning and selection process.	No community facilities or institutions have the potential to be directly impacted by the widening alternatives. The new corridor section has the potential to impact 14 schools, 17 community recreation centres/arenas, 5 children's camps, 15 places of worship, 2 municipal facilities as well as 6 clubs/meeting halls. Direct impacts can be minimized through the route planning and selection process.	No community facilities or institutions have the potential to be directly impacted by the widening alternatives. The new corridor section has the potential to impact 18 schools, 13 community recreation centres/arenas, 3 children's camps, 23 places of worship, 7 municipal facilities as well as 5 clubs/meeting halls. Direct impacts can be minimized through the route planning and selection process.
2.3 Noise	2.3.1 Transportation Noise *<u>Measure:</u>* *Qualitative description of different types of noise impacts, locations of increased noise, proximity to NSAs and magnitude / severity of impacts.*	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. This alternative has the most widening and therefore potential to have the largest noise increases along existing corridors.	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. New corridors may result in increased nuisance impacts such as noise and illumination to areas closest to the new facility. Proximity to residential areas is described in "residential" criteria.	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. New corridors may result in increased nuisance impacts such as noise and illumination to areas closest to the new facility. Proximity to residential areas is described in "residential" criteria.	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. New corridors may result in increased nuisance impacts such as noise and illumination to areas closest to the new facility. Proximity to residential areas is described in "residential" criteria.	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. New corridors may result in increased nuisance impacts such as noise and illumination to areas closest to the new facility. Proximity to residential areas is described in "residential" criteria.	Nuisance / proximity impacts (increased noise, illumination etc) may occur in built-up areas. New corridors may result in increased nuisance impacts such as noise and illumination to areas closest to the new facility. Proximity to residential areas is described in "residential" criteria.

Exhibit 4-11: Land Use / Social Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
2.4 Air	2.4.1 Local and regional air quality impacts; greenhouse gas emissions <u>*Measures:*</u> *Potential for exposure of sensitive receptors to various levels of air pollution.*	For many sections of freeway, the traffic volume in 2031 will be approximately the same as for other alternatives. However, 407 ETR between Winston Churchill and Highway 400, and Highway 400 north of 407 ETR have higher projected traffic volumes in 2031 than for other alternatives. On Highway 400, the approximate predicted area of influence potentially affects residences located between Rutherford Road and Teston Road. On Highway 407, it potentially affects residences in the vicinity of Mavis Drive and Hurontario Street and at Pine Valley Drive.	Lower traffic volume on 407 ETR and Highway 400 reduces the zone of above-background pollutant levels identified in Alternative 3-1. 2031 traffic volume on proposed new corridor is relatively low; however, the highway will be in a rural setting with less turbulence and less dispersion of pollutants. Predicted influence area is similar or larger than that for existing highways. Depending on the choice of alignment, it could potentially affect some residences in northern Brampton, northern Vaughan, Wildfield or Nobleton.	Additional new corridor in this alternative has an approximate influence area of 180m. The potential number of affected residences will depend on the choice of alignment but, in general, there are relatively few residences along this route. Along existing highways, this alternative has approximately the same air quality impact as Alternative 4-1.	Additional new corridor in this alternative has an approximate influence area of 160m. The potential number of affected residences will depend on the choice of alignment but, in general, there are relatively few residences along this route. Along existing highways, this alternative has approximately the same air quality impact as Alternative 4-1.	Additional new corridor in this alternative has an approximate influence area of 160m. The potential number of affected residences will depend on the choice of alignment but, in general, there are relatively few residences along this route. Along existing highways, this alternative has approximately the same air quality impact as Alternative 4-1, but with somewhat reduced influence area along Highway 401, potentially benefiting residences near Campbellville and on Maple Avenue in Milton.	Along existing highways and new corridor, this alternative has approximately the same air quality impact as Alternative 4-4.
	Incremental annual amounts of air pollutants (air contaminants emitted into the region for the horizon year).	Network-wide, peak hour vehicle kilometres travelled (VKT) and pollutant emissions are slightly lower than other alternatives.	Network-wide, peak hour VKT and pollutant emissions are slightly higher than Alternative 3-1, and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and pollutant emissions are slightly higher than Alternative 3-1, and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and pollutant emissions are slightly higher than Alternative 3-1, and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and pollutant emissions are slightly higher than Alternative 3-1, and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and pollutant emissions are slightly higher than Alternative 3-1, and approximately the same as other Group #4 alternatives.
	Incremental annual amounts of greenhouse gases emitted per annum for the horizon year.	Network-wide, peak hour vehicle kilometres travelled and GHG emissions are slightly lower than other alternatives.	Network-wide, peak hour VKT and GHG emissions are slightly higher than Alternative 3-1 and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and GHG emissions are slightly higher than Alternative 3-1 and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and GHG emissions are slightly higher than Alternative 3-1 and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and GHG emissions are slightly higher than Alternative 3-1 and approximately the same as other Group #4 alternatives.	Network-wide, peak hour VKT and GHG emissions are slightly higher than Alternative 3-1 and approximately the same as other Group #4 alternatives.
2.5 Land Use / Resources	2.5.1 First Nations Treaty Rights and Interests or Use of Land and Resources for Traditional Purposes <u>*Measure:*</u> *Potential to impact FN Treaty rights and interests or use of land and resources for traditional purposes (i.e., hunting fishing, harvesting food and medicinal plants, etc.)*	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential significance to impact First Nations Treaty Rights and Interest or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
	2.5.2 Agriculture *Measure:* *Qualitative assessment of potential impacts to prime agricultural lands outside of future development areas and woodlots, measured by linear distance of Class 1-3 agricultural lands potentially impacted.*	This alternative has potential to impact agricultural land as follows: **Class 1 – 10 km** **Class 2 – 2.54 km** In comparison with other alternatives, Alternative 3-1 has lowest potential to impact agricultural lands.	Widening sections impact agricultural land as follows: Class 1 – 10 km Class 2 – 2.54 km The new corridor section potentially impacts the following linear distance of Class 1-3 agricultural land: **Class 1 – 16 km** **Class 2 – 3 km** **Class 3 – 1 km** In comparison with other alternatives, Alternative 4-1 has low to moderate potential to impact agricultural lands.	Widening sections impact agricultural land as follows: Class 1 – 10 km Class 2 – 2.54 km The new corridor section potentially impacts the following linear distance of Class 1-3 agricultural land: **Class 1 – 27 km** **Class 2 – 3 km** **Class 3 – 5.5 km** In comparison with other alternatives, Alternative 4-2 has moderate potential to impact agricultural lands.	Widening sections impact agricultural land as follows: Class 1 – 10 km Class 2 – 2.54 km The new corridor section potentially impacts the following linear distance of Class 1-3 agricultural land: **Class 1 – 32 km** **Class 2 – 3 km** **Class 3 – 9 km** In comparison with other alternative, Alternative 4-3 has moderate potential to impact agricultural lands.	Widening sections impact agricultural land as follows: Class 1 – 10 km Class 2 – 2.54 km The new corridor section potentially impacts the following linear distance of Class 1-3 agricultural land: Class 1 – 38 km **Class 2 – 4 km** **Class 3 – 4.5 km** In comparison with other alternatives, Alternative 4-4 has highest potential to impact agricultural lands.	Widening sections impact agricultural land as follows: Class 1 – 10 km Class 2 – 2.54 km The new corridor section potentially impacts the following linear distance of Class 1-3 agricultural land: **Class 1 – 31 km** **Class 2 – 4 km** **Class 3 – 11 km** In comparison with other alternatives, Alternative 4-5 has moderate potential to impact agricultural lands.
	2.5.3 Recreational Lands and Natural Areas of Provincial Significance (e.g. national / provincial parks, conservation areas, major trails) *Measure:* *Number of parks and recreational areas potentially affected.*	This alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401.	The widening component of this alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401. The new corridor section potentially impacts 30 TRCA properties. It may be possible to avoid some Conservation Areas and trails during route planning / selection / design processes.	The widening component of this alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401. The new corridor section potentially impacts 31 TRCA properties, 1 CVC property and 3.5 km of the Credit Valley Footpath. It may be possible to avoid some Conservation Areas and trails during route planning / selection / design processes.	The widening component of this alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401. The new corridor section potentially impacts 31 TRCA properties, 1 CVC property and 3.6 km of the Credit Valley Footpath. It may be possible to avoid some Conservation Areas and trails during route planning / selection / design processes.	The widening component of this alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401. The new corridor section potentially impacts 31 TRCA properties, 9 CVC properties, 15 GRCA properties, within the NEC: Wetland Trail, Bruce Trail, Caledon Trail, Terra Cotta Side Trail, Walking Fen Side Trail, Irwin Quarry Side Trail, Roberts Side Trail, Bennett Heritage Trail, Maureen Smith Side Trail, and Credit Valley Footpath, and the Guelph Trans Canada Trail. It may be possible to avoid some Conservation Areas and trails during route planning / selection / design processes.	The widening component of this alternative has the potential to directly impact the Bruce Trail MNR Trail Segments along Highway 401. The new corridor section potentially impacts 31 TRCA properties, 1 CVC property, and 5 Conservation Halton properties, within the NEC: Bruce Trail, Hilton Falls Side Trail, Speyside Side Trail, Vanderleck Side Trail, Restoration Side Trail, and Credit Valley Footpath. It may be possible to avoid some Conservation Areas and trails during route planning / selection / design processes.
	2.5.4 Aggregate and Mines *Measure:* *Number of pits and quarries potentially affected.*	No aggregates or mines have the potential to be impacted by this widening alternative.	No aggregates or mines have the potential to be impacted by the widening component of this alternative. There are no aggregates in the new corridor section.	No aggregates or mines have the potential to be impacted by the widening component of this alternative. There are no aggregates in the new corridor section.	No aggregates or mines have the potential to be impacted by the widening component of this alternative. The new corridor section potentially impacts 2 quarries (i.e., Class A Quarry below water). It is possible to avoid these aggregate areas through route planning / selection process.	No aggregates or mines have the potential to be impacted by the widening component of this alternative. The new corridor section potentially impacts 9 areas of authorized aggregate sites, where 5 sites area active (i.e., 3 Class A pits above water, 1 Class A quarry above water, and 1 Class B quarry above water) and 4 sites have been revoked or surrendered. It is possible to avoid these aggregate areas through route planning / selection process.	No aggregates or mines have the potential to be impacted by the widening component of this alternative. The new corridor section potentially impacts 3 Class A Quarries (below water). It is possible to avoid these aggregate areas through route planning / selection process.
2.6 Municipal Services	2.6.1 Major Utility Transmission Corridors *Measure:* *Number of potential major utility transmission corridors that could be potentially impacted.*	This alternative has potential to directly impact 8 railway crossings and 20 transmission line crossings. Widest sections along 407 ETR have some potential to impact major hydro corridors running parallel to highway.	The widening component of this alternative has the potential to directly impact 8 railway crossings and 20 transmission line crossings. The new corridor section potentially impacts 1 railway crossing and 3 transmission line crossings.	The widening component of this alternative has the potential to directly impact 8 railway crossings and 20 transmission line crossings. The new corridor section potentially impacts 3 railway crossings and 6 transmission line crossings.	The widening component of this alternative has the potential to directly impact 8 railway crossings and 20 transmission line crossings. The new corridor section potentially impacts 1 railway crossing and 3 transmission line crossings.	The widening component of this alternative has the potential to directly impact 8 railway crossings and 20 transmission line crossings. The new corridor section potentially impacts 4 railway crossings and 6 transmission line crossings.	The widening component of this alternative has the potential to directly impact 8 railway crossings and 20 transmission line crossings. The new corridor section potentially impacts 6 railway crossings and 4 transmission line crossings.

Exhibit 4-11: Land Use / Social Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
2.7 Contaminated Property Identification and Management	Landfills, Hazardous Waste Sites, Brownfield Areas, etc. *Measure:* *Number and type of contaminated sites potentially affected.*	There are no known contaminated properties that would be impacted by this widening alternative.	There are no known contaminated properties that would be impacted by the widening component of this alternative. The new corridor section potentially impacts 3 known waste disposal sites. It is possible to avoid these areas through route planning / selection process.	There are no known contaminated properties that would be impacted by the widening component of this alternative. The new corridor section potentially impacts 3 known waste disposal sites and 1 waste treatment plant. It is possible to avoid these areas through route planning / selection process.	There are no known contaminated properties that would be impacted by the widening component of this alternative. The new corridor section potentially impacts 3 known waste disposal sites, 1 waste treatment plant and 1 brownfield site. It is possible to avoid these areas through route planning / selection process.	There are no known contaminated properties that would be impacted by the widening component of this alternative. The new corridor section potentially impacts 5 known waste disposal sites. It is possible to avoid these areas through route planning / selection process.	There are no known contaminated properties that would be impacted by the widening component of this alternative. The new corridor section potentially impacts 1 known waste disposal sites and 1 waste treatment plant. It is possible to avoid these areas through route planning / selection process.
SUMMARY **LAND USE / SOCIAL ENVIRONMENT**		**LEAST PREFERRED** because it has limited ability to support municipal land use plans for future growth and development and does not sufficiently support some growth especially in York and Peel Regions because the widening improvements are too far south to effectively serve future development/growth areas. However, the option best supports intensification of existing employment areas. This alternative has the most number of direct impacts to residential, commercial and industrial properties along existing Highways 401 and 400, and 407 ETR especially in the widest sections. There is also some potential for local air quality impacts in these areas. In addition to property impacts there is a high potential to impact to provincial and municipal infrastructure along 407 ETR, east of Highway 427- including existing municipal bridges, intersections, servicing and utilities.	**MODERATELY PREFERRED** because it supports future growth in York Region and some parts of Peel Region but not Halton Region – with new corridor section close to future growth areas in York and eastern Peel. In widening sections, this alternative results in fewer impacts to residential, commercial and industrial properties. Potential impacts to properties along the new corridor can be minimized through route planning and selection process. The new corridor impacts 16 km of Class 1 soils. The widening sections have reduced impacts to provincial and municipal infrastructure, especially on 407 ETR, east of Highway 427.	**MOST PREFERRED** because it supports future growth in York, Peel and Halton Regions – with new corridor section close to future growth areas. In widening sections, this alternative results in fewer impacts to residential, commercial and industrial properties. Potential impacts to properties along new corridor can be minimized through route planning and selection process. The new corridor impacts 27 km of Class 1 soils. The widening sections have reduced impacts to provincial and municipal infrastructure, especially on 407 ETR, east of Highway 427.	**MOST PREFERRED** because it supports future growth in York, Peel and Halton Regions – with new corridor section close to future growth areas. However, this alternative would impact the existing and future land use in Halton's plans between Georgetown and Milton. In widening sections, this alternative results in fewer impacts to residential, commercial and industrial properties. Potential impacts to properties along new corridor can be minimized through route planning and selection process. The new corridor impacts 32 km of Class 1 soils. The widening sections have reduced impacts to provincial and municipal infrastructure, especially on 407 ETR, east of Highway 427.	**LEAST PREFERRED** - because although it supports growth in York and Peel, it does not support future planned growth in Halton – with new corridor section extending north to Guelph. In widening sections, this alternative results in fewer impacts to residential, commercial and industrial properties. Potential impacts to properties along new corridor can be minimized through route planning and selection process, although areas in north Guelph are built-up with residential, commercial and industrial land uses. The new corridor impacts 38 km of Class 1 soils – and fragments many viable farming operations in north Halton and Wellington County. Impacts to agricultural soils and operations could be difficult to mitigate. The widening sections have reduced impacts to provincial and municipal infrastructure, especially on 407 ETR, east of Highway 427.	**LEAST PREFERRED** because although it supports growth in York and Peel, it has limited ability to support future land use development in Halton (i.e., Milton) and potentially impacts several aggregate operations west of the escarpment as well. In widening sections, this alternative results in fewer impacts to residential, commercial and industrial properties. Potential impacts to properties along new corridor can be minimized through route planning and selection process, although some areas south of Guelph are built-up with residential, commercial and industrial land uses. The new corridor impacts 31 km of Class 1 soils. The widening sections have reduced impacts to provincial and municipal infrastructure, especially on 407 ETR, east of Highway 427.
							
OVERALL SUMMARY	Although Alternative 3-1 will likely result in the fewest direct impacts on existing land uses, properties and agricultural lands, it is least preferred because it does not serve future growth as well as Group #4 alternatives and has major impacts on provincial and municipal infrastructure. All the Group #4 alternatives result in higher direct impacts to existing land uses, properties and agricultural lands than Alternative 3-1, however, they are more compatible with future growth/land use patterns in York, Peel and Halton Regions. Alternative 4-1 is only moderately preferred as it does not support future growth areas and land use in Peel and Halton Regions as well as 4-2 and 4-3. Although Alternatives 4-4 and 4-5 support future growth they are less desirable as they result in higher direct impacts to on existing land uses, properties and agricultural lands. **Alternatives 4-2 and 4-3 are most preferred in the land use/socio economic factor** because they best satisfy and balance land use planning policies and goals while minimizing impacts to community features, properties and existing infrastructure along existing highways as well as prime agricultural land in the study area. Overall, Alternatives 4-2 and 4-3 are similar and better than Alternatives 3-1, 4-4 or 4-5 in most evaluation criteria in this factor group. They are slightly better than Alternative 4-1 because they both extend to Milton.						

Noise and Illumination

Nuisance impacts from increased noise and illumination may occur in built-up areas along the existing highways as well as along new corridor sections. Alternative 3-1 has the most widening in built-up areas and therefore has potential to have the largest noise increases along existing corridors. While Group #4 alternatives may result in some increased nuisance from noise and illumination for areas closest to a new facility, impacts could be reduced by avoiding built-up areas through the route planning process.

Air

An Air Quality Assessment was carried out for the new corridor alternatives, to inform and support the evaluation of alternatives in accordance with the evaluation criteria.

Overall, the Group #3 and Group #4 alternatives are relatively similar. As shown in the table to the right, the following provides a summary of the main air quality and greenhouse gas emission differences between the alternatives.

- Alternative 3-1 has higher traffic volumes on Highways 401 and 400, and 407 ETR with potential for increased local air quality impacts in areas where the most widening is needed;
- New corridor sections west of Highway 410 will likely have no noticeable effect on local air quality in surrounding areas. Minor impacts could occur east of Highway 410, depending on where the route is located;
- The Group #4 alternatives have slightly reduced traffic volumes (compared to Alternative 3-1) on Highways 401 and 400 and 407 ETR, and therefore have potential for slightly reduced local air quality impact;
- Alternative 3-1 has slightly lower overall network emissions of both air pollutants and greenhouse gases than the Group #4 alternatives (year 2031); and
- The Base Case scenario shows the worst air quality results (this scenario was identified as a benchmark for comparing other "improvement" alternatives and is considered the status quo, where improvements to the transportation system would be limited to the implementation of approved provincial, regional and local municipal initiatives).

GROUP #3 AND #4 ALTERNATIVES	BASE CASE	3-1	**3-1	**4-1	**4-2	**4-3	**4-4	**4-5
PEAK HOUR CO_{2E} EMISSION (KTONNE)[1]	1.61	1.58	1.57	1.59	1.59	1.59	1.59	1.59
PEAK HOUR NO_X EMISSION (TONNE)[2]	1.32	1.33	1.33	1.34	1.36	1.36	1.35	1.36
PEAK HOUR CO EMISSION (TONNE)[3]	22.9	23.1	23.0	23.3	23.6	23.5	23.5	23.5
PEAK HOUR THC EMISSION (TONNE)[4]	0.95	0.88	0.88	0.89	0.89	0.89	0.89	0.89
PEAK HOUR PM_{10} EMISSION (TONNE)[5]	2.02	1.38	1.37	1.38	1.36	1.36	1.36	1.36

[1] CO_{2e}: Greenhouse gas emissions expressed as equivalent amount of carbon monoxide

[2] NO_x: Oxides of nitrogen (the predicted concentrations were assumed to be entirely in the form of nitrogen dioxide (NO2), which is the form of NOx that is of greatest concern in terms of potential effects to human health. This was done as a simplifying measure that errs on the safe side. In reality, the concentrations would consist of a mixture of various NOx species (primarily NO and NO2))

[3] CO: Carbon monoxide

[4] THC: Total hydrocarbons

[5] PM_{10}: Particulate matter smaller than 10 microns in diameter

** Niagara to GTA (NGTA) Transportation modeling Alternative 3-1 was combined with GTA West Transportation Modeling. However, the information presented in this table only applies to the GTA West preliminary study area. NGTA Alternative 3-1 includes widening of provincial highways in the NGTA preliminary study area and is discussed in detail in the draft NGTA Transportation Development Strategy reporting.

Land Use / Resources

The table below provides a summary of the impacts of each corridor alternative on agricultural soils. Overall, Alternative 3-1 has minimal impacts because existing corridors will be widened, and agricultural impacts will occur on the fringes of farming operations. The table shows that Alternatives 4-1, 4-2 and 4-3 have relatively moderate impacts to agricultural soils. Alternatives 4-4 and 4-5 have the highest potential to impact agricultural soils, especially in north Halton and Wellington County. As a result of their locations, these alternatives also have a higher potential to fragment farming operations.

GROUP #4 – NEW CORRIDOR SECTIONS	4-1	4-2	4-3	4-4	4-5
*km on Class 1 Soil Lands (linear distance)	16	27	32	38	31
*km on Class 2 Soil Lands (linear distance)	3	3	3	4	4
*km on Class 3 Soil Lands (linear distance)	1	5.5	9	4.5	11

* These measurements do not include areas designated for future development in municipal official plans or significant woodlots

Alternative 3-1 will have minimal impacts on recreational lands and natural areas of Provincial Significance. Alternatives 4-1, 4-2 and 4-3 will have moderate impacts to Conservation Authority properties, while Alternatives 4-4 and 4-5 have the potential to impact a number of Conservation Authority properties. It may be possible to avoid some Conservation Areas and trails through route planning, during the next stage of the EA.

Alternatives 4-4 and 4-5 have the greatest potential to impact active and revoked / surrendered quarries. It would be possible to avoid these aggregate areas through the route selection process in new corridor sections.

Municipal Services

Alternative 3-1 has significant impacts to municipal infrastructure at 407 ETR arterial road and other highway crossings, especially east of Highway 427, where existing municipal bridges, intersections, servicing and utilities would be impacted by extensive highway widening.

Contaminated Property Identification and Management

Alternatives 4-3 and 4-4 have the greatest potential to disturb contaminated properties along their new corridor sections. It may be possible to avoid these contaminated areas through the route selection process in new corridor sections, during the next stage of the EA.

A summary of the Social Environment findings is provided in **Section 4.11**.

4.7. EVALUATION OF ALTERNATIVES – CULTURAL ENVIRONMENT

4.7.1. Methodology

The Study Team used information from secondary sources (i.e. Stage 1 Archaeological Assessment and historic records, mapping, aerial photography, documentation, other studies / reports, websites, etc.) and obtained from agencies (local historical groups), ministries (Ministry of Tourism, Culture and Sport, formerly Ministry of Culture) and municipalities during the study to assess the alternatives in accordance with the factors and criteria under cultural environment. Secondary source information was supplemented by local knowledge obtained through consultation with the public, agencies, municipalities and First Nations. Major features (i.e. clusters of built heritage, etc.) were also confirmed in the field during this stage of the study. Additional field work will be carried out during the next stage of the EA process.

Recognizing that Stage 1 of the EA process identifies wide corridors (new corridors were presented schematically to be about 4 kilometres wide in GTA West preliminary study area), the Study Team understands that every cultural feature in the corridor would not be impacted by future routes, and that some features could be avoided in the next stage of the EA, when route planning and generation will occur. In other instances, it is apparent that the feature is so large that the entire width of the preliminary study area crosses it (i.e. areas with high potential for archaeological resources because they are currently undisturbed). Distinctions about the magnitude of potential impacts and the likelihood of avoidance or mitigation are noted in the evaluation tables shown as **Exhibit 4-12**. Although significant features within the Group #3 and #4 alternatives could be named and in some cases counted or "measured" to provide a comparison between alternatives, other criteria required a qualitative assessment of potential impacts or benefits at a higher level of detail. Names of the most significant / largest features potentially impacted by each alternative were documented in the evaluation tables. Additional information on cultural resources is provided in the *Existing Environmental Conditions and Constraints Report*, summarized in **Section 2.3**.

4.7.2. Findings

Exhibit 4-12 provides the evaluation of the alternatives for the Cultural Environment Factors, as presented at PIC #4. A summary of the findings is provided below.

Cultural Heritage- Built Heritage and Cultural Heritage Landscapes

Overall, Alternative 3-1 has limited potential to impact the cultural environment because most areas are previously disturbed either through highway construction or urbanization. Group #4 alternatives have increased potential to impact cultural environment. The longest new corridors (Alternatives 4-4 and 4-5) have the highest potential to impact cultural heritage landscape and built heritage features. Route selection and design can mitigate impacts, but it may be difficult to avoid some built heritage features because of the length of the corridor.

Cultural Heritage – Archaeological Sites or Resources

Overall, Alternative 3-1 has limited potential to impact cultural environment because most areas are previously disturbed either through highway construction or urbanization. Alternatives 4-1, 4-2 and 4-3 have increased potential to impact archaeological sites and resources, and Alternatives 4-4 and 4-5 have the most potential to impact archaeological sites and resources, although some areas through Halton and Wellington County are pre-disturbed by aggregate / quarry operations.

A summary of the Cultural Environment findings is provided in **Section 4.11**.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
3.1 Cultural Heritage – Built Heritage and Cultural Heritage Landscapes	3.1.1 Buildings (i.e., standing sites of architectural or heritage significance, Ontario Heritage Properties, heritage bridges, cemeteries) and Cultural Heritage Landscapes (i.e., areas of historic 19th century settlement). _Measure:_ *Qualitative assessment of the potential to impact built cultural heritage areas and resources.*	Widening sections do not impact any built heritage resources and have minimal impact on cultural heritage landscapes in GTA West study area, in part because of urban / commercial / industrial nature of landscape along the existing 400 series highways in the study area.	Widening sections have minimal impacts to built heritage or cultural landscape. New corridor section crosses Humber River, a designated Canadian Heritage River and site of Toronto Carrying Place Trail (with historical significance) in King Township. Impacts can be partially mitigated through route selection and design.	Widening sections have minimal impacts to built heritage or cultural landscape. New corridor section crosses Humber River, a designated Canadian Heritage River and site of Toronto Carrying Place Trail (with historical significance) in King Township. Impacts can be partially mitigated through route selection and design.	Widening sections have minimal impacts to built heritage or cultural landscape. New corridor section crosses Humber River, a designated Canadian Heritage River and site of Toronto Carrying Place Trail (with historical significance) in King Township. Impacts can be partially mitigated through route selection and design. The new corridor section in this alternative potentially impacts cultural landscapes near Niagara Escarpment and Greenbelt at Milton.	Widening sections have minimal impacts to built heritage or cultural landscape. New corridor section crosses Humber River, a designated Canadian Heritage River and site of Toronto Carrying Place Trail (with historical significance) in King Township. Impacts can be partially mitigated through route selection and design. The new corridor section in this alternative has potentially significant impacts to cultural landscapes across the Niagara Escarpment and through Greenbelt areas and further west towards Guelph. It will be difficult to avoid some impacts to built heritage features throughout the length of the new corridor.	Widening sections have minimal impacts to built heritage or cultural landscape. New corridor section crosses Humber River, a designated Canadian Heritage River and site of Toronto Carrying Place Trail (with historical significance) in King Township. Impacts can be partially mitigated through route selection and design. The new corridor section in this alternative has potentially significant impacts to cultural landscapes across the Niagara Escarpment and through Greenbelt areas and further west towards Guelph. It will be difficult to avoid some impacts to built heritage features throughout the length of the new corridor.
	3.1.2 First Nations Burial Sites _Measure:_ *Qualitative assessment of the potential to impact First Nation Burial Sites.*	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nation burial sites will be confirmed through discussions with First Nations as part of the EA process.
3.2 Cultural Heritage – Archaeology	3.2.1 Pre-Historic and Historic First Nations Sites _Measure:_ *Qualitative assessment of potential to impact archaeological sites of historical significance to First Nations.*	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process.
	3.2.2 Archaeological Sites or Resources _Measure:_ *Qualitative assessment of impacts to archaeological sites or resources using impacts to undisturbed areas as indicator.*	Widening sections have limited potential to impact archaeological sites or resources because they are primarily located in built up and/or pre-disturbed areas.	The new corridor section has some potential to impact archaeological sites and resources.	The new corridor section has some potential to impact archaeological sites and resources.	The new corridor section has some potential to impact archaeological sites and resources.	The new corridor section has the most potential to impact archaeological sites and resources, based on its length through undisturbed areas.	The new corridor section has moderate potential to impact archaeological sites and resources. Some areas through Halton and Wellington County are pre-disturbed by aggregate / quarry operations.

Exhibit 4-12: Cultural Environment Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST 407 ETR EAST OF HIGHWAY 401)	4-1 REDUCED 407 ETR WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
SUMMARY CULTURAL ENVIRONMENT		**MOST PREFERRED** – Results in the least number of built heritage and cultural landscapes that may be directly impacted. It has the lowest potential of impacting land with archaeological potential.	**MODERATELY PREFERRED** – Has increased potential to impacts built heritage and cultural landscapes. It has more potential to impact land with archaeological resources.	**MODERATELY PREFERRED** – Has increased potential to impacts built heritage and cultural landscapes. It has more potential to impact land with archaeological resources.	**MODERATELY PREFERRED** – Has increased potential to impacts built heritage and cultural landscapes. It has more potential to impact land with archaeological resources.	**LEAST / NOT PREFERRED** – As one of the longest new corridors, it has highest potential to impact built heritage resources and cultural landscape - especially at new escarpment crossing. It has a high potential to impact land with archaeological resources.	**LEAST / NOT PREFERRED** – As one of the longest new corridors, it has highest potential to impact built heritage resources and cultural landscape - especially at new escarpment crossing. It has a high potential to impact land with archaeological resources.
							
OVERALL SUMMARY		Alternative 3-1 impacts the least number of built heritage resources and has the least impact on cultural landscape because it does not include a new corridor section or a new escarpment crossing. It also has least potential to impact archaeological resources with existing highway rights-of-way, due to previous disturbance of land in footprint area. Alternatives 4-4 and 4-5 have the longest new corridor sections that would be expected to have the largest impacts to potential built heritage features and archaeological resources, as well as the cultural landscape, especially at the new escarpment crossings. Alternatives 4-1, 4-2 and 4-3 have relatively moderate impacts that can be mitigated through route location and design. **Alternative 3-1 is preferred from a Cultural perspective.** Alternatives 4-1, 4-2 and 4-2 are slightly less preferred as they result in relatively similar moderate impacts. Alternatives 4-4 and 4-5 result in significantly higher impacts than the other alternatives.					

4.8. EVALUATION OF ALTERNATIVES – AREA ECONOMY

The purpose of the economic analysis was to provide an assessment of the degree to which each study alternative supported the economy of the GTA West area and of the Greater Golden Horseshoe (GGH) as a whole.

Transportation investments benefit the economy in several ways. Traffic congestion, accidents, pollution and other delays are negative impacts that cost businesses and people money. Commuters and goods are delayed in congested traffic, with time and financial implications. Vehicle emissions damage the natural environment, with costs to society as a whole, including health care costs associated with poor air quality. Further, accidents have terrible human costs, and even minor accidents cause damage to vehicles and further delays. These are all costs to society that cannot be recovered.

When the transportation system works more efficiently, the above costs are reduced, and Ontario is more economically competitive. This brings jobs, increased investment and higher quality of life to the area.

As such, improvements to the transportation network can have the following benefits:

- Travel time savings – people and goods move more efficiently – this improves our competitiveness as a province;
- Accident reduction savings – the costs of personal injuries and property damage is reduced and the delays caused by accidents are reduced;
- Vehicle operating costs – where all vehicles operate more efficiently, and where people or goods can travel by modes other than car or truck, such as by rail, vehicle operating costs are reduced;
- Emissions reductions – the costs to society of emissions, such as health care costs and greenhouse gas emissions, are reduced;
- Land use benefits – increased capacity can "unlock" lands for new development, stimulate revitalization, and permit development at higher densities within urban areas, which reduces costs for other municipal services; and
- Increased mobility – people can access jobs, services, tourist attractions, and other opportunities that they could not access before.

The above is in addition to the jobs and spending directly generated by the construction of new transportation facilities.

The economic analysis of alternative transportation corridors was conducted using two types of analysis: a quantitative economic impact modeling exercise using software called Transportation Economic Development Impact System (TREDIS), and a qualitative analysis of the fit between the transportation options and the location and scale of current and future economic growth areas in the corridor.

4.8.1. Methodology

Quantitative Modeling

The expected economic impact of the GTA West alternatives on a regional basis was calculated using the Transportation Economic Development Impact System (TREDIS) multi-modal economic analysis tool. This economic analysis system has been applied in numerous provinces in Canada and states across the United States, but the version applied here was built by separating regions of the GGH into the GTA West and NGTA study areas, and the rest of GGH and analyzing ways in which different GTA West industries depend on transportation for workers, materials and product deliveries from within and outside its borders. It was also designed to use results of the transportation demand modeling conducted by MTO and the Study Team (see **Section 4.9**).

The TREDIS economic impact model is designed to provide both economic development impact evaluation and benefit-cost analysis for transportation investments and policies. It is applicable for all modes: highway, transit (rail / bus), air and marine projects, as well as multi-modal projects. TREDIS is also applicable for both freight and passenger transportation projects and accounts for rural accessibility as well as urban congestion factors. The system distinguishes between economic growth due to mobility improvements (e.g. faster speeds, more reliability) and economic improvements due to business growth attracted by mobility improvements. This is done using economic geography tools that integrate Geographic Information System (GIS) with an economic development assessment process that accounts for threshold effects associated with changes in service areas, market access and travel times.

The economic analysis process estimated long-term productivity impacts, which are the continuing effects of improved transportation conditions on economic productivity and competitiveness, and hence economic growth many years after an investment is made. In this case, the impacts were calculated out to the year 2031. Estimates of both types of impact were measured in terms of additional employment, gross domestic product (GDP) and wages due to the proposed mobility improvements. The long-term benefit of capital investment in transportation facilities is the improvement in travel conditions that lead to economic cost savings and productivity enhancement for GTA West residents and businesses. These improvements occur through five types of impacts on transportation system users:

- Cost savings due to reduced user time delay and expense;
- Cost savings due to enhanced safety and reliability;
- Cost savings from enhanced inter-modal capacity and connectivity;
- Cost savings and scale economies from enhanced market access; and
- Added growth enabled by elimination of capacity constraints at gateways.

Those user benefits, in turn, lead to direct, indirect and induced effects on household living costs, business operating costs, productivity and competitiveness. They enable more jobs and business activity to take place in the GTA West study area and the whole GGH, which also reduces the "leakage" of income and savings that might otherwise flow to businesses located outside of the region.

These long-term economic impacts of planned capital investments should be interpreted carefully. It is important to note that these impacts represent the difference between a scenario in which needed investments are made and a scenario in which those capital investments are not made.

So in a very real sense, the capital investments are enabling a continued level of economic growth while the failure to invest would lead to a lower level of economic growth.

TREDIS is comprised of modules that work together to determine the full economic impact of transportation projects. They are listed below and illustrated in **Exhibit 4-13**.

- Travel Cost Module (TC) – The first module translates changes in traffic volumes, travel times and accidents into direct cost savings that accrue to households and businesses. Factors that translate changes in vehicle kilometres travelled, vehicle hours travelled, reliability and safety to economic benefits were developed by research of the Study Team and provided to the MTO.
- Market Access Module (MA) – The second module translates changes in regional accessibility and inter-modal connectivity into effects on productivity and business relocation.
- Economic Adjustment Module (EA) – The third module incorporates a dynamic time series economic impact model to estimate total impacts on growth of regional economies over time. This module was developed by using the Canadian industry by industry purchasing developed by Statistics Canada on behalf of the Organization for Economic Co-operation and Development (OECD), and economic data purchased from Statistics Canada (employment and wages by place of work for GTA West, NGTA and the rest of the GTA).

Information on project costs, travel patterns, traffic conditions, market access and inter-modal connectivity can be input through a series of input forms, or it can be input directly from spreadsheets or from travel demand models. The range of inputs is shown in **Exhibit 4-14**. From those inputs, TREDIS then calculates the economic consequences of changes in travel patterns, speed, safety and reliability. This is illustrated in the report form shown as **Exhibit 4-15**.

The results are then portrayed in terms of a wide range of alternative perspectives, showing regional and GTA-wide benefits in terms of traveller benefit, and impact on the GTA West preliminary study area and overall GTA economy.

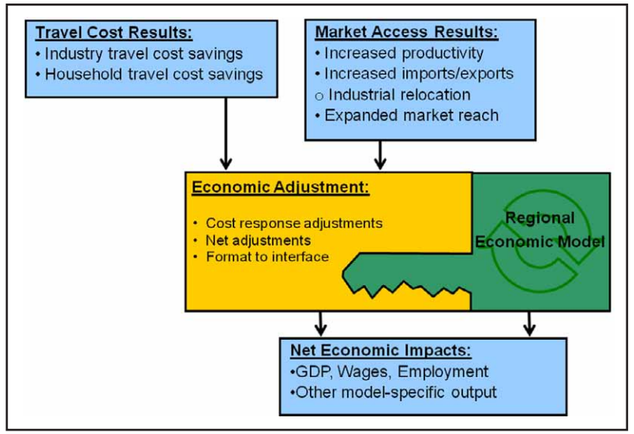


Exhibit 4-13: TREDIS Components

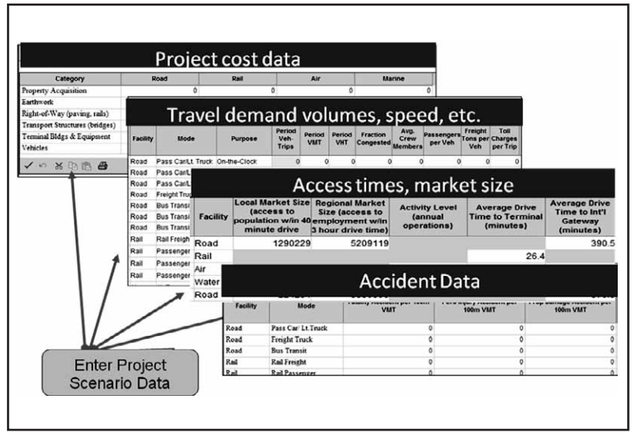


Exhibit 4-14: Example of the Range of Inputs Allowed by the TREDIS Framework

DIRECT IMPACT BY MODE (TARGET YEAR)
Period/Region Combination Inputs

Base Scenario: Base Scenario
Region: Unnamed Region / Period: Annual

Transportation Measure	Pass Car	Truck Freight	Bus Transit	Rail Freight	Rail Transit	Air Trans	Water Trans
Gross VMT	0	0	0	0	0	0	0
Gross VHT	0	0	0	0	0	0	0
Gross VHT w/reliability adj	0	0	0	0	0	0	0
Passenger Trips	0	0	0	0	0	0	0
Passenger Miles	0	0	0	0	0	0	0
Freight Ton - Trips	0	0	0	0	0	0	0
Freight Ton - Miles	0	0	0	0	0	0	0
Fatalities	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Injuries	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Property Damage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local Gross VMT	0	0	0	0	0	0	0
Local Gross VHT w/reliability adj.	0	0	0	0	0	0	0
Total Value of Travel Costs:							
Passenger Cost - Total	$0	$0	$0	$0	$0	$0	$0
Crew Cost - Total	$0	$0	$0	$0	$0	$0	$0
Freight Cost - Total	$0	$0	$0	$0	$0	$0	$0
Veh Oper Cost - Total	$0	$0	$0	$0	$0	$0	$0
Toll Cost - Net Total	$0	$0	$0	$0	$0	$0	$0
Safety Cost - Total	$0	$0	$0	$0	$0	$0	$0
Environmental Cost - Total	$0	$0	$0	$0	$0	$0	$0
Sum of Total Travel Costs	$0	$0	$0	$0	$0	$0	$0

Exhibit 4-15: Example Report on Transportation System Changes

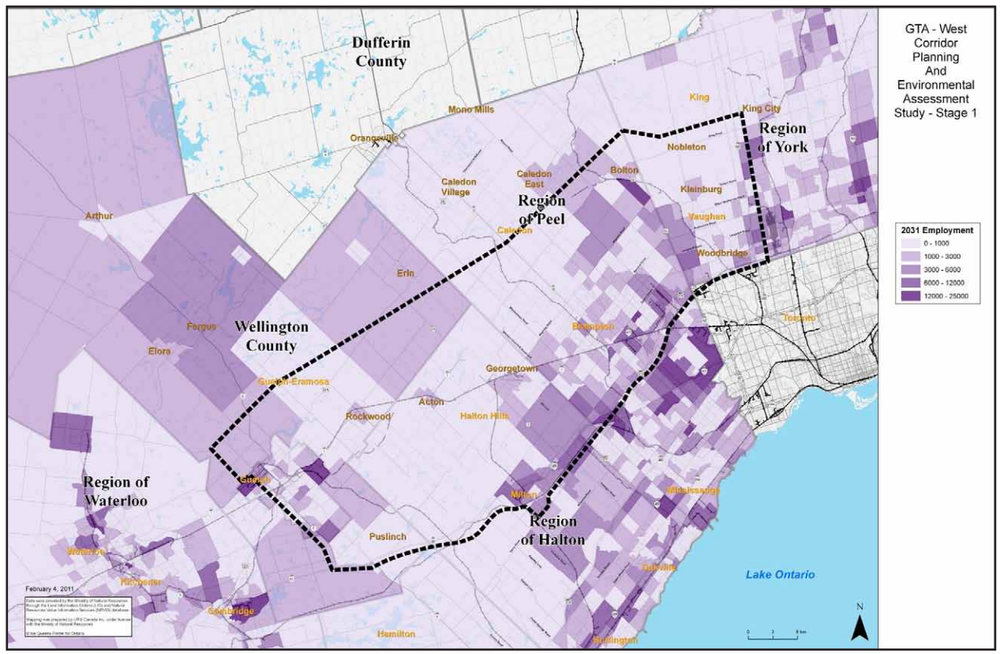


Exhibit: 4-16: Total Forecast Employment by Traffic Zone in 2031

Qualitative Assessment

The qualitative assessment was designed to assess the degree to which each alternative transportation corridor supported future patterns of employment and growth sectors. A number of secondary sources were used to complete this analysis, including:

- Growth Management Strategies and studies at the municipal level;
- Economic development strategies and studies at the municipal level;
- Traffic zone allocations of population and employment, reflecting these strategies; and
- Economic forecasts completed by the Ontario government.

In order to interpret the relationship between growth patterns and the proposed alternatives, growth areas were mapped using a series of thematic maps at the traffic zone level showing the amount of employment anticipated by 2031 (see **Exhibit 4-16**).

In addition, the assessment considered local economic development strategies by identifying sectors that municipal partners have targeted for growth, and the degree to which the proposed alternative supported this sector. This was accomplished by comparing the TREDIS economic impact results by sector to the sectors identified for growth in the economic development strategies.

4.8.2. Findings

TREDIS Analysis

TREDIS was used to analyze regional economic impacts of GTA West Alternatives. Selected alternatives (i.e., alternatives that are significantly different) were used (namely Alternatives 3-1, 4-3, 4-4 and 4-5) in the TREDIS analysis to generate representative results. These alternatives were selected as representative of the proposed transportation corridor options. These analyses all assumed that the NGTA Alternative 3-1 (roadway widenings) had been developed.

Direct economic benefits stemming from improvements in the GTA West transportation system are costs saved transportation users due to improvements in the GTA West transportation system. The savings will include both households' reduced costs of travel (including vehicle operating expenditures) and transportation cost savings to area businesses (including reduced highway congestion effects), and the benefits of improved reliability on the improved transportation network. **Exhibit 4-17** shows the dollar amount of these direct savings per alternative and **Exhibit 4-18** illustrates the composition of the savings averaged among the four alternatives. The former benefit is simply a redirected consumption demand by households away from purchases of transportation products (gas, parking, automotive parts and services) and into other consumer goods / services. The latter reflects improved regional competitiveness for metro-area businesses that now have lower costs of doing businesses, with access to a larger labour market and encountering less congestion because of reduced roadway congestion and improvements of the transit system. The impact of the improved GTA West highway and transit network will be different for each business sector, depending on the level of highway freight dependency of their operations.

Overall, the four alternatives modeled (Alternatives 3-1, 4-3, 4-4 and 4-5) showed similar results across the GGH. The direct value of transportation impacts in the GGH is expected to be between $2.2 and $2.3 billion (see **Exhibit 4-17**). These impacts include savings for passengers' costs, reliability benefits, tolls (407ETR) and adjustments for transit and truck crew costs, vehicle operating costs and tolls based on the bundle of highway and transit changes embedded in each alternative. Note these are annual benefits accruing to the GGH by 2031 due to mobility improvements created by proposed GTA West projects.

GTA West Representative Alternatives	Direct Transportation Benefits (Millions $CA)
3-1	$2,258
4-3	$2,214
4-4	$2,203
4-5	$2,241

Analysis assumed NGTA Alternative 3-1 is built and operating

Exhibit 4-17: Direct Transportation Benefits in the GGH by Representative Alternatives in 2031

Transportation derived benefits are annual benefits that are expected to be achieved by 2031. These transportation savings yields a comprehensive forecast of total economic impacts (direct + indirect) as measured by changes in Gross Domestic Product (GDP), employment, and household income attributable to the proposed transportation investments defined by the alternatives. Benefits are attributable to:

- Existing transit riders who will benefit from faster travel and more convenient service, as well as travellers who switch from auto travel and save money as the new transit alternatives cost them less than they currently spend on car operating costs (tires, fuel, oil and parking), and they can use a portion of those savings to purchase other consumer products and services;
- Travellers who continue to drive or ride in autos, as well as truck drivers and the businesses dependent on freight transported on highways, benefit from reduced peak period traffic congestion, which leads to direct savings in time and vehicle operating costs;
- Household savings are re-directed to the purchase of other consumer products and services as desired (including expenditures associated with more leisure time);
- Business savings attributable to reduced congestion are allocated to increased production associated with expanded market access and greater output associated with increased productivity of freight transportation resources. Insofar as traffic congestion is reduced along the corridor, some businesses can gain productivity from fewer late arrivals due to traffic delay, and a reduced need to pay higher wages or accept shorter work hours to attract workers in those congested areas. The net effect is a reduction in the cost of doing business;
- Businesses can also gain productivity as a result of having access to larger labour markets with more diverse and specialized skills. That can allow businesses to draw on a better match between available workers and required skill needs, and it can also allow some industries to achieve greater economies of scale;
- Further impacts result as the directly-affected businesses also buy more from suppliers within the region ("indirect economic effects"); and
- Direct effects on business growth occur as greater productivity and changes in consumer spending lead to more business sales and attraction of new business activity. Further impacts result as the directly-affected businesses also buy more from suppliers within the region ("indirect economic effects").

Exhibit 4-18 illustrates the averaged sources of cost savings for GTA West Alternatives 3-1, 4-3, 4-4 and 4-5, assuming completion of NGTA Alternative 3-1. These cost savings, in turn, are the drivers of economic impact benefits.

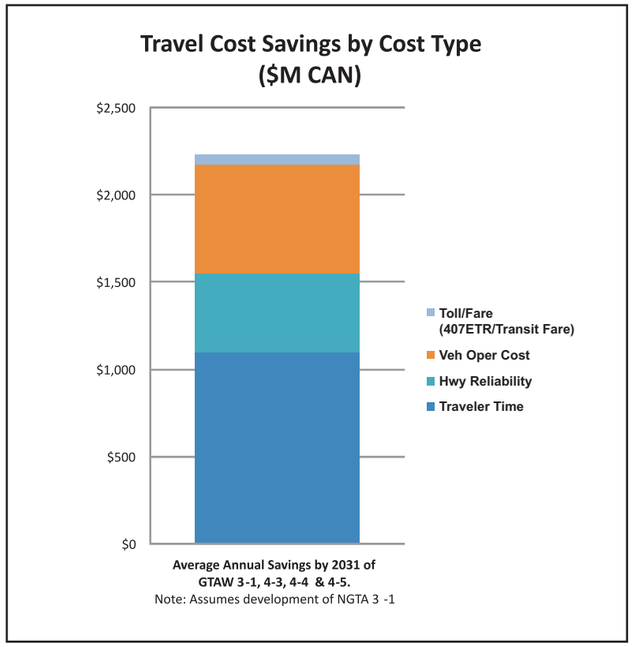


Exhibit 4-18: Total Cost Savings by Cost Type

Transportation user benefits, discussed above and as illustrated in **Exhibit 4-18**, are the source of economic benefits (GDP, jobs and wages). Therefore, user benefits reviewed above should not be added to economic impact benefits to avoid double counting the same dollars.

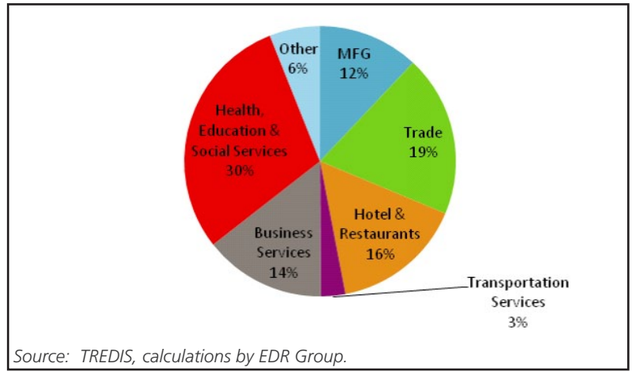
By 2031, the economic impacts of operating the four proposed GTA West alternatives are expected to generate approximately $1 billion in annual GDP, which will support 11,000-12,000 jobs in the GGH. The projected economic impacts of the four alternatives are shown in **Exhibit 4-19** (in 2010 dollars).

GTA WEST ALTERNATIVE	GROSS DOMESTIC PRODUCT (MILLIONS $CAD)	JOBS
3-1	$ 1,070	12,500
4-3	$ 990	11,600
4-4	$ 980	11,500
4-5	$ 1,000	11,700

Note: GDP is rounded to the nearest $10 million and jobs are rounded to the nearest 100. Analyses assumed implementation of NGTA Alternative 3-1.

Exhibit 4-19: Total Economic Impacts in the GGH by Selected Alternative in 2031

Impacts of alternatives will vary across sectors. **Exhibit 4-20** illustrates the average impacts among major sectors of the initial four alternative bundles of GTA West within the GGH in terms of jobs (Alternatives 3-1, 4-3, 4-4 and 4-5).



Source: TREDIS, calculations by EDR Group.

Exhibit 4-20: Future Job Impacts in GGH by Major Economic Sector (Average among All Alternatives)

Note that these impacts assume implementation of the NGTA Alternative 3-1 (together with **Exhibit 4-20**).

Qualitative Analysis

As noted above, the qualitative analysis considered the location of future employment as outlined in both the *Growth Plan* for the Greater Golden Horseshoe and individual municipal growth management strategies. *Growth Plan* population and employment targets are presented in **Exhibit 4-21**.

In the GTA West preliminary study area, employment growth to 2031 is concentrated in Vaughan, Brampton, and Milton; Guelph will also add jobs, but at a lower overall rate. New employment growth areas exist along the northern and western edges of the existing urban area, most significantly: the Vaughan Enterprise Zone and Brampton Area 47, along Highway 50; northwest Brampton; and the Milton business parks.

	POPULATION (THOUSANDS)			EMPLOYMENT (THOUSANDS)		
REGION / COUNTY / CITY	**2001**	**2031**	**% GROWTH**	**2001**	**2031**	**% GROWTH**
Region of York	760	1,500	97%	390	780	100%
Region of Peel	1,030	1,640	59%	530	870	64%
Halton Region	390	780	100%	190	390	105%
County of Wellington	85	321	65%	36	158	60%
City of Guelph	110			63		
TOTAL GGH*	**7,790**	**11,500**	**48%**	**3,810**	**5,560**	**46%**

Source: Growth Plan for the Greater Golden Horseshoe
Note: Geographic areas that are not within the GTA West Preliminary Study Area are excluded from table

Exhibit 4-21: Growth Plan Population and Employment Targets, GTA-West Upper-Tier Municipalities

Widening Alternative (Alternative 3-1)

This alternative consists of a series of widenings of existing highway facilities. It expands capacity to most existing industrial areas in the preliminary study area, and serves the massive employment area surrounding Toronto Pearson International Airport with additional capacity on a number of 400-series highways.

Additional capacity on existing highways will reduce congestion and facilitate goods movement and trade. Due to the significant amount of economic activity within these existing 400-series highway corridors, the evaluation of economic impact identifies the highest level of economic benefits associated with this option. This option will produce the highest potential output and employment gains for the manufacturing sector, although the impact is not much greater than that for other sectors. Additional capacity on existing highways will also reduce congestion and facilitate improved travel for tourism and recreational purposes. The economic impact evaluation shows that this option will produce the highest potential output and employment gains for the hotel and restaurant sector, although again the impact is not much greater than that for other sectors.

Alternative 3-1 has the strongest economic performance and serves existing employment areas and many growth areas well through expansions to existing corridors. Although it does not serve new employment areas in Caledon, Brampton, or Vaughan as well as some new corridor alternatives, it provides the highest benefit to the manufacturing and tourism sectors.

New Corridor Alternatives (Alternatives 4-1 to 4-5)

The new corridor alternatives provide variations on new corridor connections from Highway 400 in the east to Guelph or to Highway 401 near Milton in the west. Alternative 4-1 is a relatively short new corridor, extending only to Highway 410 from Highway 400. As this link would serve only a small fraction of the transportation needs in the preliminary study area, Alternative 4-1 was not evaluated in detail as part of the economic evaluation. Alternative 4-2 and Alternative 4-3 provide a new link from Highway 400 to Highway 401 (at the 407 ETR or west in the Town of Milton, respectively), while Alternatives 4-4 and 4-5 provide a link from Highway 400 to Highway 6 in Guelph (north and south of Guelph, respectively).

All options improve the efficiency of goods movement and potentially benefit trade, through reduction in congestion and improved access to the Canadian Pacific Railways (CPR) inter-modal terminal in Vaughan and Canadian National Railways (CNR) inter-modal terminal in Brampton. All new corridor alternatives would potentially provide improved access to industrial areas in York, Peel and Halton Regions and support new industrial areas in northwestern parts of the GTA.

Alternatives 4-2 and 4-3 serve industry and trade well by connecting the major existing and emerging nodes that are the focus of the logistics / wholesale trade sectors for growth in Halton (Alternative 4-3 serves the Milton area directly, while Alternative 4-2 would serve the eastern edge of this area via the Halton-Peel Boundary Area Transportation Study (HP BATS) north-south transportation corridor). The nature of the economic activity in these areas is likely to require more road capacity than the areas served by other alternatives and, as such, a new corridor is desirable to support the logistics-oriented economic activity in the area.

Alternative 4-3, used here as an example, directly serves the largest employment areas in the preliminary study area and closely matches the anticipated pattern of employment growth, as shown in **Exhibit 4-22**.

As with the other new corridor alternatives, Alternatives 4-4 and 4-5 would enhance the preliminary study area's economic competitiveness by improving access to existing and planned industrial areas and inter-modal facilities, taking pressure off municipal roads, reducing the cost of congestion, and enhancing transportation system efficiency and reliability / redundancy for growth centres throughout the area. In this case, the connection to Guelph will provide redundancy to Highway 401 west of Milton and to some extent can provide a more reliable goods movement network. However, the

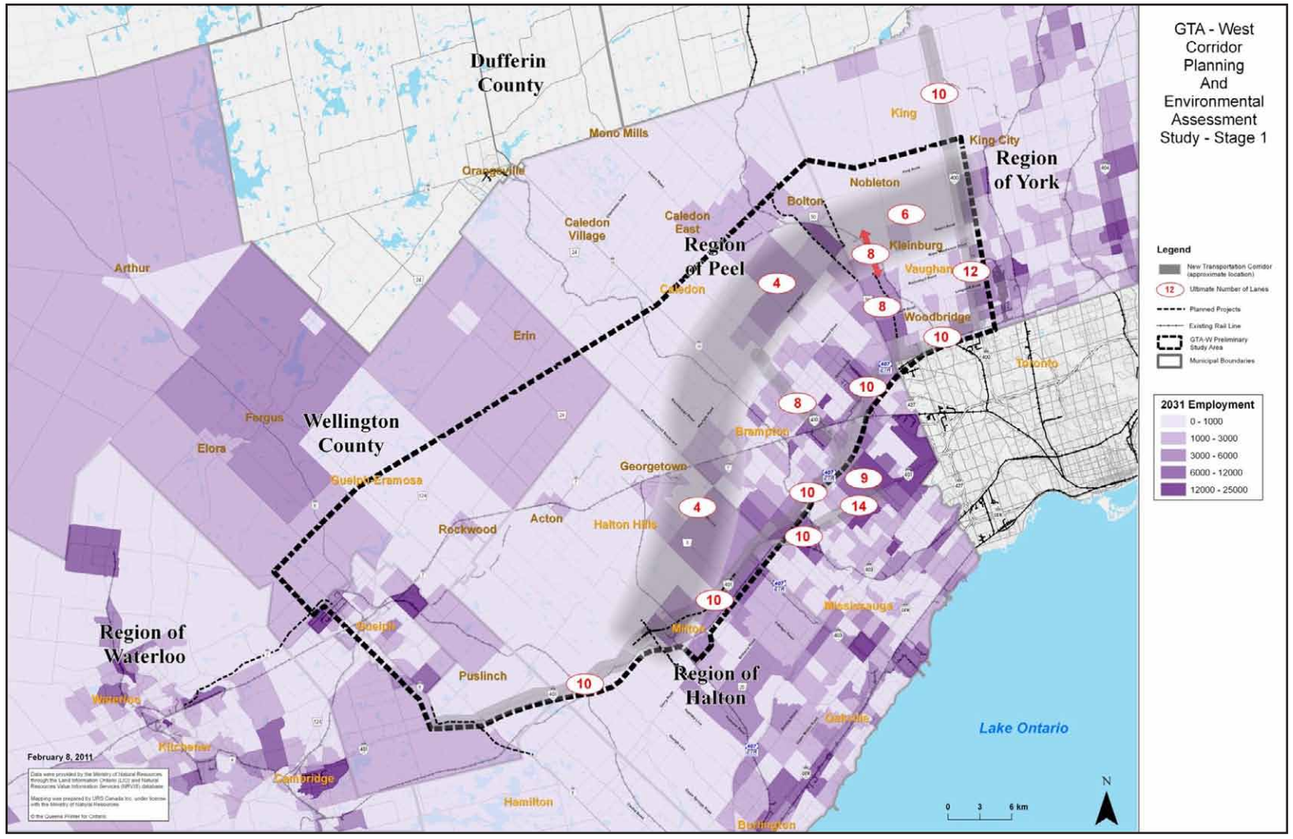


Exhibit: 4-22: Total Forecast Employment by Traffic Zone in 2031

economic impact evaluation shows that these alternatives will produce slightly lower potential output and employment gains for the manufacturing sector compared to Alternative 3-1; their performance is comparable to Alternative 4-3.

A new corridor also supports improved road connection for intra-provincial tourism, including to Highway 400 and northern Ontario ("cottage country") and supports improved road connections for international tourism arriving from the Toronto Pearson International Airport. The new corridor alternatives (except for Alternative 4-1) generally provide additional potential to connect tourist traffic in the north GTA with areas to the south and west. Alternative 4-5 provides significantly improved access to eco-recreational areas (e.g. Forks-of-the-Credit, Palgrave, Albion Hills, Terra Cotta, Elora Gorge), many of which are located along the Niagara Escarpment. However, it does not provide a direct link to the GGH south of the preliminary study area.

Summary

The widening alternative, Alternative 3-1, has the strongest economic impact performance and serves existing employment areas and many growth areas well through expansions of existing corridors. Although it does not serve new employment areas in Caledon, Brampton, or Vaughan as well as some new corridor alternatives, it provides the highest benefit to the manufacturing and tourism sectors. Alternative 4-3 best conforms to the location of future employment growth and provides an additional connection to major trade routes through the north part of the GTA. This connection will help support supply chains and distribution nodes that are based in the large hub of logistics businesses operating in the GTA West preliminary study area.

In terms of the impact of the alternatives on various sectors of the economy, the economic analysis found no significant difference in terms of the relative benefit to the manufacturing sector (Alternative 4-1 was not evaluated through modeling). The economic impact for the distribution / logistics sectors is strongest for Alternative 3-1, followed by Alternative 4-3. The economic impact on business / professional services and the public sector is strongest for Alternative 3-1, and the others are roughly equal. Finally, the economic impact on the agricultural sector is highest for Alternative 3-1, and the other sectors roughly equal.

Exhibit 4-23 describes the evaluation of the alternatives for the economic analysis, as presented at Public Information Centre (PIC) #4.

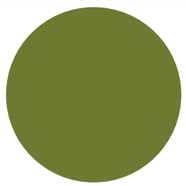
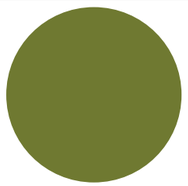
Note that a summary of the Economic analysis findings is provided in **Section 4.11**.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
4.1 First Nations Industry	4.1.1 The potential to support First Nations industry.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.	The potential to support First Nation industry will be confirmed through discussions with First Nations as part of the EA process.
4.2 Heavy Industry and Trade	4.2.1 Potential to support heavy industry and trade by efficient and reliable goods movement. *Measure:* *Qualitative description of how industry and trade are supported.* *TREDIS economic impact evaluation of alternatives*	Widening existing transportation corridors would service existing and future industry located close to existing provincial highways. Additional capacity on existing highways would reduce congestion and facilitate goods movement and trade. The evaluation of economic impact identifies the highest level of economic benefits associated with this option. When coupled with widenings in the NGTA area (the assumption for economic evaluation of all options), this option would produce: Approx. $2.3bn in transportation cost savings in the Greater Golden Horseshoe Approx. $1.1bn in increased GDP in the Greater Golden Horseshoe Approx. 12,500 in increased employment in the Greater Golden Horseshoe The economic impact evaluation shows that this option will produce the highest potential output and employment gains for the manufacturing sector, although the impact is not much greater than for other sectors.	The new corridor would potentially provide improved access to industrial areas in York and Peel Regions and support new industrial areas in the north GTA. It would also improve the efficiency of movement of goods and potentially benefit trade through reduction in congestion and improved access to CP inter-modal terminal in Vaughan and CN inter-modal terminal in Brampton. This corridor was not evaluated separately through the TREDIS model, as the impacts are much lower due to the very limited scale of the corridor.	This new corridor alternative would potentially provide improved access to industrial areas in York, Peel and Halton Regions and support new industrial areas in Northwestern parts of the GTA. It would also improve the efficiency of movement of goods and potentially benefit trade through reduction in congestion and improved access to CP inter-modal terminal in Vaughan and CN inter-modal terminal in Brampton. This alternative serves industry and trade well because it connects the major existing and emerging nodes that are the focus of the logistics/wholesale trade sectors for growth in Halton, although it does not serve the Milton area directly (as does Alternative 4-3). This corridor was not evaluated separately through the TREDIS model, as the economic impacts are likely to be very similar to Alternative 4.3 (the corridors have a different connection point to Highway 401 but are otherwise similar)	This new corridor alternative would potentially provide improved access to industrial areas in York, Peel and Halton Regions and support new industrial areas in Northwestern parts of the GTA. It would also improve the efficiency of movement of goods and potentially benefit trade through reduction in congestion and improved access to CP inter-modal terminal in Vaughan and CN inter-modal terminal in Brampton and improved access to the CP intermodal facility in Milton, on Trafalgar Road. Furthermore, the nature of the economic activity in these areas is likely to require more road capacity than the areas served by other alternatives. This alternative serves industry and trade well because it connects the major existing and emerging nodes that are the focus of the logistics/wholesale trade sectors for growth in Halton. It also supports improved access to these areas for the labour force (i.e., 200,000 between 2001 and 2031). The evaluation of economic impact identifies that the level of economic benefits associated with this option are comparable, but slightly lower than other options. When coupled with widenings in the NGTA area (the assumption for economic evaluation of all options), this option would produce: Approx. $2.2bn in transportation cost savings in the Greater Golden Horseshoe Approx. $1.0bn in increased GDP in the Greater Golden Horseshoe Approx. 11,600 in increased employment in the Greater Golden Horseshoe The economic impact evaluation shows that this option will produce slightly lower potential output and employment gains for the manufacturing sector compared to Alternative 3-1, and comparable to Alternatives 4-4 and 4-5.	This new corridor alternative would potentially provide improved access to industrial areas in York, Peel and Wellington County and support new industrial areas north of the GTA. It would also improve the efficiency of movement of goods and potentially benefit trade through reduction in congestion and improved access to CP intermodal terminal in Vaughan and CN intermodal terminal in Brampton. The evaluation of economic impact identifies that the level of economic benefits associated with this option are comparable, but slightly lower than other options. When coupled with widenings in the NGTA area (the assumption for economic evaluation of all options), this option would produce: Approx. $2.2bn in transportation cost savings in the Greater Golden Horseshoe Approx. $1.0bn in increased GDP in the Greater Golden Horseshoe Approx. 11,500 in increased employment in the Greater Golden Horseshoe The economic impact evaluation shows that this option will produce slightly lower potential output and employment gains for the manufacturing sector compared to Alternative 3-1, and comparable to Alternatives 4-3 and 4-5.	This new corridor alternative would enhance the area's economic competitiveness by improving access to existing and planned industrial areas and inter-modal facilities, taking pressure off municipal roads, reducing the cost of congestion, and enhancing transportation system efficiency and reliability/redundancy for growth centres throughout the study area, from Vaughan to Guelph and on to Kitchener-Waterloo. It would also improve the efficiency of movement of goods and potentially benefit trade. Furthermore, the nature of the economic activity in these areas is likely to require more road capacity than the areas served by other alternatives. This alternative serves industry and trade well because it connects the major existing and emerging nodes that are the focus of the logistics/wholesale trade sectors for growth in Halton. It also supports improved access to these areas for the labour force (i.e., 200,000 between 2001 and 2031). Furthermore, the nature of the economic activity in these areas is likely to require more road capacity than the areas served by other alternatives. The evaluation of economic impact identifies that the level of economic benefits associated with this option are comparable or slightly lower than Alternative 3-1. When coupled with widenings in the NGTA area (the assumption for economic evaluation of all options), this option would produce: Approx. $2.2bn in transportation cost savings in the Greater Golden Horseshoe Approx. $1.0bn in increased GDP in the Greater Golden Horseshoe Approx. 11,700 in increased employment in the Greater Golden Horseshoe The economic impact evaluation shows that this option will produce slightly lower potential output and employment gains for the manufacturing sector compared to Alternative 3-1 and comparable to Alternatives 4-3 and 4-4.

Exhibit 4-23: Area Economy Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
4.3 Tourism and Recreation Industry	4.3.1 Potential to support tourism and recreation industry by efficient and reliable movement of people. *Measure:* Qualitative description of how provincial/regional/ municipal tourism and recreation are supported. TREDIS economic impact evaluation of hotel/restaurant sector	Widening existing transportation corridors would service existing tourism operations located close to existing provincial highways. Additional capacity on existing highways would reduce congestion and facilitate improved travel for tourism and recreational purposes. The economic impact evaluation shows that this option will produce the highest potential output and employment gains for the hotel and restaurant sector, although the impact is not much greater than for other sectors.	Widening existing transportation corridors would service existing tourism operations currently accessible by existing provincial highways. The new corridor supports improved road connection for intra-provincial tourism, including to Highway 400 and "cottage country" and supports improved road connections for international tourism arriving from Lester B. Pearson International Airport. Some existing tourist/ recreational attractions may be impacted although impacts can be minimized through the route selection process.	Widening existing transportation corridors would service existing tourism operations currently accessible by existing provincial highways. A new corridor supports improved road connection for intra-provincial tourism, including to Highway 400 and "cottage country" and supports improved road connections for international tourism arriving from Lester B. Pearson International Airport. Some existing tourist / recreational attractions may be impacted although impacts can be minimized through the route selection process. This alternative provides additional potential to connect the tourist traffic in north GTA with areas to the south via the Highway 401/407 connection.	Widening existing transportation corridors would service existing tourism operations currently accessible by existing provincial highways. A new corridor supports improved road connection for intra-provincial tourism, including to Highway 400 and "cottage country" and supports improved road connections for international tourism arriving from Lester B. Pearson International Airport. Some existing tourist / recreational attractions may be impacted although impacts can be minimized through the route selection process. This alternative provides additional potential to connect tourist traffic in north GTA with areas to the south and west via the connection to Highway 401 near Milton. The economic impact evaluation shows that this option will produce lower potential output and employment gains for the hotel and restaurant sector compared to Alternative 3-1, but similar levels to Alternatives 4-4 and 4-5.	Widening existing transportation corridors would service existing tourism operations currently accessible by existing provincial highways. A new corridor supports improved road connection for intra-provincial tourism, including to Highway 400 and "cottage country". Some existing tourist / recreational attractions may be impacted although impacts can be minimized through the route selection process. This alternative provides significantly improved access to eco-recreational areas (i.e., Forks of the Credit, Palgrave, Albion Hills, Terra Cotta, Elora Gorge etc.), many of which are located along the Niagara Escarpment. However, this alternative does not provide a direct link to the Greater Golden Horseshoe south of the study area. The economic impact evaluation shows that this option will produce lower potential output and employment gains for the hotel and restaurant sector compared to Alternative 3-1, but similar levels to Alternatives 4-3 and 4-5.	Widening existing transportation corridors would service existing tourism operations currently accessible by existing provincial highways. A new corridor supports improved road connection for intra-provincial tourism, including to Highway 400 and "cottage country" and supports improved road connections for international tourism arriving from Lester B. Pearson International Airport. Some existing tourist / recreational attractions may be impacted although impacts can be minimized through the route selection process. This alternative provides improved connections to areas south of Guelph, but does not provide a direct link to the Greater Golden Horseshoe south of the study area. The economic impact evaluation shows that this option will produce lower potential output and employment gains for the hotel and restaurant sector compared to Alternative 3-1, but similar levels to Alternatives 4-4 and 4-5.
4.4 Agriculture Industry	4.4.1 Potential to support area agriculture industry by efficient movement of goods. Measure: *A qualitative assessment of potential impacts to farming operations and fragmentation of agricultural operations.*	This alternative has low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts.	The widening sections of this alternative have low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts. The new corridor section has minor potential to impact or fragment agricultural operations because it is relatively short (in length) and because most lands are designated as future urban areas at the corridor.	The widening sections of this alternative have low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts. The new corridor section has moderate potential to impact or fragment agricultural operations because some lands are designated as future urban areas along this corridor, although there are also farming operations in non-urban areas.	The widening sections of this alternative have low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts. The new corridor section has moderate potential to impact or fragment agricultural operations because some lands are designated as future urban areas along this corridor, although there are also farming operations in non-urban areas. This new corridor section runs diagonally across lots and concessions in Halton Region, which could also result in fragmentation of agricultural operations.	The widening sections of this alternative have low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts. The new corridor section of this alternative has high potential to impact agricultural operations through fragmentation especially in north Halton and Wellington County, where many farming operations are currently located in areas designated for future rural land uses.	The widening sections of this alternative have low potential to fragment agricultural operations because improvements are at existing highway corridors and result in fringe impacts. The new corridor section of this alternative has moderate/high potential to impact agricultural operations through fragmentation. There are fewer farming operations along this corridor than Alternative 4-4 because of soil types, and pit/quarry operations.

Exhibit 4-23: Area Economy Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
SUMMARY ECONOMIC ENVIRONMENT		**MOST PREFERRED** - This alternative has the strongest economic impact performance and serves existing employment areas and many growth areas well through expansions to existing corridors. Although it does not serve new employment areas in Caledon, Brampton, or Vaughan as well as some new corridor alternatives, it provides the highest benefit to the manufacturing and tourism sectors.	**LEAST PREFERRED** -This alternative has the least economic impact due to its short length and does not serve most of the future employment growth areas.	**MODERATELY PREFERRED** -This alternative has a strong economic impact/benefit, although slightly lower than Alternative 3-1. It serves many employment growth areas but does not serve the significant growth area of Milton directly with a new corridor.	**MOST PREFERRED** -This alternative has a strong economic impact / benefit. It serves many employment growth areas including more directly serving the future employment growth in Milton. While it scores slightly lower than Alternative 3-1 in economic impact, it better services future growth areas than other options.	**MODERATELY PREFERRED** -This alternative has a strong economic impact / benefit, although lower than Alternative 3-1. It serves many employment growth areas and provides a connection to the Highway 7 corridor from Kitchener / Waterloo to Guelph, but does not serve the significant growth area of Milton and does not connect directly to Highway 401.	**MODERATELY PREFERRED** -This alternative has a strong economic impact / benefit, comparable to Alternative 3-1. It serves many employment growth areas but does not serve the significant growth area of Milton and does not connect directly to Highway 401.
							
OVERALL SUMMARY		From an economic perspective, Alternative 4-1 is least desirable due to its short length, not serving most future employment growth areas, or providing connections to trade routes. Other new corridor alternatives provide similar economic benefits. However, Alternatives 4-4 and 4-5 are less desirable than Alternatives 3-1 and 4-3 as they do not serve future growth areas as well. Alternative 4-2 is moderately preferred because the new corridor section does not extend far enough west to directly service Milton as well as Alternative 4-3. **Overall, Alternatives 3-1 and 4-3 are most preferred from an economic perspective because they have the highest economic benefit and / or serve the economic growth areas most effectively.**					

4.9. EVALUATION OF ALTERNATIVES – TRANSPORTATION ANALYSIS

The transportation analysis work to aid in the evaluation of GTA West corridor alternatives included the following: detailed modeling of various transit and road network improvement alternatives; development of transportation criteria to measure how well each alternative would perform in addressing transportation objectives; and assessment of each alternative using both qualitative and quantitative evaluation methodologies.

The results from the transportation modeling and forecasting also provided key inputs to support the economic analysis, and air quality and noise assessments documented as part of the overall evaluation (see **Section 4.5** and **Section 4.7**).

4.9.1. Modeling Methodology

Greater Golden Horseshoe Model

The Study Team used the Ontario Ministry of Transportation (MTO) Greater Golden Horseshoe Model (GGH Model) to forecast future travel demands for the transportation analysis. The GGH Model as developed and validated was used by Metrolinx in the development of the Draft Regional Transportation Plan (RTP), and is also being used by MTO in major planning studies throughout the GGH area. The model utilizes a detailed transportation network including both transit and roadway and forecasts trip-making by all modes of travel based on forecasts of population and employment growth, land use densities, socio-economic and demographic information, current and future transportation costs (representing fuel costs, tolls, parking costs, transit fares, vehicle operating costs, etc.), and transportation network performance for all travel modes.

An updated version of the GGH Model (version 2.2) was used for the modeling and analysis undertaken for assessment and evaluation of transportation alternatives to support the Transportation Development Strategy (Strategy). This version includes some of the improvements implemented as part of MTO's ongoing efforts to improve and update their travel demand forecasting model, and reflects updated information collected by the Study Team and incorporated into the model, as discussed in this section.

Land Use Assumptions

The land use patterns developed for the Metrolinx RTP were used as the starting point for the GTA West study. Population and employment forecasts used in the RTP were developed prior to each municipality completing updates to their Official Plan to conform to the new policy directions outlined in the *Growth Plan*. The allocation of future growth within each municipality was estimated using a top down approach, based on the policies outlined in the *Growth Plan*.

Since the completion of the RTP, all of the municipalities have embarked upon their *Growth Plan* conformance reviews, and many have completed their own assessments of future population and employment growth. These forecasts, developed from the bottom-up, represent the most recent land use forecasts available and were therefore incorporated into the detailed travel demand forecasting work. The population and employment estimates for the remainder of the GGH were retained from the RTP model.

Exhibit 4 -24 summarizes the 2031 population and employment forecasts and lower tier allocations for the municipalities within the GTA West preliminary study area, encompassing the regions of York, Peel, Halton and the County of Wellington. Growth forecasts for the remaining communities in the GGH are summarized in the *Transportation Model Technical Background Report* (February 2011), available on the study web site (www.gta-west.com).

Base Case Transportation Network

The Base Case scenario was identified as a benchmark for comparing other "improvement" alternatives. The Base Case is considered the status quo, where improvements to the transportation system would be limited to the implementation of approved provincial, regional and local municipal initiatives. This includes the broad range of planned infrastructure improvements to be implemented by 2031:

- The Metrolinx Regional Transportation Plan (Metrolinx RTP);
- GO Transit's Strategic Plan, GO 2020;
- MTO's planned and committed improvements including projects identified in the Southern Ontario Highway Program (2006-2010) and the High Occupancy Vehicle (HOV) Lanes Plan (2007). Other planned improvements to the provincial highway network, beyond those noted above were not included for consideration in the Base Case;
- Road, transit and active transportation programs identified through approved Transportation Master Plans, Official Plans or Development Charge Background Studies completed by regional / lower tier municipalities. Local and regional roads in the RTP model were updated based on information provided by the following regions: Halton, Durham, Peel, York, Wellington, Niagara and the City of Hamilton.

For detailed local and regional road network updates included in the 2031 Base Case Network, please refer to the *Transportation Model Technical Background Report* (February 2011).

REGION	LOWER-TIER MUNICIPALITY	2031 POPULATION	2031 EMPLOYMENT
Peel	Brampton	741,850	317,574
	Caledon	109,790	47,439
	Mississauga	788,356	504,993
Halton	Burlington	196,653	105,576
	Halton Hills	93,952	42,547
	Milton	232,508	114,533
	Oakville	256,895	127,348
Wellington	Guelph	168,691	98,425
	Rest of Wellington	152,307	59,574
York	Aurora	70,095	34,190
	East Gwillimbury	87,557	34,401
	Georgina	70,347	21,237
	King	34,981	11,952
	Markham	428,441	240,886
	Newmarket	96,860	49,429
	Richmond Hill	241,523	99,321
	Vaughan	409,702	265,583
	Whitchurch-Stouffville	60,489	23,027

Exhibit 4-24: 2031 GTA West Population and Employment Forecasts

Commercial Vehicle Forecasting

In the updated version of the GGH Model, MTO has provided a separate model to forecast commercial vehicle demand in the GGH area. MTO's Commercial Vehicle (CV) model generates, distributes and assigns commercial vehicle trips by truck type for the 12.5 - hour daytime period and distributes trips to the AM and PM peak periods using time of day factors from available traffic counts data.

This model forecasts the growth in commercial vehicle travel based on forecasts of increased goods movement activity in various industrial and manufacturing sectors of the economy. For example, the higher the anticipated growth in a sector that relies on trucking to transport raw materials or finished goods, the higher the tonnage of goods that are moved and the more trucks that are required to move those goods. The MTO commercial vehicle model uses the Commercial Vehicle Survey (CVS), undertaken by MTO every five years, to provide data on the types of goods being moved by truck and the origin-destination patterns of these truck trips.

For the purpose of this study, the commercial vehicle demand estimates developed in the GGH Model origin-destination zone format are assigned to the transportation roadway network and analyzed along with the auto and transit demands.

Modeling Group #1 and Group #2 Initiatives

Following the "building block" approach used in the GTA West study, modeling for the Group #3 and #4 alternatives has assumed that the implementation of Group #1 and #2 initiatives would proceed. These include Transportation Systems Management (TSM) and Transportation Demand Management (TDM) measures aimed at improving the efficiency of existing infrastructure and reducing auto demand.

The GGH Model already incorporates a series of demographic and socio-economic assumptions (such as higher vehicle operating costs in 2031) that result in increased auto occupancies and higher transit mode splits. The Metrolinx RTP also included a number of post-model adjustments to account for some of its policy initiatives, including:

- Increase auto occupancy by 0.05 over modeled result;
- Work at home increase from 5.3% to 8%;
- Transit mode split – add 2.0% to modeled mode split; and
- Active Transportation – add 5% to active transportation modes for trips under 10 kilometres.

These assumptions are internal to the GGH Model. According to the MTO, these assumptions capture the anticipated behavioural trends that are likely to occur in trip-making independent of TDM policy measures introduced through the GTA West or Niagara to GTA (NGTA) studies.

The draft *Area Transportation System Alternatives Report* (April 2010) applied additional post GGH Model reductions to the auto demand to account for the TDM / TSM measures incorporated into the Group #1 and #2 initiatives. These include:

- A global 4% reduction in auto demand to account for TDM and other transit initiatives.
- A 10% reduction in long distance truck demand to account for diversion to other travel modes, predominantly freight rail.

These adjustments were retained for the detailed evaluation of GTA West and NGTA alternatives, although the global 4% reduction in auto demand was applied in a more targeted manner. Higher reductions were applied in urban areas where TDM and transit measures can have a larger impact on auto demands, and lower reductions were used in suburban or rural areas where opportunities are more limited. A trip reduction matrix was developed with higher reduction in trips internal to regions and lower reduction in long distance trips, and in regions with lower potential for TDM.

Of the 4% reduction in auto demand:

- 2.5% of trips were assumed to shift from auto driver to transit;
- 1% of trips were assumed to shift from auto driver to auto passenger (carpooling); and
- 0.5% of trips no longer travel during peak periods (or at all).

Exhibit 4-25 illustrates the distribution of the auto trip reduction assumptions used in the updated modeling work. The detailed trip reduction matrix is presented in the *Transportation Model Technical Background Report* (February 2011).

The 10% reduction in long distance truck demand was applied to the 2031 heavy truck demand. The rationale for reduction of longer distance truck demand was that some of it will shift to rail with improvements to rail freight. Based on the "407 East Alternatives to the Undertaking" report, 10% of all tractor-trailer demand was reduced to account for the longer distance trips shifting to rail. These reductions were applied to the demand matrices produced by the Commercial Vehicle model and were implemented in the GGH model runs prior to the traffic assignment stage, to forecast resulting traffic volumes on the roadway network.

Accounting for Improvements in the NGTA Study Area

The travel demand forecasting for both GTA West and NGTA studies was performed simultaneously using an integrated travel demand forecasting model and common transportation evaluation criteria. The need for transportation improvements within each study area was previously identified in the draft *Area Transportation System Problems and Opportunities Report* (July 2009, Updated December 2010) for each project. Given that the study areas share a boundary along the Highway 401 corridor, it was recognized that capacity improvements in one study area might affect travel demands and, more importantly, the routing of trips through the adjacent study area. Therefore, the modeling to support the evaluation process has assumed that "something" would be done to address the problems and opportunities in the other study area.

For this reason, the modeling of various transportation improvement alternatives for each study required considering the potential improvements that might occur in the other study area. Rather than trying to model every permutation and combination of the various alternatives identified in each study, the modeling approach identified a series of combinations of improvements that the Study Team

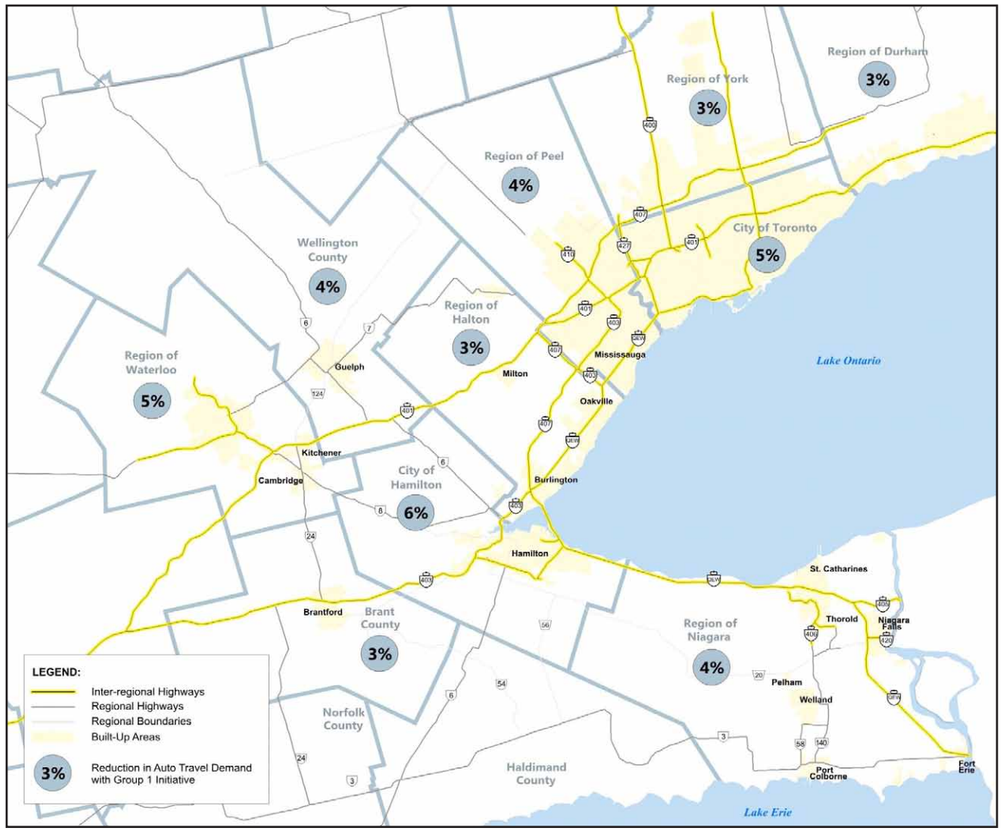


Exhibit 4-25: 2031 Auto Trip Reduction – Group #1 and #2 Alternatives

considered would have the potential to alter the regional trip distribution patterns, transit mode shares and resulting auto demand patterns. Each study contained several Group #3 alternatives that focused on increasing capacity on existing corridors and several Group #4 alternatives that include various configurations for new transportation corridors.

Therefore, the following three basic alternatives could occur in the GTA West preliminary study area:

1. Group #3 alternatives (widening) are implemented in each preliminary study area;
2. A Group# 4 alternative (new corridor) is implemented in the GTA West preliminary study area and a Group #3 alternative is implemented in the NGTA preliminary study area; or
3. A Group #4 alternative (new corridor) is implemented in both preliminary study areas.

While it is important that the evaluation of transportation network performance consider improvements beyond the preliminary study area boundary to properly assess how well the overall network would perform, the economic analysis component of the study required a different approach. It required the transportation benefits associated with each alternative to be considered independently of the transportation benefits associated with improvements in the other preliminary study area. To accommodate this, two additional model runs were required to identify the basic transportation benefits associated with the Group #3 alternatives in each study area on their own.

Exhibit 4-26 summarizes the various NGTA and GTA West combinations that were used for the initial GGH model runs. For the Group #4 alternatives, GTA West Alternative 4-3 was used in the first set of runs in each preliminary study area since this alternative provided an extensive length of new corridor in each preliminary study area that connected to Highway 401 in the Milton area. It was assumed that this combination (NGTA Alternative 4-3 and GTA West Alternative 4-3) would represent the most integrated network of new corridors between the two preliminary study areas that would have the highest potential to alter regional trip distribution patterns in both study areas. For each of the various combination alternatives the regional travel demand patterns and transit mode shares were reviewed to determine the degree to which the different combinations of improvement alternatives influenced regional travel demand patterns.

GGH MODEL RUN	NGTA	GTA WEST
1	Base Case	
2	NGTA Alternative 3-1	
3	GTA West Alternative 3-1	
4	NGTA Alternative 4-3	GTA West Alternative 3-1
5	NGTA Alternative 3-1	GTA West Alternative 4-3
6	NGTA Alternative 4-3	GTA West Alternative 4-3
7	NGTA Alternative 3-1	GTA West Alternative 4-4

Exhibit 4-26: GGH Model Run Scenarios for NGTA and GTA West Transportation Modeling

These GGH Model runs established the transit mode share component of travel and the zone to zone auto travel demand for each of the above scenarios. **Exhibit 4-27** summarizes the resulting total person trips by mode of travel for each respective scenario for the AM and PM peak periods.

As summarized above, the PM peak hour has a higher number of auto trips on the roadway network compared to the AM peak hour. As a result, the PM peak hour was selected as the time period used in the assessment and evaluation of the various network alternatives.

The number of auto trips is forecast to decrease for all of the Group #3 and #4 alternatives compared to the Base Case, due to the benefits of the Group #1 and #2 initiatives. Transit mode shares are expected to increase under all the alternatives compared to the Base Case, from 20.2% to 21.9% in the AM peak and from 16.7% to 18.4% in the PM peak hour. Although transit ridership is generally anticipated to decrease with provision of additional roadway capacity (widening or new corridor), the implementation of the Group #1 and Group #2 initiatives results in a net increase in transit mode share in the GGH area compared to the Base Case. The new corridor alternatives, while impacting transit use to a degree, do not significantly impact the transit mode shares compared to the GTA West Alternative 3-1.

Similar to transit mode share, average auto (passenger car) occupancy would increase under all the alternatives compared to the Base Case, from 1.20 to 1.22 in the AM peak and from 1.27 to 1.29 in the PM peak hour. This can also be attributed to the Group #1 and Group #2 initiatives. Details of transit mode share and regional self-containment are provided in the *Transportation Model Technical Background Report* (February 2011).

4.9.2. Alternatives Evaluation Methodology and Findings

In addition to "triple bottom line" considerations, as well as engineering, the alternatives must reasonably address the key problem statements identified for the GTA West study. Therefore, a series of qualitative and quantitative transportation criteria were included to assess the ability of each of the alternatives to:

	PERSON TRIPS	BASE CASE	GTA WEST ALTERNATIVE 3-1	GTA WEST ALTERNATIVE 4-3/ NGTA ALTERNATIVE 3-1	GTA WEST ALTERNATIVE 4-3/NGTA ALTERNATIVE 4-3	GTA WEST ALTERNATIVE 4-4/NGTA ALTERNATIVE 3-1
AM	Auto Driver	1,402,750	1,348,030	1,349,650	1,350,070	1,349,520
	Auto Passenger	283,460	297,820	297,920	298,030	297,940
	Transit Person	451,000	484,290	482,840	482,500	482,920
	Total Person	2,235,150	2,210,530	2,210,370	2,210,370	2,210,360
	Transit Mode Share	20.2%	21.9%	21.8%	21.8%	21.8%
	Auto Occupancy	1.20	1.22	1.22	1.22	1.22
PM	Auto Driver	1,493,570	1,434,510	1,435,860	1,436,290	1,435,730
	Auto Passenger	403,470	419,050	419,260	419,440	419,220
	Transit Person	396,510	432,410	431,060	430,610	431,200
	Total Person	2,367,970	2,350,440	2,350,340	2,350,340	2,350,330
	Transit Mode Share	16.7%	18.4%	18.3%	18.3%	18.3%
	Auto Occupancy	1.27	1.29	1.29	1.29	1.29

Exhibit 4-27: 2031 GGH Model Person Trips by Mode (including Group #1 and Group #2 Initiatives)

- Address traffic operations;
- Support efficient movement of people and goods;
- Provide multi-modal integration;
- Support future inter-regional transit opportunities;
- Provide transportation system reliability, redundancy and safety; and
- Accommodate recreational and tourism travel.

Some of these criteria, such as ability to provide capacity and reduce travel delays, are quantitative, while others, such as potential for multi-modal integration and impacts on safety, are addressed through qualitative evaluation approaches. These criteria are described in detail in **Section 4.2**.

Updated Base Case

Each GTA West alternative was evaluated by comparing its performance against other GTA West alternatives and also against the Base Case; the Base Case was the benchmark for comparing the improvement alternatives. Hence, it was necessary to establish Base Case conditions for 2031 using the updated modeling approach adopted for the detailed evaluation of alternatives, including the use of the new model version, updates to land use, roadway network and approach to forecasting commercial goods movement demands. Note that levels of congestion are classified into three categories as shown below:

DESCRIPTION OF CONGESTION TYPE, LEVEL OF SERVICE (LOS) AND VOLUME/ CAPACITY (V/C) RATIO			
Congestion Type	Approx. LOS	Approx. V/C	Description
Minor	LOS C or better	Less than 0.80	Non-recurring congestion*
Moderate	LOS D	0.80 to 0.90	Approaching Unstable Conditions
Major	LOS E or F	0.90 and above	Unstable Conditions (Stop- and-Go)

* Congestion may result from non-recurring incidents such as inclement weather, accidents, road maintenance, etc.

Note that the lower the Volume / Capacity (V/C) ratio, the more capacity that is available and the better the traffic flows on the corridor. As the V/C ratio approaches 0.9 (meaning that the volume demand is about 90% of the available capacity) the speed deteriorates and the traffic flow becomes unstable and/or congested as the traffic volumes reach the link capacity. This is referred to as congested traffic conditions on the link. Congestion plots were reviewed to assess future congestion levels under the Base Case. Discussion of 2031 Base Case peak hour congestion on the key inter-regional facilities in the study area can be found in the *Transportation Model Technical Background Report* (February 2011).

In addition to plotting alternatives to assess congestion, the transportation network was analyzed for its capacity to accommodate travel demands at critical screenlines in 2031. The Study Team assessed roadway system capacity in the preliminary study area by comparing estimated traffic flows on selected corridors and at selected screenlines against available capacity. This is measured in units of Volume / Capacity ratio (V/C).

A screenline is a real or imaginary boundary that defines a broad corridor across which traffic flows, and may represent one or several road links. Each roadway link has limited capacity, which is its maximum ability to accommodate vehicular traffic. Screenlines are used to examine travel demands within a broader area to determine the ability of the overall network to accommodate travel demands. Some roadways crossing a screenline may be congested, but there may be available capacity on other under-utilized roads. This would suggest that improvements aimed at balancing the flow across the available roads would address the problem before looking at adding new capacity. When the majority of the roads crossing the screenline are operating at or close to capacity, this would tend to suggest the need for new capacity, either as new lanes or a new roadway.

The selection of screenlines in the GTA West preliminary study area for alternatives evaluation is presented in **Exhibit 4-28**. For each screenline, V/C ratios were computed for the peak direction only, which is westbound (WB) for the links under the north-south screenlines and northbound (NB) for the east-west screenlines. The screenline locations are as follows:

8002 East of Guelph – WB
8001 West of Milton (East of Eramosa Townline and Tremaine Road) – WB
4002 East of Winston Churchill Boulevard – WB
4001 East of Highway 10 (Hurontario Street) – WB
3002 East of Highway 50 – WB
3001 West of Highway 400 – WB
4007 North of Queen Street – NB

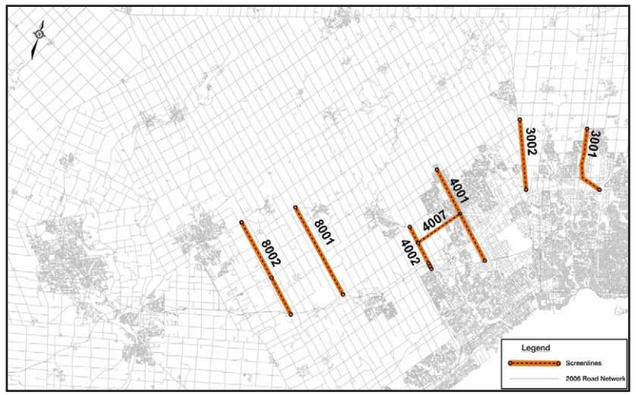


Exhibit 4-28: GTA West Preliminary Study Area Screenlines

Exhibit 4-29 shows the screenline V/C ratios for the 2031 PM peak hour. Since one of the primary objectives of the GTA West study is to address inter-regional transportation needs, inter-regional facilities within each of these screenlines were examined for their performance separate from other roadways. As summarized below, on most screenlines the inter-regional facilities are forecast to perform worse in terms of V/C ratio compared to the overall screenline results with all roadways included. The two exceptions to this include the screenlines east of Guelph and east of Highway 50. At the east of Guelph screenline, Highway 7 (which is also a provincial highway but is considered as a regional facility for the purpose of this assessment) would operate with significant congestion along with Highway 401. At the east of Highway 50 screenline, 407 ETR is the only inter-regional facility. Since it is a tolled corridor, it will tend to operate at lower congestion levels than the other free facilities.

SCREENLINE	ALL FACILITIES WEEKDAY PM PEAK	INTER-REGIONAL FACILITIES WEEKDAY PM PEAK
East of Guelph WB	1.04	1.02
West of Milton (East of Eramosa Townline and Tremaine Road) WB	0.95	1.10
East of Winston Churchill Boulevard WB	0.75	0.79
East of Highway 10 (Hurontario Street) WB	0.82	0.97
East of Highway 50 WB	0.85	0.76
West of Highway 400 WB	0.98	1.02
North of Queen Street (407 ETR) NB	1.02	1.14
x.xx - indicates V/C ratio greater than 0.9 (LOS E or F)		

Exhibit 4-29: 2031 Base Case Screenline Evaluation

Based on the deficiencies identified for the updated Base Case model run, it is clear that significant inter-regional transportation solutions are required, even with the updated land use and transportation network improvements incorporated into the model. This confirms the original assessment completed as part of the draft GTA West *Area Transportation System Problems and Opportunities Report* (July 2009, Updated December 2010).

The updated Base Case modeling results for each of the evaluation criteria and measures were compared to the results for the GTA West improvement alternatives. A summary of the evaluation finding is discussed in the sections below.

Assessment of Commuter Travel Characteristics for GTA West Alternatives

The new capacity provided by roadway widening and / or new corridors included within the Group #3 and Group #4 alternatives has the potential to improve travel times between municipalities. This, in turn, may encourage additional longer distance auto travel and reduce transit use and municipal self-containment to some degree. To address this concern, the evaluation process has considered the implications on

regional travel patterns for each of the alternatives using the GGH Transportation Model. The Group #1 and #2 initiatives would also reduce auto travel and encourage additional transit use compared to the Base Case conditions. Therefore, this assessment includes the benefits of the Group #1 and Group #2 initiatives, which introduce new or enhanced TDM / TSM and inter-regional transit services into the preliminary study area in addition to adding new road capacity. The net cumulative effects included consideration of the expected benefits of the Group #1 and Group #2 initiatives compared to the Base Case scenario.

The GGH Model calculates 2031 AM and PM peak period total person, transit person and auto trip tables at a detailed traffic zone level. To assess the changes to regional travel patterns, the GGH Model travel demand tables were aggregated to regional and municipal planning districts in order to assess:

- Self-containment (trips staying within each regional municipality);
- Inter-regional travel across municipal boundaries; and
- Regional transit mode shares (percent of trips made using transit).

A summary of the 2031 PM peak hour cross-boundary trips without trips external to GGH is presented in **Exhibit 4-30**. The trip distribution and mode split patterns from the GGH Model run for Alternative 3-1 were also used to represent the patterns that would occur for Alternative 4-1. The GGH Model run for Alternative 4-3 was used to represent the patterns for Alternatives 4-2, 4-3, 4-4 and 4-5. Total person trips include auto person, transit, and other modes such as walking and cycling. Truck trip forecasts derived from the CV Module of the GGH Model are not included in the summary of passenger demand forecasts here.

Exhibit 4-31 and **Exhibit 4-32** show changes in automobile and transit trips with the alternative scenarios from the Base Case. Truck demand was assumed constant under Base Case and the alternative scenarios, with the exception of a 10% reduction in long-distance trucks in the alternatives scenarios to account for the Group #1 and #2 initiatives. Note that the base maps of Alternatives 3-1 and Alternative 4-3 were used to illustrate representative corridor conditions for Alternatives 3-1 and 4-1, and for Alternatives 4-2, 4-3, 4-4 and 4-5, respectively.

	BASE CASE		GTA WEST ALTERNATIVE 3-1*		GTA WEST ALTERNATIVE 4-3*	
	EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
WATERLOO-WELLINGTON						
Auto Person	12,200	10,200	12,000	10,200	12,100	10,300
Transit Person	260	70	190	210	190	220
Truck	1,900	1,800	1,800	1,800	1,800	1,800
Total Person	12,400	10,300	12,200	10,400	12,300	10,500
Auto Occupancy	1.22	1.20	1.23	1.21	1.23	1.21
WELLINGTON-HALTON						
Auto Person	9,100	9,500	9,300	9,800	9,400	9,800
Transit Person	580	260	180	310	190	350
Truck	1,200	1,400	1,100	1,300	1,100	1,300
Total Person	9,600	9,800	9,500	10,100	9,600	10,100
Auto Occupancy	1.29	1.25	1.30	1.26	1.30	1.26
HALTON-PEEL						
Auto Person	39,300	45,500	39,100	45,400	39,900	46,400
Transit Person	7,900	13,200	8,100	13,600	8,000	13,400
Truck	5,100	6,900	4,900	6,800	4,900	6,800
Total Person	47,300	58,700	47,300	59,000	47,900	59,800
Auto Occupancy	1.23	1.20	1.24	1.21	1.24	1.21
PEEL-YORK/TORONTO						
Auto Person	54,800	62,500	53,800	61,500	54,100	62,200
Transit Person	24,000	36,700	24,700	37,700	24,500	37,300
Truck	7,700	8,500	7,500	8,300	7,500	8,300
Total Person	78,900	99,300	78,600	99,300	78,700	99,600
Auto Occupancy	1.24	1.24	1.26	1.26	1.26	1.26

Note: Total person trips may be less than the sum of auto and transit person trips due to rounding
* GGH Model run for Alternative 3-1 was used to represent the patterns for Alternative 4-1, and Alternative 4-3 was used to represent the patterns for Alternatives 4-2, 4-3, 4-4, and 4-5.

Exhibit 4-30: 2031 PM Peak Hour Cross-boundary trips (excluding externals)

Alternatives 3-1 and 4-1 both rely on significant widening of existing facilities to accommodate inter-regional travel demands. In Alternative 4-1, a new corridor is provided between Highway 410 in Brampton and Highway 400 in Vaughan. Alternatives 4-2, 4-3, 4-4 and 4-5 provide similar levels of new road capacity as Alternative 3-1 and 4-1, except a greater share of this capacity is provided as a new corridor rather than as widening of existing roads.

As a result of this additional road capacity, cross-boundary transit trips for all alternatives decrease for Waterloo-Wellington and Wellington-Halton, but increase modestly at other boundaries due to the influence of the Group #1 and Group #2 initiatives, which offset the effect of additional roadway capacity. For Alternatives 3-1 and 4-1, cross-boundary auto trips increase by 3% for Wellington-Halton, but decrease by 1%-2% at other boundaries. For Alternatives 4-2 to 4-5, cross boundary auto trips also increase by 3% for Wellington-Halton, but the Peel-Halton boundary also experiences a 2% increase and the Peel-York / Toronto boundary experiences a 1% reduction due to increased transit use.

Exhibit 4-31: Alternatives 3-1 and 4-1 – Cross boundary Trips, Transit Mode Share and Self-Containment

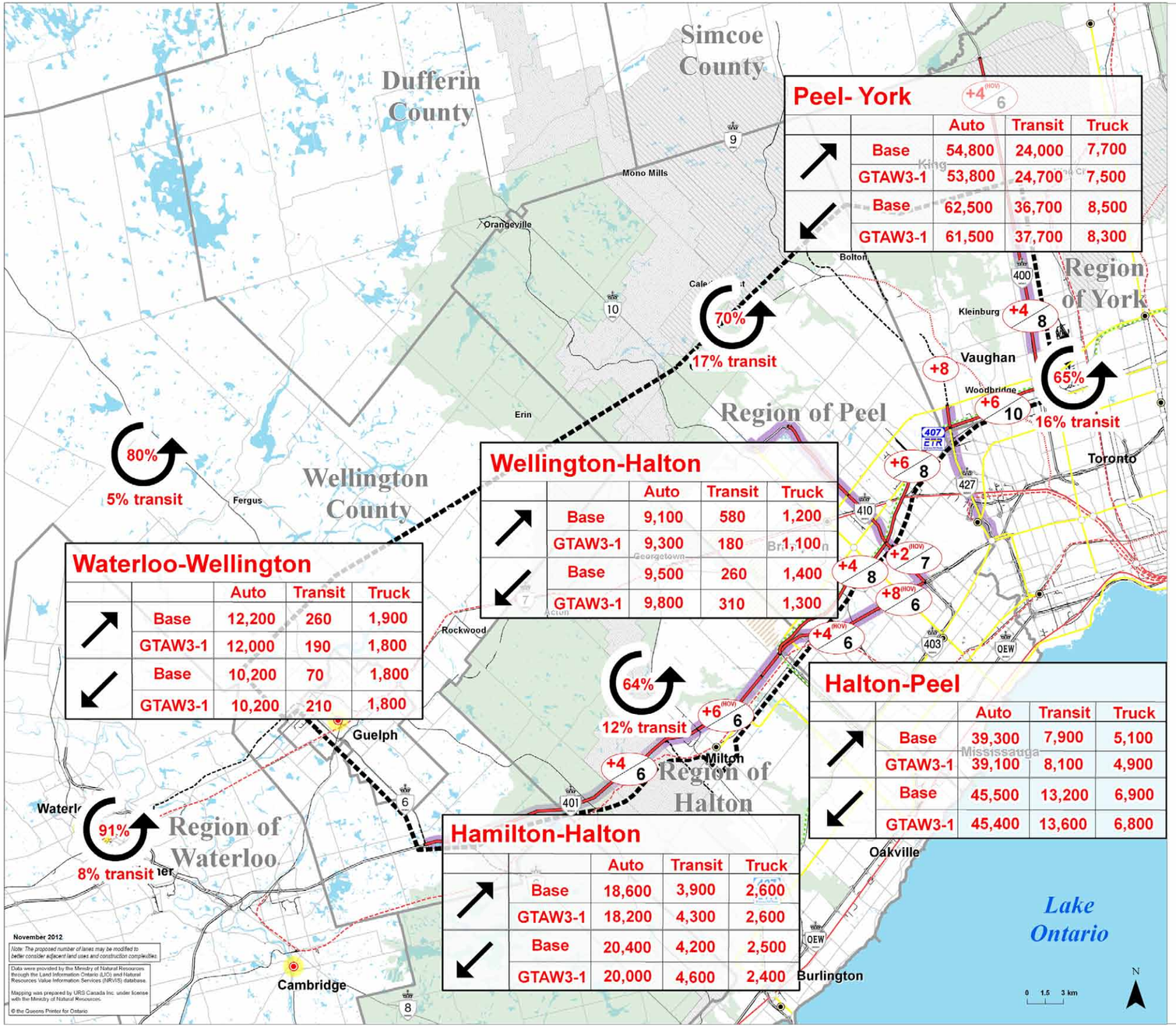
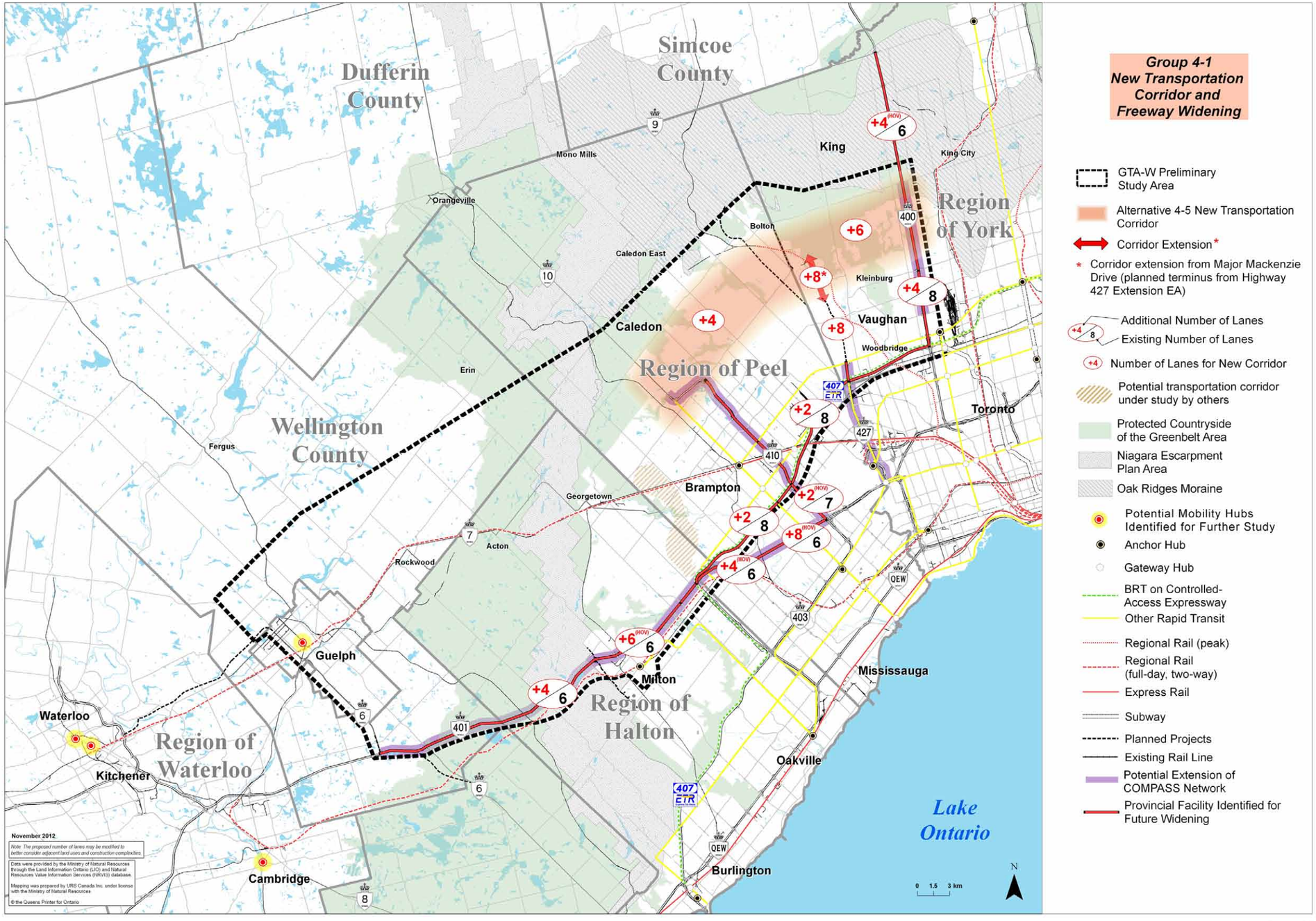


Exhibit 4-32: Alternatives 4-2, 4-3, 4-4 and 4-5 – Cross Boundary Trips, Transit Mode Share and Self-Containment



There is no change to the share of intra-regional trip-making (self-containment) as a result of Alternatives 3-1 and 4-1; however, the longer extent of new corridor in Alternatives 4-2 to 4-5 results in a 1% drop in municipal self-containment in Peel and Halton Regions. As a result, the average automobile trip length does not change from 20 kilometres in the Base Case to Alternatives 3-1 and 4-1, and it increases to 20.4 kilometres in Alternatives 4-2, 4-3, 4-4 and 4-5.

The increase in auto person trips observed at most of the boundaries with all of the GTA West alternatives suggests that the new road capacity is diverting some trips from transit; however, these shifts are being offset by the increase in transit ridership resulting from the Group #1 and Group #2 transit initiatives. As a result, all of the GTA West alternatives result in a 1%-2% increase in transit mode shares in Toronto, York, Peel and Halton. A 2% increase in mode share is anticipated in Wellington, Waterloo and Hamilton. The Group #1 and Group #2 TDM initiatives also offset the effect of highway widening, resulting in a modest increase in average passenger car occupancy.

The addition of new capacity to the transportation network can also play an important role in supporting existing and new inter-regional transit services. A new corridor can be used to provide bus-based transit services (similar to the popular 407 ETR GO Bus service) or a new transitway within the corridor that can be used for bus or rail based services. For Alternative 3-1, the potential to support transit opportunities is limited to improving the performance of current inter-regional transit services operating on existing corridors. For the new corridor alternatives, the potential person demand for inter-regional transit services was estimated as the forecasted commute trips during the three hour AM peak period.

In Alternative 4-1, there is an opportunity to introduce new inter-regional transit services on the new corridor between Brampton and Vaughan; forecasts suggest a potential market of 34,290 person trips (for a three hour peak period) between these municipalities by 2031. Alternative 4-2 provides a longer corridor that can be used to support new inter-regional transit services, effectively linking Vaughan and Brampton to Georgetown and to the 407 ETR transitway at the 407 ETR / Highway 401 interchange. This alternative serves a similar demand between these municipalities, although it is recognized that this alternative has additional market potential due to the proximity of Georgetown and the Bram-West development areas to the new corridor.

Alternative 4-3 provides a new corridor that directly links Brampton and Vaughan to Milton, increasing the potential market served to 48,800 person trips by 2031. Alternatives 4-4 and 4-5 both provide a new corridor that links Vaughan, Brampton and Guelph, with a forecast person demand of 36,300 trips by 2031. These peak period demands are summarized in **Exhibit 4-33**.

ALTERNATIVE	2031 PEAK PERIOD PERSON TRIP DEMAND	COMMENTS
GTAW 3-1	N/A	No new inter-regional transit corridor opportunities
GTAW 4-1	34,290	Demand between Brampton and Vaughan
GTAW 4-2	35,000	Demand between Brampton and Vaughan
GTAW 4-3	48,800	Demand between Brampton, Vaughan and Milton
GTAW 4-4	36,300	Demand between Brampton, Vaughan and Guelph
GTAW 4-5	36,300	Demand between Brampton, Vaughan and Guelph

Exhibit 4-33: 2031 PM Peak Period Demand between Municipalities, by Alternative

Based on the above analysis, the GTA West corridor alternatives will have a very modest impact on regional commuting patterns between communities, although there is slight increase in automobile person travel compared to Base Case conditions. The resulting impacts to transit use are mitigated by the proposed transit and TDM measures contained within the Group #1 and #2 initiatives, which result in higher overall transit mode shares in all regions compared to Base Case conditions. Since the main differences in commuting patterns that were observed occur in all of the alternatives, it can be concluded that these changes are caused by the addition of new road capacity, and are less influenced by how that new capacity is added.

Alternative 4-3 provides the best support for new inter-regional transit services by providing a significant length of new corridor (that can also be used for new transit services) combined with the highest potential demand between Urban Growth Centres directly served by the corridor.

Assessment of Traffic Operations Performance - Screenline Analysis

Model runs for each of the GTA West alternatives were completed to develop forecasts of future traffic volumes on the road links in the preliminary study area. PM peak hour travel demand forecasts for the key inter-regional facilities were assessed to determine the screenline performance and how well each of the alternatives address 2031 roadway capacity issues. Future volume forecasts for the key inter-regional facilities in the preliminary study area were converted to AADT using current patterns of AADT compared to peak hour volumes. **Exhibit 4-34** through **Exhibit 4-39** illustrate the forecasted AADT and V/C ratios for the key segments of the preliminary study area's major inter-regional facilities for each alternative.

For Alternative 3-1, Highway 401 would be less congested to the west of Milton relative to Base Case conditions due to the proposed widening from six to 10 lanes. Highway 401 through Milton (near the 407 ETR interchange) would still operate at capacity with 12 lanes, and would also be at capacity with 10 lanes between the 407 ETR and Mavis Road. The widening of 407 ETR to 14 lanes between Highways 410 and 427, and to 16 lanes between Highways 427 and 400 would significantly improve the operation on this facility with V/C ratios below 0.80 (LOS D). Note that the modeling undertaken for this alternative did not include any additional widening of 407 ETR to the east of Highway 400, beyond the 10 lane cross section currently planned. For this alternative to successfully work, additional improvements on 407 ETR west of Highway 400 would need to be examined to transition from the 16 lane cross section west of Highway 400 down to the planned 10 lanes to the east. The improved operation of 407 ETR does provide some modest level of congestion relief to Highway 400 south of 407 ETR, although, due to the influence of tolling on the 407 ETR, this benefit is primarily oriented to passenger cars and does not accrue to commercial traffic to the same degree. Highway 410 would continue to operate at capacity even with the planned widening to eight lanes.

Exhibit 4-34: Alternatives 3-1 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios

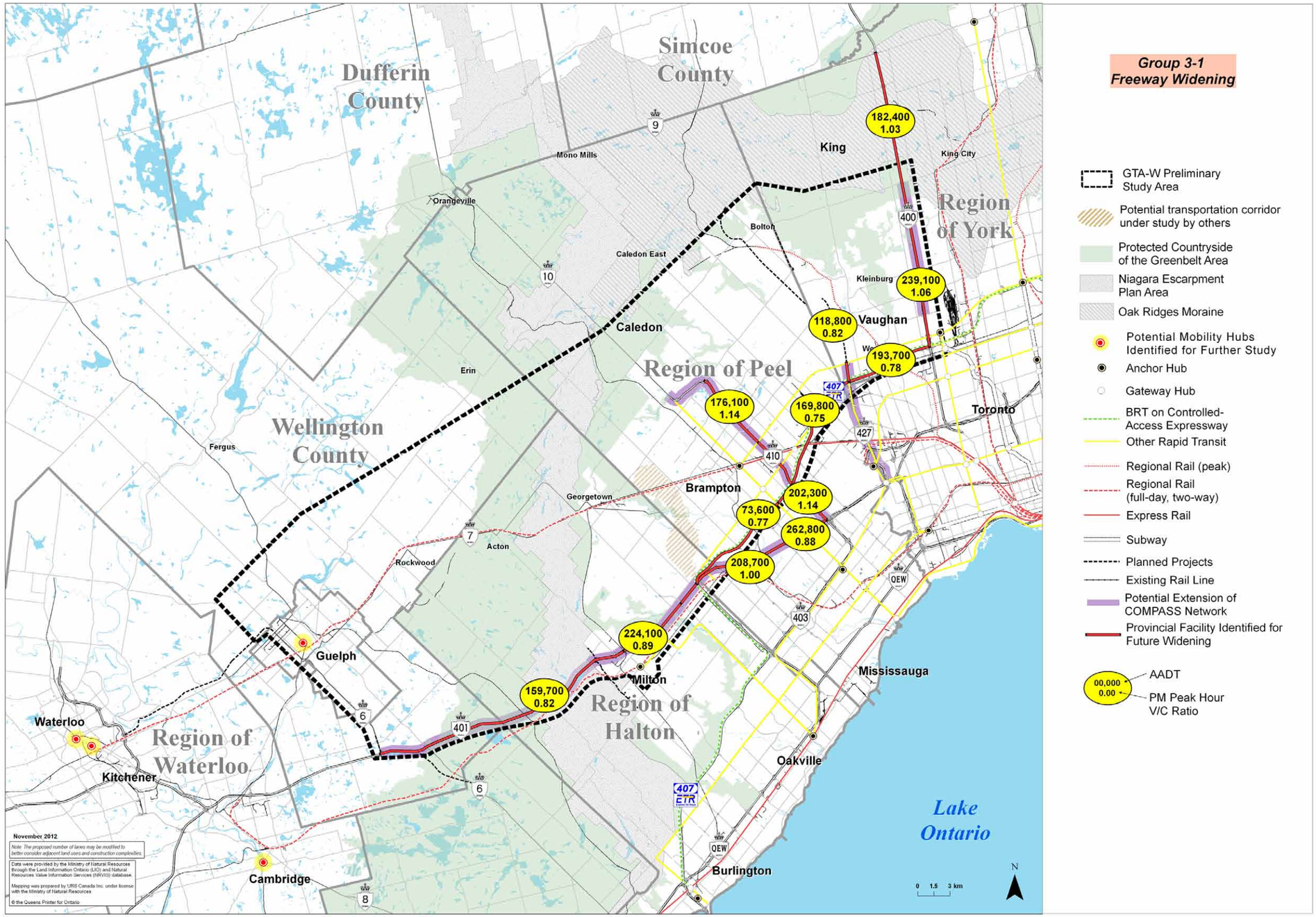


Exhibit 4-35: Alternative 4-1 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios

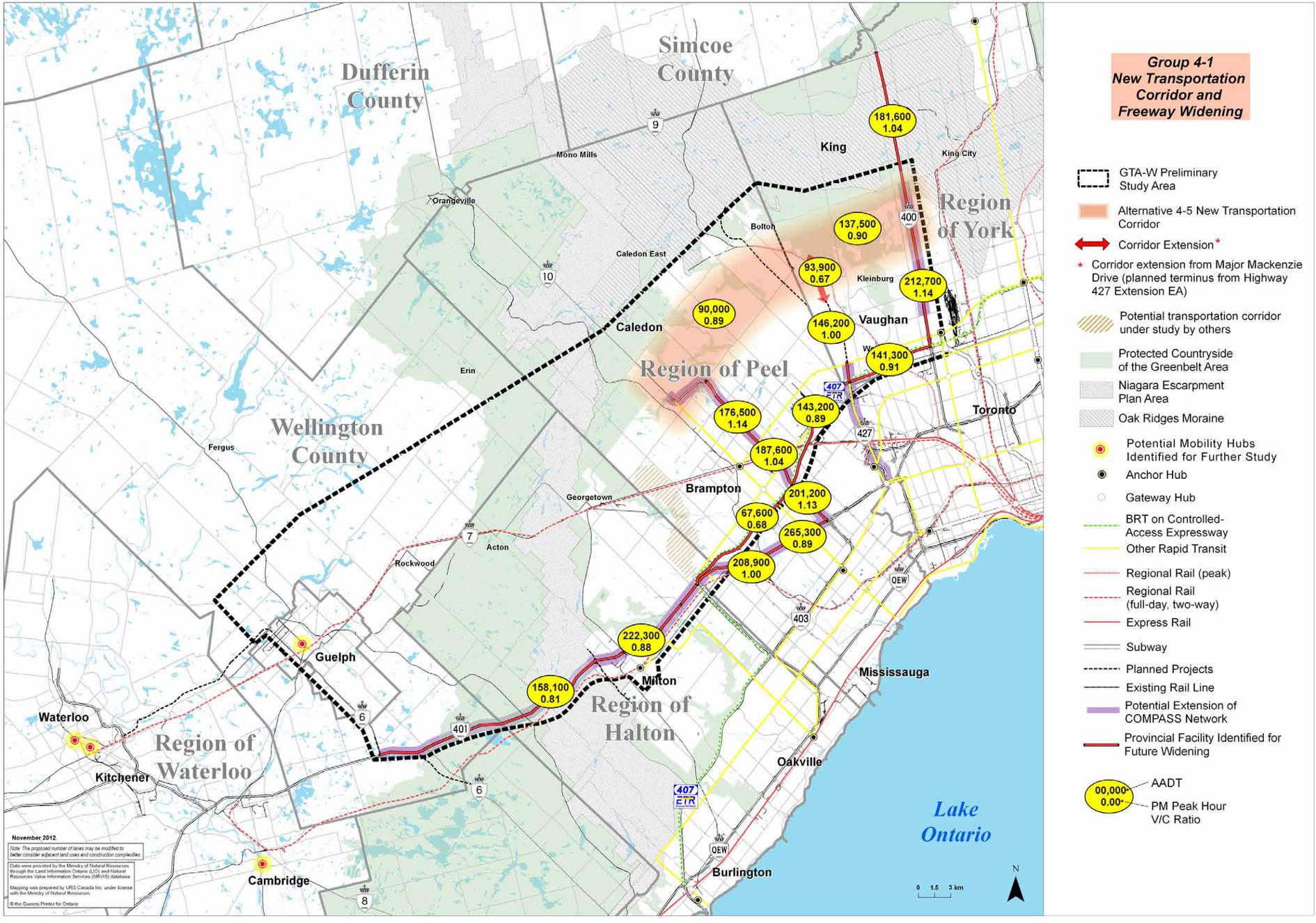


Exhibit 4-36: Alternative 4-2 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios

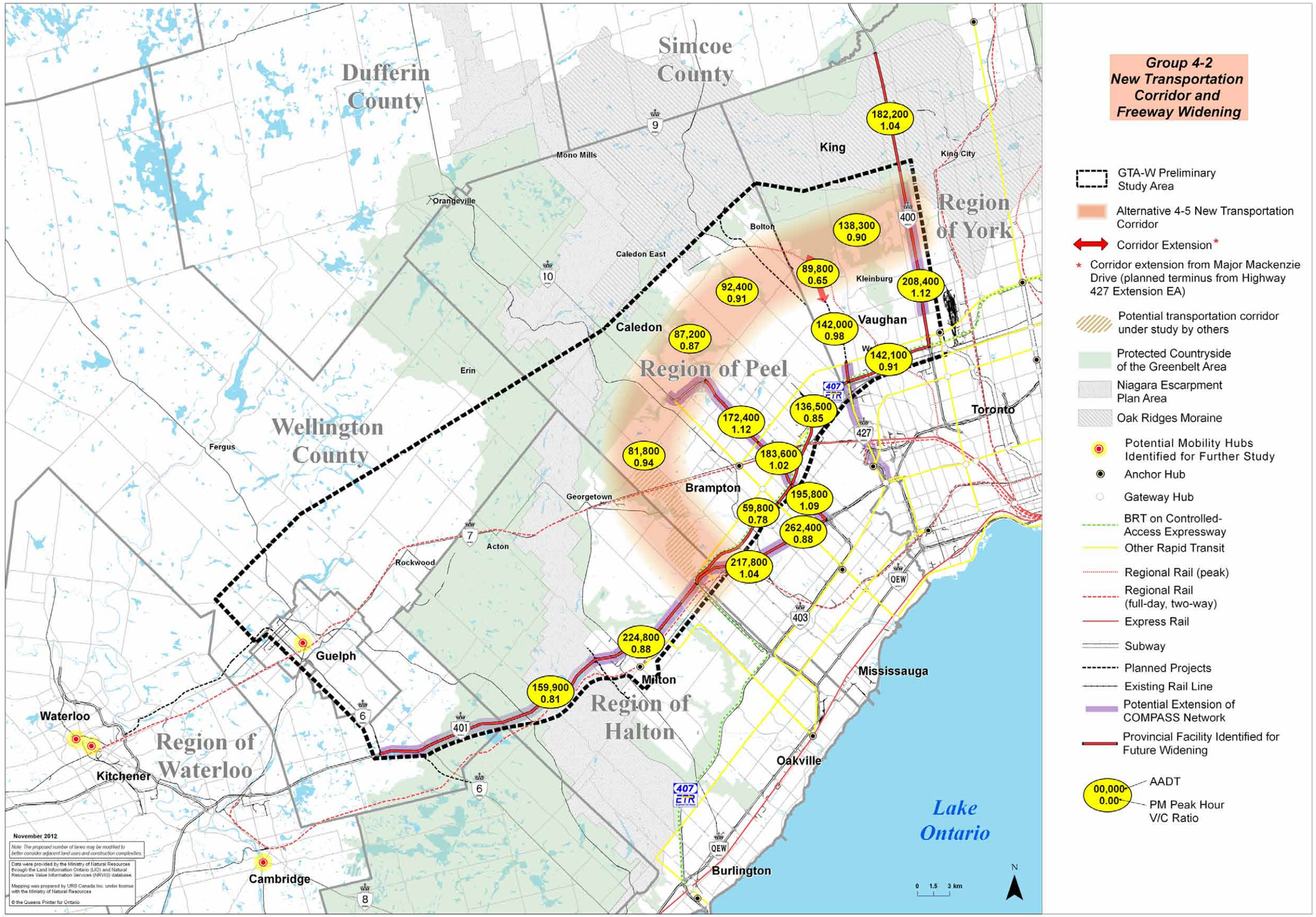


Exhibit 4-37: Alternative 4-3 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios

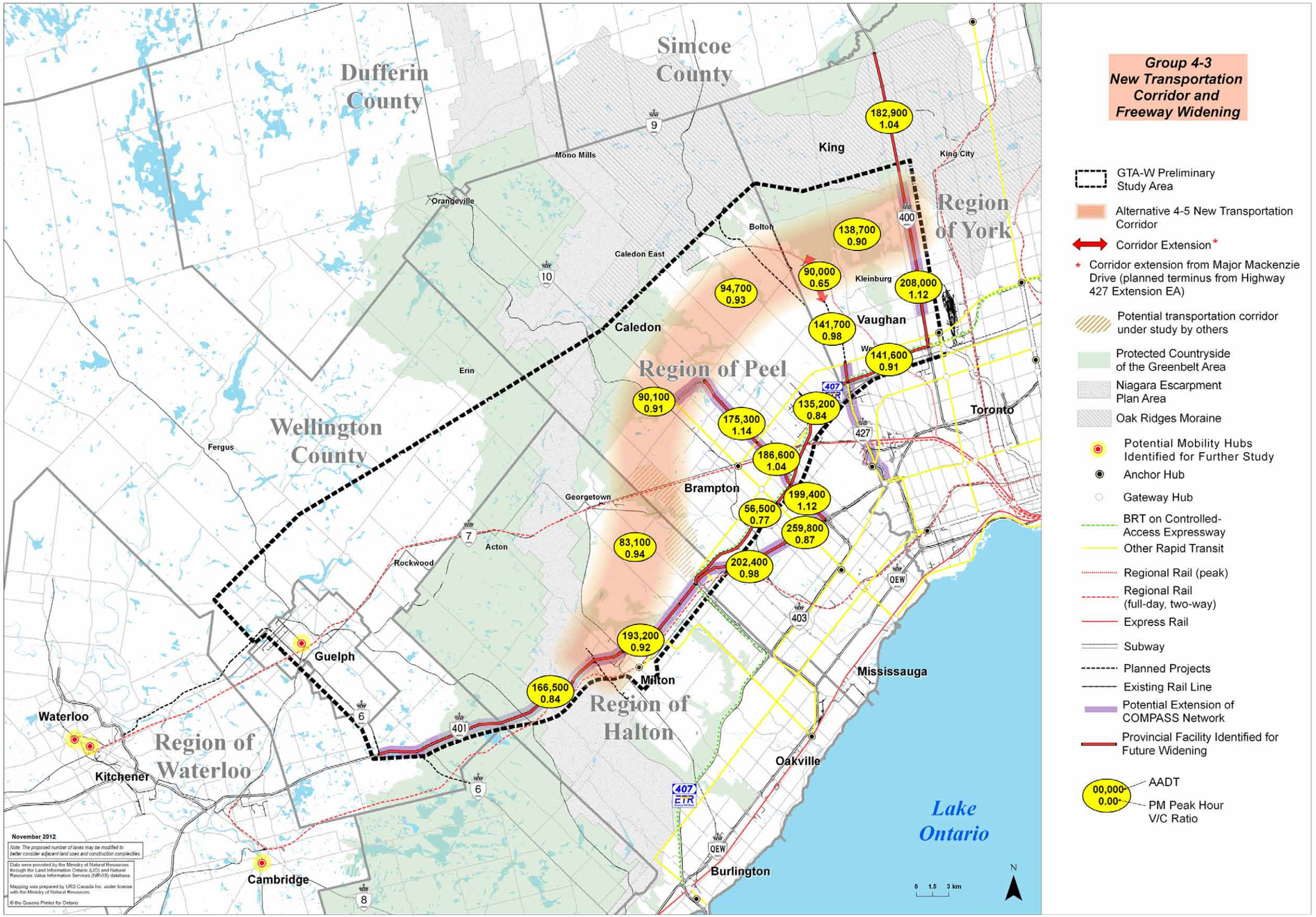


Exhibit 4-38: Alternative 4-4 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios

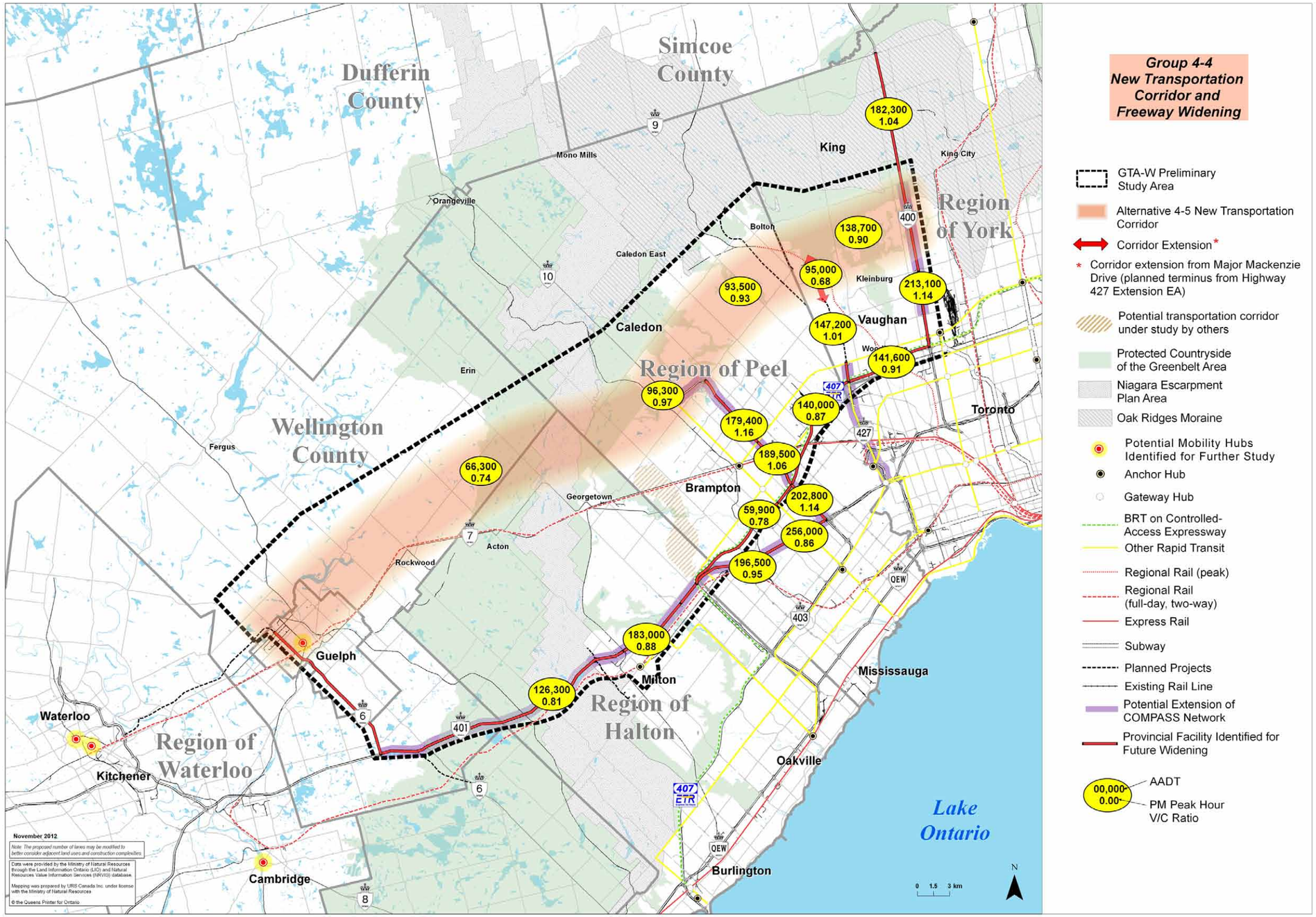
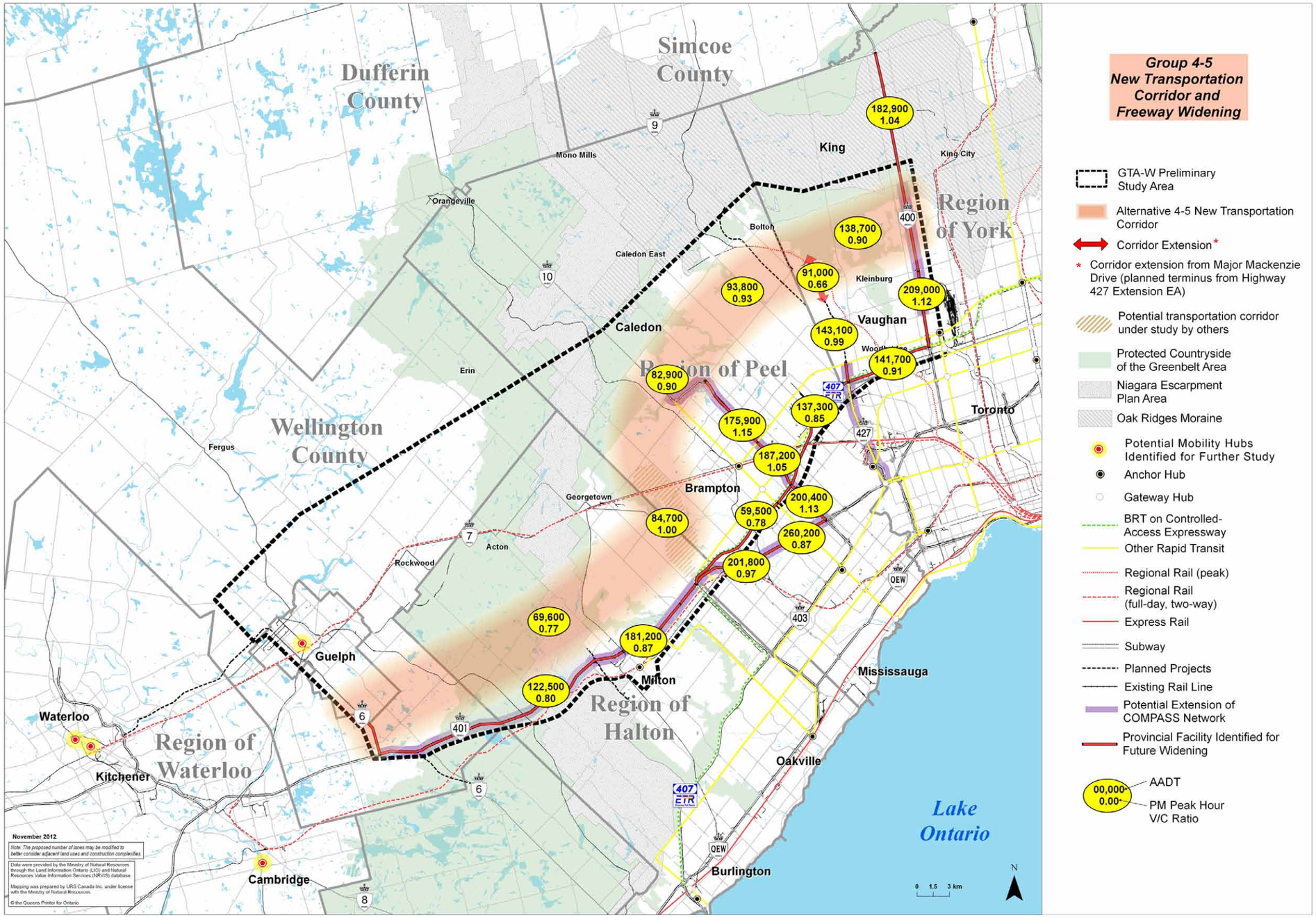


Exhibit 4-39: Alternative 4-5 2031 Inter-Regional AADT and PM Peak Hour V/C Ratios



SCREENLINE	BASE CASE	GTA WEST ALTERNATIVE					
		3-1	4-1	4-2	4-3	4-4	4-5
East of Guelph WB	1.04	0.82	0.82	0.82	0.84	0.80	0.75
West of Milton (East of Eramosa Townline and Tremaine Road) WB	0.95	0.82	0.82	0.82	0.76	0.77	0.77
East of Winston Churchill Boulevard WB	0.75	0.74	0.78	0.78	0.75	0.75	0.72
East of Highway 10 (Hurontario Street) WB	0.82	0.76	0.78	0.76	0.76	0.77	0.76
East of Highway 50 WB	0.85	0.75	0.75	0.77	0.79	0.78	0.78
West of Highway 400 WB	0.98	0.82	0.87	0.87	0.87	0.87	0.87
North of Queen St NB	1.02	0.98	0.96	0.91	0.95	0.97	0.98

x.xx - indicates V/C ratio greater than 0.9 (LOS E or F)

Exhibit 4-40: 2031 PM Peak Hour Screenline Evaluation – All Facilities

SCREENLINE	BASE CASE	GTA WEST ALTERNATIVE					
		3-1	4-1	4-2	4-3	4-4	4-5
East of Guelph WB	1.02	0.82	0.81	0.81	0.84	0.80	.775
West of Milton (East of Eramosa Townline and Tremaine Road) WB	1.10	0.97	0.96	0.96	0.86	0.89	0.90
East of Winston Churchill Boulevard WB	0.79	0.80	0.86	0.83	0.82	0.82	0.82
East of Highway 10 (Hurontario Street) WB	0.97	0.87	0.91	0.88	0.87	0.88	0.87
East of Highway 50 WB	0.76	0.65	0.76	0.79	0.80	0.79	0.80
West of Highway 400 WB	1.02	0.74	0.89	0.89	0.89	0.90	0.89
North of Queen St NB	1.14	1.14	1.14	1.12	1.14	1.16	1.15

x.xx - indicates V/C ratio greater than 0.9 (LOS E or F)

Exhibit 4-41: 2031 PM Peak Hour Screenline Evaluation – Inter-Regional Facilities Only

Considering Alternative 4-1, the inter-regional highway system to the west of the Highway 401 / 407 ETR interchange is forecast to operate at similar levels as in Alternative 3-1. The 407 ETR between Highways 427 and 400 would operate at a worse level of service than in Alternative 3-1, as the extent of widening is not as great. This suggests that the limited extent of the new corridor in Alternative 4-1 does not draw enough inter-regional traffic off of the 407 ETR to provide a comparable level of congestion relief as does Alternative 3-1; however, its conditions are improved compared to the Base Case. The section of the new corridor between Highways 400 and 410 would operate at moderate levels of congestion and is forecast to carry between 90,000 and 138,000 vehicles per day. As a result, there is modest improvement in congestion on Highway 400 south of the 407 ETR. Highway 410 would continue to operate at capacity even with widening to eight lanes.

In addition to the congestion relief provided by Alternative 4-1, Alternative 4-2 reduces the demand and improves the level of congestion on Highway 401 between Highway 427 and the 407 ETR, and on Highway 401 through the Milton area. The new GTA West corridor would operate at moderate to major congestion through most of its extent, indicating significant usage and the possible need to widen this facility beyond the four to six lane cross section used in the model runs. This is due to a mix of traffic diverting from Highway 401, 407 ETR and from regional / local roads. The north-south portion of the GTA West corridor would operate with minor to moderate levels of congestion near the Highway 401 / 407 ETR interchange, indicating the need to provide additional capacity beyond the four lanes assumed in the initial model runs. This is consistent with the findings of the Halton Peel Boundary Area Transportation Study (HP BATS), which recommended a six to eight lane cross section for this section of the HP BATS corridor. The provision of a continuous new corridor between Highways 400 and 401 in the Milton area reduces traffic demands and congestion levels on Highway 400 to the south of 407 ETR for both automobiles and commercial vehicles.

Alternative 4-3 further builds upon these benefits by reducing traffic volumes through the Highway 401 / 407 ETR interchange, and reducing demands on Highway 401 through Milton, since the Alternative 4-3 corridor would connect to Highway 401 near the Tremaine Road interchange. Highway 401 through Milton would continue to approach capacity in this scenario, although it features 10 lanes on Highway 401 compared to the 12 lanes (requiring an express collector system) assumed for Alternative 4-2.

Alternative 4-4 features many similar congestion benefits as Alternative 4-3 to the east of Georgetown. This alternative assumes completion of the HP BATS corridor to connect with the new GTA West corridor, although this is not quite as effective in drawing traffic off of the other inter-regional facilities in the eastern portion of the preliminary study area, since the connection to Highway 401 is not as direct. For example, Highway 400, 407 ETR and Highway 410 all have higher volumes and worse v/c ratios in this scenario compared to Alternatives 4-2 or 4-3. The segment of the new GTA West corridor to the west of Georgetown would carry an estimated 66,000 vehicles per day and operate at good levels of service, reducing daily traffic volumes on Highway 401 between Guelph and Milton by about 24%, although the level of traffic reduction through Milton is reduced by only 5%. About 40% of the traffic using this new facility is being drawn from the local road network and Highway 7.

Alternative 4-5 operates very similarly to Alternative 4-4, although the more southerly alignment allows this route to provide more relief to the Highway 401 corridor through Milton and to the west of Milton. The segment to the west of Milton is forecast to carry about 70,000 vehicles per day and will operate at an acceptable level of service. This alternative also performs similarly to Alternative 4-3 in terms of providing relief to congested highways in the eastern part of the preliminary study area, including Highway 400, 407 ETR and Highway 410.

Based on forecasted traffic, comparisons of the PM peak hour screenline V/C ratios for all facilities and for inter-regional facilities are presented in **Exhibit 4-40** and **Exhibit 4-41**. These results are presented for the peak direction of travel (typically westbound / northbound in the PM peak).

As shown, based on the screenline analysis results, Alternative 3-1 provides the best performance at three of the

seven key screenlines, and four of the seven screenlines when the performance of inter-regional facilities is considered alone. Alternative 3-1 tends to perform better in the east end of the preliminary study area due to the significant widening of the 407 ETR of up to 16 lanes, which provides significant capacity relief through the screenlines within Brampton and Vaughan. Alternatives 4-2 and 4-3 provide the best screenline performance on two of the screenlines, with Alternative 4-3 also providing the second best performance on two additional screenlines. Alternative 4-3 also provides the best performance for inter-regional facilities on two of the seven screenlines and ranks second on another screenline.

Alternatives 4-4 and 4-5 both rank the best on one of the seven screenlines and ranked second best on three to four of the other screenlines. These two alternatives tend to perform better in the west end of the preliminary study area than the other alternatives. Alternative 4-4 also ranks best on the east of Guelph screenline for inter-regional facilities due to the reduction in traffic on Highway 401. This alternative also ranks second best for inter-regional facilities on three other screenlines in the west portion of the preliminary study area. Alternative 4-5 does not perform as well on the inter-regional facilities, failing to rank best on any of the screenlines.

In summary, all of the alternatives would provide congestion relief compared to the Base Case. All of the east-west screenlines are forecast to operate at LOS D or better. In general, Alternative 3-1 would provide better screenline performance in the east end of the preliminary study area by widening existing facilities, while Alternative 4-3 or Alternative 4-4 would provide better relief in the west end. The north-south screenline would only experience marginal congestion relief under the alternatives but not on the inter-regional facilities. The inter-regional facilities were also assessed for congestion during the summer peak; results are presented in the *Transportation Model Technical Background Report* (February 2011).

People Movement

One of the primary objectives of the GTA West study is to develop a solution to improve the movement of people in the preliminary study area. To achieve this, a series of criteria and performance measures were used, including:

- percentage of inter-regional and local road travel performing at LOS D or better;
- percentage of inter-regional trips using local roads;
- auto delays on the inter-regional and local road networks (Delay is measured as the time taken to travel a certain distance over and above the free flow travel time for that distance, i.e. forecast travel time minus free flow travel time. It is measured in vehicle-hours (vehicular volume * hours of delay); and
- average vehicle occupancy on the road network.

For the purpose of this assessment, an inter-regional trip is defined as trip that is longer than the average commuting distance within the preliminary study area, which was estimated at 20 kilometres based on 2006 Census results.

Exhibit 4-42 summarizes the modeling results and quantitative measures used to evaluate how well the GTA West alternatives perform in terms of people movement relative to the Base Case scenario. Alternative 3-1 provides the best performance in terms of the share of inter-regional road network operating at LOS D or better. With Alternative 3-1, approximately 43% of travel on the inter-regional road network (measured in terms of auto kilometres of travel) is forecast to operate at better than LOS D. This is approximately twice that achieved for the Base Case, which forecasts 22% of the inter-regional road network travelling at LOS D or better. These results are primarily due to the extensive widening proposed for existing inter-regional facilities in the preliminary study area, which already carry a significant amount of traffic in the network. Alternatives 4-4 and 4-5 are the next best performing alternatives in terms of share of inter-regional road network operating at LOS D or better, with 36% and 35% respectively. These two alternatives add a significant amount of inter-regional capacity to the overall system, and the western end of this network would operate at good levels of service as a result of demands. Alternatives 4-1, 4-2, and 4-3 all result in 32% of the travel on the inter-regional network performing at LOS D or better, which is about 30% better than the Base Case conditions. Although these alternatives vary in the length of the new corridor that is provided, modeling results indicate that the new facilities would be well utilized, with volumes approaching the capacity of the new facilities.

CRITERIA	BASE CASE	GTA WEST ALTERNATIVE					
		3-1	4-1	4-2	4-3	4-4	4-5
% of Inter-regional roadway auto network better than LOS D (auto veh-km)	22%	43%	32%	32%	32%	35%	35%
% of local roadway auto network better than LOS D (auto veh-km)	54%	66%	68%	72%	70%	70%	70%
Auto delay on inter-regional roadway network (auto veh-hr)	24,266	18,245 (6,021)	19,944 (4,321)	21,102 (3,164)	21,001 (3,265)	20,582 (3,684)	20,515 (3,751)
Auto delay on local roadway network (auto veh-hr)	41,737	27,385 (14,351)	24,862 (16,875)	22,349 (19,387)	23,523 (18,214)	23,931 (17,806)	24,310 (17,427)
% of Inter-regional auto travel using local roads	61%	52%	49%	47%	47%	47%	47%

(XXX) indicates reduction from the Base Case

Exhibit 4-42: 2031 PM Peak Hour Alternatives Evaluation - People Movement

The performance of the local road network is better served by Alternative 4-2, with approximately 72% of the auto travel on the local road network operating at LOS D or better. Alternative 4-2 includes a new corridor that attracts east-west demand from the busy regional road network in Brampton and Vaughan plus north-south demand from the Georgetown and West Brampton growth areas. This alternative represents a 33% improvement compared to the Base Case scenario, which results in 54% of the travel on the local road network operating at LOS D or better. Alternatives 4-3, 4-4, and 4-5 all result in about 70% of the local network travelling at LOS D or better, while Alternatives 3-1 and 4-1 result in 66% and 68% respectively.

Auto delays on the transportation network represent a significant drain on our economy and place the GGH at a competitive disadvantage to other regions in terms of attracting new investment and maintaining our current transportation dependent industries. As shown in **Exhibit 4-43**, the combined auto delay savings on the local and inter-regional road network within the GTA West preliminary study area is estimated at 22,550 veh-hours for Alternative 4-2. Alternatives 4-3 and 4-4 result in overall delay savings of about 21,500 veh-hours, followed by Alternative 4-5 and 4-1, which result in overall delay savings of about 21,200 veh-hours. Alternative 3-1, while performing the best for inter-regional facilities, results in the lowest overall delay savings of the GTA West alternatives.

ALTERNA-TIVE	INTER-REGIONAL ROAD SAVINGS	LOCAL ROAD SAVINGS	TOTAL SAVINGS
3-1	6,021	14,352	20,373
4-1	4,321	16,875	21,196
4-2	3,164	19,388	22,552
4-3	3,265	18,214	21,479
4-4	3,684	17,806	21,490
4-5	3,751	17,427	21,178

Exhibit 4-43: 2031 PM Peak Hour Delay Savings by Alternative (auto veh-hours)

The share of inter-regional trips using the local road network is an important measure of how well the transportation network is serving the different travel demand markets in an area. For the Base Case scenario, approximately 61% of the inter-regional auto trips in the preliminary study area will use the local road network. Alternatives 4-2, 4-3, 4-4 and 4-5 reduce this use to about 47%, as the new corridors pass through the growth areas of Brampton and Vaughan and draw longer distance traffic off of the local road network. These alternatives do a better job of shifting longer distance traffic to the inter-regional road network than Alternatives 3-1 and 4-1, which place a greater emphasis on widening of existing facilities, which tend to be located to the south of the emerging growth areas.

System reliability and redundancy are also important considerations in the evaluation of how well a transportation network supports person movement. Reliability of the transportation network affects the lives of commuters and business travellers alike and in networks with high levels of congestion, incidents that reduce the capacity (e.g. accidents, weather conditions, and construction) can have dramatic impacts on users. Adding new capacity can increase the level of reliability of existing corridors, as the stop-and-go conditions will occur more readily when demand approaches the physical capacity of the facility. A new route can also improve reliability by improving system-wide capacity and providing an alternate route that can be used during incidents that affect another route.

Alternative 3-1 does not provide any new alternate routes for inter-regional transportation, beyond new transit corridors recommended in the Metrolinx RTP. This alternative provides increased inter-regional road capacity on the existing freeway system, which can support improved transportation system reliability. Alternative 4-1 provides potential to improve transportation system reliability with a new inter-regional corridor over a portion of the preliminary study area. Alternatives 4-2 and 4-3 improve upon this by increasing the length of the new alternate corridor. This alternate route has an enhanced potential to improve transportation system reliability. Both Alternatives 4-4 and 4-5 provide a new alternate corridor between Highways 400 and 6 in Guelph, encompassing the entire GTA West preliminary study area. Although the Highway 6 connection to Highway 401 is not as efficient as a direct connection to Highway 401, the new east-west corridor provides route choice to both commuter and long distance traffic and creates the potential to improve transportation system reliability throughout the preliminary study area.

Goods Movement

Similar to people movement, improved goods movement is one of the critical objectives of the GTA West study. To assess how well the various alternatives improve goods movement in the preliminary study area, a series of criteria and performance measures were used including:

- percentage of inter-regional road network performing at LOS D or better;
- percentage of inter-regional truck trips using local roads; and
- truck delays on the inter-regional road networks.

Commercial vehicle demands for the 2031 horizon year were obtained from MTO's commercial vehicle model. The commercial vehicle demand from the MTO model was adjusted to reflect the anticipated benefits of the Group #1 and Group #2 initiatives that are designed to encourage longer distance truck traffic to shift to rail based travel. Based on a review of the commodities being shipped by truck at the various CVS stations, it was estimated that these policy initiatives could result in a 10% reduction in longer distance truck trips that are over 500 kilometres in length. This reduction was applied to the truck travel demands prior to running the model to assess the GTA West alternatives. **Exhibit 4-44** summarizes the quantitative measures used to evaluate the alternatives in terms of goods movement.

For the Base Case scenario, only 13% of the PM Peak Hour truck travel on the inter-regional road network is forecast to operate at LOS D or better by 2031. This represents a significant amount of delay to commercial goods movement in the region, which could significantly impact the competitiveness of industries and the costs of the goods. All of the alternatives improve upon this to some degree, with Alternatives 3-1, 4-4 and 4-5 all ranking the best in terms of improving the share of truck travel operating at LOS D or better. Alternative 3-1 provides significant new capacity on the existing freeway network in the preliminary study area, which improves operation of these corridors that are heavily

CRITERIA	BASE CASE	ALTERNATIVE					
		3-1	4-1	4-2	4-3	4-4	4-5
% of Inter-regional truck roadway network better than LOS D (truck-km)	13%	37%	32%	32%	30%	37%	36%
Truck delay on inter-regional roadway network (truck-hr)	5,857	2,884 (2,973)	3,020 (2,837)	3,069 (2,788)	3,075 (2,783)	2,957 (2,900)	2,954 (2,903)
% of Inter-regional truck travel using local roads	30%	28%	28%	25%	25%	24%	25%

(XXX) Indicates reduction from the Base Case

Exhibit 4-44: 2031 PM Peak Hour Alternatives Evaluation - Goods Movement

used by trucks. Alternatives 4-4 and 4-5 provide a similar level of improvement due to the influence of the new corridor that provides an alternate route for longer distance trucks to by-pass the congested areas in Milton and Mississauga to access Highway 400 and the industrial nodes in northern Brampton and Vaughan. Alternatives 4-1, 4-2 and 4-3 also provide a significant improvement compared to the Base Case, although they do not perform as well as the other alternatives.

Alternatives 3-1, 4-4, and 4-5 would all reduce the amount of truck delays on the inter-regional road network by around 50% compared to the Base Case scenario, representing a reduction of about 3,000 vehicle-hours during the afternoon peak hour. Alternative 4-1 would reduce the amount of auto delays on inter-regional facilities by about 2,800 vehicle-hours and Alternatives 4-2 and 4-3 reduce truck delays by just less than 2,800 veh-hours. All of these alternatives represent considerable improvements to commercial vehicle travel times during peak periods, which helps shippers and manufacturers maintain the efficiency of their just-in-time manufacturing processes.

Improving access to areas or facilities that support or rely on goods movement is also an important consideration. Alternative 3-1 provides improved inter-regional accessibility to inter-modal facilities and employment centres that are oriented in close proximity to the existing freeway network, although connections to new industrial areas are not served as well. Alternative 4-1 provides improved inter-regional goods movement between Brampton and Vaughan through the new corridor between Highways 410 and 400 and connectivity to the Highway 427 extension. Alternatives 4-2 and 4-3 improve upon this by providing improved inter-regional goods movement connectivity between Highways 400 and 401. This new corridor will link the Highway 400 corridor, the Canadian National (CN) inter-modal yard (via the Highway 427 extension), and the inter-modal facilities in Milton, along with enhanced accessibility to new industrial growth areas in Brampton and Halton Hills. Alternatives 4-4 and 4-5 also provide improved inter-regional goods movement with a new corridor between Highway 400 and Highway 6 in the Guelph area.

One of the key issues for truck movements in the GTA West preliminary study area is the congestion in the Highway 400 / Highway 401 interchange area. For truck movements to and from Simcoe County (and points north along Highway 400 and Highway 11), this congestion represents significant amounts of delay added to these trips. The cost of truck tolls on the 407 ETR make this route less attractive to trucks, although this is expected to change over time as congestion levels continue to grow. As a result, there are a number of truck trips that utilize the local and county road network to the north of the GTA West preliminary study area to travel between Simcoe County and the Highway 401 corridor to the west of the GTA. This pattern was also identified in the Area Transportation System Problems and Opportunities Report (July 2009, Updated December 2010) and was raised by a number of industry and local stakeholders.

Based on the modeling results, the Alternative 4-3 corridor would support truck traffic demands to / from Simcoe County and points to the north. As a result, the number of commercial vehicle tips taking these northern routes is reduced by about 25% compared to the Base Case, or the equivalent of about 100 trucks per hour in the PM peak hour. A similar level of diversion would also be anticipated for Alternative 4-2. For Alternatives 4-4 and 4-5, which provide a new corridor connection to Highway 6 in the Guelph area, the truck traffic using the northern routes is forecast to be about 46% lower than the Base Case, amounting to a reduction of about 200 trucks in the PM peak hour.

Modal Integration and Linking Population and Growth Centres

As the movement of people is a critical objective of the GTA West study, the Study Team evaluated the alternatives for their potential to improve modal integration, balance and choice for movement of people between activity centres.

The evaluation findings for all transportation criteria are shown in **Exhibit 4-45**.

Exhibit 4-45: Transportation Evaluation

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
TRAFFIC OPERATIONS Potential impact on traffic operations due to factors such as design features and transportation network connections	Peak period performance of key corridors – forecast volume/capacity ratio at critical screenlines	East of Guelph – 0.82 West of Milton – 0.82 East of Winston Churchill (WC Blvd) – 0.74 East of Highway 10 – 0.76 East of Highway 50 – 0.75 West of Highway 400 – 0.82 North of Highway 407 – 0.98	East of Guelph – 0.82 West of Milton – 0.82 East of Winston Churchill (WC Blvd) – 0.78 East of Highway 10 – 0.78 East of Highway 50 – 0.75 West of Highway 400 – 0.87 North of Highway 407 – 0.96	East of Guelph – 0.82 West of Milton – 0.82 East of Winston Churchill (WC Blvd) – 0.78 East of Highway 10 – 0.76 East of Highway 50 – 0.77 West of Highway 400 – 0.87 North of Highway 407 – 0.91	East of Guelph – 0.84 West of Milton – 0.76 East of Winston Churchill (WC Blvd) – 0.75 East of Highway 10 – 0.76 East of Highway 50 – 0.79 West of Highway 400 – 0.87 North of Highway 407 – 0.95	East of Guelph – 0.80 West of Milton – 0.77 East of Winston Churchill (WC Blvd) – 0.75 East of Highway 10 – 0.77 East of Highway 50 – 0.78 West of Highway 400 – 0.87 North of Highway 407 – 0.97	East of Guelph – 0.75 West of Milton – 0.77 East of Winston Churchill (WC Blvd) – 0.72 East of Highway 10 – 0.76 East of Highway 50 – 0.78 West of Highway 400 – 0.87 North of Highway 407 – 0.98
	Peak period performance of key inter-regional corridors – forecast volume/capacity ratio at critical screenlines	East of Guelph – 0.82 West of Milton – 0.97 East of Winston Churchill (WC Blvd) – 0.80 East of Highway 10 – 0.87 East of Highway 50 – 0.65 West of Highway 400 – 0.74 North of Highway 407 – 1.14	East of Guelph – 0.81 West of Milton – 0.96 East of Winston Churchill (WC Blvd) – 0.86 East of Highway 10 – 0.91 East of Highway 50 – 0.76 West of Highway 400 – 0.89 North of Highway 407 – 1.14	East of Guelph – 0.81 West of Milton – 0.96 East of Winston Churchill (WC Blvd) – 0.83 East of Highway 10 – 0.88 East of Highway 50 – 0.79 West of Highway 400 – 0.89 North of Highway 407 – 1.12	East of Guelph – 0.84 West of Milton – 0.86 East of Winston Churchill (WC Blvd) – 0.82 East of Highway 10 – 0.87 East of Highway 50 – 0.80 West of Highway 400 – 0.89 North of Highway 407 – 1.14	East of Guelph – 0.80 West of Milton – 0.89 East of Winston Churchill (WC Blvd) – 0.82 East of Highway 10 – 0.88 East of Highway 50 – 0.79 West of Highway 400 – 0.90 North of Highway 407 – 1.16	East of Guelph – 0.77 West of Milton – 0.90 East of Winston Churchill (WC Blvd) – 0.82 East of Highway 10 – 0.87 East of Highway 50 – 0.80 West of Highway 400 – 0.89 North of Highway 407 – 1.15
	Potential to provide for higher order inter-regional transportation corridors (qualitative)	No new inter-regional transportation corridors beyond new transit corridors.	Provides new higher order inter-regional transportation corridor over a short distance.	Provides new higher order inter-regional transportation corridor over approximately half of the study area.	Provides new higher order inter-regional transportation corridor over a long distance east of the Niagara Escarpment areas.	Provides new higher order inter-regional transportation corridor over the full study area.	Provides new higher order inter-regional transportation corridor over the full study area.
	Percentage of inter-regional trips* on key inter-regional corridors at critical screenlines	East of Guelph – 82% West of Milton – 78% East of Winston Churchill (WC Blvd) – 85% East of Highway 10 – 73% East of Highway 50 – 67% West of Highway 400 – 63% North of Highway 407 – 58%	East of Guelph – 82% West of Milton – 78% East of Winston Churchill (WC Blvd) – 85% East of Highway 10 – 71% East of Highway 50 – 74% West of Highway 400 – 71% North of Highway 407 – 59%	East of Guelph – 81% West of Milton – 78% East of Winston Churchill (WC Blvd) – 84% East of Highway 10 – 76% East of Highway 50 – 74% West of Highway 400 – 70% North of Highway 407 – 63%	East of Guelph – 83% West of Milton – 84% East of Winston Churchill (WC Blvd) – 87% East of Highway 10 – 76% East of Highway 50 – 73% West of Highway 400 – 70% North of Highway 407 – 60%	East of Guelph – 85% West of Milton – 82% East of Winston Churchill (WC Blvd) – 87% East of Highway 10 – 75% East of Highway 50 – 73% West of Highway 400 – 70% North of Highway 407 – 60%	East of Guelph – 87% West of Milton – 84% East of Winston Churchill (WC Blvd) – 90% East of Highway 10 – 75% East of Highway 50 – 73% West of Highway 400 – 70% North of Highway 407 – 59%

Exhibit 4-45: Transportation Evaluation

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
COMMUTER TRAVEL CHARACTERISTICS Potential impact on commuter trip distribution and trip length	Percentage of peak period self-containment of trips with the municipality/region	York – 65% Toronto – 69% Peel – 70% Halton – 64% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%	York – 65% Toronto – 69% Peel – 70% Halton – 64% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%	York – 65% Toronto – 69% Peel – 69% Halton – 63% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%	York – 65% Toronto – 69% Peel – 69% Halton – 63% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%	York – 65% Toronto – 69% Peel – 69% Halton – 63% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%	York – 65% Toronto – 69% Peel – 69% Halton – 63% Wellington – 80% Waterloo – 91% Hamilton – 80% Brant – 88%
	Average automobile trip length	20.0	20.0	20.4	20.4	20.4	20.4
	Potential to support transit opportunities on a new corridor^	Does not provide opportunities for new transit linkages on a new corridor; road widenings may provide for improved transit services on existing corridors	Provides opportunities for new transit linkages between Urban Growth Centres of Vaughan and Brampton; total demand between these points is approximately 34,290 persons	Provides opportunities for new transit linkages between Urban Growth Centres of Vaughan and Brampton; total demand between these points is approximately 35,000 persons	Provides opportunities for new transit linkages between Urban Growth Centres of Vaughan, Brampton and Milton; total demand between these points is approximately 48,800 persons	Provides opportunities for new transit linkages between Urban Growth Centres of Vaughan, Brampton and Guelph ; total demand between these points is approximately 36,300 persons	Provides opportunities for new transit linkages between Urban Growth Centres of Vaughan, Brampton and Guelph; total demand between these points is approximately 36,300 persons
EFFICIENT MOVEMENT OF PEOPLE Potential to support the efficient movement of people between communities and regions by road	Percentage of inter-regional network operating better than LOS D (automobile km)	43%	32%	32%	32%	35%	35%
	Percentage of local road network operating better than LOS D (automobile km)	66%	68%	72%	70%	70%	70%
	Percentage inter-regional automobile trips* using the local road network	52%	49%	47%	47%	47%	47%
	Automobile hours of delay on the inter-regional transportation network+ (automobile hours)	18,245 (-6,021 from base)	19,944 (-4,321 from base)	21,102 (-3,164 from base)	21,001 (-3,265 from base)	20,582 (-3,684 from base)	20,515 (-3,751 from base)
	Automobile hours of delay on the local transportation network+ (automobile hours)	27,385 (-14,351 from base)	24,862 (-16,875 from base)	22,349 (-19,387 from base)	23,523 (-18,214 from base)	23,931 (-17,806 from base)	24,310 (-17,427 from base)

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
	Average automobile vehicle occupancy	1.30	1.30	1.30	1.30	1.30	1.30
	Total persons moved in study area	Wellington-Halton: 19,600 Halton-Peel: 106,500 Peel-York: 178,400	Wellington-Halton: 19,600 Halton-Peel: 106,500 Peel-York: 178,400	Wellington-Halton: 19,800 Halton-Peel: 107,900 Peel-York: 178,800	Wellington-Halton: 19,800 Halton-Peel: 107,900 Peel-York: 178,800	Wellington-Halton: 19,800 Halton-Peel: 107,900 Peel-York: 178,800	Wellington-Halton: 19,800 Halton-Peel: 107,900 Peel-York: 178,800
EFFICIENT MOVEMENT OF GOODS Potential to support the efficient movement of goods between communities and regions by road	Percentage of inter-regional system operating better than LOS D (truck km)	37%	32%	32%	30%	37%	36%
	Percentage inter-regional truck trips* using the local road network	28%	28%	25%	25%	24%	25%
	Truck hours of delay on the inter-regional transportation network+	2,884 (-2,973 from base)	3,020 (-2,837 from base)	3,069 (-2,788 from base)	3,075 (-2,783 from base)	2,957 (-2,900 from base)	2.954 (-2,903 from base)
SYSTEM RELIABILITY/ REDUNDANCY Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions	Availability of alternate routes/ facilities for inter-regional transportation between regions, communities and terminals (qualitative)	No new alternate routes for inter-regional transportation beyond new transit corridors; provides increased inter-regional road capacity on freeway system.	New alternate corridor between Hwy 400 and 410, plus new transit corridors and increased roadway capacity throughout the study area.	New alternate corridor between Hwy 400 and 401/407 ETR, plus new transit corridors and increased roadway capacity throughout the study area.	New alternate corridor between Hwy 400 and 401 east of the Niagara Escarpment areas, plus new transit corridors and increased roadway capacity throughout the study area; direct connection to Hwy 401 provides ease of route choice.	New alternate corridor between Hwy 400 and Highway 6 at Guelph, plus new transit corridors and increased roadway capacity throughout the study area; connection to Hwy 401via Hwy 6 through Guelph, opportunity to connect to New Hwy 7 corridor between Guelph and Kitchener-Waterloo provides new route choice.	New alternate corridor between Hwy 400 and Highway 6 north of Hwy 401, plus new transit corridors and increased roadway capacity throughout the study area; connection to Hwy 401 via short section of Hwy 6 provides route choice.
	Potential to improve transportation system reliability (qualitative)	Potential to improve transportation system reliability with increased inter-regional road and transit capacity.	Potential to improve transportation system reliability with new inter-regional corridor over a short distance and increased road and transit capacity.	Potential to improve transportation system reliability with new inter-regional corridor over a moderate distance and increased road and transit capacity.	Potential to improve transportation system reliability with new inter-regional corridor east of the Niagara Escarpment areas and increased road and transit capacity.	Potential to improve transportation system reliability with new inter-regional corridor across the entire study area and increased road and transit capacity.	Potential to improve transportation system reliability with new inter-regional corridor across the entire study area and increased road and transit capacity.
SAFETY Potential to improve traffic safety based on opportunity to reduce congestion on the area road network	Potential to improve response times for emergency service providers due to reduced congestion on the inter-regional road network (refer to LOS in Traffic Operations)	Provides safety and response time benefits due to improvement in transportation system congestion from increased road capacity. No system alternatives to accommodate traffic during closures.	Provides some safety and response time benefits due to improvement in transportation system congestion from new corridor between Hwy 400 and 410 and increased road capacity. Limited length of new corridor does not provide significant benefits for routing traffic during closures.	Provides safety and response time benefits due to improvement in transportation system congestion from new corridor between Hwy 400 and 401/407 ETR and increased road capacity. New route connection to Hwy 401 provides alternate to accommodate traffic during closures.	Provides safety and response time benefits due to improvement in transportation system congestion from new corridor between Hwy 400 and 401 east of the Niagara Escarpment areas and increased road capacity. New route connection to Hwy 401 provides alternate to accommodate traffic during closures.	Provides safety and response time benefits due to improvement in transportation system congestion from new corridor between Hwy 400 and Hwy 6 at Guelph and increased road capacity. New route provides alternate to accommodate traffic during closures.	Provides safety and response time benefits due to improvement in transportation system congestion from new corridor between Hwy 400 and Hwy 6 north of Hwy 401 and increased road capacity. New route provides alternate to accommodate traffic during closures.
	Potential to reduce collisions due to improved network LOS (refer to LOS in Traffic Operations)	Major potential to reduce collisions due to improved network performance.	Major potential to reduce collisions due to improved network performance.	Major potential to reduce collisions due to improved network performance.	Major potential to reduce collisions due to improved network performance.	Major potential to reduce collisions due to improved network performance.	Major potential to reduce collisions due to improved network performance.

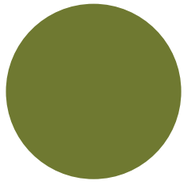
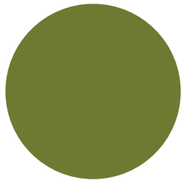
Exhibit 4-45: Transportation Evaluation

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
MODAL INTEGRATION, BALANCE AND CHOICE FOR MOVEMENT OF PEOPLE (COMMUTERS, RECREATION/TOURIST)	Potential to increase attractiveness/ effectiveness of existing, new and improved transit services (qualitative)	Potential to improve attractiveness / effectiveness of inter-regional transit on existing corridors due to widened freeways.	Moderate potential to increase attractiveness / effectiveness of inter-regional transit on existing corridors due to widened freeways. Opportunity to introduce new services on a new corridor over a short distance (Hwy 410 to Hwy 400).	Moderate potential to increase attractiveness / effectiveness of inter-regional transit on existing corridors. Opportunity to introduce new services on a new corridor over a moderate distance (Hwy 401/407 ETR to Hwy 400).	Significant potential to increase attractiveness / effectiveness of inter-regional transit by introducing new services on a new corridor over a moderate distance (West of Milton – Hwy 400).	Significant potential to increase attractiveness / effectiveness of inter-regional transit by introducing new services on a new corridor over the entire study area.	Significant potential to increase attractiveness / effectiveness of inter-regional transit by introducing new services on a new corridor over the entire study area.
Potential to improve modal integration, balance and choice for person trips between communities, employment centers and major transit hubs	Peak period transit mode share (by destination)	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%	York = 36% Toronto = 36% Peel = 16% Halton = 10% Wellington = 3% Waterloo = 9% Hamilton = 9%
	Provision of higher order inter-regional transit services (qualitative)	Higher order inter-regional transit services limited to existing / widened inter-regional freeways.	Limited potential for new higher order inter-regional transit on new corridor over a short distance.	Potential for new higher order inter-regional transit on new corridor over approximately half of the study area.	Potential for new higher order inter-regional transit on new corridor east of Niagara Escarpment areas.	Potential for new higher order inter-regional transit on new corridor over the entire study area.	Potential for new higher order inter-regional transit on new corridor over the entire study area.
	Provision of linkages between inter-regional and regional/ community (local) transit systems (qualitative)	Minor potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors.	Moderate potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors and new corridor linking Vaughan and Brampton systems.	Moderate potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors and new corridor linking Vaughan and Brampton systems.	Major potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors and new corridor linking Vaughan, Brampton and Milton systems.	Major potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors and new corridor linking Vaughan, Brampton and Guelph systems.	Major potential to improve linkages between inter-regional and local transit with improved service integration and new opportunities for station locations and service connections on widened inter-regional corridors and new corridor linking Vaughan, Brampton and Guelph systems.
	Bus operational performance on inter-regional road network (refer to LOS in Traffic Operations)	Improves bus operational performance on existing facilities with improved road network operations.	Improves bus operational performance with improved road network operations and potential for bus rapid transit (BRT) on new corridor.	Improves bus operational performance with improved road network operations and potential for bus rapid transit (BRT) on new corridor.	Improves bus operational performance with improved road network operations and potential for bus rapid transit (BRT) on new corridor.	Improves bus operational performance with improved road network operations and potential for bus rapid transit (BRT) on new corridor.	Improves bus operational performance with improved road network operations and potential for bus rapid transit (BRT) on new corridor.
	Availability/provision of alternate travel modes for tourism/ recreational travel (qualitative)	Potential to provide alternate travel modes for tourism / recreational travel on new bus and rail services.	Potential to provide alternate travel modes for tourism / recreational travel on new transit services, with transit opportunities on new corridor over a short distance.	Potential to provide alternate travel modes for tourism / recreational travel on new transit services, with transit opportunities on new corridor over a short distance.	Potential to provide alternate travel modes for tourism / recreational travel on new transit services, with transit opportunities on new corridor over a longer distance and potentially toward NGTA corridor.	Potential to provide alternate travel modes for tourism / recreational travel on new transit services, with transit opportunities on new corridor across the northern portion of the study area.	Potential to provide alternate travel modes for tourism / recreational travel on new transit services, with transit opportunities on new corridor over the study area, potentially toward NGTA corridor.
	Provision of/ allowance for active transportation measures (e.g., bike lanes, bike racks on buses/ trains) (qualitative)	Results in highest use of local roads for inter-regional trips impacting safety / security for active transportation.	Results in high use of local roads for inter-regional trips impacting safety / security for active transportation. New corridor creates barrier affect to movement by active modes across new facility over a short distance (Hwy 410 to Hwy 400) although this can be mitigated by providing sidewalks / bike lanes on new structures.	Results in lowest use of local roads for inter-regional trips improving safety / security for active transportation users. New corridor creates barrier affect to movement by active modes across new facility over a moderate distance (Hwy 401/407 ETR to Hwy 400) although this can be mitigated by providing sidewalks / bike lanes on new structures.	Results in lowest use of local roads for inter-regional trips improving safety / security for active transportation users. New corridor creates barrier affect to movement by active modes across new facility over a moderate distance (Milton to Hwy 400) although this can be mitigated by providing sidewalks / bike lanes on new structures.	Results in lowest use of local roads for inter-regional trips improving safety / security for active transportation users. New corridor creates barrier affect to movement by active modes across new facility over the entire study area, although this can be mitigated by providing sidewalks / bike lanes on new structures.	Results in lowest use of local roads for inter-regional trips improving safety / security for active transportation users. New corridor creates barrier affect to movement by active modes across new facility over the entire study area, although this can be mitigated by providing sidewalks / bike lanes on new structures.

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
MODAL INTEGRATION, BALANCE AND CHOICE FOR MOVEMENT OF GOODS Potential to improve modal integration, balance and choice for goods movement between ports and terminals, communities and employment centres.	Potential to improve accessibility of inter-modal centres, ports and terminals (qualitative)	Improved inter-regional goods movement network operations with increased roadway capacity improve accessibility of inter-modal facilities.	Improved inter-regional goods movement network operations with a new corridor between Hwy 400 and Hwy 410 and increased roadway capacity improve accessibility of inter-modal facilities.	Improved inter-regional goods movement network operations with a new corridor between Hwy 400 and Hwy 401/407 ETR and increased roadway capacity improve accessibility of inter-modal facilities.	Improved inter-regional goods movement network operations with a new corridor between Hwy 400 and Hwy 401 east of the Niagara Escarpment areas and increased roadway capacity improve accessibility of inter-modal facilities.	Improved inter-regional road network operations with a new corridor between Hwy 400 and Hwy 6 at Guelph and improved connection to Kitchener-Waterloo, and increased roadway capacity improve accessibility of inter-modal facilities.	Improved inter-regional goods movement network operations with a new corridor between Hwy 400 and Hwy 6 north of Hwy 401 and increased roadway capacity improve accessibility of inter-modal facilities.
LINKAGES TO POPULATION AND EMPLOYMENT CENTERS Potential to improve accessibility to Urban Growth Centers, Gateway Economic Centres and Gateway Economic Zones for people and goods movement based on higher order network continuity and connectivity	Availability/provision of higher order linkages between Urban Growth Centers, Gateway Economic Centres and Gateway Economic Zones (qualitative)	No new higher order roadway or transit linkages between Urban Growth Centers beyond base improvements.	New transit linkages and services possible on new higher order transportation corridor between Urban Growth Centres of Vaughan and Brampton.	New transit linkages and services possible on new higher order transportation corridor between Urban Growth Centres of Vaughan and Brampton toward Milton.	New transit linkages and services possible on new higher order transportation corridor between Urban Growth Centres of Vaughan, Brampton and Milton.	New transit linkages and services possible on new higher order transportation corridor between Urban Growth Centres of Vaughan, Brampton and Guelph.	New transit linkages and services possible on new higher order transportation corridor between Urban Growth Centres of Vaughan, Brampton and Milton toward Guelph.
	Accessibility of Urban Growth Centers, Gateway Economic Centres and Gateway Economic Zones (qualitative)	Improves accessibility to Urban Growth Centres and the GTA with additional inter-regional road capacity and transportation network operation improvements; limited improvements to roadway linkages to Guelph.	Improves accessibility to Urban Growth Centres and the GTA with new corridor between Hwy 400 and Hwy 410, additional inter-regional road capacity and transportation network operation improvements; limited roadway linkage improvements to Guelph.	Improves accessibility to Urban Growth Centres and the GTA with new corridor between Hwy 400 and Hwy 401/407 ETR, additional inter-regional road capacity and transportation network operation improvements; limited roadway linkage improvements to Guelph.	Improves accessibility to Urban Growth Centres and the GTA with new corridor between Hwy 400 and Hwy 401 at Milton, additional inter-regional road capacity and transportation network operation improvements; limited roadway linkage improvements to Guelph.	Improves accessibility to Urban Growth Centres and the GTA with new corridor between Hwy 400 and Hwy 6 at Guelph, additional inter-regional road capacity and transportation network operation improvements; limited roadway linkage improvements to Milton.	Improves accessibility to Urban Growth Centres and the GTA with new corridor between Hwy 400 and Hwy 6 north of Hwy 401, additional inter-regional road capacity and transportation network operation improvements; moderate roadway linkage improvements to Milton and Guelph.
	Percentage change in peak hour travel times between Urban Growth Centres	auto improvement = 19.2% transit improvement = no significant change	auto improvement = 19.5% transit improvement = similar to auto improvement for road based transit services	auto improvement = 19.1% transit improvement = similar to auto improvement for road based transit services	auto improvement = 19.6% transit improvement = similar to auto improvement for road based transit services	auto improvement = 20.52% transit improvement = similar to auto improvement for road based transit services	auto improvement = 19.96% transit improvement = similar to auto improvement for road based transit services

Exhibit 4-45: Transportation Evaluation

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
RECREATION AND TOURISM TRAVEL Potential to support recreation and tourism travel within and to/from the study area	Directness of routes between population centers, international gateways and tourist/ recreation destinations (qualitative)	No improvement to directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario. Relies on increased road capacity on existing routes and new / expanded transit services.	Provides limited potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor over a short distance. Increased road capacity on existing routes and new / expanded transit services.	Provides moderate potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor that links to Hwy 401 to Hwy 400 over a moderate distance. Some increased road capacity on existing routes and new / expanded transit services.	Provides significant potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor over a long distance east of the Niagara Escarpment areas. Minimal increase in road capacity on existing routes and new / expanded transit services. Potential for improved directness to Niagara Region and U.S. border if combined with a connection to NGTA corridor.	Provides significant potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor over the entire study area. Minimal increase in road capacity on existing routes and new / expanded transit services. Improved connection via New Hwy 7 to Kitchener-Waterloo enhances directness of travel to southwest Ontario.	Provides significant potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor over the entire study area. Minimal increase in road capacity on existing routes and new/expanded transit services; potential for improved directness to Niagara Region and U.S. border if combined with a connection to NGTA corridor.
	Peak period (summer/weekend) transportation system performance on key inter-regional corridors – forecast volume/ capacity issues at critical screenlines	East of Guelph – 0.91 West of Milton – 1.07 East of Winston Churchill (WC Blvd) – 0.87 East of Highway 10 – 0.95 East of Highway 50 – 0.69 West of Highway 400 – 0.78 North of Highway 407 – 1.27	East of Guelph – 0.90 West of Milton – 1.07 East of Winston Churchill (WC Blvd) – 0.95 East of Highway 10 – 0.99 East of Highway 50 – 0.82 West of Highway 400 – 0.94 North of Highway 407 – 1.27	East of Guelph – 0.90 West of Milton – 1.07 East of Winston Churchill (WC Blvd) – 0.92 East of Highway 10 – 0.96 East of Highway 50 – 0.86 West of Highway 400 – 0.94 North of Highway 407 – 1.24	East of Guelph – 0.93 West of Milton – 0.96 East of Winston Churchill (WC Blvd) – 0.90 East of Highway 10 – 0.96 East of Highway 50 – 0.87 West of Highway 400 – 0.94 North of Highway 407 – 1.26	East of Guelph – 0.89 West of Milton – 0.99 East of Winston Churchill (WC Blvd) – 0.90 East of Highway 10 – 0.97 East of Highway 50 – 0.85 West of Highway 400 – 0.95 North of Highway 407 – 1.29	East of Guelph – 0.86 West of Milton – 1.00 East of Winston Churchill (WC Blvd) – 0.90 East of Highway 10 – 0.96 East of Highway 50 – 0.86 West of Highway 400 – 0.94 North of Highway 407 – 1.27
	Diversion of summer recreational trips from local and regional roadways. (qualitative)	Potential to divert summer / recreational trips from local / regional roads in close proximity to existing corridors due to increased freeway capacity on alternate routes.	Potential to divert summer / recreational trips from local / regional roads to new corridor between Hwy 400 and Hwy 410 and from roads in close proximity to widened freeways.	Potential to divert summer / recreational trips from local / regional roads to new corridor over a moderate distance between Hwy 400 and Hwy 401/407 ETR.	Potential to divert summer / recreational trips from local / regional roads to new corridor over a long distance between Hwy 400 and Hwy 401 east of the Niagara Escarpment areas.	Potential to divert summer / recreational trips from local / regional roads to new corridor over the entire study area between Hwy 400 and Hwy 6 at Guelph.	Potential to divert summer / recreational trips from local / regional roads to new corridor over the entire study area between Hwy 400 and Hwy 6 north of Hwy 401.

FACTOR	MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
SUMMARY **TRANSPORTATION**		**LEAST PREFERRED** • Addresses future capacity needs more to the east end of the study area • Provides significantly improved traffic operations and is best at reducing delays on the inter-regional network for autos and trucks, though does the least to improve operations on local roads • Does not provide opportunities for new transit linkages through new corridor • Does not provide significant redundancy benefits and results in higher use of local road network for inter-regional auto and truck trips • Provides least opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)	**PREFERRED** • Addresses future capacity needs • Provides least improvement to traffic operations and results in greater delays on the inter-regional network • Provides modest opportunities for transit linkages on new corridor due to limited length of new corridor • Provides limited redundancy benefits and results in higher use of local road network for inter-regional auto and truck trips • Provides limited opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)	**MODERATELY PREFERRED** • Addresses future capacity needs • Provides significantly improved traffic operations and is the second best at reducing delays on the inter-regional network for autos and trucks • Provides moderate opportunities for transit linkages on new corridor • Provides moderate redundancy benefits and is best at reducing use of local road network for inter-regional auto and truck trips • Provides limited opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)	**MOST PREFERRED** • Is second best at addressing future capacity needs • Provides significantly improved traffic operations and is the best at reducing delays on the inter-regional network for autos and trucks • Provides greatest opportunities for transit linkages on new corridor, with highest potential transit demand in Milton area • Provides significant redundancy benefits and is second best at reducing use of local road network for inter-regional auto and truck trips • Provides greatest opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)	**MOST PREFERRED** • Is second best at addressing future capacity needs • Provides significantly improved traffic operations and reduced delays on the inter-regional network for autos and trucks • Provides opportunities for transit linkages on new corridor • Provides significant redundancy benefits and reduces use of local road network for inter-regional auto and truck trips • Provides moderate opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)	**MOST PREFERRED** • Best addresses future capacity needs • Provides significantly improved traffic operations and is second best at reducing delays on the inter-regional network for autos and trucks • Provides opportunities for transit linkages on new corridor • Provides significant redundancy benefits and reduces use of local road network for inter-regional auto and truck trips • Provides moderate opportunities for modal integration of people and goods movement (between Urban Growth Centres, transit hubs, employment centres)
							
OVERALL SUMMARY		Alternatives 4-3, 4-4 and 4-5 perform best in terms of overall traffic operations (e.g., v/c ratios at critical screenlines, percentage of inter-regional trips on inter-regional facilities) and result in reduced delays on both the inter-regional and local road network for auto and truck trips. Alternative 4-3 provides the greatest opportunity for new linkages, including transit connections to Milton where there is potential to serve a substantial growth in future demand. Alternative 4-2 performs second best in terms of overall traffic operations, but it does not provide significant opportunities for modal integration and new linkages. Alternatives 3-1 and 4-1 address future capacity needs but provide only moderate potential for transit linkages, limited redundancy benefits, and result in much higher use of local roads by longer distance inter-regional traffic.					

* "Inter-regional trip" defined as trips with a length greater than average commuting distance within study area (>20km)
^ Total person demand between Urban Growth Centres, 3-hour AM peak period
+ "Inter-regional network" defined as provincial freeways and "relevant" highway systems – i.e., where a local highway is planned to be improved as part of a transportation alternatives (e.g., County Road 124).

4.9.3. Sensitivity Analysis

Dedicated Truck Facility

Currently, Highway 401 experiences significant truck volumes during the day and even throughout the evening off-peak periods. These demands are forecast to grow significantly by 2031 as described in the GTA West Area *Transportation System Problems and Opportunities Report* (July 2009, Updated December 2010). Since one of the key objectives for the GTA West study is to improve goods movement in the region, the Study Team also considered the feasibility of a new GTA West corridor operating as a dedicated truck only facility. In addition to linking manufacturing and distribution related employment areas with a dedicated facility, this option would permit longer distance truck trips to avoid congested road segments during peak periods. If enough truck traffic could be diverted from existing highway facilities, this could also reduce congestion and provide travel time savings benefits to automobile and transit travel using these corridors during peak periods.

An integrated GTA West and NGTA network was used for this test to examine the feasibility of truck-only corridors in both preliminary study areas simultaneously. The network combination of the GTA West Alternative 4-3 and NGTA Alternative 4-3, which both connect to Highway 401 in the Milton area, was chosen for this test since this option was considered to provide the most integrated goods movement corridor. In addition to traversing through the majority of the preliminary study areas, these two alternatives provide connectivity between Highways 400 and 401 and south to the border crossings in Niagara, making this an attractive route for long-distance truck trips.

The Study Team also reviewed the GTA West Alternative 4-3 as a truck only facility without the NGTA corridor connection. The GTA West Alternative 3-1 GGH Model run was selected to test the truck only facility since the new corridor would not be used by cars and the trip distribution and transit mode shares would be similar to those under the Group #3 alternative. The existing highways were assumed at similar configuration as under GTA West Alternative 4-3 with mixed traffic. In the results discussed below, "truck only facility" refers to both NGTA and GTA West corridors as dedicated truck facilities, unless specified as a GTA West dedicated truck corridor.

Exhibit 4-46 summarizes the 2031 PM peak hour truck volume demands and passenger car equivalencies using the dedicated truck facility in the GTA West preliminary study area. Forecasts suggest that the truck demands would be equivalent to two freeway lanes in each direction. Truck traffic using the facility would be higher in the off peak hours as expected from an average truck traffic profile over the course of a day.

CORRIDOR SEGMENT	TRAFFIC VOLUME (CAR EQUIVALENTS)	
	EASTBOUND	WESTBOUND
Highway 401 (west of Milton) to HP BATS Corridor	1,660 (3,320)	1,580 (3,160)
HP BATS Corridor to Highway 410	1,765 (3,530)	1,985 (3,970)
Highway 410 to Highway 427	1,700 (3,400)	1,875 (3,750)
Highway 427 to Highway 400	2,215 (4,430)	1,690 (3,380)

Exhibit 4-46: 2031 PM Peak Hour Truck Volumes between Highway 401 and Highway 400

Screenline evaluation results are presented in **Exhibit 4-47**, and show that the option of providing a truck only facility on the GTA West corridor will provide sufficient screenline capacity to accommodate the projected demands at a similar or better level than the scenario with a mixed use facility. The dedicated truck facility frees up capacity on existing inter-regional facilities by diverting considerable truck demand. Since one truck is equivalent to more than one passenger car, even a smaller traffic volume on the truck only facility than on a mixed traffic facility could result in comparable congestion relief. Truck traffic diversion plots, from existing facilities to the GTA West truck only corridor, indicate that most of the truck traffic is diverted from inter-regional facilities such as Highway 401, 407 ETR, and parts of Highways 403 and 400.

The demands on the truck only facility suggest that the section between Highway 427 and Highway 400 may not require six lanes as would be required under GTA West Alternative 4-3 with mixed traffic. With GTA West Alternative 4-3 as a mixed traffic or dedicated truck facility, the section of Highway 401 between 407 ETR and Milton would operate over capacity with similar V/C ratios. With the mixed use facility there is flexibility to widen the new corridor to six lanes to provide additional capacity to relieve the over capacity situation on Highway 401. In the truckway scenario, a widening might attract a few additional trucks from Highway 401, but this

SCREENLINE	GTA WEST ALTERNATIVE 4-3 (MIXED TRAFFIC)		GTA WEST ALTERNATIVE 4-3 AND NGTA ALTERNATIVE 4-3 (DEDICATED TRUCK FACILITY)		GTA WEST ALTERNATIVE 4-3 (DEDICATED TRUCK FACILITY)	
	Lanes on GTA West Corridor	Screenline V/C	Lanes on GTAW Corridor	Screenline V/C	Lanes on GTA West Corridor	Screenline V/C
East of Guelph	-	0.84	-	0.88	-	0.82
West of Milton	4	0.86	4	0.73	4	0.71
East of Winston Churchill Blvd	4	0.75	4	0.74	4	0.73
East of Highway 10	4	0.76	4	0.76	4	0.76
East of Highway 50	4	0.79	4	0.78	4	0.78
West of Highway 400	6	0.87	6	0.82	6	0.82

Exhibit 4-47: 2031 PM Peak Hour Screenline Evaluation for GTA West 4-3 Alternative Scenarios

would not necessarily provide sufficient auto capacity on Highway 401, and may necessitate the need for additional widening to 12 lanes, resulting in the need to protect for a core-collector system through Milton.

With the truckway alternatives, the share of the auto and truck travel operating at LOS D or better on the inter-regional road network is improved compared to the Base Case and compared to Alternative 4-3 operating as a mixed use facility. This results in a noticeable delay savings for truck and auto traffic using all inter-regional facilities. One drawback of the truck only facility is that some auto traffic would be diverted to local road network, most of it within the northern portions of Brampton and Vaughan, and to the north of the new corridor.

Based on the results of the sensitivity test, there appears to be a combination of benefits and drawbacks that may accrue if the GTA West new transportation corridor was to be operated as a truck only facility. Before a definitive conclusion on the viability of this alternative can be reached, additional work would need to be completed to better understand the benefits, the design and operational issues that may need to be addressed and the local implications and potential mitigation measures that could be implemented. As such, the Study Team believes that the truck only facility should be carried forward to Stage 2 of the EA Study for consideration.

Connection to the NGTA Corridor

As the GTA West and NGTA studies are being conducted simultaneously, they are being coordinated in terms of the assessment and development of recommended alternatives. To a large degree, traffic patterns between the two preliminary study areas are different and distinct, as were the problems and opportunities that were highlighted in previous reports; however, it is also recognized there are considerable longer distance trips which may benefit from a connection between the two facilities.

To assist in understanding how a road connection between the two corridors would influence the network performance, the Study Team tested one of the GTA West alternatives modeled in combination with one of the NGTA alternatives. Since both NGTA Alternative 4-3 and GTA West Alternative 4-3 connect to Highway 401 in Halton, the combination of these two corridors was considered to likely have the most interaction between the two study alternatives.

The modeling results suggest that the introduction of NGTA Alternative 4-3 would worsen conditions at the screenline east of Guelph from moderate to major congestion levels. This can be attributed to higher traffic volumes and greater congestion on Highway 401. The screenline west of Regional Road 25 in Milton would also experience slightly higher congestion. The screenlines east of the Highway 401 / 407 ETR interchange would not experience any operational differences due to the NGTA Alternative 4-3. The analysis suggests that capacity impact of an NGTA connection to Highway 401 would be concentrated around the Milton area.

In terms of people and goods movement measures, the combination of GTA West Alternative 4-3 and NGTA Alternative 4-3 makes very little difference in terms of the network evaluation statistics within the GTA West preliminary study area. In some categories, such as percentage of inter-regional road network operating at LOS D and total delays, the combined alternative would perform marginally worse than GTA West Alternative 4-3 combined with NGTA Alternative 3-1. This is due to the additional travel demand on Highway 401 from the NGTA corridor connection as the difference to the local network is insignificant.

4.9.4. Guelph to Cambridge Improvement Needs

As noted in the GTA West Area *Transportation System Problems and Opportunities Report* (July 2009, Updated December 2010), in 1998 MTO transferred jurisdiction for the 64 kilometres section of Highway 24, from Highway 401 in Cambridge to Highway 9, to the County of Wellington, Region of Waterloo, and Region of Peel, respectively. For the 11 kilometres section of former Highway 24 between the City of Cambridge and the City of Guelph, now referred to as County Road 24 and County Road 124 (CR24 / CR124), MTO completed an Environmental Study Report in 1996 that concluded that there was justification for this section of road to be widened to a four lane facility.
The County of Wellington completed a Role and Function Study for this facility in 2007 and concluded that this section of road functions as an integral part of a significantly longer economic corridor that serves as a by-pass for the congested GTA highway system for travel between Highway 401 west of Waterloo Region and location north of the GTA.

The *Area Transportation System Problems and Opportunities Report* (July 2009, Updated December 2010) reviewed 2007 volumes on this section of CR 24 / CR124 and observed that the current two-lane roadway is operating at capacity during typical PM peak periods with peak directional volumes exceeding 1,000 vehicles per hour on the section between Maple Grove Road and Wellington County Road 32. Preliminary forecasts for 2031 (using an assumed truck percentage of 10%) concluded that growth in travel demand in this corridor would continue, with PM peak hour conditions reaching LOS E-F for the entire two-lane section of this facility. On the existing four-lane section, between Highway 401 and Maple Grove Road, the 2031 forecasts indicate a LOS C condition during peak hours.

Updated forecasts were developed for this section of CR 24 / CR 124 as part of the updated modeling work completed for the GTA West study. Based on forecasts of future travel demands with GTA West Alternative 4-3 in place, approximately 50% of the trips forecast to use this section of CR 124 are traveling between the cities of Cambridge and Guelph. Most of the remaining trips are between Guelph and other destinations within Waterloo Region. The number of trips using CR 124 for longer distance travel is inconsequential.

The analysis of forecast travel patterns for CR24 / CR 124 suggest that although traffic demands are expected to continue to grow on the CR 24 / CR 124 corridor, much of this growth is related to continued growth in population and employment within the Region of Waterloo and County of Wellington. Updated forecasts developed for this study suggest that the introduction of GTA West Alternative 4-3 will help to reduce long distance traffic using the CR 24 / CR 124 corridor as a by-pass around the GTA.

A summary of the Transportation analysis findings is provided in **Section 4.11**.

4.10. EVALUATION OF ALTERNATIVES – COST AND CONSTRUCTABILITY

4.10.1. Methodology

The Study Team used the 2031 lane requirements for the preliminary study area's highway facilities as the primary input to evaluate constructability and cost. These lane requirements were developed as part of the travel demand forecasting work for the Group #3 and #4 transportation alternatives.

In order to assess and compare the alternatives, it was necessary to first complete sufficient conceptual design work to determine the 'footprint' of the improvement scenarios. In general, the footprint includes property required for additional lanes, new interchanges, new structures, improved shoulders (where necessary), high occupancy vehicle (HOV) facilities, realigned interchange ramps, realigned local / service roads and roadside drainage. These footprints were also important inputs in determining potential natural environment, socio-economic, transportation, and other impacts.

The majority of the work discussed below (regarding footprint identification, constructability and staging assessment and cost estimation) has been prepared to a conceptual level of design only, sufficient for the relative assessment and comparison of transportation alternatives.

Constructability and Staging Methodology

The Group #3 and Group #4 alternatives involve improvements to a large and complex network of highways, including a number of interchanges, structures and other related facilities. As mentioned above, in order to assess the potential impacts of the alternatives, it was necessary to identify a 'footprint' for each. The footprint reflects the required right-of-way (ROW) to accommodate the proposed improvements identified for each alternative.

Given the scale of the improvements, a generalized approach was taken for identifying the footprints of most of the mainline highway sections and interchanges. In simple terms, the footprints for these mainline sections were identified by applying a linear template along the highway centreline, which reflects the ROW width required for an improvement scenario (i.e., widening).

It is understood that there are some elements of the transportation network under consideration that are highly complex and / or constrained, and that these require a greater level of detail in their evaluation. These 'special areas' include major freeway-to-freeway interchanges, major structures, and other complex construction elements. For these areas, improvements were typically developed to the level of functional design. This approach yielded footprints that reflected the ROW required for the final design, and also for staging strategies. Furthermore, it addressed the major constraints of each special area that may require special design and / or construction techniques.

The five special areas identified as having particular challenges are the connections between a new GTA West transportation corridor and the following locations:

- Highway 401 in west Halton Region (i.e., in the proximity of the Town of Milton);
- Highway 401 / 407 ETR in Peel Region;
- Highway 410 extension in Peel Region;
- Highway 427 extension west of Kleinburg in City of Vaughan; and
- Highway 400 in City of Vaughan.

Wherever possible, improvements to the special areas were designed such that construction could be staged with minimal traffic disruption. This approach often involved identifying ramp, mainline and local road relocations. Where road or ramp closures were unavoidable, this was noted as an impact in the assessment of alternatives.

Assumptions regarding lane width, drainage offset, etc. were applied where appropriate for each of the special areas in order to generate the required cross-sections. Typically, the special area footprints were developed by applying these cross-sections to widened and / or relocated elements of the facility in order to identify the required ROW, with relocations generally resulting in the greatest footprint impacts.

To develop the footprint of new freeway sections, it was necessary to first generate conceptual horizontal alignments. While route planning is not within the scope of this stage of the study, these conceptual alignments were important in determining an approximate number of interchanges, structures, and other freeway elements. This information was in turn used to identify a new freeway footprint by applying ROW and interchange templates along the conceptual alignment. In this case, a 170 m ROW for the proposed GTA West transportation corridor (including 110 m ROW for freeway and 60 m for transitway) was applied per the MTO *Draft Safety Standards Manual for New Rural Freeways*.

Cost Estimation Methodology

Given the large scale of the improvement alternatives and the high-level nature of the current stage of study, it was necessary to categorize the range of work into major items in cost estimation. This high level approach was based on several assumptions that are discussed in the *GTA West Constructability and Cost Summary Technical Memorandum* (February 2011).

In addition to the major items described above, costs for each of the special areas were identified for which individual cost estimates were required due to their high complexity.

The MTO P*arametric Estimating Guide, 2007 (PEG)* was initially used for the development of unit costs. The PEG provides unit costs for several items including road reconstruction, major widening, new roadway construction, and various structure types.

For certain items such as structures, the PEG costs could be applied and adjusted for contingencies, staging, complexity, etc. Once the cost was adjusted for inflation, as appropriate, the unit cost was applied to the current study. Where appropriate, factors were applied to account for unique contingencies, complex staging, major utilities relocations / impacts, economy-of-scale efficiencies, construction locale (i.e. urban, rural, Greenfield) or other issues that could be expected for a given location.

A limitation of the PEG is that for some major items, such as interchanges, little specific guidance is provided. In order to supplement the PEG, MTO's Highway Costing (HiCo) System was employed: HiCo is a database of relatively recent contract bids that typically provides users with the tender award, as well as the average of the three low bids.

In order to derive major item costs for the current assignment, several examples of recent projects were identified, of sufficient similarity to the Group #3 and Group #4 alternatives. Contracts were limited to those on 400-series highways in MTO's Central, Eastern and Southwestern Regions. Once relevant contracts had been selected, the value of each was adjusted to a base year of 2010. Average unit costs were then derived for each item on the basis of per-kilometre (widening), per-square-metre (structures), per-interchange, etc.

For costing of the five special areas, where specific sites had been the subject of recent improvement feasibility studies, this more detailed information was used as the primary source for developing costs, as appropriate. Where specific studies were unavailable or did not provide suitable guidance, the PEG served as the primary input for costs. While the PEG has limitations for this application, as noted above, it was the best source for an objective, high-level cost estimate of this nature, and provided an indication of relative cost. Costs were adjusted to the 2010 base year.

To overcome the limitations of the PEG for the special items, input was sought from the MTO Contracts Office and other professionals, as appropriate. The PEG estimate was revised by applying a variety of adjustments for items such as staging, complexity, etc. In this way, the resulting cost estimates included more subjectivity than those of the other major items.

As noted, costs for the new freeway components of the Group #4 alternatives were calculated on per-kilometre, per-interchange, per-structure, etc., basis, where possible; however, there were some locations that required special attention to develop costs given their complexity. At major watercourse crossings such as the Humber River and Credit River, floodline and contour mapping was reviewed to identify potential bridge crossing requirements.

Costs for engineering, project management, construction administration, and other relevant items were applied to the PEG- and HiCo-based estimates. The initial sources for these costs were recent planning projects; as with the other estimates, these values were adjusted based on professional judgment in consultation with MTO and others.

To account for inflation, costs obtained from the PEG and HiCo were adjusted to 2010 dollars by direct application of MTO's Tender Price Index (TPI).

4.10.2. Findings

Exhibit 4-48 describes the evaluation of the alternatives for Cost and Constructability, as presented at PIC #4. The evaluation is summarized below.

Cost Estimation Findings

Overall, Alternative 3-1 was the least preferred in terms of the constructability and staging, and had the highest cost. Based on a high-level analysis of construction costs, Alternative 3-1 is between 4% and 14% more expensive than the Group #4 alternatives. Group #4 alternatives differ by up to 9%.

GROUP ALTERNATIVE	GROUP #3	GROUP #4				
	3-1	4-1	4-2	4-3	4-4	4-5
Cost Range ($B)	4.9 - 5.4	4.3 - 4.8	4.7 - 5.2	4.6 - 5.1	4.4 - 4.9	4.3 - 4.8

A range of construction costs was assumed for each alternative because of the high level nature of the analysis. The range of construction costs included the following items:

- cost of new freeways including interchanges and bridges (Group # 4 alternatives);
- cost of new bridges at major watercourse crossings (Group # 4 alternatives);
- cost of new lanes on existing freeways, including any modifications / replacements to existing bridges and interchange ramps (all alternatives);
- cost of new freeway to freeway interchanges (all alternatives);
- cost of property requirements based on agricultural, residential, industrial or commercial land use (all alternatives); and
- cost of contingences to cover all other items including utilities, Engineering, etc.

Constructability and Staging Findings

Amongst all alternatives, improvements to typical mainline highway sections and arterial interchanges were of similar complexity in terms of constructability and staging. Conversely, several of the special areas described above exhibited substantial differences in constructability and staging challenges across the transportation alternatives; thus, these special areas were the primary input to the evaluation and comparison of alternatives.

Alternative 3-1 would involve the most significant construction and staging issues for the 407 ETR and potential impacts to the future 407 transitway. This alternative would require major reconstruction and reconfiguration of the existing freeway-to-freeway interchanges to accommodate an express-collector system, with numerous structural replacements, ramp relocations, and possible major utilities impacts. Staging impacts were also much greater with Alternative 3-1, requiring the closure of directional ramps for extended periods during construction (i.e., entire season). There may be difficulty in widening the 407 ETR through connections with existing highways (Highways 400, 427 410 and 401) due to the complex layout of ramps and structures (including bridge piers). In addition, duration of construction, risk, disruption to the 407 ETR and adjacent roadway, major utilities, technical challenges and other impacts represent potential issues during construction. Detailed analysis is required to confirm the feasibility of retaining the existing structures.

A dedicated transitway is proposed by MTO along the 407 ETR corridor, which will initially include a separate and grade-separated two-lane roadway and stations with commuter parking. The widening of the 407 ETR and interchange improvements for Alternative 3-1 may have significant impacts to the transit infrastructure. There may be impacts to transit stations, commuter lots and transitway infrastructure, including stormwater management, due to tight property limits and access. Key challenges include potential changes in road profile, limited flexibility in modifying the location of 407 ETR transitway stations and the close proximity to the existing hydro corridor. Potential impacts to the transitway include: horizontal and vertical alignments, ramps and

structures, grade separations, adjacent arterial roads, and access to stations and parking areas.

Additional right-of-way requirements could significantly impact properties adjacent to freeways through built up areas. Alternatives 4-1 and 4-2 require additional lanes along Highway 401 between 407 ETR and Regional Road 25 which will require conversion to a collector-distributor system. Additional costs and staging requirements will come with widening Highway 401 in this area. Traffic staging issues will include the potential for increased delays during the construction period along each widened facility. In addition, the interchange of Alternative 4-2 with Highway 401 and 407 ETR requires complex staging. In general, Alternative 3-1 exhibited more challenging constructability and staging issues than Group #4 alternatives, primarily due to impacts to the 407 ETR.

The Group #4 alternatives (i.e. Alternatives 4-1, 4-2, 4-3, 4-4 and 4-5) assume that capacity improvements are achieved by new freeway construction in addition to some existing highway widening. The Group #4 alternatives differ from one another in the length and location of freeway segment(s). Consequently, Group #4 alternatives that have a larger footprint have the potential to result in more substantial natural and socio-environmental impacts. By comparison, less property is required for Alternative 3-1; however, the property that is required is along existing freeways through developed areas, which would impact existing built-up commercial, industrial and institutional lands.

Alternatives 4-4 and 4-5 will require the longest length of new construction through rural lands. These alternatives will have additional constructability challenges associated with crossing the Niagara Escarpment and greater number of watercourse crossings. Alternative 4-3 will require a moderate length of new construction with minimal widening of existing freeways.

A summary of the Cost and Constructability analysis findings is provided in **Section 4.11**.

4.11. SUMMARY OF EVALUATION FINDINGS

Following the analysis outlined in **Section 4.1**, the Study Team members across the factor-specific specialties collectively participated in the reasoned argument evaluation. This was completed using both the quantitative and qualitative measures of potential effects discussed in **Section 4.5** through **Section 4.10** to highlight the advantages and disadvantages associated with the short-listed Group #3 and Group #4 alternatives. **Exhibit 4-49** provides a summary of the overall assessment of the preliminary planning alternatives. Note that the circles only represent comparisons within each criterion across the alternatives, and do not compare the relative importance of each criterion.

The following summarizes the rationale for carrying forward Alternatives 4-2 and 4-3 for further consideration and consultation with agencies, municipalities, First Nations and the public.

Natural Environment Summary

Alternative 3-1 results in the fewest impacts in most criteria in the natural environment factor. Impacts are on the fringe of sensitive areas that have already been disturbed and most can be mitigated with standard mitigation measures.

Alternatives 4-1, 4-2 and 4-3 result in more potential impacts than Alternative 3-1, because of new footprints in new corridor sections. These alternatives are considered relatively moderate and impacts can be mitigated through route location and design. Alternative 4-1 is the shortest of the new corridor sections and therefore has slightly fewer impacts than Alternatives 4-2 and 4-3. Alternatives 4-4 and 4-5 result in significantly higher impacts to the natural environment because they cross many sensitive aquatic and terrestrial features and designated areas at the edge and west of the Niagara Escarpment. These sensitive features include evaluated wetland complexes, wildlife SAR, ESAs and ANSIs that are quite large and in many cases will be difficult (or impractical) to avoid. Therefore, mitigation of the impacts to natural environment for Alternatives 4-4 and 4-5 is difficult and impacts of new footprints in sensitive areas are expected to require compensation for loss of habitat (e.g. replacement of habitat), etc.

Alternative 3-1 is the most preferred from a natural environment perspective. Alternatives 4-1, 4-2 and 4-3 all result in relatively similar moderate impacts. Alternatives 4-4 and 4-5 result in significantly higher impacts than the other alternatives.

Land Use / Social Environment Summary

Although Alternative 3-1 will likely result in the fewest direct impacts on existing land uses, properties and agricultural lands, it is least preferred because it does not serve future growth as well as the Group #4 alternatives and has major impacts on provincial and municipal infrastructure. All the Group #4 alternatives result in higher direct impacts to existing land uses, properties and agricultural lands than Alternative 3-1; however, they are more compatible with future growth / land use patterns in York, Peel and Halton Regions. Alternative 4-1 is only moderately preferred as it does not support future growth areas and land use in Peel and Halton Regions, due to the shorter length of the new transportation corridor, as are Alternatives 4-2 and 4-3. Although Alternatives 4-4 and 4-5 support future growth, they are less desirable as they result in higher direct impacts to existing land uses, properties and agricultural lands.

Alternatives 4-2 and 4-3 are the most preferred in the land use / socio economic factor because they best satisfy and balance land use planning policies and goals while minimizing impacts to community features, properties and existing infrastructure along existing highways as well as prime agricultural land in the preliminary study area. Alternatives 4-2 and 4-3 are either similar or more preferred than Alternatives 3-1, 4-4 or 4-5 in most evaluation criteria in this factor group. Alternatives 4-2 and 4-3 are slightly better than Alternative 4-1 because they both extend to Milton.

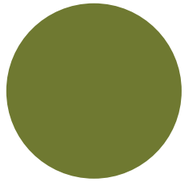
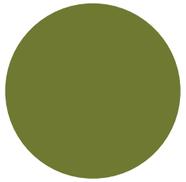
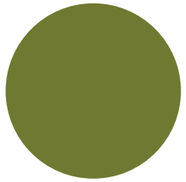
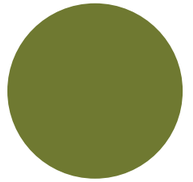
Cultural Environment Summary

Alternative 3-1 impacts the least number of built heritage resources and has the least impact on cultural landscape because it does not include a new corridor section or a new escarpment crossing. It also has least potential to impact archaeological resources within existing highway rights-of-way, due to previous disturbance of land in footprint area.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
6.1 Potential to ease implementation considering relative cost, relative property impacts, feasibility / difficulty and requirements for environmental mitigation.	6.1.1 Cost (range. $B)	4.9 - 5.4	4.3 - 4.8	4.7 - 5.2	4.6 - 5.1	4.4 - 4.9	4.3 - 4.8
	6.1.2 Feasibility of implementation (including interchange reconstruction requirements, impacts on existing schemes, etc.)	Less property is required for Alternative 3-1; however, property required is along existing freeways through developed areas which will impact existing built-up commercial, industrial and institutional lands. Property constraints in many locations by urban development for widening beyond 10 lanes. Existing six, eight and 10 lane sections will be severely affected by conversion to express / collector system. Rail bridge crossing may require major detour of rail lines. 407 ETR Connections with Existing Highways 400, 427, 410 and 401: • Difficulty in widening the 407 ETR through freeway- to- freeway interchanges due to the complex layout of ramps and structures (including bridge piers). • The freeway-to-freeway interchanges may need to be rebuilt to accommodate a core-collector system; however, a detailed analysis is required to confirm the feasibility of keeping the existing structures. • Requires replacement of all bridges crossing existing 407 ETR, and realignment of arterial crossings for new bridge(s) to maintain traffic. 407 ETR Transitway: • Limited flexibility in modifying the location of 407 ETR Transitway Stations. This alternative impacts the viability of several proposed transit stations due to tight property limit and access. • Supporting Transitway infrastructure, including storm water management and commuter lots may not fit.	More property is required for new corridor; however, most property required is through undeveloped lands. Multi-span bridges are required over approximately seven watercourses along the new corridor. Impacts to proposed development plans at connection to existing freeways. Connection with Highway 400 in Vaughan: • Conflicts with proposed development plans along the Highway 400 corridor. • Potential conflicts with adjacent interchanges along Highway 401 (King Road and Teston Road). • Potential impacts to the King City Airport, north of King-Vaughan Road. Connection with Highway 427 in Bolton: • Current EA for Highway 427 extension ends at Major Mackenzie Drive, south of new corridor. • Further extension of Highway 427 to new corridor must consider CPR Vaughan intermodal facility, realignment of Huntington Road, and minimize construction impacts to the Humber River and Rainbow Creek crossings. • Conflicts with proposed development by the municipality in the area. Connection with Highway 410 in Caledon: • Potential impacts to natural features such as the Heart Lake Conservation lands and Greenbelt areas.	More property is required for new corridor; however, most property required is through undeveloped lands. Multi-span bridges are required over approximately nine watercourses along the new corridor. Impacts to proposed development plans at connection to existing freeways. Connection with Highway 400 in Vaughan: • Potential conflicts with adjacent interchanges along Highway 401 (King Road and Teston Road). • Potential impacts to the King City Airport, north of King-Vaughan Road. Connection with Highway 427 in Bolton: • Current EA for Highway 427 extension ends at Major Mackenzie Drive, south of new corridor. • Further extension of Highway 427 to new corridor must consider CPR Vaughan intermodal facility, realignment of Huntington Road, and minimize construction impacts to the Humber River and Rainbow Creek crossings. Connection with Highway 410 in Caledon: • Potential impacts to natural features such as the Heart Lake Conservation lands and Greenbelt areas. • Conflicts with integrating new corridor with existing Highway 410 extension north of Mayfield Road (i.e., Highway 410 extension designed to 4-lane maximum). • Potential conflicts to existing subdivisions (i.e., Valleywood), and planned developments.	More property is required for new corridor; however, most property required is through undeveloped lands. Multi-span bridges are required over approximately 10 watercourses along the new corridor. Impacts to proposed development plans at connection to existing freeways. Connection with Highway 400 in Vaughan: • Potential conflicts with adjacent interchanges along Highway 401 (King Road and Teston Road). • Potential impacts to the King City Airport, north of King-Vaughan Road. Connection with Highway 427 in Bolton: • Current EA for Highway 427 extension ends at Major Mackenzie Drive, south of new corridor. • Further extension of Highway 427 to new corridor must consider CPR Vaughan intermodal facility, realignment of Huntington Road, and minimize construction impacts to the Humber River and Rainbow Creek crossings. Connection with Highway 410 in Caledon: • Potential impacts to natural features such as the Heart Lake Conservation lands and Greenbelt areas. • Conflicts with integrating new corridor with existing Highway 410 extension north of Mayfield Road (i.e., Highway 410 extension designed to 4-lane maximum). • Potential conflicts to existing subdivisions (i.e., Valleywood) and planned developments.	More property is required for new corridor; however, most property required is through undeveloped lands. Multi-span bridges are required over approximately 14 watercourses along the new corridor. Impacts to proposed development plans at connection to existing freeways. Connection with Highway 400 in Vaughan: • Potential conflicts with adjacent interchanges along Highway 401 (King Road and Teston Road). • Potential impacts to the King City Airport, north of King-Vaughan Road. Connection with Highway 427 in Bolton: • Current EA for Highway 427 extension ends at Major Mackenzie Drive, south of new corridor. • Further extension of Highway 427 to new corridor must consider CPR Vaughan intermodal facility, realignment of Huntington Road, and minimize construction impacts to the Humber River and Rainbow Creek crossings. Connection with Highway 410 in Caledon: • Potential impacts to natural features such as the Heart Lake Conservation lands and Greenbelt areas. • Conflicts with integrating new corridor with existing Highway 410 extension north of Mayfield Road (i.e., Highway 410 extension designed to 4-lane maximum). • Potential conflicts to existing subdivisions (i.e., Valleywood) and planned developments.	More property is required for new corridor; however, most property required is through undeveloped lands. Multi-span bridges are required over approximately 12 watercourses along the new corridor. Impacts to proposed development plans at connection to existing freeways. Connection with Highway 400 in Vaughan: • Potential conflicts with adjacent interchanges along Highway 401 (King Road and Teston Road). • Potential impacts to the King City Airport, north of King-Vaughan Road. Connection with Highway 427 in Bolton: • Current EA for Highway 427 extension ends at Major Mackenzie Drive, south of new corridor. • Further extension of Highway 427 to new corridor must consider CPR Vaughan intermodal facility, realignment of Huntington Road, and minimize construction impacts to the Humber River and Rainbow Creek crossings. Connection with Highway 410 in Caledon: • Potential impacts to natural features such as the Heart Lake Conservation lands and Greenbelt areas. • Conflicts with integrating new corridor with existing Highway 410 extension north of Mayfield Road (i.e., Highway 410 extension designed to 4-lane maximum). • Potential conflicts to existing subdivisions (i.e., Valleywood) and planned developments

Exhibit 4-48: Cost and Constructability Evaluation

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
		• Limited flexibility in modifying the location of 407 ETR Transitway Stations due to the proximity to the existing hydro corridor. • Potential impacts to the Transitway include: vertical profile, ramps and structures, grade separations, adjacent arterial roads and access to stations and parking areas.	• Conflicts with integrating new corridor with existing Highway 410 extension north of Mayfield Road (i.e., Highway 410 extension designed to 4-lane maximum). • Potential conflicts to existing subdivisions (i.e., Valleywood), and planned developments.	Connection with Highway 401 / 407 ETR in Peel: • Conflicts with existing freeway-to-freeway interchange ramps and bridges at Highway 401 and 407 ETR. • Potential conflict with adjacent interchanges on Highway 401 (Trafalgar Road and Winston Churchill Blvd) and local road network. • Will likely require a new core-collector system on this section of Highway 401 which would require replacement of bridges and reconfiguration of ramps.	Connection with Highway 401 in Milton: • Conflicts with proposed Tremaine Road interchange and existing Regional Road 25 interchange. • Potential impacts to the Niagara Escarpment lands and Kelso Conservation area.	Connection with Highway 6 in Guelph (north): • Proposed Highway 7 (new) connection with Highway 6 will require reconfiguration. • Proposed Hanlon Expressway extension from Highway 7 (new) to Highway 6 will require reconfiguration. • Potential impacts to existing residential properties.	
	6.1.3 Potential transportation construction staging impacts	Complex construction staging (and detours) are required along freeways, interchanges and roadway crossings. Duration of construction, disruption to traffic on 407 ETR and adjacent roadways and impacts to major utilities during construction, Impacts at freeway to freeway interchanges, including closures of directional ramps for extended periods (i.e., entire construction seasons) are unacceptable (i.e., it is too disruptive to close existing ramps from Highway 407 EB to Highway 400 NB for extended periods such as entire construction seasons or longer etc). Impacts to local road systems associated with increased traffic volumes avoiding major construction and detour areas, as well as economic impacts of increased travel time through the study area would also be significant during extended construction periods.	Less disruption to flow of existing traffic during construction than Alternative 3-1 because the new corridor is located primarily through undeveloped lands. Some minor disruption (detours) may be required for constructing crossing roads.	Less disruption to flow of existing traffic during construction than Alternative 3-1 because the new corridor is located primarily through undeveloped lands. Some moderate disruption (detours) may be required for constructing crossing roads, including the connection with Highway 401 / 407 ETR.	Less disruption to flow of existing traffic during construction than Alternative 3-1 because the new corridor is located primarily through undeveloped lands. Some minor disruption (detours) may be required for constructing crossing roads.	Less disruption to flow of existing traffic during construction than Alternative 3-1 because the new corridor is located primarily through undeveloped lands. Some minor disruption (detours) may be required for constructing crossing roads.	Less disruption to flow of existing traffic during construction than Alternative 3-1 because the new corridor is located primarily through undeveloped lands. Some minor disruption (detours) may be required for constructing crossing roads.
	6.1.4 Requirements for environmental mitigation / compensation / restoration	Lowest environmental mitigation measures are required, primarily in the vicinity of watercourse crossings.	Moderate level of environmental mitigation measures will be required at watercourse crossings and through wetlands and sensitive areas.	Moderate level of environmental mitigation measures will be required at watercourse crossings and through wetlands and sensitive areas.	Moderate level of environmental mitigation measures will be required at watercourse crossings and through wetlands and sensitive areas.	Highest levels of environmental mitigation measures will be required for the crossing of the Niagara Escarpment / greenbelt areas, at watercourse crossings and through wetlands and sensitive areas.	Highest levels of environmental mitigation measures will be required for the crossing of the Niagara Escarpment / greenbelt areas, at watercourse crossings and through wetlands and sensitive areas.

FACTOR	SUB-FACTOR AND MEASURE	3-1 WIDENING EXISTING PROVINCIAL HIGHWAYS (WIDEST HIGHWAY 407 EAST OF HIGHWAY 401)	4-1 REDUCED HIGHWAY 407 WIDENING (EAST OF HIGHWAY 401) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 410	4-2 REDUCED WIDENING (SAME AS 4-1) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401	4-3 REDUCED HIGHWAY 401 WIDENING (THROUGH MILTON) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 401 WEST OF MILTON	4-4 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (NORTH OF GUELPH)	4-5 NARROWEST HIGHWAY 401 WIDENING (THROUGH MILTON TO HIGHWAY 6) AND NEW CORRIDOR FROM HIGHWAY 400 TO HIGHWAY 6 (SOUTH OF GUELPH)
SUMMARY COST AND CONSTRUCTABILITY		**LEAST PREFERRED** – because widening existing freeways is the most complex to construct. Alternative 3-1 has the highest staging impacts, particularly along 407 ETR and potential impacts to the future 407 Transitway. Widening impacts through freeway to freeway interchanges include reconstruction of major bridges and directional ramps that require closure for extended periods during construction. Changes / disruption at interchanges during construction will also impact local transportation network and adjacent land uses. This alternative is the most costly to construct.	**MOST PREFERRED** – because a new corridor is less complex to construct compared to widening existing freeways. This alternative requires a moderate level of freeway widening, but has the shortest length of new corridor and is the least costly to construct.	**MODERATELY PREFERRED** – because a new corridor is less complex to construct compared to widening existing freeways. This alternative requires a moderate level of freeway widening and is one of the most costly to construct. This alternative has challenges associated with future interchange requirements at the existing Highway 401 / 407 ETR interchange in Mississauga, which other Group #4 alternatives do not have.	**MOST PREFERRED** – because a new corridor is less complex and costly to construct compared to widening existing freeways. This alternative has the shortest length of freeway widening and fewer property impacts through built-up areas.	**MOST PREFERRED** – because a new corridor is less complex and costly to construct compared to widening existing freeways. This alternative has the shortest length of freeway widening and fewer property impacts through built-up areas.	**MOST PREFERRED** – because a new corridor is less complex and costly to construct compared to widening existing freeways. This alternative has the shortest length of freeway widening and fewer property impacts through built-up areas.
							
OVERALL SUMMARY		Alternative 3-1 is least preferred because it is more expensive than the other alternatives and will result in very high construction staging impacts that will have negative effects on the provincial and municipal transportation systems, land uses adjacent to the road networks impacted, as well as local economic impacts associated with major traffic disruption and delay for many construction seasons (i.e., years), during reconstruction of freeway to freeway interchange ramps and structures. All of the Group #4 alternatives have relatively similar costs and significantly reduce the construction staging issues associated with Alternative 3-1. However, Alternative 4-2 is slightly less desirable because of construction staging challenges associated with future interchange connections at the existing Highway 401 / 407 ETR interchange in Mississauga. **Therefore, Alternatives 4-1, 4-3, 4-4 and 4-5 are most preferred from a cost and constructability perspective.**					

	GROUP 3-1	GROUP 4-1	GROUP 4-2	GROUP 4-3	GROUP 4-4	GROUP 4-5
NATURAL ENVIRONMENT						
LAND USE/SOCIAL ENVIRONMENT *(INCLUDES AIR QUALITY)*						
CULTURAL ENVIRONMENT						
AREA ECONOMY						
TRANSPORTATION						
COST AND CONSTRUCTABILITY						
SUMMARY	*NOT RECOMMENDED*	*NOT RECOMMENDED*	**CARRIED FORWARD**	**CARRIED FORWARD**	*NOT RECOMMENDED*	*NOT RECOMMENDED*

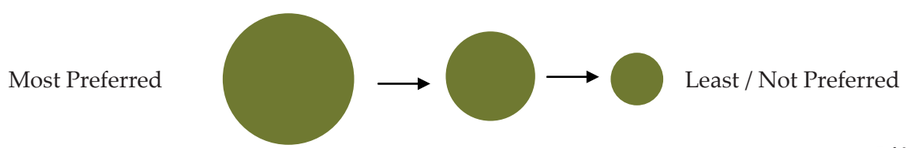


Exhibit 4-49: Overall Preliminary Planning Alternative Assessment

Alternatives 4-4 and 4-5 have the longest new corridor sections that may have the largest impacts to potential built heritage features and archaeological resources, as well as the cultural landscape, especially at the new escarpment crossings. Alternatives 4-1, 4-2 and 4-3 have relatively moderate impacts that can be mitigated through route location and design.

Alternative 3-1 is preferred from a cultural perspective. Alternatives 4-1, 4-2 and 4-3 are slightly less preferred than Alternative 3-1 as they result in relatively similar moderate impacts. Alternatives 4-4 and 4-5 result in significantly higher impacts than the other alternatives.

Area Economy Summary

From an economic perspective, Alternative 4-1 is the least desirable due to its short length and lack of efficient connection to most future employment growth areas, or provision of connections to trade routes. The other new corridor alternatives provide similar economic benefits. However, Alternatives 4-4 and 4-5 are less desirable than Alternatives 3-1 and 4-3 as they serve future growth areas less effectively. Alternative 4-2 is moderately preferred because the new corridor section does not extend to directly service Milton as well as Alternative 4-3.

Alternatives 3-1 and 4-3 are the most preferred from an economic perspective because they have the highest economic benefit and / or serve the economic growth areas most effectively.

Transportation Summary

Alternatives 4-3, 4-4 and 4-5 perform best in terms of overall traffic operations (i.e. road network performance at critical screenlines, percentage of inter-regional trips on inter-regional facilities) and result in reduced delays on both the inter-regional and local road network for auto and truck trips. Alternative 4-3 provides the greatest opportunity for new linkages, including transit connections to Milton where there is potential to serve a substantial growth in future demand. Alternative 4-2 performs second best to 4-3 and 4-5 in terms of overall traffic operations, but it does not provide significant opportunities for modal integration and new linkages.

Alternatives 3-1 and 4-1 address future capacity needs but provide only moderate potential for transit linkages, provide limited redundancy benefits and result in higher use of local roads by longer distance inter-regional traffic.

Alternatives 4-3, 4-4 and 4-5 are the most preferred from a transportation performance perspective.

Cost and Constructability

Alternative 3-1 is least preferred because it is more costly than the other alternatives and will result in high construction staging impacts that will have negative impacts on the provincial and municipal transportation systems, land uses adjacent to the road networks impacted, as well as local economic impacts associated with major traffic disruption and delay for many construction seasons (i.e. years) during reconstruction of freeway to freeway interchange ramps and structures. All of the Group #4 alternatives have relatively similar costs and significantly reduce the construction staging issues associated with Alternative 3-1. However, Alternative 4-2 is slightly less desirable because of construction staging challenges associated with future interchange connections at the existing Highway 401 / 407 ETR interchange in Halton.

Alternatives 4-1, 4-3, 4-4 and 4-5 are the most preferred from a cost and constructability perspective.

Overall Summary

The summaries provided above for each Factor Group and **Exhibit 4-49** demonstrate that although Alternative 3-1 is preferred for Natural, Cultural and Economic Environment, it is the least preferred for Land Use / Social Environment, Transportation Performance and Cost and Constructability; therefore it is not recommended to be carried forward. Alternative 4-1 is preferred for Cost and Constructability with moderate impacts on the Natural, Land Use / Social and Cultural Environment criteria. However, this alternative is least preferred for the Economic Environment and overall Transportation and is therefore not recommended to be carried forward. Although Alternatives 4-4 and 4-5 are preferred for the Transportation and Cost and Constructability factors, they have the greatest potential impacts on the Natural, Land Use / Social and Cultural Environment and as such are not recommended to be carried forward. The overall assessment indicates that Alternatives 4-2 and 4-3 provide better overall benefits and fewer potential impacts and were carried forward for further consideration.

5 Additional Assessment in Halton Area

5.1 OVERVIEW OF ADDITIONAL ANALYSIS IN HALTON AREA

5.1.1 Background

As noted in **Section 4.3**, the evaluation of alternative corridors included three evaluation processes that are each documented in this report. The initial evaluation process of Alternatives 3-1, 4-1, 4-2, 4-3, 4-4, and 4-5 as documented in Section 4.4 were presented to the public at Public Information Centre (PIC) #4 in June 2010, including the recommendation to CARRY FORWARD both Alternatives 4-2 and 4-3 for further consideration, as both alternatives resulted in similar benefits and effects in the evaluation. The other alternatives (i.e., Alternatives 3-1, 4-1, 4-4 and 4-5) were eliminated since they were significantly inferior when compared to Alternatives 4-2 and 4-3. Specifically, Alternatives 4-2 and 4-3 both present strong transportation benefits to area communities and the regional economy while avoiding significant effect to the Greenbelt and Niagara Escarpment.

In order to provide a more focused scope for Stage 2 of the EA process and in part based on comments received during PIC #4, additional analysis at a higher level of detail was carried out on Alternatives 4-2 and 4-3 in the summer and fall of 2010 using factors in natural environment, land use / social environment, cultural environment, area economy, transportation, as well as cost and constructability. Findings from the additional analysis were documented in Section 7 of the Draft Transportation Development Strategy Report (February 2011) (Draft Strategy). At the time, findings of the 2010 additional analysis indicated that rather than selecting a single preferred alternative (i.e., either Alternative 4-2 or Alternative 4-3), elements from both alternatives were carried forward in the new corridor. The recommendation for the new corridor as presented in the Draft Strategy (February 2011) included an east-west corridor from Highway 400 to Highway 401 west of the urban area in the Town of Milton (i.e., included in Alternative 4-3), together with a north-south link between the new corridor and the Highway 401 / 407 ETR interchange (i.e., included in Alternative 4-2), which would address the need for the HP BATS corridor.

Subsequent to the release of the Draft Strategy (February 2011) in March 2011 and during the comment period (between March 2011 and July 2011), several community residents and municipalities in the Halton area strongly expressed concerns regarding the potential impacts to communities and agricultural lands as a result of the east-west corridor through Halton Hills (i.e., the Alternative 4-3 component). A summary of the comments received is described in **Section 5.1.2**.

In response to the input received on the Draft Strategy (February 2011), MTO committed to carrying out additional analysis in the Halton area with a greater level of detail to determine which alternative would be preferred over the other in this geographic area. The additional work in the Halton area was carried out in fall 2011 and winter 2012.

This chapter describes the 2011/2012 additional analysis completed in the Halton area to address the input received on the Draft Strategy (February 2011). The consultation carried out as part of the 2011/2012 additional work in Halton area is documented in Section 7 of this report.

5.1.2 Additional Analysis in Halton Area Consultation

The draft Strategy Report (February 2011) was made available on March 7, 2011 for a minimum of 90 day review period. Due to interest and the volume of comments, the actual review period was extended to over 120 days, ending July 8, 2011; however comments were also accepted beyond the July 8, 2011 deadline. A record of the comments received is documented in **Section 7.7** of this report and Appendix A. The key comments in Halton area were concerns of the potential impact of a new east-west corridor to the agriculture and rural characteristics of the community.

To address the comments received in the Halton area, additional work was carried out in fall 2011 and winter 2012.

5.1.3 Approach to Additional Analysis in Halton Area

The 2011/2012 additional analysis in the Halton area was initiated in the fall of 2011 and extended through the winter 2012 in order to examine the benefits and impacts of the further widening of Highway 401 as an alternative to a new east-west corridor through Halton Hills. While the commitment to carry out the 2011/2012 additional analysis was to address comments by stakeholders and municipalities in the Halton area, MTO also felt that the draft findings may be further enhanced by additional detailed and quantitative data.

Unlike other sections of the overall GTA West study area, findings in the initial evaluation and 2010 additional analysis regarding the new transportation corridor through Halton area were very similar between the Alternatives 4-2 and 4-3 which were carried forward in the Draft Strategy (February 2011). Furthermore, Highway 401 widening alternative (element of Alternative 4-2) and the new east-west corridor alternative through the Halton area (element of Alternative 4-3) are in close proximity to each other (approximately 4 to 7 kilometres apart). The fact that the two alternatives are located geographically close together in the overall transportation network is unique to the Halton area; in other municipalities, the proposed new transportation corridor would be approximately 13 to 15 kilometres north of the next parallel provincial facility.

The work plan developed for the 2011/2012 additional analysis in Halton was designed specifically to address the concerns raised by stakeholders and agencies in the Halton area and included the following activities; much of the 2011/2012 additional analysis work is above and beyond what is typically done during this stage of an EA Study:

- A more detailed agricultural assessment, including consideration of economic and environmental impacts of the proposed transportation corridor as well as the likely loss of farmland that may be expected to follow as a result of urbanization pressures;

- Consideration of compatibility with municipal planning goals and objectives, as set out in Sustainable Halton as well as local municipal land use plans (i.e., Official Plans, etc.);
- A higher level of detail in the assessment of impacts to the natural environment – including consideration of locally significant features (i.e., woodlots, wetlands, etc.);
- A more detailed assessment of how Highway 401 could be incrementally widened (to 10, 12 or 14 lanes) and identification of the impacts of further widening, with mitigation to minimize property impacts;
- A more detailed assessment of how the new GTA West transportation corridor would connect to Highway 401 at new interchanges either east of Milton (at 407 ETR) or west of Milton (west of Tremaine Road, i.e., Milton urban area) including an engineering analysis of how the new interchanges would operate; and
- Improved notification and consultation with residents, agencies, municipalities and stakeholders, during study process.

The work plan was presented to municipal and regulatory agencies, as well as representatives from various stakeholder groups in the study area at the outset of the 2011/2012 additional analysis in early January 2012 to provide stakeholders with an opportunity to comment on and provide input to the additional work as it was initiated. Details of consultation during the 2011/2012 additional analysis are described further in Section 7.8. Input received from these sessions was taken into consideration and adjustments to the work plan and study process were made as appropriate.

Ongoing Highway 401 Environmental Assessment and Preliminary Design Studies

It is noted that MTO is currently undertaking two Class EA / Preliminary Design (Class EA / PD) Studies along Highway 401 which fall within the GTA West project limits – one study is from west of Regional Road 25 to east of Trafalgar Road, and the other is from east of Trafalgar Road to Credit River.

While there is ongoing coordination between the Highway 401 Class EA / PD Studies Study Team and the GTA West EA Study Study Team, the Highway 401 studies and the GTA West study follow separate processes and have different objectives. The purpose of the Highway 401 EA / PD Studies is to identify long term widening requirements to service the Highway 401 corridor only, whereas the GTA West EA Study is looking at long term needs to service the broader area in the GTA. The evaluation of impacts and the recommendation from the GTA West EA Study will build on the recommended improvements identified in the two Highway 401 EA / PD Studies.

Under the Highway 401 Class EA / PD from west of Regional Road 25 to east of Trafalgar Road, it is proposed that Highway 401 be widened to 12 express-collector lanes east of James Snow Parkway and to 10 lanes west of James Snow Parkway to Regional Road 25. The recommendation was presented at the second Public Information Centre in March 2011.

Under the Highway 401 Class EA / PD from east of Trafalgar Road to the Credit River, it is proposed that Highway 401 be widened to a 12-lane express-collector system between east of Trafalgar Road to the Credit River, with the exception of Highway 401 at the Highway 401/407 ETR interchange area, which will be widened to 10 lanes. The recommended alternative was presented to the public at the second Public Information Centre in October 2012.

2011/2012 Additional Work in Halton Area and Alternatives Considered

The additional analysis focused on the assessment of two significantly different alternatives, descriptively, the "further widening of Highway 401" or a "new corridor" alternative through Halton Hills as shown in **Exhibit 5-1**.

It was assumed that initiatives under the Group #1 and Group #2 alternatives, as well as the proposed new transportation corridor between Highway 400 and east of the Halton-Peel boundary as recommended in the Draft Strategy (February 2011), remained unchanged and would be carried forward into Stage 2 of the EA Study.

The criteria used in the initial evaluation and 2010 evaluation (as documented in Chapter 4) were used as a basis for the evaluation criteria of the 2011/2012 additional analysis in the Halton area. Where possible, additional quantitative measures were introduced to assess the impacts of each alternative.

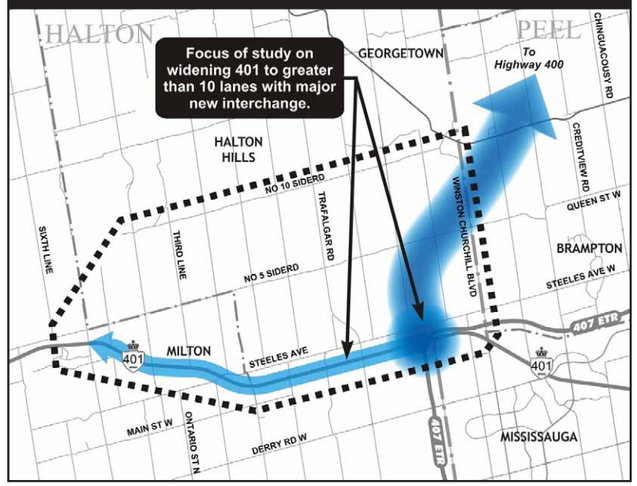
In order to provide a higher level of detail for the new corridor alternative, a range of quantitative impacts were determined based on representative east-west routes in the analysis area. The representative routes were located in the north, middle and south portions of the analysis area and were generated strictly for the purpose of identifying a quantitative range of impacts for the east/west portion of the corridor. Quantitative impacts in the north-south transportation corridor to Highway 401/407 ETR were measured in a similar manner. The range of impacts is approximate only and will be superseded as the EA study proceeds to Stage 2, where the preferred route of the proposed new transportation corridor will be selected.

The range of impacts associated with the "further widening of Highway 401" alternative were measured based on preliminary cross-sections developed for both a 12 or 14 lane Highway 401 as an express-collector system with provision for HOV lanes.

All impacts were measured to assume completion of the widening that is currently being planned by MTO in the Highway 401 EA / PD studies (i.e., beyond the 12 and 10 lanes as described above). The widening was assumed to be along the existing centerline of Highway 401 (i.e., widening to both the north and south sides of the highway); however, this will also be considered further in subsequent planning for this improvement.

FURTHER WIDENING OF HIGHWAY 401

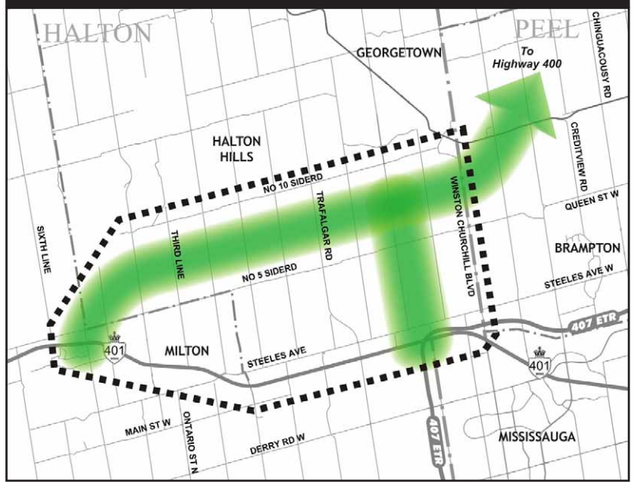
Further Study of a Much Wider Highway 401 and a Large Interchange at 401/407



- Includes a new corridor connecting to Highway 401/407 ETR and further widening of Highway 401 over and above the current Highway 401 EA studies being carried out by MTO
- Highway 401 is currently being planned for widening under two separate MTO studies:
  - From east of Highway 401/407 ETR to James Snow Parkway - from 6 to 12 lanes
  - From James Snow Parkway to Regional Road 25 from 6 to 10 lanes
- Further Highway 401 Widening includes two alternatives:
  - Further widening of Highway 401 to 12 lanes (west to Regional Road 25)
  - Further widening of Highway 401 to 14 lanes (west to Tremaine Road)

NEW CORRIDOR

Recommended in Draft Strategy (March 2011)



- Based on future transportation demand, 4 lanes will be required by 2031 on a new corridor through Halton Region, assuming Highway 401 is not widened further than 10/12 lanes, which is now being planned under the Highway 401 EA and Preliminary Design studies
- New corridor includes:
  - A new east-west transportation corridor to west of Milton urban area
  - A new north-south freeway link between GTA West Corridor and highway 401/407 ETR interchange (provincial link, partial interchange with limited moves)

Exhibit 5-1: Further Widening of Highway 401 vs. New Corridor Alternatives as Part of 2011/2012 Additional Analysis in Halton Area

The following sections describe the 2011/2012 methodology and findings for each factor group, including:

- **Section 5.2** – Natural Environment
- **Section 5.3** – Social Environment (Community and Agriculture)
- **Section 5.4** – Cultural Environment
- **Section 5.5** – Economy
- **Section 5.6** – Transportation
- **Section 5.7** – Road Design, Constructability and Cost

5.2 ADDITIONAL ANALYSIS IN THE HALTON AREA – NATURAL ENVIRONMENT

5.2.1 Methodology

With the intent to providing a higher level of detail on the natural environment evaluation, the Study Team identified locally significant features and carried out a roadside reconnaissance within the focused area in Halton, to confirm the secondary source information available. The Study Team used secondary source information (i.e. mapping, aerial photography, documentation, other studies/reports, websites, etc.) obtained from agencies (e.g., Conservation Authorities, Niagara Escarpment Commission), ministries (MNR) and municipalities to map existing natural environment features in accordance with the revised criteria under natural environment. More detailed environmental field work will continue to be carried out during the next stage of the EA process for the selected corridor.

There are several considerations regarding potential challenges and limitations of the data and information used to support this further assessment and evaluation in Halton area:

- The Stage 1 assessment is based on secondary source information, which is appropriate given the broad scale and high-level strategic planning nature of this stage. Field surveys will be a major component during Stage 2 of the EA and this more detailed information will guide the finer levels of route planning and design. As such, this revised assessment continues to be based on readily available information received from the province and technical agencies.
- Rare species information obtained from the MNR's Natural Heritage Information Centre (NHIC) database was used to inform the sensitivity and significance of habitats potentially affected by the transportation planning alternatives. However, rare species information has certain limitation for use in the assessment and evaluation. Records of rare species occurrences depend greatly on where surveys are undertaken and particular survey methods. On such a broad / regional scale, high densities of rare species occurrences may be a function of surveys being preferentially targeted in certain areas (e.g. an abundance of information is available for areas of the Niagara Escarpment). The absence of rare species records does not necessarily mean that rare species are not present. Therefore, while rare species information was useful where it was present, a lack of information was not interpreted as an absence of rare species and, as such, caution was applied in using this information. Additionally records of Species at Risk (SAR) sighting locations in the NHIC database are presented in a generalized manner across a large area. Although one area may be recorded as being a potential habitat for SAR, it does not suggest that the whole area is a habitat for that species.

Recognizing that Stage 1 of the EA process identifies wide corridors (i.e., the new corridor section in this Halton study area is approximately 3 to 4 kilometres wide), the Study Team acknowledges that not every natural feature in the corridor would be impacted by future routes, and that some features could be avoided in the next stage of the EA, when route planning and generation of design alternatives will occur. In other instances, it was apparent that the natural feature was so large that the entire width of the corridor (or study area) crossed it and could not be avoided (i.e. Middle Sixteen Mile Creek). These types of distinctions about the magnitude of potential impacts and the likelihood of avoidance or mitigation were noted in the evaluation tables. Although significant natural features could be named and in some cases counted or "measured" to provide a comparison between the alternatives, other criteria required a qualitative assessment of potential impacts or benefits at a higher level of detail. Names of the most significant / largest features potentially impacted by each alternative were documented in the evaluation tables. Exhibit 5-2 provides a summary of the natural environment features in the Halton area, and Exhibit 5-3 documents the detailed evaluation findings under natural environment criteria.

5.2.2 Findings

Fish and Fish Habitat

As shown in the table below, the further widening of Highway 401 Alternatives have a higher potential to impact the largest number of watercourse crossings – partly because several watercourses meander through the existing highway corridor and need to be crossed at several locations, including at interchanges. Although differing in the number of watercourse crossings, all alternatives impact the same named watercourses including: the main Sixteen Mile Creek branch, Middle and East Sixteen Mile Creek and Levi's Creek, in addition to the numerous unnamed tributaries. The New Corridor Alternative potentially impacts a greater number of aquatic SAR inhabited watercourses.

FISH AND FISH HABITAT	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
Potential Impact to Watercourses (#)	37	39	27-32
Potential Impact to Aquatic SAR inhabited Watercourses (#)	16	18	16-19

Terrestrial Ecosystems

The table below shows that the further widening of Highway 401 Alternatives have the highest potential to impact a number of evaluated wetland complexes that have been identified by MNR as significant ecological areas. Although all three alternatives potentially impact the same number of provincially significant wetlands, the Highway 401 Widening alternatives each have a potential to impact wetlands of local / regional significance. The New Corridor Alternative will potentially impact one significant woodland, while both Highway 401 Widening Alternatives show no potential impacts to significant woodlands. All alternatives avoid potential impacts to deer wintering areas by avoiding encroachment into the Hilton Falls Conservation Area. Finally, of the three alternatives, the New Corridor Alternative potentially impacts the least number of Fauna SAR habitats. While the New Corridor Alternative possesses the least quantifiable potential impacts to terrestrial ecosystems, it could create a significant barrier to the natural environment and to wildlife movements. As a result, the Highway 401 Widening Alternatives have been determined to have the least potential impact to terrestrial ecosystems.

TERRESTRIAL ECOSYSTEMS	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
Potential Impact to Provincially Significant Wetlands (#)	1	1	1
Potential Impact to Locally / Regionally Significant Wetlands (#)	1	1	0
Potential Impact to Significant Woodlands (#)	0	0	1
Potential Impact to Fauna SAR (#)	6	6	4

Groundwater

All three alternatives cross through areas characterized by a moderate level of permeability for groundwater recharge. All alternatives potentially impact the same number of wellhead protection areas located between both the Kelso Lake and Hilton Falls Conservation Areas.

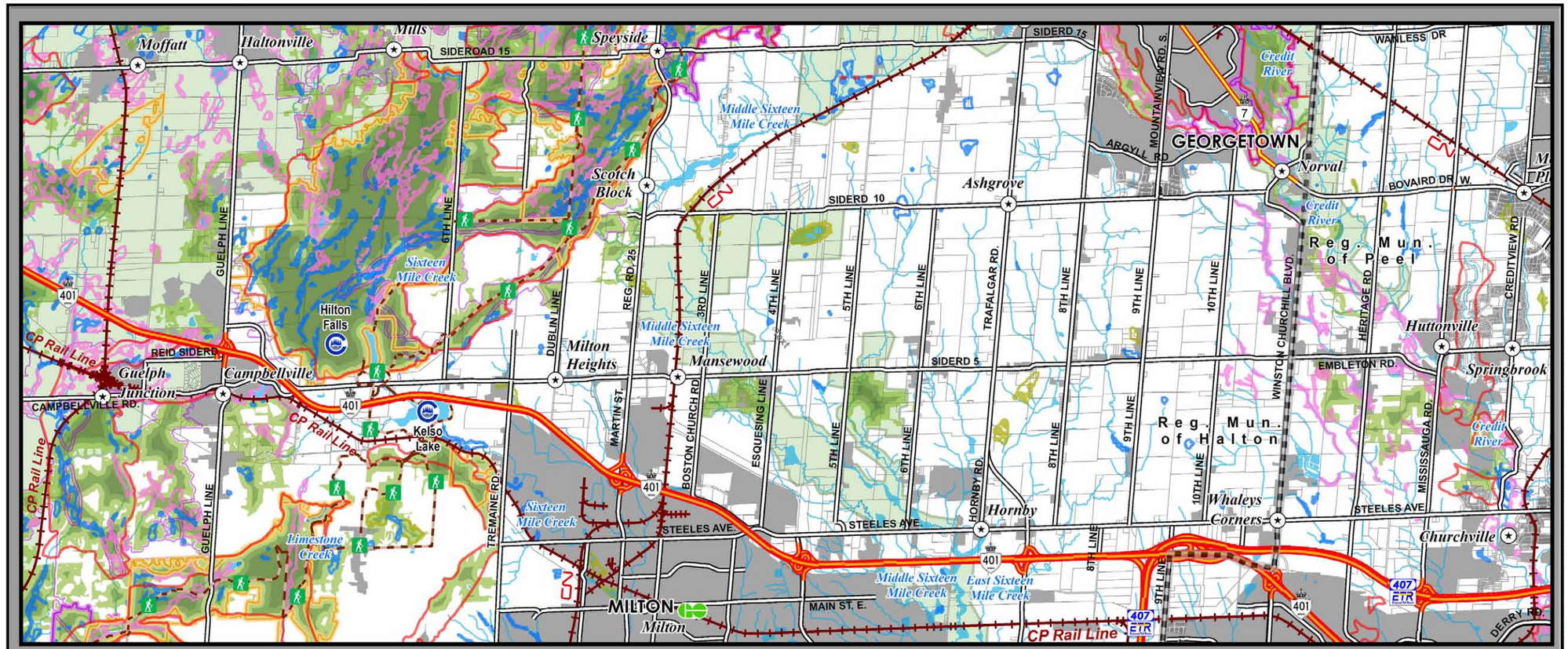
Surface Water

The two Highway 401 Widening Alternatives have a reduced potential impact to surface water in comparison to the New Corridor Alternative. This is due to the reduced amount of new pavement; the 12-Lane Highway 401 Widening Alternative has the least amount of new pavement compared against all alternatives. However, both Highway 401 Widening alternatives present fewer opportunities to integrate natural stormwater management features within the existing highway right-of-way. The New Corridor Alternative has the greatest potential impact to surface water due to the construction of a new highway, but also has the greatest potential to accommodate stormwater management through natural design features (i.e., swales, ponds, etc.) within the highway right-of-way.

Designated Areas

The New Corridor Alternative presents the greatest potential impact to designated areas as it creates new crossings of the Niagara Escarpment and Greenbelt protected lands; however, these crossings will occur at the fringes of those areas. The New Corridor Alternative also results in one new crossing of the Greenbelt at Middle Sixteen Mile Creek. The Highway 401 Widening Alternatives include minor impacts to both the Niagara Escarpment and Greenbelt protected lands. These minor impacts would only be to the lands abutting the existing Highway 401 right-of-way.

Exhibit 5-2 Natural Environment Existing Conditions and Constraints Map in Halton Area



Base mapping produced by AECOM under licence from the Ontario Ministry of Natural Resources (MNR), Copyright© Queens Printer 2011. This licence does not constitute endorsement of this product by MNR or the Ontario Government.

0 0.5 1 2 3 4
Kilometres
NAD 1983 UTM Zone 17N

Legend

- Municipal Boundary
- Conservation Authority Land
- ESA
- Deer Wintering Area
- Waterbodies
- Built Up Area
- Halton Area Parcels
- Community
- GO Station
- CN Rail Line
- Conservation Area

Woodlands
ANSI
- Provincial
- Regional
- Inner Core Woodland
- Outer Core Woodland
- Woodland Greater than 40ha

Wetlands
- Provincially Significant
- Locally Significant
- Unevaluated

- GreenBelt Protected Land

Niagara Escarpment Plan Designations
- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area
- Mineral Resource Extraction Area

Roads
- 400 Series
- Highway or Expressway
- Arterial
- Railroad
- Trail

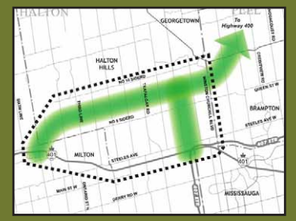
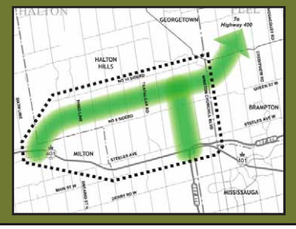
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 
1.0 NATURAL ENVIRONMENT FACTORS*				
Fish and Fish Habitat	Fish Habitat *Measure:* *Quantitative assessment of fisheries and aquatic habitats using, the presence and density of watercourses and aquatic Species at Risk (SAR) as indicators.*	**Total Individual Watercourses Impacted: 26** **Total Watercourse Crossings: 37** **Watercourse Crossings Possibly Avoided: No crossings can be avoided.** **Warm Watercourse Crossings: 16** **Cold Watercourse Crossings: 1** **Cool Watercourse Crossings: 13** **Unknown Temperature Watercourse Crossings: 2** **Waterbodies Crossed: 5** **Additional Fish habitat (Watercourses and Waterbodies) within 50 m (Adjacent lands): 4** **Named Watercourses and Waterbodies crossed:** • Sixteen Mile Creek and its unnamed tributaries • Middle Sixteen Mile Creek and its unnamed tributaries • East Sixteen Mile Creek and its unnamed tributaries • Unnamed tributaries of Levi's Creek • Kelso Lake	**Total Individual Watercourses Impacted: 32** **Total Watercourse Crossings: 39** **Watercourse Crossings Possibly Avoided: No crossing can be avoided** **Warm Watercourses Crossings: 17** **Cold Watercourses Crossings: 1** **Cool Watercourses Crossings: 31** **Unknown Temperature Watercourses Crossings: 2** **Waterbodies Crossed: 11** **Additional Fish habitat (Watercourses and Waterbodies) within 50 m (Adjacent lands): 5** **Named Watercourses and Waterbodies crossed:** • Sixteen Mile Creek and its unnamed tributaries • Middle Sixteen Mile Creek and its unnamed tributaries • East Sixteen Mile Creek and its unnamed tributaries • Unnamed tributaries of Levi's Creek • Kelso Lake	**Total Individual Watercourses: 25 – 28** **Total Watercourse Crossings: 27 – 32** **Water Crossings Possibly Avoided: 0 – 3** **Warm Watercourses Crossings: 8 – 12** **Cold Watercourses Crossings: 8 – 10** **Cool Watercourses Crossings: 9** **Unknown Temperature Watercourses Crossings: 2** **Waterbodies Crossed: 3 – 4** **Additional Fish habitat (Watercourses and Waterbodies) within 50 m (Adjacent lands): 1 – 3** **Named Watercourses and Waterbodies crossed:** • Unnamed tributaries of Sixteen Mile Creek • Middle Sixteen Mile Creek and its unnamed tributaries • Unnamed tributaries of East Sixteen Mile Creek • Unnamed tributaries of Credit River • Kelso Lake • Levi's Creek and its unnamed tributaries
	Fish Community *Measure* *Quantitative assessment of the presence and density of watercourses and aquatic Species at Risk (SAR) based on DFO Mapping.*	**Habitats with aquatic SAR presence: 16** **Additional aquatic SAR Habitat within 50 m (Adjacent Lands): 2**	**Habitats with aquatic SAR presence: 18** **Additional aquatic SAR Habitat within 50 m (Adjacent Lands): 2**	**Habitats with aquatic SAR presence: 16 – 19** **Additional aquatic SAR Habitat within 50 m (Adjacent Lands): 3 – 4**

Exhibit 5-3: Natural Environment Evaluation (2011 / 2012)

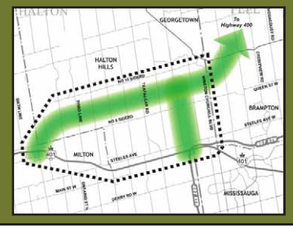
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 

Terrestrial Ecosystems	1.2.1 Wetlands
	Measure:
	Quantitative assessment of the wetland units based on density and classification including qualitative assessment of potential to avoid or mitigate impacts.
		Wetland impacts:
		• **Provincially Significant: 1**
		  • Levi's Creek Wetlands (touches in 2 locations)
		• **Additional PSWs within 120 m: 1**
		  • Levi's Creek Wetlands (touches in 2 more locations)
		• **Locally Significant: 1**
		  • Milton Heights Marsh
		• **Additional LSWs within 50 m: 0**
		• **Unevaluated: 1**
			Wetland impacts:
			• **Provincially Significant: 1**
			  • Levi's Creek Wetlands (touches in 2 locations)
			• **Additional PSWs within 120 m: 1**
			  • Levi's Creek Wetlands (touches in 2 more locations)
			• **Locally Significant: 1**
			  • Milton Heights Marsh
			• **Additional LSWs within 50 m: 0**
			• **Unevaluated: 1**
				Wetland impacts:
				• **Provincially Significant: 1**
				  • Levi's Creek Wetlands
				• **Additional PSWs within 120 m: 1**
				  • Levi's Creek Wetlands (touches 1-2 additional locations)
				• **Locally Significant: 0**
				• **Additional LSWs within 50 m: 0**
				• **Unevaluated: 2**

	1.2.2 Woodlands and Other Vegetated Areas (e.g., forest stands, woodlots, interior forest habitat, and significant woodlands) *Measure:* *Quantitative assessment of impacts to woodlots greater than 40 ha in size using linear distance impacts as indicators.*	**No Woodlands are affected by 4-2 Alt 1.** **Within 50 m (Adjacent Lands): 0**	**No Woodlands are affected by 4-2 Alt 2.** **Within 50 m (Adjacent Lands): 0**	**Impacted Woodlots Combined:** • **Directly Impacted: 0 – 1** **Additional Woodlands Within 50 m (Adjacent Lands): 0**
	1.2.3 Wildlife Habitats and Movements (including Species at Risk (SAR) *Measure:* *Quantitative assessment of the nature, significance, and sensitivity of impacted significant wildlife habitats and landscape connectivity based on presence and density of SAR known wildlife use (e.g., deer wintering, waterfowl staging, etc.) and landscape – level habitat connectivity.*	**Deer Wintering Areas: 0** **Within 50 m (Adjacent Lands): 0m** **Endangered SAR (S-Rank = 1): 0** **Threatened SAR (S-Rank = 2): 3** • Jefferson Salamander • Jefferson X Blue-spotted Salamander • Redside Dace **Vulnerable SAR (S-Rank = 3): 3** • Eastern Ribbonsnake • Milksnake • Snapping Turtle	**Deer Wintering Areas: 0** **Within 50 m (Adjacent Lands): 0m** **Endangered SAR (S-Rank = 1): 0** **Threatened SAR (S-Rank = 2): 3** • Jefferson Salamander • Jefferson X Blue-spotted Salamander • Redside Dace **Vulnerable SAR (S-Rank = 3): 3** • Eastern Ribbonsnake • Milksnake • Snapping Turtle	**Deer Wintering Areas: 0** **Within 50 m (Adjacent Lands): 0m** **Endangered SAR (S-Rank = 1): 0** **Threatened SAR (S-Rank = 2): 2** • Jefferson X Blue-spotted Salamander • Redside Dace **Vulnerable SAR (S-Rank = 3): 2** • Milksnake • Snapping Turtle

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
1.3 Groundwater	Areas of Groundwater Recharge and Discharge *Measure:* *Qualitative assessment based on soil type and permeability to identify areas of high, moderate, and low groundwater recharge capability including consideration of number and location of groundwater recharge and discharge areas.*	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.	Soil types near existing highways in the widening sections are generally characterized by a low to moderate level of permeability. Soils along the new corridor section are characterized by a moderate level of permeability for groundwater recharge capability.
	1.3.2 Groundwater Source Areas and Wellhead Protection Areas *Measure:* *Wellhead protection areas that are potentially affected and their location.*	**Wellhead Protection Areas:** • 100 Year Milton WPA • 10 Year Milton WPA • 2 Year Milton WPA • 100 Day Milton WPA	**Wellhead Protection Areas:** • 100 Year Milton WPA • 10 Year Milton WPA • 2 Year Milton WPA • 100 Day Milton WPA	**Wellhead Protection Areas:** • 100 Year Milton WPA • 10 Year Milton WPA • 2 Year Milton WPA • 100 Day Milton WPA
1.4 Surface Water	1.4.1 Watershed / Sub-Watershed Drainage Features/Patterns *Measure:* *Qualitative assessment of new pavement, based on the total linear centerline length.*	**Approximate Total CL Linear Length: 26.47** Limited space available for natural SWM design features in existing highway right-of-way.	**Approximate Total CL Linear Length: 26.47** Limited space available for natural SWM design features in existing highway right-of-way.	**Approximate CL pavement length: 22.04 -24.04 km** New corridor has potential to accommodate SWM through natural design features (i.e., swales, ponds, etc.) within highway right-of-way.

Exhibit 5-3: Natural Environment Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
1.5 Designated Areas	1.5.1 Designated Areas are defined by resource agencies, municipalities, the government and/or the public, through legislation, policies, or approved management plans, to have special or unique value. Examples of Designated Areas include: • Environmentally Sensitive Areas (ESA); • Provincially Significant Areas of Natural and Scientific Interest (ANSI); • Niagara Escarpment; • Greenbelt; • Bruce Trail. *Measure:* *Quantitative assessment of the number, nature, and significance of designated areas potentially impacted including consideration of ability to avoid designated area or mitigate impacts.*	**ESA: 0** **Within 50 m (Adjacent Lands): 0** **ANSI: 0** **Within 50 m (Adjacent Lands): 0** **Conservation Holdings: 0** **Bruce Trail: Potential to impact 415 m (Measured along centre line of affected trail)** **Greenbelt Lands: 0m (Measured along CL of corridor)** **Niagara Escarpment Lands** • Escarpment Rural: 1.27 km • Escarpment Protection: 1.84 km	**ESA: 0** **Within 50 m (Adjacent Lands): 0** **ANSI: 0** **Within 50 m (Adjacent Lands): 0** **Conservation Holdings: 0** **Bruce Trail: Potential to impact 415 m (Measured along centre line of affected trail)** **Greenbelt Lands: 0m (Measured along CL of corridor)** **Niagara Escarpment Lands** • Escarpment Rural: 1.27 km • Escarpment Protection: 1.84 km	**ESA: 0** **Within 50 m (Adjacent Lands): 0** **ANSI: 0** **Within 50 m (Adjacent Lands): 0** **Conservation Holdings: 0** **Bruce Trail: Potential to impact 515 m (Measured along centre line of affected trail)** **Greenbelt Lands: 1.72 – 3.76 km (Measured along CL of corridor)** **Niagara Escarpment Lands** • Escarpment Rural: 1.03 km • Escarpment Protection: 2.64 – 2.85 km
NATURAL ENVIRONMENT SUMMARY		**MOST PREFERRED** Impacts along existing Highway 401 can largely be mitigated, but new corridor section still results in some potential barrier impacts.	**MODERATELY PREFERRED** The built-up areas adjacent to Highway 401 make it difficult to mitigate impacts to watercourses (fisheries etc.) and difficult to manage stormwater / surface water using natural design features.	**LESS PREFERRED** New corridor potentially acts as a barrier to natural environment, impacts some unevaluated / locally significant wetlands and results in a new crossing of Greenbelt at Middle Sixteen Mile Creek.

* Note: All Natural Environment information is collected from secondary sources (including consultation with agencies, municipalities, and the public, etc.) and will be confirmed through field investigations to be conducted during Stage 2 of the Environmental Assessment.

5.3 ADDITIONAL ANALYSIS IN THE HALTON AREA – SOCIAL ENVIRONMENT (COMMUNITY AND AGRICULTURE)

5.3.1 Methodology

Many of the comments and input received on the Draft Strategy Report (February 2011) are related to potential impacts to communities and agricultural lands. While factors in these areas have previously been included as part of the Social Environment evaluation, there was a desire for additional assessment to be carried out in the Halton area taking into consideration potential impacts to communities and agricultural lands. Therefore, an update of the social environment evaluation in Halton area focused on community features (i.e., residences, businesses and recreational areas / tourist operations). Land use and agriculture was updated through obtaining the most current land use information, as well as consultation with local stakeholders. The air quality and noise assessments were also updated to include quantitative findings.

Land Use

Land use impacts associated with each alternative were discussed and identified with local municipal staff and councillors, residents and stakeholder groups in the Halton area. Sensitive features and existing conditions were confirmed through ongoing dialogue with area stakeholders, as well as through a review of current land use planning documents, aerial photography and field reconnaissance.

Land use impacts were assessed based on existing land use and future development areas identified in the Halton Region Official Plan, "Sustainable Halton", Town of Halton Hills Official Plan and Town of Milton Official Plan. Consideration of Provincial policies such as the *Provincial Policy Statement, Growth Plan, Greenbelt Plan* and *Niagara Escarpment Plan* were included in the policy criteria. Impacts on existing land uses were assessed based on direct property impacts that would result from the three representative east-west routes and connecting link for the new corridor and the potential footprints from the Highway 401 Widening options while using aerial photography and GIS mapping.

Land use impacts were considered having regards to:

- First Nations Reserves
- First Nations Sacred Grounds
- Residential Uses
- Commercial and Industrial Uses
- Tourism Operations
- Community Facilities and Institutions
- Agricultural Uses
- Recreation Uses
- Aggregates and Mines

Noise and Air Quality

The noise and air quality work carried out as part of the additional assessment in Halton area identified "areas of influence" expected based on changes in both local air quality and noise levels using the projected traffic volumes and proposed transportation improvements associated with each alternative. The "areas of influence" represents the approximate area which could be impacted by a change in either air quality or noise levels. A number of qualifiers were used in the air quality assessment. Sensitive receptors (i.e., residences) were counted within each "area of influence" to approximate how many residences may be impacted by each alternative.

Agriculture

The additional analysis for agriculture in the Halton area included the completion of roadside reconnaissance surveys to document the existing land use (both agricultural and non-agricultural), the location, use and condition of agricultural facilities (barns and ancillary buildings); discussions with local land owners / farm operators to determine the extent / character of agricultural uses in the area; the creation and dispersion of an agricultural information request form to select farm operators; and the assessment of Property Boundaries to document the potential extent of agricultural property fragmentation (severed parcels, land locked parcels).

Further, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) was contacted to determine the extent of updated information for the Canada Land Inventory (CLI) soil classification ratings, Agricultural Land Use mapping and Artificial Tile Drainage mapping for Halton Region.

5.3.2 Findings

Exhibit 5-4 summarizes the socio-economic existing conditions and constraints in the Halton area, and **Exhibit 5-5** documents the detailed evaluation findings under social environment criteria.

Provincial / Federal / Municipal Land Use Planning / Goals / Objectives

All three alternatives (i.e., Widening of Highway 401 to 12 lanes, Widening of Highway 401 to 14 lanes, and New Corridor Alternatives) are consistent with the provincial goals of promoting growth and connecting communities because they are located close to future growth areas and are capable of supporting projected traffic volumes up to 2031. The New Corridor Alternative is not consistent with "Sustainable

Halton" goals nor is it recognized in local municipal official plans.

Land Use / Community

The New Corridor Alternative crosses through the community of Halton Hills, which has a rural character, with agricultural land uses, scattered residences and built heritage features.

The New Corridor Alternatives would result in a greater number of impacts to residential properties because the rural countryside in Halton Hills is scattered with clusters of rural residential properties adjacent to existing roads. The number of residential impacts is identified based on a representative 200 m wide corridor. The number of direct impacts could be reduced with a narrower corridor as part of the preliminary design stage. The New Corridor Alternatives would also consume more undisturbed land.

The community along Highway 401 in the Town of Milton is becoming increasingly built-up with residential, business and light industrial land uses. In most vacant areas along the highway corridor, future development is planned and developing rapidly.

The Further Widening of Highway 401 alternatives have fewer direct residential impacts; however, widening the existing Highway 401 corridor to 14 lanes impacts a number of existing and proposed businesses adjacent to the highway right-of-way. It also impacts important infrastructure such as storm water management facilities, parking areas and Boston Church Road. The existing Highway 401 corridor is a key economic corridor for the Town of Milton and Halton Region.

The table below summarizes the approximate number of properties impacted by each alternative.

POTENTIAL PROPERTY IMPACTS	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
Residential Properties (#)	20	20	26 - 39
Commercial / Industrial Properties (#)	20 - 30	20 - 30	0

Note: Property impacts are approximate and based on preliminary highway widening "footprint" analysis – the number of properties impacted will be updated during route planning stage of the study.

Noise and Air Quality Impacts

Nuisance impacts from increased highway noise may occur in built-up areas along the existing Highway 401 as well as along new corridor sections. The New Corridor Alternative has the greatest potential impact to sensitive noise receptors – especially if it veers far north in the analysis area, near the residential subdivisions in southern Georgetown. Impacts may be reduced by avoiding built-up areas during the route generation and selection process in future stages of the EA. The Highway 401 Widening alternatives will have the greatest potential noise impacts to the built-up areas adjacent to the existing highway; however, some areas have existing or planned noise mitigation features in place.

Preliminary Air Quality assessment concluded that the Highway 401 Widening Alternatives would have the greatest potential impacts towards local air quality. Specifically the 12-Lane Highway 401 Widening would have a slightly greater area of impact over the 14-Lane Highway 401 Widening due to the slower traffic flow and estimated potential congestion over time. The New Corridor Alternative had the least air quality impacts due to the optimized flow of traffic and an improved baseline for existing conditions.

The table below summarizes the approximate number of properties within the "area of influence" for noise and air quality assessments under each alternative.

POTENTIAL NOISE AND AIR QUALITY IMPACTS	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
Potential Sensitive Noise Receptors Impacted within "Area of Influence" (e.g. # Residences)	191	191	191 - 615
Potential Air Quality Sensitive Receptors Impacted within "Area of Influence" (e.g. # Residences, Community Facilities, Recreational Areas)	22	17	0

Agriculture – Soil Impacts

The New Corridor Alternative has the greatest impacts of prime agricultural soils. Although mitigation of potential impacts to prime agricultural soils may be possible through the route generation and selection process, significant potential impacts to agricultural soils would still occur. The Highway 401 Widening Alternatives have the least potential impacts of prime agricultural soil due to the already and planned built-up areas adjacent to the existing Highway 401. The greatest potential impact of prime agricultural soils from either Highway 401 Widening Alternative would occur on the new alignment section east of Trafalgar Road.

POTENTIALLY IMPACTED PRIME AGRICULTURAL SOILS	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
# hectares (ha) of impacted Class 1 Soil Lands	119 ha	123 ha	133 - 222 ha
# hectares (ha) of impacted Class 2 Soil Lands	0 ha	1 ha	0 ha
# hectares (ha) of impacted Class 3 Soils Lands	22 ha	23 ha	225 - 233 ha

Agriculture – Property Fragmentation

Similar to prime agricultural soil, the New Corridor Alternative would have the greatest potential impacts to agricultural property fragmentation, as shown in the table below. Although mitigation of some potential impacts may be possible through the route generation and selection process, significant potential impacts to farming due to property fragmentation would still occur. The 12-Lane 401 Widening Alternative would have the least potential impacts of agricultural properties. The impacts to agricultural properties adjacent to the existing Highway 401 would occur on the fringes of farming operations limiting the significance to those potential impacts. The greatest amount of potential farm fragmentation from the Highway 401 Widening Alternatives would occur along the new alignment section east of Trafalgar Road.

POTENTIALLY IMPACTED AGRICULTURAL PROPERTIES	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
# Agricultural Properties Directly Impacted by Loss of Land	21	27	42 - 54
# Agricultural Properties Potentially Impacted by Severance	10	10	13 - 19

Agriculture – Facilities / Operations

The New Corridor Alternative would have the greatest number of potential impacts of agricultural facilities and operations. Although mitigation of impacts relating to loss of agricultural land or facilities is possible through the route generation and selection process, significant potential impacts would still occur. The 12-Lane Highway 401 Widening Alternative would have the least potential impacts towards agricultural facilities and operations. Most of the potential impacts to farming facilities and operations from the Highway 401 Widening Alternatives would occur along the new alignment section east of Trafalgar Road.

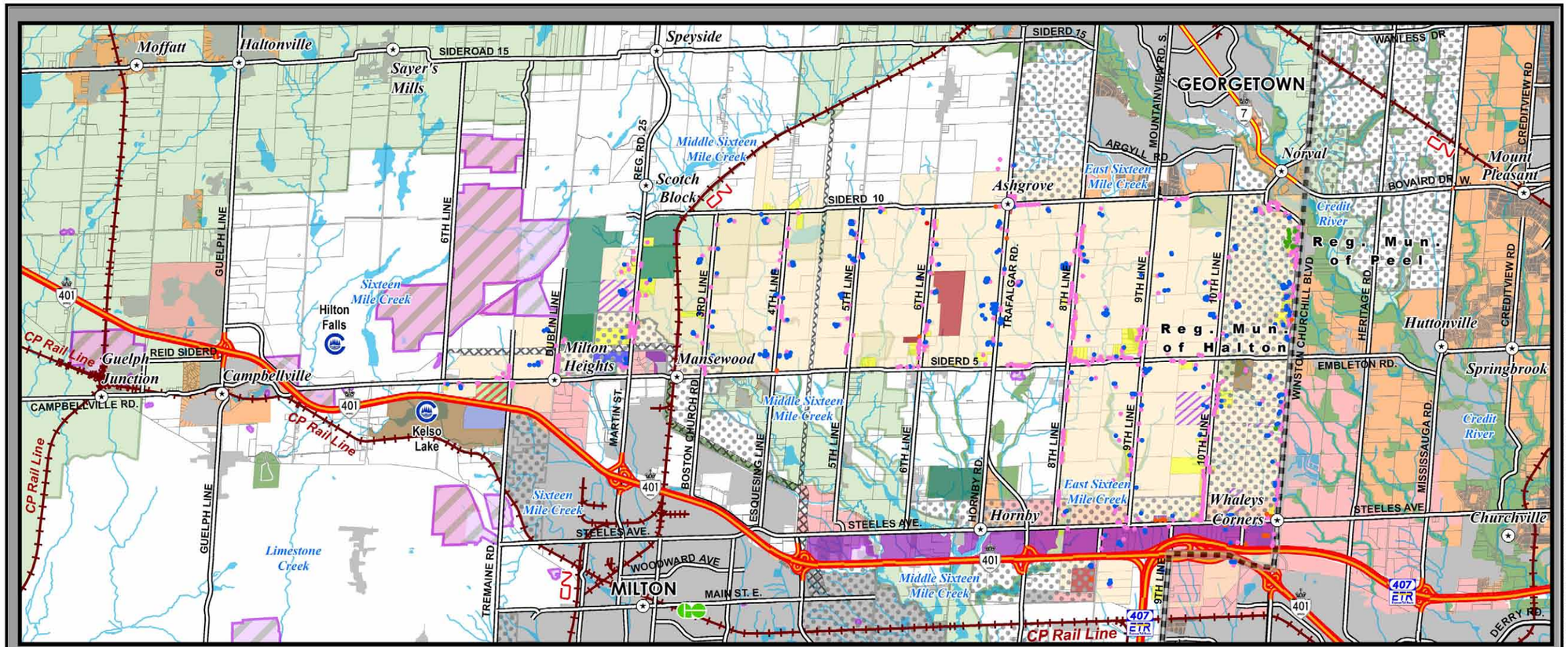
Recreational Lands

The New Corridor Alternative impacts several private recreational areas including a golf course, and campground on the west side of Milton.

All three alternatives would potentially impact adjacent conservation lands (e.g., Kelso Lake Conservation Area, Country Heritage Park, Bruce Trail) with the New Corridor Alternative having slightly greater potential impacts of these facilities.

POTENTIALLY IMPACTED AGRICULTURAL FACILITIES / OPERATIONS	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
Number of Agricultural Facilities Directly Impacted (i.e. facilities and structures)	Beef/Horse: 1 Horse: 2 Storage: 1	Beef/Horse: 1 Horse: 2 Storage: 1	Beef Feedlot: 0 – 1 Cash Crop: 1 – 2 Dairy: 0 – 2 Hobby Horse: 0 – 1 Horse: 0 – 2 Not used/derelict: 0 – 2 Poultry: 0 – 1
# hectares (ha) of Agricultural Land Use Potentially Lost	Built Up: 4.6 ha Corn: 34.5 ha Forage: 14.5 ha Grains: 8.5 ha Pasture: 9.3 ha Ploughed: 11.0 ha Unknown use: 13.7 ha Winter Wheat: 8.9 ha Woods: 1.4 ha	Built Up: 4.6 ha Corn: 37.6 ha Forage: 14.5 ha Grains: 8.5 ha Pasture: 10.4 ha Ploughed: 11.0 ha Scrubland: 0.3 ha Soybean: 0.5 ha Unknown use: 13.7 ha Winter Wheat: 8.9 ha Woods: 1.4 ha	Built Up: 10.3 – 21.5 ha Corn: 33.6 – 88.4 ha Forage: 4.1 – 70.1 ha Grains: 35.0 – 52.3 ha Open Field/scrubland: 3.0 – 24.4 ha Market Garden – Cabbage: 0 – 3.9 ha Pasture: 18.6 – 33.0 ha Ploughed: 26.3 – 54.9 ha Soybean: 35.3 -46.0 ha Special Crop – Garden Stock: 0 – 1.4 ha Unknown use: 7.6 – 72.6 ha Winter Wheat: 7.6 – 40.3 ha Woods: 25.9 – 55.1 ha

Exhibit 5-4: Socio-Economic Existing Conditions and Constraints Map in Halton Area



Base mapping produced by AECOM under licence from the Ontario Ministry of Natural Resources (MNR), Copyright© Queens Printer 2011. This licence does not constitute endorsement of this product by MNR or the Ontario Government.

0 0.5 1 2 3 4

Kilometres

NAD 1983 UTM Zone 17N

Legend

- Municipal Boundary
- Waterbodies
- Built Up Area
- Niagara Escarpment Plan Lands
- GreenBelt Protected Lands
- Halton Area Parcels
- GO Station
- CN Rail Line
- Conservation Area
- Community

Study Area Buildings

- Specialty Agricultural
- Nursery Farm
- Commercial/Industrial Use
- House
- Barn/Secondary Structure

Pits and Quarries

- Pit or Quarry - Inactive
- Pit or Quarry - Active

Existing Offical Plan Designations

- Designated Residential Area
- Designated Employment Area
- Environmental Policy Area
- Future Urban Area

Halton Land Uses

- Agricultural
- Agricultural With Industrial/Commercial
- Residential
- Golf Course
- Commercial
- Campground
- Industrial
- Recreation Land
- Hydro R.O.W.
- Rail R.O.W.
- Institutional

Roads

- 400 Series
- Highway or Expressway
- Arterial
- Railroad

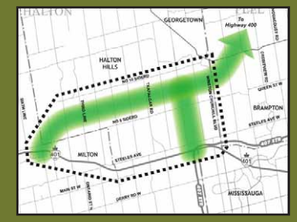
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
2.0 SOCIO-ECONOMIC ENVIRONMENT FACTORS (COMMUNITY, AGRICULTURE AND LAND USE) *				
2.1 Land Use Planning Policies	2.1.1 Provincial / Federal land use planning / goals / objectives *Measures:* *Qualitative assessment of ability to support federal/provincial land use policies, plans, goals and objectives.*	Consistent with *Growth Plan* – connecting Growth Areas and providing infrastructure up to 2031, however this alternative will be unable to support growth beyond 2031. Consistent with PPS – Ensuring efficient use of existing and planned infrastructure (1.6.5.2). Ensuring that necessary infrastructure will be available to meet existing needs, however it will not be able to meet projected future needs (1.6.6.1). Impact of agricultural resources considered within Economic Prosperity (1.7).	Consistent with *Growth Plan* – connecting Growth Areas and providing infrastructure up to and beyond 2031. Consistent with PPS – Ensuring efficient use of existing and planned infrastructure (1.6.5.2). Ensuring that necessary infrastructure will be available to meet current and future needs (1.6.6.1). Impact of agricultural resources considered within Economic Prosperity (1.7).	Consistent with *Growth Plan* – connecting Growth Areas and providing infrastructure beyond 2031. Consistent with PPS – ensuring that necessary infrastructure will be available to meet future needs, planned corridor (1.6.6.1). Impact of agricultural resources considered within Economic Prosperity (1.7).
	2.1.2 Municipal land use planning policies / goals / objectives *Measures:* *Qualitative assessment of potential to support municipal Official Plans.*	Regional and Local Plans protect agriculture but recognize future growth needs. Focus on 'landscape permanence' deals primary with 'landscape character'. Infrastructure is permitted in Agricultural Area. Consistent with Sustainable Halton goals in preserving agricultural lands, potential aggregate sites, and planned employment areas. Although not directly mentioned in local municipal plans, expectations of an expanded Highway 401 are recognized.	Regional and Local Plans protect agriculture but recognize future growth needs. Focus on 'landscape permanence' deals primary with 'landscape character'. Infrastructure is permitted in Agricultural Area. Consistent with Sustainable Halton goals in preserving agricultural lands, potential aggregate sites, and planned employment areas. Although not directly mentioned in local municipal plans, expectations of an expanded Highway 401 are recognized.	Regional and Local Plans protect agriculture but recognize future growth needs. Focus on 'landscape permanence' deals primary with 'landscape character'. Infrastructure is permitted in Agricultural Area. Not consistent with Sustainable Halton goals and new GTA West transportation corridor is not recognized in local municipal Official Plans.
2.2 Land Use / Community	2.2.1 Indian Reserves *Measures:* *Qualitative assessment of potential to avoid Indian Reserves.*	Potential impacts to First Nation Native reserves will be identified through discussions with First Nations as the study progresses. No First Nations reserves within study area.	Potential impacts to First Nation Native reserves will be identified through discussions with First Nations as the study progresses. No First Nations reserves within study area.	Potential impacts to First Nation Native reserves will be identified through discussions with First Nations as the study progresses. No First Nations reserves within study area.
	2.2.2 First Nations Sacred Grounds *Measure:* *Qualitative assessment of potential to avoid First Nation Sacred grounds.*	Potential impact to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses. Secondary source information indicates potential for First Nations Sacred Grounds.	Potential impact to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses. Secondary source information indicates potential for First Nations Sacred Grounds.	Potential impact to First Nation Sacred Grounds will be identified through discussions with First Nations as the study progresses. Secondary source information indicates high potential for First Nations Sacred Grounds.
	2.2.3 Residential (Urban and Rural) *Measure:* *Quantitative assessment of potential impacts to urban and rural residential areas, using number of areas affected and potential to avoid or mitigate impacts.*	**Residential Properties (direct impact): 20**	**Residential Properties (direct impact): 20**	**Residential Properties (direct impact): 26 – 39**

Exhibit 5-5: Socio-Economic Environment Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
	2.2.4 Commercial / Industrial *Measure:* *Quantitative assessment of potential to impact commercial and industrial areas using estimated number of properties/industrial parks potentially impacted as indicator.*	**Commercial/Industrial Properties (direct impact): 20 - 30**	**Commercial/Industrial Properties (direct impact): 20 - 30**	No/Minor Impacts to existing Commercial & Industrial (see tourist operations). Would impact future commercial development at Dublin Line (on north side of Highway 401).
	2.2.5 Tourism Operations *Measure:* *Quantitative assessment of potential impacts or ways to support tourist areas and attractions in the study area. The number of tourist areas and attractions impacted.*	**Tourism Operations: 3** • Country Heritage Park • Commercial Campground • Kelso Lake Conservation Area	**Tourism Operations: 3** • Country Heritage Park • Commercial Campground • Kelso Lake Conservation Area	**Tourism Operations: 5** • Golf Course • Sport's Club • Country Heritage Park • Campground • Kelso Lake Conservation Area
	2.2.6 Community Facilities / Institutions *Measure:* *Quantitative assessment of potential impacts to major community facilities and institutions using approximate number and type.*	**Community Facilities: 0**	**Community Facilities: 1** • **Kingdom Hall of Jehovah's Witnesses** (indirectly impacted from changes to Boston Church Road)	**Community Facilities/Institutions: 0 – 1** • **Modern Church**
2.3 Noise	2.3.1 Transportation Noise *Measure:* *Quantitative description of impacted noise receptors, locations of increased noise, and the magnitude / severity of impacts.*	**Potential Sensitive Noise Receptors: 191**	**Potential Sensitive Noise Receptors: 191**	**Potential number of sensitive noise receptors impacted: 191 - 615**
2.4 Air	2.4.1 Local and Regional air quality impacts; greenhouse gas emissions. *Measure:* *Quantitative assessment of potentially impacted sensitive receptors to various levels of air pollution.*	**Potential Air Quality Sensitive Receptors: 22**	**Potential Air Quality Sensitive Receptors: 17** Wider Highway 401 provides better traffic flow, which reduces air quality impacts slightly.	Sensitive air receptors are not impacted by this alternative.
	2.4.2 Incremental annual amounts of air pollutants (air contaminants emitted into the region for the horizon year).	Slight increase in network-wide, peak hour VKT and pollutant emissions in overall region for horizon year.	Slight increase in network-wide, peak hour VKT and pollutant emissions in overall region for horizon year.	Slight increase in network-wide, peak hour VKT and pollutant emissions in overall region for horizon year.
	2.4.3 Incremental annual amounts of greenhouse gases emitted per annum for the horizon year.	Slight increase in network-wide, peak hour VKT and GHG emissions per annum and for horizon year.	Slight increase in network-wide, peak hour VKT and GHG emissions per annum and for horizon year.	Slight increase in network-wide, peak hour VKT and GHG emissions, per annum and for horizon year.

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
2.5 Land Use / Resources	2.5.1 First Nations Treaty Rights and Interests or Use of Land and Resources for Traditional Purposes. *Measure:* *Potential to impact FN Treaty rights and interests or use of land and resources for traditional purposes (e.g., hunting fishing, harvesting food and medicinal plants, etc.).*	The potential to impact First Nations Treaty Rights and Interests or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nations Treaty Rights and Interests or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.	The potential to impact First Nations Treaty Rights and Interests or use of land and resources for traditional purposes will be confirmed through discussions with First Nations as part of the EA process.
	2.5.2 Agriculture *Measure:* *Quantitative assessment of potential impacts to prime agricultural lands outside of future development areas and woodlots, measured by GIS calculated area of CLI (Class 1-3) agricultural lands.* *Quantitative assessment of the number of agricultural properties directly impacted by loss of land.* *Quantitative assessment of the number of agricultural properties directly impacted through severance of property.* *Quantitative assessment of the number of agricultural facilities directly impacted.* *Quantitative assessment of hectares (ha) of agricultural land use lost.*	**Affected Soil Classes** **Total Class 1 = 119.1 ha** **Total Class 3 = 21.5 ha** **Note:** Most agricultural impacts for widening alternatives occur on new alignment section east of Trafalgar Road. **Agricultural Properties:** 21 **Severed Agricultural Properties**: 10 **Agricultural Facilities** **Beef/Horse:** 1 **Horse:** 2 **Storage:** 1 **Agricultural Properties by Categories** **Built Up:** 4.6 ha **Corn:** 34.5 ha **Forage:** 14.5 ha **Grains:** 8.5 ha **Pasture:** 9.3 ha **Ploughed:** 11.0 ha **Unknown use:** 13.7 ha **Winter Wheat:** 8.9 ha **Woods:** 1.4 ha	**Affected Soil Classes** **Total Class 1 = 122.6 ha** **Total Class 2 = 0.5** **Total Class 3 = 22.5 ha** **Note:** Most agricultural impacts for widening alternatives occur on new alignment section east of Trafalgar Road. **Agricultural Properties:** 27 **Severed Agricultural Properties**: 10 **Agricultural Facilities** **Beef/Horse:** 1 **Horse:** 2 **Storage:** 1 **Agricultural Properties by Categories** **Built Up:** 4.6 ha **Corn:** 37.6 ha **Forage:** 14.5 ha **Grains:** 8.5 ha **Pasture:** 10.4 ha **Ploughed:** 11.0 ha **Scrubland:** 0.3 ha **Soybean:** 0.5 ha **Unknown use:** 13.7 ha **Winter Wheat:** 8.9 ha **Woods:** 1.4 ha	**Affected Soil Classes** **Total Class 1: 133.3 – 221.7 ha** **Total Class 3: 233.4 - 225.0 ha** **Total Class 4: 0 - 1.7 ha** **Total Class 7: 0 – 3.0 ha** **Agricultural Properties: 42 – 54** **Severed Agricultural Properties: 13 – 19** **Agricultural Facilities** **Beef Feedlot:** 0 – 1 **Cash Crop:** 1 – *2 (*1 of 2 unused) **Dairy:** 0 – 2 **Hobby Horse:** 0 – 1 **Horse:** 0 – 2 **Not used/derelict:** 0 – 2 **Poultry (Old):** 0 – 1 **Agricultural Properties by Categories** **Built Up:** 10.3 – 21.5 ha **Corn:** 33.6 – 88.4 ha **Forage:** 4.1 – 70.1 ha **Grains:** 35.0 – 52.3 ha **Open Field, scrubland:** 3.0 – 24.4 ha **Market Garden – Cabbage:** 0 – 3.9 ha **Pasture:** 18.6 – 33.0 ha **Ploughed:** 26.3 – 54.9 ha **Soybean:** 35.3 -46.0 ha **Special Crop – Garden Stock:** 0 – 1.4 ha **Unknown use:** 7.6 – 72.6 ha **Winter Wheat:** 7.6 – 40.3 ha **Woods:** 25.9 – 55.1ha

Exhibit 5-5: Socio-Economic Environment Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 
	2.5.3 Recreational Lands and Natural Areas of Provincial Significance (e.g. national / provincial parks, conservation areas, major trails) *Measure:* *Number of parks and recreational areas potentially affected.*	No Provincial or Regional Parks affected. **Recreational Areas: 4** • Bruce Trail • Kelso Lake Conservation Area • Commercial Campgrounds • Country Heritage Park	No Provincial or Regional Parks affected. **Recreational Areas: 4** • Bruce Trail • Kelso Lake Conservation Area • Commercial Campgrounds • Country Heritage Park	No Provincial Parks affected. **Recreational Lands Impacted: 4 - 6** • Bruce Trail • Sport's Club • Campground • Kelso Lake Conservation Area • Commercial Campgrounds • Country Heritage Park
	2.5.4 Aggregate and Mines *Measure:* *Number of pits and quarries potentially affected and their current status.*	**Pit/Quarry: 1** • Inactive quarry potentially impacted	**Pit/Quarry: 1** • Inactive quarry potentially impacted	No aggregates or mines have the potential to be impacted.
2.6 Municipal Services	2.6.1 Major Utility Transmission Corridors *Measure:* *Number of major utility transmission corridors that could be potentially impacted.*	**Hydro ROW Crossings: 2** **Railway Crossings: 1**	**Hydro ROW Crossings: 2** **Railway Crossings: 1**	**Hydro ROW Crossings: 2** **Railway Crossings: 1**
2.7 Contaminated Property Identification and Management	2.7.1 Landfills, Hazardous Waste Sites, Brownfield Areas, etc. *Measure:* *Number and type of contaminated sites potentially affected.*	No landfills or contaminated sites affected.	No landfills or contaminated sites affected.	No landfills or contaminated sites affected.
SOCIO-ECONOMIC SUMMARY **(COMMUNITY, AGRICULTURE AND LAND USE)**		**OVERALL MODERATELY PREFERRED** **Community:** Moderately Preferred- urban, built-up community is already adjacent to Highway 401. **Agricultural:** Moderately Preferred – widening of Highway 401 will have lower impact to agriculture. **Land Use:** Moderately Preferred – makes use of existing infrastructure and provides infrastructure needs to 2031. Impacts adjacent employment uses.	**OVERALL MODERATELY PREFERRED** **Community:** Moderately Preferred- urban, built-up community is already adjacent to Highway 401. **Agricultural:** Moderately Preferred – widening of Highway 401 will have lower impact to agriculture. **Land Use:** Moderately Preferred – makes use of existing infrastructure and provides infrastructure needs to beyond 2031. Impacts adjacent employment uses.	**OVERALL LEAST PREFERRED** **Community:** Less Preferred – impacts of new corridor on community features will be hard to mitigate in existing rural community. **Agricultural:** Least Preferred – net impact of new corridor to agriculture is high. **Land Use:** Less Preferred – impact to existing land uses would be difficult to mitigate and could impact long-term retention of agricultural land uses.

* Note: All Socio-Economic information is collected from secondary sources (including consultation with agencies, municipalities, and the public, etc.) and will be confirmed through field investigations to be conducted during Stage 2 of the Environmental Assessment.

5.4 ADDITIONAL ANALYSIS IN HALTON AREA – CULTURAL ENVIRONMENT

5.4.1 Methodology

The additional analysis in Halton area included discussions with community members, heritage home owners, members of the local historical society and representatives of Boston Church, one of the important heritage features in Halton Hills. Their main interests were to minimize impacts to the cultural landscape, including heritage structures and several graveyards that are scattered throughout the area - referred to as Scotch Block.

Within Halton Region, Scotch Block is a notable and identifiable rural area settled in the early 1800s by Scottish settlers and is shown on the adjacent exhibit. Several of the original homesteads remain and descendants of original settlers continue to live in the area. First Nation artifacts have also been found within the area of Scotch Block by local farmers and through archaeological studies carried out in Halton over the last several decades.

The methodology for assessing potential impacts to cultural resources in the Halton area as part of the additional work in Halton was to build on the information collected during previous work (as outlined in **Chapter 4.6**) and to augment that knowledge with information collected from local historians and residents as well as the local historical society. Through discussions with local stakeholders the Study Team was able to review a number of newspaper articles and local books used to document the history of the area.
Stage 2 of the EA will include further archaeological and heritage investigations in accordance with Ministry of Tourism, Culture and Sport guidelines and protocols for MTO undertakings.

5.4.2 Findings

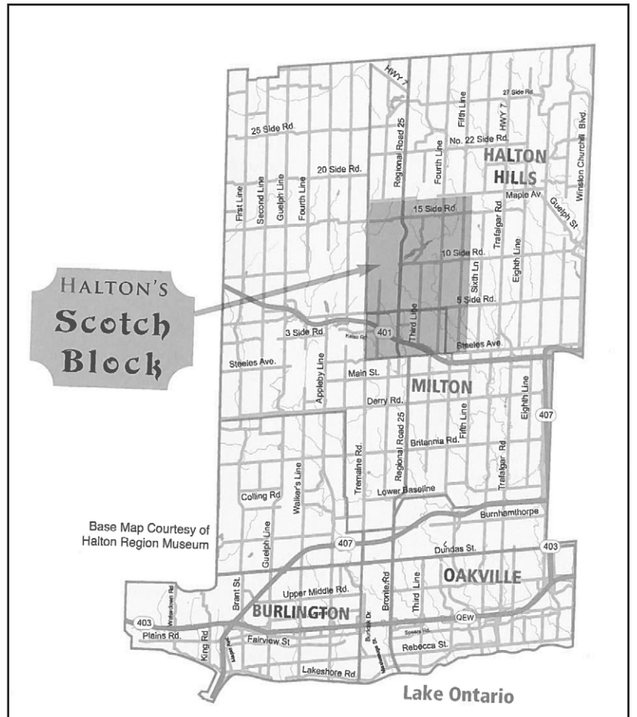
Cultural Heritage – Built Heritage and Cultural Heritage Landscapes

Overall, the Highway 401 Widening Alternatives have limited potential to impact the cultural environment because most areas have been previously disturbed either through highway construction or urbanization. The New Corridor Alternative would have the highest potential to impact cultural heritage, landscape, and built heritage features. Route generation, selection and design would potentially mitigate those impacts, but impacts to the cultural landscape in Scotch Block cannot be avoided with a new corridor through Halton Hills given the area coverage of Scotch Block.

Cultural Heritage – Archaeological Sites or Resources

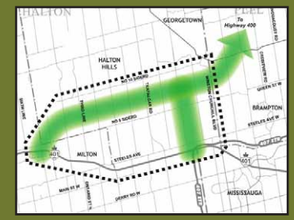
Overall, the Highway 401 Widening Alternatives have the least potential to impact archaeological sites and resources as most have been previously disturbed either through highway construction or urbanization. The New Corridor Alternative would have the greatest potential impact to archaeological sites and resources as it would pass through the Scotch Block area - known to have heritage farms, unmarked graves, First Nation artifacts, etc. While some of these impacts could be potentially mitigated through route generation, selection or design, significant impacts to previously undisturbed archaeological sites and resources could occur.

Exhibit 5-6 documents the detailed evaluation findings under cultural environment criteria.



Source: J. Dills & G. Brown, Halton's Scotch Block - The People and Their Stories, The Milton Historic Society, 2009

Exhibit 5-6: Cultural Environment Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 
3.0 CULTURAL ENVIRONMENT FACTORS*				
3.1 Cultural Heritage – Built Heritage and Cultural Heritage Landscapes	3.1.1 Buildings (e.g., standing sites of architectural or heritage significance, Ontario Heritage Properties, heritage bridges, cemeteries) and Cultural Heritage Landscapes (e.g., areas of historic 19th century settlement). <u>Measure:</u> *Quantitative assessment of potentially impacted built cultural heritage areas and resources.*	No known built heritage sites are affected by this alternative.	No known built heritage sites are affected by this alternative.	Potential impact to one build heritage site (cemetery).
	3.1.2 First Nations Burial Sites <u>Measure:</u> *Qualitative assessment of the potential to impact First Nation Burial Sites.*	The potential impact to First Nation Burial sites will be confirmed through discussions with First Nations as part of the environmental assessment process.	The potential impact to First Nation Burial sites will be confirmed through discussions with First Nations as part of the environmental assessment process.	The potential impact to First Nation Burial sites will be confirmed through discussions with First Nations as part of the EA process. Secondary source information indicates high potential for First Nations burial sites in Scotch Block.
3.2 Cultural Heritage – Archaeology	3.2.1 Pre- Historic and Historic First Nations Sites <u>Measure:</u> *Qualitative assessment of the potential to impact First Nation Burial Sites.*	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the environmental assessment process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the environmental assessment process.	The potential to impact archaeological sites of historical significance to First Nations will be confirmed through discussions with First Nations as part of the EA process Secondary source information indicates high potential for First Nations historic sites.
	3.2.2 Archaeological Sites or Resources <u>Measure:</u> *Quantitative assessment of impacts to archaeological sites or resources and impacts to undisturbed areas.*	**<u>Archaeological Sites:</u> 2** 1 Homestead – AjGw-271 – midden, historic – Euro-Canadian 1 Homestead – AjGw-253 – midden, historic – Euro-Canadian	**<u>Archaeological Sites:</u> 4** 1 Findspot – AjGw-133 – Bifurcate; Archaic, Early 1 Unknown Site - AjGx-132 1 Homestead – AjGw-271 – midden, historic – Euro-Canadian 1 Homestead – AjGw-253 – midden, historic – Euro-Canadian	**<u>Archaeological Sites:</u> 2 – 7** 3 – Undetermined – Undermined 1 – Village – AjGx-64 – Native, Historic; Neutral 1 – Campsite – AjGw-276 – Pre-Contact 1 – Homestead – AjGw-271 – midden, historic – Euro-Canadian 1 – Homestead – AjGw-253 – midden, historic – Euro-Canadian
CULTURAL SUMMARY		**MOST PREFERRED** Less impact to previously undisturbed areas along Highway 401.	**MODERATELY PREFERRED** Slightly higher potential to impact previously undisturbed areas (with wider footprint) along Highway 401.	**LESS PREFERRED** Impact on cultural landscape (Scotch Block) and high potential for archaeological resources.

* Note: Cultural information is collected from secondary sources, including consultation with agencies, municipalities and the public, and the Stage 1 Archaeological and Built Heritage Assessment conducted during Stage 1 of the EA process. A Stage 2 Archaeological and Built Heritage Assessment will be carried out during Stage 2 of the Environmental Assessment.

5.5 ADDITIONAL ANALYSIS IN HALTON AREA – ECONOMY

5.5.1 Methodology

One of the key comments received on the Draft Strategy Report (February 2011) is related to the potential impact to the agricultural industry in Halton area. Therefore, the approach to additional analysis was developed to identify relevant differences between the three alternatives (ie. comparative analysis), which include:

- Qualitative assessment of indirect impacts and direct impacts on connectivity and linkages
- Quantitative analysis of user impacts based on traffic modelling data and economic values for travel time, vehicle operating costs and accident
- Quantitative analysis of property assembly costs based on land use data and property value ranges based on MLS asking price data in the study area
- Quantitative analysis of employment and economic output based on estimated construction costs using the Statistics Canada Input-Output model
- Analysis of lost farm output from impacted agricultural lands, using cropping pattern for Halton Region and average revenue data from Ontario Ministry of Agriculture, Food and Rural Affairs

Economy impacts were considered having regards to:

- Direct User Impacts: travel time, vehicle operating costs, accidents and injury, and redundancy
- Indirect Impacts: land value uplift, economic productivity, and area desirability
- Construction Impacts: land assembly cost, employment, economic output, and construction delays
- Industry / Agriculture / Tourism Impacts: connectivity and linkages to industry, lost output from farming, and tourism connectivity

The economic assessment was carried out as part of social environment (see Section 5.3), including land use, community and agriculture. The economic assessment is dependent on the land use data and agricultural assessment outcome, quantifying type of land use and agricultural output as a result of the new transportation corridor and the widening of Highway 401. Direct User Impact analysis was based on information derived from the transportation assessment (**Section 5.6**). Cost of travel time represents the total annual amount of time spent traveling by users on the highway segment multiplied by the average hourly wage. These costs are incurred by direct users with or without the transportation alternatives in place. While these costs are probably higher from the Base Case scenario, the analysis comprises only three alternatives, where lower costs are more desirable. It is also important to note that these figures are annual (starting after the project becomes operational).

5.5.2 Findings

All three alternatives would provide connection to employment areas south of Georgetown and Halton Hills, and improved access to the employment areas along Winston Churchill Boulevard west of 407 ETR. The New Corridor Alternative would provide better access to businesses north of Highway 401 in the Milton urban area.

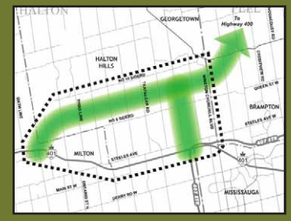
Key findings indicated that the key advantage of the New Corridor Alternative is providing system redundancy where an alternate route is available to minimize time lost due to incidents and closures on other roadways. With a new corridor, it would also benefit from having the least amount of travel delay compared to the Highway 401 Widening Alternatives. However, the New Corridor Alternative would have higher impact on agricultural zoned lands.

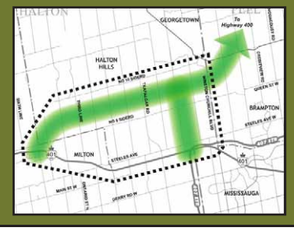
Highway 401 widening to 12 lanes would not provide an alternate corridor to minimize congestion delays and incident occurrence delays, which would impact the competitiveness of the economy. This alternative would have some impact to existing commercial and industrial properties along the Highway 401 corridor; however, it is not anticipated that there would be direct impact to existing buildings. This alternative would have the lowest impact to agricultural zoned lands, while providing accessibility to established commercial and industrial areas along the Highway 401 corridor.

Similar to the Highway 401 widening to 12 lanes alternative, the widening of Highway 401 to 14 lanes would not provide an alternate corridor to minimize congestion delays and incident occurrence delays, which would impact the competitiveness of the economy. It would have the highest impact to existing commercial and industrial properties along the Highway 401 corridor. While this alternative would generate the highest economic output and job creation during construction, it would also have the highest impact from congestion delays during construction.

Exhibit 5-7 documents the detailed evaluation findings under the economy criteria.

Exhibit 5-7: Economic Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 
4.0 ECONOMIC FACTORS				
4.1 Direct User Impacts	4.2.1 Potential to support industry and trade by efficient and reliable movement of goods and people. *Measure:* *Quantitative assessment of* *Travel Time* *Accidents & Injury* *Vehicle Operating Costs* *Redundancy.* *(lower figures are more desirable)*	Widening of existing transportation corridors would service existing and future industry located near the existing provincial highway. The additional capacity on the existing highways would reduce congestion and facilitate goods movement and trade. The key cost parameters in goods and people movement: cost of travel time and vehicle operating costs are highest for this alternative and it offers the lowest benefit in terms of congestion reduction. **Cost Of Travel Time (annual)** For automobiles: $662 Million For trucks: $54 Million Total: $716 Million **Cost Of Accidents & Injury (annual)** Cost of Accidents: $405 Million **Vehicle Operating Costs (annual)** For automobiles: $1,299 Million For trucks: $468 Million Total: $1,767 Million **Cost Of Travel Time During Incidence (Redundancy) (annual)** For automobiles: $38 Million For trucks: $13 Million Total: $51Million	Widening of existing transportation corridors would service existing and future industry located near the existing provincial highway. The additional capacity on the existing highways would reduce congestion and facilitate goods movement and trade. The key cost parameters in goods and people movement: cost of travel time and vehicle operating costs are higher than the new corridor alternative. **Cost Of Travel Time (annual)** For automobiles: $631 Million For trucks: $47 Million Total: $678 Million **Cost Of Accidents & Injury (annual)** Cost of Accidents: $406 Million **Vehicle Operating Costs (annual)** For automobiles: $1,302 Million For trucks: $474 Million Total: $1,778 Million **Cost Of Travel Time During Incidence (Redundancy) (annual)** For automobiles: $42 Million For trucks: $15 Million Total: $57 Million	The evaluation of economic impact identifies the highest level of economic benefits associated with this option in terms of serving the goods and people movement for industry and trade. The new corridor would provide an alternate route and additional capacity and improve access to existing and planned industrial areas, taking pressure off municipal roads, reducing cost of congestion and enhancing transportation system efficiency and reliability/redundancy. The key cost parameters in goods and people movement: cost of travel time and vehicle operating costs are the lowest for this alternative. This alternative provides an alternative route during incidence and minimizes travel time. **Cost Of Travel Time (annual)** For automobiles: $ 613 Million For trucks: $44 Million Total $657 Million **Cost Of Accidents & Injury (annual)** Cost of Accidents $401 Million **Vehicle Operating Costs (annual)** For automobiles $1,264 Million For trucks $471 Million Total $1,736 Million **Cost Of Travel Time During Incidence (Redundancy) (annual)** For automobiles $29 Million For trucks $10 Million Total $40 Million
4.2 Indirect User Impacts	4.2.1 Potential to support the economy. *Measure:* *Qualitative assessment of indirect impacts from land value uplift, economic efficiency and area desirability.*	As the area will continue to be supported by the existing road network it is not likely to support any new sites for commercial, industrial or retail development.	As the area will continue to be supported by the existing road network it is not likely to support any new sites for commercial, industrial or retail development.	The new corridor can potentially provide an additional link to the markets in the region thus helping to make the corridor areas more competitive for growth. This is likely to enhance the development potential of areas traversed by the new highway facility and open up new sites for commercial and industrial development. The development of the local access roads is further likely to stimulate retail development.

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
4.3 CONSTRUCTION IMPACTS	4.3.1 Effects of construction spending on the economy and construction impacts on traffic *Measure:* *Quantitative measure of output and employment creation due to construction* *Land assembly costs* *Assessment of travel time delays due to congestion during construction*	The evaluation of economic impact identifies the lowest economic benefits associated with construction of this option. The impact on agricultural properties is the lowest for this alternative. **Output and Employment creation due to construction** Output: $721 Million Employment: 3,700 FTE Jobs **Land Assembly Costs** Agricultural Properties: $32 Million - $39 Million Commercial/industrial Properties: $44 Million - $73 Million **Cost of Travel time delays due to congestion during construction** For automobiles: $21 Million For trucks: $6 Million Total: $27 Million	The evaluation of economic impact identifies the highest level of economic benefits associated with construction of this option. This has the highest impact on the existing businesses along Highway 401. **Output and Employment creation due to construction** Output: $1,163 Million Employment: 5,900 FTE Jobs **Land Assembly Costs** Agricultural Properties: $33 Million - $40 Million Commercial/industrial Properties: $65 Million - $105 Million **Cost of Travel time delays due to congestion during construction** For automobiles: $36 Million For trucks: $11 Million Total: $47 Million	The evaluation of economic impact identifies the following economic benefits associated construction of this option. However, it has higher impact to agriculture sector. **Output and Employment creation due to construction** Output: $888 Million Employment: 4,500 FTE Jobs **Land Assembly Costs** Agricultural Properties: $73 Million - $94 Million Commercial/industrial Properties: $26 Million - $44 Million **Cost of Travel time delays due to congestion during construction** For automobiles: $15 Million For trucks: $4 Million Total: $19 Million
4.4 AGRICULTURE/ INDUSTRY/TOURISM	4.4.1 Potential to support area agriculture industry *Measure:* *Connectivity and Linkages for Agriculture and Industry.* *A quantitative assessment of potential impacts of lost output from farming operations* *Qualitative description of how tourism and recreation are supported.*	Widening of existing transportation corridors would service existing transportation corridor located close to the existing provincial highway and provide connectivity and linkages for agriculture and industry. Annual Revenue Loss = $210,000 approx. (Loss of Area Under Major Crops, Fruit Crops & Vegetable Crops) The existing corridor provides connectivity and linkages for tourism.	The existing corridor provides connectivity and linkages for agriculture and industry. Annual Revenue Loss = $220,000 approx. (Loss of Area Under Major Crops, Fruit Crops & Vegetable Crops) The existing corridor provides connectivity and linkages for tourism.	The new corridor provides additional connectivity and linkages for Agriculture and Industry. Annual Revenue Loss = $610,000 approx. (Loss of Area Under Major Crops, Fruit Crops & Vegetable Crops) The new corridor provides additional connectivity and linkages for tourism.
ECONOMIC SUMMARY		**LESS PREFERRED** This alternative has no alternate corridor for minimizing congestion delays, and incidence occurrence delays. This is likely to impact the competitiveness of the regional economy.	**LEAST PREFERRED** This alternative is the least preferred as it provides no alternate corridor for minimizing congestion delays, and incidence occurrence delays. This is likely to impact the competitiveness of the regional economy. It also has higher impact to existing businesses along Highway 401.	**MODERATELY PREFERRED** This alternative is moderately preferred as it has the best travel time results, supports business & tourism sector, promotes economic development. However, it has higher impact to agriculture sector.

5.6 ADDITIONAL ANALYSIS IN HALTON AREA – TRANSPORTATION

5.6.1 Modeling Methodology

The additional transportation analysis in the Halton area was conducted to assist in identifying the preferred termination of the GTA West corridor in Halton and the configuration of Highway 401 through Halton. The analysis included detailed modeling of the Highway 401 Widening and New Corridor alternatives, and assessment of each alternative using both qualitative and quantitative evaluation methodologies.

The results from the transportation modeling and forecasting also provided key inputs to support the economic analysis, and air quality and noise assessments documented as part of the overall evaluation.

The Ontario Ministry of Transportation (MTO) Greater Golden Horseshoe Model (GGH Model) was used to forecast future travel demands for the transportation modeling and analysis. A description of the GGH model setup and process is provided in the Transportation Model Technical Background Report (February 2011). The land use, transportation network and other assumptions used for the Draft Transportation Development Strategy (February 2011) were carried over for the 2011/2012 additional analysis, with a few changes. The elements that are common with the Draft Transportation Development Strategy (Strategy) (February 2011) are as follows:

1. The land use patterns developed for the Metrolinx RTP were updated with the regional allocation of population and employment as per their *Growth Plan* conformance reviews.

2. Road, transit and active transportation programs identified through approved Transportation Master Plans, Official Plans or Development Charge Background Studies completed by Regional / Lower Tier municipalities

3. Full implementation of Metrolinx RTP 25-year transit plan by 2031 and GO Transit's Strategic Plan GO 2020

The Base Case scenario was used as a reference for comparing the Widening and New Corridor alternatives. The Base Case scenario described in the Draft Strategy Report (February 2011) was updated:

- The Base Case scenario in the Draft Strategy Report (February 2011) had Highway 401 at 6 lanes through Halton. For the 2011/2012 additional work, Highway 401 was assumed to be widened to 12 lanes from 407 ETR to James Snow Parkway and to 10 lanes to Regional Road 25. This was done to reflect the progress for the ongoing Preliminary Design for Highway 401.
- In the NGTA study area, the Base Case scenario in the Draft Strategy Report (2011) assumed no additional improvements to the provincial highway network beyond MTO's planned and committed improvements including projects identified in the Southern Ontario Highway Program (2006-2010) and the High Occupancy Vehicle (HOV) Lanes Plan (2007). For the additional work, the Niagara GTA Group #3 (Highway Widenings) scenario was assumed as part of the definition of the Base Case scenario. Please refer to the *NGTA Draft Transportation Development Strategy Report (March 2011)* for the definition of the NGTA Group #3 (Highway Widenings) scenario.

Another update to the transportation modeling for the Draft Strategy was to the commercial vehicle (CV) forecasts used to develop the transportation demand forecasts for the year 2031. The GGH Model CV forecasts were updated to be consistent with the forecasts from the Continental Gateway study. Details of the update to freight forecasts can be found in the *Transportation Model Technical Background Report (2012)*. The evaluation criteria used in the Draft Strategy were also used to perform transportation evaluation of the alternatives in the Halton area. The following updates have been made to the evaluation methodology:

1. Some of the stakeholders commented on the Draft Strategy Report (February 2011) that the planning year of 2031 is not sufficiently long-term. However, there is a constraint to forecast travel demand beyond 2031. The *Growth Plan* only provides growth projections to 2031. Transportation demand forecasting for beyond 2031 is not feasible based on official growth projections. In an attempt to address the concern of the stakeholders without developing demand forecasts beyond 2031, the Study Team was able to assess the capacity of the transportation system for growth beyond 2031. This was done by assessing the roadway system capacity available after serving the demand forecast for the year 2031. This remaining capacity is defined as 'residual capacity'. The residual capacity would provide an estimate of how much additional system capacity is left to serve the growth in demand beyond 2031. Additionally, based on a conservative assumption of 1% annual growth in travel demand beyond 2031, a projection of when the system would exceed the capacity threshold (demand more than 90% of capacity) could be made.

2. As the study progressed, one of the considerations in forecasting travel demand was the impact of factors that are beyond the control of the GTA West Study Team or differ from the assumptions made for the GTA West Study. The forecasts for travel demand forecasting are conservative and are based on the following assumptions. Details about these assumptions are provided in the Transportation Model Technical Background Report (February 2011).

   - Full implementation of Metrolinx RTP 25-year transit plan by 2031
   - No increase in transit fares (not considering inflation) to 2031
   - A doubling of auto operating costs by 2031 (not considering inflation)
   - 50% increase in non-residential parking costs by 2031 (not considering inflation)
   - Introduction of new parking costs in all Urban Growth Centers, nodes/corridors, and major employment nodes by 2031
   - Optimization of transportation network and expansion of non-roadway infrastructure could further reduce auto demands by 4%, and long distance truck demands by 10% by 2031.

These forecasts are the basis for estimating the network performance under the different alternatives. However, there are factors that could lead to an increase in these forecasts in the Halton area. Some of these factors are not under the purview of the GTA West Study – for instance, the recommendation of the NGTA Study. Other factors represent scenarios in the future that could create different travel patterns and amount of auto travel demand in the

Halton area – for instance, summer tourism-related trips could increase auto demand. Another scenario could be a lower than expected reduction in auto and truck demand on the roadway network due to implementation of Group #1 and Group #2 alternatives:

- Summer traffic in the study area is typically 11% higher than average weekday traffic based on historical relationship between Summer Average Daily Traffic (SADT) and Annual Average Daily Traffic (AADT). Forecasts considering SADT scenario could increase auto demand on Highway 401 by about 8 to 10%.
- Potential NGTA Corridor connection to Highway 401 (NGTA Study is ongoing and a connection from Highway 403 to Highway 401 west of the Niagara Escarpment is an alternative under consideration). Comparison of forecasts with and without the NGTA connection to Highway 401 shows that the NGTA connection could increase travel demand on Highway 401 by approximately 3 to 8%. Details of this analysis are presented in the *Transportation Model Technical Background Report (2012)*.
- Expected reduction in auto (4%) and truck (10%) demand from non-roadway infrastructure and existing transportation network optimization (Group #1 and #2 initiatives) may not fully occur by 2031. This assumed reduction in auto demand is in addition to the reduction in auto demand expected to result from the implementation of the Metrolinx RTP. Forecasts considering the possibility that the expected reduction in auto demand may not fully occur could increase auto demand on Highway 401 by about 4 to 5%.

These factors together could increase the auto demand on Highway 401 by approximately 15 to 25%. The impact on available capacity on the highway road network (Highway 401 plus the new corridor) is shown in **Exhibit 5-8**. The sensitivity analysis suggests that the combined system of Highway 401 and a new corridor could provide adequate capacity to serve the potentially higher amount of traffic in the Halton area resulting from the above factors. However, a 12-lane Highway 401 without a new corridor may not provide sufficient capacity if the above factors were to result in higher auto demand, particularly between James Snow Parkway and 407 ETR. This led to the inclusion of a 14-lane Highway 401 as an additional alternative for evaluation.

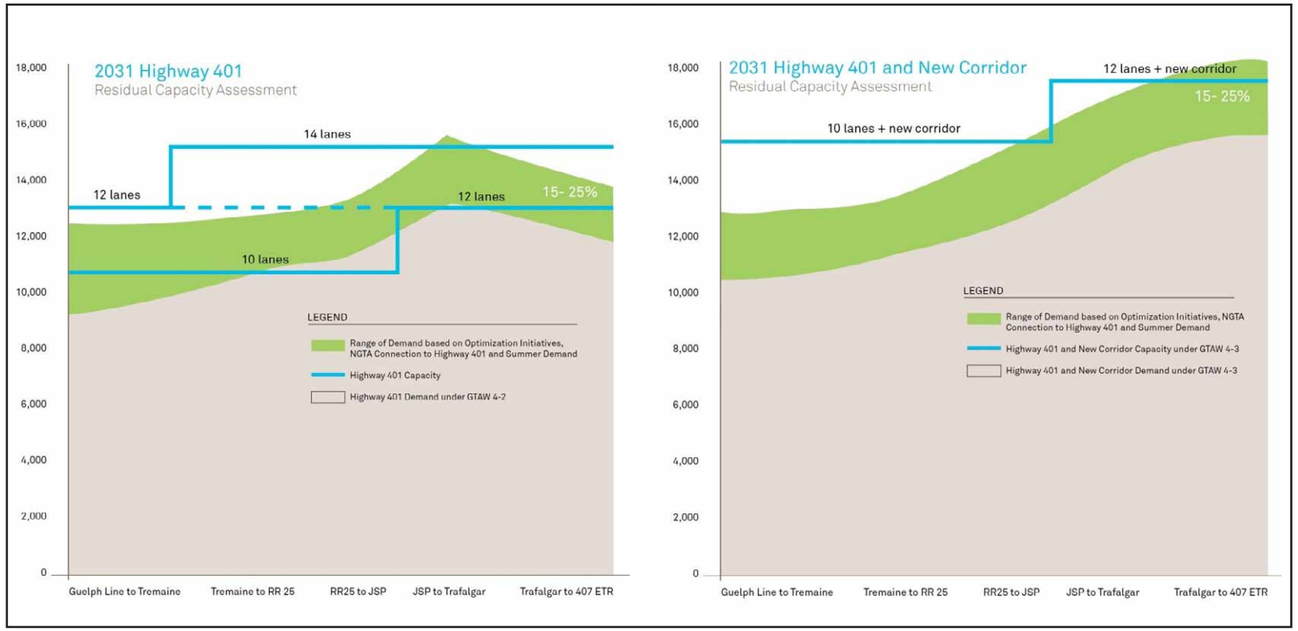


Exhibit 5-8: Sensitivity of Travel Demand to factors such as NGTA Connection and Summer Demand

As items (1) and (2) above would suggest, the residual capacity assessment captures the ability of the roadway network to accommodate higher demands arising from either growth beyond 2031 or other possible planning scenarios for the study area in Halton.

Both criteria suggest the need to consider a 14-lane Highway 401 as an alternative for evaluation.

3. In addition to estimating people and goods movement benefits for the inter-regional and local roadway network, the Study Team assessed the performance of Highway 401 in moving passenger and freight demand in the study area. This assessment of Highway 401 performance in more detail is intended to better inform the decision to choose between widening Highway 401 to 12 or 14 lanes or a new corridor in the Halton area.
4. In response to the feedback on the Draft Strategy Report (February 2011), transportation system redundancy in the Halton area is assessed quantitatively. The Draft Strategy Report (February 2011) included a qualitative evaluation of the alternatives for the level of redundancy that they may provide. As part of the 2011/2012 additional analysis in the Halton area, the alternatives are evaluated for redundancy based on quantitative network performance measures. For the purpose of this exercise, redundancy is the defined as the ability of the roadway network to accommodate the diversion of traffic from the major facilities due to closures resulting from incidents. Select road closure scenarios are modeled and resulting travel delays under different alternatives are compared to those under the Base Case scenario to derive a measure of transportation network redundancy. In addition to the transportation evaluation, road network redundancy is also considered in the economic evaluation of alternatives. The ability of the road network to absorb the impact of unexpected incidents by minimizing resulting delays to passenger and freight movement has implications

to the performance of the local economy. Results of the road network redundancy assessment were fed into the estimation of benefits to road users as part of the economic evaluation.

5. Transportation system safety assessment is quantified. For the purpose of the additional analysis, road safety is defined in terms of expected number of collisions on the roadway network under different alternatives. This was intended to capture the differences between the alternatives in traffic safety resulting from the level of traffic and the nature of interactions based on the type of roadway network element – mainline freeway, arterial intersection, freeway interchange, etc. - that the traffic may access.

The network performance measures of safety, redundancy, screenline capacity, and people and goods movement are extracted for the area in Halton within the defined limits shown in **Exhibit 5-9**.

Exhibit 5-9: Study Area Limits for Transportation Evaluation

5.6.2 Sensitivity Analysis and Findings (12 Lanes, 14 Lanes Highway 401, and New Corridor)

Road Network Capacity Assessment

The road network within the study area was assessed for the capacity it could provide to serve the demand forecast for 2031. Also assessed was how much additional capacity would be available after serving the forecast demand for 2031.

One of the ways the network capacity was assessed is at the screenline level. The screenlines defined in the Draft Strategy Report (February 2011) covered the larger GTA West area. For the 2011/2012 additional work focusing on the Halton area, additional screenlines were identified. Additional screenlines were located at every interchange along Highway 401 within the focused study area, as shown in **Exhibit 5-10**.

Exhibit 5-11 shows the performance of the screenline capacity under the Widening and New Corridor alternatives. All the three alternatives improve the screenline capacity compared to the Base Case. None of the screenlines would be at a volume-capacity (V/C) ratio of 0.90 or over, which is the capacity

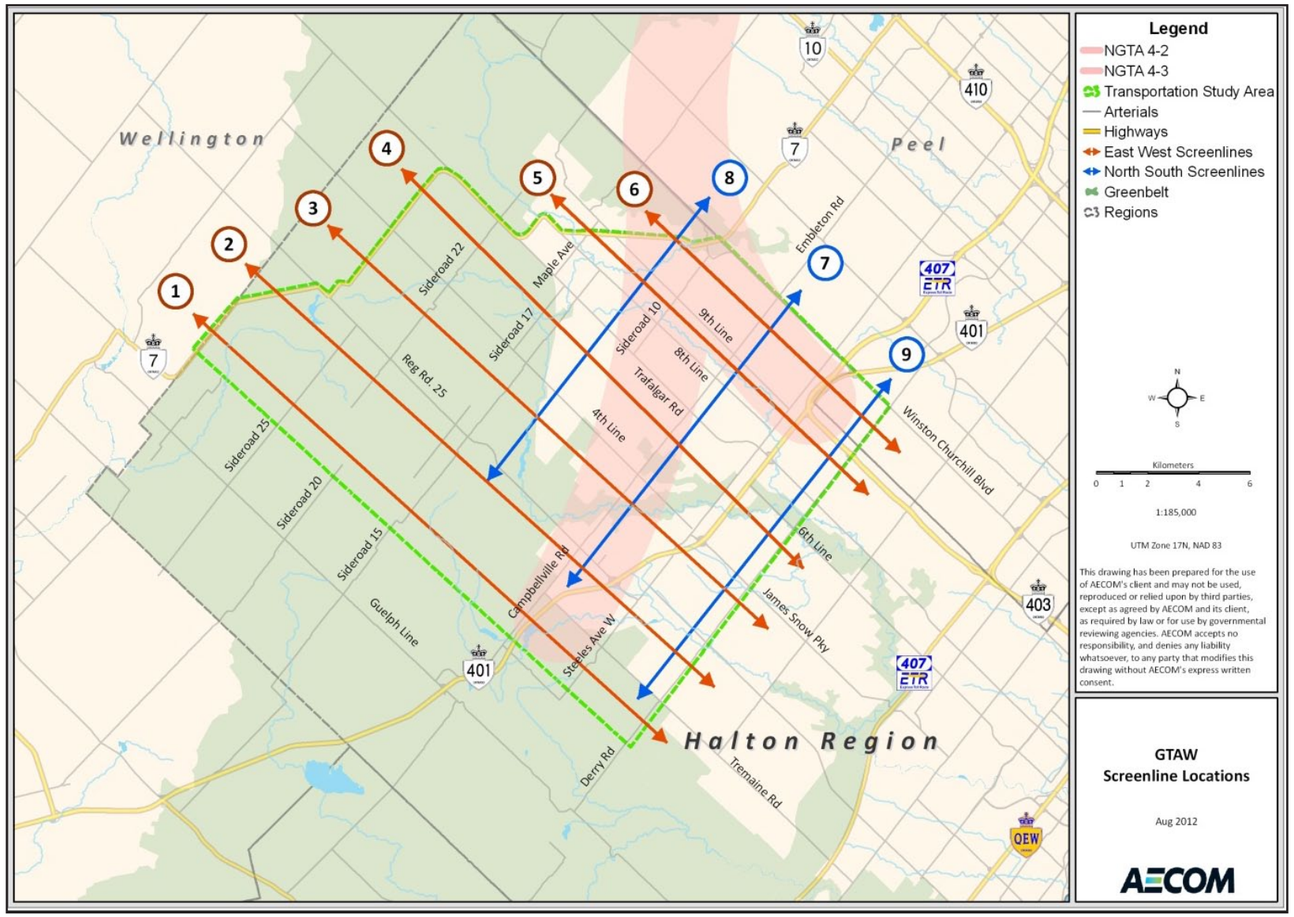


Exhibit 5-10: Screenlines in Halton Area

SCREENLINE NUMBER	SCREENLINE NAME	BASE CASE	12-LANE HIGHWAY 401	14-LANE HIGHWAY 401	NEW CORRIDOR
	East – West Roads				
1	West of Tremaine Road	1.00	0.77	0.78	0.62
2	Tremaine Road to Regional Road 25	0.91	0.74	0.63	0.63
3	Regional Road 25 to James Snow Parkway	0.70	0.67	0.62	0.63
4	James Snow Parkway to Trafalgar Road	0.78	0.82	0.76	0.71
5	Trafalgar Road to Highway 401-407ETR	0.81	0.82	0.75	0.81
6	Highway 401-407 ETR to Winston Churchill Blvd	0.83	0.80	0.80	0.81
	North – South Roads				
7	North of Highway 401	0.75	0.71	0.71	0.57
8	South of Highway 401	0.84	0.80	0.80	0.79
9	North of Side Rd. 10 - RR25 to Highway 7	0.79	0.71	0.72	0.76

XXX – V/C ratio greater than target of 0.90 (LOS E)

Exhibit 5-11: Screenline capacity under the Widening and New Corridor alternatives

	BASE CASE	12-LANE HIGHWAY 401	14-LANE HIGHWAY 401	NEW CORRIDOR
407 to Trafalgar Rd.	1.01	0.97	0.86	0.94
Trafalgar Rd. to James Snow Parkway	0.92	1.04	0.94	0.86
James snow Parkway to RR 25	0.92	0.91	0.82	0.87
RR 25 to Tremaine Rd.	1.30	0.98	0.75	0.75
West of Tremaine Rd.	1.22	0.90	0.77	0.68

XXX – V/C ratio greater than target of 0.90 (LOS E)

Exhibit 5-12: 2031 PM Peak Hour Peak Direction (Westbound) Volume-Capacity Ratios for Inter-Regional Facilities (Highway 401 and New Corridor)

threshold established for the additional analysis. This finding validates the definition of alternatives in the Draft Strategy (February 2011) aimed at providing basic capacity to support the travel demand in 2031. Among the three alternatives, the new corridor would provide similar to or marginally better screenline capacity than the Highway 401 14-Lane Widening alternative, and both the alternatives would perform better than Highway 401 12-Lane Widening.

A combined volume-capacity ratio is calculated for Highway 401 and the new corridor (**Exhibit 5-12**). The capacity assessment indicates that the Highway 401 12-Lane Widening would have less than 10% additional capacity available upon serving the 2031 forecast demand. Most of Highway 401 in this section operates at or over capacity in 2031 under the Highway 401 12-Lane Widening alternative. The Highway 401 14-Lane Widening alterative performs better than the Highway 401 12-Lane Widening in providing capacity, and the new corridor alternative also improves upon the Highway 401 12-Lane Widening throughout the study area. The new corridor alternative performs marginally better than the Highway 401 14-Lane Widening at the west end of the study area, while the Highway 401 14-Lane Widening would perform better in providing capacity east of Regional Road 25. The Highway 401 12-Lane Widening and Highway 401 14-Lane Widening alternatives would perform worse than the Base Case between Trafalgar and Regional Road 25 because the GTA West corridor that terminates at the Highway 401/407 ETR interchange under these alternatives feeds additional demand to Highway 401.

In addition to screenline and highway network (Highway 401 and new corridor) volume-capacity assessment, the roadway network was evaluated for its ability to provide suitable capacity beyond 2031. The rationale and methodology for this assessment is described in **Section 5.6.1**. The *Growth Plan* provides land use forecasts only to the year 2031. Hence, travel demand forecasts could not be developed for a horizon year beyond 2031. However, the capacity of the system to serve the growth in demand beyond 2031 was reviewed through residual capacity – a measure of the capacity left upon serving the demand forecast for 2031. This residual capacity would be used by the growth in demand beyond 2031 – assumed at a conservative 1% (the demand on QEW is projected to grow

at an average of 2% in the NGTA study area). By stipulating the rate at which the demand would likely grow beyond 2031 and estimating the residual capacity for the system in 2031, a timeline was estimated for the system (Highway 401 plus the new corridor) to exceed the threshold of 90% of capacity – (volume-capacity ratio of 0.90). The results are shown in **Exhibit 5-13**. The sections of the network exceeding capacity threshold prior to 2031 are highlighted.

As the results show, all the sections of Highway 401 would exceed capacity threshold by 2031 with the Highway 401 12-Lane Widening alternative. With the Highway 401 14-Lane Widening alternative, most sections of Highway 401 would not exceed capacity threshold before 2035 based on assumption. Similarly, the new corridor alternative would provide sufficient capacity on Highway 401 to last till 2035 and beyond.

A sensitivity analysis was performed to assess the variability in travel demand in the study area due to factors that are uncertain within the framework of the current GTA West Study.

People Movement

A series of network performance metrics were analyzed to assess the alternatives in terms of their ability to improve the movement of people in the Halton area. These metrics included

- Travel delays on Highway 401 and overall roadway network
- Local and Inter-regional roadway network operating at good levels of service
- Inter-regional trips using local roads

The delays on the total road network are also presented in **Exhibit 5-14**. Delays to passenger travel are shown in **Exhibit 5-15**.

As the exhibit shows, the new corridor alternative would provide the most delay savings over the Base Case scenario. The new corridor could also provide the most delay savings

	BASE CASE	12-LANE HIGHWAY 401	14-LANE HIGHWAY 401	NEW CORRIDOR
407 ETR to Trafalgar Rd.	2026	2028	2036	2032
Trafalgar Rd. to James Snow Parkway	2030	2025	2029	2036
James Snow Parkway to RR 25	2030	2030	2041	2035
RR 25 to Tremaine Rd.	2016	2028	2050	2049
West of Tremaine Rd.	2019	2030	2047	2059

XXX – indicates segment could reach capacity threshold (0.9) prior to 2031

Exhibit 5-13: Timeline projection for Highway 401 exceeding capacity threshold under Widening and New Corridor Alternatives

CRITERIA	BASE CASE	12-LANE HIGHWAY 401	14-LANE HIGHWAY 401	NEW CORRIDOR
Auto delay on total roadway network (auto veh-hr)	9,064	7,525 (1,539)	7,065 (1,999)	6,965 (2,099)
Auto delay on Highway 401 roadway network (auto veh-hr)	1,897	1,571 (326)	1,100 (797)	898 (999)
Auto delay on Existing Local roadway network (auto veh-hr)	6,262	4,229 (2,033)	4,168 (2,094)	4,173 (2,090)

(xxx) – indicates reduction from Base Case

Exhibit 5-14: 2031 PM Peak Hour Passenger Travel Delays

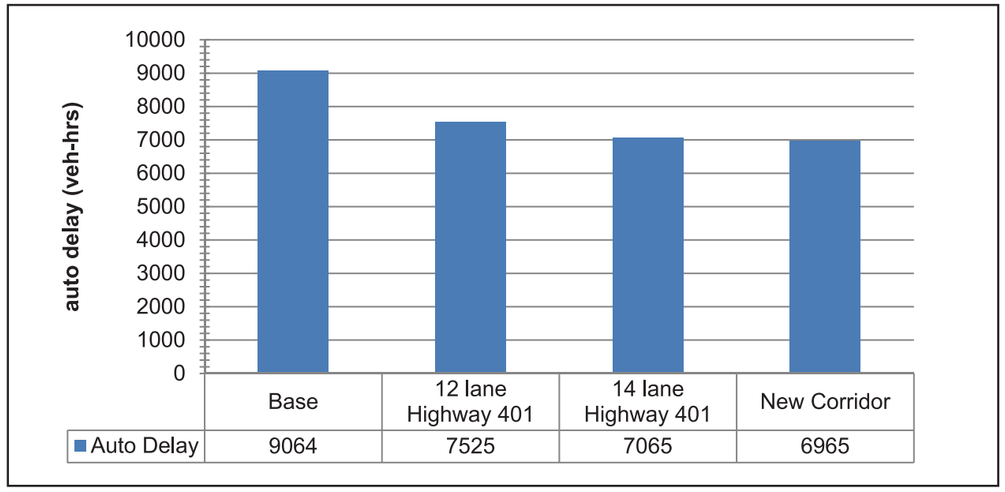


Exhibit 5-15: Roadway Network Delays for Passenger Vehicles

when considering Highway 401 alone. The delay savings on the total road network with the new corridor are about 35% higher than with the Highway 401 12-Lane Widening. The delay savings on Highway 401 with the new corridor are about three times the savings with the Highway 401 12-Lane Widening. The performance of the local road network would be similar either with the Highway 401 14-Lane Widening or the new corridor.

The alternatives are also assessed in terms of the share of the road network operating at good levels of service (represent better than LOS D conditions). Good level of service is defined as volume-capacity ratio being 0.80 or lower, i.e. the demand for the facility being below 80% of its capacity. As is the case with delays, the new corridor alternative performs considerably better than the Highway 401 12-Lane Widening and marginally better than the Highway 401 14-Lane Widening alternative. The performance of Highway 401 would be considerably better with Highway 401 14-Lane Widening and new corridor than with the Highway 401 12-Lane Widening, as shown in **Exhibit 5-16**.

Also included in **Exhibit 5-16** is the percentage of inter-regional auto travel using existing local roads. This criterion is intended to measure the amount of inter-regional travel (defined as longer than 20 kilometres for passenger travel) that is diverted to the local road network because the highway network is congested. The additional highway road network capacity provided by the new corridor could keep the amount of long-distance travel on local roads to 38%, which is similar to 12-lane widening.

Goods Movement

The benefits to goods movement provided by the alternatives are assessed through metrics similar to those for the benefits to passenger travel discussed in the previous section. The results are provided in **Exhibit 5-17.** Truck delays on total road network are also shown in **Exhibit 5-18**.

The new corridor and Highway 401 14-Lane Widening would provide similar delay savings for trucks, while the Highway 401 14-Lane Widening would provide the most delay savings on Highway 401.

CRITERIA	BASE CASE	12 LANE HIGHWAY 401	14 LANE HIGHWAY 401	NEW CORRIDOR
% of Total roadway network better than V/C 0.8 (auto veh-km)	43%	53%	58%	60%
% of Total roadway network worse than V/C 1.0 (auto veh-km)	20%	13%	5%	6%
% of Highway 401 roadway network better than V/C 0.8 (auto veh-km)	7%	24%	40%	38%
% of Highway 401 roadway network worse than V/C 1.0 (auto veh-km)	34%	29%	4%	2%
% of Existing Local roadway network better than V/C 0.8 (auto veh-km)	61%	67%	68%	68%
% of Existing Local roadway network worse than V/C 1.0 (auto veh-km)	12%	5%	6%	7%
% of Inter-regional auto travel using existing local roads	53%	40%	39%	38%

Exhibit 5-16: 2031 PM Peak Hour Passenger Travel Level of Service

CRITERIA	BASE CASE	12 LANE HIGHWAY 401	14 LANE HIGHWAY 401	NEW CORRIDOR
Truck delay on total roadway network (auto veh-hr)	461	330 (131)	271 (189)	270 (191)
Truck delay on Highway 401 roadway network (auto veh-hr)	273	179 (94)	156 (117)	103 (169)

(XXX) – indicates reduction from Base Case

Exhibit 5-17: 2031 PM Peak Hour Truck Travel Delays

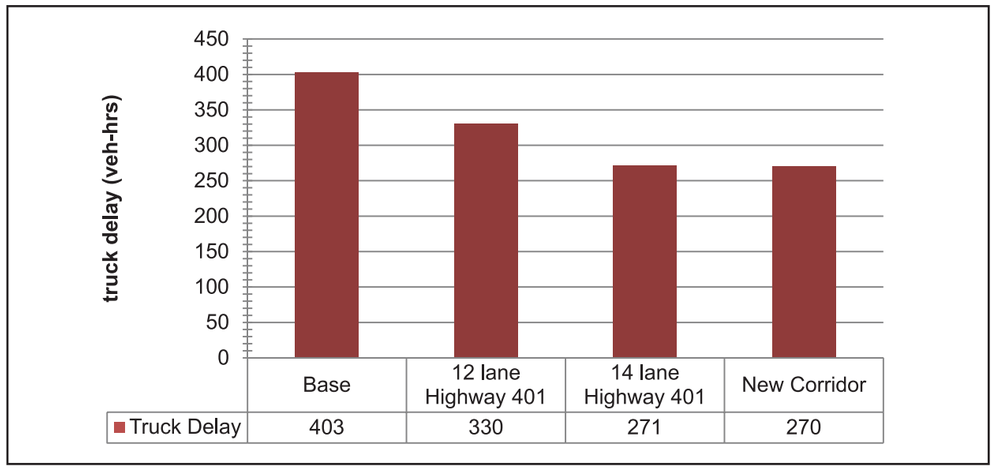


Exhibit 5-18: Roadway Network Delays for Commercial Vehicles

CRITERIA	BASE CASE	12 LANE HIGHWAY 401	14 LANE HIGHWAY 401	NEW CORRIDOR
% of Total roadway network better than V/C 0.8 (truck veh-km)	23%	34%	46%	45%
% of Total roadway network worse than V/C 1.0 (truck veh-km)	33%	22%	4%	3%
% of Highway 401 roadway network better than V/C 0.8 (truck veh-km)	7%	21%	37%	33%
% of Highway 401 roadway network worse than V/C 1.0 (truck veh-km)	39%	30%	4%	2%
% of Inter-regional truck travel using existing local roads	16%	8%	8%	8%

Exhibit 5-19: 2031 PM Peak Hour Truck Travel Level of Service

The road network is also assessed for the level of service it provides under the various alternative scenarios. The results are shown in **Exhibit 5-19**. Similar to passenger travel, the truck traffic on Highway 401 would benefit considerably more with the Highway 401 14-Lane Widening or new corridor alternatives compared to the Highway 401 12-Lane Widening. Unlike passenger travel, the amount of long-distance truck travel using local road network would not be different across the alternatives (at 8% under all three alternatives).

Transportation System Redundancy Assessment

An additional measure of the transportation network performance was quantified as part of the detailed analysis in the Halton area. This is the transportation system redundancy, which is a measure of the availability of alternative travel routes for passenger and freight movement in case the primary travel facilities are blocked. In the Draft Strategy Report (February 2011, Chapter 4), the alternatives were assessed qualitatively for the level of transportation system redundancy that they may provide.

Redundancy means having an alternate route available for motorists / trucks to use to avoid congestion or delays in the event of incidents, construction / maintenance.

- Redundancy reduces impacts on local road network
- Redundancy provides significant benefits to goods movement industry by
  - reducing overall cost of shipping,
  - improving competitiveness of GTA for logistics / manufacturing industries
  - increasing the reliability of supply chains to support manufacturing that relies on just in time delivery

As part of the additional analysis within the Halton area, the system redundancy was quantified in terms of the delay savings that an alternative would provide if an unexpected incident were to occur on Highway 401, which necessitated either a partial or full closure. The GGH travel demand model was used to model scenarios of partial and full closure of Highway 401 during a weekday PM peak in 2031. The resulting travel delays are estimated under the Base Case scenario and each of the three alternative scenarios.

Delays due to road closures are projected to a full year based on the data for closures on similar highways in the province. Data on partial and full closures due to an incident on highways such as Highway 400, Highway 401, Highway 403, Highway 427, Highway 410, Highway 407, etc. were obtained for the year 2011. Since data for multiple years was not readily available, an average annual closure rate (per unit length of highway) for similar highways was used instead of the closure rate for Highway 401 alone. This was done because a single incident on Highway 401 in a single year could skew the closure rate and lead to misrepresentation of delays due to such incidents.

A few critical elements of the methodology to estimate the delays from road closures are below:

1. Annual rate of partial and full road closures during different times of the day – peak, mid-day and night - were considered. However, only the peak period was modeled in the GGH model to estimate delays from a typical partial and full closure. A relationship was established between delays during peak period and other times of the day was established. Mid-day delays were assumed to be 65% of peak period delays, and night-time delays were assumed to be 15% of peak period delays.

MAINLINE CLOSURES PER YEAR		
	Full closures Per km	Partial closures Per km
Peak Period	1.15	17.29
Mid-Day	0.16	5.64
Night	0.36	2.15

2. Express-collector and simple freeway configurations were evaluated separately. The 12-lane and 14-lane Highway 401 Widening alternatives differ from the New Corridor alternative in that they would include an express-collector system on Highway 401 through Milton. An express-collector system would rarely be fully closed due to an incident. Either the express or the collector lanes may be closed completely while the other could remain open to traffic. Hence a full closure (of both express and collector lanes) is assumed to happen only in 10% of cases, while the rest of the full closures for an express-collector system is treated as a partial closure.

3. The total delays are allocated to auto and truck demand based on an 85%-15% split for peak periods, 80%-20% for mid-day and 65%-35% for night.

4. The data on road closures also included the duration of each closure. An average duration for a partial and full closure was used to estimate total delay during a typical closure.

AVERAGE DURATION OF A TYPICAL CLOSURE		
	Full closure	Partial closure
Peak Period	4.81	4.87
Mid-Day	1.72	2.43
Night	3.05	5.93

A partial closure scenario was modeled as only three lanes on a stretch of Highway 401 between James Snow Parkway and Regional Road 25 being open to westbound passenger and truck vehicles. A full closure meant that all lanes in that stretch were closed to traffic. In order to simulate (at the least, partially) the effect of queuing on lanes upstream of the closure, the roadway capacity was downstream from the Highway 401-407 ETR interchange.

The results are presented in **Exhibit 5-20**. As the results suggest, the new corridor alternative would provide the most savings (or the least delays) due to closures of Highway 401. The New Corridor Alternative provides the best ability to manage delays due to incidents / closures:

- New Corridor reduces annual estimated delays due to incidents by 22% compared to Highway 401 12-Lane Widening alternative
- New Corridor reduces annual estimated delays due to incidents by 30% compared to the Highway 401 14-Lane Widening alternative
- The additional delays due to incidents under the Base Case are shown to be lower than under the widening and new corridor alternatives. This is because the delays on the roadway network under the Base Case are high to begin with, and even though incidents result in additional delays, the additional delays are not as significant under the widening and new corridor alternatives.

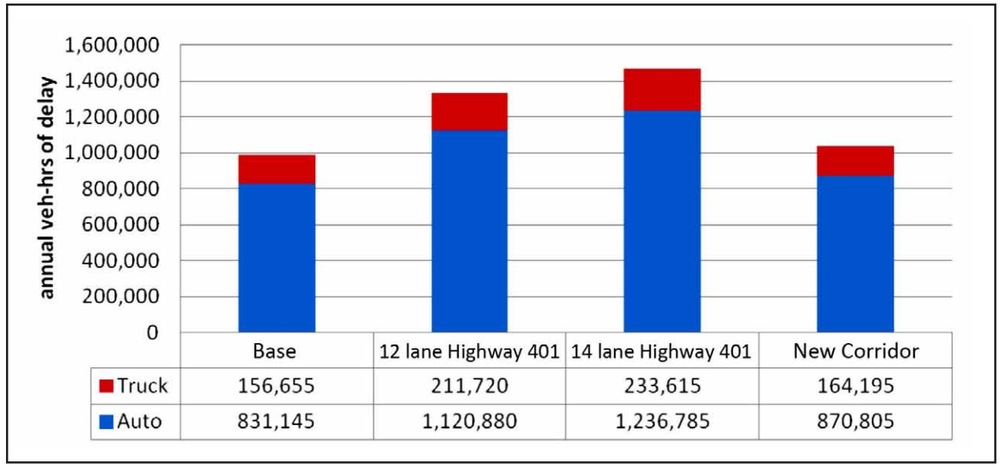


Exhibit 5-20: Annual Delays Caused by Highway 401 Closures due to Incidents

Transportation Safety Assessment

A quantitative assessment of safety is performed by estimating the expected number of collisions due to a combination of factors such as introduction of new roadway interchanges and arterial intersections, and additional traffic on the facilities. Expected collisions were estimated for the new corridor considering prescribed collision rates for the mainline and interchange segments. Expected collisions were estimated for the existing road network considering highway mainline and interchange areas, and arterial roads and intersections.

Mid-Block Road Sections:

- Steeles Avenue between Regional Road 25 and Ninth Line
- No. 5 Side Road between Tremaine Road and Ninth Line
- No. 10 Side Road between Regional Road 25 and Ninth Line
- Trafalgar Road between Steeles Avenue and No. 5 Side Road
- Regional Road 25 between Highway 401 and No. 5 Side Road

Intersections:

- Steeles Avenue / Trafalgar Road
- No. 5 Side Road / Trafalgar Road
- No. 10 Side Road / Trafalgar Road
- No. 10 Side Road / Regional Road 25
- No. 10 Side Road / Esquesing Line (4th Line)
- No. 5 Side Road / Regional Road 25
- No. 5 Side Road / Tremaine Road
- No. 5 Side Road / Esquesing Line (4th Line)
- James Snow Parkway and Steeles Avenue
- Esquesing Line and Steeles Avenue

Safety Performance Functions (SPFs) are used to explore relationship between collision frequencies and traffic volume and site characteristics. The safety performance functions (SPFs) were obtained from "Safety-Analyst Interim Tools"[1]. MTO-approved SPFs were not selected for this analysis as they do not differentiate between 4-lane (2 lanes per direction), 6-lane (3-lanes per direction), and 8+ lane (4 or more lanes per direction) freeways. For this study, the SPFs presented by Harwood et al were used as these SPFs were calibrated based on data from some states in the US and assumed to be transferable to our application. The selected SPFs were applied to predict total (TOT) and severe (SEV) collisions for

[1] *Harwood, D. W., K. M. Bauer, K. R. Richard, D. K. Gilmore, B. Persaud, and C. Lyon, Development of SPFs for Safety Analyst Interim Tools—Technical Memorandum, Prepared by Midwest Research Institute for the Federal Highway Administration. September 2004*

	COLLISION TYPE	BASE CASE	12-LANE HIGHWAY 401	14-LANE HIGHWAY 401	NEW CORRIDOR AND HIGHWAY 401
Freeways	Injury	344	513	525	493
	Fatal	5	7	8	7
	Property Damage only (PDO)	531	823	841	806
	Severe (Injury and Fatal)	349	520	533	500
	Total Freeways	**881**	**1344**	**1374**	**1306**
Arterials	Injury	684	601	596	583
	Fatal	10	9	9	9
	Property Damage only (PDO)	2710	2382	2360	2310
	Severe (Injury and Fatal)	694	610	604	592
	Total Arterials	**3404**	**2993**	**2964**	**2901**
Total (Arterials and Freeways)	Injury	1028	1114	1121	1076
	Fatal	15	16	16	16
	Property Damage only (PDO)	3241	3206	3201	3116
	Severe (Injury and Fatal)	1043	1130	1137	1092
	Total	**4284**	**4336**	**4338**	**4207**

Exhibit 5-21: Annual Estimated Collisions under the Widening and New Corridor Alternatives

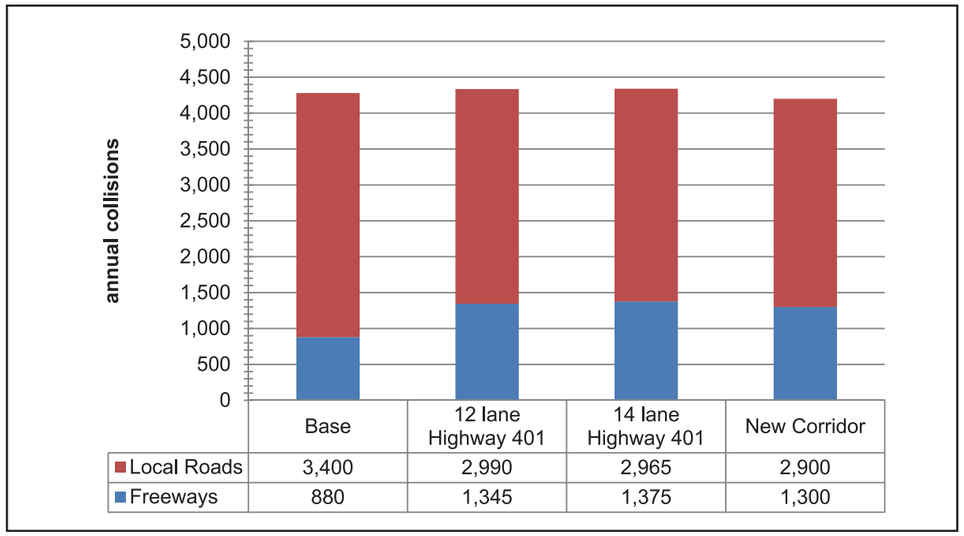


Exhibit 5-22: Total Annual Estimated Collisions under the Widening and New Corridor Alternatives

subtypes of each interchange element including mainline freeway segments, ramp portions, acceleration lanes, crossroad ramp terminals and intersections, and crossing roadway segments, where subtypes differ by geometric design or functional characteristics. For instance, according to Harwood et al, proper SPFs related to mainline freeway segments are selected based on the followings:

- Area Type (Urban or Rural)
- Number of lanes (2, 3, 4 or more)
- Inside /outside Interchange area (in order to account for the increased level of weaving, lane changing, and acceleration/deceleration that takes place immediately upstream, downstream, and between interchange ramps).

Three types of collisions were estimated – Property Damage Only (PDO), Injury and Fatal. Injury and Fatal collisions together are considered as severe collisions. The expected annual number of collisions for the alternatives are presented in **Exhibit 5-21**.

The Highway 401 12-Lane and 14-Lane Widening alternatives would result in additional collisions over the Base Case, primarily due to the complex interchange at the Highway 401/407 ETR interchange. The new corridor, by relieving Highway 401 congestion, would result in lower number of collisions on the freeway system than the Highway 401 12-Lane and 14-Lane Widening scenarios. The new corridor alternative would result in more collisions on the highway network than the Base Case. However, it would result in lower number of collision on local roads by diverting some of demand to the new corridor. All the three alternatives, by providing relief to arterials through additional highway capacity, would result in lower number of collisions on arterials. In summary, the new corridor would result in lowest number of collisions by balancing the traffic demand among Highway 401, the new corridor and the arterial road network. The estimated total and severe collisions are presented in graphs in **Exhibits 5-22** and **5-23**, respectively.

Delays During Construction

The delays to users due to lane closures during construction for the three alternatives were assessed. These delays were considered in the Economic evaluation of the alternatives, and also in the Constructability analysis.

Construction for the Highway 401 12-Lane and 14-Lane Widening scenarios in the Halton area would involve widening mainline Highway 401, and connecting the GTA West transportation corridor at the Highway 401/407 ETR interchange. Construction for the new corridor alternative in the Halton area would involve building the GTA West transportation corridor and connecting it to Highway 401 west of Tremaine Road, and tying the north-south link to the Highway 401/407 ETR interchange. There is no additional widening of Highway 401 over the Base Case for the new corridor alternative.

Scenarios are specified to represent a typical closure during construction. The following considerations were made in defining the construction closure delays:

- Only weekday closures were considered.

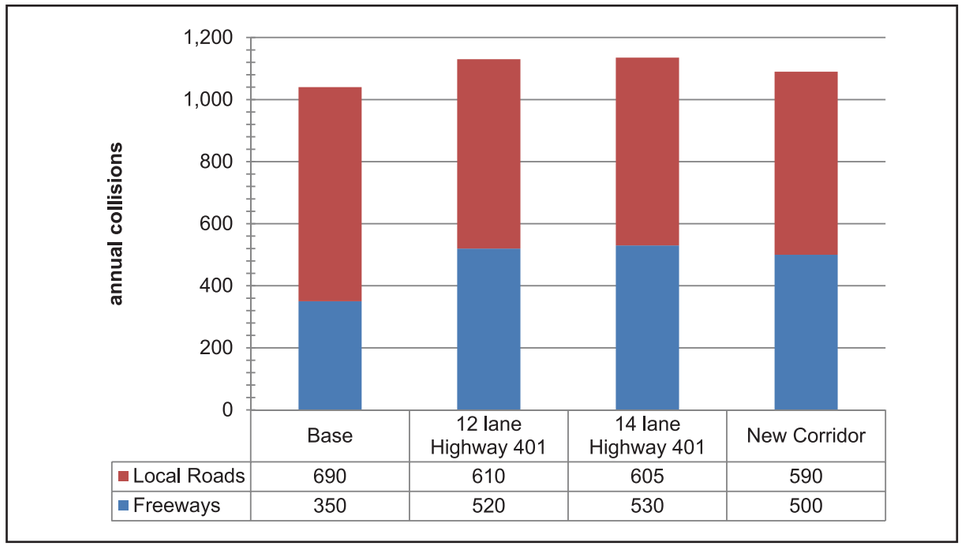


Exhibit 5-23: Total Annual Estimated Severe Collisions under the Widening and New Corridor Alternatives

- Construction is assumed during 9 out of 12 months (excluding winter)
- Construction for Highway 401 12-Lane and 14-Lane Widening is assumed to last for a duration of 4 years.
- Construction for the new corridor interchange at Highway 401 is assumed to last for 2 years.
- Night time is defined as the 9 hours between 9 pm and 6 am. For delays during the night time, the average delay for 9 pm-midnight period is applied for the first 4 hours. The average delay for 9 pm to 6 am is applied to the next 5 hours.
- The peak hour delays are multiplied by a factor of 9 to estimate delays for the day time (15-hour period).

The construction scenarios for daytime and night time are modeled as below:

- Day time delays for 12-lane and 14-lane Highway 401 widening: capacity per lane is reduced from Guelph Line to 407 ETR. Even though there are no lane closures during daytime construction, the reduced lane and shoulder widths are reflected in the lower capacity per lane.
- Night time delays for 12-lane and 14-lane Highway 401 widening: 3 out of 5 lanes (Base Case has 10 lanes in this stretch) are kept open between James Snow Parkway to Regional Road 25.
- Daytime delays for the new corridor: capacity per lane is reduced from Guelph Line to 407 ETR to reflect the construction at the interchange with Highway 401.
- Night time delays for the new corridor: 4 out of 6 lanes are assumed to be kept open between 407 ETR and Trafalgar Road, and 1 out of 3 lanes are kept open between Guelph Line and Tremaine Road.

Based on the above assumptions and analysis methodology, potential construction delays for the alternatives are as shown in **Exhibit 5-24**.

As can be seen from the above exhibit, potential delays during daytime construction for the Highway 401 14-Lane Widening are forecast to be the highest among the three alternatives. The delays for the new corridor are projected to be the lowest, since there is no mainline widening of Highway 401. Most of the construction for the new corridor is away from Highway 401 in the green field.

Night time construction delays for the new corridor are significantly higher than those for the widening alternatives. The reason is that since Highway 401 widening is incremental (from 10 lanes to 12 or 14 lanes), there would be sufficient capacity remaining even with some of the lanes closed. However, for the construction of the new GTAW corridor interchange with Highway 401 west of Tremaine Road, there are only three lanes on Highway 401 and only one of the lanes would be kept open during night time construction. This may result in significantly higher night time construction delays for the new corridor alternative compared to the widening alternatives.

	12 LANE HIGHWAY 401 – DAYTIME	12 LANE HIGHWAY 401 – NIGHT TIME	14 LANE HIGHWAY 401 – DAYTIME	14 LANE HIGHWAY 401 – NIGHT TIME	NEW CORRIDOR DAYTIME	NEW CORRIDOR NIGHT TIME
Auto Hours of Delay (veh-hours)	630,242	7	1,093,295	7	430,319	2,930
Truck Hours of Delay (veh-hours)	87,287	25	163,819	38	47,546	3,159

Exhibit 5-24: Construction Delays for the Widening and New Corridor Alternatives

Construction delays for the new corridor alternative do not include delays due to construction of new interchanges at Trafalgar and Regional Road 25. However, these delays are expected to be insignificant compared to delays on Highway 401 for the widening alternatives.

Conclusion

Based on the above transportation evaluation, the new corridor alternative is found to perform the best among the three alternatives. The evaluation tables in **Exhibit 5-25** show the entire spectrum of transportation evaluation criteria. The above discussion has focused mostly on the quantitative aspects of transportation evaluation – such as network capacity, travel delays, redundancy, construction impacts and safety. The evaluation tables, considering all the criteria, also suggest that the new corridor would provide the best transportation performance, followed by the Highway 401 14-Lane and 12-Lane Widening alternatives. However, it should be noted that even the Highway 401 12-Lane Widening alternative is still expected to accommodate transportation demands to 2031.

Exhibit 5-25: Transportation Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
5.0 TRANSPORTATION FACTORS				
5.1 Traffic Operations *Measure* *Potential Impact on Traffic Operations and capacity at key screenlines.*	5.1.1. Peak Period performance of key corridors – forecast volume/ capacity ratio at critical screen lines.	West of Tremaine Rd – 0.77 Tremaine Rd to RR 25 – 0.74 RR 25 to James Snow Pkwy– 0.67 James Snow Pkwy to Trafalgar Rd – 0.82 Trafalgar Rd to Highway 407 IC – 0.82 North of Highway 401 – 0.71	West of Tremaine Rd – 0.78 Tremaine Rd to RR 25 – 0.63 RR 25 to James Snow Pkwy– 0.62 James Snow Pkwy to Trafalgar Rd – 0.76 Trafalgar Rd to Highway 407 IC – 0.75 North of Highway 401 – 0.71	West of Tremaine Rd – 0.62 Tremaine Rd to RR 25 – 0.63 RR 25 to James Snow Pkwy– 0.63 James Snow Pkwy to Trafalgar Rd – 0.71 Trafalgar Rd to Highway 407 IC – 0.81 North of Highway 401 – 0.57
	5.1.2. Peak Period performance of key inter-regional corridors – forecast volume/capacity ratio at critical screen lines.	West of Tremaine Rd – 0.90 Tremaine Rd to RR 25 – 0.98 RR 25 to James Snow Pkwy– 0.91 James Snow Pkwy to Trafalgar Rd – 1.04 Trafalgar Rd to Highway 407 IC – 0.97	West of Tremaine Rd – 0.66 Tremaine Rd to RR 25 – 0.75 RR 25 to James Snow Pkwy– 0.82 James Snow Pkwy to Trafalgar Rd – 0.94 Trafalgar Rd to Highway 407 IC – 0.86	West of Tremaine Rd – 0.68 Tremaine Rd to RR 25 – 0.75 RR 25 to James Snow Pkwy– 0.87 James Snow Pkwy to Trafalgar Rd – 0.86 Trafalgar Rd to Highway 407 IC – 0.94
5.2. Commuter Travel Characteristics *Measure* *Potential impact on commuter trip distribution and trip length.*	5.2.1. Percentage of peak period self-containment of trips within the municipality / region.	Peel – 69% Halton – 63% Wellington – 80%	Peel – 69% Halton – 63% Wellington – 80%	Peel – 69% Halton – 63% Wellington – 80
		No difference between alternatives		
	5.2.2 Average automobile trip length.	20.4 km	20.4 km	20.4 km
		No difference between alternatives		
	5.2.3. Potential to support transit opportunities on a new corridor.	Opportunities for new transit linkages on N-S portion of new corridor connecting to Highway 401/407 IC Highway 401 widening may permit improved transit services on existing corridor although limited access to HOV lane (located in express) from GTAW corridor	Opportunities for new transit linkages on N-S portion of new corridor connecting to Highway 401/407 IC Highway 401 widening may permit improved transit services on existing corridor although limited access to HOV lane (located in express) from GTAW corridor	New corridor allows for protection of transitway to better serve Milton growth area, although connection via RR 25 would be required.
5.3 Efficient movement of people *Measure* *Potential to support the efficient movement of people between communities and regions by road.*	5.3.1. Percentage of inter-regional network operation better than Level of Service D (automobile km).	53% of overall network operating at LOS D or better 24% of Highway 401 operating at LOS D or better	58% of overall network operating at LOS D or better 40% of Highway 401 operating at LOS D or better	60% of overall network operating at LOS D or better 38% of Highway 401 operating at LOS D or better
	5.3.2. Percentage of local road network operating better than Level of Service D in peak hours (automobile km).	67% of local road network operating at LOS D or better	68% of local road network operating at LOS D or better	68% of local road network operating at LOS D or better
	5.3.3. Percentage of inter-regional automobile trips* using the local road network in peak hours.	38%	37%	36%

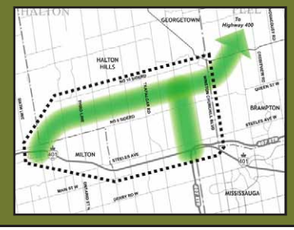
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
	5.3.4. Peak Hour Automobile hours of delay on the inter-regional transportation network† (automobile hours).	7,525 automobile hours of delay	7,065 automobile hours of delay	6,965 automobile hours of delay
	5.3.5. Peak Hour Automobile hours of delay on the local transportation network† (automobile hours).	4,229 automobile hours of delay	4,168 automobile hours of delay	4,173 automobile hours of delay
	5.3.6. Total persons moved in the study area.	No difference between alternatives	No difference between alternatives	No difference between alternatives
5.4. Efficient movement of goods. *Measure* *Potential to support the efficient movement of goods between communities and regions by road.*	5.4.1. Percentage of inter-regional system operating better than Level of Service D in peak hours (truck km).	34% of overall network operating at LOS D or better 21% of Highway 401 operating at LOS D or better	46% of overall network operating at LOS D or better 37% of Highway 401 operating at LOS D or better	45% of overall network operating at LOS D or better 33% of Highway 401 operating at LOS D or better
	5.4.2. Percentage inter-regional truck trips using the local road network* in peak hours.	8% of inter-regional truck traffic using local road network	8% of inter-regional truck traffic using local road network	8% of inter-regional truck traffic using local road network
	5.4.3. Peak Hour Truck hours of delay on the inter-regional transportation network†.	330 veh-hrs	271 veh-hrs	270 veh-hrs
5.5. System Reliability / Redundancy *Measure* *Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions.*	5.5.1. Availability of alternate routes / facilities for inter-regional transportation between regions, communities and terminals (qualitative).	No inter-regional alternate route through Milton / Halton Hills area. Express-Collector system allows some ability to route traffic around incidents on Highway 401.	No inter-regional alternate route through Milton / Halton Hills area. Express-Collector system allows some ability to route traffic around incidents on Highway 401.	New corridor provides an alternate inter-regional route through Milton / Halton Hills area with direct connections to Highway 401.
	5.5.2. Potential to improve transportation system reliability (quantitative).	Reduces annual delays due to incidents by approximately 3% when compared to base case Est. Annual Truck Delay – 211,720 veh-hrs Est. Annual Auto Delay – 1,120,880 veh-hrs	Increases annual delays by approximately 7% when compared to base case Est. Annual Truck Delay – 233,615 veh-hrs Est. Annual Auto Delay – 1,236,785 veh-hrs	Reduces annual delays by approximately 25% when compared to base case Est. Annual Truck Delay – 164,195 veh-hrs Est. Annual Auto Delay – 870,805 veh-hrs
	5.5.3. Residual capacity to accommodate demands higher than base forecasts or growth beyond 2031.	Limited amount of reserve capacity to accommodate demands beyond base forecasts. At 1% annual growth rate capacity on Highway 401 would be reached by year: West of Tremaine Rd - 2045 Tremaine Rd to RR 25 – 2036 RR 25 to James Snow Pkwy– 2044 James Snow Pkwy to Trafalgar Rd – 2030 Trafalgar Rd to Highway 407 IC – 2037	Can accommodate demands 15% higher than base forecasts with reserve capacity in most segments. At 1% annual growth rate capacity on Highway 401 would be reached by year: West of Tremaine Rd - 2061 Tremaine Rd to RR 25 – 2064 RR 25 to James Snow Pkwy– 2054 James Snow Pkwy to Trafalgar Rd – 2040 Trafalgar Rd to Highway 407 IC – 2049	Can accommodate demands 15% higher than base forecasts with reserve capacity on new corridor in all segments. At 1% annual growth rate capacity on Highway 401 would be reached by year: West of Tremaine Rd – 2063 (2100 on new corridor) Tremaine Rd to RR 25 – 2050 (2100 on new corridor) RR 25 to James Snow Pkwy– 2041 (2067 on new corridor) James Snow Pkwy to Trafalgar Rd – 2044 (2048 on new corridor) Trafalgar Rd to Highway 407 IC – 2038 (2048 on new corridor)

Exhibit 5-25: Transportation Evaluation (2011 / 2012)

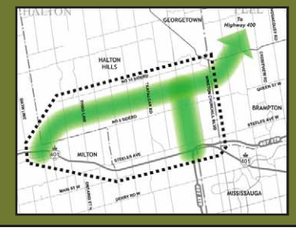
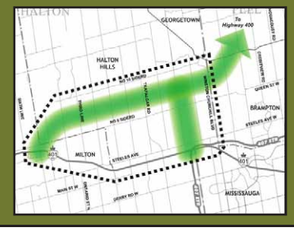
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES 	FURTHER 401 WIDENING TO 14 LANES 	NEW CORRIDOR 
5.6. Safety *Measure* *Potential to improve traffic safety based on opportunity to reduce congestion on the area road network.*	5.6.1. Potential to improve response times for emergency service providers due to reduced congestion on the inter-regional road network (refer to Level of Service in Traffic Operations).	Lowest overall network and Highway 401 Level of Service performance Emergency response times may be higher No system alternative available to accommodate emergency service vehicle during closures	Highest Highway 401 Level of Service performance Improved corridor may improve emergency response time, however no system alternative available to accommodate emergency service vehicles during closures	Highest overall network Level of Service performance New corridor provides an alternative route to accommodate traffic during closures and may improve emergency response times
	5.6.2. Potential to reduce collisions due to improved network LOS (refer to Level of Service in Traffic Operations).	A slight overall increase (1%) in collisions expected annually compared to base case due to additional widening to more complex express-collector system and higher volumes Severe collisions anticipated to increase by 9% annually	A slight overall increase (1%) in collisions expected annually compared to base case due to additional widening to more complex express-collector system and higher volumes Severe collisions anticipated to increase by 9% annually	A 2% overall decrease in collisions expected annually compared to base case due to lower volumes (traffic split between Highway 401 and new corridor) Severe collisions anticipated to increase by 5%
5.7. Modal integration, balance and choice for movement of people (commuters, recreation / tourist) *Measure* *Potential to improve modal integration, balance and choice for person trips between communities' employment centres and major transit hubs.*	5.7.1. Potential to increase attractiveness / effectiveness of existing, new and improved transit services (qualitative).	Moderate potential to increase attractiveness/ effectiveness of inter-regional transit on existing corridors.	Moderate potential to increase attractiveness/ effectiveness of inter-regional transit on existing corridors.	Moderate potential to increase attractiveness/ effectiveness of inter-regional transit on existing corridors. Opportunity to introduce new services on a new corridor over a moderate distance
	5.7.2. Peak period transit mode share (by destination).	No difference between alternatives	No difference between alternatives	No difference between alternatives
	5.7.3. Provision of higher order inter-regional transit services (qualitative)	Higher order transit services limited to existing/widened freeway	Higher order transit services limited to existing/widened freeway	Potential for new higher order inter-regional transit on new corridor
	5.7.4. Provision of linkages between inter-regional and regional/community (local) transit systems (qualitative)	Potential to improve linkages between inter-regional and local transit with improved service integration at Highway 401 interchanges.	Potential to improve linkages between inter-regional and local transit – although wider cross section may restrict opportunities to integrate local transit service in interchange areas.	Linkages between inter-regional and local transit possible although local buses in Milton would have to travel further to access station locations and service connections on new corridor.
	5.7.5. Bus operational performance on inter-regional road network (refer to Level of Service in Traffic Operations).	Improves bus operational performance with improved road network operations	Improves bus operational performance with improved road network operations	Improves bus operational performance with improved road network operations Potential for bus rapid transit (BRT) on new corridor
	5.7.6. Availability/provision of alternative travel modes for tourism / recreation travel (qualitative)	No difference between alternatives	No difference between alternatives	No difference between alternatives
	5.7.7. Potential of/allowance for active transportation measures (e.g., bike lanes, bike racks on buses / trains) (qualitative)	Highest use of local roads by inter-regional trips expected, affecting safety/security for active transportation users.	Reduced use of local roads for inter-regional trips expected, improving safety/security for active transportation users. Wider Highway 401 results in higher costs to provide new north-south connections for active travel modes.	Lowest use of local roads by inter-regional trips expected, improving safety/security for active transportation users. New corridor introduces a new barrier to north-south travel using active travel modes requiring crossing road grade separations
5.8. Modal integration, balance and choice for movement of goods. *Measure* *Potential to improve modal integration, balance and choice for goods movement between ports and terminals, communities and employment centres.*	5.8.1 Potential to improve accessibility of inter-modal centres, ports and terminals (qualitative)	No difference between alternatives	No difference between alternatives	No difference between alternatives

Exhibit 5-25: Transportation Evaluation (2011 / 2012)

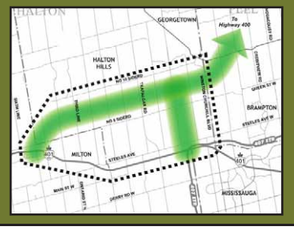
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
5.9. Linkages to Population and Employment Centres. *Measure* *Potential to improve accessibility to Urban Growth Centres, Gateway Economic Centres and Gateway Economic Zones for people and goods movement based on higher order network continuity and connectivity.*	5.9.1. Availability/provision of higher order linkages between Urban Growth Centres, Gateway Economic Centres, and Gateway Economic Zones (qualitative).	All alternative improve connection between the Milton Urban Growth Centre to other Growth Centres in northern GTA (i.e. Vaughan)	All alternative improve connection between the Milton Urban Growth Centre to other Growth Centres in northern GTA (i.e. Vaughan)	All alternative improve connection between the Milton Urban Growth Centre to other Growth Centres in northern GTA (i.e. Vaughan) New corridor improves linkage between Urban Growth Centres west of GTA and those in northern GTA (i.e. Vaughan)
	5.9.2. Accessibility of Urban Growth Centres, Gateway Economic Centres, and Gateway Economic Zones (qualitative).	Congestion on Highway 401 may reduce accessibility to Milton Urban Growth Centre from GTA.	Increased capacity on Highway 401 improves accessibility to Milton Urban Growth Centres and the GTA.	New Corridor improves accessibility to Milton Urban Growth Centre and to other Growth Centres west of the GTA and in northern GTA.
	5.9.3. Percentage change in peak hour travel times between Urban Growth Centres.	No difference between alternatives	No difference between alternatives	No difference between alternatives
5.10. Recreation and Tourism Travel *Measure* *Potential to support recreation and tourism travel within and to / from the study area.*	5.10.1. Directness of routes between population centres, international gateways and tourist/ recreation destinations (qualitative).	Provides moderate potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor that links to Highway 401 to Highway 400 over a moderate distance.	Provides moderate potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor that links to Highway 401 to Highway 400 over a moderate distance.	Provides improved potential to improve directness of routes to tourist destinations within and outside of the study area, including the GTA and toward northern Ontario, with a new transportation corridor over a long distance. Potential for improved directness to Niagara Region and U.S. border if combined with a connection to NGTA corridor.
	5.10.2. Diversion of summer recreation trips from local and regional roadways (qualitative).	Some potential to divert summer/recreational trips from local and regional roads in close proximity to existing corridors due to increased freeway capacity	Improved potential to divert summer/recreational trips from local and regional roads in close proximity to existing corridors due to increased freeway capacity	Greatest potential to divert summer/recreational trips from local/regional roads to new corridor over a long distance

* “Inter-regional trip” defined as trips with a length greater than average commuting distance within study area (>20km)

^ Total person demand between Urban Growth Centers, 3-hour AM peak period

† “Inter-regional network” defined as provincial freeways and “relevant” highway systems – e.g., where a local highway is planned to be improved as part of a transportation alternatives (e.g., County Road 124)

Exhibit 5-25: Transportation Evaluation (2011 / 2012)

	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
			
TRANSPORTATION SUMMARY	**LESS PREFERRED** This alternative is less preferred because: • Worst overall network performance; Highway 401 performance is also worst • Provides limited capacity to accommodate higher than base demands or growth beyond 2031. • Highest amount of auto and truck delay • Highest amount of inter-regional auto and truck traffic using local roads • Reduces annual delays due to incidents by 3% compared to base • Increases overall network collisions by 1% compared to base conditions	**MODERATELY PREFERRED** This alternative is moderately preferred because: • Better overall network performance; Best performance on Highway 401 • Performs reasonably well in terms of capacity to accommodate higher demands - no flexibility to address deficiencies east of James Snow Parkway • Widening to 14 lanes provides similar results to the east of Regional Road 25 but not to the same extent as the new corridor • Provides the second lowest amount of auto and truck delay • Provides the second lowest amount of inter-regional auto and truck traffic using local roads • Increases annual delays due to incidents by 7% compared to base • Increases overall network collisions by 1% compared to base conditions.	**MOST PREFERRED** This alternative has been selected as the most preferred because: • Best overall network performance; Better performance on Highway 401 • Performs the best in terms of capacity to accommodate higher demands • Provides the greatest residual capacity with 4 lane new corridor (provides sufficient capacity until 2033-2100) • Lowest amount of auto and truck delay • Lowest amount of inter-regional auto and truck traffic using local roads • Provides network redundancy with an alternative inter-regional corridor to Highway 401 in case of adverse conditions / closures • Reduces annual estimated delays due to incidents by 25% compared to base • Reduces overall network collisions by 2% compared to base conditions – lowest increase in severe collisions

5.7 ADDITIONAL ANALYSIS IN HALTON AREA – ROAD DESIGN, CONSTRUCTABILITY AND COST

Additional cost and constructability analysis was undertaken to assess the New Corridor Alternative and two Highway 401 Widening Alternatives including a new interchange at Highway 401 / 407ETR at a higher level of detail. The Study Team used 2031 lane requirements as the primary input to evaluate constructability and cost of the three alternatives. These lane requirements were developed as part of the travel demand forecasting work. It should be emphasized that the majority of this work has been prepared only to a conceptual level of design, sufficient for the assessment and comparison of alternatives at Stage 1 of the study and should not be taken to be representative of the absolute requirements for this project, which are subject to Stage 2 of the EA.

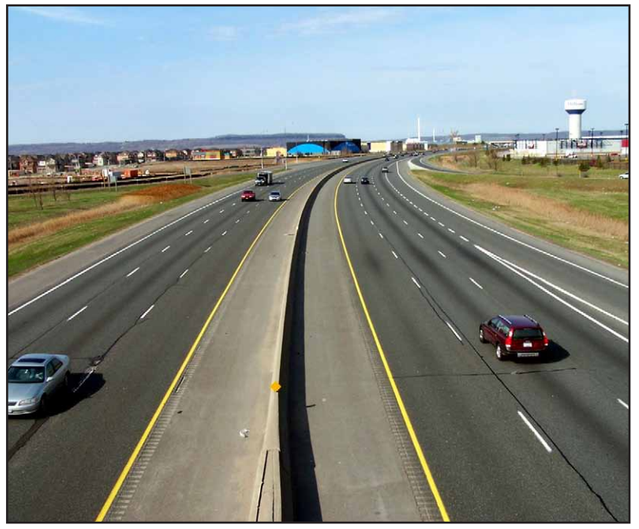
5.7.1 Methodology

The following approach and assumptions were used in undertaking the additional analysis:

- Preliminary layouts for Highway 401 Widening to 12 and 14 lanes as well as Representative Routes for the New Corridor were identified in accordance with MTO Geometric Design Standards. In addition, New Corridor routes were subject to the MTO Safety Standards Manual for Rural Freeways which utilizes a higher design standard, a common practice for new rural freeways.
- All highway widening requirements identified as part of the Highway 401 12-Lane and 14-Lane Widening alternatives are over and above what is currently being planned by MTO in the ongoing Highway 401 Environmental Assessment / Preliminary Design (EA/PD) Studies which was assumed to be the base case for this analysis:
  - **W.O. 07-20024 Highway 401 EA/PD from Regional Road 25 to East of Trafalgar Road** recommends widening Highway 401 from 6 lanes to a 12 lane express-collector system between east of Trafalgar Road and east of James Snow Parkway, and from 6 lanes to a 10 lane core between east of James Snow Parkway and Regional Road 25. The Alternative for Widening Highway 401 to 12 lanes requires widening Highway 401 as identified in the base case above from a 10 lane core to a 12 lane express-collector system from east of Regional Road 25 to east of James Snow Parkway. The Alternative for Widening Highway 401 to 14 lanes requires widening Highway 401 as identified in the base case from a 10 lane core to a 14 lane express-collector system from east of Trafalgar Road to east of James Snow Parkway, and from a 10 lane core to a 12 lane express-collector system from east of James Snow Parkway to Regional Road 25.
  - **W.O. 07-20021 Highway 401 EA/PD from East of Trafalgar Road to east of the Credit River** recommends widening Highway 401 from 6 lanes to a 12 lane express-collector system between east of Trafalgar Road and 407ETR, 10 lanes from 407ETR to east of Winston Churchill Boulevard, and 12 lane express-collector system from east of Winston Churchill Boulevard to east of the Credit River. The Alternative for Widening Highway 401 to 12 lanes does not require any additional lanes along Highway 401 east of Trafalgar Road. The Alternative for Widening Highway 401 to 14 lanes requires widening Highway 401 from a 12 lane express-collector system to a 14 lane express-collector system from east of Trafalgar Road to 407ETR.
- The Highway 401 Widening alternatives included assessment of impacts to bridges, interchanges, adjacent service roads, drainage systems including stormwater management ponds, and impacts to adjacent properties including buildings, parking lots and fire access routes.
- Locations where future grading limits would impact buildings, parking areas and fire routes were mitigated by introducing retaining walls.
- All requirements including property were cost based on unit pricing for similar freeway widening expansion projects in the Greater Toronto Area.
- A complex 'full movement' interchange was assessed at Highway 401 / 407ETR as part of the Highway 401 Widening alternatives. Parameters used in developing the full-movement interchange include:
  - Provide full moves between the GTA West, Highway 401 and 407ETR in all directions;
  - Interchange geometrics were in accordance with MTO Safety Standards Manual for Rural Freeways, where practical;
  - Traffic analysis must be consistent with traffic analysis undertaken in the ongoing two EA/PD studies along Highway 401;
  - Existing 407ETR bridges are to be retained.

The following criteria have been used consistently in other evaluations for this study and have been applied for assessment of the alternatives in Halton area.

- Highway and Interchange Geometrics
- Impacts to Existing Infrastructure (i.e., bridges, stormwater management facilities etc.)
- Impacts to Municipal Side Roads or Service Roads
- Retaining Wall Requirement to Minimize Property Impact
- Compatibility with Adjacent MTO Studies
- Flexibility to Accommodate Future Expansion



Existing Cross-section of Highway 401 through Milton

New Corridor Alternative

The process for assessing the New Corridor alternative included high level review of representative alignments between Winston Churchill Boulevard (eastern limit) to Dublin Line (western limit) with partial moves freeway to freeway interchange connections at Highway 401 west of Tremaine Road, and at a North-South Link to Highway 401/407ETR. Representative alignments were created for the purpose of defining a length of highway, approximate number of interchanges, structures, freeway elements and impacts. The conceptual alignments were also used to estimate the property footprint based on the minimum right-of-way of 200 m which allows for a 110 m freeway, 60 m transitway and an additional 30 m for high fill and deep cuts. The footprint was expanded at select locations to allow for a standard Parclo A-4 interchange with major Regional Road crossings at Trafalgar Road and Regional Road 25. It was assumed that all other north-south roadways would be grade separated with a bridge. A range of impacts was determined based on three (3) representative east-west routes in the analysis area. The east-west representative routes were located in the "north", "middle" and "south" portions of the analysis area, and were generated strictly for the purpose of identifying a quantitative range of impacts for the east/west portion of the corridor. The Environmental impacts of the generated routes were minimized by avoiding visible natural features such as wood lots and river valleys, bisecting farms avoiding communities, clusters of homes and farm buildings and heritage features. In general, the representative routes were selected to balance impacts to the extent possible. The range of impacts is approximate only and will be updated as the Environmental Assessment Study proceeds to Stage 2 where the route of the proposed new transportation corridor will be identified.

Two North-South link alternatives were assumed as part of the analysis: The first alternative assumed a 200 m right-of-way to accommodate a North-South Link freeway connection and transitway between the New Corridor and Highway 401/407ETR. The second alternative assumed a 100 m right-of-way to accommodate a North-South arterial connection and transitway.

Key elements of the New Corridor included eight underpass structures at crossing roads, one rail overpass and one major creek crossing at Middle Sixteen Mile Creek. Two Parclo A4 interchanges were assumed at Regional Road 25 and Trafalgar Road interchange. The New Corridor includes a new partial freeway to freeway interchange with Highway 401 west of the proposed Realigned Tremaine Road interchange. The interchange includes ramps from Highway 401 eastbound to GTA West eastbound, and from GTA West westbound to Highway 401 westbound.

Highway 401 Widening Alternatives (12 Lanes or 14 Lanes)

Existing Highway 401 is a 6-lane freeway with median concrete barrier through Milton. Interchanges are located at 407ETR, Trafalgar Road, James Snow Parkway and Regional Road 25. Grade separations are located at Ninth Line, Sixth Line, Fifth Line, Steeles Avenue and CN Rail. The average right-of-way width is 90 m, with additional property at interchanges and areas of high fill. The highway is drained by a median storm sewer and drainage ditches. Stormwater management ponds for highways are located at the 407ETR interchange. Smaller stormwater ponds are located along Highway 401 to service development.

Recommendations from the ongoing Highway 401 Environmental Assessment / Preliminary Design Study from west of Trafalgar Road to east of Regional Road 25, include widening Highway 401 from 6 to 12 lanes between the 407ETR and James Snow Parkway, and from 6 to 10 lanes between James Snow Parkway and Regional Road 25. The recommendations also include replacement of bridges at Trafalgar Road, Sixth Line and Regional Road 25, reconfiguration of interchanges at Trafalgar Road and Regional Road 25 and widening of existing bridges at Sixth Line, Fifth Line, Steeles Avenue, CN Rail and various watercourse crossings. Completion of this work represents 'the base case'. Impacts and costs associated with implementing the base case are not included in our analysis / findings.

The process for assessing improvements to existing roadway facilities involved a generalized approach for identifying property requirements for constructing additional lanes (between east of James Snow Parkway and Regional Road 25 for the Highway 401 12-Lane Widening alternative, and between 407ETR and Regional Road 25 for the Highway 401 14-Lane Widening alternative) and modifying existing interchanges as required at Regional Road 25, James Snow Parkway, Regional Road 25 and 407ETR. The approach included applying cross-sections of the future 12 or 14 lane highway to the base case, ensuring adequate drainage could be provided and determining the resulting property requirements. The approach assumed that the construction of future lanes would be based on retaining the existing centre line of the highway. For all scenarios, it was assumed that typical freeway cross-sections would be updated to include the best practice roadway elements such as standard 3.75 m lanes, 3.0 m outside shoulders, HOV lanes with buffers and a median shoulder width of 4.25 m to include enforcement of HOV lanes. Additional property widths were added as required to account for ramp relocations at interchanges, relocation of service roads and known areas of high fill and deep cuts. The assumed cross-section for the 12 and 14 lane alternatives is a semi-urban cross-section, which is standard practice for MTO freeways in urban areas. The cross-section includes an urban median with storm sewers and rural outside shoulders with drainage ditches. Rural outside shoulders were replaced by urban outside shoulders and retaining walls in constrained areas (i.e. areas in which the rural outside shoulder and drainage ditch would impact adjacent buildings, parking spaces or fire routes). Property requirements were determined by calculating the area between the existing right-of-way (ROW) and future ROW lines. It is recognized that improvement alternatives will each have some unique challenges and opportunities, and that actual ROW requirements will likely vary somewhat from the ROW lines generated for this assessment. However, it is believed that this approach would provide a reasonable representation of the footprint impacts of the alternatives being evaluated.

Two options were examined as part of the Highway 401 Widening Scenarios:

i.) Widen Highway 401 to 12 lanes. This alternative includes widening Highway 401 as identified in the base case from 10 lane core to a 12 lane express-collector system from east of James Snow Parkway to east of

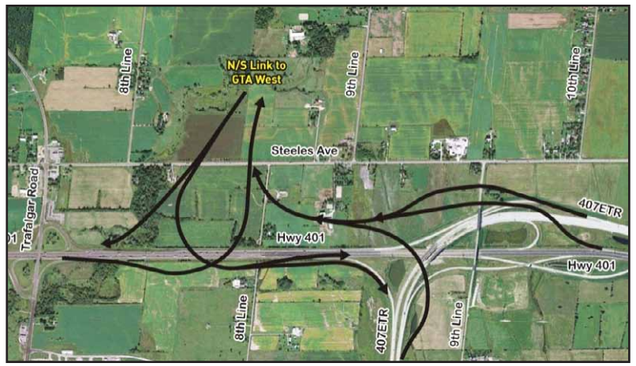
Regional Road 25. This alternative would result in a 12 lane express-collector system from east of Trafalgar Road to Regional Road 25, and a 10 lane core from Regional Road 25 to west of Realigned Tremaine Road. This alternative is similar to an alternative developed by Halton Hills as part of their review of the feasibility to provide an express-collector system between James Snow Parkway and Regional Road 25.

ii.) Widen Highway 401 to 14 lanes. This alternative includes widening Highway 401 as identified in the base case from a 12 lane express-collector system to a 14 lane express-collector system between east of Trafalgar Road to James Snow Parkway, and widening Highway 401 from a 10 lane core to 12 lane express-collector system from James Snow Parkway to Regional Road 25. This option assumed that transfer lanes would be required at key locations to provide opportunities for vehicles to transfer back and forth between the core and collector lanes. This alternative would result in a 14 lane express-collector system from east of Trafalgar Road to James Snow Parkway, a 12 lane express-collector system from James Snow Parkway to Regional Road 25, and a 10 lane core from Regional Road 25 to west of Realigned Tremaine Road.

Freeway to Freeway Interchange

Additional analysis was completed for a full moves interchange with GTA West and Highway 401 / 407ETR as part of the Highway 401 Widening alternatives. This interchange is constrained by proposed development, the existing Trafalgar Road interchange and Sixteen Mile Creek tributary to the west and the existing Winston Churchill Boulevard interchange to the east.

Part of the additional analysis included a full one day Constructability Review workshop for the interchange. The primary purpose of the workshop was to invite the independent team of highway specialists to review and comment on the staging, detour and design of the full movement interchange. The workshop provided confirmation that an interchange is constructable at this location and can be staged without long term closures of freeway segments or ramps. Additional traffic analysis based on travel demand forecasting to 2031 was completed using the VISSIM software package. The analysis confirmed adequate operations and the need for an auxiliary lane along Highway 401 westbound between the on-ramp from the GTA West (east of Trafalgar Road) to the Highway 401 westbound off-ramp to James Snow Parkway.



Conceptual GTA West transportation corridor and Highway 401 / 407ETR Interchange (only Freeway to Freeway ramps are shown)

5.7.2 Findings

The New Corridor provides a higher degree of flexibility to incorporate features such as a dedicated transitway or truck lanes. It also provides flexibility for providing additional lanes in the median in the future if needed including HOV lanes. The New Corridor will also include protection for a transitway including transitway stations and carpool lots. The Highway 401 Widening alternatives are constrained through the built-up area of Milton. Key constraints include retail, commercial, stormwater management ponds and service roads. One of the constraints is the Steeles Avenue bridge over Highway 401 which when replaced, would impact adjacent properties / businesses. Retaining wall is a mitigation measure to minimize displacement of buildings, service roads and stormwater management ponds in some areas where sloped fills will have significant impacts. The construction of retaining walls will limit flexibility to further expand Highway 401 in the future if extra lanes are required.

Exhibit 5-26 documents the detailed evaluation findings under the cost and constructability criteria.

Exhibit 5-26: Cost and Constructability Factors Evaluation (2011 / 2012)

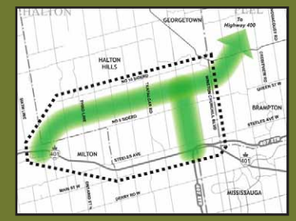
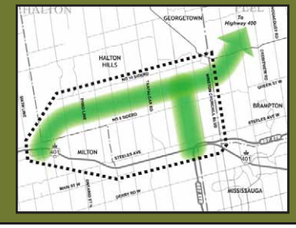
FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
6.0 Cost and Constructability Factor				
6.1 Potential to ease implementation considering relative cost, relative property impacts, feasibility / difficulty and requirements for environmental mitigation.	6.1.1Cost (range. $B) (includes construction and property costs only)	$ 0.5 - 0.55 B	$ 0.8 - 0.85 B	$ 0.6 - 0.7 B
	6.1.2. Feasibility of implementation (including interchange reconstruction requirements, impacts on existing schemes, etc.).	• Requires extensive retaining walls (2.5 km) to avoid impacts to service roads, SWMPs, buildings, parking/fire routes between Regional Road 25 (RR25) and James Snow Parkway (JSP). • Requires reconstruction of interchange at JSP and partial reconstruction of interchanges at RR25 and Trafalgar Road. • JSP Ramp S-E realignment required to avoid impacts to Hydro tower at Highway 401/JSP quadrant. (Increased property requirement).	• Requires extensive retaining walls (5.0 km) to avoid impacts to service roads, SWMPs, buildings, parking/fire routes between RR25 and JSP. • Requires reconstruction of interchanges at Tremaine Road, RR25, JSP and partial reconstruction of interchange at Trafalgar Road. • Will result in reduced cross-section of Highway 401 (ie reduced shoulders) at Trafalgar Road and Sixth Line. • Requires realignment of 2.1 km of Boston Church Road (retaining wall required). • JSP Ramp S-E realignment required to avoid impacts to Hydro tower at Highway 401/JSP quadrant. (Increased property requirement).	• Impact to hydro corridor between Dublin Line and RR25. Requires relocation of poles. • May require high skew crossing of Rail, Third Line and Winston Churchill Boulevard. • Constrained opportunities for interchange at existing Winston Churchill Boulevard due to proximity of Credit River. Realigned Winston Churchill Boulevard In close proximity to N-S Link interchange.
	6.1.3 Potential transportation construction staging impacts.	• Requires complex staging along Highway 401 between RR25 and JSP to convert from Core to Express-Collector configuration, and to construct retaining walls along Highway 401. • CN bridge replacement East of RR25 would require complex staging of 401 or lowering of CN rail. • Staging of bridge replacements at RR25, Steeles Avenue and JSP will impact local traffic. • Requires high complex staging of new full moves Interchange at Highway 401/407ETR and new corridor including temporary detours.	• Requires complex staging along Highway 401 between RR25 and JSP to convert from Core to Express-Collector configuration with additional transfer lanes, and to construct retaining walls along Highway 401. • CN bridge replacement East of RR25 would require complex staging of Highway 401 or lowering of CN rail. • Staging of bridge replacements at Tremaine, RR25, Steeles Avenue and JSP will impact local traffic. • Requires high complex staging of new full moves Interchange at Highway 401/407ETR and new corridor including temporary detours.	• Requires moderately complex staging of new partial moves N-S Link Interchange at Highway 401/407ETR including temporary detours. • Requires minor staging of new partial moves interchange at Highway 401 and new corridor, west of Tremaine Road.

Exhibit 5-26: Cost and Constructability Factors Evaluation (2011 / 2012)

FACTOR	SUB-FACTOR AND MEASURE	FURTHER 401 WIDENING TO 12 LANES	FURTHER 401 WIDENING TO 14 LANES	NEW CORRIDOR
				
	6.1.4 Requirements for environmental mitigation.	• Impacts to East Sixteen Mile Creek at N-S Link. • Long construction duration will result in increased noise, air quality concerns in the short term; noise wall may be required at Highway 401/JSP SW quadrant. • Impacts to planned Stormwater Management Ponds (SWMPs) between Highway 401 and Steeles Avenue, east of Trafalgar Road.	• Realignment of Sixteen Mile Creek West Branch in SW quadrant of Highway 401/RR25 Interchange and impacts to East Sixteen Mile Creek. • Long construction duration will result in increased noise, air quality concerns in the short term; noise wall may be required at Highway 401/JSP SW quadrant. • Impact to existing SWMP at Highway 401/RR25 NE quadrant. • Requires expansion of planned SWMPs between JSP and Trafalgar. • Impacts to planned SWMPs between Highway 401 and Steeles, east of Trafalgar. • Minor impacts to Kelso Lake.	• Impacts to new corridor crossing of Middle Sixteen Mile Creek. • Minor impacts to Kelso Lake.
CONSTRUCTABILITY SUMMARY		**LESS PREFERRED** Geometrics will need to be reduced, complex interchange at 407ETR, limited flexibility for future expansion.	**LEAST PREFERRED** Geometrics will need to be reduced, requires extensive retaining walls, complex interchange at 407ETR, limited flexibility for future expansion.	**MOST PREFERRED** Allows use of higher MTO Design Standards. Maximum flexibility for future expansion.
COST SUMMARY		**MOST PREFERRED** Moderate complication associated with construction. Less costly compared to new corridor.	**LEAST PREFERRED** High complication associated with construction. Highest estimated cost.	**MODERATELY PREFERRED** Can be built “off-line”

5.8 SUMMARY OF EVALUATION FINDINGS OF 2011/2012 ADDITIONAL ANALYSIS

In summary, while the New Corridor Alternative would provide the best transportation and long-term economic benefits, its construction would have the highest impact on the natural environment, agriculture and rural communities. Between the two "Further Widening of Highway 401" alternatives, the Highway 401 12-Lane Widening alternative would have much less impact on adjacent business and commercial land uses when compared to the Highway 401 14-Lane Widening alternative.

The "Further Widening of Highway 401 to 12 lanes" alternative would accommodate forecast demand to 2031 and could be designed to provincial design standards, with retaining walls proposed to mitigate property impacts, although this would limit the flexibility to further expand Highway 401 in the future.

The "Further Widening of Highway 401 to 12 lanes" alternative would also have minimal impact to agricultural lands and the agricultural economy, as well as the cultural heritage and rural character of the community and it better reflects the land use planning and policies of local municipalities, as established in their respective Official Plans.

Exhibit 5-27 summarizes the evaluation findings of 2011/2012 additional analysis.

Given that considerably more social and environmental impacts would be expected with a new corridor through Halton Hills and that the Highway 401 alternative at 12 lanes will provide the essential transportation needs to 2031, it is recognized that "**Further Widening of Highway 401 to 12 lanes**" through Halton will provide the best balance of benefits and impacts and is therefore preferred based on the additional analysis.

	New Corridor	Further 401 Widening to 12 lanes	Further 401 Widening to 14 lanes	
Community (Residences, Tourism and Recreational Lands, Community Facilities/Institutions)	Less Preferred	Moderately Preferred	Moderately Preferred	Given the rural nature of the community and presence of active agricultural land uses, the "Further 401 Widening to 12 lanes" alternative would have the least impact to existing rural communities, agriculture lands, as well as built heritage and archaeology resources.
Cultural (Archaeology, Built Heritage, First Nations)	Less Preferred	Most Preferred	Moderately Preferred	
Agriculture (Agricultural Facilities and Land Use, Class 1 to Class 3 Lands)	Least Preferred	Moderately Preferred	Moderately Preferred	
Natural (Fish and Fish Habitat, Terrestrial Ecosystems, Surface Water, Designated Area)	Less Preferred	Most Preferred	Moderately Preferred	The "Further 401 Widening to 12 lanes" alternative would have the least impact to natural environment features, as the widening would be along an existing corridor.
Land Use Planning (Planning Policies, Existing and Future Land Use)	Less Preferred	Moderately Preferred	Moderately Preferred	The "Further 401 Widening to 12 lanes" alternatives would make use of existing infrastructure and meets infrastructure needs to 2031. There would be some impacts to adjacent commercial lands, but no complete business removals along Highway 401 are expected under the 12-lane Widening alternative scenario.
Economy (Savings, Benefits / Impact to Industries, Construction)	Moderately Preferred	Less Preferred	Least Preferred	The "New Corridor" alternative is preferred as there would be greater travel time savings, it supports business & tourism sector, promotes economic development; however, there would be higher impact to agriculture sector / economy.
Transportation (Network Performance, Residual Capacity, People & Goods Movement, Redundancy, Safety)	Most Preferred	Less Preferred	Moderately Preferred	The "New Corridor" and "Further 401 Widening" alternatives address transportation need to 2031 to an adequate level of service ("New Corridor" alternative would provide more redundancy, while "Further 401 Widening to 12 lanes" would be close to capacity shortly after 2031). The "New Corridor" alternative reflected more opportunities to achieve efficient and reliable transportation connections than the "Further 401 Widening" alternatives over the long term.
Road Design / Constructability (Geometrics, Staging, Impact to Existing Infrastructure, Flexibility for Future Expansion)	Most Preferred	Less Preferred	Least Preferred	The "New Corridor" is preferred as it would allow the use of higher MTO design standards, and it would allow maximum flexibility for future expansion (when required).
Cost	Moderately Preferred	Most Preferred	Least Preferred	The "Further 401 Widening to 12 lanes" alternative has the lowest estimated construction cost.

PREFERRED ALTERNATIVE

Exhibit 5-27: Summary of Evaluation Findings of 2011/2012 Additional Analysis

6 Transportation Development Strategy

6.1. OVERVIEW

Within the GTA West preliminary study area, there is a mosaic of community, industry and natural features with a complex transportation network, including transit, rail and road infrastructure, woven through it. A well-balanced and comprehensive transportation network is key in supporting future growth in the Greater Golden Horseshoe (GGH) and providing the necessary connections for commuting, goods movement and tourism / recreation activities.

A suite of transportation alternatives was developed through the review of firstly - existing transportation, economic and environmental conditions, secondly - a determination of the area transportation system problems and opportunities, and thirdly - future traffic demand analysis. This suite used the "building block" approach and the alternatives were analyzed based on consideration of the social environment, natural environment, economic environment, transportation and cost and constructability factors. The final outcome is a comprehensive Transportation Development Strategy (Strategy) that represents a new generation of transportation planning for people and goods movement while respecting the area land uses and environment, and accommodating future growth.

The recommended Strategy is shown in **Exhibit 6-1** and emphasizes optimizing existing transportation infrastructure and increasing transit ridership through new / expanded non-road infrastructure prior to considering widening existing highway facilities beyond the planned program and a new transportation corridor.

The recommended approach to addressing current and future transportation problems and opportunities features the following:

- A "transit first" approach – supporting existing long-range transit plans with the need to explore further enhancements;
- Making better use of transportation infrastructure that is already in place – through optimization including use of advanced technologies;
- Providing more and better choices for people and shippers in making trip decisions – with more effective transit and rail infrastructure and service;
- Pursuing means to reduce travel demands – through building on current Transportation Demand Management programs such as Smart Commute, and increased community self-containment (jobs and homes in the same community);
- Introducing timely transportation improvements – to influence decisions on mode choice and to accommodate projected growth; and
- Shaping growth through provision of transportation services – thereby meeting government objectives.

Through assessment carried out as part of the study (as documented in **Chapter 4**), it was demonstrated that optimizing existing transportation infrastructure and increasing transit ridership through new / expanded non-road infrastructure alone would offer some improvements out of the six features mentioned above. However, these options would not fully address the future transportation problems and opportunities. In order to fully realize the vision of a functional and efficient multi-modal transportation network that provides user choice and balance, planning for additional roadway capacity is required in the long-term. This could be achieved through widening existing highways beyond the planned program at several locations, as well as introducing a new transportation corridor.

The high level evaluation of new corridor alternatives, outlined in **Chapter 4**, and the two levels of additional assessment carried out in the Halton area, outlined in **Chapter 5**, recommends that a new transportation corridor be provided from Highway 400 westerly and then southerly to connect to Highway 401/407 ETR.
The resulting draft Transportation Development Strategy is shown in **Exhibit 6-1**.

In general, elements of the Transportation Development Strategy to 2031 include:

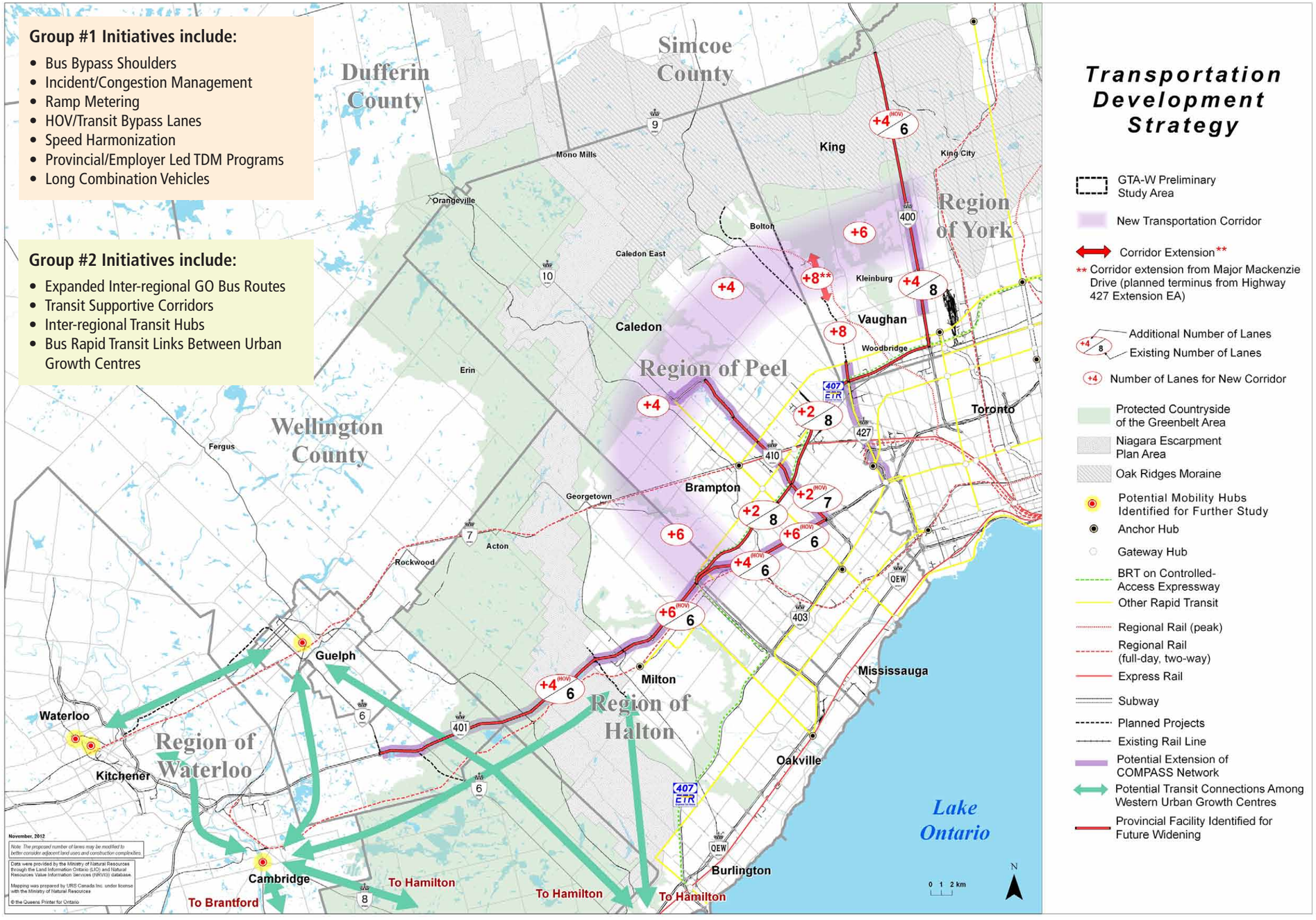
- Supporting transit initiatives that are consistent with Metrolinx RTP and GO 2020;
- Optimize use of existing transportation infrastructure through Transportation Demand Management (TDM) and Transportation System Management (TSM) measures in cooperation with Metrolinx;
- Initiate a region-wide Active Traffic Management Study;
- Widen selected highways to provide additional capacity including High Occupancy Vehicles (HOV - uses or 2+ occupancy) and multi-modal uses;
- Initiate a multi-modal area-wide study in the Waterloo/ Wellington/Brantford area to explore potential for inter-regional transit service improvements west of the GTA;
- New transportation corridor from Highway 400 west to connect to Highway 401/407ETR at the Halton-Peel boundary.

It is anticipated that transportation needs beyond 2031 may be better known in the future and so there are other elements of the strategy that are recommended:

- Future study will be required to determine and address future transportation needs; and
- Future study will be closely linked with, and influenced by updates to the (*Growth Plan for the Greater Golden Horseshoe*), Metrolinx's Regional Transportation Plan and municipal transportation and land use plans.

The Transportation Development Strategy provides for the important modal shift to transit to occur over time, and

Exhibit 6-1: Transportation Development Strategy



encourages a shift to rail and marine for goods movement. It also places the highest priority on optimizing the use of existing infrastructure and increasing transit ridership, while planning for additional highway capacity in the longer term. This is essential, as good transportation planning must consider a long planning horizon (20 years and beyond). It is worth noting that the traffic forecasts carried out as part of the GTA West study show that in the long-term, even with extensive investment in transit, congestion will build to very inefficient levels unless other improvements are provided.

Sections 6.2 to **6.4** describe the various elements of the Transportation Development Strategy:

- **Section 6.2**: Group #1 – Optimize Existing Transportation Networks
- **Section 6.3**: Group #2 – New / Expanded Non-Road Infrastructure
- **Section 6.4**: New / Expanded Roadway Infrastructure

6.2. GROUP #1 – OPTIMIZE EXISTING TRANSPORTATION NETWORKS

This group of alternatives includes transportation initiatives that focus on improving the performance of the existing transportation system for all modes of travel and freight transport through strategies designed to reduce auto and truck demand and improve system operating efficiency.

The optimization measures discussed in this section are most effective when applied in a combined and coordinated manner.

One of the key outcomes of this study, and one of the founding elements of the Strategy will be the development of an Active Traffic Management Plan that encompasses many ways of optimizing existing transportation networks.

The Active Traffic Management Plan will include the following key elements:

- The expanded use of bus bypass shoulders along sections of the provincial highway network forecast to experience recurring congestion;
- The implementation of transit / HOV bypass lanes at existing highway entrance ramp locations to provide expedited access for transit and HOV vehicles to and from commuter parking lots as well as efficient access to highways where ramp metering is present;
- The development of an enhanced incident management and congestion management system, which builds on the existing Ontario Ministry of Transportation (MTO) COMPASS system;
- The expanded use of ramp metering at key interchange locations within the preliminary study area and consideration of ramp metering installations as part of the planning and design of all future interchanges.
- Further study of the potential to introduce speed harmonization along applicable sections of the provincial highway network; and
- Identification of mechanisms to support MTO, Metrolinx and the Smart Commute program in expanding TDM opportunities.

This Active Traffic Management Plan will serve as the basis for integrating strong TDM and TSM principles in many future transportation planning initiatives. MTO will undertake an Active Traffic Management Study in the near-term to identify locations where all of the above initiatives can be provided along existing provincial facilities to improve the performance of the existing transportation system by reducing demand and improving system efficiency. These initiatives are described in further detail below.

The timeframes indicated below are defined as follows:

- Near Term – 0-5 years
- Medium Term – 5-15 years
- Long Term – 15+ years

Expanded Use of Ramp Metering

Ramp metering (**Exhibit 6-2**) works by regulating vehicle access to the freeway through the use of traffic signals on interchange entrance ramps. These computer-controlled signals allow vehicles onto the freeway at a specified rate to maintain optimum highway traffic flows. At the same time, end-of-queue detectors prevent excessive backups on the access ramps. Ramp metering is already operating on portions of the Queen Elizabeth Way (QEW) in the City of Mississauga and Town of Oakville.

It is recommended that the feasibility of ramp metering on Highway 401 and other interchanges be explored by MTO in the near term.

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	Active Traffic Management Study to identify areas where ramp metering could be installed at interchanges along exisiting provincial facilities.

Exhibit 6-2: Examples of Ramp Metering

High Occupancy Vehicle (HOV) / Transit Bypass at Key Locations

This concept involves providing bypass lanes on metered highway entrance ramps, ramps accessing transit stations and ramps in the vicinity of carpool lots for HOV and transit vehicles. These ramps would allow HOV and transit vehicles to bypass traffic queues and provide more efficient access (**Exhibit 6-3**).

As shown in **Exhibit 6-3**, bus bypass shoulders offer transit improvements by providing extra-wide paved outside shoulders to enable buses to bypass queues during times of heavy congestion. It is recommended that the application of bus bypass shoulders be expanded to include sections of Highways 400, 410, 427 and 401, where recurring congestion is anticipated to continue and worsen. Bus bypass shoulders already operate along part of Highway 403 in the City of Mississauga. It is proposed that this initiative be further pursued by MTO and be implemented in the near term.

Exhibit 6-3: Examples of Highway Entrance Ramp and Bus Bypass Shoulders

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	Active Traffic Management Study to identify locations where bus bypass ramp provisions should be provided along exisiting and planned provincial facilities.

Transit Supportive Highway Corridors

This concept involves introducing reserved bus lanes, HOV lanes, bus bypass shoulders and other transit supportive measures within provincial facilities including Highways 400, 410, 427 and 401 that would serve to make bus transit a more reliable and viable service. These would integrate with the above-noted HOV / Transit Bypass provisions.

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	Active Traffic Management Study to identify locations where transit supportive highway corridors could be provided along existing and planned provincial facilities.

Enhanced Incident / Congestion Management

MTO's COMPASS system (**Exhibit 6-4**) uses sensors along a highway to transmit traffic data to the MTO Traffic Operations Centre. The COMPASS system performs both incident and congestion management functions.

For incident management, the system reviews the traffic data and sends a warning to the traffic operator requesting confirmation of an incident when one is detected. The traffic operator at the operations centre uses COMPASS closed-circuit television cameras to confirm the system warning. MTO is also working with the Ontario Provincial Police (OPP) to improve incident management through development of improved emergency response procedures. For congestion management, the COMPASS signs provide real time information about prevailing traffic operations. On core / collector highway systems, these signs help to improve the balance of traffic and improve the overall efficiency of the traffic flow.

As shown in **Exhibit 6-5**, the Highway 401 COMPASS System currently extends from the Highway 403 / 410 interchange easterly to Westney Road for a distance of approximately 60 kilometres, as well as Highway 400 from Langstaff Road to Highway 401, covering part of the GTA West preliminary study area.

The Strategy recommends that the Active Traffic Management Study by MTO include an assessment of the potential for further expansion of the COMPASS system beyond the current service area. Potential extensions of the COMPASS program include:

- Highway 400, north from Langstaff Road to King Road;
- Highway 427, north from Highway 401 to the proposed terminus at Major Mackenzie Drive;
- Highway 410, north from the Highway 401 to the junction at Highway 10; and
- Highway 401, west from the Highway 403 / 410 interchange west to Highway 6.

It is proposed that this initiative be further pursued by MTO in the near term.

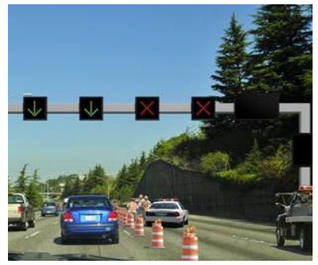
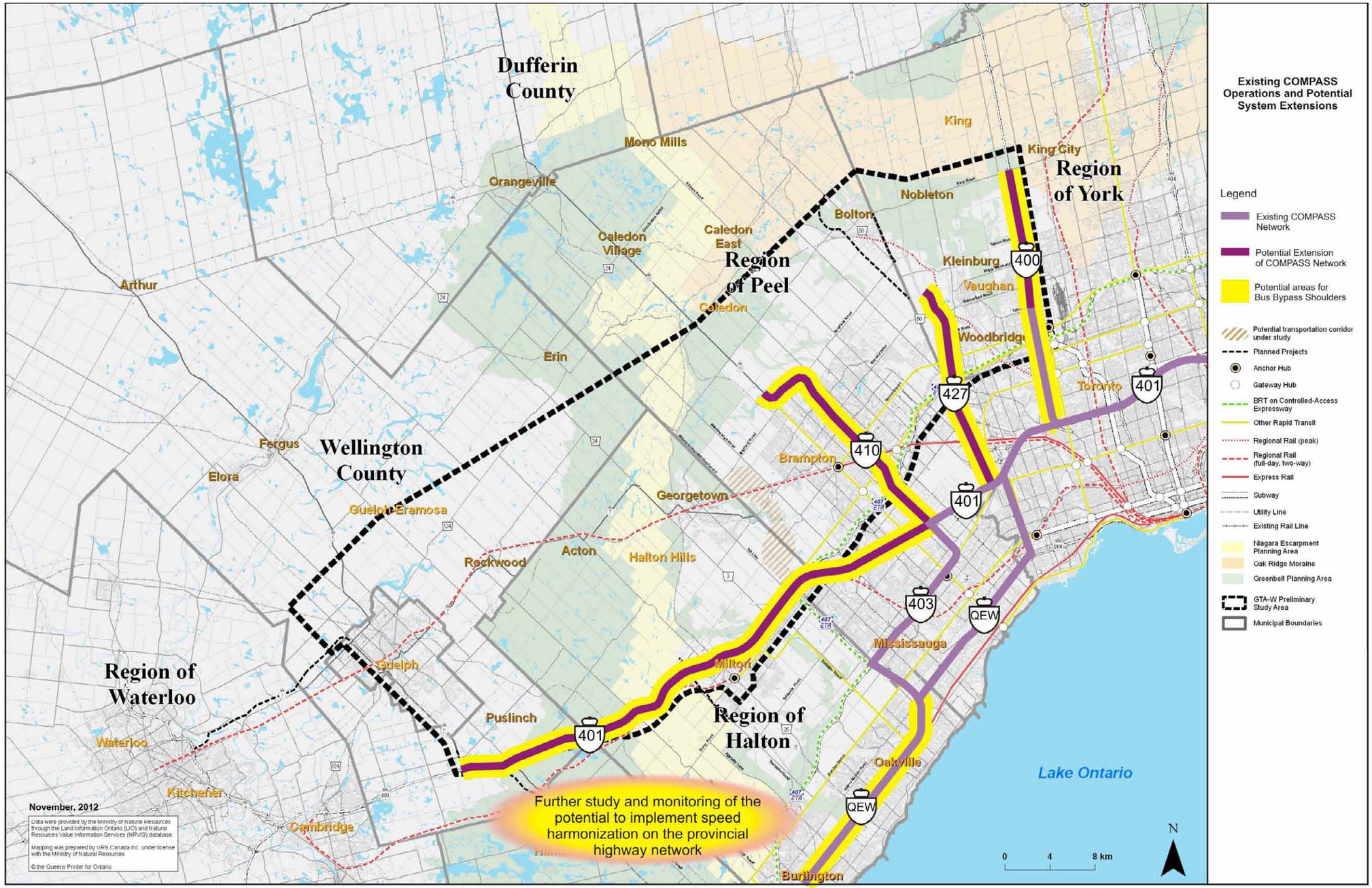


Exhibit 6-4: Examples of Application of COMPASS System

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	Active Traffic Management Study to assess the potential for further expansion of the COMPASS System beyond the current service area.

Exhibit 6-5: Existing COMPASS Operations and Potential System Extensions



Use of Speed Harmonization

Speed harmonization (**Exhibit 6-6**) requires the use of a traffic management technique similar to the MTO COMPASS system that currently monitors travel data. Cameras or sensors in the roadway are used to sense vehicle presence to measure traffic flow. Posted speed limits are automatically adjusted when congestion thresholds are exceeded. This is accomplished using variable speed limit signs mounted above each travel lane and shoulders at regular intervals along the highway. Throughput is therefore maximized by maintaining a constant flow (versus typically stop and go conditions). Speed harmonization is a common practice in many European countries, e.g. Germany, Denmark, the United Kingdom, etc. It is currently being tested in several US states and has been studied for application in Canada.

It is proposed that speed harmonization be further pursued by MTO in the near term through monitoring of experience in the US to determine if this initiative is feasible in the Greater Golden Horseshoe.

Exhibit 6-6: Examples of Application of Speed Harmonization

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	Active Traffic Management Study monitoring experience elsewhere to determine viability of speed harmonization in the study area.

Provincial / Employer Led Transportation Demand Management (TDM) Programs

Currently operating TDM programs could be improved by expanding the Metrolinx Smart Commute program beyond the Greater Toronto and Hamilton Area (GTHA) into the Guelph and Wellington County area and into Waterloo Region.

In addition to providing broader coverage, this concept would also involve introducing a regional organization that would provide strategic direction and / or potentially reach out to employers. The program could be managed on a regional level.

Experience in other jurisdictions has shown that regional organization of TDM initiatives leads to operational and economic efficiencies that translate into increased awareness of programs, a greater variety of services, and higher utilization. This concept would also involve providing additional carpool parking lots at key locations. This initiative is to be further pursued by Metrolinx, and MTO will explore opportunities to provide additional support to Metrolinx, as well as the potential for legislative changes to address current policy barriers in the near term.

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO/ Metrolinx	MTO and Metrolinx will explore opportunities to provide additional support as well as the potential for legislative changes to address current jurisdictional policy barriers.

Long Combination Vehicles

Long Combination Vehicles (LCVs) feature a single tractor with two 16 m (53 ft) trailers. MTO initiated a pilot project to allow up to 100 LCVs on the provincial highway network. This program improves fuel efficiency and traffic operations for goods movement. According to MTO, in 2011, LCVs eliminated 3.9 million tonnes of greenhouse gas emissions compared to the two-tractor trailers they replaced (www.mto.gov.on.ca).

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO	MTO will continue to monitor the LCV program based on the review of recent experience.

6.3. GROUP #2 – NEW / EXPANDED NON-ROAD INFRASTRUCTURE

6.3.1. Current Plans and Initiatives

This group of alternatives builds upon the comprehensive suite of transit initiatives included in the Metrolinx Regional Transportation Plan - The Big Move (RTP) and includes initiatives to develop a comprehensive transit network.

The 15-Year Plan from the RTP included the following projects with components in the GTA West preliminary study area:

- Rapid transit line on Highway 10 from Mayfield West to Downtown Brampton;
- Hurontario Street / Main Street Rapid Transit from Downtown Brampton to 407 ETR (Brampton's Züm service);
- Hurontario Street Rapid Transit Port Credit to Mayfield Road;
- Brampton's Queen Street Züm from Downtown Brampton to the Peel-York boundary;
- VIVA BRT Highway 7 from the Peel-York boundary to Locust Hill in Markham;
- Spadina Subway extension from Downsview Station to Vaughan Corporate Centre (known as Vaughan Metropolitan Centre);

- BRT on 407 ETR from Halton to Durham;
- Jane Street Rapid Transit from Vaughan Metropolitan Centre to Bloor Street;
- Rail service between Union Station and Lester Pearson International Airport;
- Expansion on Milton and Georgetown corridors to all-day bi-directional rail service;
- Possible rail service extensions to Cambridge;
- Peak period rail service to Bolton from Union Station;
- Express Rail from Union Station to Downtown Brampton; and
- Numerous improvements to GO Transit service.

The 25-Year Plan from the RTP included the following projects in the GTA West preliminary study area:

- Additional Rapid Transit services in Halton connecting Downtown Milton to the Rapid Transit service on Dundas Street, and 407 ETR;
- Brampton's Züm Rapid Transit service on Steeles Avenue connecting the Lisgar GO Station to Highway 427;
- Rapid Transit along Highway 427 connecting Toronto Pearson International Airport to Queen Street;
- The first component of the dedicated 407 ETR Transitway providing Rapid Transit service through York Region, continuing as high speed bus service to the east and west along the 407 ETR, and connecting to Toronto Pearson International Airport via Highway 427;
- Necessary transit improvements along arterial road networks to service new growth that will continue to take place in accordance with municipal transportation master plans;
- Walking and cycling infrastructure; and
- Opportunities for upgrading Bus Rapid Transit services to Light Rail Transit.

On an ongoing basis, Metrolinx continues to provide transit improvements along the arterial road network, as well as pedestrian and cycling improvements.

6.3.2. New Plans and Initiatives

In addition to the strategies identified above, the Strategy has identified a number of complementary strategies, which may be further supplemented and refined. These strategies are described in the following sections. The timeframes indicated below are defined as follows:

- Near Term – 0-5 years
- Medium Term – 5-15 years
- Long Term – 15+ years

Expanded Inter-regional GO Bus Routes

GO Transit has recently begun operating bus services in the western part of the GTA West study area. The services have been well received and ridership has grown significantly since the services have been introduced. This suggests that there are opportunities to attract riders to regional travel routes in this area. GO Transit has provided rail services between Kitchener-Waterloo and Union Station during AM and PM peak periods since late 2011.

Improvements to the current inter-regional GO Bus service are being seamlessly integrated with the Toronto-centric services to provide expanded coverage from Toronto to areas west of Georgetown such as Guelph, Hamilton and Kitchener-Waterloo. Existing bus services to these areas would be improved by more frequent buses and better coordination with local services.

Transit Supportive Highway Corridors

This concept involves introducing reserved bus lanes, HOV lanes, bus bypass shoulders and other transit supportive measures within existing provincial facilities including Highways 400, 410, 427 and 401 that would serve to make bus transit a more reliable and viable service. While these types of improvements could result in some level of impact to properties that abut these corridors, it is envisioned that these impacts would be relatively minor in nature and could be mitigated to a significant extent.

Inter-regional Transit Hubs Where Local Transit and GO Transit Connect

This concept involves the introduction of transit hubs in Downtown Guelph, Vaughan Metropolitan Centre, Toronto Pearson International Airport, Downtown Milton and Downtown Brampton. Transit hubs can result in land use intensification, as they tend to attract development patterns that encourage use of transit, cycling and walking. This would be consistent with the intent of Urban Growth Centres.

New Bus Rapid Transit Links Between Urban Growth Centres

This concept involves providing better transit connections between Urban Growth Centres in the GTA West preliminary study area including the Downtown Brampton, Downtown Milton, Vaughan Metropolitan Centre and Downtown Guelph. Given that these are smaller growth centres and the potential ridership may not be significant, a potential would be to use Bus Rapid Transit (BRT), Light Rail Transit (LRT) or in the longer term small train systems such as self-propelled railcars (individual or clustered). Stations would be multi-modal facilities to provide for a well-connected and integrated transportation system.

Connection Beyond the GTA West Study Area

The Metrolinx RTP plans to implement inter-regional transit across the GTHA with strategically-located "mobility hubs". Similarly, the GTA West Transportation Development Strategy envisages better inter-regional transit services connecting the westerly Urban Growth Centres (UGCs) identified in the Growth Plan for the Greater Golden Horseshoe (*Growth Plan*): Downtown Kitchener, Uptown Waterloo, and Downtowns Cambridge, Guelph, Milton, Brampton, Hamilton, and Brantford. The recommended strategy recognizes three elements of a future transit network connecting urban and rural centres west of the GTHA with one another and with the City of Toronto:

- 1st Element – Inter-regional transit links to Toronto;
- 2nd Element – Linking Urban Growth Centres by transit; and
- 3rd Element – Urban Growth Centres and Transit Gateways

1st Element – Inter-regional Transit Links to Toronto:

Currently, the GTHA inter-regional rail network is primarily Toronto-centric. GO Rail lines from Union Station connect to some outlying communities directly with Toronto's city

centre, for example, Guelph and Kitchener. However, not all communities in the western part of the study area are connected to Toronto through rail services. It will be important in the future to enhance this "spoke" transit network in order to connect the UGCs located in the west with goods, services and employment opportunities in the rest of the GTHA, as shown in **Exhibit 6-7**. GO bus services are filling some of this immediate need for inter-regional travel. Consideration should be given to further study.

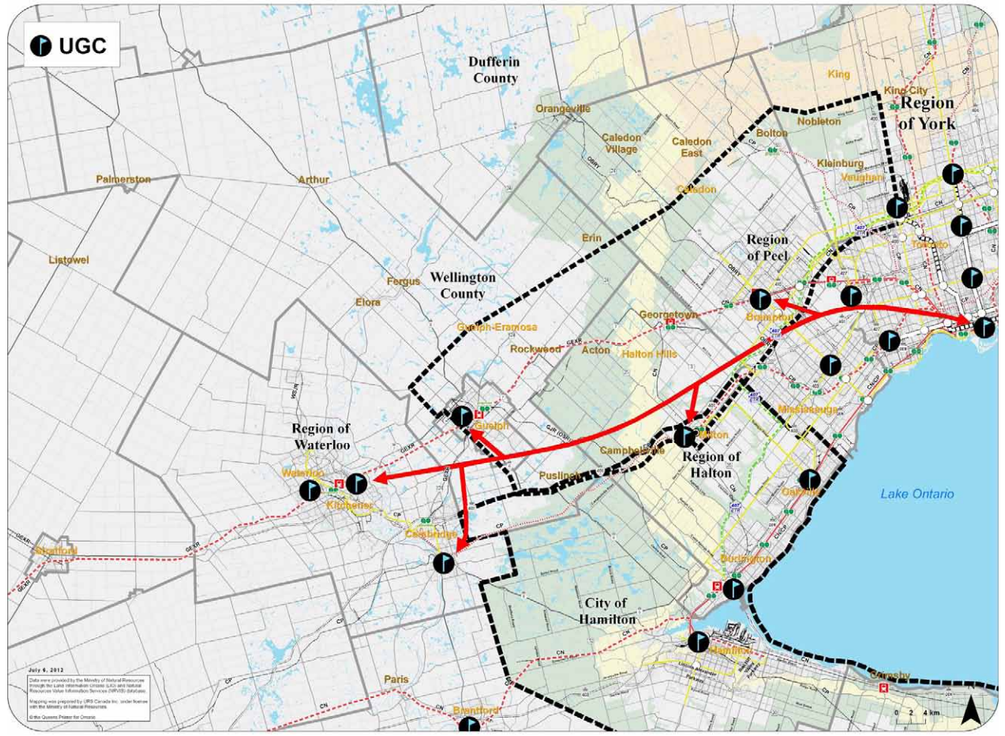
Current Initiatives

There are already service improvements by Metrolinx / GO Transit to enhance the spine network by creating extensions to pre-existing regional rail lines extending from Toronto. The Georgetown to Kitchener Rail service began in 2011, with eastbound trains during the AM peak period and westbound trains during the PM peak period.

As part of this rail expansion, two new stations were recommended, along with the refurbishing of three existing stations to accommodate GO trains. The Georgetown GO Station, Guelph VIA Station, and Kitchener VIA Station would all receive upgrades and / or expansions. Additionally, the Kitchener VIA Station would eventually be replaced with a new multi-modal station on King Street West (three blocks west of the existing station).

The preferred alternatives for new station locations were in Acton (at Hide House on Eastern Avenue) and Breslau (on Greenhouse Road east of Fountain Street North). In addition, there would be a new layover site on Nafziger Road in Wilmot Township.

A second rail expansion (the first being the Georgetown to Kitchener/Waterloo expansion) has been investigated for a potential extension of the Milton GO line westward to Cambridge. This expansion has only gone as far as a feasibility study led by the Region of Waterloo, although GO Transit could potentially undertake an Environmental Assessment in the future. The Cambridge to GTA Rail Passenger Feasibility Study recommends the implementation of four new passenger transfers, with stations possible in Campbellville (at Guelph Line), Puslinch (at Highway 6), and in Cambridge (a park-and-ride at Franklin Boulevard, and a full station on Water Street near Galt Collegiate Institute).



Note: Connection as shown is representative only.

Exhibit 6-7: Connecting Urban Growth Centres to Toronto

Future Initiatives

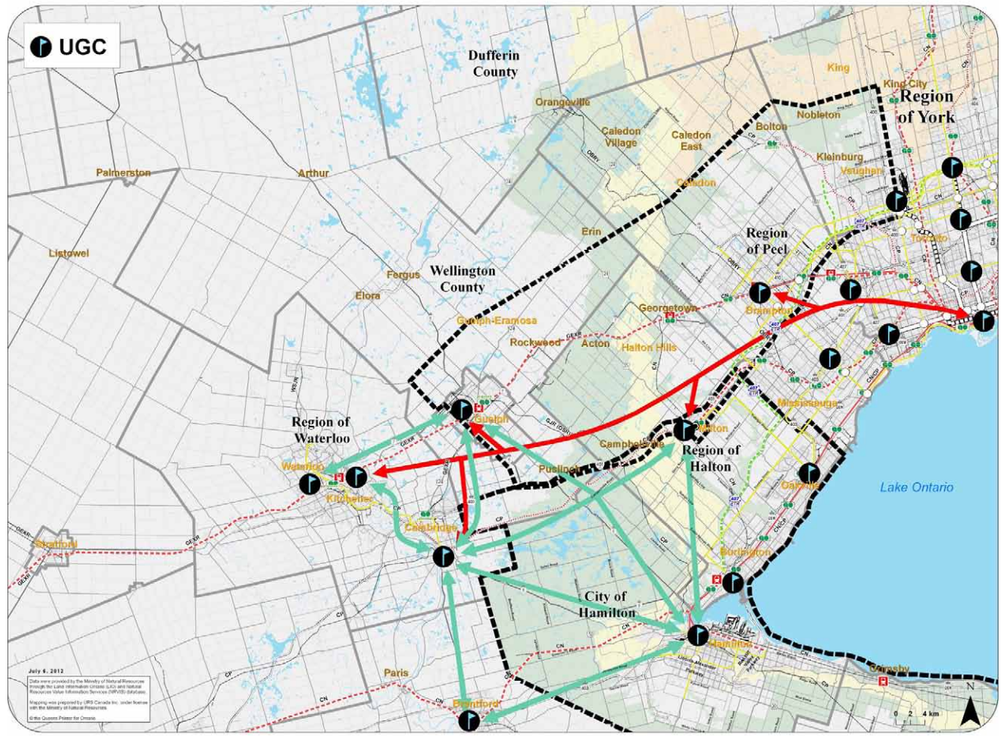
The GO Transit 2020 Service Plan from the GO 2020 Long Range Strategic Plan has identified the Hamilton-to-Brantford corridor as a "service extension", stating that "service will be considered to Urban Growth Centres currently beyond GO's service area", including Brantford. The rail infrastructure is already in place, with no less than two tracks at any location on CN's Dundas Subdivision for the entire stretch from Aldershot GO Station to Brantford VIA Station. GO Transit could potentially run service to Brantford by way of a Lakeshore West line service expansion, with the potential to greatly enhance the Toronto-centric spoke transit network.

2nd Element – Linking Urban Growth Centres by Transit

Connecting the western UGCs with one another is vital to building a comprehensive transit network that extends to the west of the GTHA. Thousands of trips are generated between those UGCs on a daily basis. To understand what the transit network connecting these UGCs will look like in the future, it is important to understand transit infrastructure upgrades that are in progress and that are programmed for the future. These upgrades are illustrated in **Exhibit 6-8**.

Current Initiatives

The Region of Waterloo has taken steps towards the implementation of an LRT system that would run from Conestoga Mall in Waterloo to Ainslie Street Terminal in Cambridge, effectively linking the UGCs of Uptown Waterloo,



Note: Connections as shown are representative only

Exhibit 6-8: Linking Urban Growth Centres with a Web Network

Downtown Kitchener, and Downtown Cambridge, as well as the proposed GO rail line extension from Georgetown to Kitchener and the contemplated GO rail line from Milton to Cambridge. The project was approved by Waterloo Regional Council on June 24, 2009 and will include LRT from Conestoga Mall to Fairview Park Mall in southern Kitchener, and adapted Bus Rapid Transit (aBRT) preferred from Fairview Park Mall southward to Ainslie Street Terminal. In 2010 and 2011, planning for the LRT / BRT was undertaken by the Region of Waterloo and the recommended rapid transit implementation option was presented to council in June 2011. The Transit Project Assessment Process was formally initiated in November 2011 and in March 2012, the study was completed. It is anticipated that full implementation of stage 1 "aBRT" and construction of stage 1 LRT would begin in 2014.

Furthermore, an EA process is already underway concerning the realignment and widening of the current Highway 24 connecting Cambridge and Brantford that explores the possibility of a new transportation corridor. The realization of the Brantford-to-Cambridge Corridor would create an opportunity to implement rapid transit between the UGCs in Cambridge and in Brantford, further enhancing the web network west of the GTHA.

It should be noted that the urban areas of Waterloo, Kitchener, Cambridge, and Milton are all currently connected with a single GO Transit regional bus route, although only the UGCs in Kitchener and Milton are directly serviced by this route. Additionally, GO bus service connects Guelph and Hamilton, although only the connection in Hamilton is located within its UGC boundaries. These routes help to further enhance the western web transit network.

Future Initiatives

As part of the GTA West Corridor Planning and EA Study, the Study Team has considered the possibility of implementing regional rail or bus options connecting the Urban Growth Centres (UGC) west of the GTHA, including a preliminary rail investigation on the condition of the existing rail tracks connecting the UGCs. A future study is recommended to examine the feasibility for such transit facilities.

3rd Element – Urban Growth Centres as Transit Gateways

In order to complete a comprehensive transit web network to the west of the GTA West preliminary study area, the smaller outlying rural communities must have connectivity to Toronto and other centres by way of transit links to nearby urban areas, as shown in **Exhibit 6-9**.

Current Initiatives

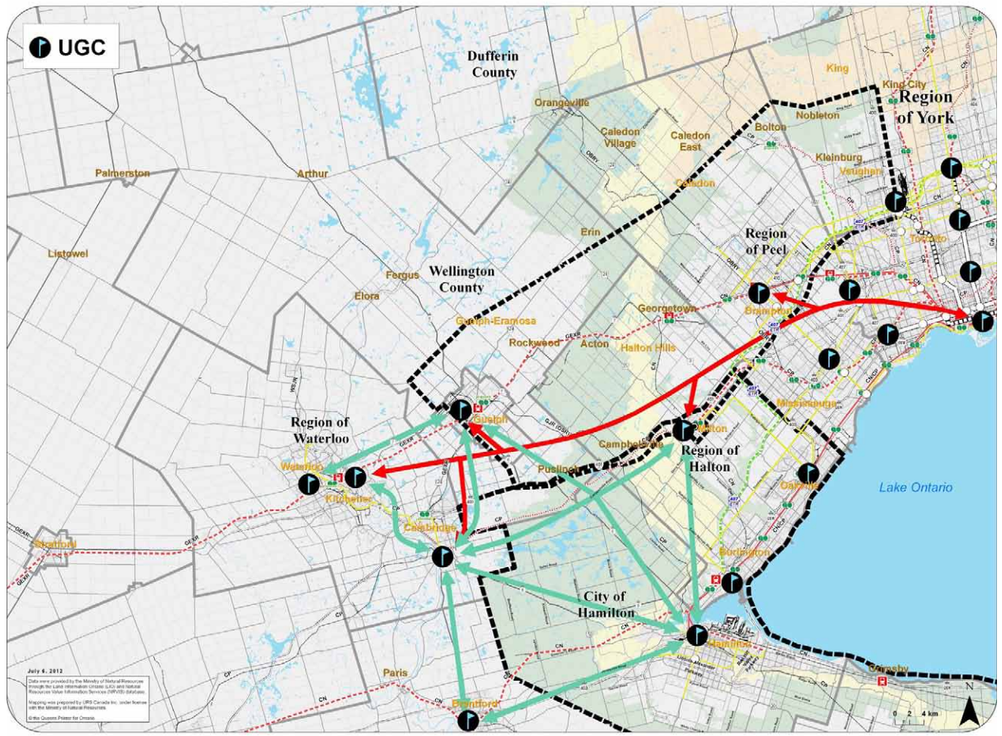
Inter-regional transit providers have shown some initiative to connect western urban areas with the smaller rural communities locally. GO Transit already runs buses from Guelph to Mississauga with a stop in the small town of Aberfoyle (in Puslinch) along the way. As previously noted, GO's service expansions to Kitchener and to Cambridge is placing new stations in smaller communities. The Georgetown expansion to Kitchener would have stops in the towns of Acton (now GO bus stop only) and Breslau, while the Milton expansion to Cambridge could potentially have stations in Campbellville and Puslinch. Also, Grand River Transit (GRT), which runs bus service primarily in Kitchener, Waterloo and Cambridge, runs a route northward to St. Jacobs and Elmira.

Future Initiatives

Outside of the previously discussed potential GO service extensions that would place new stations in Acton, Breslau, Campbellville and Puslinch, there are currently no future transit initiatives that would help service outlying rural communities.

Mobility Hubs

The Metrolinx RTP differentiates between two types of mobility hubs: Gateway Hubs and Anchor Hubs. Gateway Hubs are located at the interchange between two or more



Note: Connections as shown are representative only

Exhibit 6-9: Urban Growth Centres as Transit Gateways

current or planned regional rapid transit lines, while Anchor Hubs are the primary major transit station areas in an UGC. This ideology must be expanded to the west of the RTP study area (which encompassed only the GTHA) in order to identify areas where it is especially important to promote community self-containment. It is vital to implement transit-supportive land use practices (i.e. transit-oriented development (TOD)) and adopt policies consistent with improving transit (commuter parking, TDM, HOV lanes, transit priority, etc.) in these areas. (See www.metrolinx.com/mobilityhubs).

Therefore, new mobility hubs have been identified in the western web area. However, these mobility hubs were not sub-classified as anchor or gateway hubs. **Exhibit 6-10** identifies locations of all potential mobility hubs for further study.

Building on Existing Mobility Hubs

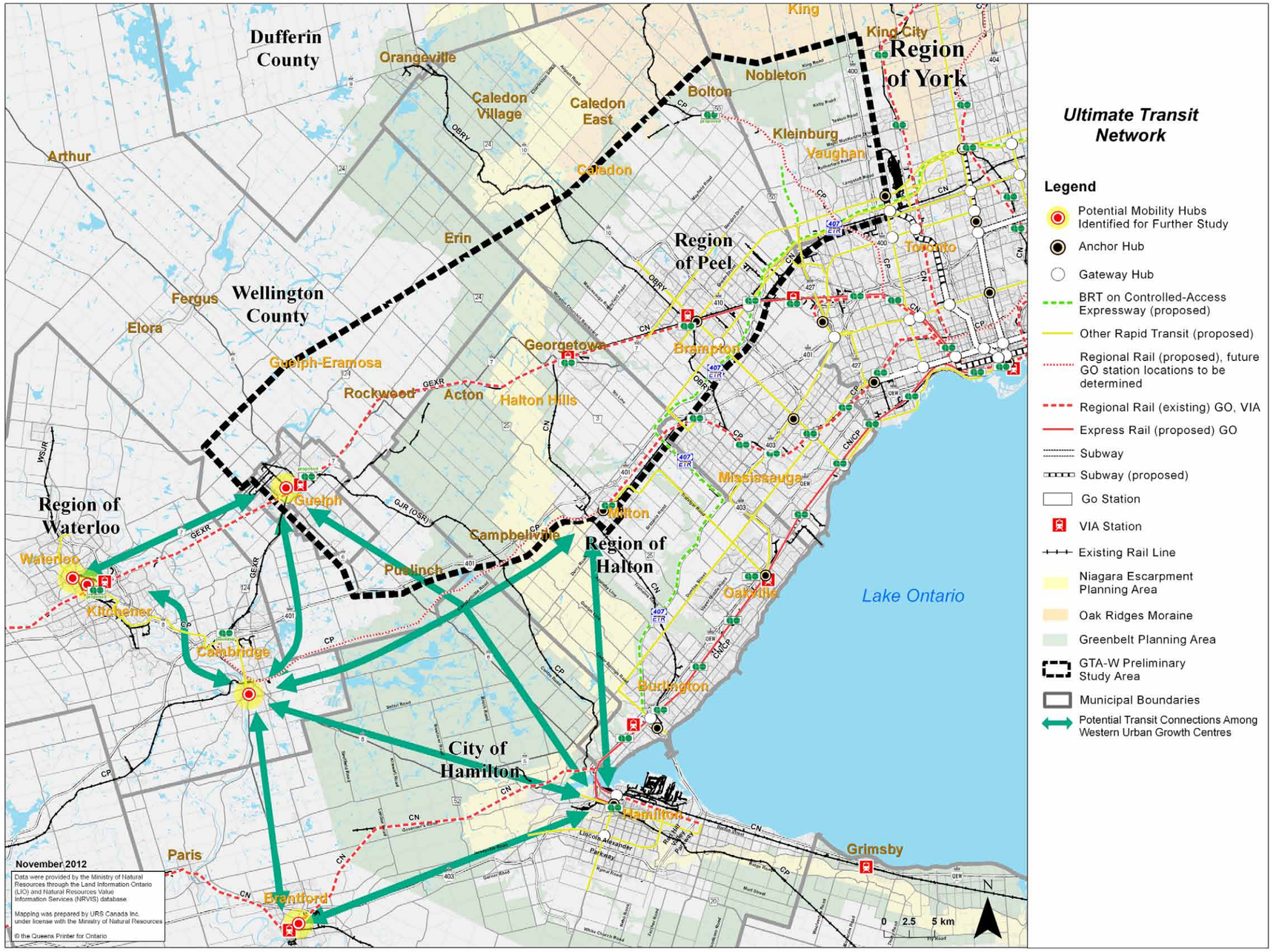
There are two existing mobility hubs located in the western stretches of the GTHA, in Milton and in Hamilton. Each has strong inter-regional transit links to Toronto including efficient regional rail services.

Both the Metrolinx RTP and *GO Transit Strategic Plan* illustrate potential future rail corridors extending regional rail service from Milton to Cambridge and the most recent expansion of GO services from Georgetown to Kitchener. These new corridors will serve as the spine of a comprehensive transit network extending west through the GTA into the Region of Waterloo, the City of Hamilton, Brant County and Wellington County.

Therefore, new mobility hubs should be placed in UGCs in Guelph, Kitchener and Cambridge where potential new GO stations will be located. Additionally, since the UGC in Waterloo will be connected to this network pending the implementation of the Waterloo LRT, it should also have a new mobility hub. Finally, since *GO 2020* reflects a potential rail service extension from Hamilton to Brantford, its UGC should have a mobility hub. Thus, five new mobility hubs should be considered in the following locations, all of which contain an UGC as defined in the *Growth Plan*:

- Brantford – The UGC in Brantford is located downtown. The Brantford VIA Rail Station is located in the immediate vicinity and has potential to accommodate GO Transit service in the future (similar to plans to use existing VIA stations in Guelph and Kitchener to facilitate the Georgetown line extension). Also, several bus routes service the UGC and surrounding area;
- Cambridge – The Cambridge to GTA Rail Passenger Feasibility Study recommended a new GO Station be built near Galt Collegiate Institute. This area is located adjacent to Cambridge's UGC and as such may be a desirable mobility hub. The Ainslie Street Bus Terminal is located in the centre of the UGC and is the major hub for GRT in Cambridge. Additionally, it is to be the southern terminus of the pending Waterloo LRT (although it is to be initially serviced by a BRT). Galt Collegiate Institute is programmed as the next stop to the north on the Waterloo LRT, and is already serviced by GRT, making the UGC in Cambridge a potentially strong location for inter-regional transit links;
- Guelph – The Georgetown to Kitchener Rail Expansion Environmental Study Report recommended that the existing VIA Guelph Station be upgraded to accommodate the potential GO service running through this corridor. This station is located within the UGC boundary in Guelph. Also located within the UGC boundary is the Guelph Bus Terminal, providing a direct link to Guelph Transit buses. Therefore, the UGC in Guelph is a strong candidate to be designated as a mobility hub;
- Kitchener – The Georgetown to Kitchener Rail Expansion Environmental Study Report also recommends that the VIA Kitchener Station be used as a GO train passenger transfer location. The station is located within the Kitchener UGC, approximately 0.6 kilometres northwest of Charles Street Terminal, which serves GRT and Coach Canada buses. However, it should be noted that there are

Exhibit 6-10: Ultimate Transit Network



plans to move the station three blocks west and relocate it on King Street West. This location is also a planned Waterloo LRT passenger transfer location. The "potential inter-modal station" on King Street West could facilitate GO, VIA, and Waterloo LRT services in the future, with GRT likely to follow and service the new station also. Therefore, the Kitchener UGC is a worthy candidate for an anchor hub; and

- Waterloo – Identifying an anchor hub location in the UGC of Uptown Waterloo is much more difficult due to the fact there is no regional rail servicing the area nor is there any planned for the immediate future. There is, however, frequent GRT bus routes as well as a planned Waterloo LRT transfer platform in the vicinity of King Street South and Willis Way. This location is only one block south of a rail corridor that connects with the proposed Georgetown to Kitchener Rail Expansion, presenting future opportunity for GO service expansion to this area. Therefore, it is recommended that a new anchor hub be considered in Uptown Waterloo.

The urban areas containing UGCs to the west of the GTA West preliminary study area are not as populated as those in the GTHA, making it much harder to identify suitable locations for multiple mobility hubs. Therefore, since each of the major urban areas described above contains a UGC with a new mobility hub recommended for further investigation in the future, additional mobility hubs will be recommended in smaller rural communities that present future transit opportunities due to their strategic location in the western web transit network. Examples are provided below of three locations that potentially warrant additional mobility hubs, where multiple transit services have the potential to meet in the future:

- Campbellville – Campbellville has been identified in the Cambridge to GTA Rail Passenger Feasibility Study as an area warranting a potential GO station in the event of a service extension from Milton to Cambridge. This potential station would be located on Guelph Line along the CP Galt Subdivision rail corridor. Campbellville is ideally situated to contain a mobility hub, due to strong positioning in the region's rail network. It is located just east of Guelph Junction, and could facilitate the transfer of rail passengers looking to travel north to Guelph, south to Hamilton or west to Cambridge. It is also the beneficiary of an interchange with Highway 401 (which runs directly through it) at Guelph Line, presenting opportunities to integrate with bus transit as well.
- Puslinch – Puslinch, a Township to the southeast of Guelph, has similar opportunities as Campbellville. It has been identified as a location suitable for a new station in the event of a GO service extension to Cambridge and is conveniently located near Highway 401 to the north. It is connected to Highway 401 via Highway 6 (where the potential station would be located), which runs north (as Brock Road) into Guelph and connects with Aberfoyle (a community serviced by GO buses at present time) en route.
- Paris – Paris is one of the larger outlying communities located within the western web area. It qualifies as a good location for a mobility hub due to Highway 403 being located just slightly to the south. It also contains two abandoned rail links, one of which leads southeast into Brantford and the other of which leads north into Cambridge. Both links appear to be reconstitutable and could be implemented as regional rail corridors at some point in the future. VIA Rail passenger trains currently run through Paris (although there is no stop in the town) on the CN Dundas Subdivision.

It is recommended that a study be initiated in the near-term to explore the potential for inter-regional transit services that are focused on connections between Urban Centres. This study would involve forecasting the future commuter demands for travel to areas in the Region of Waterloo, Cities of Hamilton, Guelph, Brantford and beyond from the surrounding municipalities and assessing whether there is sufficient future demand to warrant these transit services. If the demand exists, the study would recommend a strategy to identify the appropriate service provider (i.e. GO Transit, municipal transit services, etc., as well as the mode of travel – e.g. bus or rail). It should be noted that within and in the proximity of the GTA West preliminary study area, there are several active and abandoned rail corridors, as shown in **Exhibit 6-11**. It may be worthwhile to consider the potential for commuter rail transit on active tracks or on reconstituted abandoned tracks as one possible form of rapid transit in the long-term future. This potential should be investigated as part of the recommended study to examine demand and reasonable transit solutions.

A comparison of area rail corridors is provided in **Exhibit 6-12**.

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO Metrolinx Municipalities	Initiate a multi-modal area-wide study in the Waterloo/ Wellington/Brantford area to explore potential for inter-regional transit service improvements west of the GTA.

Goods Movement and Freight Rail

While the existing freight rail network has sufficient capacity to address future growth in goods movement by rail, there are numerous locations where conflicts exist between passenger rail and freight rail services. These conflicts occur when both services use the same tracks at the same time, as well as at-grade road / rail crossings. These locations have an adverse effect on current rail operations.

Removal of these constraints will have an overall positive effect on freight and passenger rail operations, allowing people and goods to be moved more efficiently, which may result in a higher efficiency of this mode to attract commuters and shippers.

To support increased utilization of freight rail, MTO will coordinate with Canadian National Railway, Canadian Pacific Railway and Metrolinx in the near-term to identify the conflict points, and will support potential future initiatives, such as the Ontario Goods Movement Strategy, aimed at removing freight rail / passenger rail conflicts and providing grade separations at road / rail crossings. Opportunities for transit and high-speed rail on separate tracks will also be considered.

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
✓			MTO CN/CP GO Transit Municipalities	Feasibility review of potential future initiatives aimed at removing freight rail/passenger rail conflicts and providing grade separations at road/rail crossings.

Exhibit 6-11: Active and Abandoned Rail Corridors

Exhibit 6-12: Rail Corridor Comparisons

Railway Operator	GEXR	CP (Waterloo Subdivision) / GEXR (Huron Park Spur)	GEXR (Fergus Spur)	OSR	CP (Galt Subdivision)	CP (Abandoned)	CN (Dundas Subdivision)	CP (Hamilton Subdivision)	CP (Galt Subdivision)	CN
Connecting Urban Areas/Junctions	Guelph	Kitchener / Waterloo	Cambridge	Guelph	Guelph Junction	Cambridge	Brantford	Hamilton	Guelph Junction	Milton	Hamilton
Role/Function	**Freight** (1-3 movements/day) **Passenger** (6 movements/day)	**Freight** (approx. 1-3 movement/week)	**Freight** (approx. 3 movements/week)	*Weekdays* - **Freight** (approx. 3 movements/week) *Weekends* - **Tourist**	**Freight** (20-25 movements/day)	*Cycling Trail*	**Freight** (20-25 movements/day) **Passenger** (11 movements/day)	**Freight** (5-10 movements/day)	**Freight** (20-25 movements/day)	*N/A*
Design Parameters	**Speed** - 25-55 mph (freight) 45-70 mph (passenger)	**Speed** - 10 mph	**Speed** - 10-15 mph	**Speed** - 35 mph **Weight** - no limit	**Speed** - 35-60 mph	*Majority of track salvaged*	**Speed** - 40-60 mph (freight) 40-80 mph (passenger)	**Speed** - 15-25 mph	**Speed** - 35-60 mph	*N/A*
Trackage	Majority 1 track 2 tracks in places	Majority 1 track 2 tracks in places	1 track	Majority 1 track 2 tracks in places	Majority 1 track 2 tracks in places	*N/A*	Majority 2 tracks 3 tracks in places	1 track	Majority 2 tracks 3 tracks in places	Varies from 1-4 tracks

6.4. NEW / EXPANDED ROADWAY INFRASTRUCTURE

Assessment carried out as part of the study (as documented in **Chapter 4 and Chapter 5**), has demonstrated that optimizing the existing transportation infrastructure and increasing transit ridership through new / expanded non-road infrastructure alone would provide some transportation improvement. However, it would not fully address the future transportation problems and opportunities. In order to fully realize the vision of a functional and efficient multi-modal transportation network that provides user choice and balance, planning for additional roadway capacity is required for the long term, including widening existing highways beyond the planned program at several locations, as well as a new transportation corridor.

Alternatives were developed for the widening of existing highways (beyond the planned program), and widening in combination with a proposed new transportation corridor. Analysis and evaluation were carried out to assess these alternatives based on consideration of socio-economic environment, natural environment, economic environment, transportation, as well as cost and constructability factors.

The proposed transportation corridor will consist of a highway corridor, and transitway and / or truckway. Future HOV lanes could be accommodated where warranted. The right-of-way of the transportation corridor may range between 110 m (highway/truckway without transitway) and 170 m (with transitway). The new transportation corridor could accomodate a transitway and/or priority truck features; and will include a north-south connection to Highway 427 and connection to Highway 410.

The high level evaluation of new corridor alternatives, outlined in **Chapter 4**, and the additional analysis in Halton area, outlined in **Chapter 5**, recommended that a new transportation corridor be provided from Highway 400 westerly and then southerly to connect to Highway 401 / 407 ETR as a provincial facility.

Details related to the new transportation corridor and other widening of 400 series highway are outlined below:

New Transportation Corridor

The proposed new transportation corridor is shown in **Exhibit 6-13**, which follows the configuration of Alternative 4-2 as shown in **Exhibit 4-5**. Based on the anticipated 2031 traffic forecast and analysis, the new transportation corridor is proposed to include six lanes (three in each direction) between Highway 400 and the Highway 427 Extension, four lanes (two in each direction) between Highway 427 and the north-south portion of the corridor near the Halton / Peel municipal boundary and six lanes as the corridor turns south and connects to the Highway 401 / 407 ETR interchange in the Town of Milton and Town of Halton Hills. HOV lanes could also be incorporated into the new corridor.

The Halton-Peel Boundary Area Transportation Study (HP BATS) included a Halton / Peel Freeway that would become part of the GTA West transportation corridor – i.e. the north-south portion of the transportation corridor along the Halton / Peel municipal boundary with a connection to the Highway 401 / 407 ETR interchange. The GTA West study has been coordinating with the HP BATS Study Team during Stage 1 of the EA Study and will continue to coordinate with municipal representatives during Stage 2 of the EA.

The proposed new transportation corridor would function in combination with widening of existing highway facilities beyond the planned program, as outlined in **Exhibit 6-14**. During Stage 2 of the EA Study connections to existing north-south provincial facilities (such as Highway 400, Highway 427, and Highway 410) will also be investigated.

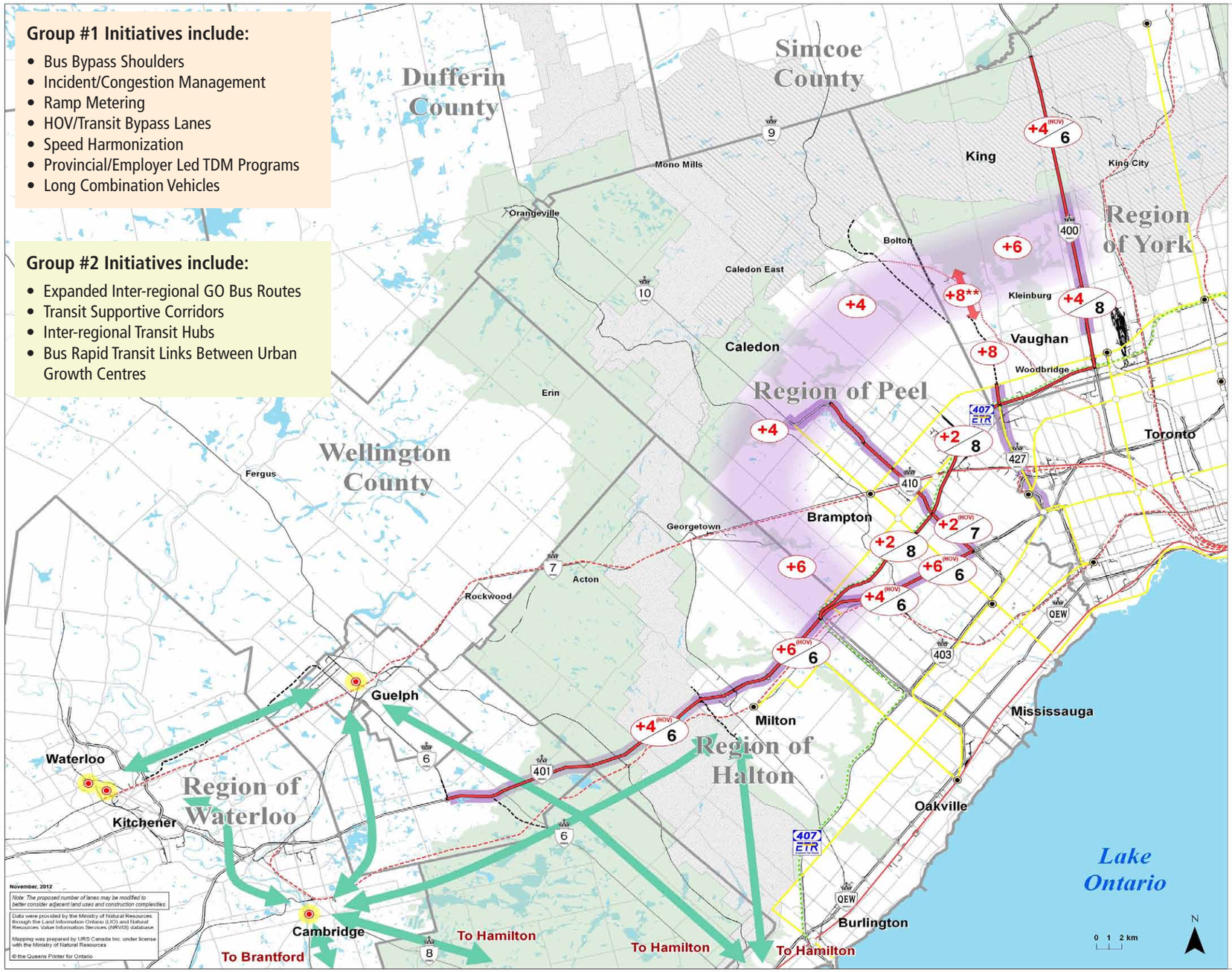
Exhibit 6-13: Transportation Development Strategy - Proposed Highway Widening and New Transportation Corridor

Group #1 Initiatives include:

- Bus Bypass Shoulders
- Incident/Congestion Management
- Ramp Metering
- HOV/Transit Bypass Lanes
- Speed Harmonization
- Provincial/Employer Led TDM Programs
- Long Combination Vehicles

Group #2 Initiatives include:

- Expanded Inter-regional GO Bus Routes
- Transit Supportive Corridors
- Inter-regional Transit Hubs
- Bus Rapid Transit Links Between Urban Growth Centres



Transportation Development Strategy

- GTA-W Preliminary Study Area
- New Transportation Corridor
- Corridor Extension**

** Corridor extension from Major Mackenzie Drive (planned terminus from Highway 427 Extension EA)

- Additional Number of Lanes
- Existing Number of Lanes
- Number of Lanes for New Corridor
- Protected Countryside of the Greenbelt Area
- Niagara Escarpment Plan Area
- Oak Ridges Moraine
- Potential Mobility Hubs Identified for Further Study
- Anchor Hub
- Gateway Hub
- BRT on Controlled-Access Expressway
- Other Rapid Transit
- Regional Rail (peak)
- Regional Rail (full-day, two-way)
- Express Rail
- Subway
- Planned Projects
- Existing Rail Line
- Potential Extension of COMPASS Network
- Potential Transit Connections Among Western Urban Growth Centres
- Provincial Facility Identified for Future Widening

Road Section	2031 Basic Number of Lanes (2-way)	
	Existing No. of Lanes	Ultimate No. of Lanes
Highway 401		
Highway 6 to Regional Road 25	6	10
Regional Road 25 to 407 ETR	6	12
407 ETR to Winston Churchill Boulevard	6	10
Winston Churchill Boulevard to Highway 410	6	12
407 ETR		
Highway 401 to Highway 410	8	10
Highway 410 to Highway 427	8	10
Highway 427 to Highway 400	10	10
Highway 410*		
Highway 401 to 407 ETR	7	9
407 ETR to Steeles Avenue	6	8
Steeles Avenue to Queen Street	8	10
Queen Street to Mayfield Road	8	8
Highway 427*		
407 ETR to Highway 7	6	8
Highway 7 to Major Mackenzie Drive (EA approved)	0	8
Highway 400		
407 ETR to Major Mackenzie Drive	8	12
Major Mackenzie Drive to King Road	6	10
King Road to Highway 9	6	10
New Transportation Corridor		
Highway 401/407 ETR to approximately Mayfield Road (north-south portion)	0	6
Approximately Mayfield Road (north-south portion) to Highway 427	0	4
Highway 427 to Highway 400	0	6

HOV lanes assumed as part of total lanes.

* Number of lanes to New Transportation Corridor not included

** It should be noted that while the analysis and evaluation documented in Chapter 4 of this report assumed Highway 401 between Winston Churchill Boulevard and Highway 410 to be 14 lanes, MTO has subsequently completed planning for this section of Highway 401 and determined that it will not be widened beyond the planned 12 lanes. Since this update would be applied to all alternatives, it would not change the outcome of the preferred improvement.

Exhibit 6-14: Proposed Highways Improvements

Transportation Corridor Implementation

It should be noted that accommodation for a transitway may be provided in the proposed new transportation corridor and would be explored in further detail during Stage 2 of the GTA West EA Study.

Hydro One has indicated the potential need for a new hydro tower corridor. Hydro One representatives have been notified of milestones of the GTA West Study and have been invited to attending Regulatory Agency Advisory Group meetings. The GTA West Corridor Planning and EA Study Team have had a few meetings with Hydro One to discuss the planning timeline and planning process of the new hydro corridor, which may coincide with sections of the new transportation corridor and North-South Link to Highway 401 / 407 ETR, as well as opportunities to coordinate between the two studies. The two Study Teams will continue to coordinate as the two planning studies progress.

Some preliminary analysis was carried out in assessing the benefit of utilizing the new transportation corridor as a truck only route. This will be carried forward for further consideration and analysis during Stage 2 of the GTA West EA Study.

One component of the Transportation Development Strategy is the introduction of a new transportation corridor between Highway 400 and Highway 401/407 ETR. Given that this transportation corridor is likely to be over 50 km and will likely require some federal approvals, it is anticipated to trigger a Comprehensive Study under the Canadian Environmental Assessment Act. As the study progresses into Stage 2, MTO will continue to consult with the Canadian Environmental Assessment Agency to coordinate Federal and Provincial EA Requirements in accordance with the approach outlined in the EA Terms of Reference.

In terms of timing and implementation, it is proposed that right-of-way designation of the new transportation corridor will be provided by MTO in the near-term, as an outcome of Individual EA completion. The widening of existing highways is to be pursued by MTO in the medium-term following the implementation of strategies in the Active Traffic Management Plan by MTO and transit programs by Metrolinx and GO Transit. The extent of widening (i.e. exact number of lanes) identified on the existing highways will be subject to MTO's Class Environmental Assessment and / or Feasibility Studies.

The timeframes indicated below are defined as follows:

- Near Term – 0-5 years
- Medium Term – 5-15 years
- Long Term – 15+ years

Timeframe			Jurisdiction	Recommended Action
Near	Medium	Long		
	✓		MTO/ 407 ETR	Widening of highways (EA studies, etc.)
✓			MTO	Route planning and preliminary design of new transportation corridor and connecting links (Stage 2 of EA Study) and protection of required lands.
		✓	MTO	Design and construction of new transportation corridor and connecting links.

6.5. MITIGATION MEASURES

There are several key natural environmental features within the GTA West preliminary study area, including the Humber River crossing, Credit River crossing, and designated areas such as the *Greenbelt Plan* area and the Niagara Escarpment. Mitigation measures will be explored during Stage 2 of the GTA West EA Study to minimize impact to natural environmental features, and MTO will work closely with Conservation Authorities, the Ontario Ministry of Natural Resources, the Department of Fisheries and Oceans and other regulatory agencies to ensure compliance with policies and guidelines. As part of the roadway design, consideration of drainage and stormwater management and other technical investigations will also occur.

Per the MTO Environmental Standards and Practices, the **Exhibit 6-15** lists the type of environmental work that is required to be carried out during route planning and preliminary design (i.e. Stage 2 EA).

Exhibit 6-15: Environmental Works to be Carried Out in Stage 2 EA

RELEVANT SECTION OF MTO ENVIRONMENTAL STANDARDS AND PRACTICES	DATA/INVESTIGATION TYPICALLY CARRIED OUT DURING STAGE 2 OF AN EA (I.E., ROUTE PLANNING AND PRELIMINARY DESIGN)
Section 2	*Fish and Fish Habitat investigations* • Field forms, photos, maps, Constraints and Opportunities map • Fish and Fish Habitat Existing Conditions Report • Fish and Fish Habitat Impact Assessment Report, • Project Notification Form “HADD” or “No HADD” • Project File for Fish and Fish Habitat • Compensation Strategy
Section 3	*Wetlands (Terrestrial Ecosystems)* • Terrestrial Ecosystems Report (includes field investigations, assessment of impacts, environmental protection, mitigation and/or compensation). o Determine and map wetland resources, o Determine Significance of wetland resources o Assess Impacts o Confirm Environmental Protection/Mitigation
Section 4	*Woodlands and Other Vegetated Areas (Terrestrial Ecosystems)* • Terrestrial Ecosystems Report (includes field investigations, assessment of impacts, environmental protection, mitigation and/or compensation). o Determine and map vegetation communities and plant species o Determine Significance of woodlands and other vegetated areas o Assess Impacts o Confirm Environmental Protection/Mitigation
Section 5	*Wildlife habitats and Movements (Terrestrial Ecosystems)- see above* • Terrestrial Ecosystems Report (includes field investigations, assessment of impacts, environmental protection, mitigation and/or compensation). o Wildlife habitat, significant wildlife habitat areas o Determine Significance of wildlife habitat o Assess Impacts o Confirm Environmental Protection/Mitigation
Section 6	*Groundwater* • Groundwater Report addresses potential changes in groundwater hydraulic regime (decrease or increase in groundwater quantity) and reduced groundwater quality. Assessment includes: o Background Data and Field investigations o Determination of Significance o Assessment of Impacts o Confirmation of Environmental Protection/Mitigation

Exhibit 6-15: Environmental Works to be Carried Out in Stage 2 EA

RELEVANT SECTION OF MTO ENVIRONMENTAL STANDARDS AND PRACTICES	DATA/INVESTIGATION TYPICALLY CARRIED OUT DURING STAGE 2 OF AN EA (I.E., ROUTE PLANNING AND PRELIMINARY DESIGN)
Section 7	*Land Use study* Includes impacts to agricultural, residential communities and built up areas, recreational lands and natural areas of provincial significance, aggregates and mines and municipal services. • Land Use Factors Report (includes field investigations, assessment of impacts, environmental protection, mitigation and/or compensation) o Determine and map specialty crop and tender fruit areas, class 1-6 agricultural land, drainage, microclimate data, property boundary/assessment data soil class, topographic/ demographic features, active farm locations and type of operation, farm buildings and other key permanent facilities o Determine and map – existing and future land uses, federal, provincial and municipal plans, policies and guidelines, local and regional resources, property boundary/assessment data, locations of residential neighborhoods, locations of rural communities, areas of vehicular and pedestrian access, heritage buildings and features o Verify background data for existing land uses o Determine and map commercial, industrial and tourism areas and verify data with site visit o Determine and map community facilities and vehicular and pedestrian access. Verify data with site visit o Determine and map passive and active parks, vehicular and pedestrian access, public recreational corridors, recreational and navigable river systems. Verify data with site visit o Determine and map data pertaining to aggregate and mines, recreational land uses and natural areas. o Determine and map data related to municipal services. Verify services. o Obtain property ownership for consultation purposes
Section 8	*Noise* • Noise Report includes: o Collection of Background Data o Determine noise sensitive areas and complete acoustical analysis o Determine significance o Assess impacts o Confirm environmental protection/mitigation
Section 9	*Contaminated Property and Excess Materials Management* • Contaminant report to identify past and present site activities, evaluate existing environmental liabilities, current environmental performance and environmental risk of a property and determine and undertake contamination management. Also addresses Management of Excess Materials during Construction. • Depending on findings, work may include Phase 1 or 2 Environmental Site Assessments
Section 10	*Built Heritage and Cultural Landscape inventory of field data* • Built Heritage and Cultural Heritage Landscape Report (includes background data, field investigations, determination of significance, assessment of impacts, mitigation strategy o Determine and map cultural heritage resources – buildings, structures, or cultural heritage landscapes that are protected and/or designated under the Part IV or V of the Ontario Heritage Act (R.S.O. 1980), Ontario Foundation easements, municipal easements, provincially owned or leased heritage properties, buildings, structures, or sites and areas/ cultural heritage landscapes listed on municipal inventories and/or recognized with Provincial historical plaques erected by the Ontario Heritage Foundation, heritage bridges, building structures or cultural heritage landscapes of recognized federal significance and cemeteries. Verified by site visit.

Exhibit 6-15: Environmental Works to be Carried Out in Stage 2 EA

RELEVANT SECTION OF MTO ENVIRONMENTAL STANDARDS AND PRACTICES	DATA/INVESTIGATION TYPICALLY CARRIED OUT DURING STAGE 2 OF AN EA (I.E., ROUTE PLANNING AND PRELIMINARY DESIGN)
Section 11	*Archaeological Stage 1 investigation* • Archaeological Technical Report (completed by licensed Archaeologist) o Stage 1 investigation for background information o Stage 2 for property assessment
Section 12	*Surface Water* o Surface Water Report includes: o Determine and map –where surface water will be released from the highway right-of-way to external lands, data related to wetland hydrology and aquatic and terrestrial habitat data. o Determine areas with evidence of historical flooding, areas with evidence of erosion and/or sedimentation, downstream surface water use and existing upstream and downstream channel characteristics. o Determine significance o Assess impacts o Confirm environmental protection/mitigation
Section 13	*Air Quality* • Background data and field investigations, determination of significance and assessment of impacts is to be determined on a project specific basis.
Section 14	*Designated Areas* • Includes Oak Ridges Moraine, Niagara Escarpment, *Greenbelt Plan* Area and Other areas (Bruce Trail, Trans Canada Trail, ESAs, Provincially significant ANSIs). • Transportation facilities shall comply with the Environmental Protection Requirements for Designated Areas.

Mitigation measures will be reviewed to minimize impact and / or to enhance cultural and heritage features, including the development of a landscaping plan.

Several types of mitigation measures can be utilized to minimize adverse environmental effects to natural, community and cultural features associated with the widening of existing highways and the construction of new facilities, including:

- Underpasses for animals and agricultural equipment (**Exhibit 6-16**);
- Rural Road Cross-Sections (**Exhibit 6-17**).

Exhibit 6-16: Underpasses for Animals and Agricultural Equipment

Exhibit 6-17: Rural Cross-Section

- Stage 2 of the GTA West Corridor Planning and EA study presents an opportunity to evaluate the effectiveness of wildlife passages and mitigation fencing. In conjunction with the environmental work typically carried out during route planning and preliminary design, MTO will work with groups such as the Ontario Road Ecology Group (OREG), and the appropriate regulatory agencies, to assess the viability of a wildlife passage research project. This type of study may provide opportunities to improve the functionality of wildlife passages specifically for the GTA West Corridor as well as other provincial highway expansion projects.

Mitigation measures are related to implementation that will be examined during all subsequent planning of transportation improvements including Stage 2 of the study.

6.6. STUDY AREA REFINEMENTS AND LAND DEVELOPMENT PRESSURES

Given the high degree of development activity within the GTA West preliminary study area, there has been significant consideration given to reducing the amount of land required for the corridor protection process. In addition, the uncertainty caused by an extensive planning process can result in long standing anxiety about potential personal and property effects to local stakeholders.

In order to provide greater certainty to local stakeholders, the Study Team has developed a preliminary route planning study area, defined as a geographic area within which a reasonable range of route alternatives can be generated. This study area will be applied to Stage 2 of the EA process.

The Preliminary Route Planning Study Area was developed in consultation with affected municipalities, regulatory agencies and the public. The limits of the study area were determined using a combination of MTO Geometric Design Standards with consideration of the built-up, natural, and social environment. MTO Geometric Design Standards were also used to ensure the (engineering) feasibility at key locations including the potential interchanges at Highways 400, 427, 410 and 401; and the crossings at the Humber River and Credit River.

The Preliminary Route Planning Study Area is intended to be large enough to accommodate several route alternatives for new highway / transitway routes, including interchanges to connecting freeways and major arterials, sideroad connections or realignments, transit stops or rail connections, as well as other related facilities such as stormwater management ponds, areas for environmental mitigation, transit station parking, etc. It is recognized that this area is preliminary and will be refined during Stage 2 of the EA.

The principles for generating the Preliminary Route Planning Study Area are outlined in **Exhibit 6-18**. The overarching principle is to maximize the opportunities for route generation while attempting to achieve the rationale in **Exhibit 6-18**.

A Preliminary Route Planning Study Area was initially presented in the Draft Transportation Development Strategy (Strategy) Report (February 2011). The area was developed based on the new transportation corridor alternative recommended in the draft Strategy Report (February 2011) – i.e. a new transportation corridor from Highway 400 to Highway 401 west of the Milton urban area, and a north-south link to Highway 401 / 407 ETR, now superseded.

Since the release of the draft Strategy Report (February 2011), a number of comments from municipalities and stakeholders were received regarding their concerns about the recommended transportation corridor through

PRINCIPLE	RATIONALE
Meet desirable MTO Geometric Design Standards, including interchange and ramp distance spacing criteria, horizontal radius, and protect for a minimum right-of-way of 170m	MTO standards require a 120 kilometres per hour design speed to provide sufficient roadway capacity and reduce the potential for accidents.
Produce an efficient design which considers crossing angles of roads, railways, rivers, etc. and directness of route.	Minimizing route length reduces overall impacts and improves transportation service by reducing travel times. Large skew angles between two grade-separated roadways are not desirable and sometimes are not viable.
Minimize impacts to the Greenbelt, Oak Ridges Moraine and Niagara Escarpment wherever possible (this principle was used to identify northern edge of study area, where there are no other limitations).	These policy protected areas contain potentially more sensitive unique features that should be avoided if technically and economically feasible.
Provide maximum areas, based on MTO Geometrics and/ or other constraints, at locations where crossing of key natural features cannot be avoided (ie. major valleys and rivers) so that numerous crossing locations can be examined	It is recognized that not all features can be avoided, so it is important to ensure that sufficient space is available for a number of route alternatives to be generated in the next steps of the study, when more detailed environmental and engineering information will be obtained to evaluate route alternatives at a higher level of detail.
Avoid built up areas.	Avoiding existing residential and business areas will decrease the number of people and businesses displaced and reduce potential proximity effects (e.g. noise, air quality and aesthetics).
Minimize impacts to approved municipal urban expansion areas and approved secondary plans.	Minimizing impacts to future residential and business areas will decrease the number of people and businesses displaced and reduce potential proximity effects (e.g. noise, air quality and aesthetics)
Integrate with existing transportation infrastructure where possible, or be at an appropriate distance to it and to offer flexibility to connect to existing and planned transportation facilities in the study area.	It is important for the future facility to be compatible with, and not preclude, the future transportation network.

Exhibit 6-18: Principles for Defining the GTA West Preliminary Route Planning Study Area

Halton Region which resulted in additional analysis in the Halton area as documented in **Chapter 5**. Findings from the additional analysis indicated that further widening of Highway 401 through Halton area would provide the best balance of benefits and impacts amongst factors in social, natural and cultural environment, as well as transportation, cost and constructability. Therefore, as documented in **Section 6.4**, the proposed new transportation corridor would begin from Highway 400 westerly and then southerly to Highway 401 / 407 ETR.

In addition, area municipalities in Peel and York Regions, as well as stakeholders also provided comments regarding potential impact on future development opportunities and the completion of secondary plans within the Preliminary Route Planning Study Area as presented in the draft Strategy Report (February 2011). The Study Team investigated various focus areas and modified the boundary of the Preliminary Route Planning Study Area accordingly. In general, comments from municipalities and stakeholders were mainly related to potential development impacts and requests to refine the Preliminary Route Planning Study Area to minimize impacts to future development and/or delay in moving forward in the planning process.

Exhibit 6-19 provides a summary of modification to the Preliminary Route Planning Study Area. The updated Preliminary Route Planning Study Area is shown on **Exhibit 6-20**.

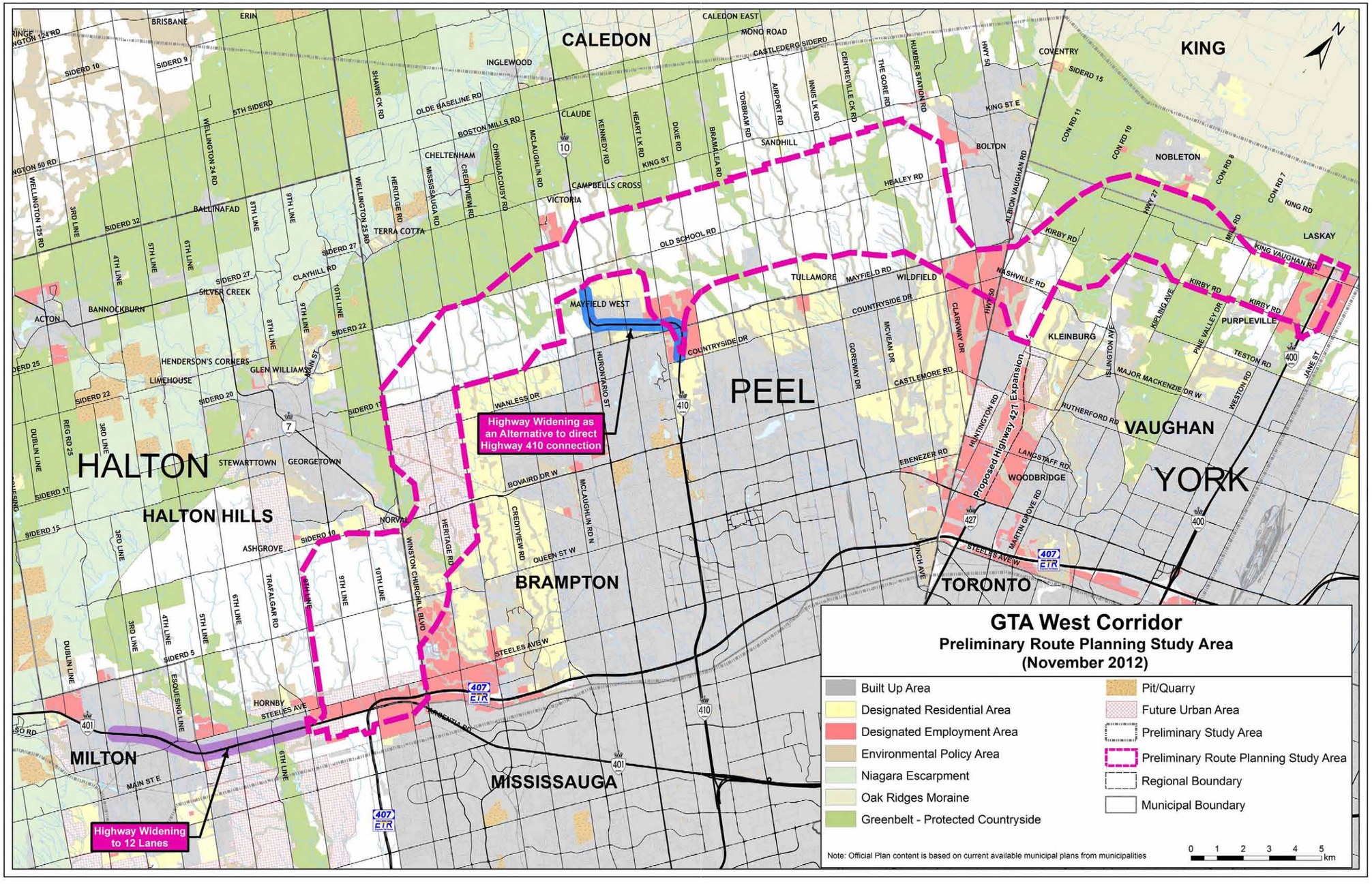
Exhibit 6-19: Summary of Modifications to Preliminary Route Planning Study Area

AREA	DESCRIPTION OF AREA	CONSTRAINTS / CONSIDERATIONS	PRELIMINARY ROUTE PLANNING STUDY AREA UPDATE
General Correction	• While this is not a request for change from municipalities or stakeholders, it should be noted that there was an unintended graphical shift in the Preliminary Route Planning Study Area boundary included in the Draft Strategy Report (February 2011). The boundary was not shown as intended and was shifted by as much as 300-500m farther north than intended at the east end (i.e. within York Region and the easterly area in Peel Region). The shift in the Preliminary Route Planning Study Area has been corrected as part of the update.		
City of Vaughan – Highway 400 North Employment Area	• Lands located in the area are bounded by Teston Road, Vaughan-King boundary, Weston Road and Jane Street.	• The key constraints to the new transportation corridor include: o Geometric constraints to connect future GTA West transportation corridor and Highway 400 o Interchanges at Teston Road and future King-Vaughan Road interchange o Potential impact to directional service centres along Highway 400 o Potential expansion of urban area up to King-Vaughan Road • Consideration must be given to accommodate the freeway to freeway interchange between Highway 400 and the new transportation corridor and to ensure sufficient spacing between existing interchanges / crossings and service centre accesses / egresses.	• South end of the Highway 400 connection updated to be the "triangular" shape. • South boundary of the Preliminary Route Planning Study Area will remain in the same location (i.e. along Kirby Road) at this stage to ensure a reasonable range of route alternatives for Stage 2 EA.
City of Vaughan – North Kleinburg- Nashville Area	• Lands located in the area are bounded by Kirby Road, Kipling Avenue, Major Mackenzie Drive and Huntington Road.	• The key constraints to the new transportation corridor include: o Humber River valley lands and floodplains o Geometric constraints to connect future GTA West transportation corridor and Highway 427 extension o High voltage hydro tower corridor (500 kV) and o CP Rail corridor o Designated development land use plans as proposed • Consideration must be given to accommodate the freeway to freeway interchange between Highway 427 and the new transportation corridor, reasonable crossing of the Humber River and CP rail track, as well as avoiding impact to transmission towers.	• Preliminary Route Planning Study Area expanded to accommodate more reasonable river crossing options where environmental features may be reduced.
City of Vaughan – West Vaughan Employment Area	• Lands located in the area stretches between Langstaff Road and Nashville Road generally along the westerly boundary of the City of Vaughan.	• See above – North Kleinburg-Nashville Area	• Preliminary Route Planning Study Area will remain the same at this stage to ensure a reasonable range of route alternatives for Stage 2 EA.
City of Brampton – Area 47	• Lands located in the area are bounded by Mayfield Road, Castlemore Road, Highway 50 and The Gore Road	• See above – North Kleinburg-Nashville Area • Consideration must also be given to provision of freeway interchange access at a crossing road in the area	• Preliminary Route Planning Study Area will remain the same at this stage to ensure a reasonable range of route alternatives for Stage 2 EA.

Exhibit 6-19: Summary of Review and Modifications to Preliminary Route Planning Study Area

AREA	DESCRIPTION OF AREA	CONSTRAINTS / CONSIDERATIONS	PRELIMINARY ROUTE PLANNING STUDY AREA UPDATE
Town of Caledon – South Albion/Bolton Area	• The area of concern is located north of Mayfield Road between Coleraine Drive and Humber Station Road.	• See above – North Kleinburg-Nashville Area	• Preliminary Route Planning Study Area will remain the same at this stage to ensure a reasonable range of route alternatives for Stage 2 EA.
Town of Caledon – Mayfield West Phase 1 Area	• Lands located in the area are bounded by Dixie Road, Chinguacousy Road, Town of Caledon / City of Brampton municipal boundary and Old School Road • Mayfield West Phase 1 north of Mayfield Road and between Hurontario Street / Highway 10 and Dixie Road are in various stages of development approval.	• The key constraints to new transportation corridor include: o Woodlots located between Dixie Road and Heart Lake Road north of Mayfield Road (under jurisdiction of TRCA) o Existing residential community of Valleywood o Geometric constraints to connect future GTA West transportation corridor and Highway 410 o Existing Highway 410 corridor o Development plans south of Mayfield Road in the City of Brampton • It is recognized that the Mayfield West Phase 1 area is in advanced stage of development • Consideration must be given to accommodate link to freeway to freeway interchange (i.e. connection to Highway 410) while minimizing impact to natural environment features and planned development.	• Preliminary Route Planning Study Area boundary has been refined in consultation with Town of Caledon to ensure that a reasonable range of alternatives can be considered in this area – some that could minimize impact to the planned development as well as some that could minimize impacts to existing communities and land uses, as well as natural features.
Town of Caledon – Existing Highway 410/ Highway 10 Area	• Lands in the general proximity of Highway 410 and Highway 10 (i.e. terminus of existing Highway 410).	• The key constraints to new transportation corridor include: o Geometric constraints to connect future GTA West transportation corridor and Highway 410 o Existing residential community o Interchange at Valleywood Drive o Environmental features o Mayfield West Phase 2 lands	• Existing Highway 410/Highway 10 will continue to be considered to potentially provide connection to the new transportation corridor as an alternative to a new north-south connection north of Highway 410/Mayfield Road Interchange.
Town of Caledon – Mayfield West Phase 2 Area	• Lands located in the area are bounded by Hurontario Street and Chinguacousy Road, north from Mayfield Road.	• The key constraints to the new transportation corridor include: o Future crossing of Etobicoke Creek, tributaries and Greenbelt o Future crossing of north-south railway corridor east of McLaughlin Road • Consideration must be given to accommodate reasonable crossing of the Etobicoke Creek and the railway corridor. There could be an opportunity for the new transportation corridor to cross the Etobicoke Creek at a perpendicular angle east of McLaughlin Road and then follow the south side of the Etobicoke Creek.	• Preliminary Route Planning Study Area boundary has been shifted to the north and to the west near Chinguacousy Road and Mayfield Road to better reflect the highway geometrics without compromising the alternatives crossing the Etobicoke Creek.
Halton Region / Town of Halton Hills – Highway 401 / 407ETR Connection Area	• The area generally between Eighth Line and Winston Churchill Boulevard along Highway 401.	• The key constraints to the new transportation corridor include: o Geometric constraints to connect future GTA West transportation corridor and Highway 401/407 ETR o The need to accommodate freeway to freeway interchange between new transportation corridor and Highway 401 / 407 ETR interchange o The area in the northeast quadrant of Highway 401 and Trafalgar Road received site plan approval, and is currently under construction for commercial development • Consideration must be given to accommodate freeway to freeway interchange between the new transportation corridor and Highway 401/407 ETR while reducing impact to the commercial development in the northeast quadrant of Highway 401 and Trafalgar Road.	• Preliminary Route Planning Study Area boundary has been updated to reflect the terminus of the new transportation corridor at Highway 401 / 407 ETR while taking into consideration the need to accommodate a future freeway to freeway interchange between the new transportation corridor and Highway 401 / 407 ETR interchange and avoiding impact to the planned development at Highway 401/Trafalgar Road. • Boundary is east of most residential lots along Eighth Line.

Exhibit 6-20: GTA West Preliminary Route Planning Study Area (November 2012)



7 Summary of Consultation Activities

7.1. OVERVIEW

An extensive consultation program was undertaken to support the development of the Transportation Development Strategy. The consultation program was designed to address the requirements of the Ontario Environmental Assessment Act and the approved EA Terms of Reference (ToR) for this project.

Those consulted include the general public, local community and interest groups, federal and provincial ministries and agencies, upper- and lower-tier municipalities and First Nations. Early and ongoing engagement with these groups has provided the Study Team (including Ministry of Transportation staff and consultant specialists) with a broad range of perspectives and viewpoints and has aided in the development and refinement of the Transportation Development Strategy.

Stakeholders were able to choose their level of involvement in the project from one or more of the following options, as appropriate:

- Study Website (www.gta-west.com);
- Notices, reports, information session;
- Public Information Centres;
- Community Advisory Group, Interest Group, and community meetings;
- Government and Agency meetings including:
  - Municipal Advisory Group meetings;
  - Regulatory Agency Advisory Group meetings;
  - Upper- and Lower-tier Council/Committee workshops and presentations;
  - Individual Municipal, Provincial Agency, Federal Agency and Technical workshops and meetings;
- Transportation Service Providers and Business and Commercial Stakeholder meetings;
- First Nations meetings; and
- Contacting the Study Team directly via mail, e-mail, phone or fax

A round of consultation was initially held during the preparation of the ToR, which included a first round of Public Information Centres (PICs) and corresponding government and agency meetings in April-May 2007. All of the consultation events that have occurred for Stage 1 since the approval of the ToR (i.e. since PIC #1) are outlined below.

7.2. PUBLIC CONSULTATION

7.2.1. Mailing List and E-mails / Letters

Study Mailing List

A GTA West study mailing list was developed following the first Public Information Centre (PIC) which included interested stakeholders that submitted requests through the study website (webform), e-mail, fax, phone or letter, and those who signed in at the first PIC. This list has been constantly updated throughout the EA study. Those who signed in at subsequent PICs or who contacted the team by other means were added to the study mailing list. Once stakeholders were added to the mailing list they received notification of study milestones, as outlined below, through their preferred method of contact (e-mail / letter).

Mailing lists containing the names of municipal, provincial and federal representatives were also generated. In consultation with local municipalities, a list of area interest groups (ratepayers associations, environmental groups, agricultural groups, etc.) was developed.

As of October 2012, the public e-mail / mail list included approximately 1380 names, the interest group e-mail / mail list included approximately 170 names / groups, the business and commercial stakeholders / transportation service providers e-mail / mail list included 440 names, and the municipal/provincial/federal mailing list included approximately 180 names. The overall number of contacts on the study contact lists total over 2170 names.

A current list of the stakeholders consulted is included in the PIC #5 Consultation Record. Consistent with the Freedom of Information and Protection of Privacy Act, public lists developed as part of this study have not been included. Details regarding First Nations notification are included in **Section 7.6**.

E-mail / Letter Notification of Transportation Demand Forecasting Information Sessions

On June 2, 2008, individuals on the Study mailing list were invited by e-mail / letter (depending on their preferred method of contact) to attend Transportation Demand Forecasting Information Sessions. The sessions, held on June 23 and 26, 2008, focused on providing a general, non-technical overview of how transportation forecasting was to be conducted and how it related to the identification of transportation problems and opportunities. The sessions were held between PICs 1 and 2.

E-mail / Letter Notification of Study Progress Update

On November 10, 2008, individuals on the Study mailing list were notified by e-mail / letter with a study progress and schedule update. The e-mail / letter described the study's progress since PIC #1 and explained the revised overall study schedule.

E-mail / Letter Notification of Public Information Centre #2

On February 13, 2009, PIC #2 notification e-mails / letters were sent directly to individuals on the Study Team's External Agency mailing list (including representatives of the Municipal Advisory Group and Regulatory Agency

Advisory Group) and interest groups. Individuals on the mailing list were also sent a letter / e-mail. MPPs within the preliminary study area were notified via mail on March 2, 2009.

E-mail / Letter Notification of the Release of the Draft Area Transportation System Problems and Opportunities Report

On July 31, 2009, individuals on the Study mailing list were notified by e-mail / letter of the release of the Draft Area Transportation System Problems and Opportunities Report. The GTA West study website was updated to include the report on July 31, 2009.

E-mail / Letter Notification of Public Information Centre #3

On November 13 and 17, 2009, PIC #3 notification e-mails / letters were sent directly to individuals on the Study Team's External Agency mailing list (including representatives of the Municipal Advisory Group and Regulatory Agency Advisory Group) and interest groups. Individuals on the mailing list were also sent a letter / e-mail. MPPs within the preliminary study area were notified via mail on November 9, 2009.

E-mail / Letter Notification of the Release of the Draft Area Transportation System Alternatives Report

On April 9, 2010 and April 13-14, 2010, individuals on the Study mailing list were notified by e-mail / letter of the release of the *Draft Area Transportation System Alternatives Report*. The GTA West study website was updated to include the report on April 9, 2010.

E-mail / Letter Notification of Public Information Centre #4

On May 31, 2010, PIC #4 notification e-mails / letters were sent directly to individuals on the Study Team's External Agency mailing list (including representatives of the Municipal Advisory Group and Regulatory Agency Advisory Group) and interest groups. Individuals on the mailing list were also sent a letter / e-mail. MPPs within the preliminary study area were notified via mail on May 16, 2010.

Further notification was undertaken following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area, including a fifth Public Information Centre. See Sections 7.7 and 7.8 for more details.

7.2.2. Website

A GTA West study website (www.gta-west.com) was launched to coincide with the study commencement notification released during the Terms of Reference (ToR) round of consultation, and has remained active throughout the EA study. The website has been consistently updated throughout the course of the study.

The website provides an ongoing opportunity for the public and stakeholders to review up-to-date study information, download reports and study materials and to contact the Study Team through the study e-mail address (project_team@gta-west.com), which is provided on the "Contact Us" page. The "Contact Us" page also includes a "webform" feature, where comments can be entered and sent directly to the Study Team to facilitate feedback from interested parties.

The website has been well used throughout the study. Over 300 comments have been received via the website since the commencement of the study, and it has seen significant visitation. The website's recent usage between January and July 2012 is shown below:

GTA WEST WEBSITE USAGE – 2012 MONTHLY VISITS	
Month	Number of Unique Visits
January	789
February	688
March	735
April	693
May	1,113
June	1,361
July	546

A copy of recent content of the study website is included in the PIC #5 Consultation Record.

7.2.3. Public Information Centres

Public Information Centres (PICs) were held to provide the public with an opportunity to review study materials, provide comments and discuss issues with representatives of the Study Team.

A first round of PICs was held in April-May 2007 to provide the public with an opportunity to review the draft Terms of Reference (ToR). The ToR was submitted to the Ontario Ministry of the Environment on July 15, 2007 and was approved on March 4, 2008.

Sections 7.2.3.1 to 7.2.3.3 summarize PICs #2, 3 and 4 that have occurred since the approval of the ToR. An additional PIC (PIC #5) was held following the release of the Draft Strategy Report (March 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area. See Section 7.8.3 for more details of PIC #5.

7.2.3.1. Public Information Centre #2

The second round of PICs was held in March 2009 in order to present the public with an update on the Study progress and to provide the opportunity for the public to comment on maps and displays depicting the problems and opportunities identified within the GTA West Corridor preliminary study area.

The PICs were held as drop-in centres with display panels presenting maps and displays illustrating the problems and opportunities and information for providing comments. Ministry of Transportation (MTO) and Consultant representatives of the Study Team attended. The Study Team participated in discussions with the attendees to address questions and concerns.

The PICs were held as follows:

WEDNESDAY MARCH 4, 2009	THURSDAY MARCH 5, 2009	MONDAY MARCH 9, 2009
River Run Centre Canada Company Hall 35 Woolwich Street Guelph, ON	Brampton Fairgrounds Hall 12942 Heart Lake Road Caledon, ON	Mold Master Sportsplex Alcott Hall 221 Guelph Street Georgetown, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**	**4:00 to 8:00 p.m.**

WEDNESDAY MARCH 11, 2009	THURSDAY MARCH 12, 2009
Le Jardin Special Events Centre Venetian Room 8440 Highway 27 Woodbridge, ON	Pearson Convention Center Hall C 2638 Steeles Avenue East Brampton, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**

A total of 338 members of the public signed the Visitor's Register at the five PIC venues.

In addition to verbal comments, the Study Team representatives encouraged visitors to submit written comments regarding the information presented. Comment sheets were available for members of the public to fill out at each PIC or to send in by the comment deadline (April 3, 2009) by e-mail, fax or mail to the Study Team.

At the PICs, 37 written comment sheets were collected. In addition, 15 comments were received via webform, e-mail, fax or mail by the comment deadline. The following is a breakdown of attendance and number of comments submitted by PIC date/venue:

DATE / LOCATION	RECORDED ATTENDANCE	WRITTEN COMMENTS RECEIVED
March 4, 2009 Guelph	94	14
March 5, 2009 Caledon	125	11
March 9, 2009 Georgetown	69	2
March 11, 2009 Woodbridge	34	5
March 12, 2009 Brampton	16	5
Total Comment Forms Received at the PIC		**37**
Total Comment Forms received via fax, mail, e-mail or webform		**8**
Total	**338**	**45**

A complete PIC #2 Consultation Record is available under separate cover, on the project website.

7.2.3.2. Public Information Centre #3

The third round of PICs was held in November / December 2009 to present alternatives that were developed to address the problems and opportunities presented at the second round of PICs, provide a high level assessment of the alternatives, and receive public input prior to the evaluation of the alternatives.

The PICs were held as drop-in centres with display panels and maps illustrating the transportation alternatives under consideration in the GTA West Corridor. MTO and Consultant representatives of the Study Team attended. The Study Team participated in discussions with attendees to address any questions or concerns.

The PICs were held as follows:

MONDAY NOVEMBER 30, 2009	THURSDAY DECEMBER 3, 2009
River Run Centre Canada Company Hall 35 Woolwich Street Guelph, ON	Mold Master Sportsplex Alcott Hall 221 Guelph Street Georgetown, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**

TUESDAY DECEMBER 8, 2009	THURSDAY DECEMBER 10, 2009
Brampton Fairgrounds Hall 12942 Heart Lake Road Caledon, ON	Le Jardin Special Events Centre Venetian Room 8440 Highway 27 Woodbridge, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**

A total of 312 members of the public signed the Visitor's Register at the four PIC venues (note: the Brampton venue was eliminated for this round due to the low turnout at PIC #2 and the availability of another venue in Peel Region).

In addition to verbal comments, Study Team representatives encouraged visitors to submit written comments regarding the information presented. Comment sheets were available for members of the public to fill out at the PIC or to send in by the comment deadline (January 15, 2010) by e-mail, fax or mail to the Study Team.

At the PICs, 29 written comment sheets were collected. In addition, 26 comments were received via webform, e-mail, fax, mail and the toll-free number/phone by the comment deadline. The following is a breakdown of attendance and the number of comments submitted by PIC date/venue:

DATE / LOCATION	RECORDED ATTENDANCE	WRITTEN COMMENTS RECEIVED
November 30, 2009 Guelph	88	17
December 3, 2009 Georgetown	106	6
December 8, 2009 Caledon	77	3
December 11, 2009 Woodbridge	41	3
Total Comment Forms Received at the PICs		**29**
Total Comment Forms / Comments received via fax, mail, e-mail, webform or the toll-free number		**26**
Total	**312**	**55**

A complete PIC #3 Consultation Record is available under separate cover, on the project website.

7.2.3.3. Public Information Centre #4

The fourth round of PICs was held to provide the public with an opportunity to review and comment on the draft multi-modal Transportation Development Strategy for the GTA West Corridor including the Preliminary Route Planning Study Area, provide comments and discuss issues with representatives of the Study Team.

The PICs were held as drop-in centres to allow members of the public to review display material and discuss the study one-on-one with Study Team members. In addition, as a result of direction to do so, brief presentations were held each night at 5:00 p.m. and 7:00 p.m. to provide a study overview. MTO, Metrolinx/GO Transit and Consultant representatives of the Study Team attended. The Study Team participated in discussions with the attendees to address questions and concerns.

The PICs were held as follows:

MONDAY JUNE 14, 2010	TUESDAY JUNE 15, 2010	WEDNESDAY JUNE 16, 2010
Brampton Fairgrounds Hall 12942 Heart Lake Road Caledon, ON	Le Jardin Special Events Centre Venetian Room 8440 Highway 27 Woodbridge, ON	Mold Master Sportsplex Alcott Hall 221 Guelph Street Georgetown, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**	**4:00 to 8:00 p.m.**

TUESDAY JUNE 22, 2010	THURSDAY JUNE 24, 2010
Snelgrove Community Centre Auditorium 11692 Hurontario Street Brampton, ON	River Run Centre Canada Company Hall 35 Woolwich Street Guelph, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**

A total of 325 members of the public signed the Visitor's Register at the five PIC venues (note: the Brampton venue was added for this round in order to ensure the draft Strategy was made available throughout the study area).

In addition to verbal comments, Study Team representatives encouraged visitors to submit written comments regarding the information presented. Comment sheets were available for members of the public to fill out at the PIC or to send in by the comment deadline (July 26, 2010) by e-mail, fax or mail to the Study Team.

At the PICs, 23 written comment sheets were collected. In addition, 25 comments were received via webform, e-mail, mail and the toll-free number/telephone by the comment deadline. The following is a breakdown of attendance and the number of comments submitted by PIC date/venue:

DATE / LOCATION	RECORDED ATTENDANCE	WRITTEN COMMENTS RECEIVED
June 14, 2010 Caledon	79	5
June 15, 2010 Woodbridge	30	2
June 16, 2010 Georgetown	128	10
June 22, 2010 Brampton	39	1
June 24, 2010 Guelph	49	5
Total Comment Forms Received at the PICs		**23**
Total Comment Forms / Comments received via fax, mail, e-mail, webform or the toll-free number		**25**
Total	**325**	**48**

A complete PIC #4 Consultation Record is available under separate cover, on the project website.

7.2.4. Newspaper Notifications

Newspaper notices announcing each round of PICs were published in 17 newspapers with circulation across the preliminary study area. The notices provided an update on the study's progress, notification of the dates and locations of the respective PICs, a key map for study context and contact information for key Study Team members. The notices were also placed on the study website. Copies of the newspaper notices are included in the corresponding PIC Consultation Record and each was published as outlined below. Notices announcing the second, third and fourth round of PICs were published in the following 17 newspapers. Notices announcing the fifth round of PICs were published in all of the below newspapers, except the Wellington Advisor and Halton Compass due to the papers ending print publishing. Reference to First Nations newspapers is also included in Section 7.6.

- Daily Newspapers:
  - Toronto Star; and
  - The Guelph Mercury.
- Tri-weekly Newspapers:
  - Mississauga News; and
  - Brampton Guardian.
- Bi-weekly Newspapers:
  - Caledon Enterprise;
  - Vaughan Citizen;
  - Guelph Tribune;
  - Georgetown Acton Independent; and
  - Milton – The Canadian Champion.
- Weekly Newspapers:
  - Caledon Citizen;
  - King Township Sentinel;
  - The Erin Advocate;
  - Le Metropolitain (French);
  - Turtle Island News;
  - Tekawennake New Credit Reporter;
  - The Halton Compass; and
  - Wellington Advertiser (changed to bi-weekly for PICs #3 and #4).

7.2.5. Community Advisory Group

To assist the Study Team as the study progressed, a Community Advisory Group (CAG) was formed to provide ongoing advice and relay valuable input on community perspectives. The CAG was comprised of 19 – 31 members of the community and organizations interested in or potentially affected by the project, including a range of residents and ratepayers with representation throughout the municipalities of the GTA West preliminary study area, environmental and conservation Non-Governmental Organizations (NGO's), business and agricultural sectors, and others. The CAG was formed with selection based on applications received during the preparation of the EA Terms of Reference and up to PIC #2 and through purposeful invitations sent to individual's representing issue areas.

A total of 7 CAG Meetings were held leading up to the release of the Draft Strategy Report (March 2011). These included:

- CAG #1 (June 3, 2008) - to review the purpose/role of the CAG, the group's operational procedures and Charter, introduce the EA study, and receive feedback on the goals, problems, and opportunities of the study;

- CAG #2 (December 4, 2008) - to discuss the specific types of transportation problems in the preliminary study area and review the Study Team's consultation approach for PIC #2;
- CAG #3 (February 5, 2009) - to further discuss the transportation problems in the preliminary study area and provide the opportunity for preliminary feedback and questions;
- CAG #4 (July 14, 2009) - to get feedback on the proposed process to generate and evaluate alternatives and input to the types of alternatives that should be considered;
- CAG #5 (November 5, 2009) - to receive feedback on the generated transportation system improvement alternatives, the preliminary high-level assessment conducted and to discuss the packaging of the material for the third round of consultation;
- CAG #6 (May 4, 2010) - to present and receive feedback on the preliminary planning alternatives [including initiatives to optimize the existing transportation network (Group #1) and introduce new/improved non-roadway infrastructure (Group #2)], the short-listed transportation alternatives [potential road widening's / improvements and new transportation corridors (Groups #3 and #4)], and the preliminary assessment of the short-listed alternatives; and
- CAG #7 (September 21, 2010) – to provide an update on the project's status and to present and receive feedback on the draft Transportation Development Strategy.

The summary notes from CAG Meetings #1 to #6 are included in the corresponding PIC Consultation Records. The summary notes from CAG Meeting #7 are included in the Supplemental Consultation Record. All consultation records are available on the project website.

Additional CAG meetings were held following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area. See Sections 7.7.2 and 7.8.2 for more details.

7.2.6. Summary of Public Comments Received

All comments received during the draft Transportation Development Strategy (March 2011) consultation were considered by the Study Team and aided in the development and refinement of the Strategy. Comments submitted to which a reply was requested, received a response from the Study Team. These comments and responses are available under separate cover. All personal information has been removed consistent with the Freedom of Information and Protection of Privacy Act.

In general, public stakeholders:

- Understood and agreed that significant transportation problems would occur in the area if the growth envisioned in the *Growth Plan* occurred;
- Understood and supported the 'building block' approach as they generally supported the concept of optimizing the existing network and improving non-roadway solutions prior to the consideration of building new roadway infrastructure;
- Recognized that optimizing the existing network and improving non-roadway solutions only could not fully address all the future transportation problems and some new roadway infrastructure was likely required;
- Supported the Province's commitment to public transit and a transit first approach and recognized the long timelines involved in planning new infrastructure;
- Some felt that the planning horizon (2031) was too short and the Province should be considering a timeframe beyond that time horizon. For this and / or other reasons (for example, improved economic links to the Guelph area), Alternatives 4-4 and 4-5 were favoured in some instances; and
- Supported the alternatives being carried forward for further consideration however,
  - Many wanted to know how specific route alternatives would impact their community, property and environment;
  - Concerns with Alternative 4-3 and its potential impact on the rural / agricultural communities in Halton Hills.

Notwithstanding the above and recognizing the widespread acknowledgement of the need to improve road capacity, there was some opposition to any new road infrastructure. This was typically predicated on concerns about impacts to either the natural or built environment.

The following table summarizes the key public and interest group comments raised from PICs #2 to #4. The comments have been summarized and organized by theme, with the corresponding response that was generally provided. Comments raised at PIC #5 are included in **Section 7.8.3**.

SUMMARY OF KEY PUBLIC AND INTEREST GROUP COMMENTS RAISED FROM PICS #2 TO #4		
THEME	**COMMENT**	**RESPONSE**
Preliminary Study Area	How were the preliminary study area boundaries determined?	The preliminary study area reflects the Purpose of the Study which is based on the transportation policy direction of the province's *Growth Plan for the Greater Golden Horseshoe* (2006). The *Growth Plan* identifies the need for better transportation linkages between some *Urban Growth Centres* including Brampton City Centre, Vaughan Metropolitan Centre, Downtown Milton and Downtown Guelph. The boundaries of the preliminary study area were developed to capture an area which included these *Urban Growth Centres.* The boundaries of the preliminary study area are approximate and subject to refinement as the EA study progresses.
Preliminary Study Area	Expand the preliminary study area boundary north to include Highway 9, to include additional communities/ roads.	The preliminary study area reflects the Purpose of the Study which is based on the transportation policy direction of the province's *Growth Plan for the Greater Golden Horseshoe* (2006). A corridor north of the existing preliminary study area boundary, in the vicinity of Highway 9, would be well removed from the transportation linkages currently envisaged in the *Growth Plan*. The travel demand analysis conducted by the Study Team has examined transportation linkages and gateways outside of the preliminary study area which have an influence on the travel demand and traffic patterns in the study area. As such, the inter-relationship between the traffic on Highway 9 and those in the preliminary study area has been examined.
Preliminary Study Area	Expand the preliminary study area east of Highway 400.	The purpose of the GTA West Corridor Environmental Assessment (EA) Study is to proactively plan for future infrastructure needs by examining long-term transportation problems and opportunities to the year 2031 and considering options to provide better linkages between Urban Growth Centres within the GTA West Corridor EA preliminary study area as identified in the *Growth Plan*, including Downtown Guelph, Downtown Milton, Brampton City Centre and Vaughan Metropolitan Centre. While the study modeling and forecasting work did include the transportation network on the east side of Highway 400, and the entire Greater Golden Horseshoe, corridor connections east of Highway 400 are outside of the scope of the current study. There are significant constraints east of Highway 400 due to concentrated development along the Yonge Street corridor and the presence of the Oak Ridges Moraine. The Ministry of Transportation (MTO) currently does not have plans to pursue a GTA East Study.
Preliminary Study Area	Expand the preliminary study area farther west to include Kitchener/Waterloo and Guelph.	The Study Team is considering the transportation linkages and gateways in areas both in and outside of the preliminary study area since both can have an influence on the travel demand and traffic patterns in the study area. Having received environmental approval for the Highway 7 Environmental Assessment, the Ministry of Transportation is now proceeding with the design for a new four-lane highway between Kitchener and Guelph. The GTA West Study has taken the approved Highway 7 project into account and has been examining alternatives that will provide better linkages between Urban Growth Centres in the preliminary study area, including Vaughan Metropolitan Centre, Brampton City Centre, Downtown Milton and Downtown Guelph. The proposed improvements to Highway 7 between Kitchener and Guelph will address future travel demands and improve the linkage between Guelph and Kitchener-Waterloo.
Preliminary Study Area / Study Process	When will the preliminary study area be refined? When will the new transportation corridor mapping be narrowed and a specific route selected?	This will be done as the study progresses. The first step will be to establish a Preliminary Route Planning Study Area for Stage 2 – Route Planning and Preliminary Design. This will be done to identify an area where a reasonable range of alternatives could be generated and evaluated. This study area will vary in width depending on local conditions. In some areas it could be as wide as 7-8 km. In other areas it could be as narrow as 1 km. Once this area is established, specific route alternatives can be generated and evaluated. The bulk of this work will occur as part of Stage 2 of the EA after the recommended Transportation Development Strategy is finalized. This Transportation Development Strategy Report will be made available for stakeholder review in late 2010.
Timeframe	This Study should be completed as soon as possible. Transportation solutions are needed now to address transportation problems currently being experienced.	The Ministry of Transportation is committed to undertaking the Study in a timely manner while meeting the requirements of the Ontario *Environmental Assessment Act*. This includes providing opportunities for public consultation throughout the process.
Travel Demand Analysis	Incorporate the recent economic recession and peak oil into the Study data and modelling.	The travel demand analysis completed by the Study Team has incorporated the prospect of economic fluctuations, including higher fuel prices. These fluctuations are difficult to estimate for future timeframes and their impact to travel are likewise difficult to estimate. Our specialist team includes economic experts and their resources will be called upon throughout the Study.
Travel Demand Analysis	Display congestion levels, goods movement and commuter patterns for areas outside of the preliminary study area.	Due to the size of the preliminary study area (it encompasses 3 Regional Municipalities and 1 County) the Study Team chose to concentrate on the data within the study area. The Study Team is considering the transportation linkages and gateways outside of the preliminary study area since they can have an influence on the travel demand and traffic patterns in the study area.
Alternatives	Prefer a rail / transit / transportation demand management solution.	The Study Team used a building-block approach when developing the various alternatives which considered optimizing the existing transportation network and new / expanded non-road infrastructure (such as public transit and rail) prior to the consideration of widening / improving / building new road infrastructure. This approach gives full consideration to those transportation improvement techniques that have the least physical impact (optimization and new / expanded non-road infrastructure) and then, if future needs aren't entirely met, considers further techniques where more infrastructure would be required (widening / improving / building new road infrastructure). With full use of optimization techniques and new / expanded non-road infrastructure initiatives in the preliminary study area in addition to the Metrolinx Regional Transportation Plan and *GO 2020* Strategic Plan, a further 4% reduction in auto demand could be achieved along with a 10% reduction in longer distance truck demand. Road widening (Group# 3) and new corridor (Group #4) Alternatives were thus still found to be required in order to address the remaining 2031 future capacity needs in the study area. The Province is currently planning many transit initiatives in the preliminary study area that were recommended by GO Transit as a part of the GO 2020 Strategic Plan and by Metrolinx as a part of the Regional Transportation Plan. All of the transit improvements recommended by GO Transit and Metrolinx have been incorporated as a part of the base network for this Study. More details on these improvements can be viewed on the GO Transit website at www.gotransit.com or Metrolinx Regional Transportation Plan at www.metrolinx.com/thebigmove. The draft Transportation Development Strategy has identified ways to improve freight movement by rail, through supporting the following actions: Removal of constraints to improve freight and passenger rail operations and increase utilization; Coordinate with CN Rail, CP Rail and Metrolinx to identify freight rail / passenger rail conflict points; Support potential future initiatives to remove freight rail / passenger rail conflicts; Provide grade separations at key road / rail crossings; and Support the Ontario-Quebec Continental Gateway strategy.
Alternatives	Prefer solutions that encourage active transportation (cycling and pedestrian travel).	The Study Team has examined Transportation Demand Management (TDM) alternatives to shift demand from the existing transportation network to alternative modes of transportation, principally transit, cycling and walking. Active transportation is an integral part of the Metrolinx Regional Transportation Plan. More details on the Metrolinx Regional Transportation Plan can be viewed at www.metrolinx.com/thebigmove.

SUMMARY OF KEY PUBLIC AND INTEREST GROUP COMMENTS RAISED FROM PICS #2 TO #4		
THEME	**COMMENT**	**RESPONSE**
Alternatives	Consider dedicated truck lanes.	Some very preliminary analysis was carried out in assessing the benefit of utilizing the new transportation corridor as a truck only route. This will be carried forward for further consideration and analysis during Stage 2 of the EA Study
Alternatives	Consider dedicated High Occupancy Vehicle (HOV) lanes and bus lanes.	The Ministry of Transportation has developed a plan for adding HOV lanes to the 400-series highways in the Greater Golden Horseshoe over the next 25 years. It is a plan for building an HOV network that allows for more efficient travel for all vehicles on some of the most heavily used and congested highways in our major urban areas. There is potential for over 450 kilometres of new HOV lanes to be created. More details of the Ministry's HOV Plan can be obtained by visiting the website at: http://www.mto.gov.on.ca/english/traveller/hov/plan2007.shtml#figure3 In addition, bus lanes and other dedicated bus facilities are either now in service or are in the planning stages for several provincial and municipal services. Both of these techniques are expected to provide better use of existing and future transportation infrastructure.
Alternatives	Consider transit corridor allowances along any new highways.	The Ministry of Transportation will consider the implementation of higher order transit along any new transportation corridor.
Alternatives	Consider transportation solutions that have been implemented in other Provinces or internationally to ensure all reasonable and innovative transportation solutions are examined.	The Study Team has considered relevant transportation studies and how other jurisdictions deal with transportation issues, including current transportation planning occurring out-of-province and internationally. Our Study Team includes an extensive group of specialists that are familiar with similar initiatives elsewhere in the world.
Alternatives	Concern regarding the location of the Group #4 Alternatives.	The representative Group 4 (New Transportation Corridors) alternatives shown are intended to illustrate possible end points and potential connections to the transportation network. Specific route locations/alignments of these illustrative alternatives, the detailed effects (advantages and disadvantages), as well as the selection of the Preferred Alternative(s) will be examined in more detail in subsequent steps of the EA Process.
Alternatives	Why were Alternatives 4-4 and 4-5 not carried forward? A new corridor to Guelph through the Niagara Escarpment would be beneficial.	Upon evaluation and analysis, Alternatives 4-2 and 4-3 were found to provide better overall benefits and less impact when compared to the other alternatives, and were therefore recommended as part of the draft Transportation Development Strategy. Alternatives 4-2 or 4-3 have both been found to be able to address the transportation demands west of Milton through widening of Highway 401, while avoiding the significant effects and costs associated with impacts to agricultural lands, cultural features, and crossing the Niagara Escarpment, Greenbelt and other environmentally sensitive features. *(Note: subsequently, additional analysis was carried out for Alternatives 4-2 and 4-3; see **Chapter 5**.)*
Alternatives	Why were the widening alternatives not carried forward? They won't have as big an impact on the natural environment as a new corridor.	The Study Team considered road widening (Group #3) and new corridor (Group #4) Alternatives. Upon analysis and evaluation using factors and criteria relating to the natural environment, social environment, cultural environment, economy, transportation, as well as cost and constructability, Alternative 3-1 was found to be least preferred when compared to the Group #4 new corridor alternatives. Widening existing highways was found to be more costly to construct, would have severe constructability issues, a severe negative impact on the 407 Transitway, and would result in local community and economic impacts associated with major traffic disruption and delay during construction. Alternative 3-1 also did not address the operational issues within the preliminary study area. We do acknowledge that the Group #4 Alternatives have higher natural environment effects than the Group #3 Alternatives. That has been recognized and considered in the evaluation. Alternative 3-1 was identified as most preferred from a Natural Environment and Cultural perspective and similar to some of the Group #4 Alternatives from an economic perspective. However, Alternative 3-1 has higher Land Use / Social impacts, does not perform as well from a transportation perspective and has some significant constructability challenges. Given these issues, Alternative 3-1 was not carried forward for further consideration. More detailed information on the evaluation of alternatives and rationale for the preferred alternatives (as presented at PIC #4) is available in Chapter 3 of this report.
Alternatives	A corridor connection between Highway 400 and Highway 427 passes almost entirely through lands designated as Greenbelt and encompasses environmentally significant areas.	Forecasts for the GTA West preliminary study area show substantial growth to 2031: population and employment are expected to more than double between 2001 and 2031, including growth of more than 1 million people and more than 450,000 jobs. As a result of this population and employment growth, 2031 travel demand is expected to increase and will be accommodated through the several means of transportation improvements that are proposed, including new highways. It has been demonstrated that even with a multi-modal solution to providing for future travel demands, this projected rise in traffic volumes is anticipated to be accompanied by worsening congestion and travel conditions during peak periods and throughout the day, particularly on Highways 401, 400, 427 and 410. 407 ETR is also anticipated to operate with major congestion between Highways 400 and 427. This future roadway congestion is expected even with the significant investment in transit recommended in the Metrolinx Regional Transportation Plan, highway improvements already planned by MTO and area municipalities, and the Group 1 and Group 2 initiatives recommended in the draft Transportation Development Strategy developed by the Study Team. Without additional highway improvements to compliment the investment in transit infrastructure, the projected increase in congestion on the highways in the study area is forecast to: impact commuter travel resulting in increased travel times between Urban Growth Centres in the study area (i.e. +15% - Vaughan to Milton, +20% Brampton to Vaughan, +35% Milton to Vaughan, and +40% Guelph to Vaughan); impact tourist travel with Highway 401, through Mississauga, representing a key bottleneck between Southwestern Ontario and the Niagara area and Eastern Ontario, Toronto, and cottage country to the north of the GTA; and increase travel delays and unpredictability in travel times for goods movement into and through the GTA, which will have negative impacts on the competitiveness of the GTA and the broader Southern Ontario region and limit the ability to retain and attract new industry that depends on access to major highways, ports and rail terminals. The major highways in York and Peel Regions, for example, are all forecast to be operating over capacity by 2031 even with the significant investments in transit noted above. Highways 401, 400, 427 and 410 were all identified as needing additional capacity to accommodate the project growth in these communities, with or without the proposed GTA West corridor. Impacts related to inter-regional traffic (autos and trucks) using municipal roads are also forecast to increase significantly by 2031, and many stakeholders noted that this trend is already beginning to cause problems in many communities. Much of the diversion in longer distance trips to municipal roads within the GTA West study area can be traced back to recurring congestion on Highway 401, including congestion at the Highway 401/400 interchange. Given these problems, the Study Team fully examined a number of alternatives, including modal alternatives and road widening alternatives, prior to recommending new corridor infrastructure.

SUMMARY OF KEY PUBLIC AND INTEREST GROUP COMMENTS RAISED FROM PICS #2 TO #4		
THEME	**COMMENT**	**RESPONSE**
Environmental Effects	Generally concerned about environmental effects.	The GTA West Study is an environmental planning process, required by law, to ensure the Ministry of Transportation (MTO) examines alternative ways of addressing transportation problems and opportunities in selecting a preferred alternative. When considering alternatives, MTO is required to consider the advantages and disadvantages of the various alternatives on the natural, socio-economic and cultural environments. The evaluation process was designed to select an alternative that avoids, minimizes or prevents adverse effects to significant environmental features, including land use, natural, socio-economic and cultural features, to the extent possible. The Study Team has compiled a *Draft Overview of Environmental Conditions and Constraints Report (July 2008)* which documents the existing environmental conditions and constraints within the preliminary study area. As the EA Study progresses more detailed environmental investigations will be undertaken. The *Draft Overview of Environmental Conditions and Constraints Report* is available on the study website at www.gta-west.com.
Environmental Effects	Protect the Greenbelt, the Oak Ridges Moraine, Niagara Escarpment and other conservation areas.	The EA process being followed by the GTA West Study Team is designed to carefully consider potential impacts to environmental features including the Niagara Escarpment, Greenbelt, Oak Ridges Moraine and other conservation areas during the generation and evaluation of alternatives. The results of the evaluation determined that while Alternatives 4-2 and 4-3 will result in new footprint impacts to some previously undisturbed areas, these alternatives have fewer impacts to sensitive designated lands and their impacts are considered relatively moderate and mitigable (particularly when compared to Alternatives 4-4 and 4-5 which result in a new escarpment crossing and significant encroachment into the Greenbelt). Impacts to natural areas will be minimized where possible during generation / evaluation of route planning alternatives in the next stage of the EA. The next EA study stage will also be supported by environmental field work that will include identifying locations of the most sensitive features within these designated areas. *(Note: subsequently, additional analysis was carried out for Alternatives 4-2 and 4-3; see **Chapter 5**.)*
Environmental Effects	Concern about increased development pressure along any new corridor located in Greenbelt lands.	If a new corridor is located within the Greenbelt, limited highway access and proper land use policies can discourage development pressure for lands adjacent to the new corridor.
Environmental Effects	Protect natural recreation areas (i.e. The Bruce Trail, rural hiking trails)	The Study Team has compiled a *Draft Overview of Environmental Conditions and Constraints Report (July 2008)* which documents the existing environmental constraints within the preliminary study area, including a recreation and trail map (Exhibit 4-7). The *Draft Overview of Environmental Conditions and Constraints Report* is available on the study website at www.gta-west.com. As we move forward in the study we will begin gathering further detailed information on trail networks within the study area. This information will be used primarily in Stage 2 of the EA (Route Location) when the preferred alignment and right-of-way requirement for a new corridor will be determined. At that stage the Study Team will consider all trails and will develop mitigation measures to ensure trail connectivity, if impacts are anticipated.
Environmental Effects	Protect agricultural lands and the interests of farmers and rural landowners.	The study maintains as an underlying principle to protect prime agricultural lands to the extent possible which is consistent with the provincial policy direction in the *Growth Plan (2006)* and *Greenbelt Plan (2005)*. Each of the road widening and new corridor alternatives were assessed based on a number of evaluation criteria, such as natural environment (including agriculture and rural land use), social environment, cultural environment, economic, transportation performance and cost and constructability. Alternatives 4-2 and 4-3 were found to provide better overall benefits and less impact as compared to the other alternatives, and were, therefore recommended to be carried forward for additional analysis. *(Note: subsequently, additional analysis was carried out for Alternatives 4-2 and 4-3; see **Chapter 5**.)* The additional analysis of these options will allow us to look more closely at the specific potential effects associated with these two options including specific effects to land-use, the agricultural community and natural environment in order to make a more informed decision.
Environmental Effects	Concerns regarding the effects of increased idling and traffic on air quality.	As the study progresses, specific measures of the effects on air quality will be developed. Stage 1 of the EA Study included an assessment of regional air quality including an examination of greenhouse gas emissions associate with the various alternatives. More detailed air quality modeling will be undertaken during Stage 2 of the EA Study.
Provincial Transportation Planning	The Province's transportation planning efforts should be coordinated.	While the GTA West Corridor EA Study is primarily examining east-west travel in the Greater Golden Horseshoe (GGH), the transportation demand forecasting for the study has been based on the entire transportation network in the GGH. Therefore, future travel to and from cities/communities outside the preliminary study area, such as Peterborough and Fort Erie US, has been accounted for. In addition, the analysis and findings from other Ministry of Transportation studies, such as the Niagara to GTA Corridor, 427 Corridor Extension, Highway 407 East Extension Corridor and municipal transportation studies, has been considered and coordinated throughout the GTA West EA Study.
Corridor Protection	What is the purpose of the Areas of Interest?	It has been recognized that the fast-paced land development in certain areas within the preliminary study area may significantly reduce the amount of opportunities available for new transportation corridors. The Ministry of Transportation (MTO) has been working with the Ministry of Municipal Affairs and Housing (MMAH), the Ministry of Energy and Ministry of Infrastructure (formerly Ministry of Energy and Infrastructure (MEI)) and municipalities to explore strategies to retain corridor opportunities while the EA Study is still underway. This work has led to the identification of strategic and critical locations that are under development pressure - called "Areas of Interest". The identification of the "Areas of Interest" will guide the Province and municipalities in monitoring and reviewing development activities in the preliminary study area.
Growth Plan	General doubt about the predicted growth figures in the Growth Plan.	The Greater Golden Horseshoe is one of the fastest growing regions in North America. The *Growth Plan* is a 25-year plan that sets out a vision and strategic policy direction for managing growth in the Greater Golden Horseshoe. The population and employment projections and distributions that have been developed by the Study Team are consistent with the policy objectives of the *Growth Plan* and have been developed in consultation with the Ministry of Energy and Ministry of Infrastructure (formerly Ministry of Public Infrastructure and Renewal), Ministry of Municipal Affairs and Housing and the municipalities within the preliminary study area.
Growth Plan	The planning horizon of 2031 is too short of a planning timeframe.	The Study Team recognizes the challenge to balance the need for planning for longer terms and the need to have reliable forecast information regarding growth patterns. It is particularly important to strike the right balance in order to make informed decisions when planning for major infrastructures. The planning horizon and the growth level in the GTA West Corridor Study are consistent with the *Growth Plan* which provides the growth targets and the associated growth management policies for the year 2031.
Growth Plan	Discourage the propagation of urban sprawl.	This study was initiated to support the policy directions of the Province's *Growth Plan for the Greater Golden Horseshoe (2006)*, which was designed specifically to direct growth to built-up areas, where the capacity exists to accommodate the expected population and employment growth. Subsequently, the focus of this EA study has been to provide better transportation linkages between Urban Growth Centres in the GTA West Corridor preliminary study area identified in the *Growth Plan* (including Downtown Guelph, Downtown Milton, Brampton City Centre and Vaughan Metropolitan Centre) through an integrated system of transportation modes characterized by efficient public transit, a highway system for moving people and goods with good access to intermodal facilities, airports and transit hubs.
Growth Plan	Concern about the rate of growth in Southern Ontario.	A planning vision for the Greater Golden Horseshoe Region to 2031 has been outlined in the *Growth Plan for the Greater Golden Horseshoe (2006)*. Among other policy directions, the *Growth Plan* identifies the need to plan for infrastructure to support growth and for better transportation linkages between Urban Growth Centres. Within the GTA West Corridor study area, these Urban Growth Centres include Brampton City Centre, Vaughan Metropolitan Centre, Downtown Milton, and Downtown Guelph. We encourage you to review the *Growth Plan*. A copy can be found at www.placestogrow.ca.

7.2.7. Media

Through the duration of the project, media (newspapers / online blogs) in the preliminary study area have been reporting on the project's progress. Media outlets also attended select Public Information Centre's. For a sample of articles written on the project, refer to the Supplemental Consultation Record.

7.3. MUNICIPAL CONSULTATION

7.3.1. Municipal Advisory Group

A Municipal Advisory Group (MAG) was formed during the Study's commencement and included representatives from upper and lower tier municipalities in the preliminary study area. The MAG provided input from a municipal and regional perspective.

A pre-study meeting was held on January 12, 2006, ahead of study initiation, and the first MAG meeting was held on March 6, 2007. Both of these meetings were held prior to ToR approval. An additional four meetings were held leading up to the release of the Draft Strategy Report (March 2011). These included:

- MAG #2 (February 3, 2009) - to discuss transportation problems and opportunities in the preliminary study area. The meeting provided the opportunity for preliminary feedback and questions on the problems and opportunities material;
- MAG #3 (June 24, 2009) - to get feedback on the proposed process to generate and evaluate alternatives and acquire input to the types of alternatives that should be considered;
- MAG #4 (November 3, 2009) - to receive feedback on the generated alternatives and the assessment process used; and
- MAG #5 (May 11, 2010) - to present and receive feedback on the preliminary planning alternatives [including initiatives to optimize the existing transportation network (Group #1) and introduce new/improved non-roadway infrastructure (Group #2)], the short-listed transportation alternatives [potential road widening's / improvements and new transportation corridors (Groups #3 and #4)], and the preliminary assessment of the short-listed alternatives.

The summary notes from MAG meetings #2 to #5 are provided in the corresponding PIC Consultation Records.

Additional MAG meetings were held following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area (MAG #6 and 7). See **Sections 7.7.2** and **7.8.2** for more details on these.

7.3.2. Individual Technical Meetings

In addition to MAG meetings, the Study Team held individual technical meetings with the upper- and lower-tier municipalities in the preliminary study area as needed / requested. The following is a list of those meetings, the date they were held and their overall purpose:

The summary notes from these meetings are included in the Supplemental Consultation Record.

Additional technical meetings were held following the release of the Draft Strategy Report (February 2011) as part of the consultation undertaken for the additional analysis in the Halton Area and as part of the consultation for refinements to the Preliminary Route Planning Study Area. See **Sections 7.7.2 , 7.8.2** and **7.9** for more details.

DATE	MEETING	PURPOSE
March 18, 2008	Town of Caledon Council Workshop	Updated Council on the study's progress since the approval of the ToR, reviewed the purpose of study and addressed questions.
April 11, 2008	Corridor Protection Meeting with Municipalities, MAH, PIR	Provided an update on the study's progress, discussed corridor protection issues and addressed questions.
May 16, 2008	Town of Caledon Council/Staff	Provided an update on the study's progress and answered questions.
February 23, 2009	Municipal Workshop – Halton Region	To discuss corridor protection issues, review areas of interest identified by the Study Team, discuss opportunities to refine these areas and identify any additional areas known by municipalities.
February 24, 2009	Municipal Workshop – Peel Region	
February 24, 2009	Municipal Workshop – York Region	To discuss corridor protection issues, review areas of interest identified by the Study Team, discuss opportunities to refine these areas and identify any additional areas known by municipalities.
March 2, 2009	Municipal Workshop – Guelph/Wellington	
April 24, 2009	Town of Halton Hills Council Workshop	Discussed corridor protection and development issues related to the areas of interest identified by the Study Team.
June 8, 2009	City of Vaughan Planning Department	Discussed development activity and municipal planning studies and the need to consult regarding potential corridor protection.
June 9, 2009	Township of King Planning Department	Discussed development activity and municipal planning studies.
June 25, 2009	Town of Caledon	Discussed development activity and municipal planning studies and the need to consult regarding potential corridor protection.
July 3, 2009	City of Brampton Planning Department	Discussed development activity and municipal planning studies and the need to consult regarding potential corridor protection.
July 3, 2009	Town of Halton Hills Planning Department	Discussed development activity and municipal planning studies and the need to consult regarding potential corridor protection.
October 13, 2009	Halton Transportation Advisory Committee	Presentation and discussion on the Draft Area Transportation System Problems and Opportunities Report
May 25, 2010	Halton Transportation Advisory Committee	Presentation and discussion on the Draft Area Transportation Systems Alternatives Report
June 14, 2010	Town of Milton Staff	Follow-up meeting to MAG #5 to present and receive feedback on preliminary planning alternatives.
September 7, 2010	Municipal Workshop – York Region	To discuss and obtain input on the draft route planning study area limits for new transportation corridor alternative(s) that would be carried forward into the next stage of the EA.
September 9, 2010	Municipal Workshop – Halton Region	
September 10, 2010	City of Guelph Staff	To provide an update on the progress of the GTA West Strategy and summarize the City of Guelph's Transit Growth Strategy and Plan.
September 13, 2010	Municipal Workshop – Peel Region	To discuss and obtain input on the draft route planning study area limits for new transportation corridor alternative(s) that would be carried forward into the next stage of the EA.

7.3.3. Council / Committee Presentations

The Study Team was received as delegations at upper-tier municipal councils and committees at the time of each round of Public Information Centres to provide updates on the progress of the Study. The consultation program was flexible to accommodate requests for additional presentations (e.g. provide presentation to local municipalities if requested and as possible). The summary notes from these meetings are included in the corresponding PIC Consultation Records. Presentations were also recorded in the municipal minutes of meeting as adopted. The presentations associated with PICs #2 – 4 were held as follows:

PRIOR TO / DURING PIC #2

- Halton Region – Planning and Public Works Committee February 4, 2009
- Peel Region – General Committee February 5, 2009
- County of Wellington Council* February 26, 2009
- York Region – Planning and Economic Development Committee March 4, 2009

*The City of Guelph as well as lower-tier municipalities in the County of Wellington were invited to attend the Wellington Council presentation.

PRIOR TO / DURING PIC #3

- Halton Region – Planning and Public Works Committee (joint presentation with NGTA Study Team) November 12, 2009
- Town of Caledon – Council November 17, 2009
- County of Wellington Council* November 23, 2009
- Peel Region – General Committee December 3, 2009
- City of Brampton – Council January 27, 2010

*As above.

By request of the Commissioner of Transportation and Works and through the Manager of Transportation Planning, the GTA West Study Team delegation scheduled for December 2, 2009 at the York Region Planning and Economic Development Committee was cancelled. The material that was to be presented was forwarded to the Regional Clerk on November 24, 2009 for distribution to Committee members.

PRIOR TO / DURING PIC #4

- Halton Region – Planning and Public Works Committee (joint presentation with NGTA Study Team) June 16, 2010
- York Region – Planning and Economic Development CommitteeJune 16, 2010
- Peel Region – General Committee June 17, 2010
- City of Brampton – Planning and Development CommitteeJune 21, 2010
- Town of Caledon – Council June 22, 2010
- County of Wellington Council* June 24, 2010

*As above

Additional council / committee presentations were made following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area (PIC #5). See **Sections 7.7.2** and **7.8.2** for more details.

7.3.4. Summary of Municipal Comments Received

All correspondence with Municipal Stakeholders is included in the Supplemental Consultation Record.

The following summarizes key municipal comments, which are largely consistent with the public input noted in **Section 7.2.6**:

- Understood and agreed that significant transportation problems would occur in the area if the growth envisioned in the *Growth Plan* occurred;
- Understood and supported the 'building block' approach as they generally supported the concept of optimizing the existing network and improving non-roadway solutions prior to the consideration of building new roadway infrastructure;
- Recognized that optimizing the existing network and improving non-roadway solutions only could not fully address all the future transportation problems and some new roadway infrastructure was likely required;
- Supported the Province's commitment to public transit and a transit first approach and recognized the long timelines involved in planning new infrastructure;
- Concerned about the timelines required to plan and construct new infrastructure and were concerned about the impact this could have on land development applications;
- Some felt that the planning horizon (2031) was too short and the Province should be considering a timeframe beyond that time horizon. For this and/or other reasons (for example, improved economic links to the Guelph area), Alternatives 4-4 and 4-5 were favoured in some instances; and,
- Supported the alternatives being carried forward for further consideration however,
  - Some (specifically the Town of Halton Hills) were concerned about the benefits of Alternative 4-3 in relation to 4-2; it was felt that Alternative 4-3 would have significantly higher social and agricultural impacts than 4-2; and,
  - Wanted to know how specific route alternatives would impact their communities.

7.4. REGULATORY AGENCY CONSULTATION

7.4.1. Regulatory Agency Advisory Group

A Regulatory Agency Advisory Group (RAAG) was formed during the Study's commencement and includes potentially affected provincial ministries, agencies (including Conservation Authorities), and federal departments.

The first RAAG meeting was held on March 9, 2007 during the ToR round of consultation. An additional four meetings were held leading up to the release of the Draft Strategy Report (February 2011). These included:

- RAAG #2 (February 12, 2009) - to discuss transportation problems and opportunities in the preliminary study area. The meeting provided the opportunity for preliminary feedback and questions on the problems and opportunities material;
- RAAG #3 (June 19, 2009) - to get feedback on the proposed

process to generate and evaluate alternatives and acquire input to the types of alternatives that should be considered. This meeting was held as a joint meeting with the Niagara to GTA Corridor Environmental Assessment team;

- RAAG #4 (November 10, 2009) - to receive feedback on the generated alternatives and the assessment process used; and
- RAAG #5 (May 7, 2010) - to present and receive feedback on the preliminary planning alternatives [including initiatives to optimize the existing transportation network (Group #1) and introduce new / improved non-roadway infrastructure (Group #2)], the short-listed transportation alternatives [potential road widening's / improvements and new transportation corridors (Groups #3 and #4)], and the preliminary assessment of the short-listed alternatives. This meeting was held as a joint meeting with the Niagara to GTA Corridor Environmental Assessment team.

The summary notes from RAAG meetings #2 to #5, held during the draft Transportation Development Strategy consultation, are provided in the corresponding PIC Consultation Records.

Additional RAAG meetings were held following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area (RAAG #6 and #7). See **Sections 7.7.2** and **7.8.2** for more details.

7.4.2. Other Agency Meetings

In addition to RAAG meetings, the Study Team held individual technical meetings with agencies in the preliminary study area as needed/requested. The following is a list of these meetings, the date they were held and their overall purpose:

DATE	MEETING	PURPOSE
December 15, 2008	Ontario Chamber of Commerce	To discuss the identification of problems and opportunities within the preliminary study area.
May 19, 2009	Conservation Authority Workshop – Conservation Halton/Niagara Escarpment Commission (NEC)	To discuss current Conservation Authority/NEC studies and the sensitive environmental features within the preliminary study area.
May 20, 2009	Conservation Authority Workshop – Toronto and Region Conservation Authority	
May 20, 2009	Conservation Authority Workshop – Credit Valley Conservation	
May 26, 2009	Conservation Authority Workshop – Grand River Conservation Authority	
September 25, 2009	GTA West and Niagara to GTA Provincial Agency Workshop	Workshop to update agency members on the work completed for NGTA and GTA West and to engage agency members in a discussion to encourage the members to provide comments and / or potential policy issues with the preliminary alternatives.
September 28, 2009	Ontario Growth Secretariat	Reviewed purpose of study and addressed questions.
November 16, 2009	Meeting with Greenbelt Council	Reviewed how *Greenbelt Plan* policies will be addressed.
January 21, 2010	Niagara Escarpment Commission, Board Meeting	Joint Niagara to GTA and GTA West presentation providing a study progress update.
February 9, 2010	Ontario Power Authority / Hydro One	To discuss coordination opportunities between the GTA West Study and prospective Hydro Corridor study.
February 24, 2010	Ontario Power Authority / Hydro One	To further discuss coordination opportunities between the GTA West Study and prospective Hydro Corridor study.
April 22, 2010	GTA West and Niagara to GTA Inter-Governmental Provincial Agency Workshop (MTO, MEI, MAH, GO Transit, Metrolinx)	Purpose of the workshop is to present preliminary planning alternatives, preliminary assessment of the alternatives developed, discuss potential implementation responsibilities and conformity with existing provincial policies/ regulations and coordination with other related provincial initiatives.
June 10, 2010	407 ETR	To present and receive feedback on preliminary planning alternatives.
June 17, 2010	Niagara Escarpment Commission	Provided a study progress update and addressed questions.
July 29, 2010	Joint GTA West / NGTA meeting with Southern Ontario Gateway Council (SOGC)	To discuss the draft Transportation Development Strategies.
September 10, 2010	Joint GTA West / NGTA meeting with Greenbelt Council	To present the draft Transportation Development Strategies.
September 16, 2010	Conservation Halton	To provide a study progress update, discuss sensitive environmental features within the preliminary study area and address questions.
September 20, 2010	Ministry of the Environment (MOE) – Environmental Assessment Approvals Branch (EAAB)	To provide a study update, overview of recommendations, the process followed and compliance with the Terms of Reference, and review key comments / issues and First Nations consultation held to date.
September 24, 2010	Ontario Power Authority / Hydro One	To further discuss coordination opportunities between the GTA West Study and prospective Hydro Corridor study as per the issued agenda.
October 5, 2010	Joint GTA West / NGTA meeting with Ontario Chamber of Commerce	To discuss the draft Transportation Development Strategies.
October 13, 2010	Joint GTA West / NGTA meeting with 407 ETR	To discuss the draft Transportation Development Strategies.
November 30, 2010	Ontario Power Authority / Hydro One	To further discuss coordination opportunities between the GTA West Study and prospective Hydro Corridor study.

The summary notes from these meetings are included in the Supplemental Consultation Record.

Additional agency meetings were held following the release of the Draft Strategy Report (February 2011) and as part of the consultation undertaken for the additional analysis in the Halton Area. See **Sections 7.7.2** and **7.8.2** for more details on these.

7.4.3. Summary of Agency Comments Received

All correspondence with Agency Stakeholders is included in the Supplemental Consultation Record.

The following summarizes key agency comments prior to the release of the draft Strategy:

- Understood and agreed that significant transportation problems would occur in the area if the growth envisioned in the *Growth Plan* occurred;
- Understood and supported the 'building block' approach as they generally supported the concept of optimizing the existing network and improving non-roadway solutions prior to the consideration of building new roadway infrastructure;
- Recognized that optimizing the existing network and improving non-roadway solutions only could not fully address all the future transportation problems and some new roadway infrastructure was likely required;
- Supported the Province's commitment to public transit and a transit first approach and recognized the long timelines involved in planning new infrastructure;
- Concerned about natural environment impacts;
- Supported the alternatives being carried forward for further consideration however,
  - Wanted to know how specific route alternatives would impact their mandates/jurisdictions; and,
  - Liked that a new crossing of the Niagara Escarpment was avoided.

7.5. TRANSPORTATION SERVICE PROVIDERS AND BUSINESS AND COMMERCIAL STAKEHOLDERS CONSULTATION

In April - August 2008, the Study Team consulted with Transportation Service Providers (TSP) and Business and Commercial Stakeholders (BCS) in order to better understand people and goods movement within the preliminary study area and to obtain relevant information about their transportation requirements. TSP and BCS stakeholders were consulted via letter / e-questionnaire, face-to-face interviews and/or through one-on-one phone interviews.

A copy of the Business and Commercial Stakeholders & Transportation Service Providers Problems and Opportunities Consultation Summary Report has been compiled under separate cover.

An additional TSP / BCS meeting was held following the release of the Draft Strategy Report (February 2011). See **Section 7.7.2** for more details.

7.5.1. Individual Technical Meetings

In addition to the TSP/BCS consultation, the Study Team held individual technical meetings with transportation service providers and business and commercial stakeholders in the preliminary study area as needed/requested. The following is a list of these meetings, the date they were held and their overall purpose to the release of the draft Strategy:

DATE	MEETING	PURPOSE
October 21, 2008	GO Transit	Reviewed the study purpose and transportation forecasting approach.
July 27, 2009	407 ETR	Discussion of the projects in relation to the 407 ETR.
October 14, 2009	Metrolinx/ GO Transit	To provide a study update and present and seek feedback on the group alternatives that had been generated.
February 19, 2010	Metrolinx/ GO Transit/ Smart Commute	Joint meeting with Metrolinx, GO Transit and Smart Commute to Discuss Transportation Demand Management (TDM) and transit concepts.

The summary notes from those meetings are included in the Supplemental Consultation Record.

7.6. FIRST NATIONS

During the development of the draft Terms of Reference, MTO identified First Nations that may have an interest in the preliminary study area. Based on this review MTO initiated contact with four First Nations groups including: the Six Nations of the Grand River Territory Elected Council; the Six Nations of the Grand River Confederacy Council (the Haudenosaunee Confederacy Council); the Mississaugas of the New Credit First Nation; and the Kawartha Nishnawbe First Nation.

Following the approval of the EA Terms of Reference, MTO continued to engage these First Nations groups.

The early focus of consultation with the identified First Nations assisted the Study Team with the collection of data on the location and understanding of treaty rights and traditional land uses, as well as other aspects that may be of interest to these First Nations groups.

Consultation held prior to / during PIC #2

Letters were sent by MTO to the four First Nations groups on February 4, 2009 inviting them to attend PIC #2 in order to review and comment on the materials presented. Notice of PIC #2 was also advertised in the following weekly newspapers:

- Turtle Island News
- Tekawennake New Credit Reporter

In addition to inviting the First Nations community members to PIC #2, MTO offered to present the information to First Nations communities and / or their Councils.

Consultation held prior to / during PIC #3

A meeting was held with the Mississaugas of the New Credit First Nation on October 28, 2009 in order to provide a study progress update, present and seek feedback on the process framework for developing & assessing transportation alternatives and to present and seek feedback on the group alternatives that had been generated.

The Study Team also offered the opportunity to meet with First Nation communities potentially affected by the project at their request at any point in the study process.

Letters were sent by MTO to the four First Nations groups on November 9, 2009 inviting them to attend PIC #3 in order to review and comment on the materials presented.

Notice of PIC #3 was also advertised in the above mentioned weekly newspapers.

Consultation held prior to / during PIC #4

A meeting was held with the Six Nations of the Grand River on April 10, 2010 to provide them with an update on study progress and discuss the draft framework of the First Nations Existing Conditions Report.

The Study Team also offered the opportunity to meet with the other First Nations communities potentially affected by the project at their request.

Letters were sent by MTO to the four First Nations groups on April 21, 2010 informing them of the release of the draft Area Transportation Systems Report.

Letters were also sent by MTO to the four First Nations groups on May 26, 2010 inviting them to attend PIC #4 in order to review and comment on the materials presented.

Notice of PIC #4 was also advertised in the above mentioned weekly newspapers.

All correspondence with First Nations is included in the corresponding PIC consultation record.

A First Nations communications binder has also been assembled which includes the First Nations consultation plan, meeting minutes, record of contact with agencies, and communication logs for each First Nation. The binder is constantly updated.

On September 20, 2010, the Study Team was invited to present the draft Transportation Development Strategy to the Mississaugas of the New Credit Chief and Council. MTO also offered the same opportunity to the Six Nations of the Grand River Territory and to the Haudenasaunee Confederacy Council.

Study Team members and consultants also met with staff from Mississaugas of the New Credit and Six Nations of the Grand River Territory to discuss the development of an 'existing conditions report' for Stage 2 of the EA.

Consultation following the release of the Draft Strategy Report (February 2011)

The MTO continued to engage First Nations groups during the Draft Strategy Report review period. Two copies of the Draft Strategy Report, plus a digital CD copy, were sent to all First Nations on the study mailing list on March 8, 2011.
No meeting requests or comments on the draft report have been received from First Nations.

Consultation held during the Additional Analysis in Halton during PIC #5

Letters were also sent by MTO to the four First Nations groups on May 18, 2012 inviting them to attend PIC #5 in order to review and comment on the materials presented.

Notice of PIC #5 was also advertised in the above mentioned weekly newspapers.

A meeting was held with the Mississaugas of the New Credit First Nation on June 18, 2012 to provide a project status update to Chief and Council, with the focus being on the additional analysis work undertaken in Halton.

A meeting was held with the Six Nations Consultation and Accommodation Process (CAP) Team on August 8, 2012 to provide project status updates on the NGTA and GTA West Corridor studies.

7.7. CONSULTATION FOLLOWING RELEASE OF DRAFT TRANSPORTATION DEVELOPMENT STRATEGY (MARCH 2011)

The following section outlines the consultation completed during the review period for the Draft Transportation Development Strategy (Strategy) Report (February 2011). The Draft Strategy Report was made available starting March 7, 2011, for a minimum 90 day review period. Due to interest and the volume of comments, the actual review period lasted over 120 days, ending July 8, 2011, although input has continued to be submitted since then.

All comments received during the review period from the general public, interest groups, First Nations, agencies and municipalities were considered by the Study Team. The consultation which occurred during the Draft Strategy Report review period played an integral role in project decisions.

For an outline of the consultation program undertaken to support the development of the Draft Strategy Report prior to its release in March 2011, refer to **Sections 7.2** to **7.6**.

7.7.1. Draft Strategy Report Release

Notification of the release of the Draft Strategy Report and its availability were provided via letter to those on the study mailing list by regular mail and / or e-mail on March 7, 2011. At the time of the Draft Strategy Report's release, the study mailing list included over 1,300 contacts: approximately 1,070 members of the public, 155 interest groups, and 135 municipal/provincial/federal contacts. Refer to **Section 7.2.1** for further information on how the study mailing list was developed.

The GTA West study website (www.gta-west.com) was updated to include the Draft Strategy Report on March 7, 2011. Hardcopies of the Draft Strategy Report were made available at local libraries and clerk's offices throughout the study area beginning March 11, 2011. The following is a list of the review locations:

DRAFT STRATEGY REPORT REVIEW LOCATIONS
Libraries
1. Vaughan Public Library, Pierre Berton Branch
2. Vaughan Public Library, Kleinburg Branch
3. King Township Public Library, Nobleton Branch
4. King Township Public Library, King City Branch
5. Caledon Public Library, Caledon East Branch
6. City of Brampton Public Library, Chinguacousy Branch
7. City of Brampton Public Library, Cyril Clark Branch and Lecture Hall
8. City of Mississauga Public Library, Meadowvale Branch
9. Town of Halton Hills Public Library, Acton Branch Library
10. Town of Halton Hills Public Library, Georgetown Branch Library
11. Milton Public Library, Main Branch
12. County of Wellington Public Library, Erin Branch
13. County of Wellington Public Library, Rockwood Branch
14. County of Wellington Public Library, Marden Branch
15. County of Wellington Public Library, Puslinch Branch
16. Guelph Public Library, Main Branch
Municipal Clerk's Offices
1. Region of York, Corporate Services Department
2. City of Vaughan, City Clerk's Department
3. Township of King, Clerk's Department
4. Region of Peel, Corporate Services Department
5. Town of Caledon, Administration Department

DRAFT STRATEGY REPORT REVIEW LOCATIONS
6. City of Brampton, City Clerk's Office
7. City of Mississauga, Office of the City Clerk
8. Region of Halton, Clerk's Office
9. Town of Milton, Clerk's Division
10. Town of Halton Hills, Clerk's Office
11. Wellington County, Clerk's and CAO Department
12. Town of Erin, Clerk's Department
13. Township of Centre Wellington, Clerk's Department
14. Township of Guelph-Eramosa, Administration / Clerk's Office
15. Township of Mapleton, Clerk's Department
16. Township of Puslinch, Administration / Clerk
17. Township of Wellington North, Clerk's and Administration
18. City of Guelph, City Clerk's Office
19. Region of Waterloo, Clerk's Department

On June 2, 2011, those on the study mailing list were notified by regular mail and / or e-mail of the availability of the Draft Strategy Report and the established deadline for comments – June 30, 2011. The GTA West study website was updated on June 2, 2011 to include the comment deadline [Note: The comment deadline was later extended to July 8, 2011 following a Halton Hills Resident Meeting. See Section 7.7.2.1 for further details].

7.7.2. Meetings and Council / Committee Presentations

Throughout the review period the Study Team consulted with various public, government agency, and municipal stakeholders, both at meetings and at council / committee presentations, in order to assist stakeholders in reviewing the Draft Strategy Report and to obtain feedback on the report. The consultation program during this time was made flexible in order to permit requests for additional presentations and meetings.

The table to the right outlines all of the meetings and council / committee presentations attended by the Study Team during the Draft Strategy Report review period.

The summary notes from these meetings are included in the Supplemental Consultation Record.

DATE	MEETING	PURPOSE
April 12, 2011	Caledon Council Workshop	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
April 14, 2011	Region of Halton, Town of Halton Hills, Town of Milton Staff Meeting	To provide an update on the study's progress, discuss specific municipal issues and answer questions.
April 20, 2011	Municipal Advisory Group (MAG) Meeting #6	To present and discuss the Draft Strategy Report, with particular focus on the Preliminary Route Planning Study Area, in order to facilitate municipal review of the report and discuss any preliminary municipal comments. *See **Section 7.3.1** for more information about the MAG.*
April 29, 2011	York Region, City of Vaughan Staff Meeting	To follow-up on letters received from municipal staff regarding issues with the Draft Preliminary Route Planning Study Area.
April 29, 2011	Regulatory Agency Advisory Group (RAAG) Meeting #6	To present and discuss the Draft Strategy Report, with particular focus on the Preliminary Route Planning Study Area, in order to facilitate agency review of the report and discuss any preliminary agency comments. *See **Section 7.4.1** for more information about the RAAG.*
May 2, 2011	Huntington Road Community Developer Meeting	To follow-up on a letter submitted regarding issues with the Draft Preliminary Route Planning Study Area. Meeting requested by developer.
May 3, 2011	Community Advisory Group (CAG) Meeting #8	To present and discuss the Draft Strategy Report, with particular focus on the proposed new transportation corridor. *See **Section 7.2.5** for more information about the CAG.*
May 4, 2011	York Region Planning and Economic Development Committee	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
May 10, 2011	Town of Halton Hills Council	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
May 11, 2011	Transportation Service Providers (TSP) / Business and Commercial Stakeholders (BCS)	To provide an overview of the Draft Strategy Report and receive and discuss preliminary comments on the draft report, as they relate to people and goods movement. *See **Section 7.5** for more information about the TSP / BCS.*
May 16, 2011	Town of Caledon Staff	To discuss the development pressure issues associated with the proposed GTA West Corridor in the Town of Caledon – particularly the South Albion-Bolton area and Mayfield West Phases 1 and 2.
May 20, 2011	Halton Peel – Boundary Area Transportation Study (HP-BATS) Municipal Stakeholder Meeting	To discuss the connection and functional needs at the GTA West Corridor North-South Link / Highway 401 / 407ETR interchange, and the EA coordination process options available when proceeding with Stage 2 of the EA Study.
May 25, 2011	York Region – Councillor Deb Schulte Meeting	To follow up on the presentation made by the Study Team to York Region Planning and Economic Committee on May 4, 2011. Meeting requested by Councillor Deb Schulte, and also attended by municipal staff.
May 26, 2011	Peel Regional Council	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
May 27, 2011	Southern Ontario Gateway Council	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
May 31, 2011	City of Vaughan Committee of the Whole	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
June 4, 2011	Bruce Trail Conservancy Board	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
June 13, 2011	City of Brampton Planning, Design and Development Committee	To provide an overview of the progress of the Study and review the recommendations in the Draft Strategy Report.
June 16, 2011	Meeting with Sylvia Jones, MPP	To discuss the progress of the Study and potential impacts to a large agricultural operation in Caledon, also attended by owners.
June 17, 2011	Hydro One	To further discuss coordination between the GTA West Study and prospective Hydro One transmission corridor EA.

DATE	MEETING	PURPOSE
June 17, 2011	Toronto and Region Conservation Authority (TRCA), Credit Valley Conservation Authority (CVC) Staff *(Note: Conservation Halton staff was invited to the meeting, but were unable to attend.)*	To review the progress of the Study, Conservation Authority input provided to date, and to further discuss the Preliminary Route Planning Study Area
June 20, 2011	Region of Peel, City of Brampton, City of Mississauga, and Town of Caledon Staff	To follow-up on recent presentations regarding the Draft Strategy Report, Draft Preliminary Route Planning Study Area and related input submitted by municipalities to the Study Team.
June 21, 2011	Mid-York East-West Transportation Study Meeting	To review the study background, existing conditions, and development of preliminary interchange and corridor alternatives. For GTA West Study information purposes only.
June 23, 2011	Halton Hills Resident Meeting	To allow for information sharing about the study and provide concerned citizens the opportunity to ask questions of the Study Team.
June 24, 2011	Toronto and Region Conservation Authority (TRCA) Board	To answer questions resulting from the review of a TRCA staff report on the study's progress.
June 28, 2011	South Bolton – Developer Meeting	To update the Study Team on the status of lands and discuss issues associated with the Draft Preliminary Route Planning Study Area. Meeting requested by developer in Caledon.
July 22, 2011	Valleywood Resident's Association	To discuss challenges associated with the existing Highway 410 interchange at Valleywood, the potential impact to the Valleywood community as a result of the proposed Smart Centres development, the proposed connections between Highway 410 and the future GTA West corridor, and key information that the GTA West Study Team should be aware of when moving forward to the next stage of the EA study.
September 21, 2011	City of Brampton	To provide an overview of the study progress and discuss land use issues in the City of Brampton, particularly with regards to Area 47.
November 2, 2011	Town of Caledon Staff	To further discuss the integration of the GTA West Corridor and development planning in the Town – particularly, South Albion-Bolton area and Mayfield West Phases 1 and 2. The meeting was in follow-up to a meeting held on May 16, 2011.

7.7.3. Summary of Comments Received on the Draft Strategy Report

Comments on the Draft Strategy Report were received through the following means:

- **E-mail** (project_team@gta-west.com)
- **Webform** (Digital comment form feature on the "Contact Us" page of the project website)
- **Mail** (Attn: Mr. Neil Ahmed, P. Eng., Consultant Project Manager, McCormick Rankin (MRC), 2655 North Sheridan Way, Suite 300, Mississauga, ON L5K 2P8)
- **Phone** (Study Team Toll-Free Line: 1-877-522-6916 OR/ Attn: Mr. Neil Ahmed, McCormick Rankin (MRC): 1-877-522-6916)
- **Fax** (905-823-8503)
- **Submission to the former Ontario Minister of Transportation, Kathleen Wynne, and Premier of Ontario, Dalton McGuinty**

In total, **465 comments** were received by the Study Team during the Draft Strategy Report review period (from March 7, 2011 to July 8, 2011) including: 179 e-mails, 96 webforms, 7 letters/faxes, 85 phone calls, 46 municipal / agency comments, and 52 comments sent to the former Minister of Transportation, Kathleen Wynne. In addition, a large number of postcards were also sent to the former Minister. All comments received during the Draft Strategy Report review period were considered by the Study Team and aided in project decisions.

7.7.4. Summary of Public Comments Received

The Study Team considered all comments received from the public and interest groups. Comments submitted to which a reply was requested, received a response from the Study Team. These comments and responses are available in **Appendix A**. All personal information has been removed consistent with the Freedom of Information and Protection of Privacy Act. It should be noted that the majority of public comments received on the Draft Strategy Report were from the Region's of York, Peel and Halton.

The following summarizes the key public comments received:

- General inquiries about the study process timeline and anticipated start of construction. The Study Team was urged to quickly proceed with EA Stage 2 and refine the Draft Preliminary Route Planning Study Area in order to provide better certainty to property owners and the development industry;
- Concerns and inquiries about specific property impacts and proximity issues associated with a new transportation corridor;
- Inquiries about the property acquisition process and compensation for potential impacts to property values;
- General questions about corridor protection methods to be utilized in the future, and particularly if development lands will be frozen;
- Concerns regarding the environmental impacts of a new transportation corridor, particularly its effects on the natural and social environments;
- Specific concerns associated with potential effects on the Greenbelt (particularly through the City of Vaughan), Oak Ridges Moraine, Bruce Trail, and the Humber and Credit River Valleys;
- Concerns regarding potential impacts to agricultural lands, particularly in the Towns of Halton Hills and Caledon;
- General questions about the need for a new transportation corridor, particularly in the Halton area. Existing highways should be widened and/or new rail / transit options should be looked at instead of building new highway's; and,
- Concerns about the study's notification procedures. Many at the Halton Hills Resident Meeting noted that they were unaware of the study until they received a letter from their Mayor. In future, the Study Team should better engage property owners and provide notification to all who will be directly affected by the EA process.

Not withstanding the above, there was general support for the various improvements recommended in the Draft Strategy

Report. There is a widespread acknowledgement of the need to improve road capacity and transportation connections throughout the study area.

Appendix A includes summary tables outlining all of the specific comments received from the public during the Draft Strategy Report review period and how those comments were responded to / addressed.

7.7.5. Summary of Municipal Comments Received

The Study Team has considered all comments received from municipalities. **Appendix A** includes summary tables outlining all of the specific comments received from municipalities during the Draft Strategy Report review period and how those comments were responded to / addressed.

The following summarizes the key municipal comments:

- Supported the Draft Strategy Report recommendations however,
  - Some municipalities (specifically the Region of Halton, Town of Halton Hills and Town of Milton) were concerned about the need for and impacts associated with including elements of Alternative 4-3, and did not support its inclusion as a recommendation in the Draft Strategy Report;
- The Study Team should continue to work closely with municipalities as the study progresses. Municipalities would like to work with the Study Team / MTO in order to identify / release lands which will not be needed for a future corridor;
- The Study Team was urged to quickly proceed with EA Stage 2 and refine the Draft Preliminary Route Planning Study Area. The selection of a preferred route should be expedited in order to provide certainty and allow development to proceed;
- Specific issues associated with lands included in the Draft Preliminary Route Planning Study Area;
- Specific issues associated with the GTA West Corridor's connection to existing highways, particularly at Highway's 400, 427, 410 and 401; and,
- Concerns regarding the impacts of a new transportation corridor, particularly the effects on agriculture and the natural, social and cultural environments.

All correspondence with municipal stakeholders is included in the Supplemental Consultation Record.

7.7.6. Summary of Agency Comments Received

The Study Team has considered all comments received from agencies. **Appendix A** includes summary tables outlining the specific comments received from agencies during the Draft Strategy Report review period and how those comments were responded to / addressed.

The following summarizes the key agency comments received:

- The Study Team should continue to work closely with agencies as the study progresses;
- Requests for specific information / text to be clarified or revised in the report;
- Questions regarding the evaluation of the alternatives; and,
- Concerns regarding the environmental impacts of a new transportation corridor, particularly the effects on the natural environment and agriculture.

All correspondence with agency stakeholders is included in the Supplemental Consultation Record.

7.7.7. Decision Following Review of Draft Strategy Report Input

In response to the input received on the Draft Strategy Report regarding the proposed transportation improvements in the Halton area, MTO decided to carry out additional analysis and consultation over the Fall 2011 / Winter 2012 to further examine the recommendations in that area.

The work focused on further examining the benefits and impacts of both a potential new transportation corridor through Halton Hills and potential improvements to the Highway 401 corridor. In particular, the work included further assessment of the ability of Highway 401 to adequately meet future transportation network needs resulting from the rapidly growing population and commercial growth forecast for the area into the long term.

The additional work would provide more details on potential impacts to natural features, agricultural operations, the local communities and area businesses, and included further consultation with the public and stakeholders on the results before the Transportation Development Strategy was updated. See Section 5.0 for further details.

7.8. CONSULTATION FOR ADDITIONAL ANALYSIS IN HALTON AREA

The following section outlines the consultation completed during the Halton additional analysis work period and leading up to PIC #5. All comments received from the general public, interest groups, First Nations, agencies and municipalities during this period were considered by the Study Team and helped in updating and finalizing the strategy.

7.8.1. Notification of Additional Analysis in Halton Area

E-mail / Letter Notification of Study Update / Notice of Additional Analysis

On December 9, 2011, individuals on the Study mailing list were notified by e-mail / letter with a study update. The e-mail / letter provided notice of the MTO decision to carry out additional analysis and consultation in order to further examine the proposed transportation improvements in the Halton area.

In addition, a bulk mailout and hand delivery of approximately 2,870 newsletters were sent to residents within the Halton additional analysis area in postal codes L0P, L7G and L9T during the week of December 12, 2011.

E-mail / Letter Notification of Public Information Centre #5

On May 18, 2012 PIC #5 notification e-mails / letters were sent directly to individuals on the Study Team's External Agency mailing list (including representatives of the Municipal Advisory Group and Regulatory Agency Advisory Group) and interest groups. Individuals on the mailing list were also sent a letter / e-mail.

In addition, a bulk mailout and hand delivery of approximately 3,450 PIC notification brochures were sent to residents within the Halton additional analysis area in postal codes L0P, L7G and L9T during the week of May 21, 2012.

7.8.2. Meetings and Council / Committee Presentations

Throughout the additional analysis work period the Study Team consulted with various public, government agency, and municipal stakeholders, both at meetings and at council / committee presentations, to acquire input on the proposed additional work plan, incorporate information, and ultimately receive comments on the draft recommendation. The consultation program during this time was flexible to accommodate requests for additional presentations and meetings.

The table on the following page outlines all of the meetings and council / committee presentations attended by the Study Team during the additional analysis and PIC #5 period.

The summary notes from these meetings are included in the PIC #5 Consultation Record, available on the project website.

7.8.2.1. Municipal/Agency and Stakeholder Workshops

Workshops for stakeholders (March 28, 2012) and municipalities / agencies (April 4, 2012) were held to present the preliminary results of the additional analysis in Halton and allow the Study Team to receive comment and feedback on the work completed to date. The sessions were 'invitation only' and were intended to provide an interim and additional step in the consultation process, before the Study Team completed the evaluation and presented the results to the broader public at PIC #5.

Stakeholder Workshop

The stakeholder workshop was held on March 28, 2012 at the Glencairn Golf Club in the Town of Halton Hills from 6:00 p.m. to 9:00 p.m.
An overview presentation was provided, followed by Study Team specialists associated with six topic areas (Community/ Natural Features, Agriculture, Future Travel Demand, Economic Analysis, Existing and Future Land Use and Road Design/Constructability) rotating and presenting the preliminary results of their additional analysis to the various stakeholder groups.

The stakeholder groups whom attended the meeting included varied Halton interest groups, including the Halton Hills Chamber of Commerce, Milton Chamber of Commerce, Concerned Residents Against a Superhighway in Halton Hills (CRASHH), the Milton Heights Resident Group, the Milton Heights Landowners Group, and the Halton Hills Owner Operator Farmers (HHOOF). The Milton Rural Residents Association was invited to the meeting but did not attend.

Most of the discussion at the workshop was focused on clarifying information presented, however the following general comments were raised:

- If the new corridor goes through a farm the impact will be far greater than any road widening impact.
- Additional slides clarifying the current Highway 401 Widening EA study limits should be added to the presentation. The difference between the two studies needs to be better explained.
- Halton farmers have to contend with many issues, including no natural gas service, insufficient road shoulders for moving equipment, lack of water availability due to the expansion of Georgetown, an aging farming populstion, etc. This makes it difficult to farm.
- Even though there are two studies looking at widening Highway 401 through Milton, the ultimate construction of the widening should only be done once.

A complete summary of the workshop is available in the PIC #5 Consultation Record, which is available under separate cover.

Municipal / Agency Workshop

The municipal / agency workshop was held on April 4, 2012 at the Glencairn Golf Club in the Town of Halton Hills from 1:00 p.m. to 4:00 p.m.

An overview presentation was provided, followed by Study Team specialists associated with six topic areas (Community/ Natural Features, Agriculture, Future Travel Demand, Economic Analysis, Existing and Future Land Use and Road Design/Constructability) rotating and presenting the preliminary results of their additional analysis.

The municipalities and agencies in attendance included the Region of Peel, City of Mississauga, Town of Caledon, City of Brampton, Halton Region, the Town of Halton Hills and their consultants, Town of Milton and Niagara Escarpment Commission. Conservation Halton was invited to the meeting but did not attend.

Most of the discussion at the workshop was focused on clarifying information presented, however the following general comments were raised:

- Building a new corridor has different environmental impacts than widening an existing facility.
- The project's assumptions regarding transit are aggressive, and many policy changes still need to be implemented, such as the build out of the Metrolinx Big Move. This should be more adequately communicated to the public.
- If Highway 401's maximum capacity is reached in Halton by 2031, then what? There is no discussion of solutions for beyond 2031.
- An assessment of the impact on local roads during construction should be completed.
- The Town of Halton Hills is appreciative that the Study Team delayed the end of the study to do the requested additional analysis.
- The challenge for the Study Team is determining what is more valuable: agriculture or transportation. It will not be an easy decision to make, as there are a lot of trade-offs to consider.

DATE	MEETING	PURPOSE
January 10, 2012	Town of Halton Hills, Halton Region and the Town's consultant	To meet with the Town of Halton Hills and Halton Region, as well as Halton Hill's consultant, to discuss their submission regarding the feasibility to widen Highway 401 to 12 lanes between James Snow Parkway and Regional Road 25.
January 10, 2012	Halton Region, Town of Halton Hills and Town of Milton Staff	To provide an update on the GTA West Study including a review of additional work scope to address comments received.
January 18, 2012	Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA), Ontario Ministry of Municipal Affairs and Housing (MMAH) and Ontario Ministry of Infrastructure (MOI) Teleconference	To provide an overview of the GTA West Study work plan for additional analysis in Halton, with a focus on agriculture.
January 19, 2012	Concerned Residents Against Superhighway in Halton Hills (CRASHH)	To provide an update on the study, review the work plan for additional analysis in Halton, and acquire input from CRASHH.
January 20, 2012	Conservation Halton (CH) and Niagara Escarpment Commission (NEC)	To provide an update on the study and review and discuss the additional work plan for the Halton area.
January 23, 2012	Halton Hills and Milton Chambers of Commerce	To provide an update on the study and review and discuss the expanded work plan for the Halton area.
January 23, 2012	Town of Halton Hills Council	To provide an update on the study, highlights of the proposed work plan for additional analysis in Halton, and acquire input from Halton Hills Council.
January 31, 2012	Halton Hills Owner Operator Farmers (HHOOF)	To provide an update on the study, review and discuss the expanded work plan for the Halton area, and to review and discuss HHOOF's questions / concerns as provided ahead.
February 1, 2012	Town of Milton Staff	To discuss the potential impact of study to the Emery Subdivision at the northwest quadrant of Highway 401 and Dublin Line.
February 6, 2012	Town of Milton Community Services Advisory Committee	To provide an update on the study, highlights of the proposed work plan for additional analysis in Halton, and acquire input from the Committee.
February 8, 2012	Country Homes	To discuss the potential impact of the study.
February 15, 2012	Halton Peel – Boundary Area Transportation Study (HP-BATS) Representatives Update Meeting	To provide an update on the study and review its expanded work plan. A similar and separate meeting was held with Halton Region and the Towns of Halton Hills and Milton on January 10, 2012.
February 16, 2012	Freeman Planning Solutions and Emery Investments	To provide an update on the study and discuss potential impacts to the subject property.
February 21, 2012	Milton Heights Landowners Association and Milton Rural Residents Association	To provide an update on the study, review and discuss the expanded work plan for the Halton area.
February 22, 2012	Halton Planning and Public Works Committee	To provide an update on the study, highlights of the proposed work plan for additional analysis in Halton, and acquire input from the Committee.
February 22, 2012	Halton Hills Owner Operator Farmers (HHOOF)	To discuss the content and logistics to distribute the agriculture information requests to HHOOF members.
February 28, 2012	Halton Agricultural Advisory Committee	To provide an update on the study and review the additional analysis underway in the Halton area.
February 29, 2012	Milton Heights Residents Group	To discuss residents' concerns regarding the potential impact of the GTA West Corridor on their community.
March 7, 2012	Ministry of the Environment (MOE) – Environmental Assessment Approvals Branch (EAAB)	To provide an update on the study, review the additional analysis underway in the Halton area, and discuss the 2031 planning horizon.
March 8, 2012	Halton Region, Town of Halton Hills and Town of Milton Staff	To provide an update on the GTA West Study Team review of the functional plan prepared by Town of Halton Hills consultant re: widening of Highway 401 to 12 lanes between James Snow Parkway and Regional Road 25, as well as other issues associated with Highway 401 widening and demand forecasting.
March 26, 2012	Region of Peel, City of Brampton and Town of Caledon Staff	To provide an update on the study's progress.
March 28, 2012	Stakeholder Workshop	To present the preliminary results of the additional analysis in the Halton area and receive comment and feedback on the work presented. *See **Section 7.8.2.1** for a complete summary of the meeting.*

DATE	MEETING	PURPOSE
April 4, 2012	Municipal / Agency Stakeholder Workshop	To present the preliminary results of the additional analysis in the Halton area and receive comment and feedback on the work presented. *See **Section 7.8.2.1** for a complete summary of the meeting.*
April 17, 2012	Country Heritage Park	To discuss the study with representatives from Country Heritage Park and seek input regarding the additional work underway in Halton.
June 1, 2012	Pre-PIC Municipal / Agency Meeting	To present the final results of the additional analysis in the Halton area and receive comment and feedback on the work presented.
June 7, 2012	Community Advisory Group (CAG) Meeting #9	To review the findings of the additional analysis in the Halton area and draft recommendations, and provide an update on the overall study, its schedule and next steps. *See **Section 7.2.5** for more information about the CAG.*
June 11, 2012	Town of Halton Hills Council	To provide an update on the study, review the results of the additional analysis in Halton, present the draft recommendation, and acquire input from Council.
June 11, 2012	Milton Community Services Advisory Committee	To provide an update on the study, review the results of the additional analysis in Halton, present the draft recommendation, and acquire input from the Committee.
June 13, 2012	Halton Planning and Public Works Committee	To provide an update on the study, review the results of the additional analysis in Halton, present the draft recommendation, and acquire input from the Committee.
June 21, 2012	Town of Milton Staff	To review and discuss the questions / concerns outlined by Town staff in the June 11, 2012 Report No. PD-033-12 to the Community Services Standing Committee.
June 26, 2012	City of Brampton Staff	To discuss recent update and changes to the Preliminary Route Planning Study Area in the vicinity of City of Brampton Area 47.
June 27, 2012	Town of Caledon Council Workshop	To provide an opportunity to have an in-depth discussion with the Town of Caledon Council about the study process, development plans and status in the Mayfield West area, a potential connection between Highway 410 and the proposed new corridor, and alternatives to minimize impact.
June 28, 2012	Region of Peel Council	To provide an update on the study, review the results of the additional analysis in Halton, present the draft recommendation, and acquire input from Council.
July 31, 2012	Toronto and Region Conservation Authority	To discuss the TRCA lands in Mayfield West.
August 3, 2012	Peel Federation of Agriculture	To provide an update on the study's progress and current status.
August 15, 2012	Weston Consulting	Meeting with property owners regarding site plan in City of Vaughan
August 16, 2012	Toronto and Region Conservation Authority (TRCA)	Meeting arranged by the TRCA to discuss the Nashville Management Tract, located within the GTA West Corridor Preliminary Route Planning Study Area.
September 5, 2012	Meeting with Halton Hills Resident	Meeting with Halton Hills Resident to discuss comments submitted to the Study Team and Minister's Office.
September 7, 2012	Smart Centres	To discuss Smart Centres Valleywood development
September 11, 2012	Highway 401 Business Stakeholder Meeting	To provide a progress update on the GTA West study, review the draft recommendations, and better understand potential impacts on businesses and properties along Highway 401.
September 27, 2012	City of Brampton and Area 47 Developers	To provide an overview of the study progress and discuss land use issues in the City of Brampton, particularly with regards to Area 47.
October 4, 2012	Region of Halton and Town of Halton Hills	To discuss the status of the GTA West Corridor EA and the municipal Halton Peel – Boundary Area Transportation Study (HP BATS) corridor protection.
October 11, 2012	Hydro One	To further discuss coordination between the GTA West Study and prospective Hydro One transmission corridor EA.

A complete summary of the workshop is available in the PIC #5 Consultation Record, which is available under separate cover.

7.8.3. Public Information Centre #5

The fifth round of PICs was held to provide the public with an opportunity to review and comment on the results of the additional analysis in Halton and draft recommendations, provide comments and discuss issues with representatives of the Study Team.

The PICs were held as drop-in centres to allow members of the public to review display material and discuss the study one-on-one with Study Team members. In addition, brief presentations were held each night at 5:00 p.m. and 7:00 p.m. to provide a study overview. MTO and Consultant representatives of the Study Team attended. The Study Team participated in discussions with the attendees to address questions and concerns.

The PICs were held as follows:

TUESDAY JUNE 12, 2012	THURSDAY JUNE 14, 2012
Gellert Community Centre Kinsmen Hall 10241 Eighth Line Georgetown, ON	Milton Sports Centre Banquet Hall 605 Santa Maria Boulevard Milton, ON
4:00 to 8:00 p.m.	**4:00 to 8:00 p.m.**

A total of 250 members of the public signed the Visitor's Register at the two PIC venues.

In addition to verbal comments, Study Team representatives encouraged visitors to submit written comments regarding the information presented. Comment sheets were available for members of the public to fill out at the PIC or to send in by the comment deadline (July 31, 2012) by e-mail, fax or mail to the Study Team.

At the PICs, 15 written comment sheets were collected. In addition, 49 comments were received via webform, e-mail, mail and the toll-free number/telephone by the comment deadline. The following is a breakdown of attendance and the number of comments submitted by PIC date/venue:

DATE / LOCATION	RECORDED ATTENDANCE	WRITTEN COMMENTS RECEIVED
June 12, 2012 Georgetown	176	10
June 14, 2012 Milton	74	5
Total Comment Forms Received at the PIC's		**15**
Total Comment Forms / Comments received via fax, mail, e-mail, webform or the toll-free number		**49**
Total	**250**	**79**

A complete PIC #5 Consultation Record is available under separate cover, and is available on the project website.

7.9. CONSULTATION FOR UPDATING THE PRELIMINARY ROUTE PLANNING STUDY AREA

As noted in Section 6.6, since the release of the draft Strategy Report (February 2011) a number of comments from municipalities and stakeholders were received regarding their concerns about the recommended transportation corridor through Halton Region which resulted in additional analysis in the Halton area as documented in Chapter 5. Findings from the additional analysis indicated that further widening of Highway 401 through Halton area would provide the best balance of benefits and impacts amongst factors in social, natural and cultural environment, as well as transportation, cost and constructability. Therefore, as documented Section 6.4, the proposed new transportation corridor would begin from Highway 400 westerly and then southerly to Highway 401 / 407 ETR.

In addition, area municipalities and stakeholders in Peel and York Regions also provided comments regarding potential impact on future development opportunities and the planning of secondary plans within the Preliminary Route Planning Study Area as presented in the draft Strategy Report (February 2011). In order to address these comments, various meetings were held with municipalities and stakeholders; see **Section 7.8.2**.

The Study Team investigated various focus areas and modified the boundary of the Preliminary Route Planning Study Area where possible. In general, comments from municipalities and stakeholders were mainly related to potential development conflicts and requests to refine the Preliminary Route Planning Study Area to minimize impacts to future development and/or delay in moving forward in the planning process.

7.10. UPDATED STRATEGY REPORT RELEASE

To notify those on the study mailing list, and the general public and property owners within the Preliminary Route Planning Study Area (Updated November 2012) of the Transportation Development Strategy (Strategy) Report's release and the study's next steps, the following were completed:

1. Letters were sent via regular mail and / or e-mail to the study mailing list;

2. Newspaper notices advertising the release of the Strategy Report were published starting on November 20th, 2012 in all of the newspapers noted in **Section 7.2.4** (except the Wellington Advisor and Halton Compass due to the papers ending print publishing), and will occur for two consecutive weeks.

3. Hardcopies of the updated Strategy Report were placed in local libraries and clerk's offices. See **Section 7.2.2** for a list of the viewing locations.

4. The GTA West study website (www.gta-west.com) was updated to include the updated Strategy Report.