

## 3. Group Transportation Alternatives

### 3.1 OVERVIEW

This Chapter provides an overview of the second stage of the process for generating and assessing the Area Transportation Alternatives that was discussed in **Section 1.6** of this report and illustrated in **Exhibit 1-3**.

As mentioned in **Section 1.6**, the development and assessment of alternatives is undertaken at an increasing level of detail. As the range of alternatives under consideration becomes 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 will also become more detailed.

The primary focus of the second stage of the process is 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. The alternatives that comprise this list are described in **Chapter 2** of this report. The following provides a brief description of the four group alternatives:

- **Group #1: Optimize Existing Networks**

Transportation initiatives that focus on improving the performance of the existing transportation system for all modes of travel and transport through strategies designed to reduce auto 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 Roads**

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 from Group #3, and adds new road and / or highway capacity on a new corridor to address identified transportation problems and opportunities.

As described above, the development and assessment of group alternatives has been undertaken sequentially. For example, Group #2 was generated and assessed subsequent to the generation and assessment of Group #1. The rationale for assembling the group alternatives in this manner is two-fold: Firstly, this approach is consistent with current government policy which talks to optimizing existing infrastructure before new infrastructure is built and it also promotes transit initiatives as a priority. The

second reason is that the development of group alternatives at this stage of the process is inherently additive. Where a group alternative does not adequately satisfy the identified transportation objectives it will not be removed from further consideration, but rather used as a building block that the next group will build upon.

### 3.2 ASSESSMENT OF MULTI-MODAL ALTERNATIVES

A number of alternatives were identified by the study team, stakeholders and the public to address the transportation problems and opportunities in the study area as part of the first stage of the process (refer to **Chapter 2**). These include policies, programs, operational changes, and new infrastructure and inter-modal connections. **Appendix B** describes each alternative and the study team's assessment as to whether it is able to substantively contribute to addressing the transportation problems and opportunities in the study area. The table further categorizes each of the alternatives that are considered able to substantively contribute on the basis of whether the alternative will be pursued as part of this study, or should be pursued as part of a separate study or initiative.

### 3.3 ASSESSMENT OF GROUP ALTERNATIVES

The focus of the generation and assessment of group alternatives was to identify what further enhancements are 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 achieves 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. For example, the geographic "footprint" of a group alternative may only be understood in terms of having no "footprint" impacts to potentially high "footprint" impacts. As described in **Section 3.10**, a more detailed impact assessment will be conducted during Stage 3 – Preliminary Planning when more detailed information is available and alternatives have been refined.

The assessment criteria builds upon that outlined in the NGTA ToR and the Study Plan and reflects the input received through stakeholder consultation in the development of study goals and objectives.

The assessment of advantages and disadvantages of the group alternatives was presented to all stakeholder advisory groups (MTAG, RAAG and CAG), relevant business and commercial stakeholders, transportation services providers and the public (at PIC #3). Subsequent to the receipt of stakeholder feedback on the assessment of group alternatives, the study team will undertake a comparative assessment of the group alternatives that satisfy the transportation objectives of the NGTA study. The only alternatives that will be carried forward are those that address the transportation problems and opportunities in a meaningful way. A reasoned argument evaluation<sup>10</sup> will be the method used to select the preferred group alternatives to be carried forward to Stage 3: Preliminary Planning.

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<sup>10</sup> *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. The relative significance of the impacts is examined to provide a clear rationale for the selection of the preferred alternative.*

### 3.4 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 *The Growth Plan*, *The Greenbelt Plan*, and the *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 all of the group alternatives (Group #1) includes strategies that are aimed at optimizing the existing transportation networks.

#### 3.4.1 Overview of Group #1

Group #1 builds upon comprehensive optimization strategies embodied in the *RTP*, *GO 2020 strategic plan*, *MTOs 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;
- making active transportation a viable choice with secure storage at transit terminals, bicycles on transit vehicles, etc.;
- expanding the use of bus bypass shoulders during peak periods;
- improving schedule and fare integration between transit providers;
- providing drivers with real time trip planning information;
- providing real time information to transit riders in stations and vehicles along with remote access via telephone and the internet;
- optimizing use of commuter rail system, through the use of longer trains comprising of 12 cars for example; and,
- more aggressive use of TDM / TSM.

In addition to these strategies, the study team has 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 numerous European jurisdictions and essentially involves adjusting the speed limit on inter-regional facilities based on prevailing congestion levels. Changeable message speed signs which are connected through an electronic system to sensors in the pavement are used to reduce the speed limit during times of congestion. The reduced speeds promote a more even traffic flow which increases throughput and improves safety.

#### **Provincial / Employer Led TDM Programs**

TDM programs (as described in **Section 2**) could be improved upon by expanding the Smart Commute program beyond the Greater Toronto and Hamilton Area (GTHA).

In addition to providing broader coverage, this concept would also involve introducing an inter-regional organization which would reach out to employers and would

potentially be managed on a regional level by the provincial government. Other potential initiatives to support TDM include marketing of carpooling using overhead signage in the corridor or at carpool lots in the area, and providing support for municipalities along the corridor to implement TDM measures.

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 may also involve providing additional Park 'n Ride lots at key locations.

### **Long Combination Vehicles (LCV's)**

Long Combination Vehicles (LCVs) feature a single tractor with two 53 foot trailers. Increased use of these types of vehicles is anticipated to reduce the number of trucks on provincial facilities, thereby improving traffic operations. MTO recently initiated a pilot project to allow up to 100 LCV's on the provincial highway network.

### **Ramp Metering**

Ramp metering involves the implementation of signal control measures on a freeway on-ramp to control the traffic entering the highway in order to ensure a smooth downstream traffic flow. Ramp metering is already in existence on portions of the QEW. It may be beneficial to recommend expanding the ramp metering program to other sections of QEW, Highway 403 and Highway 407 through Hamilton, Halton and Niagara.

### **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 HOV and transit vehicles that would allow HOV and transit vehicles to bypass traffic queues on these ramps and access the corresponding facilities more efficiently.

### **Improved Incident Management**

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

### **Better Integration between Inter-Regional Transit Providers**

This concept involves creating better integration between GO Transit and other inter-regional carriers such as Greyhound and Coach Canada by providing access to GO Transit stations for pick up and drop off of passengers.

## **3.4.2 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. The reader is referred to **Appendix B** for a more detailed assessment of the Group Alternatives.

### **Community**

- Minimizes footprint impacts to existing residences and community features.
- Will not fully accommodate future planned population and employment growth.

- Does not provide improved connections between Urban Growth Centres (UGCs).

### **Economy**

- Minimizes footprint impacts to existing businesses.
- 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.

### **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.

The Group #1 strategies represent innovative and effective ways of improving and getting the most out of what already exists. 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. Some form of new infrastructure investment is required.

## **3.5 GROUP #2 – NEW / EXPANDED NON-ROAD INFRASTRUCTURE**

The extensive transit recommendations embodied in the *RTP* as well as 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*.

### **3.5.1 Overview of Group #2**

Group #2 includes significant transit, marine and air service expansion initiatives envisioned by the *RTP*, *GO 2020*, Hamilton International Airport (HIA) and Port of Hamilton that serve the study area. These include:

- Express rail service along GO Transit Lakeshore Corridor;
- GO Transit Lakeshore extension to downtown Hamilton;
- Rapid transit in Hamilton area;
- Rapid transit along Highway 5;
- Rapid transit along Trafalgar Road;
- Rapid transit along Brant Street;
- Bus Rapid Transit and Transitway along Highway 407 / 403;
- GO Transit expanded service to Niagara Falls;

- Port of Hamilton Infrastructure Development Strategy;
- Sea3 – container feeder service between Hamilton and Montreal;
- Hamilton International Airport – expansion of existing taxiways and terminal; and,
- Expanded and improved parking facilities at some transit stations.

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

### **Hamilton-Focused Inter-Regional Transit Service**

Currently inter-regional service is focused on the Toronto area and particularly on Union Station. As such, the scheduling of these services is based on arrival and departure from Union Station during peak commuter times.

The concept of a Hamilton-focused inter-regional transit service is based on Hamilton's increasing stature as a significant employment area, which is anticipated to continue to increase over the coming decades. A transit service that is focused on Hamilton would therefore offer scheduling that would allow commuters to access the employment districts within Hamilton during peak periods.

### **Transit Supportive Corridors**

This concept involves introducing reserved bus lanes, HOV lanes, bus bypass shoulders and other transit supportive measures within existing provincial facilities such as the QEW, Highway 403, Highway 401, etc. that would serve to make bus transit a more reliable and viable service.

### **Bus Transit Service Between Hamilton International Airport (HIA) and Niagara Tourist Destinations**

Through consultation with the Hamilton International Airport, it is understood that a significant portion of tourists that arrive at the airport are destined to the Niagara tourist areas. While the airport offers limited shuttle services to Niagara, these services are not well utilized due to their limited frequency and availability. The airport has suggested that there is a latent demand for a dedicated bus transit service that provides services to Niagara Falls and other tourist areas.

### **New inter-regional rail transit links between Urban Growth Centres**

This concept involves providing a western 'web' of rail passenger services which would provide coverage to the Kitchener-Waterloo, Guelph, Cambridge, Hamilton and Brantford areas. This concept could be combined with the Hamilton focused inter-regional transit service described previously. The concept would provide for new passenger rail lines on existing rail corridors to link urban growth centres. Given that these are smaller growth centres and the potential ridership may not be significant, an opportunity exists to use smaller train systems or even self-propelled railcars, which can be individual or clustered. Rail stations would comprise multi-modal facilities to provide for a well-connected and integrated transportation system.

## **3.5.2 Assessment of Group #2**

The high level assessment of the Group #2 alternative (which also includes the Group #1 alternative) on the basis of potential community, economic, environmental

impacts as well as transportation considerations and costs is summarized below. The reader is referred to **Appendix B** for a more detailed assessment of the group alternatives.

### **Community**

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

### **Economy**

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

### **Environment**

- Potential for impacts to Niagara Escarpment and Greenbelt lands.
- Potential for impacts to other natural and cultural features.
- 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.
- Cannot fully address future travel demands for commuters, goods movement and tourists.

## **3.6 THE NEED FOR ROADWAY BASED SOLUTIONS**

By 2031, the population in the GGH is expected to increase by almost 4 million people. To accommodate this growth, the study team anticipates that by 2031:

- the 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 healthy mix of land uses;
- the development of compact, vibrant and complete communities will be fostered in which people will live, work, and play;
- an additional 700 million transit trips within the Greater Toronto and Hamilton Area will be accommodated;
- all current provincial transportation plans, such as the *RTP* or the *GO 2020 strategic plan*, will be implemented;
- 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; and
- more non-road based infrastructure such as the Group #2 initiatives will be implemented, along with additional related actions.

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.

Notwithstanding these positive improvements, by the year 2031, roadway congestion will still exist, particularly at the Burlington Skyway and the Freeman Interchange (where QEW / Highway 403 / Highway 407 meet).

To realize the vision of a functional transportation network that provides user choice and balance, additional 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 will include recommendations for Group #3 and/or Group #4, it is envisioned that the government's "transit first" priority will be reflected in the implementation of the Transportation Development Strategy.

### 3.7 GROUP #3 – WIDEN / IMPROVE ROADS

The Group #3 alternative has been developed to address the future transportation problems that have been identified within the study area. As such, the additional roadway widening described in the following section are based on providing adequate traffic capacity, operations and safety conditions on existing provincial facilities to the year 2031.

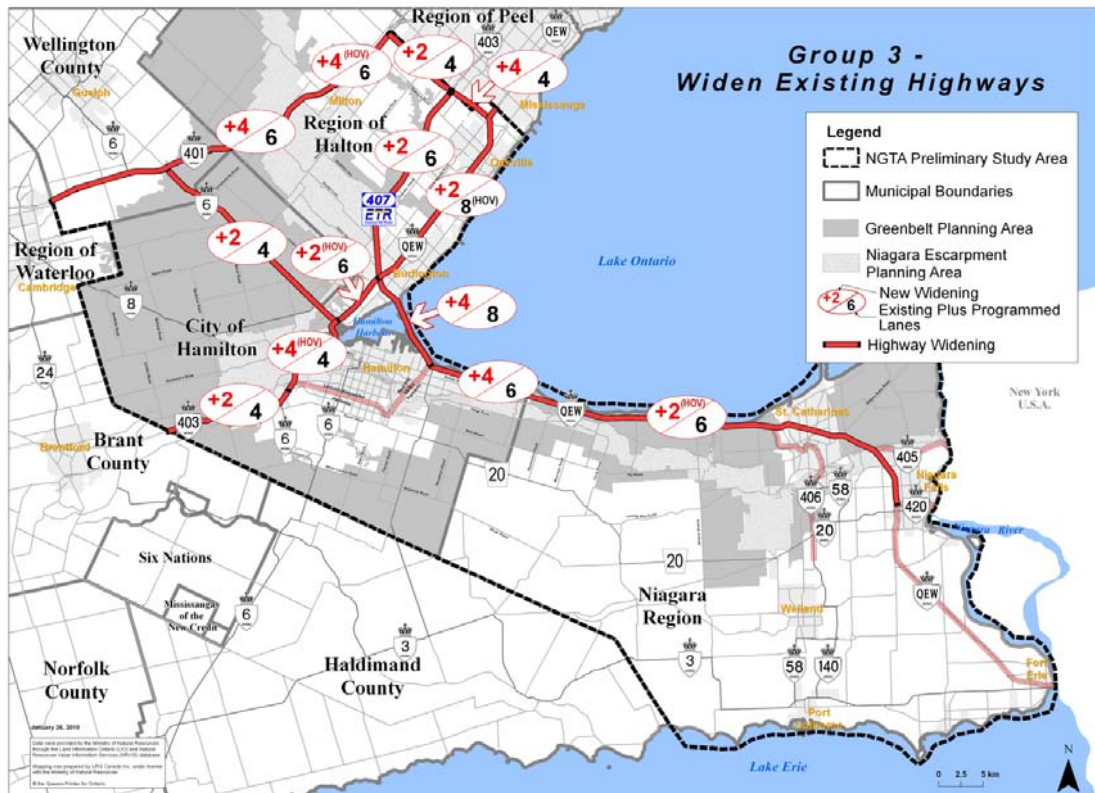
#### 3.7.1 Overview of Group #3

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:

- QEW;
- Highway 403;
- Highway 6;
- Highway 407; and,
- Highway 401.

The degree of widening that would be required to address the future transportation needs is illustrated on **Exhibit 3-1**. Within the 'bubbles' on this exhibit, the lower (black) number indicates the number of lanes that are existing as well as any planned widening. The upper number (red) indicates the number of lanes that will be required over and above the existing and planned lanes. This incremental widening is the basis for comparing the Group #3 alternative to the Group #4 alternative.

Exhibit 3-1: Group #3 Alternative



### 3.8 GROUP #4 – NEW TRANSPORTATION CORRIDORS

#### 3.8.1 Overview of Group #4

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

- New corridor connecting either:
  - QEW in Fort Erie / Niagara Falls area to Highway 403;
  - QEW in Fort Erie / Niagara Falls area to Highway 401;
  - QEW in Fort Erie / Niagara Falls area to Highway 407; or,
  - QEW in Fort Erie / Niagara Falls area to Highway 6.
- Upgrade or widening of Regional Road 20 with potential bypasses of settlement areas such as Smithville, Fonthill, etc.;
- Combination of new and existing corridors to provide bypass around urban core of the City of Hamilton; and
- Upgrade or widening of Highway 406 connecting to a new corridor between Highway 406 and QEW south of Niagara Falls.

### 3.9 ASSESSMENT OF GROUP #3 AND GROUP #4

Widening of the existing provincial inter-regional facilities within the study area as described in **Section 3.7** will provide both benefits and challenges. Serious engineering and construction issues, major impacts to adjacent residences and businesses, and significant costs are associated with the widening of these corridors at the following locations:

- QEW / Highway 403 / Highway 407 (Freeman) interchange;
- Burlington Skyway Bridge;
- QEW / Red Hill Valley Parkway Interchange;
- Highway 403 through Hamilton;
- Garden City Skyway Bridge;
- Widening QEW through St. Catharines;
- Widening through the Niagara Escarpment in Hamilton or Halton; and,
- Widening QEW through Halton.

In addition, the Group #3 alternative would not fully address many of the transportation opportunities that have been identified. In contrast, the provision of a new transportation corridor presents the opportunity to:

- Support Niagara's "Grow South" plans and relieve development pressures on the tender fruit & grape lands.
- Support Hamilton's plans to develop employment lands around the Hamilton International Airport.
- Provide increased security and dependability for trade and promote increased tourism by providing a high quality alternate route to the Niagara border and tourist areas.

The trade-offs between widening and new corridors are challenging and complex. Widening the existing highways can have an impact on neighbouring communities; however, impacts are focused in existing corridors. New corridors will have a larger footprint impact on the undisturbed environment, but effects can be mitigated through careful environmental planning and can provide new economic development opportunities.

The high level assessment of the Group #3 and Group #4 alternatives on the basis of potential community, economic, environmental impacts as well as transportation considerations and costs is described in the following sections and summarized in **Exhibit 3-2**. The reader is referred to **Appendix B** for a more detailed assessment of the group alternatives.

#### **Community**

##### *Group #3*

- Will alleviate future congestion levels for people and tourists.
- Provides improved connections between Urban Growth Centres (UGC's).
- Potential for significant impacts to residences and community features in close proximity to existing corridors.

*Group #4*

- Provides alternate route for people and tourists.
- Could provide improved connections between Urban Growth Centres (UGCs).
- Facilitates municipal development plans, e.g. Niagara's "Growth South" and Hamilton's "AEGD".
- Potential for significant impacts to residences and community features but may be mitigated by route location.

**Economy**

*Group #3*

- Will significantly alleviate future congestion levels for people and goods movement.
- Potential for impacts to businesses along existing corridors.

*Group #4*

- Will significantly alleviate future congestion levels for people and goods movement.
- Provides supplementary trade corridor and improved connections to Niagara Gateway Economic Zone and Centre.
- Opens opportunities for Niagara to grow south.

**Environment**

*Group #3*

- Potential for significant impacts to Niagara Escarpment and Greenbelt lands, but limited to existing corridors.
- Potential for impacts to other previously disturbed natural and cultural features.
- Increased impacts to air quality in built up areas.

*Group #4*

- Greater potential to impact endangered species and Species at Risk.
- Significant impacts to previously undisturbed Greenbelt lands.
- Significant impacts to other previously undisturbed natural and cultural features.
- May result in a new crossing of the Niagara Escarpment.
- Air quality impacts are less concentrated but over a larger area.

**Transportation Considerations and Costs**









*Group #3*

- Significant constructability issues and construction costs related to:
  - Widening through QEW / Highway 403 / Highway 407 interchange;
  - Widening through QEW / Red Hill Valley Parkway interchange;
  - Widening Highway 403 through Hamilton;
  - Widening Burlington Skyway and Garden City Skyway structures; and,
  - Widening QEW through Halton.
- Does not provide reserve capacity to address transportation demands beyond 2031.

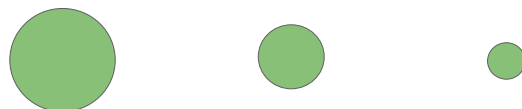
*Group #4*

- Results in many of the same constructability issues as Group #3.
- Construction cost anticipated to be significantly higher than Group #3.
- Alternate corridor may alleviate some of the construction staging issues associated with Group #3.
- Provides reserve capacity to address transportation demands beyond 2031.

**Exhibit 3-2: High Level Assessment of Group #3 and #4**

CRITERIA	GROUP 3	GROUP 4	COMMENTS
COMMUNITY			<ul style="list-style-type: none"> <li>◆ Both alternatives will result in impacts adjacent to existing corridors.</li> <li>◆ Community impacts for Group 3 are limited to existing corridors.</li> <li>◆ Group 4 may better facilitate growth.</li> </ul>
ECONOMY			<ul style="list-style-type: none"> <li>◆ Both alternatives facilitate goods movement.</li> <li>◆ Both alternatives will result in impacts adjacent to existing corridors.</li> <li>◆ Group 4 provides system redundancy for economic trade and tourism.</li> </ul>
ENVIRONMENT			<ul style="list-style-type: none"> <li>◆ Both alternatives will result in impacts adjacent to existing corridors.</li> <li>◆ Group 3 impacts are limited to previously disturbed lands.</li> <li>◆ Group 4 will result in additional impacts to undisturbed lands.</li> </ul>
TRANSPORTATION			<ul style="list-style-type: none"> <li>◆ Both alternatives can address travel demand to 2031.</li> <li>◆ Both alternatives result in similar constructability issues along existing corridors.</li> <li>◆ Group 4 may alleviate some of these issues by providing an alternate route during construction.</li> <li>◆ Group 4 is generally more costly.</li> <li>◆ Group 4 offers reserve capacity and system redundancy.</li> </ul>

**Most Benefit**  **Least Benefit**



### **Summary of Key Trade-Offs**

Additional roadway capacity is required to realize the vision and transportation needs of the Niagara to GTA Corridor. The Ontario government faces the challenging task of deciding whether to widen the existing highways and / or protect for new transportation corridors. Each option presents challenging and complex trade-offs:

- Alternatives for widening existing highways:
  - Make good use of existing transportation infrastructure and maintains origin and destination patterns.
  - Provide the capacity to accommodate long-term inter-regional transportation needs to 2031.
  - Provide limited flexibility to accommodate growth beyond the planned and projected future.
  - Limited system redundancy in the highway network.
  - Require significant expansion to the Burlington Skyway, Garden City Skyway and Freeman interchange.
  - Would result in unavoidable impacts to adjacent natural and community features, including significant displacements along the QEW through St. Catharines and along Highway 403 through Hamilton.
  - Result in widening of existing corridors through the Niagara Escarpment.
- Alternatives for new transportation corridors may still require widening of some provincial facilities and would therefore result in some of the impacts associated with Group #3. In addition, new transportation corridors:
  - Provide the capacity and flexibility to accommodate the long-term inter-regional transportation needs to 2031 and beyond.
  - Provide enhanced system redundancy and choice in the transportation network.
  - Provide superior economic growth and development opportunities through an enhanced trade corridor connecting the GTA to the Niagara Frontier and markets in the United States.
  - Result in potentially extensive impacts to greenfield areas, including significant changes to the character and use of undisturbed rural areas, as well as displacement and severance of agricultural lands.
  - Potentially impact undisturbed natural habitats, but also provides the opportunity to minimize and avoid important natural and built features through route planning.
  - Would potentially require a new crossing of the Niagara Escarpment.
  - Are generally more costly alternatives to construct.

The right solution will provide the best balance between benefits and impacts.

### **3.10 NEXT STEPS**

The next steps for this study will involve further refining each of the group alternatives described in previous sections of this report, and will ultimately culminate in the development of a Transportation Development Strategy, which will be presented in draft

form to members of the public and other stakeholders at the fourth and final round of Public Information Centres (PIC #4).

In further refining the Group #1 and Group #2 alternatives, the study team will consult with Metrolinx (including GO Transit), Transportation Demand Management / Transportation Systems Management (TDM / TSM) specialists within the MTO and other relevant agencies and ministries. Through this consultation exercise, the study team will seek endorsement and a commitment to further explore the recommendations embodied in the Transportation Development Strategy.

In addition, the study team will further refine the Group #3 and Group #4 alternatives to a preliminary planning level of detail. A more comprehensive assessment and evaluation of these alternatives will be completed, using the broad range of approved Environmental Assessment criteria from the *Niagara to GTA Environmental Assessment Terms of Reference (NGTA ToR)*, June 2006 as well as the *Study Plan* that was prepared at the outset of this phase of the study.

The transportation, environmental, economic and community criteria that will be utilized to support the assessment and evaluation of the preliminary planning alternatives are outlined **Table 3-1**. As illustrated in the table, the assessment of the preliminary planning alternatives will include quantitative as well as qualitative measures of potential impacts to environmental systems and functions.

**Table 3-1: Factors & Criteria for Assessing Preliminary Planning Alternatives**

CATEGORY	FACTOR	INDICATOR
Natural Environment	Fish and Fish Habitat	Potential to affect sensitive fish habitat and fish community
	Terrestrial Ecosystems	Potential to affect: <ul style="list-style-type: none"> <li>• Provincially and locally significant wetlands</li> <li>• Significant forest and vegetation communities</li> <li>• Significant wildlife habitat and wildlife movement opportunities</li> </ul>
	Groundwater	Potential to affect: <ul style="list-style-type: none"> <li>• Areas of groundwater recharge and discharge</li> <li>• Groundwater source areas and wellhead protection areas</li> </ul>
	Surface Water	Potential to affect existing drainage systems associated with permanent watercourses
	Designated Areas	Potential to affect designated areas (as defined through legislation, policies, or approved management plans to have special value)
Socio-Economic Environment	Land Use Planning Policies, Plans, Goals, and Objectives	<ul style="list-style-type: none"> <li>• Potential to affect areas with First Nations outstanding land claims or treaties</li> <li>• Potential to support federal / provincial land use policies / plans / goals / objectives, and municipal Official Plans.</li> </ul>
	Land Use / Community	Potential to affect: <ul style="list-style-type: none"> <li>• Indian Reserves</li> <li>• First Nations Sacred Grounds</li> <li>• Urban and residential areas</li> <li>• Commercial and industrial areas</li> <li>• Tourist areas and attractions</li> <li>• Major community facilities and institutions</li> </ul>
	Noise	Potential for increased transportation noise in Noise Sensitive Areas (NSAs) (residential areas and sensitive institutional uses)
	Air	<ul style="list-style-type: none"> <li>• Potential for exposure of sensitive receptors to various levels of air pollution (including extent and duration of exposure)</li> <li>• Incremental annual amounts of air pollutants emitted into the region for the horizon year</li> <li>• Incremental annual amounts of greenhouse gases emitted per annum for the horizon year</li> </ul>
	Land Use / Resources	Potential to affect: <ul style="list-style-type: none"> <li>• First Nations Treaty Rights and Interests or use of land and resources for traditional purposes</li> <li>• Specialty crop areas and / or areas of Canada Land Inventory Classes 1, 2 and 3 soils</li> <li>• Parks and recreational areas</li> <li>• Aggregate and mineral resources sites</li> </ul>
	Municipal Services	Potential to affect major utility transmission corridors
	Contaminated Property Identification and Management	Potential to release of existing site contamination from landfills (open and closed), hazardous waste sites and other known contaminated sites
Cultural Environment	Cultural Heritage – Built Heritage and Cultural Heritage Landscapes	Potential to affect: <ul style="list-style-type: none"> <li>• Buildings or “standing” sites over 40 years of age including local, provincial or national interest or Ontario Heritage properties</li> <li>• Significant heritage bridges</li> <li>• Areas of historic 19th century settlement</li> <li>• Known cemeteries</li> <li>• Known burial sites</li> </ul>
	Cultural Heritage - Archaeology	Potential to affect: <ul style="list-style-type: none"> <li>• Significant pre-historic and historic First Nations archaeological sites of extreme local, provincial or national interest</li> <li>• Significant historic Euro-Canadian archaeological sites of extreme local, provincial or national interest</li> </ul>

CATEGORY	FACTOR	INDICATOR
Area Economy	First Nations Industry	Potential to support First Nations industry in the area by efficient and reliable movement of people and goods
	Industry and Trade	Potential to support industry and trade by efficient and reliable goods movement
	Tourism and Recreation Industry	Potential to support tourism and recreation industry by efficient and reliable movement of people
	Agriculture Industry	Potential to support area agriculture industry by efficient movement of goods
Transportation Factors	Federal / Provincial / Municipal transportation planning policies / goals / objectives	Potential to support federal / provincial / municipal transportation planning policies / goals / objectives
	Efficient movement of people	Potential to support the efficient movement of people between communities and regions based on Level of Service (LOS) and volume to capacity (v / c) on a network, screenline and critical link basis
	Efficient movement of goods	Potential to support efficient movement of goods between urban growth centres and regional inter-modal facilities and communities based on road network performance measures (LOS and travel speed)
	System reliability / redundancy	Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions
	Safety	Potential to improve traffic safety based on opportunity to reduce congestion on area road network (LOS and v / c)
	Modal integration, balance and efficiency	Potential to improve modal choice and increase mode split for person trips between communities, regions and major transit station areas based on travel performance indicators (LOS, v / c, travel speed) at critical screenlines and on potential to provide higher order transit service
	Linkages to Population and Employment Centres	Potential to improve accessibility to urban growth centres for people and goods movement based on higher order network continuity and connectivity
	Recreation and Tourism Travel	Potential to support recreation and tourism travel within and to / from the Preliminary Study Area by provision of higher order network (roads and transit) continuity and connectivity and through network performance indicators (LOS, v / c, travel speed)
	Constructability	Potential ease of implementation considering feasibility / difficulty of physical, property or environmental constraints and relative cost (where possible to approximate)
Traffic Operations	Potential impact on traffic operations due to factors such as design features, and transportation network connections	