



HOW WE GO

Niagara Region Transportation Master Plan Needs and Opportunities Report



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Executive Summary

Introduction

By 2041, Niagara Region will have grown and evolved. To prepare for change, the Region is developing a new long-range Transportation Master Plan (TMP) called **How We GO**. As part of this process, a transportation vision and major goals have been developed, and Niagara residents have been consulted on their priorities and preferred strategies. Based on that work, and on a critical analysis of the current situation and future conditions, this report identifies the most important needs and opportunities to be addressed by the TMP, including key action areas.

Trends and Projections

Population and employment. Over the next 25 years, Niagara Region will grow twice as fast as it did over the last 25 years. The population of 442,800 in 2011 will increase by 38% to reach 610,000 in 2041.

Land use. Even with growth focused in urban locations, only 5% of Niagara's urban area will have density that meets today's density standard for efficient, effective transit service. Only 32% of the urban area will even exceed half of that standard. Therefore, alternatives to conventional, fixed-route transit will be needed.

Demographics. Seniors will be the fastest-growth segment of population. The number of young adults, which dropped over the last 25 years, will instead increase over next quarter-century. Seniors of tomorrow will be more likely to drive than in the past, even if age ultimately means many will have to give up their cars, while young adults of tomorrow are likely to drive less. Young adults are key to the transition from an industrial to knowledge-based economy, and expect to have a range of travel choices.

Travel by residents and visitors. By 2041, travel demand will see greater than average growth outside of peak hours, for non-commute purposes (i.e. other than work and school), and between local municipalities rather than into or out of Niagara. Conventional transit services will find it difficult to increase their share of motorized (i.e. transit and car) trips. More than half of all trips within Niagara are shorter than five kilometres and would take less than 20 minutes by bicycle, but cyclists and pedestrians only make 4% of all trips; there is potential for active transportation to join transit in competing for trips now made by car. The impact of cross-border travel is unclear, since the demand fluctuates with currency exchange rates.

Freight movements. Goods movement is important to Niagara Region businesses, but most freight moving across the U.S. border simply passes through. Cross-border truck volumes have dropped since 2001, but show signs of recovery and are expected to be higher in 2041. Steeply graded roads across the Niagara Escarpment and congestion on the Queen Elizabeth Way leading to the Greater Toronto and Hamilton Area (GTHA) are among the challenges to efficient goods movement in Niagara.

Niagara Region will need to strengthen connectivity among its municipalities and to the GTHA, and to improve options for non-car travel. If it doesn't, car travel will remain the overwhelming choice of residents—a situation that would have significant impacts on the region's quality of life, economy and environment.

Transportation System Performance

Roads. Niagara's road network has enough capacity to serve the growth in auto demand that will come with the future increase in residents and jobs. Congestion and delay will remain low, with notable impacts generally limited to the QEW and Highway 406. Several other locations in the region that face capacity constraints have been examined, and solutions suggested.

Public transit. Transit services in Niagara are currently non-competitive with cars—taking four times longer to make the same trip, on average—and pose a challenge to the 15,000 households in the region that don't own a car. While very few urban areas are dense enough to support quality transit, they will grow and better transit will become more viable.

Active transportation. The Region's networks for walking and cycling, both on-road and off-road, are well used by visitors and residents. However its current potential is limited by a number of gaps and discontinuities that contribute to overall levels of active transportation use that are lower than they could be.

Today's transportation system performs acceptably. However, it is not adequate to support Niagara Region's vision, goals and objectives for the future. Niagara needs to emphasize actions that enable and support alternatives to car travel.

A Strategic View: Needs and Opportunities

Transportation as a catalyst for change. Transportation can support Niagara Region's objectives for land use, economic development, social equity and public health. Mobility investments can act not just as a supporting player, but as a leading catalyst for change. Strategic moves include improving alternatives to car travel, using transit to connect people and jobs, creating walkable streets, and influencing travel demand rather than building roads.

Connecting the Region. Analysis and public input have shown that Niagara Region could benefit from more multimodal connections within and between its communities, as well as with its neighbours. Strategic moves include better transit connections to the GTHA, more frequent and innovative internal transit services, selected increases in road capacity, compact and mixed-use development, heightened truck access to border crossings, and steps to shift freight movements from road to rail.

Meeting the needs of residents. Niagara will be home to many more seniors and young adults by 2041. Ensuring an attractive quality of life for those who cannot drive (or do not have access to a vehicle) is not just a matter of equity, but a pragmatic way to attract new businesses and the employees they seek. Strategic moves include improving transit connections to employment and social destinations, building age-friendly infrastructure and services, building complete streets that enable walking and cycling, and making it easier to live without a car.

A number of common themes emerge from these needs and opportunities. Important objectives for the TMP to address will include reducing the need to own and use cars, encouraging compact land use, building streets to serve all users, promoting dynamic and shared mobility options, enhancing the road network where it supports economic activity, and helping people reach their destinations by walking, cycling and public transit.

Taking advantage of new technologies. Emerging technologies could make mobility more cost-effective, and shift travel demand away from an over-reliance on private cars. Shared transportation services, real-time routing and autonomous vehicles could improve safety and efficiency while overcoming obstacles to transit access and equity. Strategic moves include

support for shared mobility, flexible transit services in low-density areas, technologies to reduce peak-period travel and car dependence, and proactive planning for autonomous vehicles.

Action Areas

Complete streets. The TMP will give explicit guidance on how to create streets that provide better service and safety for all users. This approach will have many benefits, and can take advantage of currently underused road capacity.

Road network. The TMP will recommend selective road extensions and widenings, as well as opportunities to improve the safety and efficiency of road operations through information systems and advanced traffic signal technology.

Public transit. The TMP will include a multifaceted transit to make public transit more competitive by creating faster and more frequent routes in more urban centres, demand-responsive services in low-density zones, and new connections between communities and to the GTHA.

Active transportation. The TMP will focus on building more connected walking and cycling facilities by eliminating network gaps and barriers that limit demand. Actions will take advantage of other planned infrastructure investments along with cycling-focused initiatives, and will be accompanied by better wayfinding and bicycle parking.

Goods movement. The TMP will call for steps to support Niagara businesses by smoothing goods movements on highways into, out of and through the region. It will consider ways to shift some truck-borne freight to rail, air and marine modes, and to support efficiency gains through advanced vehicle technologies.

New mobility services and technologies. The TMP will identify ways for Niagara Region to stay “ahead of the curve” on new mobility, maximizing the benefits of advanced vehicles and emerging business models such as shared mobility services. It is too early to be prescriptive, but close monitoring of these technology developments will enable timely testing of new approaches, coordination of policy, preparation for infrastructure modifications, and evaluation of public perceptions and preferences.

1 Introduction

1.1 Towards a New Transportation Master Plan

Since Niagara Region was created in 1970, shifting social structures, personal preferences, economic conditions and technology have transformed the region. What was once a collection of smaller, separate settlements has become a web of interconnected communities that are more dependent than ever on each other.

Niagara Region is poised to capitalize on its unique characteristics and become even more prosperous and liveable, emerging as a model for other municipalities in Ontario's Greater Golden Horseshoe. Today's decisions and actions will be key to enabling Niagara's long-term growth and prosperity.

Transportation will be a major component of the region's growth and evolution. A new Transportation Master Plan (TMP) is one of three key elements of Niagara Region's growth plan, Niagara 2041:

How We GROW – The Municipal Comprehensive Review (MCR) will examine available lands, and guide population and employment growth over the next 25 years.

How We FLOW – The Water and Wastewater Master Service Plan (MSP) will create an infrastructure blueprint for critical water and wastewater services.

How We GO – The Transportation Master Plan (TMP) will look at travel in Niagara and how it can be improved for all travel modes, including walking, cycling, transit, automobiles and goods movement. The TMP will establish a long-term transportation vision for Niagara Region.

In addition to the longer-term perspective of this planning policy framework, Niagara Region is guided by six strategic priorities that Regional Council has identified for 2015-2018. One of those priorities will guide the TMP:

Moving People and Goods

Create strong linkages between all modes of transportation for people and goods:

- People need reliable and effective transportation modes that allow them to easily move from where they live to places such as work, leisure, health care, and education
- Similarly, the inter-connectedness, along with ease of use and efficiency of various types of transportation is essential for the movement of goods to support businesses to employ, locate, invest, and expand in existing and new markets

1.2 Transportation Vision and Goals

In Stage 1 of the TMP process, the Region worked with technical agencies, stakeholders and the public to develop a Transportation Vision and seven accompanying goals. Together, these statements recognize that the transportation network is a resource for improving Niagara's competitiveness and quality of life.

Transportation Vision for Niagara Region

In 2041, Niagara Region will be supported by a transportation network that will help establish Niagara as a leader in: building, preserving and enhancing liveable communities; economic development; tourism; sustainable transportation practices; and the emerging shared economy.

Goal for the TMP

- **Integrate transportation and land use:** Transportation and land use planning will be coordinated and reflect the unique needs of the Region's communities.
- **Support economic development:** The transportation network will support the efficient movement of goods, provide adequate connections to support the tourism industry, and provide high-quality access to employment for all residents.
- **Enhance multimodal connectivity:** Modes of travel will be fully integrated across the Region, allowing seamless connections and more travel choices.
- **Improve options for sustainable modes:** A balance between modes will be achieved, minimizing the need for new infrastructure and reducing greenhouse gas emissions.
- **Maintain and improve the efficiency of the goods movement network:** The transportation network will optimize the efficiency of the freight transportation sector.
- **Promote the development of healthy communities:** The TMP will support and promote active transportation options for all network users.
- **Develop a realistic yet innovative blueprint for implementation:** The TMP will provide the blueprint for decision-making that will be transparent, inclusive and accountable, and that will provide better value to households, businesses and governments.

Together, the vision and goals provide a framework for a more detailed examination of current and future needs, and of opportunities for transportation to help create the future that Niagara Region wishes for itself.

1.3 What Niagara Residents Told Us

In March 2016, Niagara Region residents offered feedback on transportation issues through an online survey on the Transportation Vision, future priorities and possible strategies. The survey asked individuals to choose three top priorities from six candidates, and for each top priority to

rate the importance of several possible strategies. The six priorities, in order of respondents' preference, were:

1. *Improve travel within Niagara Region:* Making travel around Niagara easier for residents, businesses and visitors through improvements to transit, roads and walkways.
2. *Improve travel to and from Niagara:* Develop or expand transportation options for easier travel between Niagara and the Greater Toronto Area and other regions. This could include new or expanded services such as daily GO Train service.
3. *Support healthy communities:* The transportation system will support healthy communities by providing residents with a wide range of travel options such as cycling and walking within their communities.
4. *Embrace new technology:* Incorporate new technologies that change the way we work, communicate, and travel, including alternative fuels and driverless vehicles.
5. *Improve partnerships:* Work with other levels of government and the private sector to deliver cost effective and timely transportation projects.
6. *Support business transportation needs:* Focus on improving the movement of goods and services to support local businesses and potential investors.

The top five strategies identified by residents were:

- Extending all-day GO Rail service to Niagara Region
- Increasing roads and transit service between municipalities within Niagara Region
- Improving connections between north and south Niagara
- Develop multimodal transportation hubs
- Build Niagara-to-GTA corridor

Other highly-rated strategies were:

- Improving ways for residents of all ages to move around Niagara Region, by providing more walking, cycling pathways and trails
- Designing roads that are safer for pedestrians and cyclists
- Having an easy transit fare payment system that promotes transit use
- Providing real-time information on transit and traffic conditions
- Supporting transportation policies that can help retain young adults in Niagara
- Continuing to seek funding for transportation projects from the federal and provincial governments
- Improving service coordination between different transit providers in Niagara Region

These priorities were actively considered in later stages of TMP development.

1.4 About this Report

The purpose of this report is to identify *transportation needs* in Niagara Region, based on emerging trends and the current performance of the transportation system, and *opportunities* to address those needs and help Niagara Region become more prosperous and liveable. Its conclusions will be used to refine the TMP Vision and directions, inform the development of transportation network alternatives, and ultimately shape the final policies, programs and projects that will be recommended in the TMP.

The remainder of this report contains four sections:

- **Section 2—Trends and Projections** discusses observed and expected changes in population, land use, demographics, employment patterns, personal travel and freight movements.
- **Section 3—Transportation System Performance** assesses the current and envisioned performance of Niagara’s road, public transit and active transportation systems, considering the projections in Section 2.
- **Section 4—A Strategic View: Needs and Opportunities** identifies four groups of key needs and opportunities that can guide long-range transportation planning.
- **Section 5—Action Areas** summarizes the six major areas in which the new TMP is likely to recommend policies, programs and projects.

2 Trends and Projections

Niagara Region will change substantially over the three decades from 2011 to 2041.¹ Demographic and economic trends are expected to influence the region's land use and travel demands more strongly than in other parts of southern Ontario. As the region evolves, social and technological shifts will offer both challenges and opportunities for meeting Niagara's long-term objectives for quality of life.

This section presents current trends and future projections in several areas that will shape the need for transportation facilities and services in Niagara Region:

- **Population and employment** (Section 2.1)
- **Land use** (Section 2.2)
- **Demographics** (Section 2.3)
- **Travel by residents and visitors** (Section 2.4)
- **Freight movements** (Section 2.5)

Section 2.6 provides a summary of the most important ideas.

¹ For the purposes of this paper, the 2011 base year for planning is consistent with Niagara Region's transportation demand model.

2.1 Population and Employment

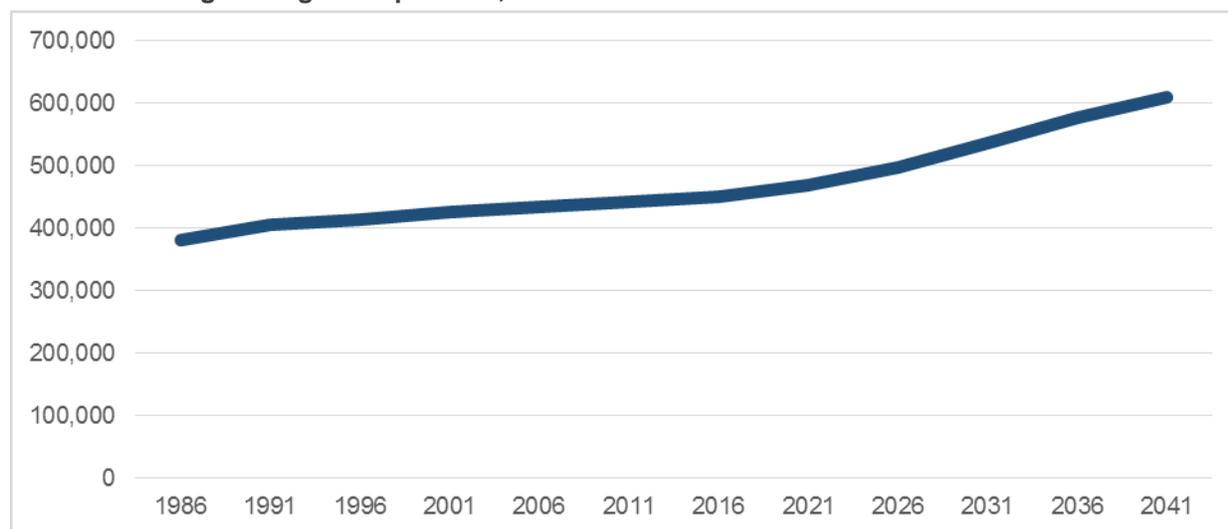
Growth will accelerate

Based on the Provincial Growth Plan, the population of Niagara Region is expected to grow by 38% from 2011 to 2041 (from 442,800 to 610,000 residents). Exhibit 2.1 illustrates the rate of growth, which is nearly double Niagara's average increase of 0.6% per year over the last 25 years.

The number of jobs in Niagara Region will also grow rapidly. By 2041, employment is expected to rise by 43% (from 185,000 to 264,000 jobs), a rate that is nearly double Niagara's average increase of 0.8% per year over the past 25 years.

Niagara is well positioned geographically, and its future population and employment growth is related to the Greater Golden Horseshoe's role as Canada's economic engine. However, growth will require new infrastructure and services to provide access and mobility to new residents, employees, tourists and goods.

Exhibit 2.1: Niagara Region Population, 1986-2041



Source: 1986-2015 CANSIM; 2016-2041 MCR

Growth will be focused in urban areas

The Municipal Comprehensive Review being undertaken as part of Niagara 2041 is developing a new growth strategy consistent with Niagara's goals of becoming more sustainable, liveable and prosperous. The Provincial Proposed Growth Plan for the Greater Golden Horseshoe calls for greater densities in urban areas, and for protection of the Greenbelt. Growth will be allocated to focus on key areas:²

- More than 69,000 new residents (41% of Niagara's total growth) will be added to the municipalities of St. Catharines and Niagara Falls, allowing today's multimodal infrastructure to be used more efficiently.

² MCR forecasts dated July 11, 2016. Growth measured between 2011 and 2041.

- The three western Niagara municipalities, whose residents are increasingly commuting to the GTHA, will see significant growth, with West Lincoln more than doubling, and Grimsby and Lincoln growing by 43% and 37% respectively.
- The region's seven other municipalities will see an average population increase of 39% by 2041, ranging from 15% in Port Colborne to 87% in Niagara-on-the-Lake.
- 46% of new employment will be located in St. Catharines and Niagara Falls, but the highest employment growth rates are expected in West Lincoln (123%) and Lincoln (82%). The smaller municipalities will have an average employment growth of 48%.

Exhibit 2.2 shows future population and employment growth by municipality.

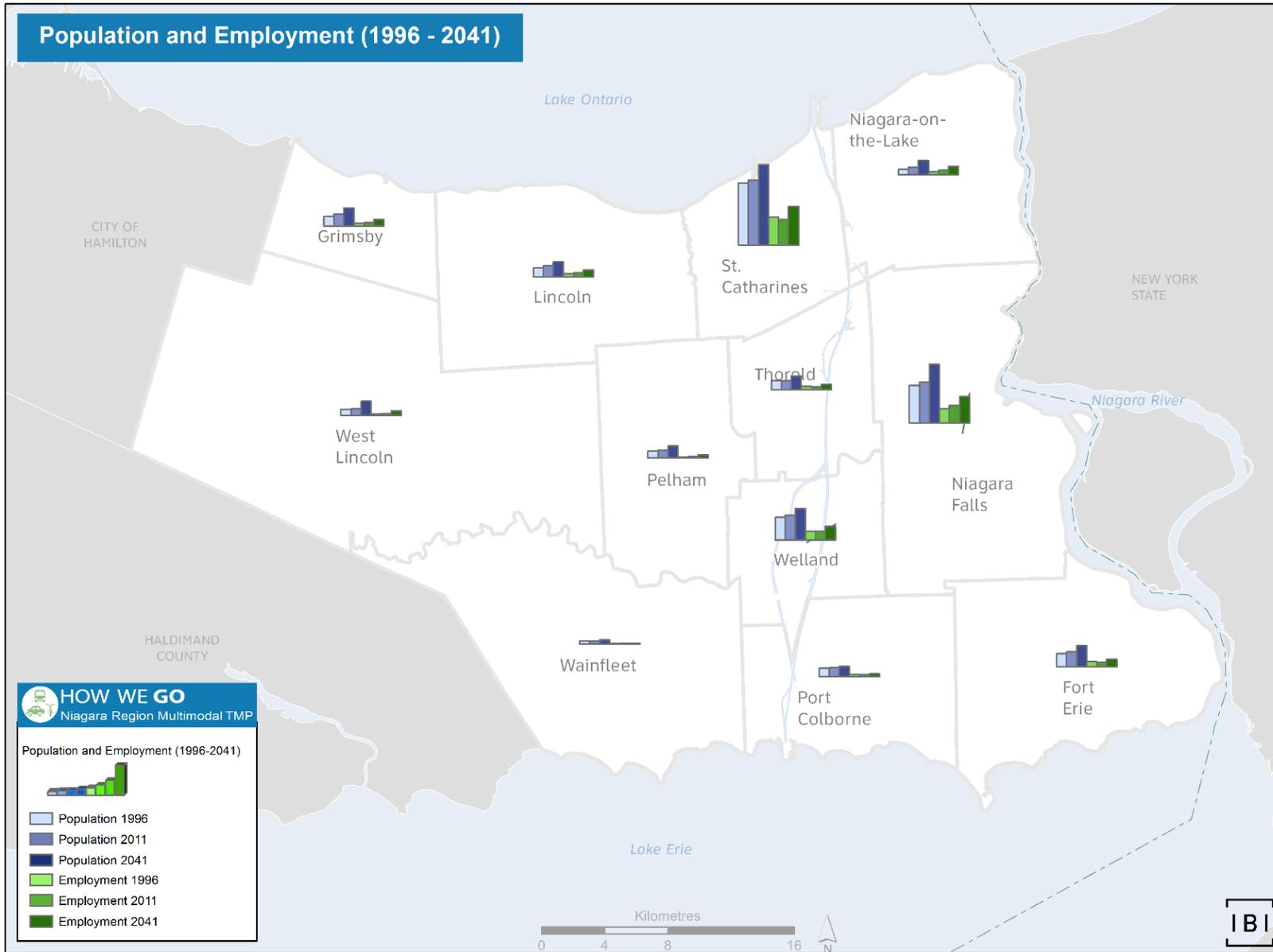
2.2 Land Use

Land use and transportation system performance are linked

Patterns of land use distribution, density and form are vital to the effectiveness and efficiency of public transit. Lower densities mean fewer people live and work within walking distance of a bus stop, meaning longer and more circuitous routes are needed to serve residents. A density of at least 50 persons and jobs per hectare is recommended to support basic transit service; however, in 2011 only 2% of Niagara's urban area had densities that met this target (see Exhibit 2.3). By 2041, that number will almost triple to 5% while another 27% of the Region will have densities that approach the target for transit-supportiveness. Further, the Region is planning for an urban structure with higher-density mobility hubs, centres and corridors, which also provide the trip densities to support higher levels of public transit service.

Providing efficient transit service to Niagara residents in lower-density areas, especially outside peak periods, will require alternatives to conventional scheduled services that leverage new technologies.

Exhibit 2.2: Population and Employment Growth by Municipality, 1996-2041

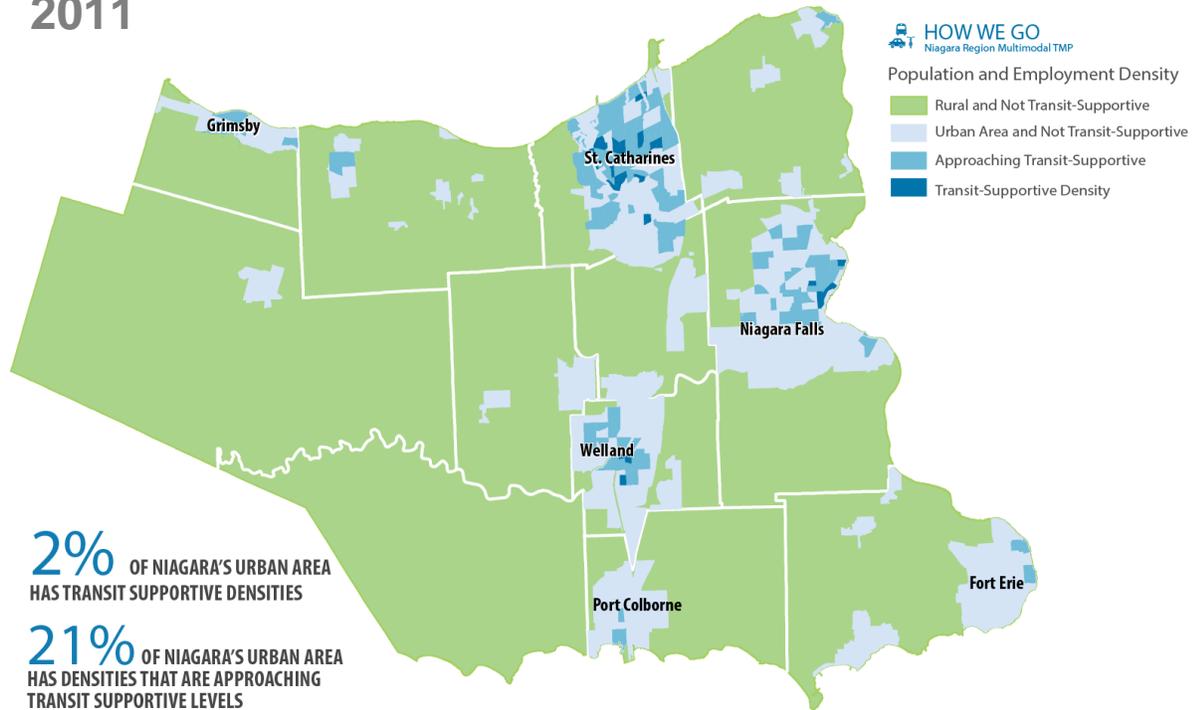


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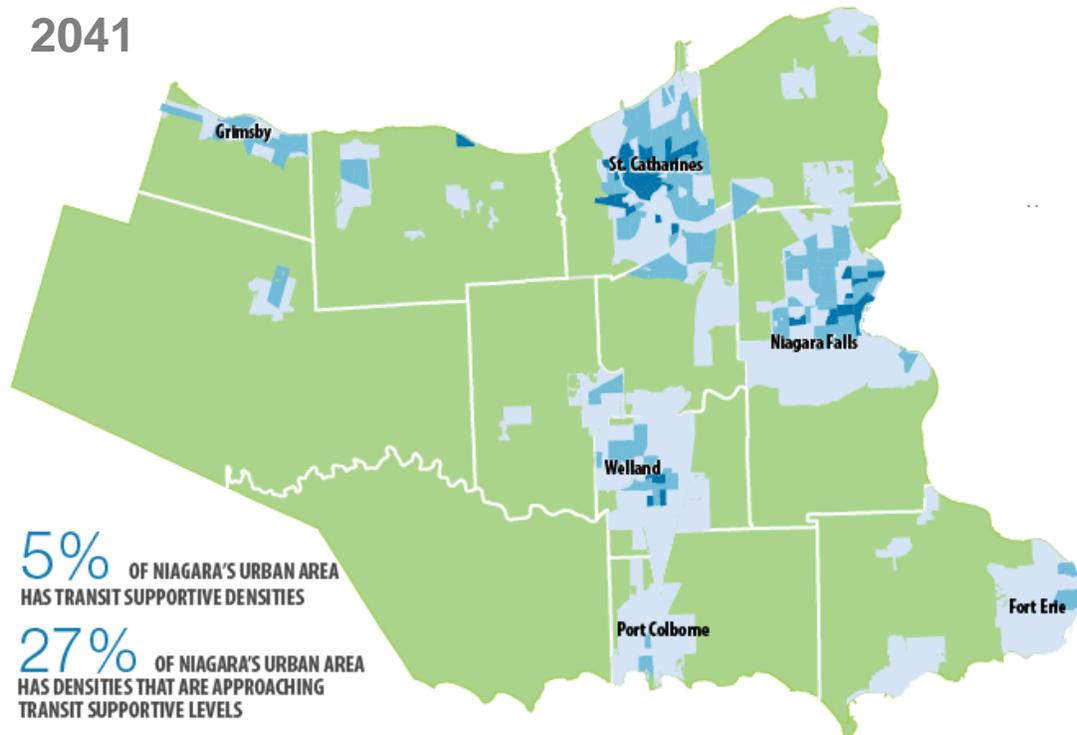
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Exhibit 2.3: Density by Urban Area, 2011 and 2041

2011



2041



2.3 Demographics

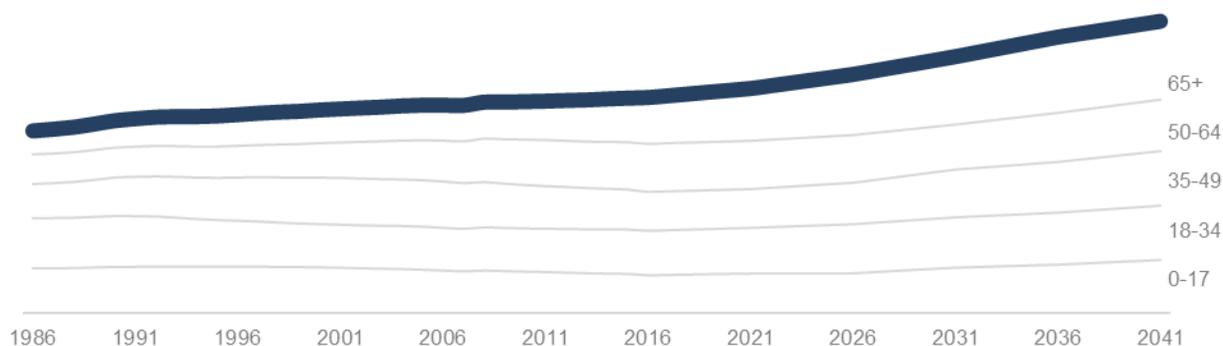
Niagara is aging, but young adults will start returning to the region

Like most of Canada, Niagara Region is getting older. Between 1986 and 2011, the median age of Region residents increased dramatically, from 36 to 44 years; in the GTHA, it only grew from 34 to 39 years. Over the last 20 years, the over-50 population grew by 35% while the under-50 population shrunk by 6%; over the next 25 years, Niagara’s population of seniors will double. Exhibit 2.4 shows more detail on these trends.

While the large generation of Baby Boomers (now 50 to 75 years old) is driving these trends, the aging of Niagara Region is also due to migration. Seniors and older adults are moving into Niagara, attracted by its affordability, recreational opportunities, cultural attractions, and access to the GTHA and the USA. At the same time, young adults are leaving Niagara and moving to capitalize on the GTHA’s education and employment opportunities, and its more urban lifestyle.

Recent decreases in Niagara’s population of young adults are expected to reverse, and this cohort will grow 31% by 2041. Young families will move into Grimsby and Lincoln, which offer proximity to the GTHA, and land use intensification in St. Catharines and Niagara Falls will attract young adults who seek an urban lifestyle. By 2041, the under-35 population is expected to grow by 51,000 persons or 30%.

Exhibit 2.4: Niagara Region Population by Age, 1986-2041



Age	1986		2011		Growth 1986- 2011	2041		Growth 2011- 2041
	Pop.	Share	Pop.	Share		Pop.	Share	
0-17	92,932	24%	84,953	19%	-9%	110,304	18%	30%
18-34	105,054	28%	90,707	20%	-14%	113,718	19%	25%
35-49	71,383	19%	89,250	20%	25%	114,223	19%	28%
50-64	62,138	16%	96,577	22%	55%	107,790	18%	12%
65+	49,045	13%	81,316	18%	66%	163,964	27%	102%
Total	380,552	100%	442,803	100%	16%	610,000	100%	38%

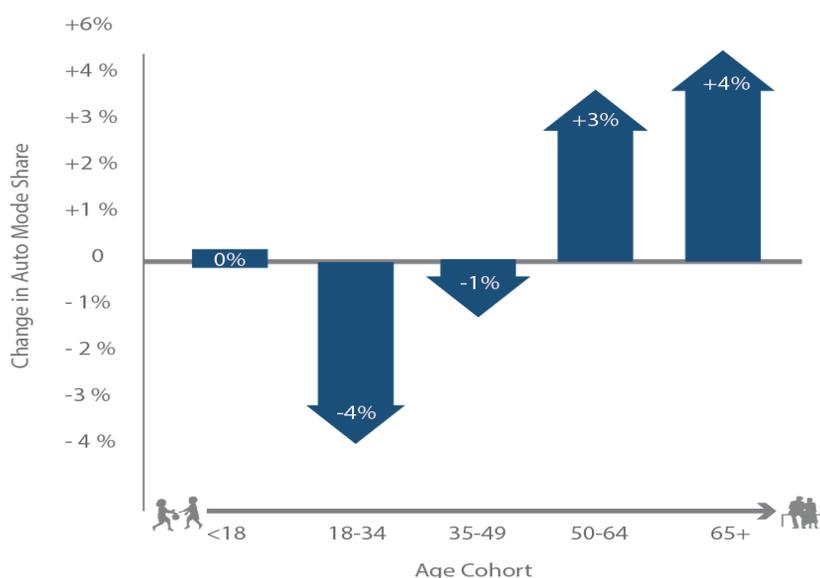
Source: 1986-2015 CANSIM; 2016-2041 MCR

Young adults are driving less

Young adults aged 18 to 34 are the future of Niagara. They place a higher importance on an urban lifestyle than previous generations, and are more averse than their parents to the cost and inconvenience of suburban homes and car ownership. Multimodal mobility options are needed to meet their transportation needs, and walk- and bike-friendly environments are essential to attracting them to Niagara.

Auto ownership has decreased among young adults, as driving has become less important to them. In 2011, only 80% of youths 18-24 years old held a driver's licence, compared to 86% in 2001. The share of travel that 18-34 year olds made by cars dropped by 4% between 1996 and 2011, as shown in Exhibit 2.5. Instead of driving, young adults are carpooling, taking transit, walking, cycling, and using technology-enabled services such as ridesharing and carsharing. Young adults are also increasingly connected with their friends/community through technology and social media and the smartphone has become an important status symbol, with ownership of a car becoming less important.

Exhibit 2.5: Change in Auto Drive Mode Share by Age Group, 1996-2011



Seniors are going out more and enjoying their retirement

The increasing health and prosperity of seniors has led them to higher levels of auto ownership and use compared to previous generations. Historically, seniors are strong transit users; they have been less likely to own cars, and age prevents many from driving for health or economic reasons. Many seniors tend to rely on walking, transit and carpooling to reach critical services and maintain social connections.

Seniors are increasingly going out to socialize and enjoy their retirement, and they are making more car and transit trips (0.33 more trips daily in 2011, compared to 1996). The share of trips that seniors make by driving grew by 4% between 1996 and 2011. Transit is capturing a lower proportion of seniors' trips, and reversing that trend will require transit systems to more effectively meet the needs of older residents.

The job market and labour force are changing

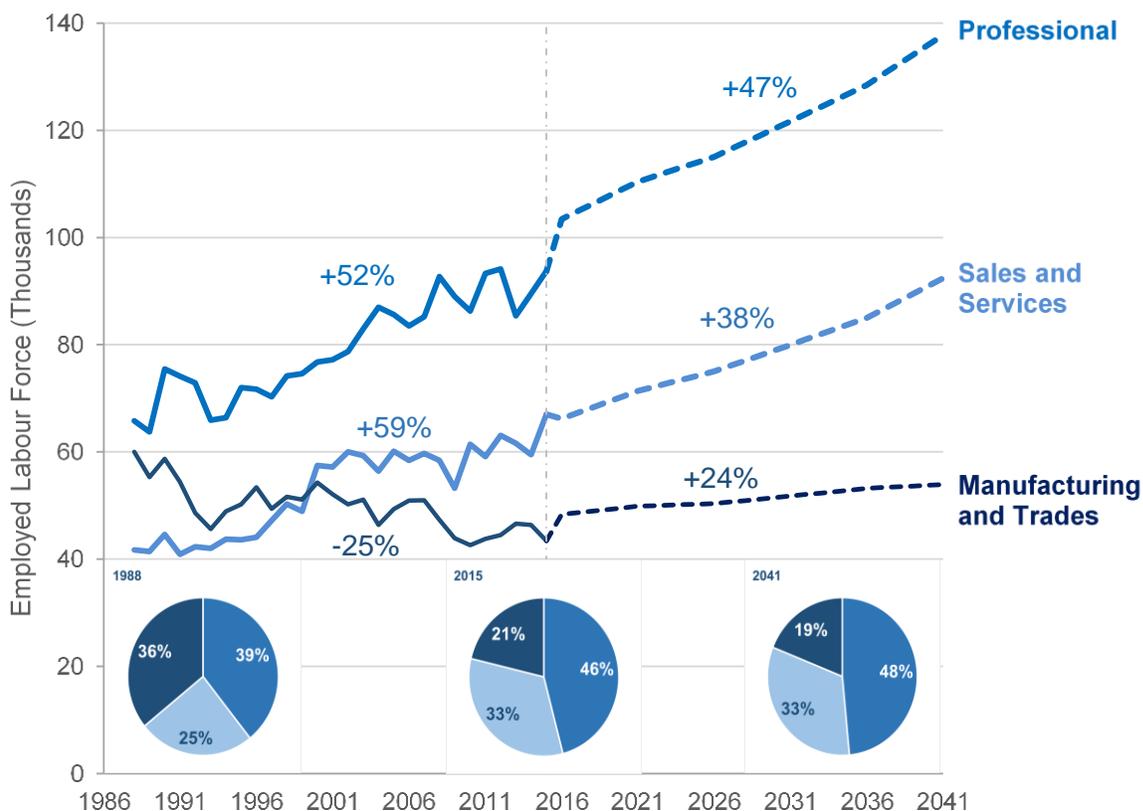
Niagara's employment base will grow by 30% over the next 25 years from 203,000 in 2016 to 264,000 in 2041, but future jobs will be different from those of 25 years ago. Heavy job losses have occurred in St. Catharines, Welland and Fort Erie, as manufacturing and trades jobs disappear with production shifting overseas. Exhibit 2.6 shows that the recession in the early 1990s led to significant job losses, especially in manufacturing and trades. In the decade after 2001, the total number of jobs³ in Niagara Region dropped by about 2,200; however, the number of jobs in manufacturing and trades actually decreased by more than 20,000, a loss counterbalanced by growth in other sectors including sales and service (which includes many jobs related to tourism).

Changes to employment in Niagara Region will affect the transportation network. The Transportation Association of Canada's *Urban Transportation Indicators* survey has revealed a relationship between occupation type and commuting mode in Canada's major metropolitan areas. People who work in manufacturing and trades are most likely to drive to work, while those who work in sales and service are most likely to take transit or active modes. While professional occupations fall somewhere in between, employers of professionals value urban areas for their ability to attract young, educated adults.

Shifts in job types and locations in Niagara Region are related to demographic change, because employment opportunities are a primary concern for those considering migrating to or from Niagara. Similarly, the availability of a suitable labour force is a key factor in the relocation of employers to Niagara. Successfully focusing the region's growth in urban areas will require better transit and active transportation options; those options, combined with urban growth and a continued shift in employment from manufacturing to sales/service and professional sectors, will reduce the share of residents who drive to work.

³ Location of usual place of work

Exhibit 2.6: Labour Force Trends, 1986-2041



Source: 1988-2015 CANSIM, 2016-2041 MCR.

2.4 Travel by Residents and Visitors

More trips are being made off-peak

From 2011 to 2041, total travel demand in Niagara is projected to grow by 44% while population and employment will grow by 38% and 43%, respectively. However, the increase in trips will not be spread evenly throughout the day, as shown in Exhibit 2.7, and new trips will increasingly be made outside peak periods. Most seniors do not have a daily work commute, and tend to travel at other times of the day. Improvements to transit services will need to consider the growing demand for travel in off-peak periods.

Exhibit 2.7: Motorized Trips by Time of Day, 2011 and 2041

Time of Day	2011 Trips	2041 Trips	Increase
AM Peak Period	219,000	308,000	41%
PM Peak Period	228,000	320,000	40%
Rest of Day	717,000	1,053,000	47%
Total	1,164,000	1,681,000	44%

Source: Niagara Regional Travel Forecasting Model

Non-home-based trips are rising

The reasons that people travel will also change over the next 30 years. Exhibit 2.8 shows that between 2011 and 2041 non-home-based trips (e.g. from work to daycare) and home-based other trips (e.g. home to shopping) are expected to increase faster than other trip types, driven mainly by retired seniors. The anticipated rise in home-based school trips is only 26%, which matches the 26% growth in the under-25 school-aged population. Home-based work and school trips tend to occur during peak periods, while home-based other and non-home-based trips occur at varying hours. These shifts reveal the impact of seniors travelling at non-peak times, when transit services happen to be of lesser quality.

Exhibit 2.8: Trips by Purpose, 2011 and 2041

Mode	2011 Trips	2041 Trips	Increase
Home-Based Work	267,000	380,000	42%
Home-Based School	85,000	107,000	26%
Home-Based Other	614,000	896,000	46%
Non-Home-Based	198,000	297,000	50%
Total Trips	1,164,000	1,681,000	44%

Source: Niagara Regional Travel Forecasting Model

Sustainable transportation modes are not gaining mode share

Today, there are limited alternatives to car travel for trips between Niagara's local municipalities. While the proportional split between different forms of motorized transportation has not changed between 1996 and 2011 (a trend expected to continue to 2041, as shown in Exhibit 2.9), the share of walking and cycling trips in the region has decreased.

Niagara Region's future population of young adults is likely to have a rising preference for sustainable travel (e.g. transit, walking and cycling). However, increasing transit's mode share will be challenging; conventional transit services serving non-commuters are less cost-effective to provide, as they are more likely to travel outside peak periods, and to destinations with lower-than-downtown densities. Innovative service approaches could help make transit more competitive for a wider range of trips, and address this challenge.

More than half (54%) of personal trips and 69% of work trips within Niagara Region are less than five kilometres long—a distance easily covered by bike in fewer than 20 minutes. Despite this, only 4% of all trips and 7% of trips to work are made by cycling or walking. Even more of the trips (75%) within individual municipalities are less than five kilometres long, but only 5% are made by foot or bike.

Exhibit 2.9: Motorized Trips by Mode, 2011 and 2041

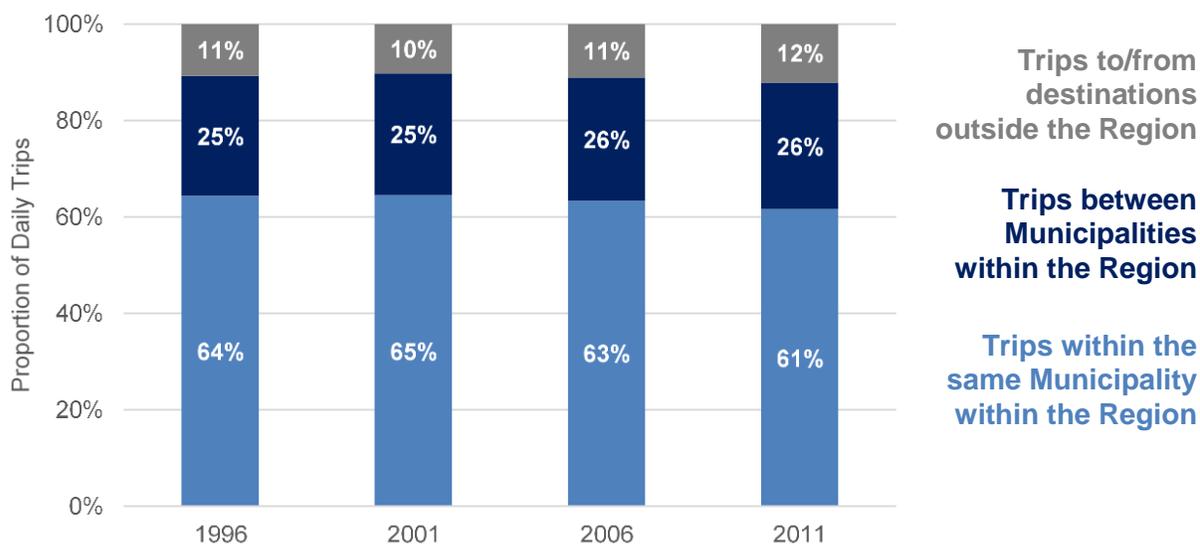
Mode	2011 Trips	2011 Share	2041 Trips	2041 Share
Auto	1,116,000	96.0%	1,614,000	96.0%
Auto Driver	883,000	75.9%	1,280,000	76.1%
Auto Passenger	234,000	20.1%	334,000	19.9%
Public Transit	19,000	1.6%	31,000	1.8%
School Bus	28,000	2.4%	36,000	2.1%
Total Motorized	1,164,000	100.0%	1,681,000	100.0%

Source: Niagara Regional Travel Forecasting Model

Niagara is “regionalizing”

Exhibit 2.10 shows how the number of trips to, from and within Niagara Region changed between 1996 and 2011. One important trend to note is a steady growth in travel into and out of the region, as well as among its twelve communities. The proportion of trips starting in one Niagara Region municipality and ending in another grew from 25% in 1996 to 26% in 2011, and is expected to reach 29% by 2041 (see Exhibit 2.11). From 2011 to 2041, the fastest-growing segment of trips (up by 60%) will be those between Niagara municipalities. While improved connections to other regions will be needed to support overall trip growth, there will also be a clear need to improve multimodal connections between communities.

Exhibit 2.10: Origin/Destination of Daily Trips based in Niagara Region 1996-2011



Source: Transportation Tomorrow Survey

Exhibit 2.11: Origin/Destination of Daily Trips based in Niagara Region, 2011 and 2041

Origin/Destination	2011 Trips	2041 Trips	Increase
Within Same Municipality	714,000 (61%)	1,015,000 (60%)	42%
Between Niagara Municipalities	306,000 (26%)	491,000 (29%)	60%
To/From Hamilton & Burlington	86,000 (7%)	106,000 (6%)	23%
To/From External	58,000 (5%)	69,000 (4%)	19%
Total	1,164,000	1,681,000	44%

Source: Niagara Regional Travel Forecasting Model

Hamilton and the western GTA remain important travel markets

The GTHA is the economic engine of the province and a major attractor of trips from Niagara Region. Not only do many Niagara residents commute to Hamilton and Halton for work, but the GTHA’s many institutional, education and retail hubs attract frequent trips for other purposes.

The number of daily trips between Niagara and the GTHA has grown rapidly, increasing by 35% between 1996 and 2011, to reach just over 135,000. This growth was much greater than the 7% increase in Niagara’s population in the same period, and resulted mostly from commuters who live in Grimsby, Lincoln or West Lincoln and work in Hamilton and Halton Region.

As Niagara Region grows, a growing proportion of its population will consist of seniors who will not commute to and from the GTHA. Increasingly, young adults will seek to work near their homes, and Niagara residents will be drawn to both live and work in the region. For these reasons, travel between Niagara and the GTHA will continue to grow but at a slower rate. By 2041, this travel market is forecast to grow by 20% to 175,000 daily trips.

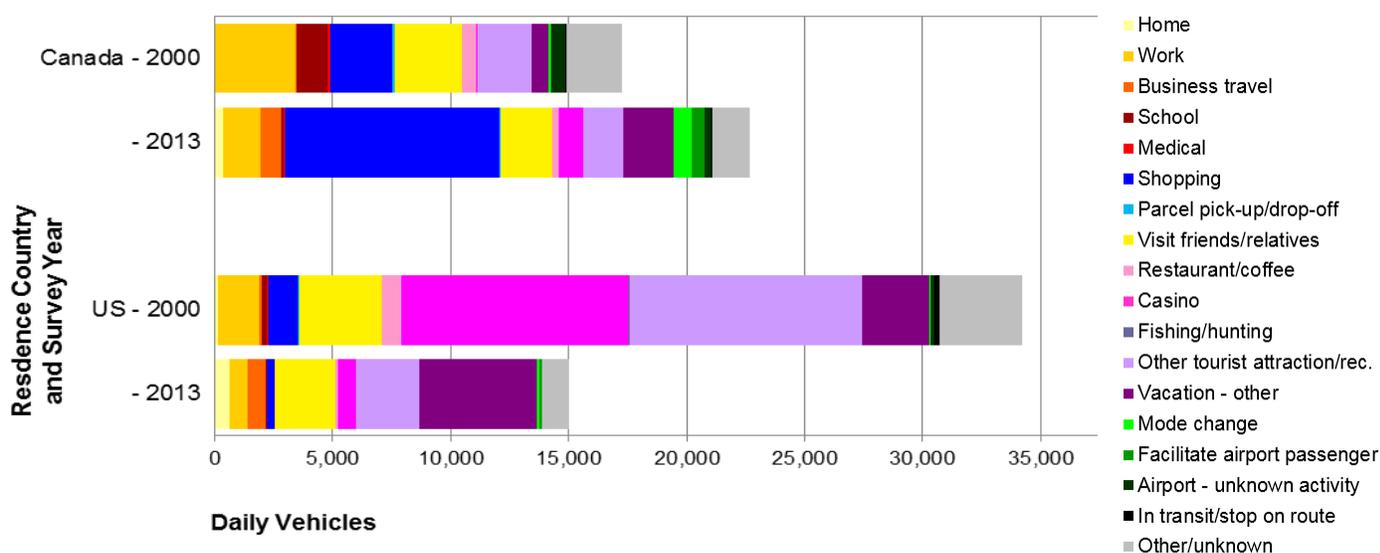
The QEW is the main road linking Niagara Region to the GTHA, and sees considerable peak period congestion all year with even more tourism-linked congestion in summer. Accommodating future growth in the QEW corridor, and fostering economic connections between Niagara Region and the GTHA, will likely require new road and transit infrastructure, as well as strategies to manage both the supply and demand for travel by all modes.

Cross-border tourism is a significant summer travel market

Niagara Region is an attractive destination for American tourists, and as a stopover point for Canadians travelling to the United States. Cross-border traveller volumes peak during the summer months, and for the last 15 years they have fluctuated with the strength of the Canadian dollar. When the U.S. dollar is strong, US residents are more likely to come across the border for recreation and tourism. When the Canadian dollar is strong, Canadians will travel to the US for tourism and shopping. Exhibit 2.12 shows the trip purposes for cross-border travellers in both directions for 2000 and 2013, while Exhibit 2.13 shows how cross-border vehicle volumes by Canadian and American vehicles at all four Niagara border crossings have varied with the Canadian and American dollars, respectively. The latter exhibit shows a strong correlation between cross-border trips by American drivers and the value of the US dollar until 2008 or so. However, since 2013 a stronger US dollar has not been matched with a rise in trips to Canada; a more negative outlook on the economy by Americans has been leading them to spend less on tourism.

In contrast, Canadians have responded more consistently to currency fluctuations. Cross-border shopping is a common reason for Canadians to visit the US, and a high Canadian dollar provides additional value for travelers.

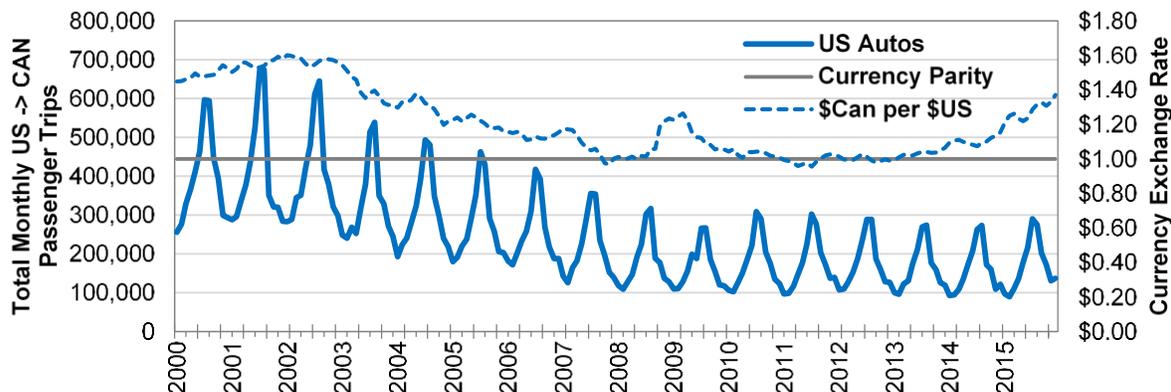
Exhibit 2.12: Cross-Border Trip Purposes at Niagara International Crossings, 2000 and 2013



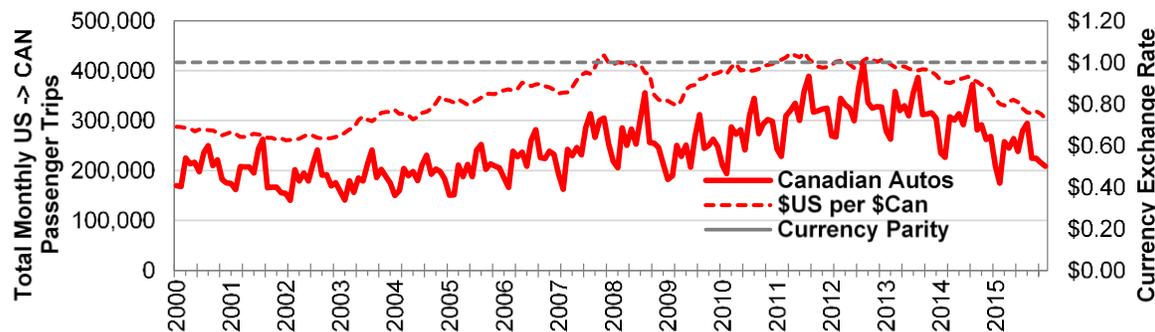
Source: MTO Border Crossing Survey

Exhibit 2.13: Monthly Cross-Border Trips at Niagara International Crossings versus \$CDN/\$USD Exchange Rates, 2000-2015

US Residents



Canadian Residents



Source: IBI analysis of CANSIM Table 427-0002

Tourism travel could be better served using existing rail infrastructure. There is one cross-border train trip in Niagara each day, entering the U.S. in the morning and returning to Canada in the evening. Thus, American tourists cannot make same-day return train trips to Niagara Region; a reverse-direction cross-border route would give them an option to do so, and would also enable connections to future expansions of GO rail service in Niagara Region.

Other possible improvements to cross-border travel could add more dedicated NEXUS lanes, or public transit and pedestrian connections that would reduce the demand for local cross-border trips by car. While security measures led to a significant drop in cross-border travel after 2001, the Canadian and U.S. governments have recently worked proactively to improve cross-border cooperation and travel times.

2.5 Freight Movements

International trade is critical, but through trips have limited local impact

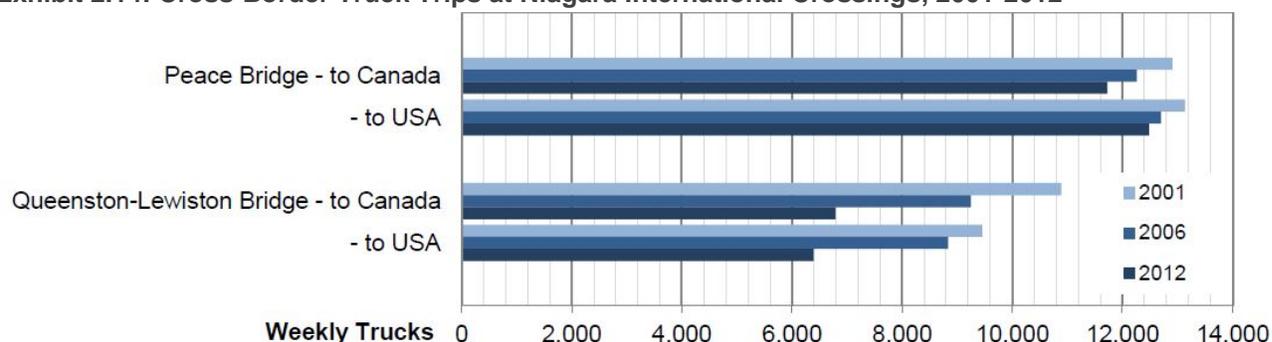
Every day, thousands of commercial vehicles pass through Niagara’s international border crossings, two of which (the Queenston-Lewiston and Peace Bridges) accommodate commercial vehicle traffic. Security measures after 2001 impinged on Canada-U.S. trade, which

has generally decreased. Over the last decade, commercial traffic crossing the border at Niagara in both directions has been decreasing, as shown in Exhibit 2.14, with truck traffic levelling off between 2010 and 2015.

While goods movement is crucial to Niagara's economy, relatively few cross-border freight trips start or end in the region. In fact, the 2012 MTO Commercial Vehicle Survey (CVS) found that only 15% of surveyed cross-border commercial vehicles were headed to or from Niagara (with 39% of those starting or ending their trips in St. Catharines or Lincoln).

Between 2013 and 2015, Canadian-U.S. trade has begun to rise back toward pre-2001 levels. Niagara's recent designation as a Foreign Trade Zone Point will also promote the region as an international trade hub with tariff and tax exemptions. By 2041, cross-border truck traffic is expected to increase as the Canadian and American economies grow; supporting infrastructure may be needed to enable the growth of Niagara businesses.

Exhibit 2.14: Cross-Border Truck Trips at Niagara International Crossings, 2001-2012



Source: MTO Commercial Vehicle Surveys

The GTHA is a growing influence on freight in Niagara Region

Despite a decrease in cross-border truck traffic, overall truck volumes in Niagara Region have remained steady. This is largely due to economic growth in the GTHA, which is a key destination for Niagara Region's manufactured goods and a growing volume of aggregates. Truck volumes in Niagara Region are expected to grow by 57% from 2011 to 2041, from 35,000 to 55,000 daily trips as shown in Exhibit 2.15. A majority of those will continue to be through trips or trips between Niagara and the GTHA.

The QEW is the main link from Niagara Region to the GTHA, and is a significant constraint on trucking activities in Niagara. Exhibit 2.16 shows that the vast majority of Niagara's truck traffic travels to or from the GTHA on the QEW. Trucks represent about 15% of weekday traffic volumes on the QEW, which is congested during weekday peak periods and off-peak tourist times. Increasing demands on the QEW will lead many truck drivers to look for alternatives.

Trucking in Niagara is also challenged by the Niagara Escarpment, where steep grades of 6% to 12% create safety and operating concerns, including the movement of trucks through small towns. However, new escarpment crossings may be needed to serve future truck traffic looking for an alternative to the QEW.

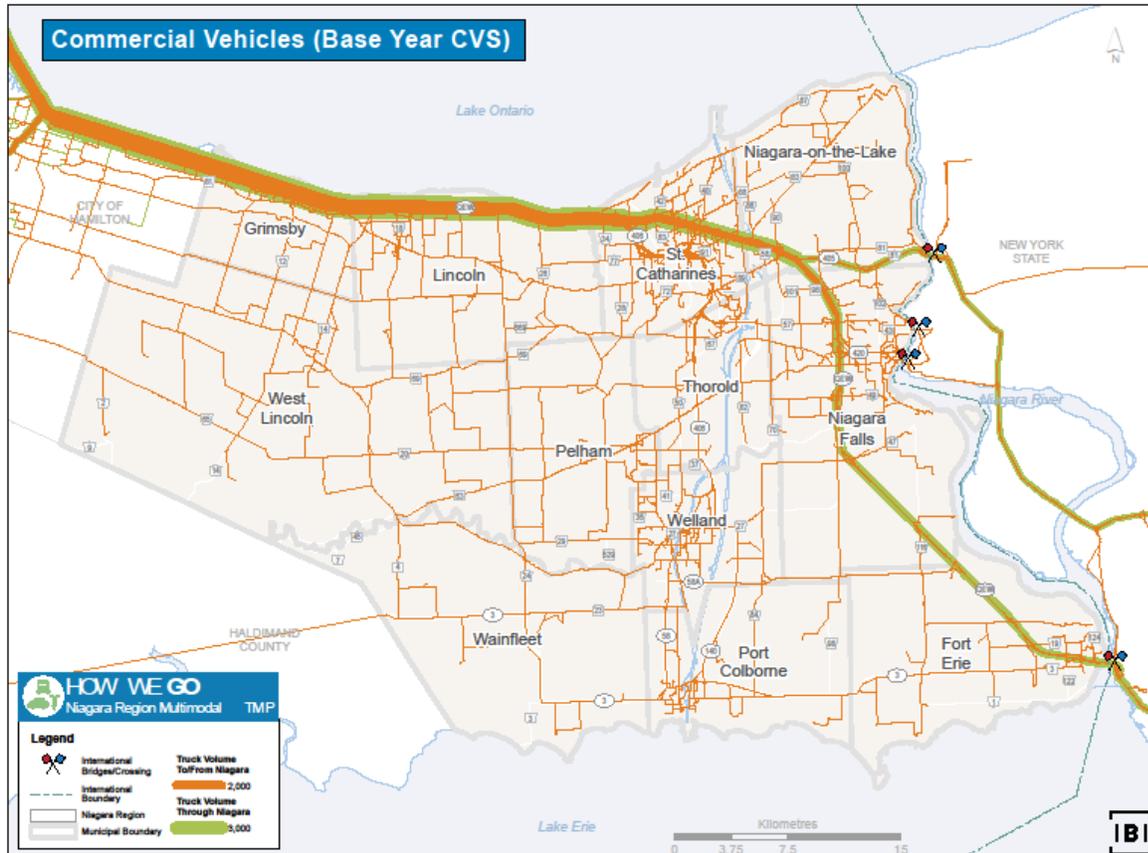
The local economy depends on the safe and efficient movement of commercial vehicles to, from and within Niagara Region. Future improvements will be needed to support truck travel to and from commercial and industrial hubs, and to ensure that road infrastructure can accommodate high truck volumes and the geometric requirements of different commercial vehicle configurations.

Exhibit 2.15: Daily Truck Trip Volumes by Origin and Destination, 2011 and 2041

Origin/Destination	2011 Trips	2041 Trips	Increase
Within Same Municipality	8,000	12,000	49%
Between Niagara Municipalities	14,000	22,000	57%
To/From External	13,000	21,000	61%
Total	35,000	55,000	57%

Source: Niagara Regional Travel Forecasting Model

Exhibit 2.16: Commercial Vehicle Volumes, 2012



Source: MTO Commercial Vehicle Survey 2012

Air, rail and marine assets play a declining role in goods movement

Goods also move through Niagara by rail, water and air. While QEW truck volumes have increased and face significant congestion, most other freight modes have shown a slow decline and now have spare capacity. The Welland Canal’s vessel transits and cargo tonnes have declined slowly for 20 years. Similarly, loaded rail containers crossing the border between Buffalo and Niagara Falls declined from 2000 to 2009, although they have been stable since then. At the region’s two publicly-owned airports (the St. Catharines/Niagara District Airport in Niagara-on-the-Lake, and the Welland/Niagara Central Airport in Welland) total aircraft movements have been fairly stable; air cargo movements are assumed to have followed suit.

Exhibit 2.17: Cargo Tonnes through the Welland Canal, 1996-2015⁴

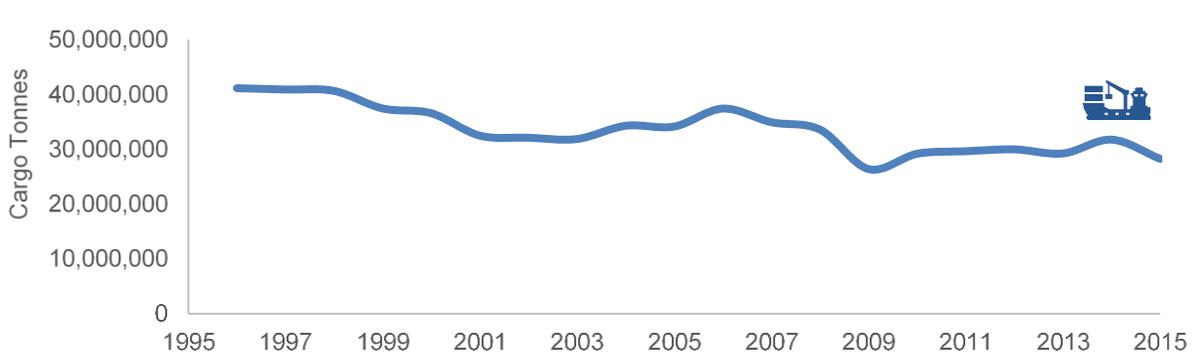


Exhibit 2.18: Loaded Rail Containers Passing Between Buffalo and Niagara Falls, 2000-2015⁵

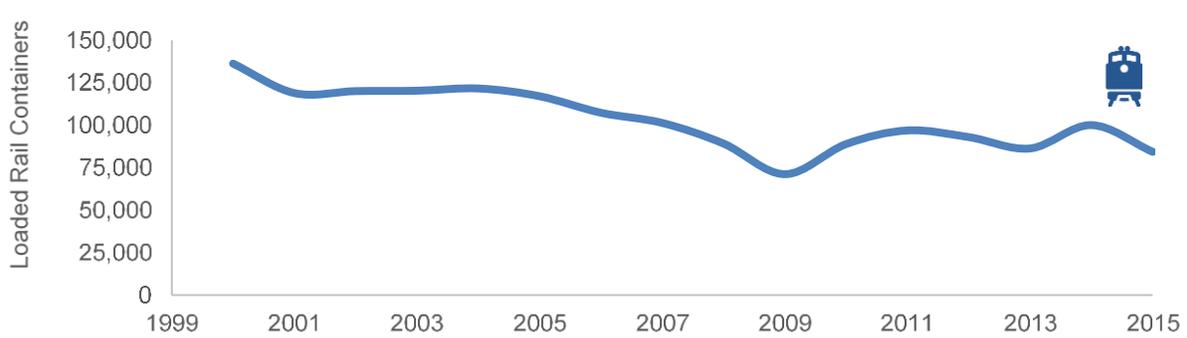
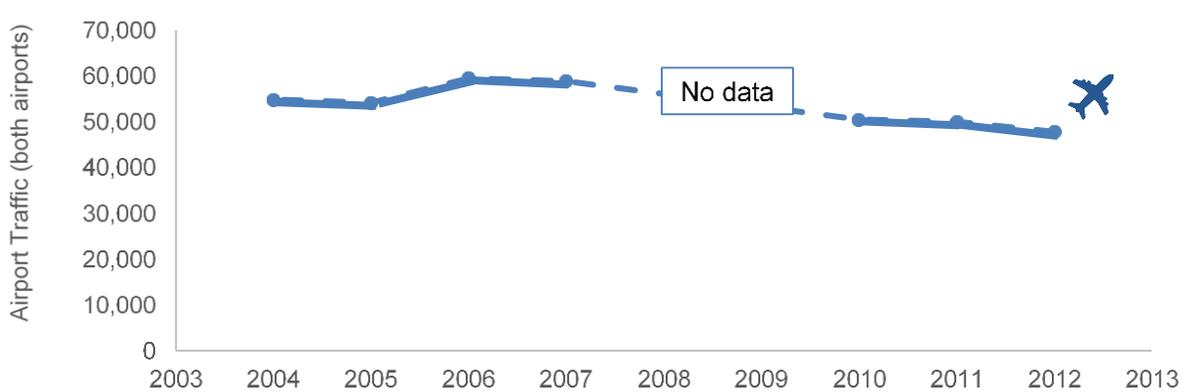


Exhibit 2.19: Airport Traffic at Niagara District Airport, 2004-2012⁶



⁴ The St. Lawrence Seaway 2015 Traffic Report

⁵ U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations.

⁶ Niagara Airports Study - Jacobs Consultancy, July 31, 2009 and Statistics Canada aircraft movement data

2.6 Summary

As Niagara Region evolves, transportation demands are growing and becoming more complex:

- The region's population and employment base will grow substantially by 2041, mostly in urban areas.
- Age-related issues and lifestyle preferences among seniors and young adults will boost demands for non-car travel options.
- A shift in employment from the manufacturing and trade sector to professional and sales/service sectors will increase the market for transit and active travel modes.
- Travel is increasing throughout the day, as seniors make trips outside of peak periods.
- Reliance on cars remains strong, and future growth in travel demand—especially those outside peak times and between local municipalities—would be poorly served by existing transit service.
- Residents are increasingly likely to make trips between local municipalities, rather than staying within them.
- Trips between Niagara Region and the GTHA, particularly by commercial vehicles, will continue to increase.

In response, Niagara Region will need to strengthen connectivity among its municipalities and to the GTHA, and to provide better options for non-car travel. Without significant action, car travel will remain the overwhelming choice of residents—a situation that could have significant impacts on Niagara's quality of life, economy and environment.

3 Transportation System Performance

The movement of people and goods through Niagara Region by road, rail and water has been a major historical influence on the region and its transportation system. Exhibit 3.2 shows the major elements of Niagara Region's transportation system including its extensive road network (195 km of Provincial highways, 772 km of Regional roads, 3,500 km of municipal roads, and 56 km of roads under the jurisdiction of the Niagara Parks Commission), 250 km of railway lines, 43 km of canals, two public airports and three ports. The Region has several vital international linkages, including four Niagara River bridges that carry road traffic between Ontario and New York State, and the Welland Canal that bisects the region from St. Catharines in the north to Port Colborne in the south.

Niagara Region's fertile agricultural lands, Niagara Escarpment and majestic Horseshoe Falls are natural heritage features that attract visitors from across the globe. The popularity of the Region as a tourist destination has led to traffic congestion that peaks during weekends and holidays, rather than weekday rush hours. The region's unique features and topography also affect personal and freight travel. The Niagara Escarpment impedes truck movements, and bottlenecks at tunnel and bridge crossings of the Welland Canal cause traffic delays at the lift bridges that allow the canal to carry 3,000 vessels each year.⁷

This section of the report provides an overview of the performance of the three mobility networks of greatest interest to the TMP process:

- **Roads** (Section 3.1)
- **Public transit** (Section 3.2)
- **Active transportation** (Section 3.3)

⁷ St. Lawrence Seaway 2015 Traffic Report

3.1 Roads

The road network can serve projected growth with only strategic expansion

At the network level, the current road network has adequate capacity to accommodate most of Niagara's projected growth. Operational improvements at specific hotspots may still be needed. Travel by motorized vehicles is expected to grow 55% by 2041, reaching more than 10 million vehicle-km daily. Despite this increase, little change in congestion levels is expected (see Exhibit 3.1). The average delay due to congestion is expected to remain under one minute for travel in both the morning and afternoon peak periods. Most increases in congestion will be on highways including the QEW and Highway 20 (see Exhibit 3.3), and the road network is otherwise expected to continue performing well.

Exhibit 3.1: Road Network Performance Comparison, 2011 and 2041 Committed Network

	2011		2041		Change	
Transportation Supply						
Roads	8,678 km		8,739 km		0.70%	
Transit	2,738 km		2,774 km		1.31%	
Congestion Measure	AM Peak			PM Peak		
	2011	2041	Change	2011	2041	Change
Vehicle Delay						
Delay (vehicle-hours)	367	948	158%	685	1,720	151%
Trips	70,400	105,000	49%	76,400	114,100	49%
Average Delay (mins)	0.31	0.54	74%	0.54	0.91	69%
Percent of Congested Road						
Highway	1.37%	12.5%	813%	1.32%	20.8%	1,476%
Non-highway	0.04%	0.06%	50%	0.13%	0.18%	38%
Total	0.14%	1.00%	614%	0.23%	1.82%	691%

Exhibit 3.2: Transportation System Infrastructure

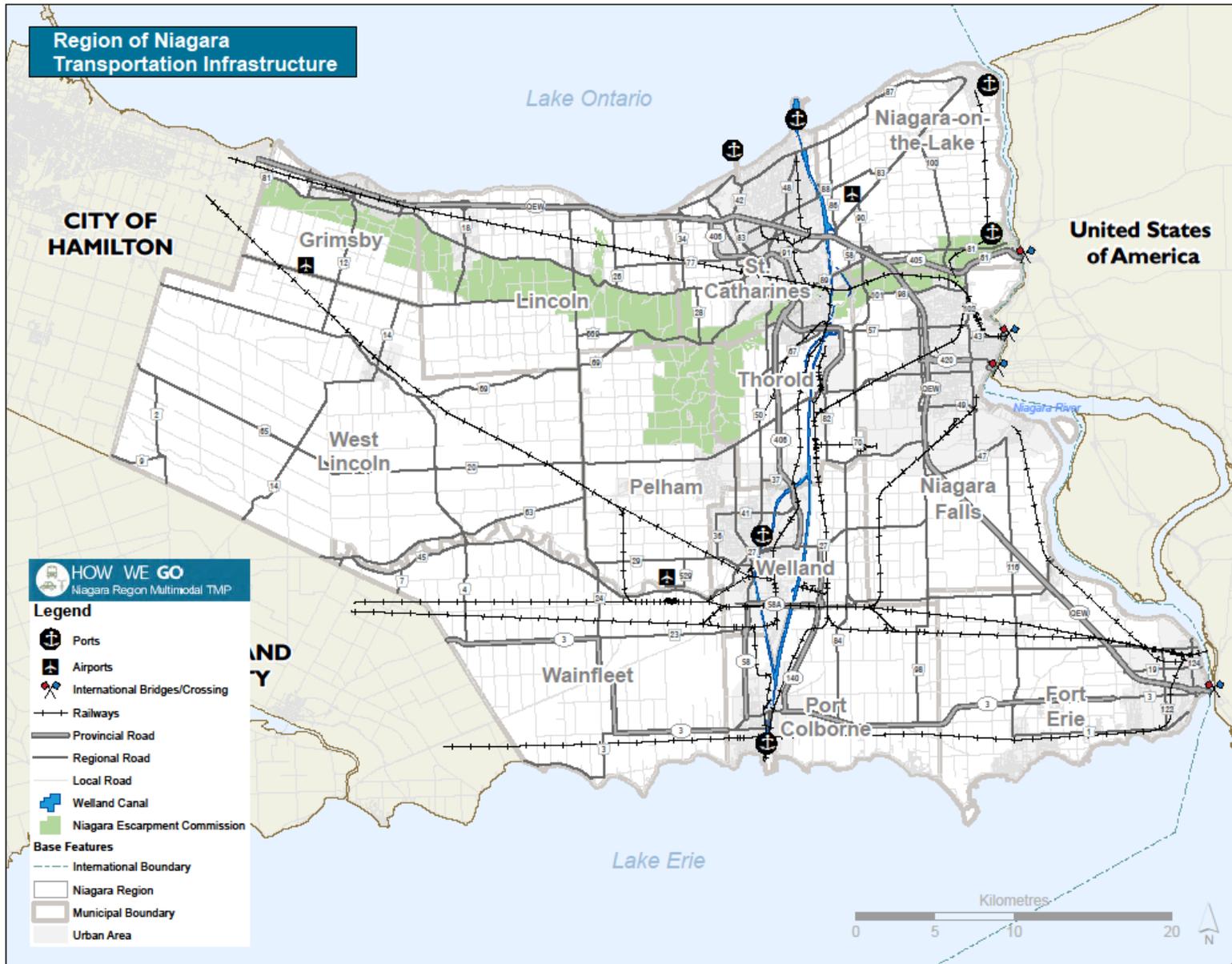


Exhibit 3.3: Road Network Performance, 2041 PM Peak

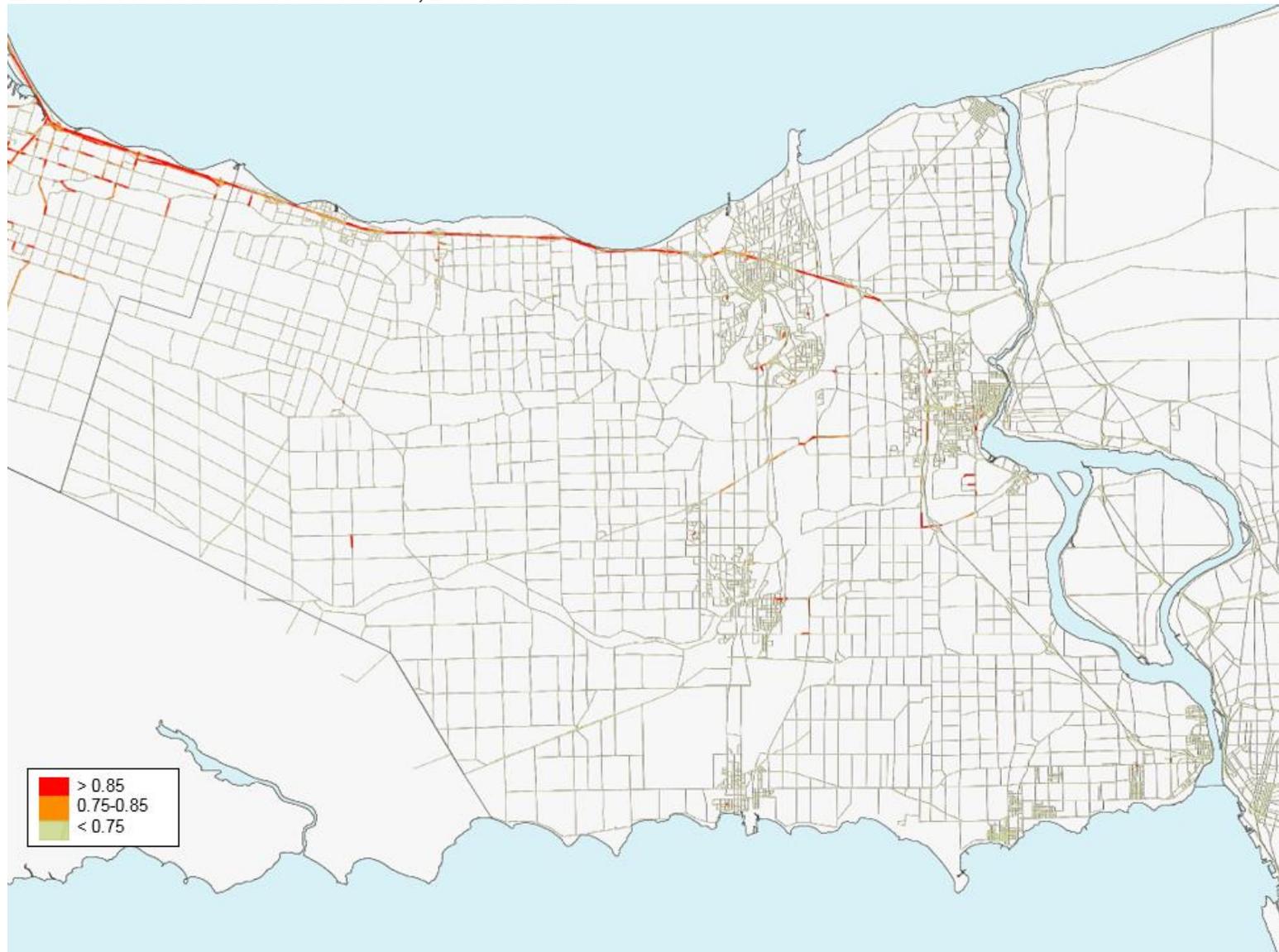
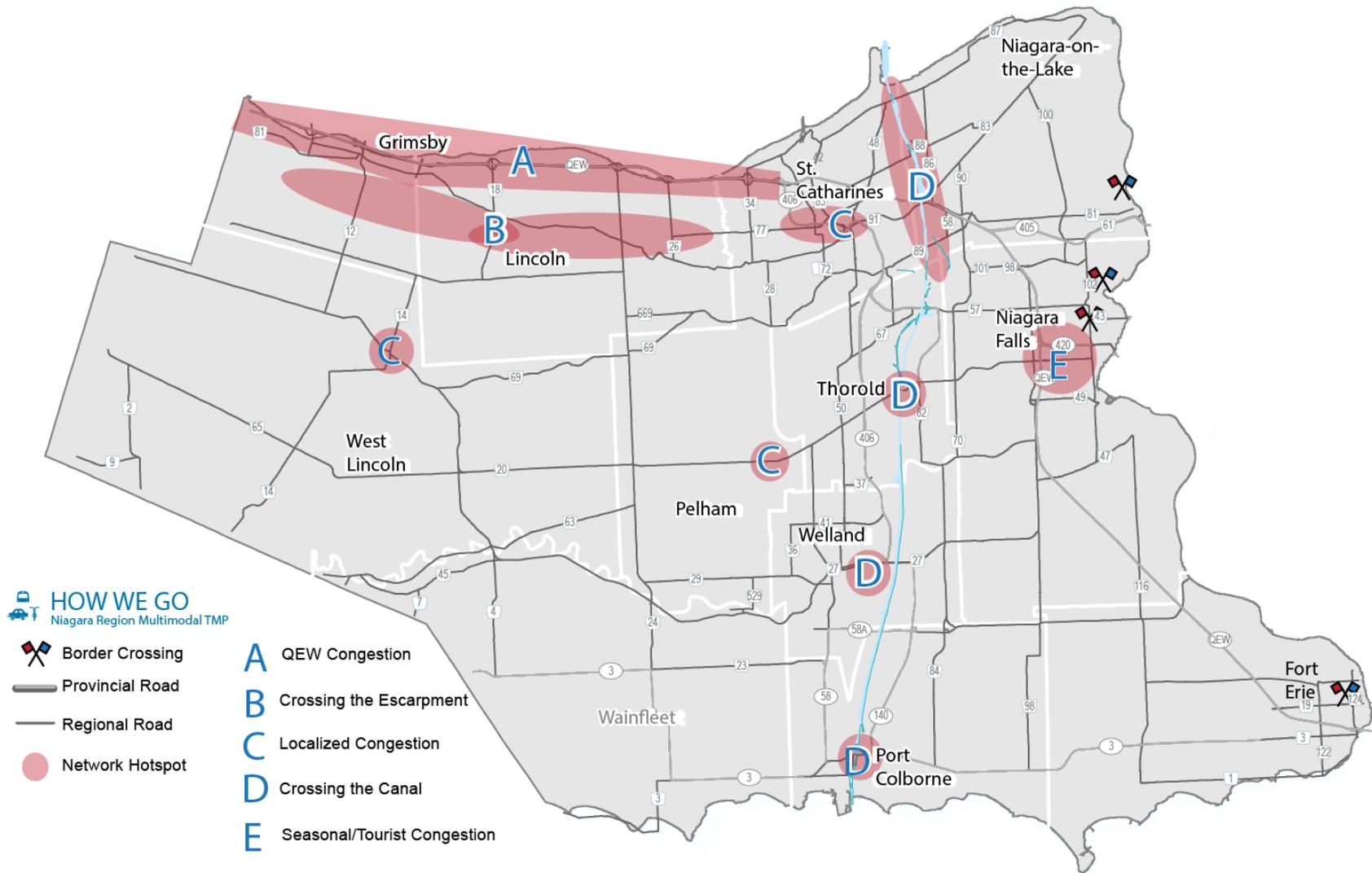


Exhibit 3.4: Current Road Network Hotspots



Congestion in hotspots warrants targeted measures

The areas that are expected to be congested in 2041 generally suffer from congestion already. They align with the following “hotspot” areas that have been identified by the public (see Exhibit 3.4) and will grow worse over time if not addressed:

- *Queen Elizabeth Way (QEW)* – The QEW is the only 400-series highway connecting Niagara Region to the GTHA, and is also the main route between Southern Ontario and the United States. It attracts high volumes of commercial and passenger vehicles, and will continue to be congested in both peak periods. Congestion on the QEW will need to be addressed by the Province of Ontario, and solutions could include a potential Niagara-to-GTA (NGTA) Corridor.
- *The Niagara Escarpment* – There are limited routes between the top and bottom of the escarpment. Existing crossings have sufficient capacity, but operational issues related to truck movements warrant and are currently under further study.
- *Localized areas* – A number of areas in local communities have been flagged for examination, as discussed in the next subsection.
- *Welland Canal crossings* – Opportunities to cross the canal by road are limited. Many crossings experience some congestion, especially in St. Catharines and the Lundy’s Lane bridge. Port Colborne crossings are not as congested, although the Clarence Street bridge may experience long wait times when the lift bridge is in use.
- *Seasonal congestion* – Tourist travel peaks in the summer, and includes visitors from the GTHA, the U.S. and other nations. Transportation demand management and supply management strategies can help address summer congestion. Cross-border congestion could be relieved through customs improvements or more NEXUS lanes. Improved transit connections with the GTHA could reduce the demand for car travel.

For much of the rest of Niagara, the network of Provincial, Regional and local roads provides sufficient capacity to accommodate existing and anticipated travel demands. In some areas, there is an opportunity to optimize use of Regional rights-of-way to better accommodate walking and cycling; this is discussed further in Section 5.1—Complete Streets.

Detailed supporting study has been conducted in key sub-areas

Five sub-areas with capacity constraints have been subjected to detailed investigation to identify possible solutions. These sub-areas have a history and were identified by the Region prior to the study due to their respective current and future traffic demands and safety concerns:

Sub-area 1: QEW-Glendale-Highway 405. Sub-area 1 is centred on the QEW and Glendale Avenue interchange, which is a key access point for the Glendale community, Old Town, Virgil, and Villages of St. David’s and Queenston. Another key location is the Niagara District Airport, north of the subarea. The QEW and the Welland Canal are barriers to travel in the area.

Vehicular and pedestrian activity in the sub-area has increased significantly due to residential, commercial and academic developments. Traffic volumes and delays are worsening at several intersections around the interchange. Accordingly, the TMP will consider improvements to manage traffic and routing. Previous studies (e.g. Glendale/QEW/Highway 405 Planning EA study; Value Engineering Study of the Glendale Interchange; Secondary Plan for the Glendale Community, Town of Niagara-on-the-Lake) have looked at a wide range of alternatives (e.g. widening of regional roads such as Taylor Road and Airport Road; intersection

improvements; improved active transportation connections; improved safety; flyovers connecting Airport Road or Townline Road to Taylor Road).

Sub-area 2: West St. Catharines. This analysis area is bounded by Third Street Louth to the west, the CN rail tracks to the south, Ontario Street and Third Avenue Louth to the north, and St. Paul Street to the east. Highway 406 passes through this area, with one interchange at Fourth Avenue Louth. There are three connections between the lands east and the west of the Twelve Mile Creek: Highway 406, Fourth/Welland Avenue, and St. Paul Street.

Prior studies (e.g. West St. Catharines Transportation Study (WSCTS), Environmental Assessment of a New Interchange on Highway 406 between Fourth Avenue Louth and Third Avenue Louth) identified several traffic operational issues in the sub-area and a number of potential mitigation measures. Additional improvements and developments have occurred since the completion of the WSCTS. The Niagara Health System Hospital at the St. Catharines site has been open for about two years, and access to the other areas of the Niagara Region via the QEW has created significant new traffic on Third Street Louth and the South Service Road. Ancillary development in the lands surrounding the new St. Catharines Hospital is also causing congestion along Fourth Avenue, as accesses to Highway 406 and across the Twelve Mile Creek to downtown are heavily travelled. The new Burgoyne Bridge across the Twelve Mile Creek may also affect travel choices in this sub-area. Finally, the former General Motors plant on Ontario Street has been sold, and the lands may be redeveloped as a mix of residential and commercial uses.

TMP work will consider the following:

- A new interchange on Highway 406 at Third Avenue Louth
- A flyover of Highway 406 at Vansickle Road
- A crossing of Twelve Mile Creek at Carlton Street
- A new interchange on Highway 406 at Fourth Avenue
- A grade separation of First Street Louth or Vansickle Road and the CN track

Subarea 3: Port Robinson Road. Located in the southwest corner of the City of Thorold, Port Robinson West is generally a greenfield area subject to plans for urban development. The 2015 Official Plan for the City of Thorold identified three significant transportation improvements in the area: widening Highway 406 to four lanes, implementing a full interchange for Merritt Road, and extending Merritt Road west of Cataract Road. The first two improvements have been implemented, and this study updates the analysis of the Merritt Road extension that would improve access between Pelham Street and Highway 406. The analysis will investigate the traffic impacts of this extension on the network and key intersections.

Subarea 4: East Main Street/Division Street one-way couplet. East Main Street and Division Street form a one-way couplet in the City of Welland. East Main Street continues east and connects to Highway 406 at a roundabout. Both streets pass through the downtown area of Welland and the Business Improvement Area, and play a vital role in moving traffic between the downtown, the west of the Canal and Highway 406. Prior studies have considered converting these two streets to two-way operation. As most intersections in the study area are signalized, the scheme would require modifications including new signs and signal timing plans. With relatively stable traffic volumes and travel patterns, the Region and Municipality continue to evaluate the idea's merits and trade-offs.

Subarea 5: Highway 20 Smithville bypass. The Village of Smithville is the largest urban centre in the Township of West Lincoln. Regional Road 20 passes through the sub-area and connects the village to the City of Hamilton from the west, and to the Town of Pelham from the

east, making it a primary east-west corridor through the subarea. The urban area in the village has mixed land uses with schools, churches, restaurants, grocery stores and residences.

According to the Smithville Safety Study of 2011, heavy trucks make up almost 15% of traffic at West Street and South Grimsby Road 6; this is a high proportion of truck traffic for the area, but not a current safety issue. The Official Plan of the Township of West Lincoln has suggested that without improvements to the Regional Road, its level of service will drop significantly by 2040. Possible improvements such as a bypass, new bridge or rail crossings, truck routes, an Industrial Park Road extension, amended speed limits, and widening of Regional Road 20 were all identified as needing more analysis. The bypass would reduce the volume of heavy trucks on local roads by providing an uninterrupted route for commercial vehicles between Hamilton and Niagara Falls.

With the current lack of momentum towards the NGTA corridor, the Region and the Town have been discussing alignment options that best suit the needs of the local communities. As such, a northern bypass option has been discussed as a link to the QEW via a new or updated crossing of the Niagara Escarpment in either Grimsby or Lincoln. The status of these options and connections are also under review.

3.2 Public Transit

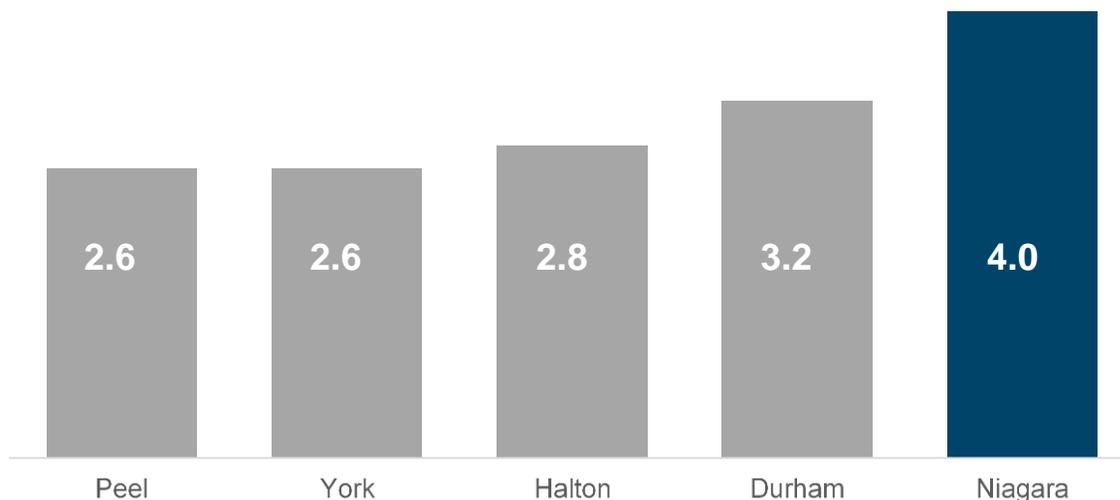
Key resident groups and geographic areas lack effective travel options

Low connectivity, infrequent arrivals and circuitous routing make transit a non-competitive travel option for most trips in Niagara Region. This represents a substantial challenge for the many Niagara residents who depend on transit—including more than 15,000 households (about 9% of the region) that do not own a vehicle and rely completely on other modes of travel.

A key theme of public input has been the poor connectivity of transit services between residents' homes and their destinations. Many transit journeys in Niagara require a walk to the bus stop, long in-vehicle times, lengthy transfer waits, and a walk to the destination. On average, the total transit travel time from point A to point B in the region is four times greater than for the same trip by car, and significantly longer than elsewhere in the GTHA (see Exhibit 3.5). The ratio between transit and auto travel times is uncompetitive even in urban areas—for example, a transit trip from Brock University's main campus to downtown St. Catharines takes about twice as long as it would by car. While the creation of Niagara Region Transit has improved mobility within the Region, low frequencies and long travel times continue to make transit impractical for most trips.

One major constraint to improving transit service is the low population density of urban areas in the region. In 2011, just 2% of Niagara's urban area had transit-supportive densities (i.e. more than 50 people and jobs per hectare), while an additional 21% of the urban area were almost transit-supportive (i.e. between 25 and 50 people and jobs per hectare). Exhibit 2.3 showed current land use and employment densities in the Region, categorized by levels of transit supportiveness. Better transit service in these areas would attract additional riders and divert some travel from cars, while promoting an urban form that could help attract young adults to live and work in Niagara Region.

Exhibit 3.5: Ratio of Transit-to-Auto Travel Times in GTHA Regions, 2011



3.3 Active Transportation

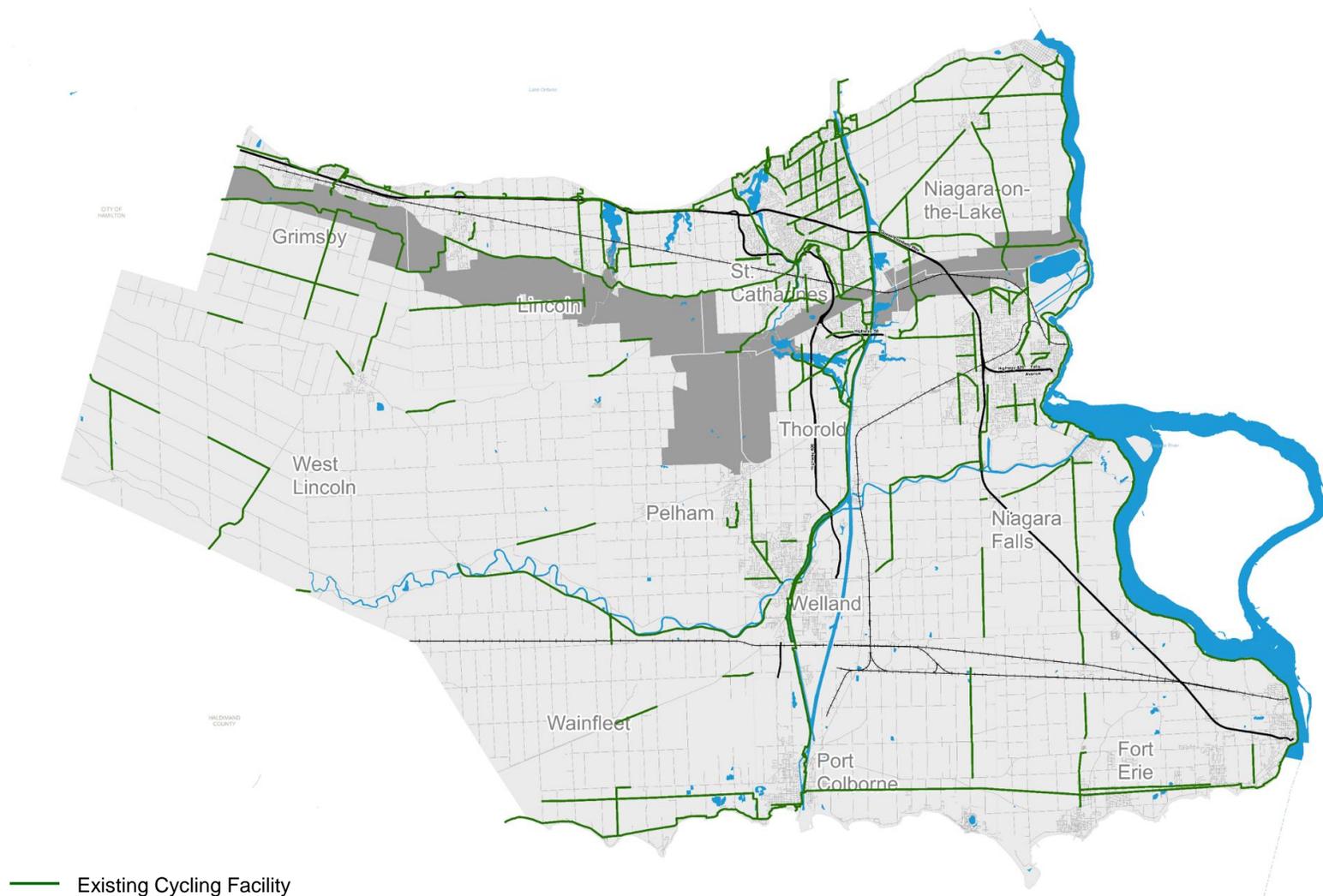
Enhanced networks will capitalize on the great potential of walking and cycling

In 2011, Niagara residents made 4% of their daily trips by active modes—amounting to 6,100 cycling trips and 27,300 walking trips.⁸ Active transportation also plays an important role in the tourist experience across Niagara Region, with popular cycling destinations including the Waterfront Trail, the Niagara River Recreational Trail, and the Niagara Wine Route that links almost 60 wineries.

The region's active transportation network, including 352 km of bicycle lanes and 409 km of trails, is well used. However, as shown in Exhibit 3.6 this network has many gaps and discontinuities. It will be a strategic priority of the TMP to develop a safer and more connected network for residents and visitors by closing these gaps.

⁸ 2011 TTS

Exhibit 3.6: Niagara Region's Cycling Network, 2016



4 A Strategic View: Needs and Opportunities

Based on the information presented earlier in this report, this section suggests four cross-cutting themes that summarize the most important needs and opportunities to be addressed by Niagara Region's TMP:

- **Transportation as a catalyst for change** (Section 4.1)
- **Connecting the Region** (Section 4.2)
- **Meeting the needs of residents** (Section 4.3)
- **Taking advantage of new technologies** (Section 4.4)

Meeting these needs and capturing these opportunities will be vital to achieving a range of higher-order outcomes identified including the Region's Strategic Priorities (see Section 1.1), the Transportation Vision and goals (see Section 1.2), and Niagara residents' priorities (see Section 1.3). These outcomes are fundamental to Niagara Region's long-term quality of life, economic competitiveness, and environmental health.

4.1 Transportation as a Catalyst for Change

Niagara Region's substantial growth over the next 25 years will be a major opportunity for constructive change. As new land uses develop, transportation can act as a catalyst to support a number of strategic objectives. Transportation systems will influence where people choose to live and work in the region, how business investors perceive it, and how people think about the prospect of moving there. Planning effectively for transportation can also support progress toward major goals such as reducing greenhouse gas emissions, improving social equity and promoting healthier lifestyles.

For many decades, long-range transportation plans have tended to respond to growth by proposing expanded road networks that meet rising demands in the busiest hour, but remain underused the other 23 hours of the day. For many reasons, Canadian cities are abandoning this pattern and adopting a more strategic approach to transportation. Niagara Region has the opportunity to join them.

TMP modelling suggests that Niagara Region's road network already has the capacity to handle growth to 2041 without adding or widening a lot of roads. While localized measures will be warranted to address capacity deficiencies on the QEW and in selected hotspots, the Region can focus on directing its transportation investments to create a more multimodal system that offers improved choice, reduces effort, maximizes connectivity, and makes Niagara more attractive to potential investors and residents.

Needs and Opportunities	→	Key Outcomes
A person's ability to live in urban areas without having to own a car, because quality travel options exist	→	Attract a talented workforce
A transit network that brings more residents within convenient reach of jobs	→	Maintain and attract new business investment
A street network that is safe and walkable for all ages, and that does not divide neighbourhoods	→	Create more healthy and liveable communities
Transportation infrastructure planning that accounts for long-term operating and maintenance costs	→	Improve financial sustainability
A selective approach to building new or wider roads, in combination with actions to improve transportation choice and manage demand	→	Establish leadership on climate change and environmental sustainability

4.2 Connecting the Region

Niagara Region's location, unique geography and urban structure make it an attractive place to live, work and play—but they also create very real challenges for mobility. Its very high level of internal trip-making (with 90% of morning peak period trips staying inside Niagara) shows that the region's economy is largely self-sustaining, but also that better connections to other regions could make it even more prosperous.

Niagara Region needs a greater degree of transportation connectivity locally (within its communities), regionally (between its communities) and externally (between it and other regions). These connections need to be multimodal, giving maximum opportunity to all residents including the many who do not own or drive a car. Over time, the Region should aim to reduce the very high proportion of daily travel by car across Niagara (currently 90%, with a majority by single-occupant vehicles).

Needs and Opportunities	→ Key Outcomes
Faster and more frequent transit services into/out of the region, including GO rail extensions	Increase economic interchange with the GTHA and other surrounding municipalities
More frequent transit services in key corridors, coupled with innovative transit services in less-dense areas	Strengthen economic and social connections between area municipalities
More freeway capacity and selected roadworks that improve links to key corridors and facilities	Boost efficiency of goods movement from local manufacturers and producers to regional, national and international markets
More compact, mixed-use development featuring fine grid networks	Maximize use of walking and cycling for short trips
Better access to border crossings for trucks moving to/from or through the Region	Improve international trade
Steps to shift freight demand from road to rail, especially between GTHA and the United States	Increase effective freight capacity through region and reduce QEW congestion

4.3 Meeting the Needs of Residents

Like most parts of Canada, Niagara Region is aging, and by 2041 its current population of seniors will more than double. Older residents will require more age-friendly infrastructure and better alternatives to driving, especially for trips between municipalities and outside peak periods. The number of younger people in Niagara will also grow, and the region’s population of young adults will represent a particularly important factor in terms of attracting business investments in the booming “new economy” knowledge and service industries. In the urban areas where they want to live and work, young adults are demanding more flexible and convenient alternatives to car ownership. Niagara residents of all ages are too dependent on car ownership, which is an increasingly expensive commitment. Maximizing transportation affordability for residents of all income levels will boost social equity and economic opportunity.

Needs and Opportunities	→ Key Outcomes
Better transit connections to employment and social hubs	Retain young adults after they complete high school and post-secondary education
Age-friendly transportation infrastructure and services, and better transit connections from neighbourhoods to activity centres	Ensure full participation of seniors
Safe and walkable neighbourhoods with complete streets and opportunities for recreational cycling	Promote Niagara Region as a place for families to thrive
Less need to own a car and greater access to jobs by transit	Improve equity for all

4.4 Taking Advantage of New Technologies

The movement of passengers and goods in Niagara Region relies heavily on roads, and a “business-as-usual” scenario would imply much greater levels of motorized travel and associated social, economic and environmental impacts. However, technology represents a “disruptive force” that might—if managed properly—change how people travel and make auto travel, freight and public transit more efficient.

The rise of smartphones has opened the door to ubiquitous, real-time transportation information; new transportation options like Uber; sharing services for cars, bicycles and parking spaces; and emerging approaches like dynamic transit routing. By 2041, connected and autonomous vehicles will improve the safe and efficient operation of both cars and trucks, and could help resolve the challenge of “first and last mile” access in major transit corridors.

By proactively identifying, testing and adopting technologies that work for its particular needs and context, Niagara Region could enhance its competitiveness in attracting both residents and businesses.

Needs and Opportunities	→ Key Outcomes
Supportive environments for shared mobility options	Reduced personal and business costs for transportation
Innovative transit options including dynamic transit to connect lower density areas	Extended coverage of transit system
Facilitate new technologies that contribute to reduced peak period travel or reduced reliance on private automobiles	Reduced need for road expansion
Proactive planning to ensure that benefits of autonomous vehicles and other new technologies outweigh potential negatives	Region seen as leader in innovative transportation solutions

5 Action Areas

Niagara Region's transportation system must become more responsive as travel demands become more complex, and as the connections between Niagara Region's municipalities grow stronger. Its TMP will focus on six key action areas that respond to the needs and opportunities discussed in Section 4:

- **Complete streets** (Section 5.1)
- **Road network** (Section 5.2)
- **Public transit** (Section 5.3)
- **Active transportation** (Section 5.4)
- **Goods movement** (Section 5.5)
- **New mobility services and technologies** (Section 5.6)

While the TMP will consider expansions to road network capacity in strategic areas, it will give priority to improving facilities and services for public transit and active transportation, and to proactively boosting demand for those modes through transportation demand management (TDM). It will also emphasize approaches to make streets more efficient such as through transportation system management (TSM) and intelligent transportation system (ITS) measures. Finally, it will recommend approaches to capitalize on the potential of emerging technologies to improve mobility and reduce its unwanted impacts.

5.1 Complete Streets

Multimodal and complete streets improve health and mobility for all

A complete street is one that safely accommodates users of all ages and abilities—pedestrians and persons with disabilities, cyclists, transit users, motorists—as shown in Exhibit 5.1. The concept of complete streets is consistent with Niagara’s goal of improving its transportation network by emphasizing walking, cycling and public transit while paying attention to quality urban design, place making and community building. It also supports Niagara’s goals for integrating transportation and land use planning, and for developing a healthy, thriving and prosperous community.

The TMP will incorporate a complete streets policy for Niagara that provides direction on how Regional roads will be planned, designed and operated to accommodate different functions and users. Consideration of each Regional road’s specific role and function will inform solutions that are context-sensitive and implementable. This approach will build opportunities to enhance transit, increase tourism, expand the cycling network, improve pedestrian facilities and support sustainability in Niagara.

As part of efforts to create complete streets in Niagara, there is considerable opportunity to take space on roads with excess capacity and convert it to multimodal uses such as sidewalks, bicycle lanes, multi-use paths or transit facilities.

The complete streets policy and design guidelines for Niagara Region are provided under separate cover, and identify guiding principles for a complete streets approach, decision-making framework, and design elements.

Exhibit 5.1: Complete Streets Concept



5.2 Road Network

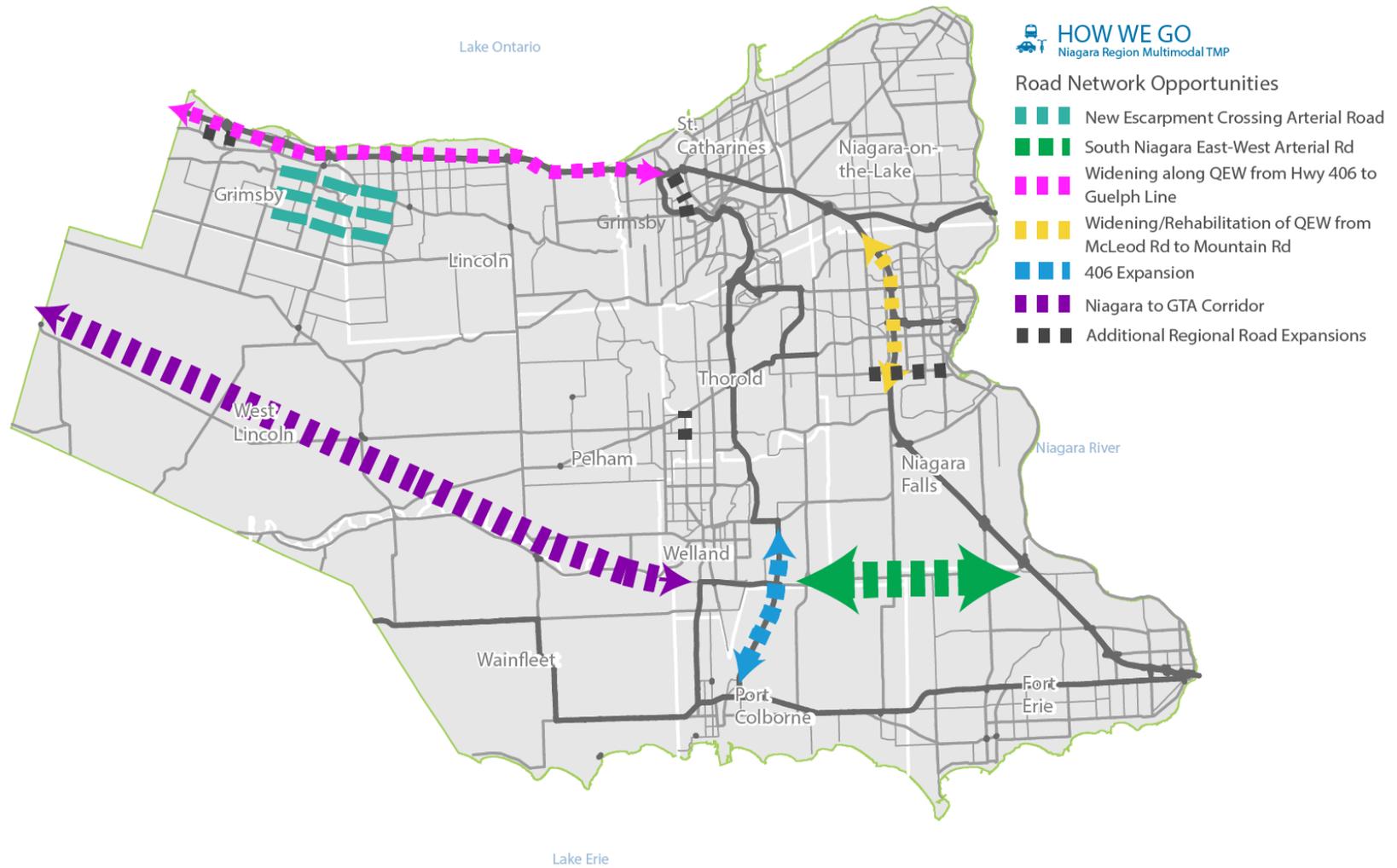
Some expansions will complement a safer and more efficient road network

Transportation system management (TSM) can maximize the capacity of existing roads, reducing the need for new capacity and improving transportation safety and efficiency. Measures include intelligent transportation system (ITS) applications like traffic signals that adjust for traffic conditions, electronic message signs, traveller information systems, weigh-in-motion systems for commercial vehicles, and road weather information systems. ITS measures can improve safety and service levels, reduce energy and environmental impacts, and enhance productivity. Other benefits can include time savings, reduced vehicle operating costs, improved system reliability, reduced emissions and a more pleasant travel experience.

Some capacity improvements will be needed in addition to the efficiencies achieved through ITS. Opportunities to expand the road network are shown in Exhibit 5.2, and include the NGTA corridor, extensions of existing corridors, and several road widenings:

- NGTA East Segment (between the southerly limit of Highway 406 and QEW in Fort Erie)
- Niagara-to-GTA transportation corridor
- New Escarpment Crossing Arterial Road (extending south from the QEW between the Hamilton/Niagara boundary and Vineland)
- New Highway 406 interchange (at Third Avenue Louth in St. Catharines)
- Extension of Highway 406 from Welland to Port Colborne
- Widening and rehabilitation of the QEW from McLeod Road to Mountain Road
- Widening and introduction of HOV lanes along the QEW from Hwy 406 to Guelph Line in Burlington
- Widening of RR 49 McLeod Road (between Pin Oak Drive and Niagara Falls)
- Widening of RR 38 Martindale Road (between Fourth Avenue and the QEW in St. Catharines)
- Widening of RR 512 Livingston Avenue (between Casablanca Boulevard and Main Street/Oaks Road in Grimsby)
- Widening of RR 55 Rice Road (between Old Highway 20 and Port Robinson Road in Pelham)

Exhibit 5.2: Road Network Opportunities



5.3 Public Transit

Enhanced public transit will support tourism and the youth and senior population

A transportation system that provides practical, attractive alternatives to driving is becoming increasingly needed in all parts of the region. In 2011, a first step toward improving regional connections was taken through the introduction of Niagara Region Transit as a link between local municipal transit services. While 60% of Niagara's population now has access to some form of transit, it remains uncompetitive in many areas and requires significantly longer travel times than driving.

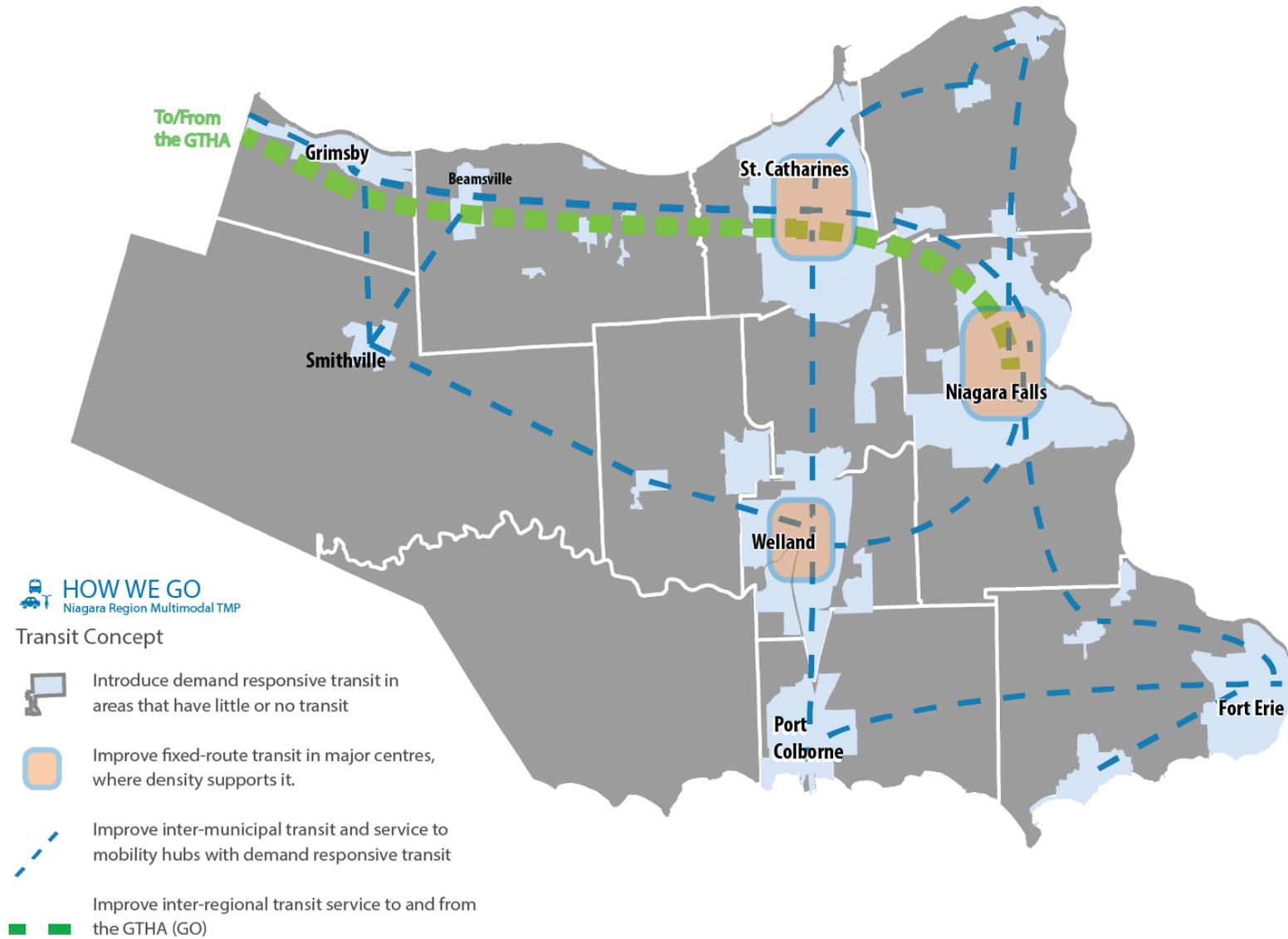
Transit can help support tourism by creating a comfortable and convenient experience for visitors to the region, many of whom are involved in recreational activities and winery-related tourism in addition to visiting Niagara Falls and other traditional attractions. Transit connections between these destinations, many of which are outside urban areas, would support sustainable growth.

While the low densities and rural settings of many parts of Niagara make efficient fixed-route bus services difficult, there are opportunities to support transit objectives by applying new technologies (e.g. on-demand ride hailing applications) in innovative ways. Exhibit 5.3 illustrates a conceptual transit strategy for the Region that includes the following elements:

- Improved fixed-route transit (e.g. more frequent service, new routes, transit priority measures) in major centres to make transit travel times more competitive in urbanized areas.
- New intermunicipal transit routes to serve the growing demand for travel between communities.
- New inter-regional connections (e.g. GO rail expansion) to substantially reduce transit travel times to the GTHA, and to relieve growing congestion on the QEW.
- Demand-responsive transit in areas that do not support efficient fixed-route transit service. These services, which leverage innovations in ridesharing and dispatching technology, pick up passengers at their starting point and drop them off at their destination or at transit hubs to continue their journey. Ridematching technology now enables advanced matching of riders with similar origins and destinations, maximizing service efficiency.

In addition to these elements, Niagara Region could help facilitate better coordination between local transit systems, with the objective of improving transfer wait times, schedule adherence, and the overall experience for transit users.

Exhibit 5.3: Transit Concept



5.4 Active Transportation

An expanded active transportation network will support healthy communities

A major focus area for the TMP will be the creation of a safe, highly connected network of active transportation facilities that is attractive to both residents and visitors. More walking and cycling can bring significant benefits by boosting physical activity and social interaction, reducing congestion and air pollution, providing affordable and accessible travel for people of all ages and incomes, and attracting new residents, businesses and visitors.

The Regional Bikeways Master Plan (2005) proposed a significant network including 1,200 km of cycling facilities; more than 760 km of that network has been implemented so far. The Region now requires a strategy to eliminate barriers and systematically connect gaps in the network. The TMP will include a Strategic Cycling Network (see Exhibit 5.4) that places short-term priority on building the connections that are most likely to be used, based on several key inputs:

- *Existing network* – Today’s region-wide cycling network will be the foundation of the strategic network.
- *Planned capital investment* – The Region’s capital plan provides regular opportunities to include cycling facilities in road reconstruction projects.
- *Key infill corridors* – These links will connect other network pieces, and will be identified and prioritized through an analysis of network gaps.

The effectiveness of the active transportation network will be maximized through user amenities such as on-street bicycle parking, and wayfinding measures that complement trail and on-street route signs.

5.5 Goods Movement

Efficient freight travel is vital to Niagara’s economic development

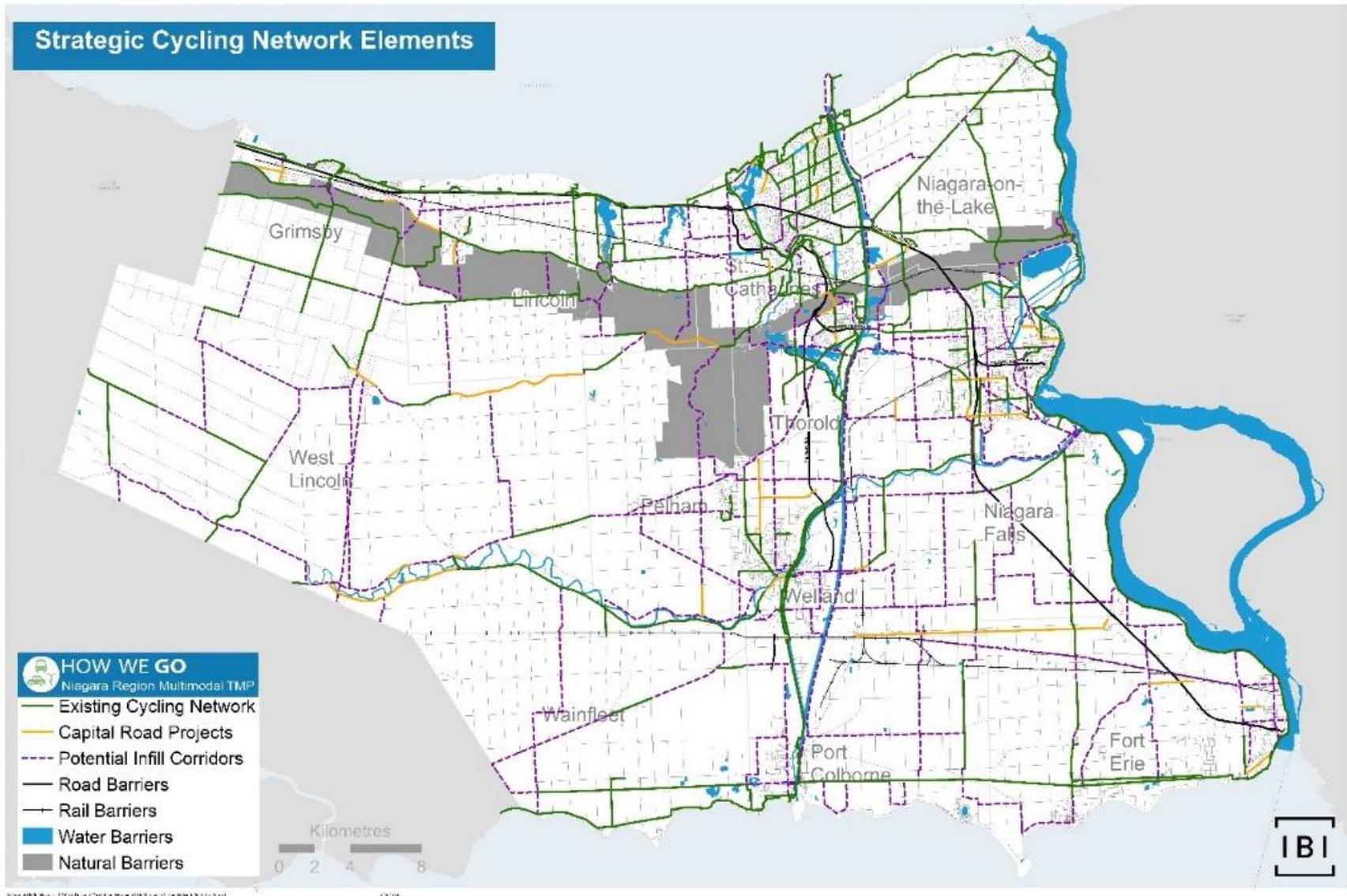
Businesses that are deciding where to locate typically consider access to markets, proximity to workers, and the ease of transporting their inputs and finished products. The ability to move goods cost-effectively is therefore a major driver of economic development.

Roads leading to the Canada-U.S. border are major routes for goods movement. Minimizing impedance from commuters and tourists is important, as every improvement in efficiency will reduce business costs and improve the value of operating in the Niagara Region. Potential improvements that would benefit local business could include the Niagara-to-GTA corridor, better escarpment crossings, and improved connections to the QEW.

Niagara has considerable air, marine and rail infrastructure to support freight travel, and ways to relieve highway demands by making better use of these modes should be fully considered. The region’s low-volume public airports could play a greater role in goods movement if similar airports in the GTHA were to close.

The freight and logistics industry is expected to be one of the early adopters of connected and automated vehicle technologies (see next section for more). Driverless trucks are advancing rapidly, and could provide substantial benefits to freight companies. Niagara Region should pursue policies and infrastructure that would enable it to host this technology.

Exhibit 5.4: Strategic Cycling Network Elements



5.6 New Mobility Services and Technologies

Emerging innovations can make mobility more effective and efficient

“New mobility” technologies like connected and autonomous vehicles (CAV), and services like ride hailing applications (e.g. Uber), represent major shifts in the delivery of transportation services. Some experts predict that door-to-door, on-demand ride hailing provided by fully autonomous vehicles will be an everyday travel option in major urban areas by 2025. The broad adoption of CAVs in conjunction with new private-sector business models would represent a transformation in how cities move, and would disrupt established practices in multiple industries. New mobility will likely have a tremendous influence on where we live and work, and how we interact.

The possible benefits of CAVs have been well documented: greater safety; less congestion; more efficient use of road capacity; reduced parking needs; lower-cost taxi, transit and trucking operations; and more affordable and convenient personal mobility. The possible risks have also been well documented: more vehicle-kilometres travelled; more sprawl; less active transportation; lost jobs; and further disconnect between people and their urban environment.

Given Niagara Region’s demographic and geographic context, it could benefit from the potential of new mobility options to:

- Help meet the lifestyle needs of an aging population with low-cost mobility services in low-density, off-peak situations.
- Support a multimodal lifestyle, free of car ownership, that is becoming more preferred by young, creative professionals.
- Expand affordable transit options through automated, on-demand transportation services in areas that are not conventionally transit-supportive.
- Reduce death, injury and property damage due to collisions.
- Improve the flow of goods.

Niagara Region can be ready

Planners and policy-makers have the opportunity to maximize the benefits of new mobility technologies and services, while limiting their risks. The path to this optimal outcome involves proactive planning, sound policy development, thoughtful design, and effective governance.

Niagara Region can stay ahead of the curve and maximize its regional competitiveness by preparing for changes in business models, vehicle fleets and personal tastes. While it is still too soon to be prescriptive about the best approaches for municipalities to take, the TMP should identify the need to track developments closely, and to evaluate possible applications as soon as practical. These efforts could include:

- *Monitoring best practices for new mobility to understand and anticipate how they could be applied in Niagara Region* – This work should apply the Region’s strategic goals and focus on the following questions: Can new mobility options provide efficient service to low density areas? Can they improve safety for pedestrians and other vulnerable road users? Do they alleviate the need for personal car ownership? Do they improve overall transportation network efficiency? Do they reduce greenhouse gas emissions compared to alternatives? Do they reduce travel times for people using

public/collective mobility? Do they expand the affordability of travel? Do they reduce the cost of moving goods? What is their cost to government?

- *Testing on-demand transportation services to fill current gaps in the transit network* – On-demand services seem likely to be a major component of tomorrow's transportation systems, and can make cost-effective use of CAVs. An aging population will be more reliant on alternatives to driving that are accessible, affordable and easy to use. Young adults are also keen adopters of multimodal transportation lifestyles; they favour travel options involving a mobile platform that serves the user, rather than a volume-based system where a user serves the platform. By introducing and evaluating these solutions at an early stage, Niagara Region will be better suited to leverage the benefits of CAVs as they become widely available. Several communities with a similar geographic context have already pilot-tested on-demand services (with operator-driven vehicles, rather than CAVs) in partnership with a private service provider, or by applying mobile ride hailing technology to their own services.
- *Understanding and preparing for the infrastructure modifications needed to optimize the use and benefits of CAVs* – This could be achieved in collaboration with the Region's ITS strategic plan.
- *Coordinating policy with local municipalities and neighbouring jurisdictions* – Ontario recently passed legislation that permits testing of CAVs, providing municipal governments an opportunity for leadership.
- *Assessing user perceptions of CAVs* – Surveys, focus groups and other forms of engagement can evaluate individual preferences for different transportation service options. This work can inform the assessment of opportunities and risks to be addressed in planning and implementation.