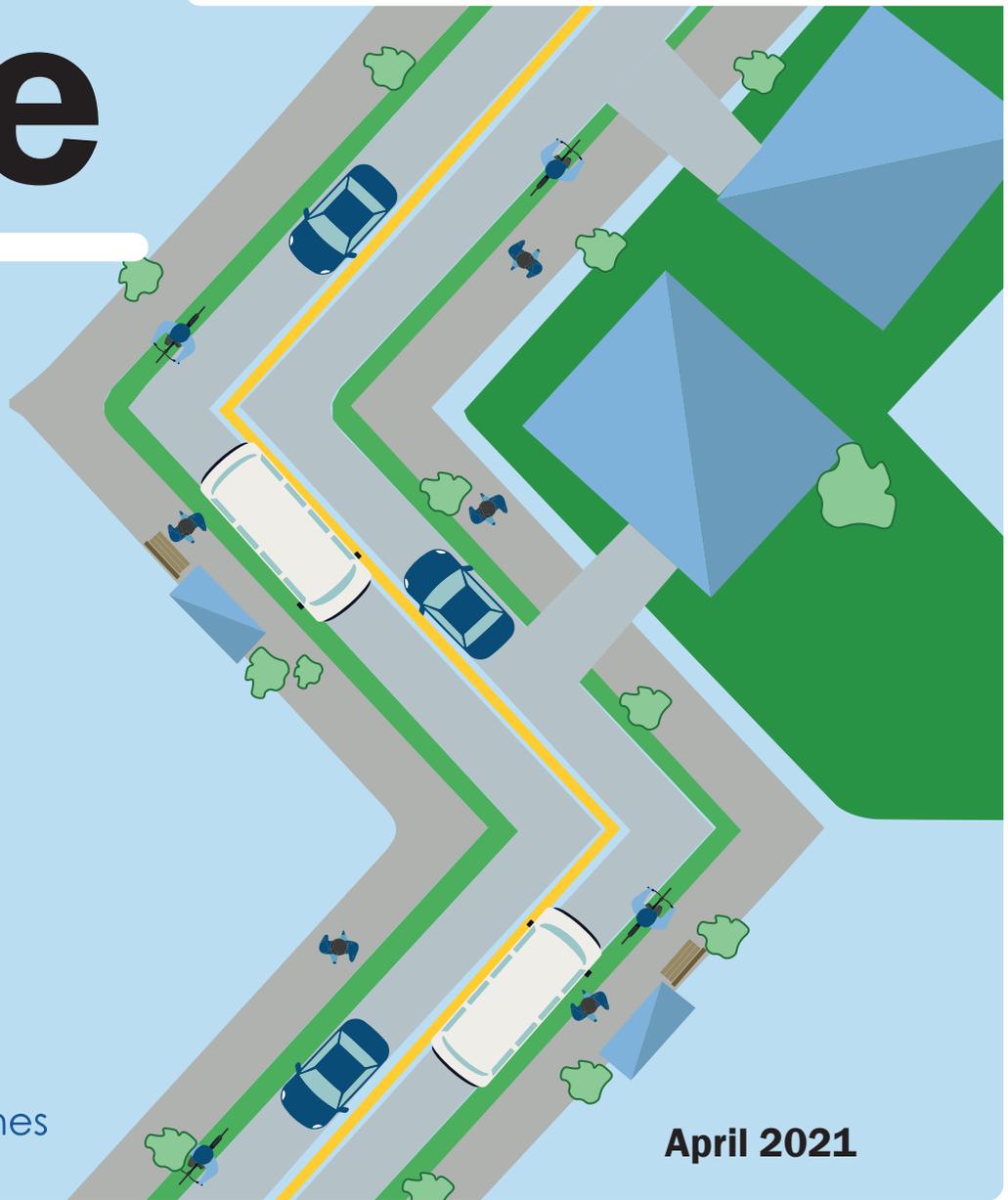


**City of St. Catharines  
Transportation Master Plan**

**2041**

# Designed to Move



# Executive Summary

## 1 Developing the TMP

### 1.1 TMP Context

The City of St. Catharines Transportation Master Plan (TMP) provides clear direction on future transportation investments through a renewed focus on complete streets that enable people to travel by any mode they wish and a renewed emphasis on linking land use and transportation planning to create context-sensitive solutions. The TMP assesses transportation issues and objectives from a more holistic perspective, resulting in shifting the focus away from single occupancy vehicles and towards enhancing multiple ways to travel around town, be it on foot, bike, transit vehicle, or automobile. This TMP provides a multi-modal complete streets approach to planning, design and implementation of transportation infrastructure, supporting the City's strategic directions and policies, resulting in realistic and implementable processes, policies, programs and infrastructure solutions. The TMP provides a foundation upon which decision-making will be made in the short (0 to 5 years), medium (6 to 10 years) and long-term (11+ years).

The TMP was completed to fulfill the master plan requirements of Approach 1 of the Municipal Class Environmental Assessment (MCEA) process, which means that an opportunity statement was prepared, alternatives were assessed, and a preferred alternative was identified in consultation with internal and external stakeholders through various means of engagement throughout the life of the project. By fulfilling these Phases, several proposed infrastructure projects will be considered "pre-approved" under MCEA requirements or would not be required to complete these steps again prior to Phases 3 through 5 of the process (as needed).

### 1.2 Inputs and Interests

Consultation and engagement has been a key component of the development of the TMP. It has enabled the City's staff and consulting team to draw upon a wide range of local expertise, experience and knowledge in charting a path forward. The integration of staff, decision maker, resident and stakeholder group interests and values help to ensure that the master plan reflects the needs and desires of those the plan is designed to serve. During the TMP's development, multiple audiences were engaged, and feedback was incorporated into technical milestones, elements of the process and ultimately the TMP report.

Five key themes were identified from stakeholders including residents, students and technical agencies to shape the vision statement and identify preliminary improvements. These improvements were to extend the transit network, extend transit access times, promote cyclist safety, improve pedestrian connectivity and reduce vehicular congestion. These themes have been addressed through recommendations in the TMP.

## 2 Transportation Today

Although St. Catharines has planned for and accommodates all modes within their existing transportation network, the City is a highly auto dependent municipality. Automobile travel represents over 90% of the modal split. The existing auto dominance influences behavioral patterns and travel mode choices, as it is perceived that the automobile is the most convenient, accessible and attractive choice. Building a resilient city that has viable age-friendly transportation options and that helps address physical, mental, community, economic and environmental health will require renewed focus on sustainability in the transportation decision making processes.

### 2.1 Vision Statement

The vision statement for the TMP, which fulfills Phase 1 of the MCEA process, states:

St. Catharines is looking to implement a Complete Streets approach that shifts towards a user focused system, placing emphasis on the sustainable and strategic movement of people and goods, inclusively and efficiently.

The City intends to achieve this vision through planning, design, implementation and maintenance of a connected transportation network, which integrates all modes of transportation equally, with a complete streets lens. The City will focus first on the pedestrian, then the cyclist, transit user, goods movement, and finally the automobile in order to shift the focus to more sustainable modes of travel.

## 3 Transportation Tomorrow: A Complete Streets Approach

### 3.1 The Complete Streets Framework

As a mature City with a well-established transportation network, the challenge is balancing the transportation network to help ensure that multiple modes of travel are convenient with a reasonable travel time and cost. In order to change how people approach their daily transportation choices, the City needs to provide accessible and affordable solutions which can only be achieved by altering how the City plans, designs and implements transportation infrastructure.

A complete streets focused approach to transportation planning and design requires the conversation surrounding mode identification and choice shifting to consider people first. The foundation of the City's integrated complete streets approach is the development and adoption of redefined assumptions around the hierarchy of modes. The redefined hierarchy protects and prioritizes the most vulnerable road users, fundamentally placing pedestrians at the top.

The complete streets objectives for St. Catharines are to:

- Support the local economy and tourism initiatives;
- Create opportunities for more passive physical activity;
- Better integrate transportation and land use planning to develop vibrant communities with a sense of place;
- Increase the efficiency of existing rights-of-way;
- Provide opportunities for access and mobility for people of all ages and abilities;
- Capitalize and build upon road rehabilitation projects;
- Preserve the natural environment by reducing greenhouse gas emissions;
- Balance multiple modes of transportation in the rights-of-way; and
- Improve road safety through design recommendations and layout.

## 3.2 The Art of Completing the Street

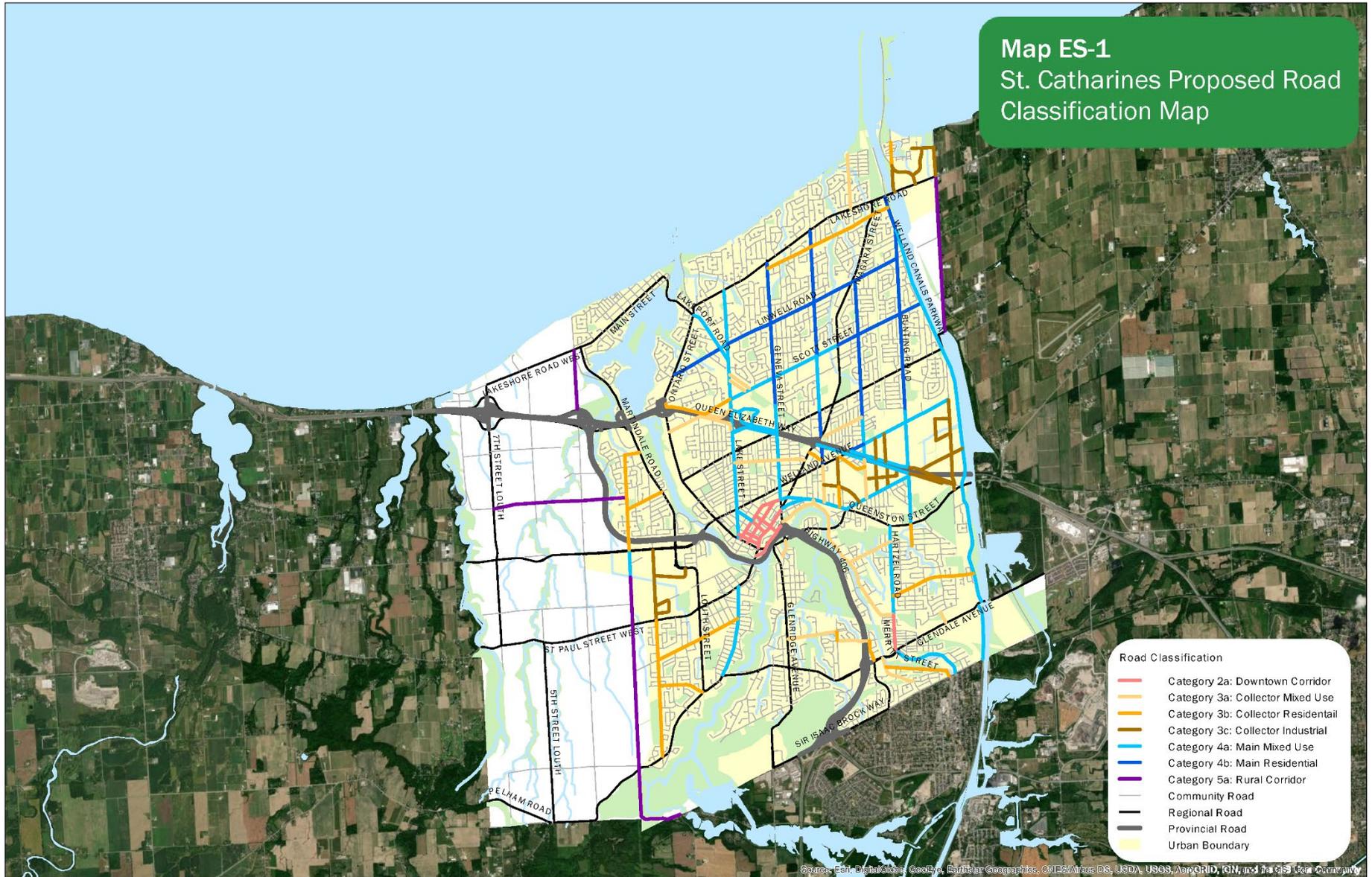
Ten new road classifications were identified which reflect the varying and unique conditions found throughout the City. The classifications were determined through extensive research and discussions with City staff. A number of inputs were considered in the reclassification of the roadway network including alignment with strategic municipal documents, optimization of the transportation network and the overall TMP objectives.

The ten classifications are:

- 1a. Community Street;
- 2a. Downtown Corridor;
- 2b. Downtown Community Street;
- 3a. Collector Mixed-use Corridor;
- 3b. Collector Residential Corridor;
- 3c. Collector Industrial Corridor;
- 4a. Main Mixed-Use Corridor;
- 4b. Main Residential Corridor;
- 5a. Rural Corridor; and
- 5b. Rural Community Street.

A map of the classified roads is provided as **Map ES-1**.

Map ES-1. St. Catharines Proposed Road Classification Map



## 3.3 Mode Specific Integration

The complete streets road classification is the foundation upon which modal change and behavior shifts will be made. The TMP also considers some unique, mode specific aspects and elements. The recommendations in this section intend to improve the functionality of the transportation system.

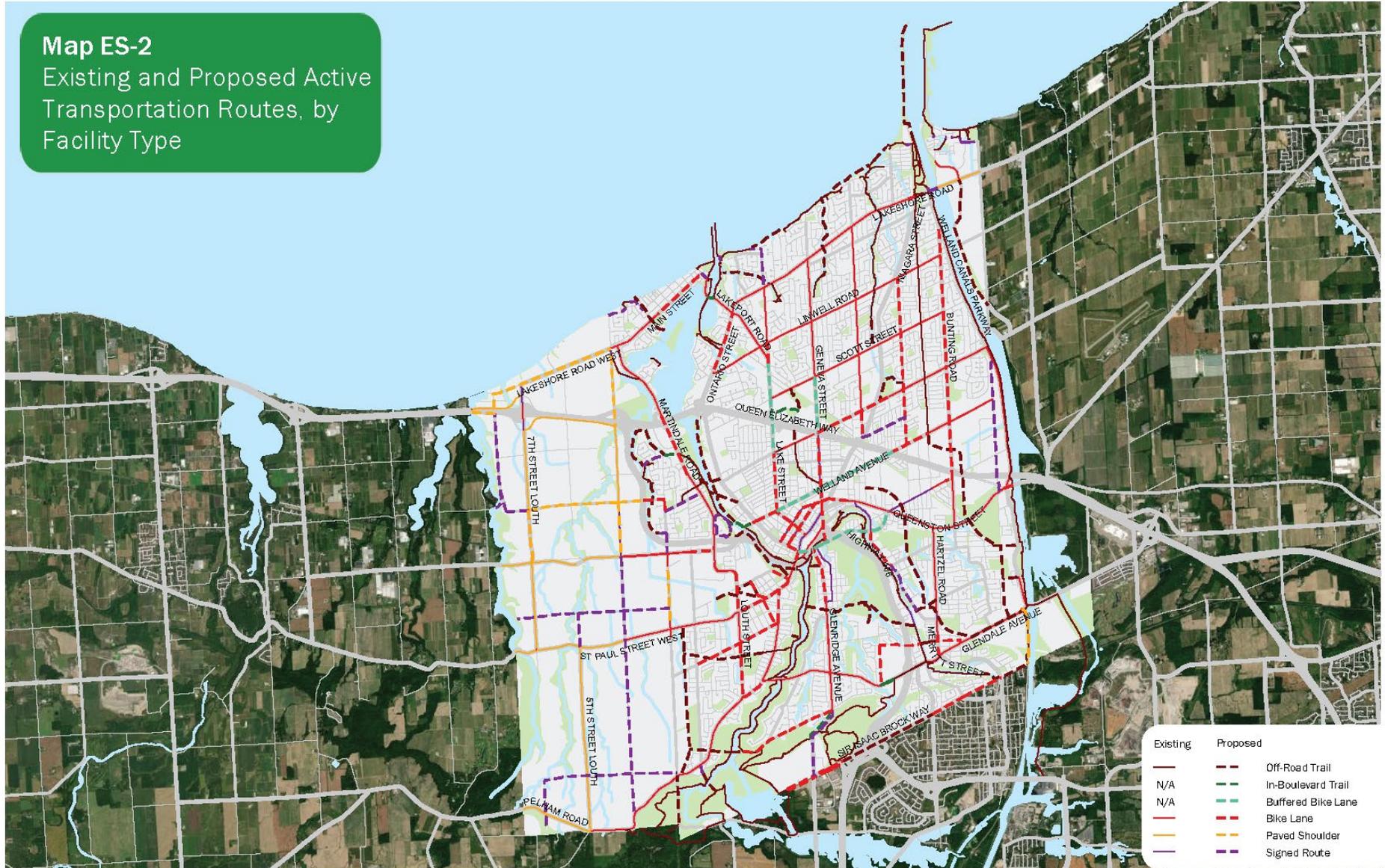
### 3.3.1 Active Transportation

Utilizing input received from staff, the Active Transportation Advisory Committee (now the Transportation Advisory Committee), residents, interest groups and new strategic objectives identified through Niagara Region's TMP and other municipal planning documents, the consultant team worked through a six step network improvement process to strategically identify critical infrastructure connections supporting the active transportation objectives identified by the community. The intent of the active transportation component of the TMP is to identify strategic improvements to guide future build-out of the on and off-road system. It also provides consistent design guidelines for on and off-road facilities and other amenities. The TMP proposes a total of 134.5 kilometres of active transportation routes made up of:

- 26 kilometres of signed routes;
- 11 kilometres of paved shoulders;
- 41 kilometres of bike lanes;
- 7 kilometres of buffered bikes lanes;
- 3 kilometres of in-boulevard trails; and
- 46.5 kilometres of off-road trails.

Proposed and existing routes are shown in **Map ES-2**. These routes include priority routes categorized as missing links, minimum grid network routes and loop routes.

Map ES-2. Existing and Proposed Active Transportation Routes, by Facility Type



## 3.3.2 Transit

The goal of the transit network recommendations is to improve routing and timing, as well as the transit connectivity throughout the City. The opportunities for improvements were analyzed through a ridership analysis where data was obtained through the passenger counter equipment, which counts boardings and alightings separately. From this, recommendations from the TMP were categorized into routes, service and “future ready” improvements.

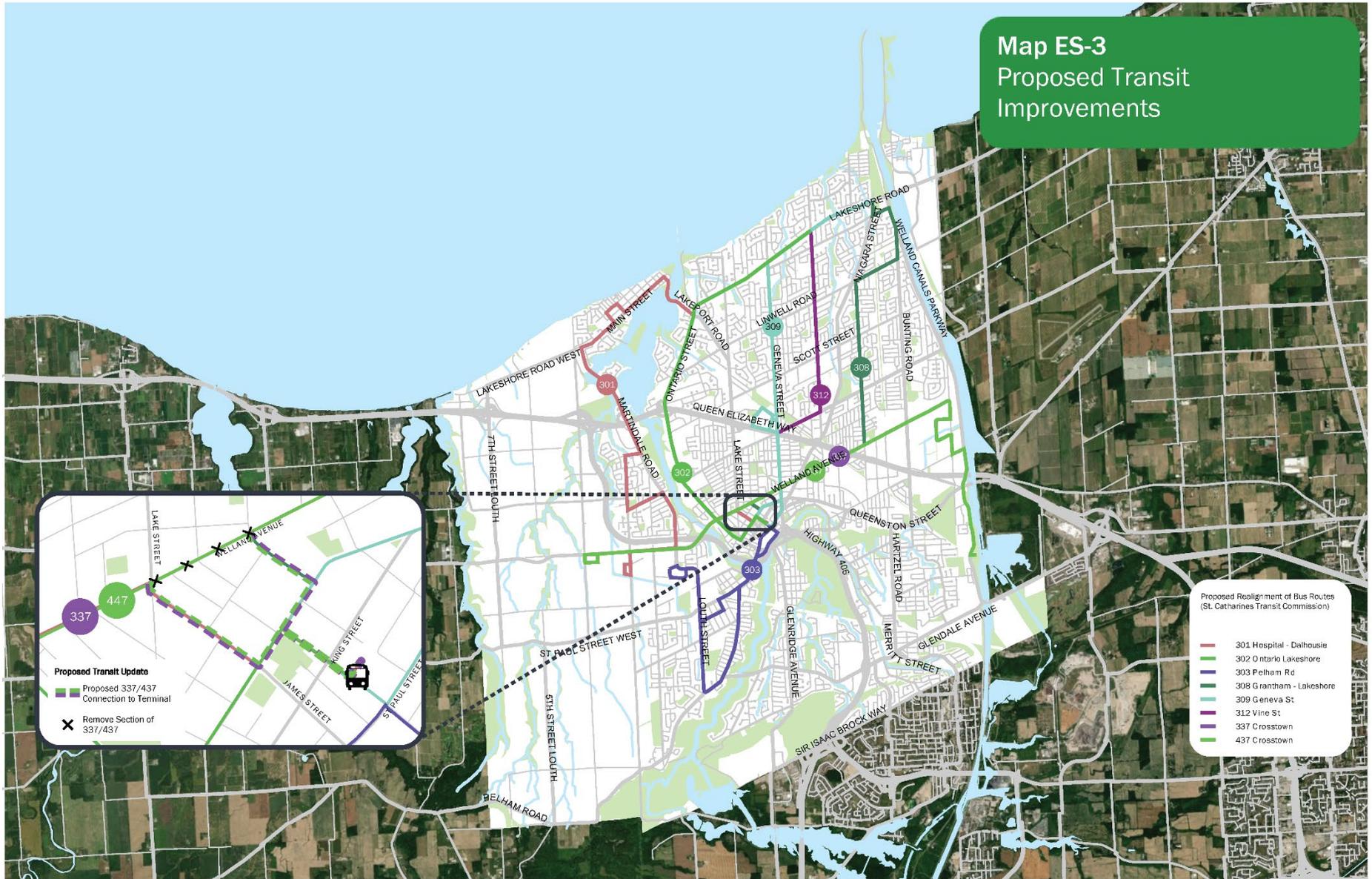
For routing improvements, route 337 / 437 Crosstown routing changes and a new Downtown connection to route 314 / 414 Scott were recommended to increase ridership and to link to other services, as shown in **Map ES-3**. It is also anticipated that in the future, GO train service along the Niagara (extended Lakeshore West) line will be increased. A downtown circulator or shuttle option connecting the downtown terminal with the station should be further explored and officially recognized as part of the system map, rather than an unofficial train-meet bus. In addition to the Downtown terminal, alternative locations or sites should be explored as a new transit hub.

Service improvements include frequency increases during the p.m. peak hour for a number of routes as well as a 15-minute frequency improvement for most 300-series routes in the afternoon to reduce overcrowding. As the fleet expands, additional maintenance and storage room will be needed depending on the number of additional buses required to accommodate the increased ridership. In addition, transit signal priority, signal coordination on transit corridors and queue jump lanes are potential improvements for transit operations. These should be placed strategically at locations with high delays to transit.

To ensure that the St. Catharines Transit Commission is operating environmentally sustainably, current trends and best practices in long term electric buses should be carefully monitored to determine the feasibility, endurance, longevity and appropriateness of new electric buses in St. Catharines.

Other transit opportunities, through GO Transit, Niagara Region Transit, and even potentially a ferry linking St. Catharines and Toronto should be kept in mind as part of the overall transit solution for the City.

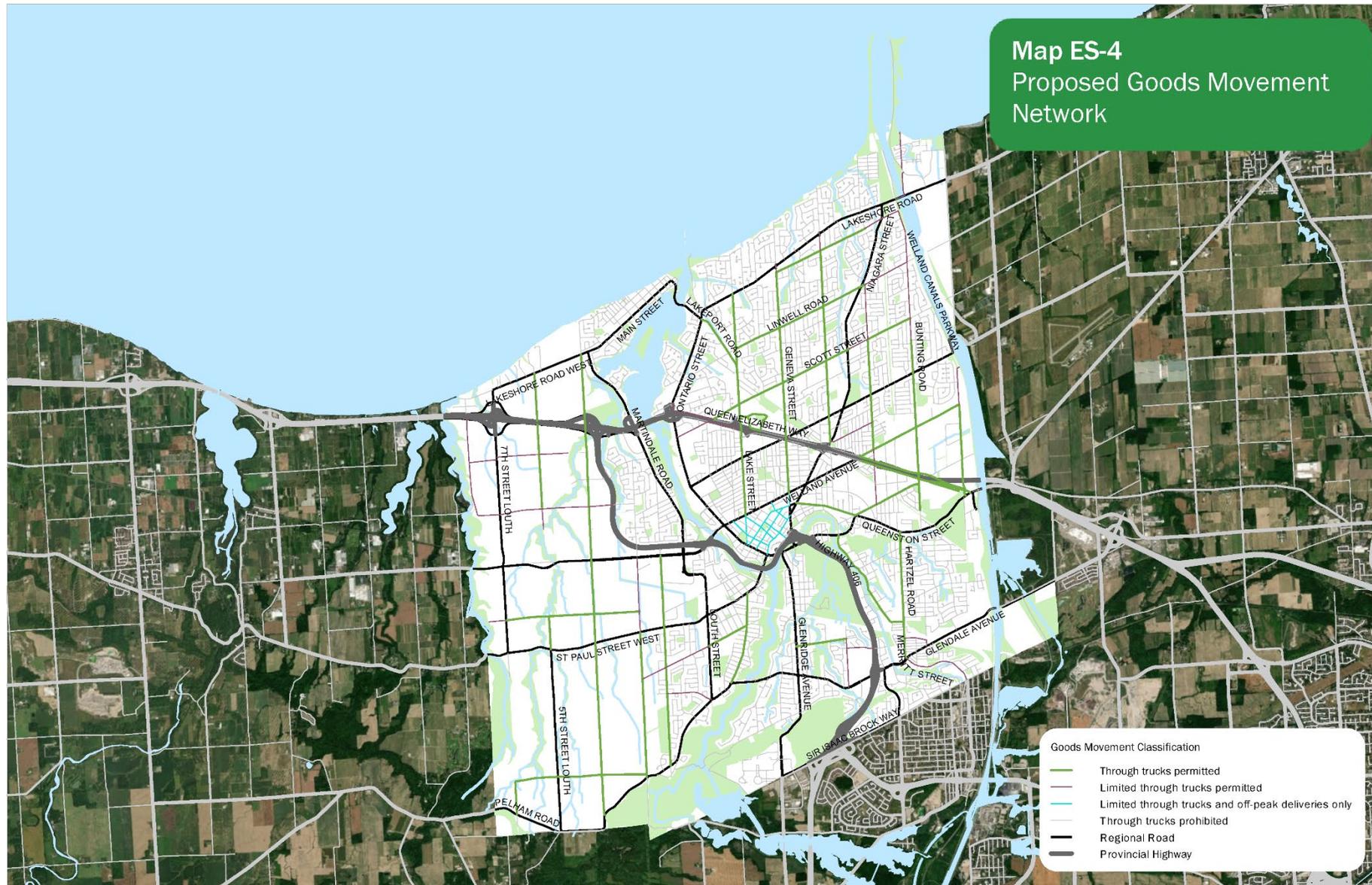
Map ES-3. Proposed Transit Improvements



## 3.3.3 Goods Movement

The fundamental goal of goods movement planning in St. Catharines is to make it more efficient. Goods movement should be considered as an element of the overall roadway system and be integrated into the considerations for complete streets. In addition, industrial areas that are key destinations for trucking and freight movement should be prioritized for key truck routes. When confirming the appropriateness of different road classifications, careful attention should be given to the land-use characteristics and whether the street will need a higher order of goods movement. It is recommended that St. Catharines supports Niagara Region in advocating the provincial and federal governments to advance the Niagara-Hamilton Trade Corridor and NGTA East Corridor, providing an efficient trade route connecting Niagara Region to the GTHA and USA. In the shorter term, it is recommended that the City encourage the Region to actively work with MTO for continuing improvements to the QEW and undertake a role and function study for Highway 20 / Regional Road 20 as an alternate provincial route that can accommodate longer-distance and interregional goods movement. The St. Catharines Downtown Creative Cluster Master Plan identifies policies for goods movement that should be upheld for downtown goods movement planning. In addition to preparing policies that can support the integration of existing goods movement, the City is also looking towards the future of goods movement through identifying future trends. Recommended goods movement routes are shown in **Map ES-4**.

Map ES-4. Existing and Proposed Active Transportation Routes, by Facility Type



### 3.4 Improving Transportation Focus Areas

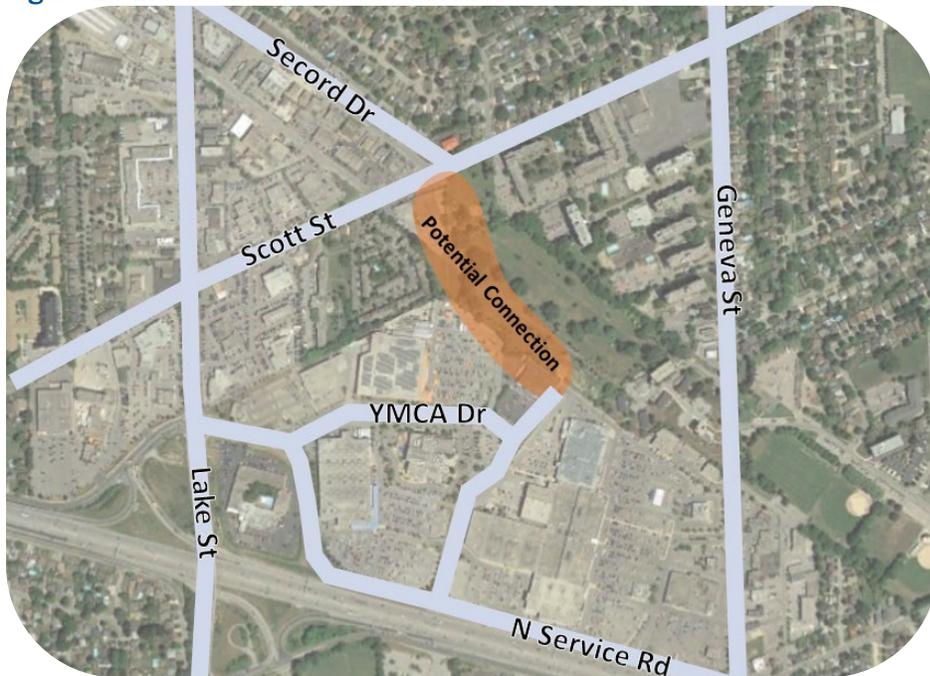
Seven transportation focus areas in the city were identified at the project outset for more detailed study. Through an initial screening process, five of these focus areas were determined to be the purview of Niagara Region or the Ministry of Transportation. The two focus areas for the City that moved forward in the analysis are the Fairview Mall Area and the Chestnut Street Extension.

For the Fairview Mall Area, the analysis focused on improving multi-modal connectivity and reducing vehicle traffic congestion. Consultation and data analysis identified that there is persistent vehicle congestion on YMCA Drive and Geneva Street as a result of high vehicle volumes, traffic signals and roadway designs. This not only affects personal automobiles but also impacts the ability of transit vehicles to maintain schedules. Site visits showed an informal path worn through the grass from people walking and cycling from Scott Street south into the precinct.

The TMP considered three alternatives and the implementation of a formal active transportation connection is recommended. A formal active transportation link will provide a direct connection for pedestrians and cyclists to/from the north while minimizing the impact on John Page Park.

Consultation regarding a transportation connection through John Page Park brought many comments supportive of an active transportation connection with strong opposition to a full vehicular connection. The primary concern being the elimination of greenspace in John Page Park that would result with a full road construction.

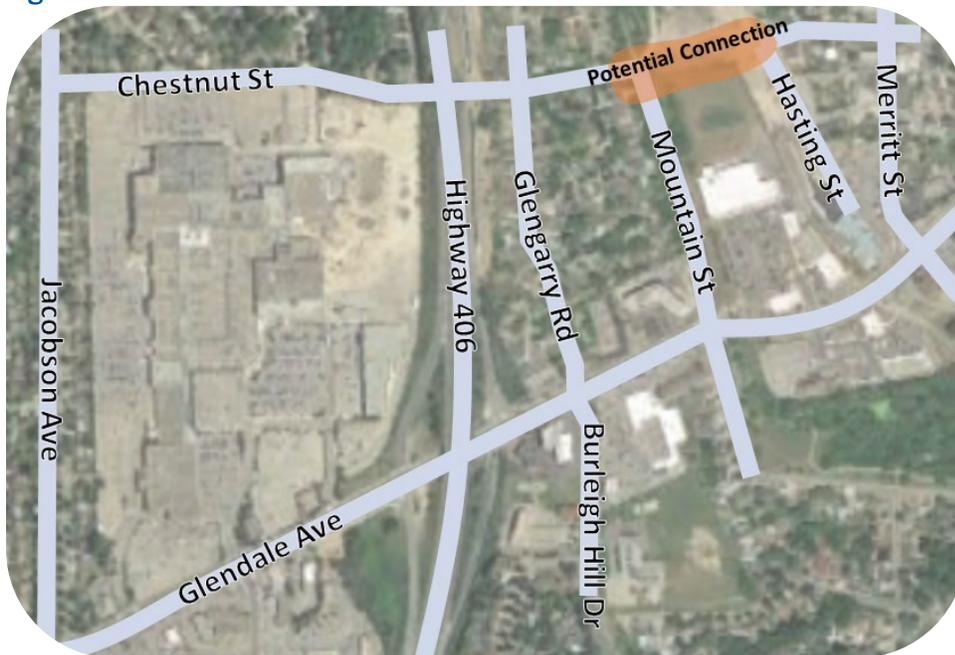
Figure ES 1. Potential Fairview Mall Area Connection



Another challenge heard was a concern about connectivity in the Glendale Avenue area near Highway 406 and the Pen Centre. Limited east-west routes and the heavy traffic volumes on Glendale Avenue impede movement in this part of the city. Three alternatives were studied and an extension on Chestnut Street West to Chestnut Street East is recommended as a Collector – Mixed Use Corridor (3a) in the complete streets road classification. This full-access link will include active transportation facilities, could be used by transit vehicles, and also would improve east-west connectivity for private vehicles throughout the neighbourhood.

Consultation regarding this recommendation generally was in favour as this recommendation is seen as a way to enhance connectivity. Concerns were raised about the possibility of traffic infiltration through the neighbourhood. Similar to the Fairview Mall area recommendation, further detailed analysis of impacts and additional consultation will take place before a final solution is identified and implemented.

**Figure ES 2. Potential Chestnut Street Extension Connection**



## 4 Implementing the TMP

Long-lasting change is shaped by the policies that are adopted and utilized by a municipality. Policies guide and inform infrastructure investment as well as the planning and design of the built environment including transportation. To facilitate a stronger complete streets foundation within the existing policy structure, there should be a standardized process of designing, constructing and maintaining the street network to ensure that it accommodates all modes of travel and all types of users. If effectively integrated, they can help to channel decisions and public investment to make streets more equitable by balancing infrastructure for the needs of different modes of travel. Complete streets policies are found throughout this TMP.

## 4.1 Summary of Recommendations

### 4.1.1 Short Term Recommendations

#### Complete Streets

- Implement Complete Street Design Guidelines
- Update Official Plan to reflect changes to road classifications
- Chestnut Street Extension Class Environmental Assessment Study
- Chestnut Street Extension
- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based Traffic Demand Management (TDM)
- On-going Official Plan updates
- Fairview Mall area active transportation improvements

#### Active Transportation

- Prepare and adopt an active transportation specific master plan
- Update promotional mapping to reflect most up-to-date route information
- Allocate annual budget to implement select missing AT links
- Continue to monitor the Region's wayfinding and signage program
- Refine, adopt trail standards and update infrastructure where needed
- Pursue discussions with the community about the design of a minimum grid pilot system to the north and south of downtown
- Work with the health unit to identify opportunities for community education around safe active transportation use
- Work with the health unit and school transportation services to identify pilot active and safe routes to school programs

#### Transit

- Route 337/437 Crosstown extension
- Route 314/414 Scott Downtown connection
- Frequency improvements during the p.m. peak hour (2 to 6 p.m.) on weekdays for certain routes
- Introduce GO-VIA Station shuttle
- Transit hub evaluation
- Electric hybrid bus feasibility

#### Goods Movement

- Implement a comprehensive Goods Movement Strategy

- Update Official Plan to introduce freight-supportive land-uses

## 4.1.2 Medium Term Recommendations

### Complete Streets

- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based TDM
- On-going Official Plan updates
- Transportation Master Plan review

### Active Transportation

- Continue to prioritize the implementation of the parkway / pathway trail system for continuous loop of off-road facilities
- Prepare and implement a coordinated municipal and regional AT-specific wayfinding and signage program
- Explore external partnerships to prioritize the implementation of a bike share system
- Implement both minimum grid systems as permanent projects within the core of the City
- Pursue additional crossings of major barriers for active transportation users
- Continue to work with partners to identify opportunities for community based social marketing initiatives focusing on a shift towards sustainable modes of transportation

### Transit

- Service hours extension for specific routes

### Goods Movement

- Research emerging goods movement sectors

## 4.1.3 Long Term Recommendations

### Complete Streets

- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based TDM
- On-going Official Plan updates
- Transportation Master Plan Update

### Active Transportation

- Continue to prioritize the implementation of missing trails including the design of accessible trail connections linking major communities to the downtown core

## Executive Summary

- Expand upon the separated cycling network (minimum grid to implement permanent solutions within the downtown core)
- Identify opportunities for enhance design and implementation of amenities including bicycle parking within major community areas as well as trailheads
- Work with surrounding municipalities to establish a continuous and connected system of AT facilities in the bordering areas

### Transit

- Explore operational improvements (queue jump lanes, signal improvements)
- Long-Term Operations and Maintenance Facility Needs Assessment
- Long-Term Frequency Adjustments

## 4.2 Costing

Efficient prioritization and allocation of financial resources are required to implement the recommendations of this TMP successfully. The following high level costs have been estimated for the active transportation, transit and road capital projects. As a living document, these costs will need to be reviewed and updated as the projects approach implementation. As the timeline progresses, additional studies, detailed designs and technical assessments are required to identify the unique requirements of each project. The following tables summarize the estimated cost for active transportation, transit and road recommendations.

**Table ES-1. Active transportation costing summary**

Facility	Length (km)	Unit Cost (\$)	Subtotal Cost (\$)	Design (15%)	Contingency (10%)	Estimated Total (\$)
Signed Route	26	\$1,200	\$31,200	\$4,680	\$3,120	\$39,000
Paved Shoulder	11	\$150,000	\$1,650,000	\$247,500	\$165,000	\$2,062,500
Bike Lane	41	\$53,000	\$2,173,000	\$325,950	\$217,300	\$2,716,250
Buffered Bike Lane	7	\$65,000	\$455,000	\$68,250	\$45,500	\$568,750
In-Boulevard Multi-Use Trail	3	\$325,000	\$975,000	\$146,250	\$97,500	\$1,218,750
Off-Road Trail	46	\$200,000	\$9,200,000	\$1,380,000	\$920,000	\$11,500,000
<b>Total</b>	<b>134</b>	<b>-</b>	<b>\$14,484,200</b>	<b>\$2,172,630</b>	<b>\$1,448,420</b>	<b>\$18,105,250</b>

## Executive Summary

**Table ES-2. Transit costing summary**

	Recommendation	Estimated Total (\$)
Short	Route 337/437 Crosstown Improvements	Capital: \$2,600,000 Annual Operating: \$900,000
	Route 314/414 Scott Improvements	
	Increased P.M. service frequency	
	GO-VIA Shuttle	
Medium	Service Hour Adjustments	Annual Operating: \$950,000
Long	Service Frequency Adjustments	Capital: \$21,450,000 Annual Operating: \$1,900,000
	Operations and Maintenance Facility Needs Assessment	-
<b>Total</b>	-	<b>Capital: \$24,050,000 Annual Operating: \$3,750,000</b>

**Table ES-3. Road costing summary**

	Segment Road	Length (km)	Cost per km (\$)	Subtotal Cost (\$) <sup>1</sup>	Design (15%)	Contingency (20%)	Estimated Total (\$)
Short	Chestnut Street Extension from Mountain Street to Hasting Street	0.19	\$2,600,000	\$494,000	\$74,100	\$98,800	\$666,900
<b>Total</b>		<b>0.19</b>	<b>\$2,600,000</b>	<b>\$494,000</b>	<b>\$74,100</b>	<b>\$98,800</b>	<b>\$666,900</b>

<sup>1</sup> Note: The Ontario Ministry of Transportation Parametric Estimating Guide, 2016 provides costing guidance based on lowest bid prices for tendered construction projects from 2010 to 2016. For widening, the cost estimates include grading, drainage, paving, granular material, markings, landscaping, traffic control and roadside safety improvements. They do not include electrical and structural works, and traffic detection equipment. For new construction/extending roads, the estimates include grading, drainage, granular base, paving, traffic control, illumination, noise barriers (if applicable), traffic control and realignment of intersecting roads. They do not include structural work or property acquisition. In some cases, too few data points were available in the estimating guide to provide a reliable average. Professional judgment and previous bid experience were used to provide an estimated cost per centre line kilometre in these cases.

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# CHAPTER

# 1

# Developing the TMP



**Chapter 1.0** of the City of St. Catharines Transportation Master Plan (TMP) provides the background explaining why and how the TMP was developed. It sets the stage for the complete streets framework with the objective to enable a shift of travel behaviour to more sustainable modes.

## Chapter 1.0 includes...

**1.1**

### Context

Answers the questions why a Transportation Master Plan should be developed and how it was developed for St. Catharines.

**1.2**

### Input & Interests

Provides an overview of the community engagement undertaken to inform the TMP recommendations and the key themes / input gathered.

**1.3**

### Rationale

Identifies the existing policies and plans that the TMP is supported by and the strategic objectives it seeks to support.

# 1.1.

## TMP Context

A TMP is a long term vision that defines and integrates transportation infrastructure requirements in strategic land-use and transportation decision making. A TMP provides the following:

- Guidance for City staff, stakeholders and decision makers.
- Supportive tools to help with the day-to-day coordination of transportation related issues and opportunities.
- The ability to leverage future community development trends including changing social and economic dynamics.

A TMP must align with the Strategic Plan and Official Plan and other long-term policies to achieve the desired objectives. While the TMP is intended to be a 20 to 30-year plan, it should be updated every five years, consistent with the Planning Act. This will allow the document to reflect the changes the City of St. Catharines will experience in the future.



*“A long-range strategy to guide decision making, budgeting and communications related to all forms of transportation.”*

# What...

## is a transportation master plan?

The TMP should reflect the characteristics of the community for which it is being developed. For the City of St. Catharines, the TMP has been designed to:

*Provide a complete streets approach to transportation planning*

*Provide guidance for decision making*

*Suggest site specific improvements for complex areas*

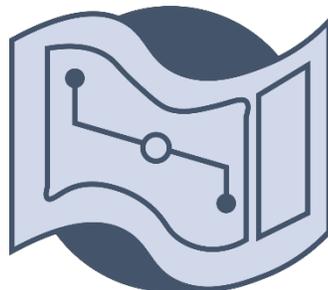
*Identify active transportation priorities and future enhancements*

*Find strategic opportunities for transit improvements*

*Identify a phased approach to implementation and management*

*Establish buy-in from key stakeholders and interest groups*

*Provide supportive policies to shape the future*



*“A TMP is a blueprint and flexible tool for the design of transportation infrastructure to inform future policy and planning.”*

## 1.1.1. Why Develop a TMP?

The City of St. Catharines TMP is intended to provide direction on future transportation investment and support community growth for the next two decades.

The plan provides a multi-modal and complete streets approach to planning, design and implementation of transportation infrastructure, supporting the City's strategic directions and policies. The TMP endeavors to assess transportation issues and objectives from a more holistic perspective, resulting in realistic and implementable processes, policies, programs and infrastructure solutions.

The TMP provides a foundation upon which decision-making will be made in the short (0 to 5 years), medium (6 to 10 years) and long-term (11+ years).

### A typical transportation master plan should include...



Investments in infrastructure and service delivery toward a municipality's desired horizon year and ensure consistency with Regional and Provincial horizon years.



Coordination with other jurisdictions that provide connected transportation services to the municipality.



Input for future Development Charges (DC) for new developments or redevelopments occurring within the municipality.



The requirements to satisfy Phases 1 and 2 of the Municipal Class Environmental Assessment process (as amended) for proposed transportation projects, facilities, and services within the municipality.



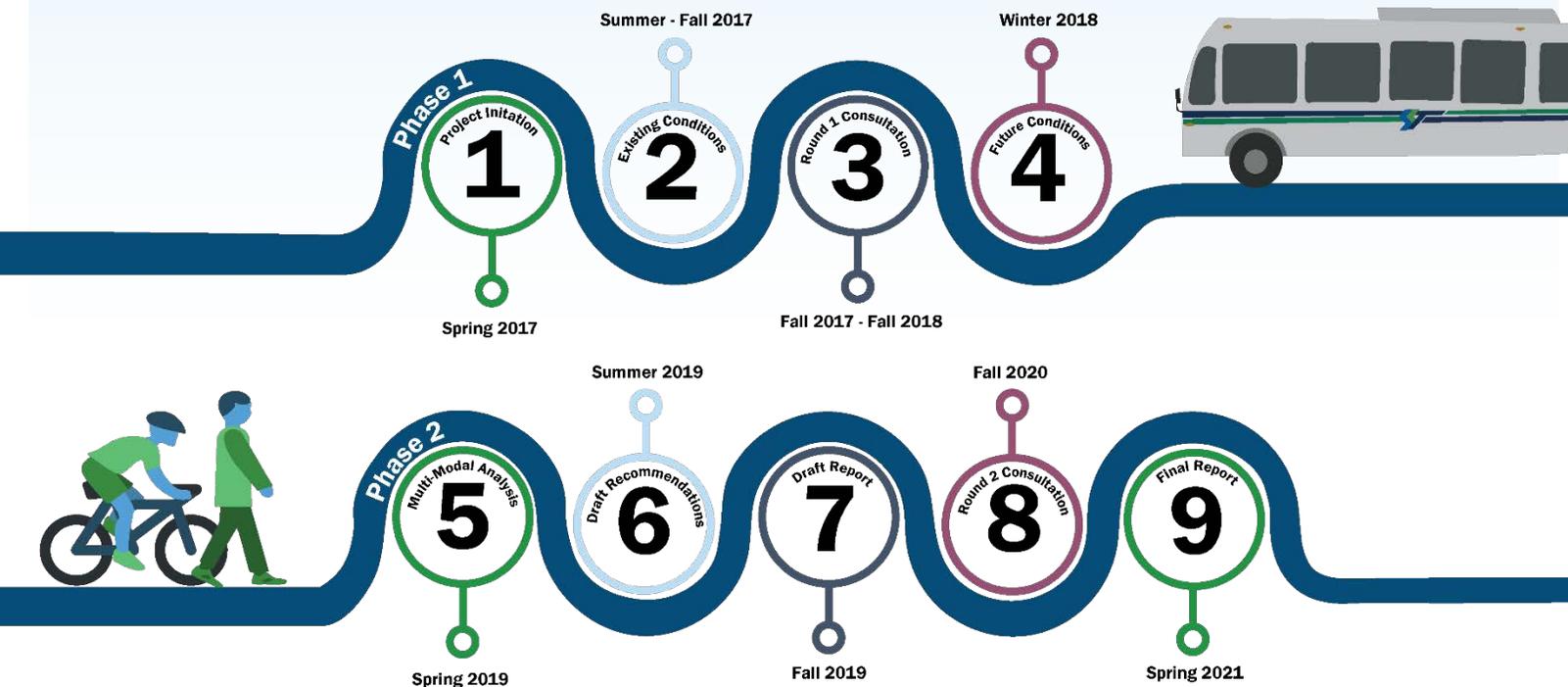
Compliance with Accessibility for Ontarians with Disabilities Act standards for both documentation and recommendations.

## 1.1.2. How was the Plan Developed?

The TMP was completed in two phases. Phase 1 identified and assessed the existing transportation conditions and engaged staff, agencies, key stakeholders and the public on the overall vision and direction of the plan. Phase 2 included an analysis, investigation and identification of potential infrastructure improvements, a complete streets approach and process to transportation planning, and decision making and policy improvements to guide St. Catharines into the next two decades.

Figure 1 illustrates the process that was used to prepare the St. Catharines TMP.

Figure 1. TMP timeline



### Why does this matter?

The TMP was completed to fulfill the master plan requirements of Approach 1 of the Municipal Class Environmental Assessment (MCEA) process, which means that there have been at least two points of consultation / engagement with stakeholders and the public, that a vision statement has been prepared (Phase 1), and that alternatives have been assessed (Phase 2), and a preferred has been identified. By fulfilling these Phases, several proposed infrastructure projects will be considered “pre-approved” under the new MCEA requirements or would not be required to complete these steps again prior to Phases 3 through 5 of the process (as needed). As the projects move to implementation, additional detailed studies may be required, including archaeological heritage, drainage assessments, detailed design, and additional public consultation.

# 1.2.

## Input & Interests

For any master planning exercise, consultation and engagement is a key component. It allows those developing the plan to draw upon a wide range of local expertise, experience and knowledge in charting a path forward. The integration of staff, decision maker, resident and stakeholder group interests and values help to ensure that the master plan reflects the needs and desires of those the plan is designed to serve.

Six core principles informed the consultation and engagement program used to develop the St. Catharines TMP - as shown to the right. The public engagement process was developed with an appreciation for these principles.

During the TMP's development, multiple audiences were engaged and feedback was incorporated into technical milestones, elements of the process and ultimately the report. A summary of Phases 1 and 2, including the engagement tactics, milestones and high-level outcomes is included on the following pages.

### Engagement needs to be...

Accessible for people of all ages and abilities where possible by providing easy to understand information in different engagement formats.

1.

Innovative and appropriate to the City in the way options and alternatives are effectively presented.

2.

Adaptive and flexible to allow for additional opportunities or requests as needed.

3.

Meaningful in the way information is exchanged and input is gathered by facilitating dialogue that helps understand the who, what, when, where, why and how.

4.

Communicated with sufficient information to build a foundational understanding for the background, process and outcomes of the project.

5.

Complementary to other municipal planning initiatives and consultation opportunities.

6.

## Who was engaged?

-  **Residents and Students:** this audience represents the individuals who live, work and play within the City of St. Catharines.
-  **Stakeholders and Technical Agencies:** this group included the City’s Advisory Committees and technical agencies such as MTO, Niagara Region, and surrounding municipalities.
-  **City Staff and Council:** this group is involved in the day-to-day planning, implementation, decision making, operation and management of the TMP.

## How were they engaged?

 **In-person:** Technical Advisory Committee Workshops; Public Workshops and “Pop-Ups”; Stakeholder Workshops; St. Catharines Transit Commission; City Staff

 **Online:** Online engagement platform  
Round 1: MetroQuest  
Round 2: EngageSTC

 **Outreach:** Promotional tools; social media; the project website; and informal presentations

## When were they engaged?

### Round 1

 2017  
**Nov 6**  
First-round Technical Advisory Committee Meeting and Public Workshop

 2018  
**May 24**  
Active Transportation Advisory (now Transportation Advisory) Committee Meeting

 2018  
**Sept 5**  
Brock University Student “Pop-up” Consultation

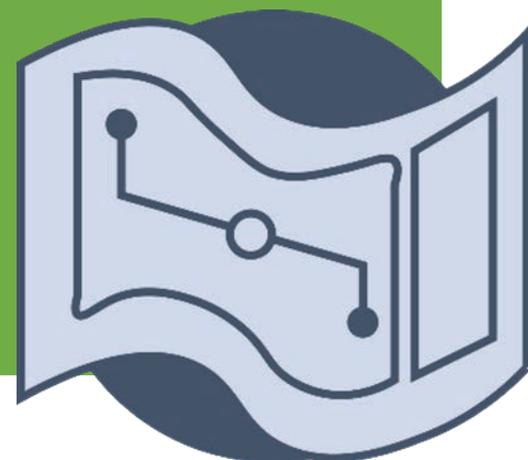
### Round 2

 2020  
**Nov 18**  
Technical Advisory Committee Meeting

 2020  
**Nov 24**  
Council Training Workshop

 2020  
**Dec 3**  
Public Presentation

 2020  
**Dec 7**  
Transportation Advisory Committee Meeting



The hundreds of comments received from the various internal and external stakeholders have been summarized into four overarching themes. These four themes were initially raised in the first round of consultation but were echoed during the second round as well, indicating that these are common or frequent challenges in the transportation network.

## What we heard



1

### Extend Transit Network & Access Times

Extend the reach of transit services in St. Catharines, connecting to rural areas and regional services. Common requests included additional downtown routes, between municipality services, and connections to Toronto. We also heard comments to improve the frequency of transit, specifically during peak period, evening, and weekend travel periods. Common requests included improving service in key destinations such as the Pen Centre and Fairview Mall areas.

2

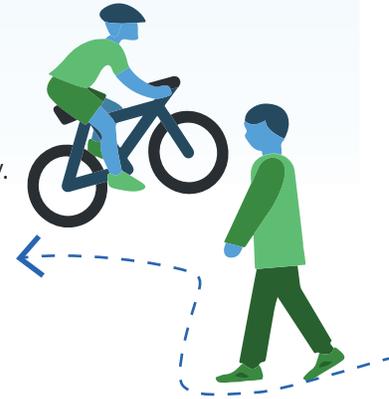
### Promote Cyclist Safety

Balance the needs of cyclists and motorists on roadways. Ensuring that cyclists are provided designated routes (both on- and off-road) is a key priority to enhance safety.

3

### Improve Pedestrian Connectivity

Improve pedestrian connectivity to key destinations by both sidewalks and multi-use trails— including the downtown core and other local amenities.



4

### Improve vehicular congestion

Reduce congestion on roads during peak travel periods, particularly in key destinations. Intersection improvements and synchronizing traffic lights were suggested as strategic interventions.



# 1.3.

## Rationale

The need for comprehensive transportation planning is supported by the policies and programs which have been developed and adopted within the planning policy hierarchy by each level of government, but also from the strategic objectives of the municipality as identified by Council.

The Strategic Plan for St. Catharines identifies four pillars - environmental, social, economic, and cultural community sustainability, which are the foundation for achieving the Strategic Plan vision. Framing transportation planning under the lens of these pillars of sustainability is important from the wider vision achievement perspective and to ensure alignment across policies and plans at the City level.

### OUR VISION FOR THE FUTURE IS:

*for St. Catharines to be the most dynamic, innovative, sustainable, and livable city in North America.*

St. Catharines Strategic Plan 2015-2025

The following sections identify the policies that support and inform this TMP and the sustainability indicators (guided by the Strategic Plan) which were the foundation upon which the existing transportation conditions were assessed and recommendations were developed.

## 1.3.1. Policy Foundations

The City's existing policies and directives provide a foundation to plan for a more balanced, multi-modal transportation system in St. Catharines. The TMP has been developed to encourage a more sustainable distribution of travel modes, emphasizing active mobility and public transit, while continuing to provide facilities for the efficient car travel that many residents will continue to require.

The benefits of producing a TMP that aligns with Provincial, Regional and local policy directions lie in the support the City is likely to receive from their higher-order government partners. By working in parallel with the planning and transportation initiatives being undertaken by Niagara Region and the Province of Ontario, St. Catharines keeps itself open to opportunities related to funding support, service improvements and other complementary future projects. It also establishes a basis for positive and mutually-supportive relationships among all levels of government working towards common goals related to improved mobility, sustainability and growth management.

## 1.3.2. Emerging Policy Guidance

The role of transportation in creating a more sustainable environment in response to significant climate change is of critical importance and is an area of emerging policy guidance.

Multi-modal planning and behaviour shifts are now becoming a necessity as opposed to a “nice to have”. In response, Niagara Region and others have moved forward with the development and adoption of a complete streets framework.

// *A complete street is a public right-of-way where the transportation facilities and adjacent land-uses are planned, designed and constructed to accommodate users of all ages and abilities including all modes.*

Niagara Region Complete Street Policy Handbook



## What are Complete Streets?

- Complete streets are designed to be safe, convenient and comfortable for every user, regardless of transportation mode, physical ability or age.
- A well designed street will promote activity, livability and connectivity and result in a network of transportation infrastructure and services that enables people to travel seamlessly on any given mode of transportation.
- While it is not appropriate or feasible to accommodate every mode on every street (for instance, public transit is not designed to service every local road), the complete streets mentality ensures that there is a network of transportation infrastructure that supports a full range of mobility options.
- Context sensitive and multi-modal considerations are applied when implementing the network.
- Typical complete street design elements and considerations include: pedestrian improvements, cycling improvements, transit improvements, wayfinding, placemaking, and / or traffic calming.

Niagara Region already has been advancing the concept of complete streets on the Regional road network and has produced guiding documents that can be applied to the City streets in St. Catharines. Niagara Region's multi-level policy approach to implementing complete streets was adopted in 2012 followed by the Niagara Region Complete Streets Model Policy Handbook and Design Guidelines document released in 2013. Each level of complete streets policy planning within Niagara Region influences the local municipalities in different ways.

The following image illustrates how the Niagara Region's complete streets policy papers have influenced the development of the complete streets approach in the St. Catharines TMP and how the Regional documents add to the existing policies which are currently woven into the City's Official Plan and the Downtown Urban Design Guidelines.



2012 discussion paper defines complete streets and how they may function in the Region. Best practices explored within this paper have been considered and used within St. Catharines.

The overarching visioning document guiding complete streets in Niagara Region. This document has helped guide the complete streets approach in St. Catharines.

The document sets out contextual complete streets guidance for the Region and addresses the concerns with model policies which could be adopted by area municipalities including St. Catharines.

The Transportation Master Plan provides additional guidance beyond the complete streets documents and introduces a framework of complete streets throughout the Region.

The guidelines outline road typologies for Regional Roads. Though not directly transferrable to St. Catharines streets, they have informed design guidelines and improvements at the City level.

The Niagara Region Complete Streets Model Policy Handbook includes examples of model policies that could be adopted by the local municipalities including some examples from St. Catharines. The following is an overview of these context-specific considerations and how they have been incorporated into the existing municipal policy structure, specifically the City's Official Plan.

## Niagara Region

## City of St. Catharines

1

Many roads do not appropriately reflect current active transportation and transit needs.

This Plan recognizes that to achieve a healthy, age-friendly, and livable community, the transportation system will need to reduce reliance on the automobile in favour of more sustainable forms of transportation, such as walking, cycling, and transit.

2

Connections should be provided between the different transportation networks.

In support of an integrated bicycle network, priority should be given to the development of bicycle facilities to facilitate linkages and connections between the local and Regional bicycle network.

3

New development should include transportation facilities for additional modes such as bicycles and transit.

Where feasible, major public and private development projects will be required to incorporate public spaces, bicycle facilities and sidewalks to support connections to the City's pedestrian, bike and transit network.

4

The streets should include more local culture.

The City shall encourage other public and private sector owners and developers to include public art as a component of their developments, particularly those developments that include space that will encourage active transportation and attract significant pedestrian traffic.

5

Streetscaping is visually appealing, however it is difficult to maintain from an operational standpoint.

The City shall consider various traffic calming and transportation demand management measures to reduce the negative impacts of vehicular traffic.

## 1.3.3. Planning Trends

It is paramount to consider the planning trends which could affect the long-term success or applicability of the master plan. Future ready is the “practice” of establishing processes, practices and policies that provide guidance on how to address future socio-demographic, cultural and environmental trends. One of the key goals of the St. Catharines TMP is to provide the foundations and tools to allow City staff to actively plan for the anticipated “future” of the City.

St. Catharines’ Future Ready planning can be categorized into two main themes: resiliency and sustainability – consistent with the City’s Strategic Plan. This will be the foundation of the policies, recommendations, initiatives and programs identified in the TMP. It will ensure that the planning will be capable of addressing any changes in transportation conditions. Connectivity is a key theme integrated into sustainability and resiliency. With well-connected routes, the walkability typically is enhanced as it is more convenient to utilize active transportation as a means to travel. Overall, the City’s urban structure is strengthened by providing a variety in both the route options and the mode of travel.

Sustainable considerations encompass the environmental, social and economic sustainability of recommendations. Sustainability and resiliency considerations will be factored into a recommendation along with a consideration if there is an emerging trend which could have a future impact.

Figure 2 illustrates the anticipated relationship between Future Ready and the key trends that need to be addressed and the desired outcomes. Potential indicators are identified that will quantify the success of the recommendation.

RESILIENCE & SUSTAINABILITY

What does *future ready* mean for St. Catharines...

Figure 2. St. Catharines' future ready considerations

**Future Ready** is the understanding that planning is a fundamentally dynamic exercise. Creating solutions for today is simple; our challenge is to understand how we can prepare for tomorrow.

**Key Trends** for St. Catharines show how transportation planning could be affected by society, economy, and technology, and the natural and built environment.

-  **Environmental trends** such as increased importance in addressing **climate change, urban storm water management, and air quality.**
-  **Built-Environment trends** such as increased importance in addressing **the shift to more urban residents, suburban sprawl, and green vs. grey space.**
-  **Social trends** such as increased importance to addressing **demographic shifts (ageing population), equity, and accessibility.**
-  **Economic trends** such as **the shared and gig economy, telecommuting and rising cost of living.**
-  **Technological trends** such as **automated and electric vehicles, smart cities and Intelligent Transportation Systems (ITS).**

St. Catharines should have the following **considerations** for how transportation planning could be affected by society, economy, and technology, and the natural and built environment.

**Climate Change** is defined as a significant long-term change in patterns of weather in a region. The effects are often attributed to increased CO2 in the atmosphere and pollution. **Transportation, through emissions, is a major contributor to CO2. In addition to impacts on climate, emissions also impact air quality. How can transportation be planned to reduce its emissions footprint?**

Beyond emissions, transportation infrastructure also covers our cities in impermeable surfaces such as concrete, and asphalt. The resulting run-off can affect water quality. **As we develop and retrofit roads, how can we design for reduced urban run-off?**

More and more residents are moving into urban cores. It is expected that by 2050, 68% of the world's population will live in a city. This density will shift how we accommodate different modes within our urban cores. **How can St. Catharines support a healthy modal split within its downtown?**

Despite increasing densities within the urban core, many of our communities are still built around suburban sprawl, communities which are often dependant on the single-occupant car use. **How can we rethink transportation options to include suburban residents sustainably?**

Our communities are a mix of different landscapes within the public realm, including hard-scaped (grey) and soft-scaped (green) areas. The interplay between these two built-forms can impact our quality of life. **How can transportation be planned to support a healthy balance of green and grey area?**

Our population is getting older. In St. Catharines the median age is 45, which is 3 years older than the 2016 census median age. As our demographics shift, **how can infrastructure be planned to be inclusive?**

Further to just older adults, equity is fundamental to resilient planning. Each person should feel represented and capable within their community, and planning for inclusive mobility can help to support community-equity through removing barriers and supporting accessibility for all.

Our economy is shifting to supported shared-mobility options (car-share and bike-share) and be gig-based through on-demand ridesharing services such as Uber and Lyft. Along with telecommuting and flex office space, these shifts are making transportation more flexible. **How can we maximise the potential of these trends to shift transportation positively?**

The cost of living is increasing and influencing travel modes. This economic shift affects equity and accessibility of different transportation modes.

New developments in technology have influenced a shift in travel options. Smart Cities technology, Intelligent Transportation Systems (ITS), new automated and electric vehicles are framed as solutions to some of the aforementioned environmental and social trends but are also going to influence how transportation infrastructure is planned and operated.

**Desired Outcomes** of a Future Ready St. Catharines will be primarily seen through a Sustainable, Resilient and, fundamentally Healthy City, with the foresight to attain the following:

-  **Physical Health**
-  **Mental and Emotional Health**
-  **Community Health**
-  **Economic Health**
-  **Environmental Health**

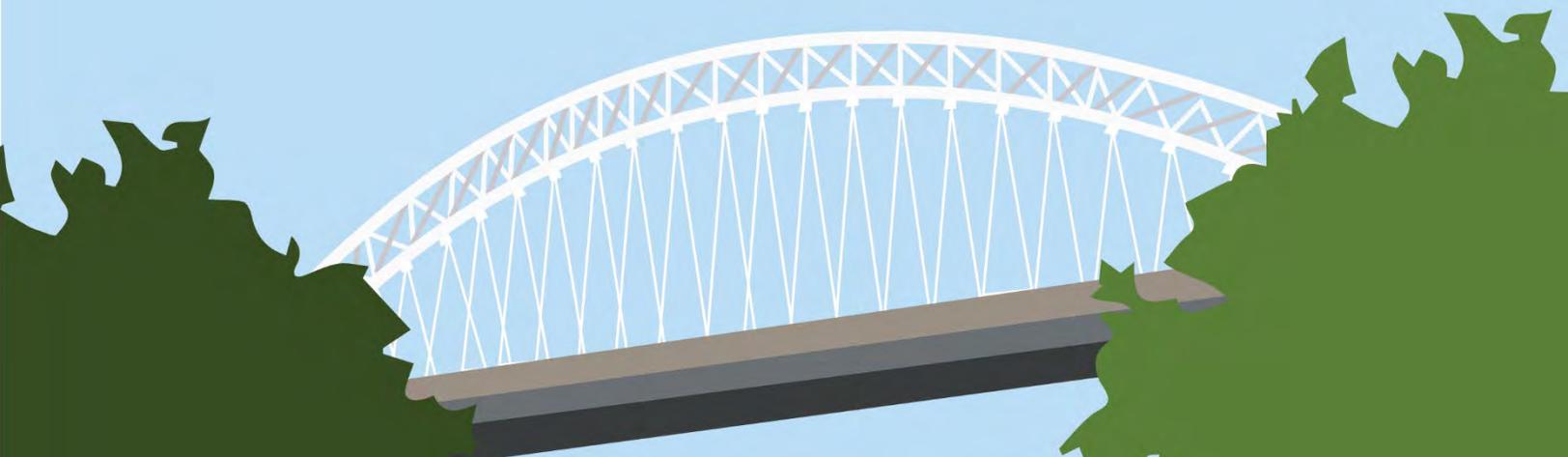
**Achieving Future Readiness** will require a constant pulse check on the indicators and effects on the desired outcomes. Adaptability to a constantly changing landscape is fundamental when planning under a future-ready mindset. Readiness is not a goal but an on-going challenge.

Throughout the TMP as Future Ready considerations are identified, they will be illustrated with a "Callouts" labeled FR (future ready) and refer to any considerations which could impact the sustainability or resiliency of the St. Catharines TMP.

**CHAPTER**

**2**

**Transportation  
Today**



**Chapter 2.0** provides the existing conditions upon which the TMP has been developed. There are two components of “existing conditions” which ultimately need to be considered.

The first is the socio-demographic profile of the City, which helps to identify trends, preferences and potential needs which help to shape potential and preferred solutions.

The second is the layout and functionality of the current transportation network. This allows for the identification of missing links, barriers and potential opportunities.

Both are necessary components as a first step in identifying potential improvements – infrastructure, policy and program.

## Chapter 2.0 includes...

2.1

### City Profile

Provides an overview of key socio-demographic information about the City including existing transportation trends.

2.2

### Context

Provides an overview of the current state of each of the transportation modes within the City including cars, goods movement, transit, walking and cycling.

# 2.1.

## City Profile

The intent of the TMP is to build upon the existing transportation conditions by using both the current and future socio-demographic trends. **Section 2.1** provides an overview of these conditions and trends. Throughout this section we have included icons identifying future ready indicators.

### 2.1.1. Geography & Population

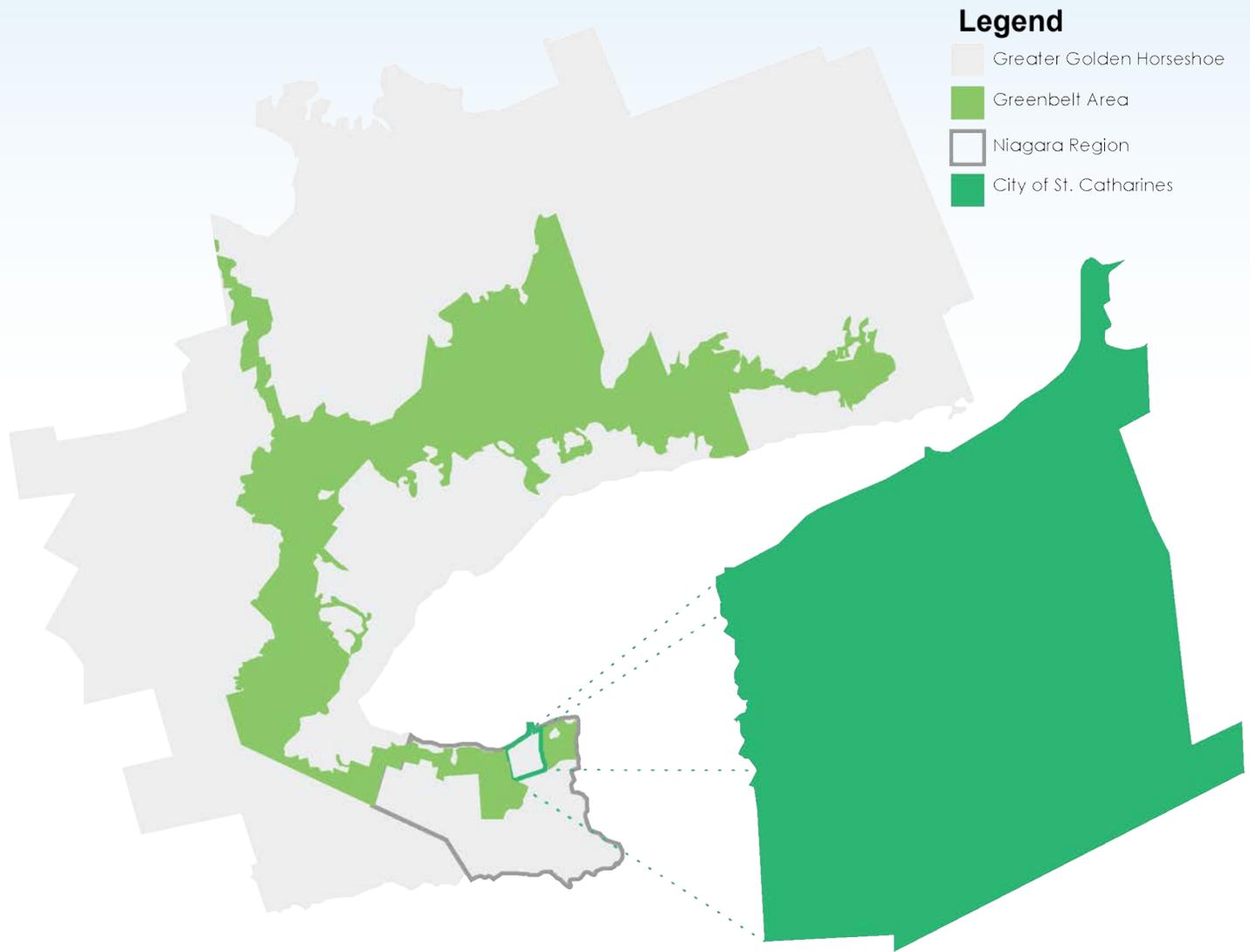
The Greenbelt encompasses the western portion of St. Catharines and contains some of the best tender fruit and crop producing agricultural lands in the country. The Niagara Escarpment runs through the southern portion of the City, and the shore of Lake Ontario forms the northern border. Portions of the eastern boundary are covered by the Welland Canal.

Ontario's Places to Grow Act designates Downtown St. Catharines as Niagara Region's only Urban Growth Centre, which emphasizes urban intensification and protection of Greenbelt lands. Urban Growth Centres are designated to support the highest concentration and mix of transit supportive residential, employment, institutional and civic uses. These are also intended to promote public and private investment. A minimum density target of 150 people and jobs per hectare to be accommodated by 2031 is established for Urban Growth Centres. Urban Growth Centres focus on a creative and cultural role in the city-core chemistry, the presence of institutions of higher learning, attracting new urban entrepreneurs, creating live/work spaces and pedestrian-friendly spaces. In the St. Catharines context, there is also the desire to position the Downtown as a signature tourism destination, including as part of the Niagara Wine Route.

St. Catharines can be identified by both its urban and agricultural areas. The urban area is established by the Region of Niagara Policy Plan and is intended to provide urban development opportunities to accommodate the majority of the City's projected future population and employment growth. The agricultural area includes all lands within the St. Catharines municipal boundary located outside the urban area. The agricultural area is to be protected, with the intended uses predominately agriculture, agricultural related, existing residential and natural heritage. The City's Official Plan (p. 5-6) does not support expansion of the urban area. The City also recognizes the value and opportunities the agricultural area and community have in enhancing the St. Catharines' sense of place.

**Figure 3** illustrates Niagara Region and St. Catharines geographic placement within the Greater Golden Horseshoe. Given that the majority of growth is anticipated to occur within the urban area, it is imperative that the TMP provide recommendations that accommodates this growth with strategic recommendations for the rural areas to enhance overall connectivity.

**Figure 3. Geographical context**



The 2016 population in St. Catharines was just over 133,000, which represented a growth of 3.1% from 2001 to 2016. The population is projected to be as high as 168,000 by 2041. St. Catharines had a 31.5% share of the Regional population in 2001 and 29.7% in 2016.

In 2001, the Niagara Region had a 3.6% share of the provincial population, which fell to 3.3% in 2016. The share of population of both St. Catharines and the Niagara Region has fallen slightly in comparison to Ontario, despite their continued modest growth.

The City of St. Catharines Official Plan (OP), adopted in January 2012, estimates the population will grow to 143,800 residents by 2031, which is approximately a 4% increase from 2011. Employment is forecasted to grow to 71,000 by 2031, representing approximately 6% increase from 2011.

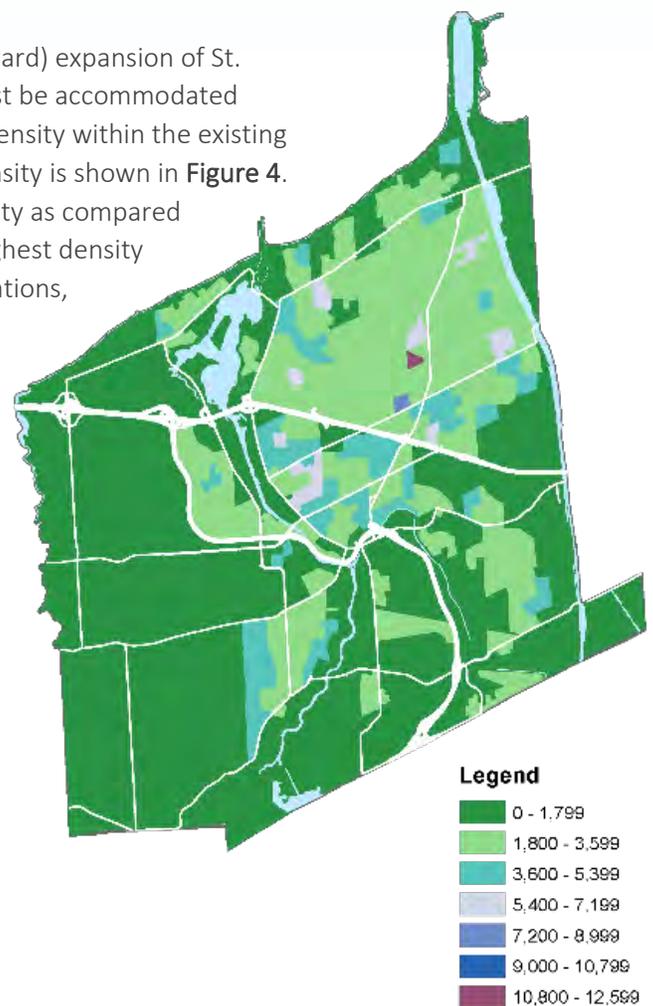
Due to legislated constraints on the physical (outward) expansion of St. Catharines, the majority of population growth must be accommodated through more compact built form and increased density within the existing urban area of the City. The existing population density is shown in **Figure 4**. Existing urban areas are expectedly higher in density as compared to the rural and industrial parts of the City. The highest density locations are around existing high-traffic retail locations, including Lake Street Shopping Area and Ontario Street Commercial Corridor, showing that a mixed land use pattern may attract larger populations.

The intensification of the existing urban area represents an opportunity for a more sustainable approach to development. Carefully considered compact built form could help to increase the number of shorter trips, creating an environment that is more conducive to sustainable modes of transportation such as walking and cycling.



*As St. Catharines continues to develop and integrate their transportation network, focus should be given to the difference in accessibility and modal options that are currently provided within the urban and rural areas. Future considerations need to recognize the vastly different infrastructure needs of the two areas.*

**Figure 4. Population density (persons/km<sup>2</sup>)**



### 2.1.2. Economy

The City's economic pattern is another aspect of the overall profile that is closely tied together with transportation. Drawing from the St. Catharines Economic Development Strategy and Action Plan, transportation is one of the key elements in attracting population and economic growth. As the headquarters for Ontario Ministry of Transportation, St. Catharines has an opportunity to take opportunities in the mobility sector, especially with major technological shifts in transportation. This includes ride-sharing transportation models, connected and autonomous vehicles, and new alternative energy sources and materials.

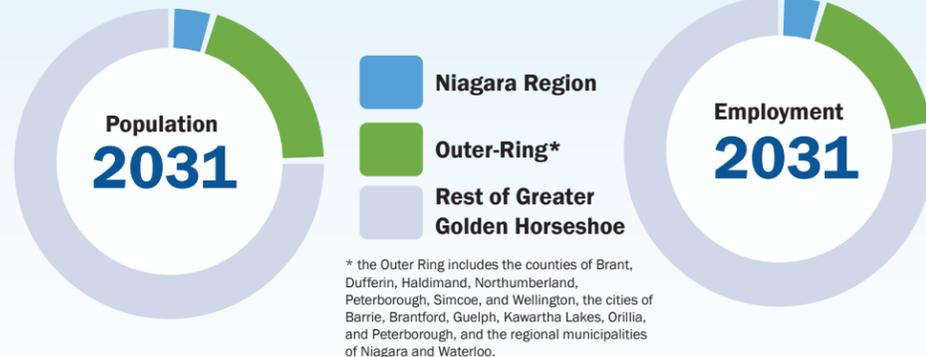
A reflection of St. Catharines' central role as the major business and service centre for Niagara Region can be seen in the relatively high proportion Niagara Census Metropolitan Area (CMA) jobs that are found in the City in sectors that cater to the needs of the residents in Niagara. Across all sectors, just over a third of all jobs (34%) in the CMA are in St. Catharines. A higher proportion of jobs is found however in retail (41%); finance and insurance (43%); real estate, rental and leasing (41%); management of companies and enterprises (68%); educational services (44%); and health care and social assistance (40%). This indicates that St. Catharines operations in these sectors serve clients beyond City residents.

In addition to the population and employment information, a current "snapshot" of key socio-demographic trends for the City of St. Catharines as it relates to Niagara Region and the Greater Golden Horseshoe is provided in **Figure 5**.

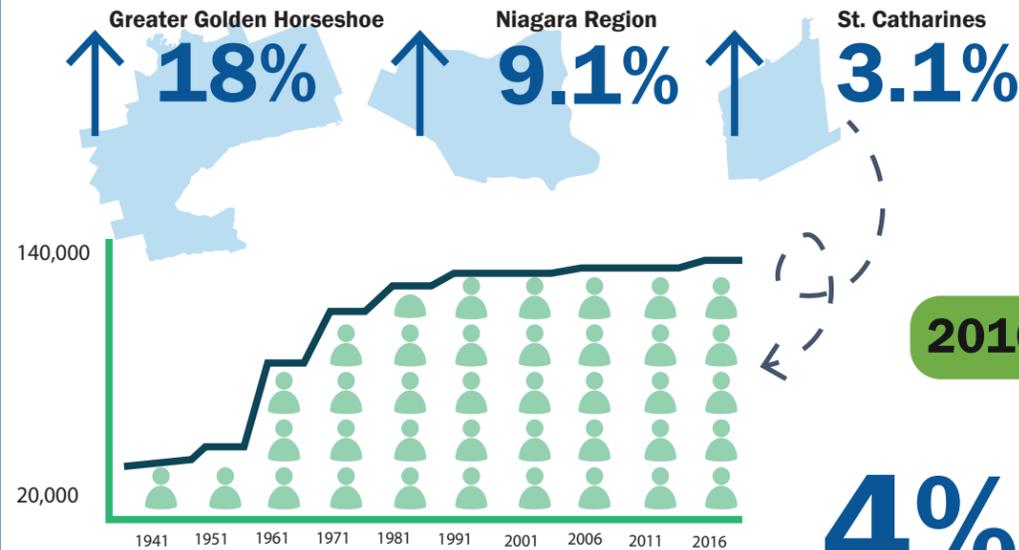
# Figure 5. St. Catharines context

## POPULATION TRENDS

### Population & Employment Distribution

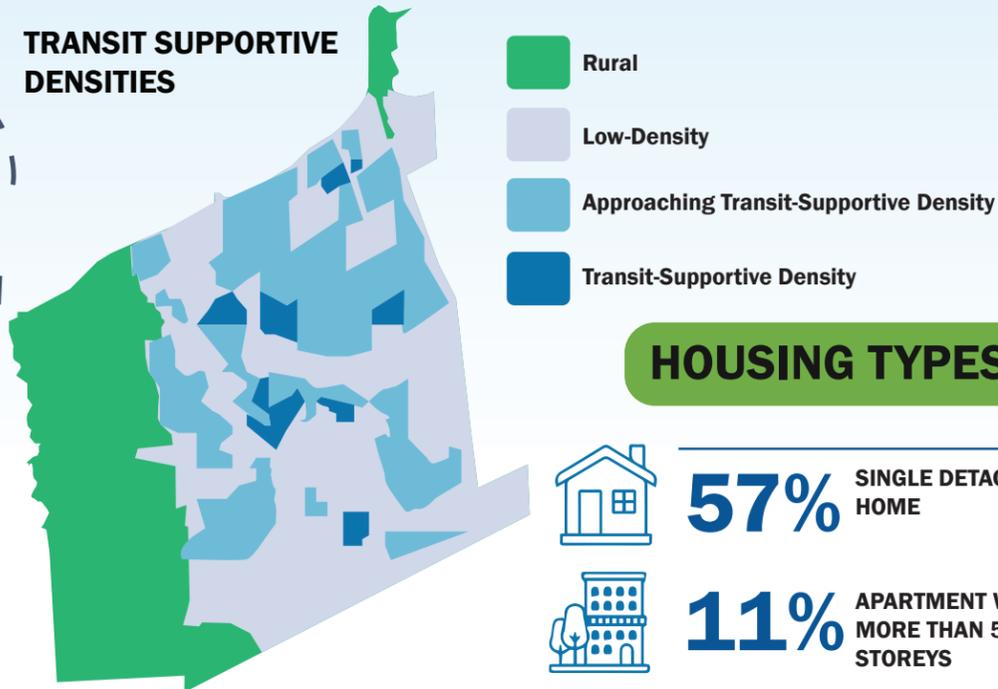


### Population Growth (2001-2016)

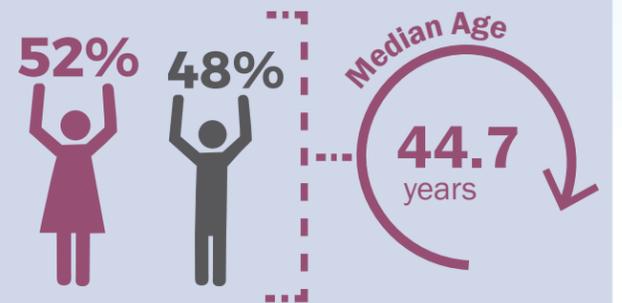


## POPULATION DENSITY

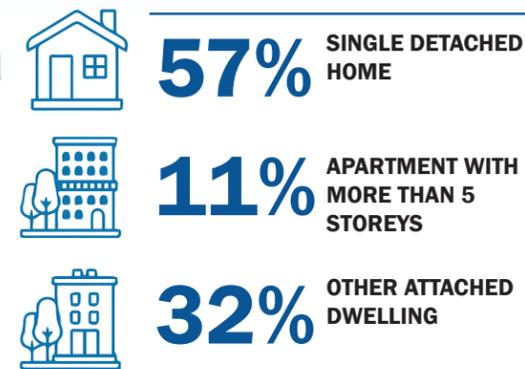
### TRANSIT SUPPORTIVE DENSITIES



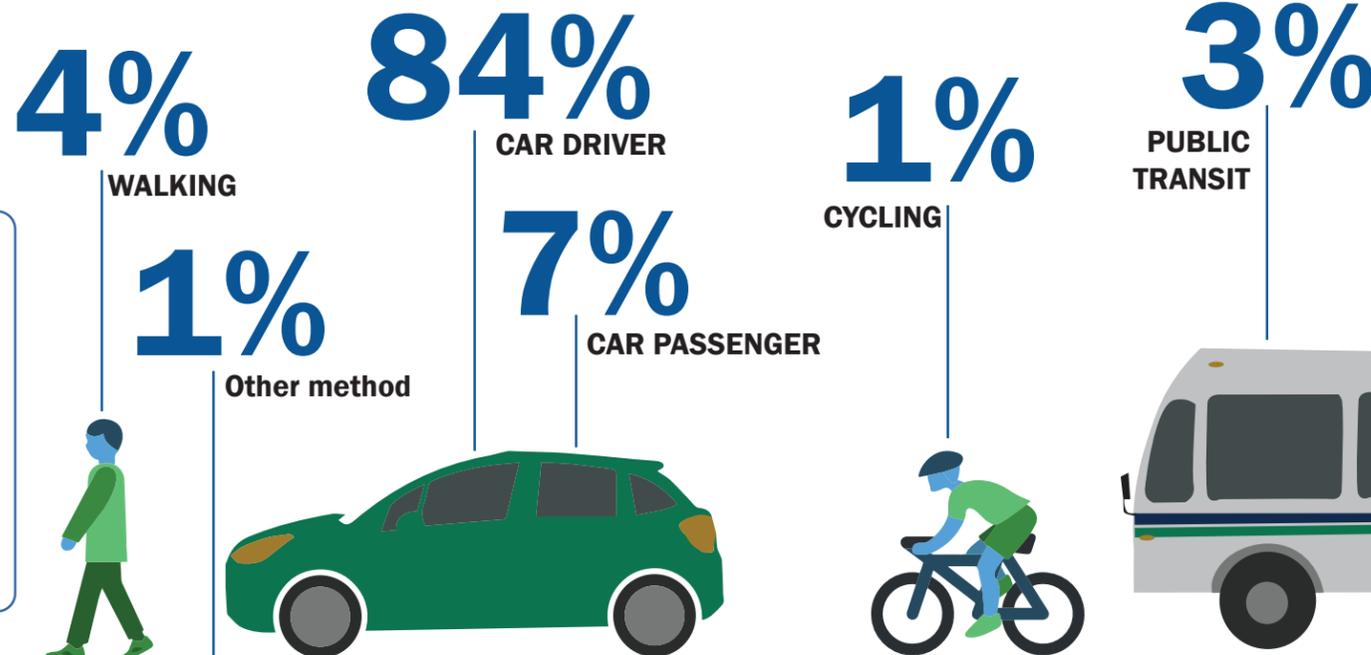
## CENSUS DATA



## HOUSING TYPES



## 2016 MODE SPLIT



**WELCOME TO**

The City of **St. Catharines**

POPULATION **133,113** (as of 2016)

Niagara Region

## Socio-Demographics

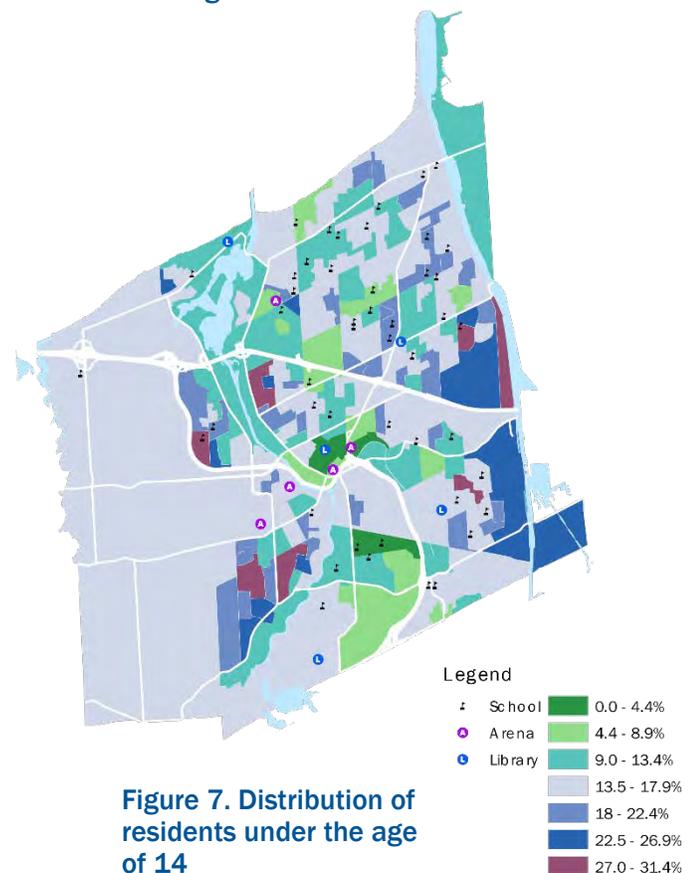
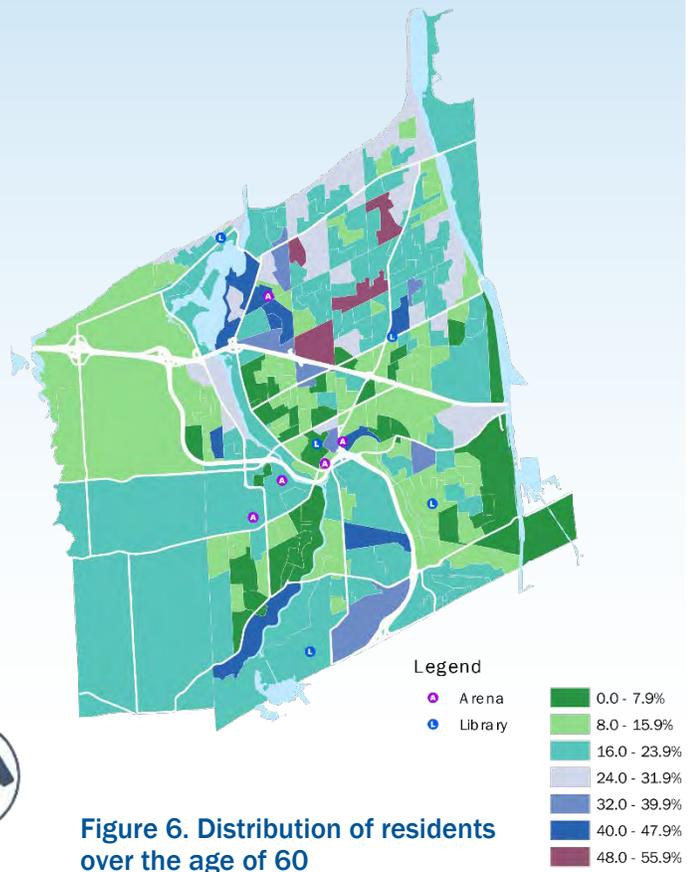
Socio-demographics indicators include age, gender, culture, education and income and are considered some of the most influential aspects of human behavior and trends. The following is a high-level overview of some of those trends.

**Age & Gender:** Across Canada, the population is collectively aging. In St. Catharines, the median age is 46, which is higher than the Canadian median of 41.2. The distribution of the residents over 60 years old is shown in **Figure 6**. The percentage of the population under 14 is 14.6%, as seen in **Figure 7**, and is less than the national percentage of 16.6%. The gender split is equal, which mirrors the Canadian national ratio.

*The future of St. Catharines transportation network should strive for a multi-modal network, for all populations aged 8-80, and beyond.*



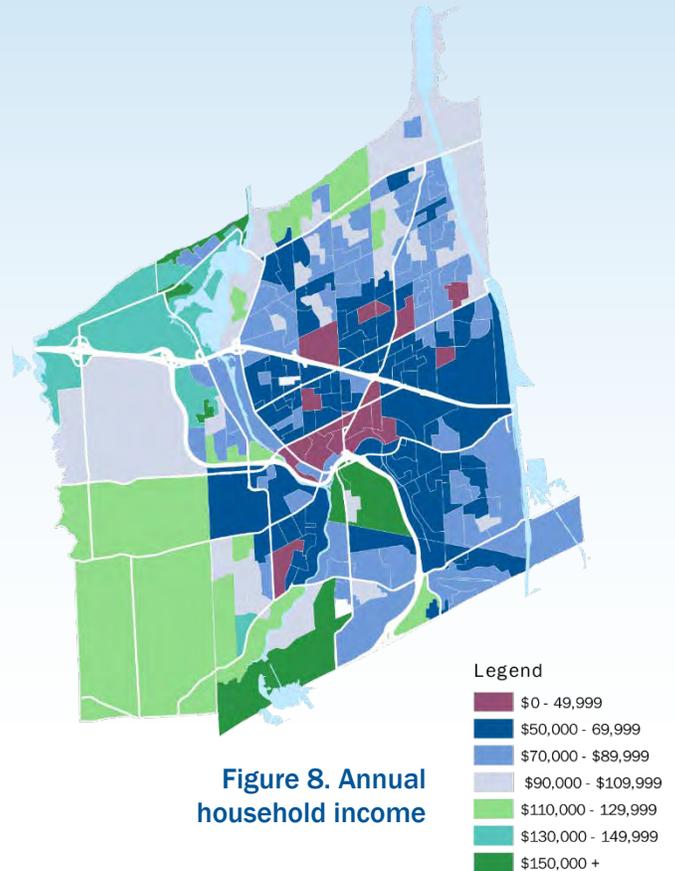
*The distribution of both the youngest and oldest populations in St. Catharines indicate the need to plan for transportation networks that meet the needs of these groups. The geographic distribution can indicate where key trends for the accessibility and functionality of the transportation network should occur. Locations with a high distribution of residents over 60 and under 14 in **Figure 6** and **Figure 7** show areas that may require additional considerations to ensure the accessibility and safety of the network.*



**Culture:** Of the total population, 16.9% identify as an immigrant with 7.4% immigrating between 2011-2016. This overall percentage is lower than what is seen nationally (21.9%). Recently, most immigration has occurred from Asian countries. 2.9% of the population identifies as aboriginal, with the majority (1.65%) identifying with First Nations. The overall distribution of aboriginal-identifying population is lower than the national percentage of 4.9%.

**Education:** Of the population aged 25 to 64 years old, 59.5% have a post-secondary certificate, diploma or degree, which is lower than the Canadian average of 64.8%.

**Income:** Personal and household income can be significant factor in day-to-day transportation choices. In St. Catharines, the median after-tax employment income for individuals in 2015 was \$28,521 and for households it was \$56,572, as compared to the national medians of \$30,866 for individuals and \$61,348 for households.



Transportation is considered a significant part of one's day-to-day cost of living. In Ontario, the average household spends around 18.8% of its income on transportation (the national average of 19.4%).

*The geographic income distribution shows that currently, income parity is not achieved throughout St. Catharines. This is important to note when considering the equity of the transportation network, and the multi-modal connections that are available across all income areas in the City.*

*Culture, education and income affect the accessibility and the overall equity of the system. Locations with lower incomes, as seen in **Figure 8**, show locations that should be connected by transportation. St. Catharines medians for income are lower than the national medians, however the percentage of income spent on transportation is relatively consistent. This indicates that accessibility and affordability in transportation are themes that the City may face and should consider as part of this TMP.*



## 2.1.3. Travel Habits

According to the 2016 census, active modes (walking and bicycling) account for 5% of trips, which is a decrease from 2006. Transit, including St. Catharines Transit and GO Transit, accounts for 3% of travel, unchanged from 2006. The census data also revealed more men than women drive, women were more likely to use transit, and men were more likely cycle to commute. **Figure 9** depicts the results from the 2006 and 2016 Transportation Tomorrow Surveys which provide a detailed break-down of how people use various modes within the City.

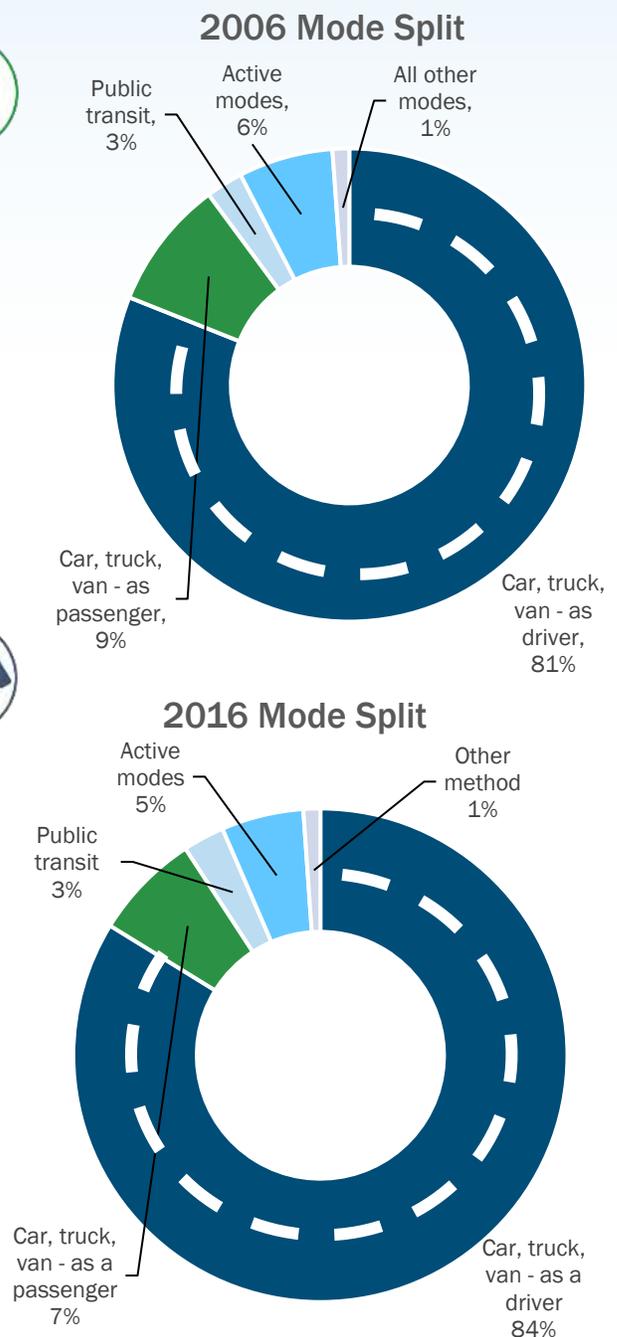
*According to commuting data from the 2016 Census of Canada, driving is the dominant mode of transportation in St. Catharines. Private vehicles (car, truck or van) account for 91% of all trips whether driving alone or as a passenger, which is an increase over the 2006 census. This is an important note to consider for the future sustainability of the City.*



*The City needs to balance the mode diversity of road users when planning for infrastructure so as to accommodate these differences, thereby increasing the resiliency of the transportation network.*



**Figure 9. Comparison of 2006 and 2016 mode split**



## Commuting Patterns

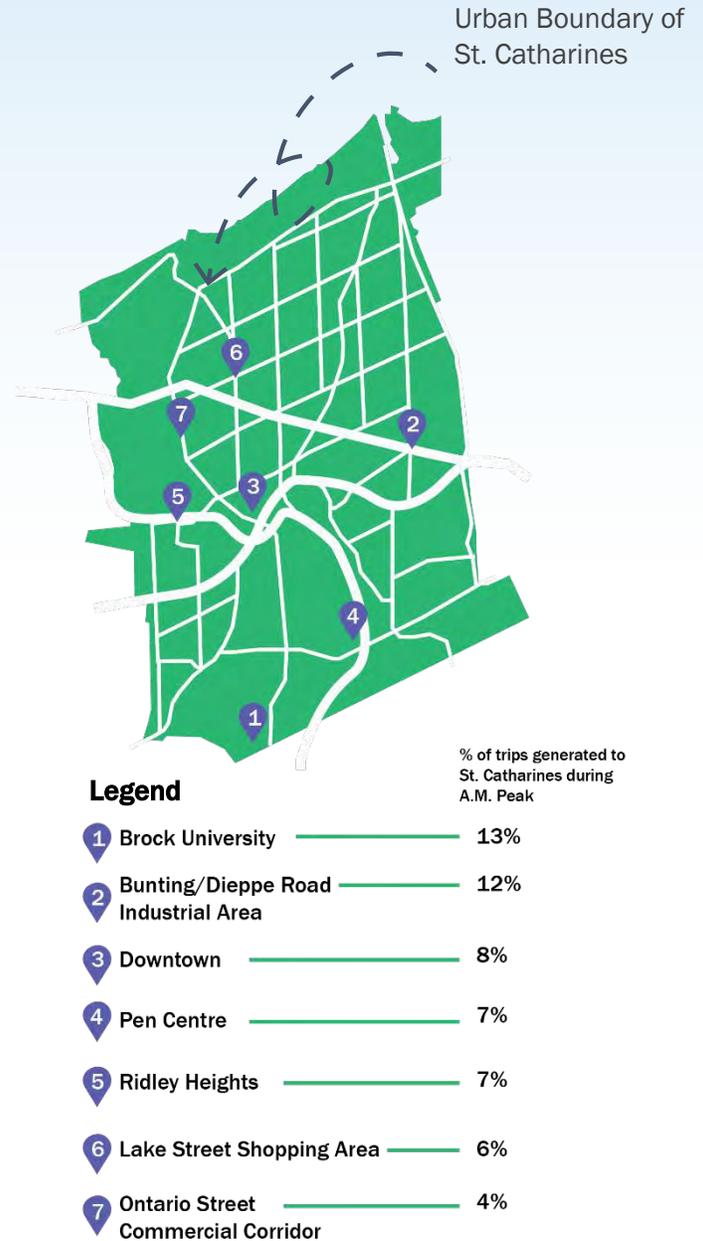
The City’s road network includes links that fall under multiple jurisdictions - Provincial freeways, Regional arterial roads, and City arterial, collector and local roads. The Queen Elizabeth Way links St. Catharines to Niagara Falls and Fort Erie to the southeast, and to Hamilton to the west. Highway 406 links St. Catharines to the southern part of the Region.

Nearly half of all external (non-resident) trips in St. Catharines originate in Niagara Falls, Thorold and Niagara-on-the-Lake. The next most common sources of external trips originate in Welland, Lincoln and the Grimsby-Hamilton area.

To better understand where traffic is destined, trip data for St. Catharines traffic analysis zones were extracted from Transportation Tomorrow Survey database. While trips were somewhat equally distributed across all zones, certain key destinations emerged. In total, “high volume” destinations constituted approximately 56% of all trips in the morning peak period – typically between 6:00 a.m. and 9:00 a.m. Brock University is the single most travelled destination, generating 13% of trips to St. Catharines within the morning peak.

The highest generating trip destination zones are summarized in Figure 10. These areas consist of employment, educational and commercial uses.

**Figure 10. Popular commuting destinations in St. Catharines**



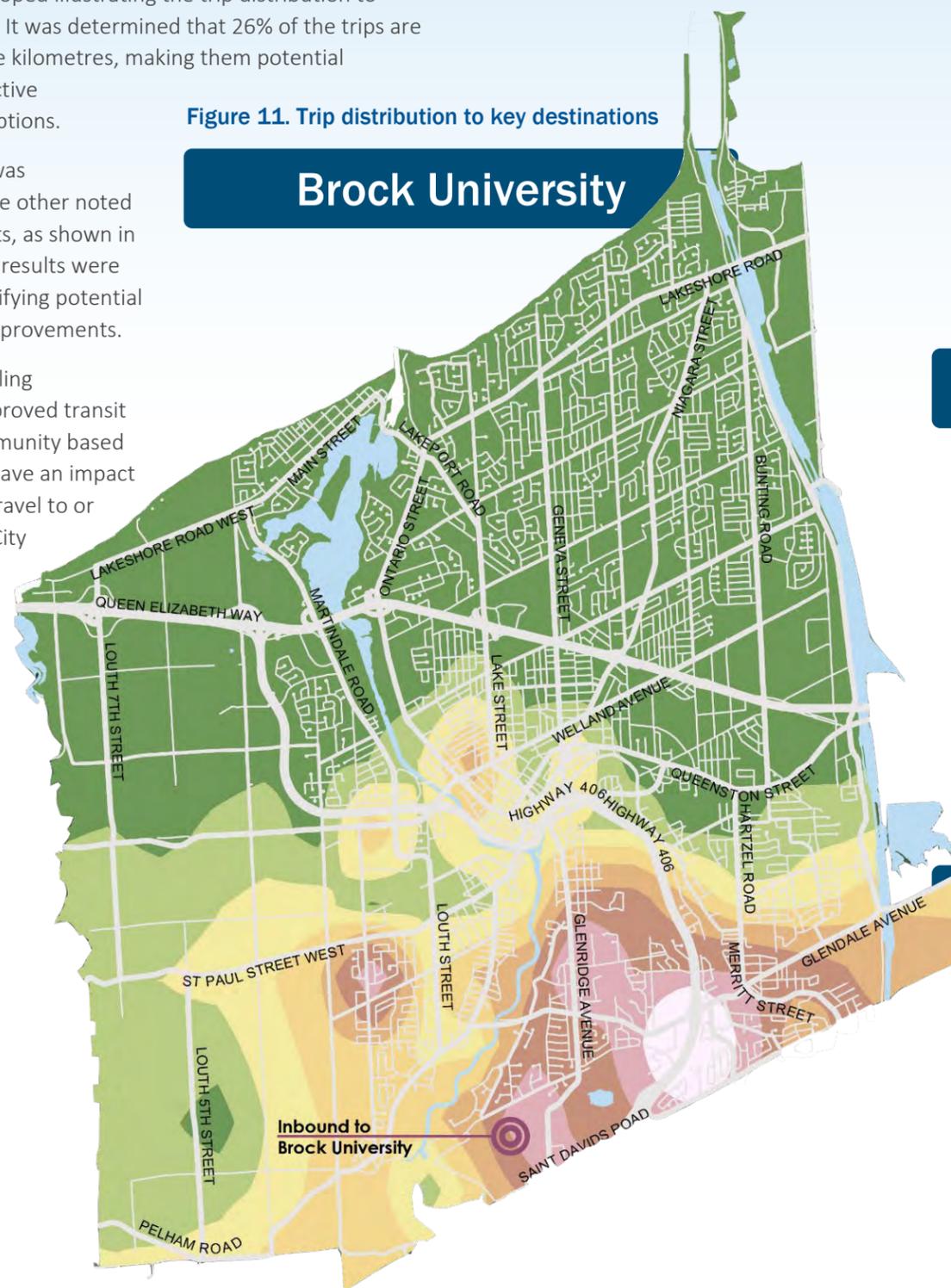
There are several destinations within the municipality that generate daily peak period trips, the majority of which are undertaken using an automobile. An assessment of the potential trips that could be taken to Brock University by more sustainable modes of transportation was undertaken.

A map was developed illustrating the trip distribution to Brock University. It was determined that 26% of the trips are within one to five kilometres, making them potential candidates for active transportation options.

Similar analysis was conducted for the other noted destination points, as shown in **Figure 11**. These results were used when identifying potential infrastructure improvements.

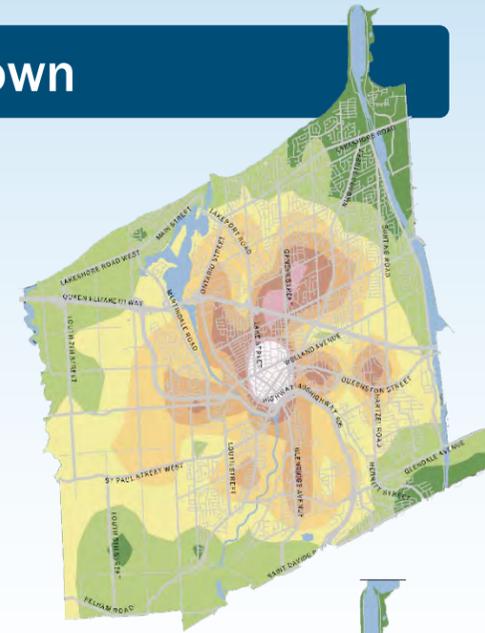
Walking and cycling connections, improved transit service and community based outreach could have an impact on how people travel to or between major City destinations.

**Figure 11. Trip distribution to key destinations**



**Brock University**

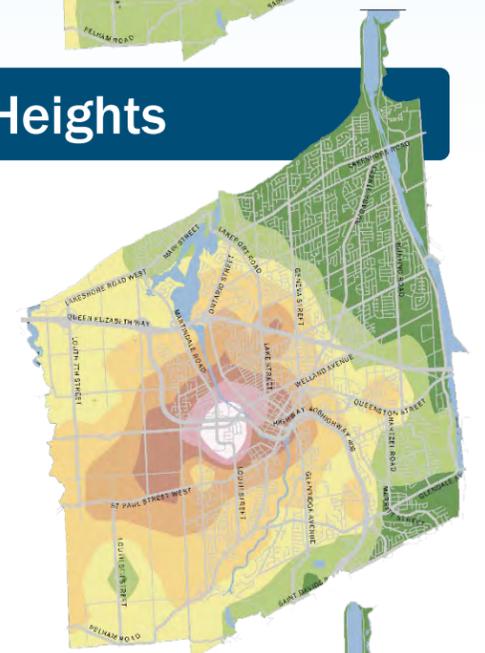
**Downtown**



**Lake Street Shopping Area**



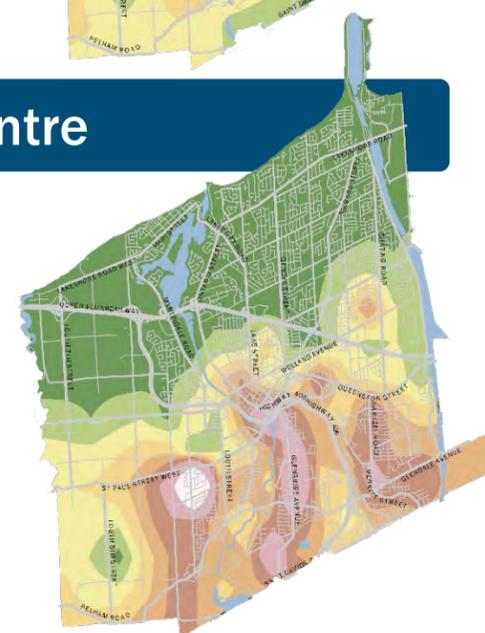
**Ridley Heights**



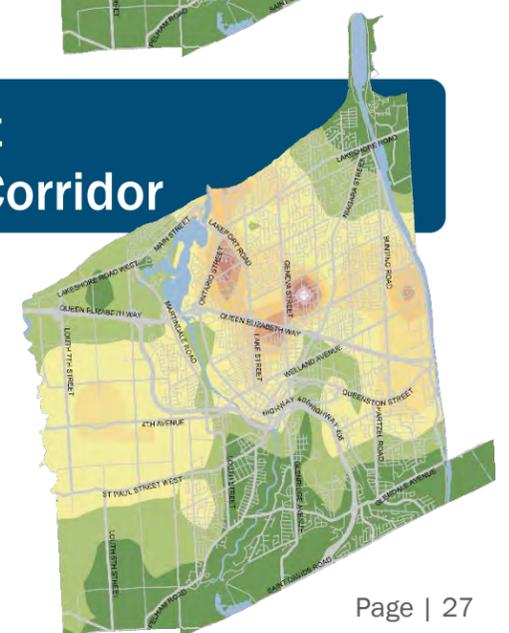
**Bunting/Dieppe Road Industrial Area**



**Pen Centre**



**Ontario Street Commercial Corridor**



# 2.2.

## Multi-Modal Context

This section explores the current operations of each transportation mode – cars, heavy trucks, transit and active transportation including human propelled forms or supported transportation – and the existing interactions between modes that influence how the transportation system functions. The TMP will build upon these existing conditions by integrating or adapting current practices into a more complete streets approach. The focus of this TMP is on trips into and around our City. Inter-municipal trips, while influencing the trips within the city, are under Niagara Region’s jurisdiction and are therefore included in the Region’s Transportation Master Plan. Similarly, high-level inter-provincial trips are considered in the Province’s transportation plans as discussed in **Section 1.3.1**.

A high-level overview is provided in **Figure 12**, followed by more detailed analysis of individual modes of travel.

Figure 12: High-level overview of current transportation conditions



- + The road network in St. Catharines includes a hierarchy of arterial, collector and local streets.
- + As one of Ontario's oldest communities, rights of way tend to be narrow, especially in the downtown.



- + Goods are moved in, out and around St. Catharines mainly by truck and on water using the Welland Canal. All Provincial highways, Regional and arterial roads accommodate truck traffic. There is no truck route bylaw and there are no time of day restrictions regarding truck activity within the City.



- + The St. Catharines Transit Commission (SCTC) oversees the City's transit system. There are 29 transit routes and shuttles provided by St. Catharines Transit and most run on 30-minute headways.
- + Niagara Region Transit, GO Transit, and VIA Rail also operate within the city.



- + Pedestrians are typically accommodated on the City's sidewalk system and comprehensive trails network; however, major barriers limit access to key destinations, causing conflicts with other road users.



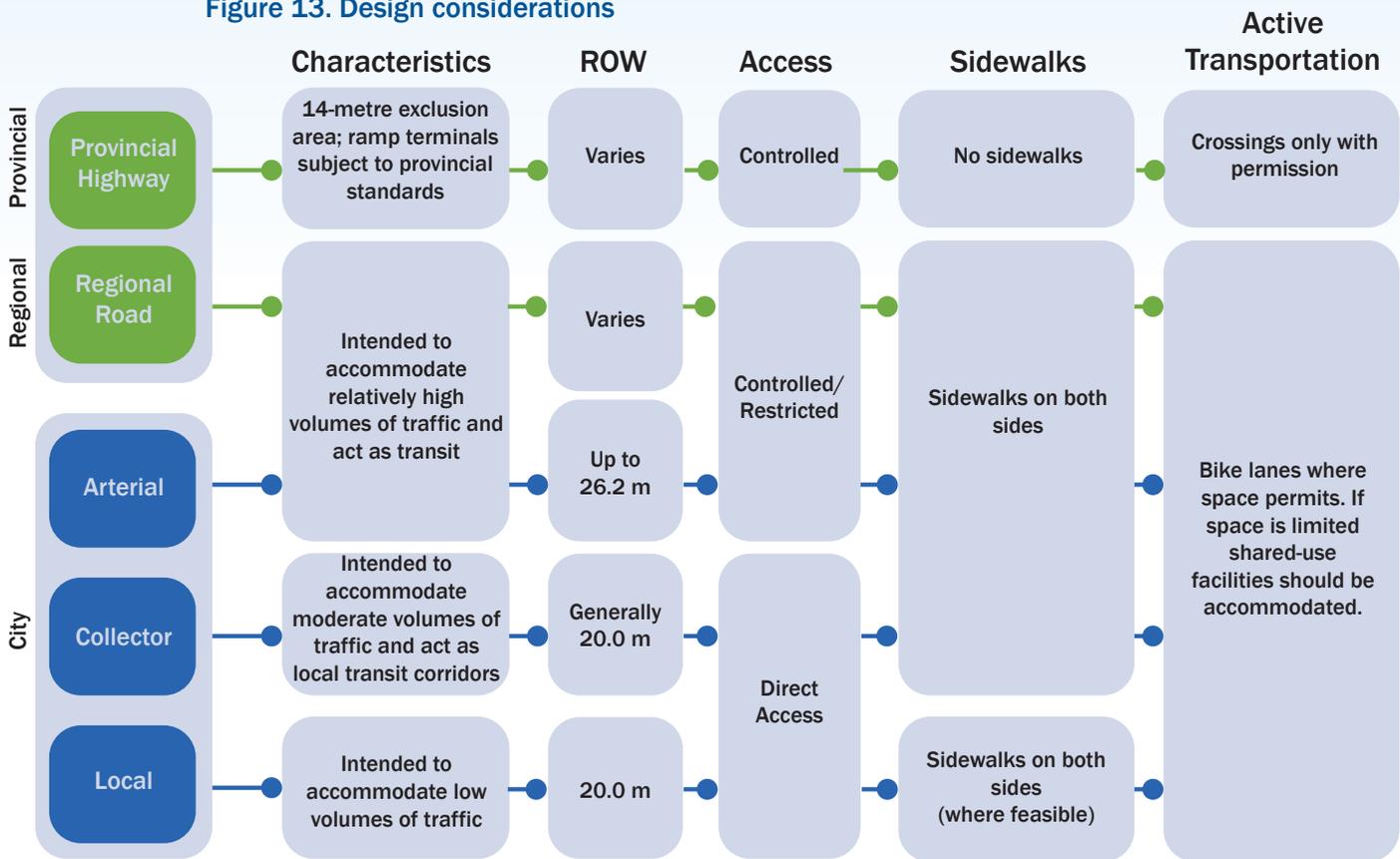
- + On-road cycling is well established within the City including many core north-south and east-west routes found within the urban area. Some critical missing links could improve overall connectivity and future ready thinking and cohesive design could enhance the sense of safety and comfort.

## 2.2.1. Roads

The City of St. Catharines Official Plan identifies four road classifications. For each road classification, a recommended roadway width, access type, sidewalk implementation and active transportation accommodation is identified.

While the road classification is typical, it limits considerations for alternative modes of transportation and those that are addressed, are not consistent with current guidelines and standards. The road classification system does not necessarily provide staff and decision makers with the tools to support a change in design approach and multi-modal integration. Figure 13 illustrates the existing road classification and the design considerations for each.

**Figure 13. Design considerations**



Map 1 depicts the existing roadways and their classifications.

# Map 1 Existing Roadway Conditions

**71km**  
Highway / Freeway

**121km**  
Arterial

**74km**  
Collector

**484km**  
Local

Roadway Classification

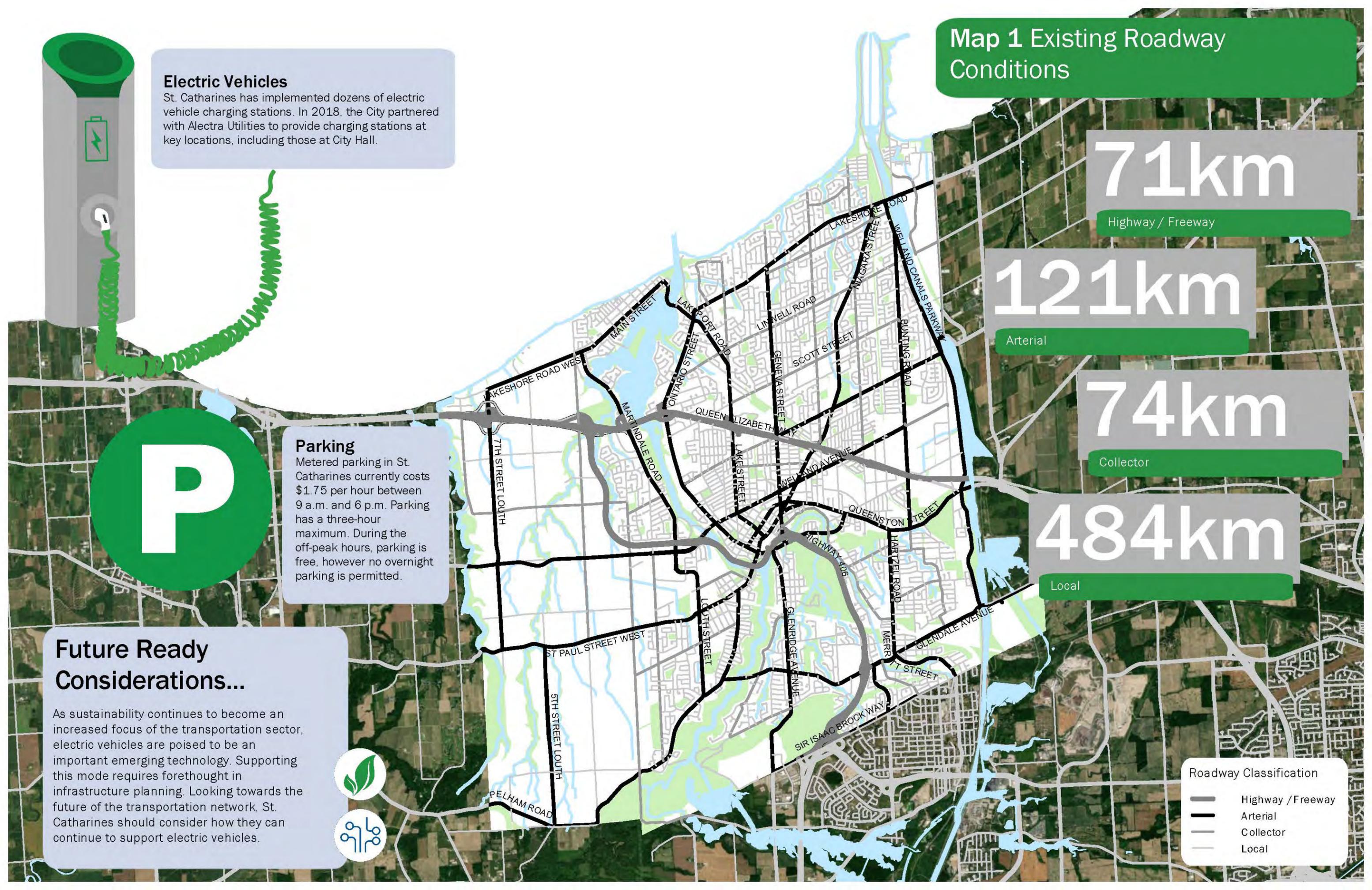
-  Highway / Freeway
-  Arterial
-  Collector
-  Local

**Electric Vehicles**  
St. Catharines has implemented dozens of electric vehicle charging stations. In 2018, the City partnered with Alectra Utilities to provide charging stations at key locations, including those at City Hall.

**Parking**  
Metered parking in St. Catharines currently costs \$1.75 per hour between 9 a.m. and 6 p.m. Parking has a three-hour maximum. During the off-peak hours, parking is free, however no overnight parking is permitted.

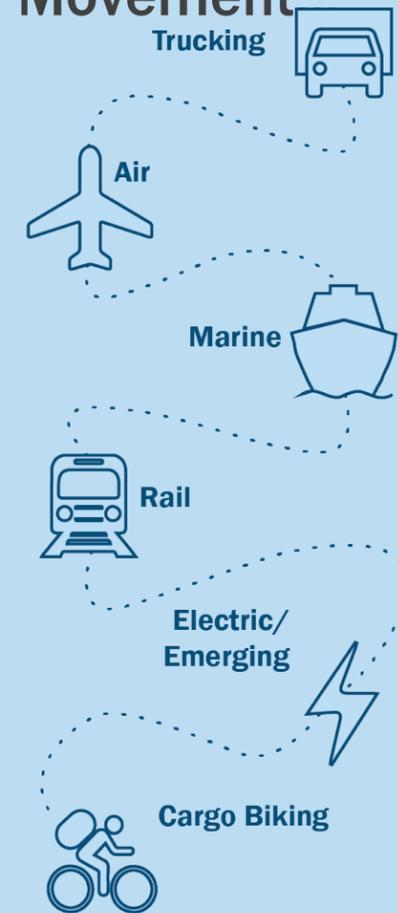


**Future Ready Considerations...**  
As sustainability continues to become an increased focus of the transportation sector, electric vehicles are poised to be an important emerging technology. Supporting this mode requires forethought in infrastructure planning. Looking towards the future of the transportation network, St. Catharines should consider how they can continue to support electric vehicles.



## 2.2.2. Goods Movement

### What is Goods Movement



Goods movement is an integral part of the transportation system. Efficient and effective goods movement is important to support economic vitality.

St. Catharines is a vital element of the Greater Golden Horseshoe’s goods movement network. In 2016, Niagara Region was designated as a Foreign Trade Zone (FTZ), encouraging innovation and international investment within the Region.

Based on this review, four modes of goods movement were identified as key components of the St. Catharines Goods Movement network: trucking, air, marine, and rail. The following is an overview of the existing and potential future goods movement methods for the City of St. Catharines.

### Traditional Considerations...

**Trucking** Much of trucking traffic currently utilizes the QEW, which cuts through the centre of St. Catharines. The majority of roads within St. Catharines accommodate truck traffic, as shown in **Map 2**. The breakdown of trips are as follows:

- 40% of trucking trips are between Niagara municipalities;
- 37% of the trips outside the Region; and
- 23% of trips within the City.

**Air** St. Catharines is near multiple airports that offer freight operations, including the Hamilton International Airport, Niagara Falls International Airport (U.S.), Buffalo-Niagara International Airport (U.S.) and Toronto Pearson Airport. In addition, the Niagara District Airport is co-owned by the City and supports freight operations within their long-term plan. Airport Zoning Regulations related to this nearby airport should be considered when reviewing future freight supportive land uses.

**Rail** There is currently one freight rail line which passes through St. Catharines - the Canadian National Railway (Grimsby Subdivision). It operates both passenger and freight services, terminating in Buffalo, New York. Trains on this line can also connect to the Port Colborne Harbour Railway (PCHR). There is no active railyard in St. Catharines.

**Marine** The largest marine freight operation in St. Catharines is the Welland Canal. The Welland Canal is part of the St. Lawrence Seaway and Great Lakes System. There are 8 locks within Niagara Region, 3 of which are in St. Catharines (Lock 1-3). It is an international, national and regional marine trade corridor resulting in transportation and economic benefits for the Canadian, US and the Niagara regional economy. In 2014, over 31,000,000 tonnes of cargo was transported through the Welland Canal.

### Future Ready Considerations...

**Emerging Technologies/Electric** The St. Catharines Strategic Plan strives for holistic sustainability, meaning economic and environmental sustainability are prioritized. While goods movement is an important economic sector for St. Catharines, there are significant environmental impacts associated with on-road goods movement. Currently, there is minimal guidance in St. Catharines for emerging technologies and/or electric goods movement to be integrated into this network.

**Cargo Biking** A new subset of goods movement is on-demand food delivery services from applications such as UberEats, Skip the Dishes and Foodora. Both Uber Eats and Skip the Dishes are operating within St. Catharines. Food delivery workers often use bicycling as a means to deliver these services. Currently, no bicycling applications are being accepted within St. Catharines and delivery is limited to car deliveries.



How goods movement is integrated into the larger transportation framework is changing. Since 1990, the volume of road freight activity in Ontario has grown by 242% and the goods movement model is adapting to support new trends in technology, including online-shopping and just-in-time delivery. This rapid expansion and fundamental shift of goods movement has increased attention on the environmental, social and economic impacts.

Heavy trucks are responsible for just under 10% of provincial emissions, according to the 2017 National Inventory Report from Environment and Climate Change Canada. Moreover, a new focus has emerged to better integrate goods movement to the community structure; considering the implications of goods movement to quality of life, human health and community functioning. As St. Catharines prepares for the future, consideration should be given to goods movement that is smaller, on-demand and electric.

# Niagara-Hamilton Trade Corridor Technical Paper

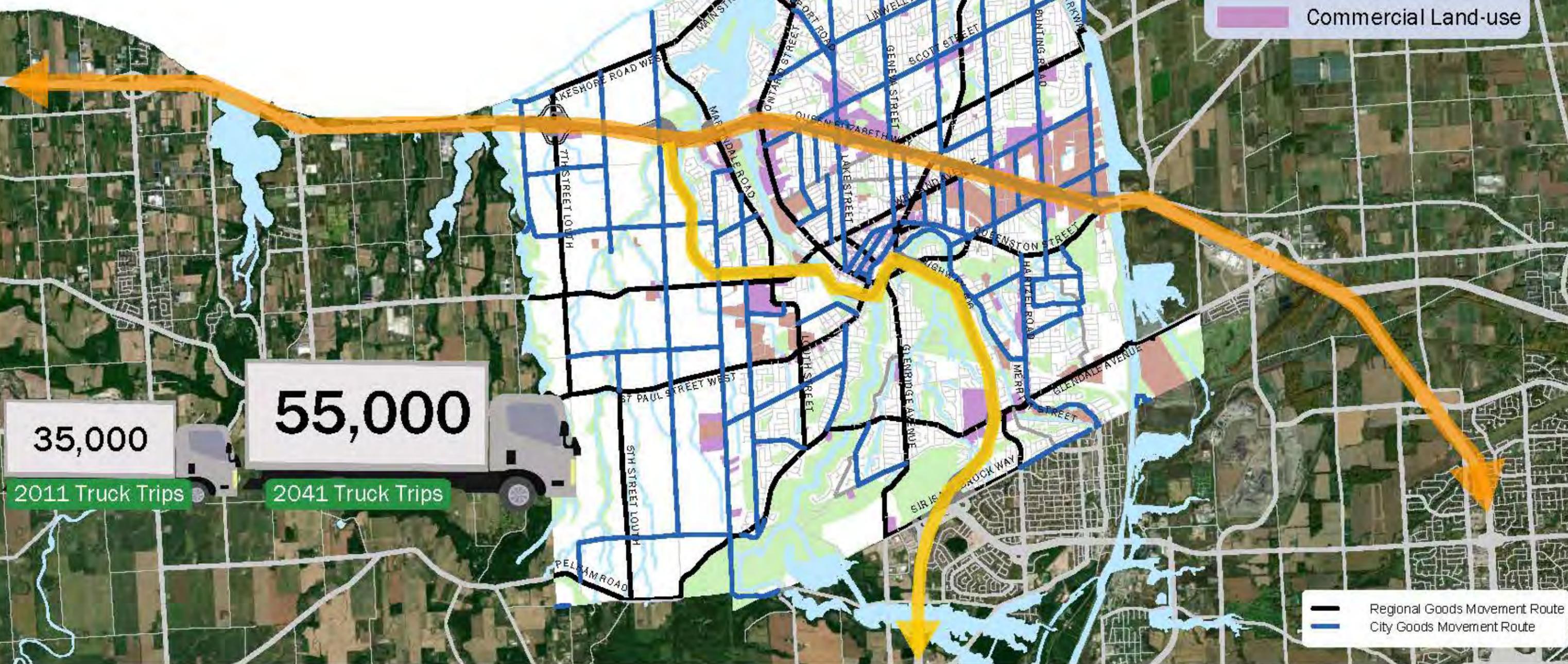
The QEW forms the main connection between Niagara Region to the GTHA. The vast majority of St. Catharines' truck traffic travels to or from the neighbouring municipalities along the QEW.

Truck volumes in Niagara Region are expected to grow by 57% from 2011 to 2041, from 35,000 to 55,000 daily trips.

## Map 2 Existing Goods Movement

**LEGEND**

- Orange arrow: Queen Elizabeth Way
- Yellow arrow: Highway 406
- Red square: Industrial Land-use
- Purple square: Commercial Land-use



— Regional Goods Movement Route  
— City Goods Movement Route

### 2.2.3. Transit

The City of St. Catharines is the owner and operator of the local transit authority, St. Catharines Transit Commission (SCTC). The Region of Niagara, Metrolinx and VIA Rail provide additional transit service within the City and to surrounding areas. The current operation and ridership experienced at the local and regional level was assessed and is documented on the following pages.

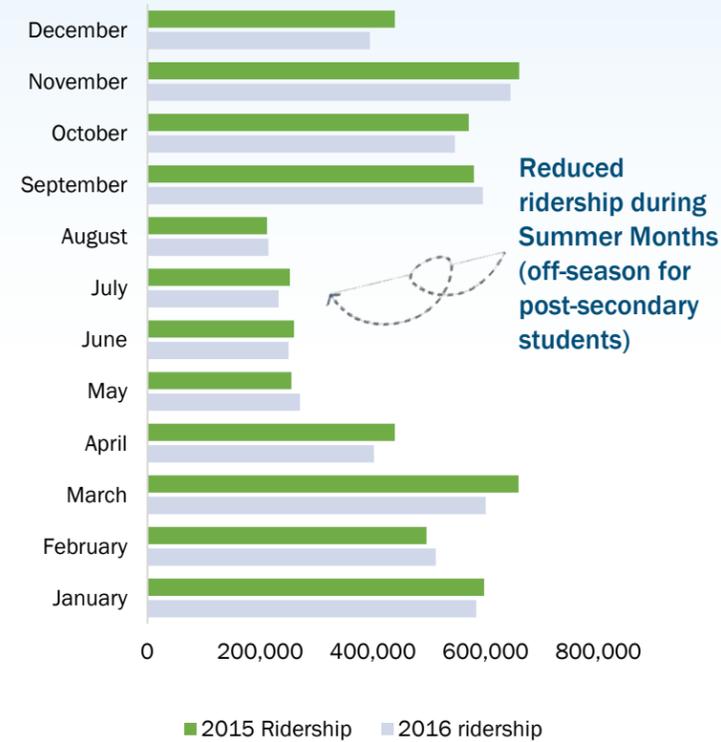
#### Local Transit

There has been a small but notable decline in transit ridership across Canada since 2015, which is attributed to several factors, including lower gas prices and slower economic growth, and possibly more people choosing to walk or bicycle to work. In St. Catharines, overall ridership in 2016 was 5,242,947, down 3 percent from the previous year (5,489,764).

**Figure 14** shows transit ridership on a month by month basis in 2015 and 2016. There is an almost 50% decline in ridership during the summer months, which can be attributed to the decrease in student ridership. Regular adult fares are \$3.00 while a monthly transit pass costs \$92.00. Routes and fares are subject to change. Brock University transit passes (U-pass) are mandatory for most students.

The busiest transit street in the downtown is St. Paul Street, with eight routes, as shown in **Map 3**. Other key transit corridors include Glenridge Avenue (Route 316), linking downtown with Brock University and Geneva/Lake Streets (Routes 306, 309, and 312), linking downtown to Fairview Mall. The SCTC maintains an online real-time map allowing users to identify where the next bus is on any given route. It also provides real-time and trip planning information through their app. Riders can use mobile apps, such as Transit App, to plan their trips using live data.

**Figure 14. Transit ridership by month**



#### Regional Transit

In addition to the municipal transit system, Niagara Region Transit provides service throughout the Region, including St. Catharines. There is also a regional paratransit service.

GO Transit operates daily bus service between Niagara Falls and the Burlington GO station, offering connections to GO rail service on the Lakeshore West Line. The service (GO Route 12) is hourly and stops at the transit terminal at Fairview Mall.

GO Transit rail service to St. Catharines consists of one inbound and one outbound train on weekdays year-round. A weekend and statutory holiday rail service between Union Station in Toronto and Niagara Falls is provided, stopping at the St. Catharines VIA Rail station. This service runs from the Victoria Day weekend through the Labour Day weekend, plus the Thanksgiving weekend in October.

#### Transit Operation Analysis

To better understand how the current transit service is operating, the revenue to cost ratios, passengers per vehicle hour and operating expenses for the St. Catharines fixed-route transit system were compared to other municipalities of similar size and geographical area. The results of the comparison are shown on the following page. The data for the comparator municipalities was attained from the Canadian Urban Transit Association’s Canadian Transit Fact Book, 2017.

The performance indicators show that the St. Catharines Transit fixed-route system is operating more efficiently as compared to its peer agencies, providing service to more riders with less of a relative financial impact to the City’s operating budget. **Figure 15**, **Figure 16** and **Figure 17** summarize the comparison to other agencies.

### Future Ready Considerations...

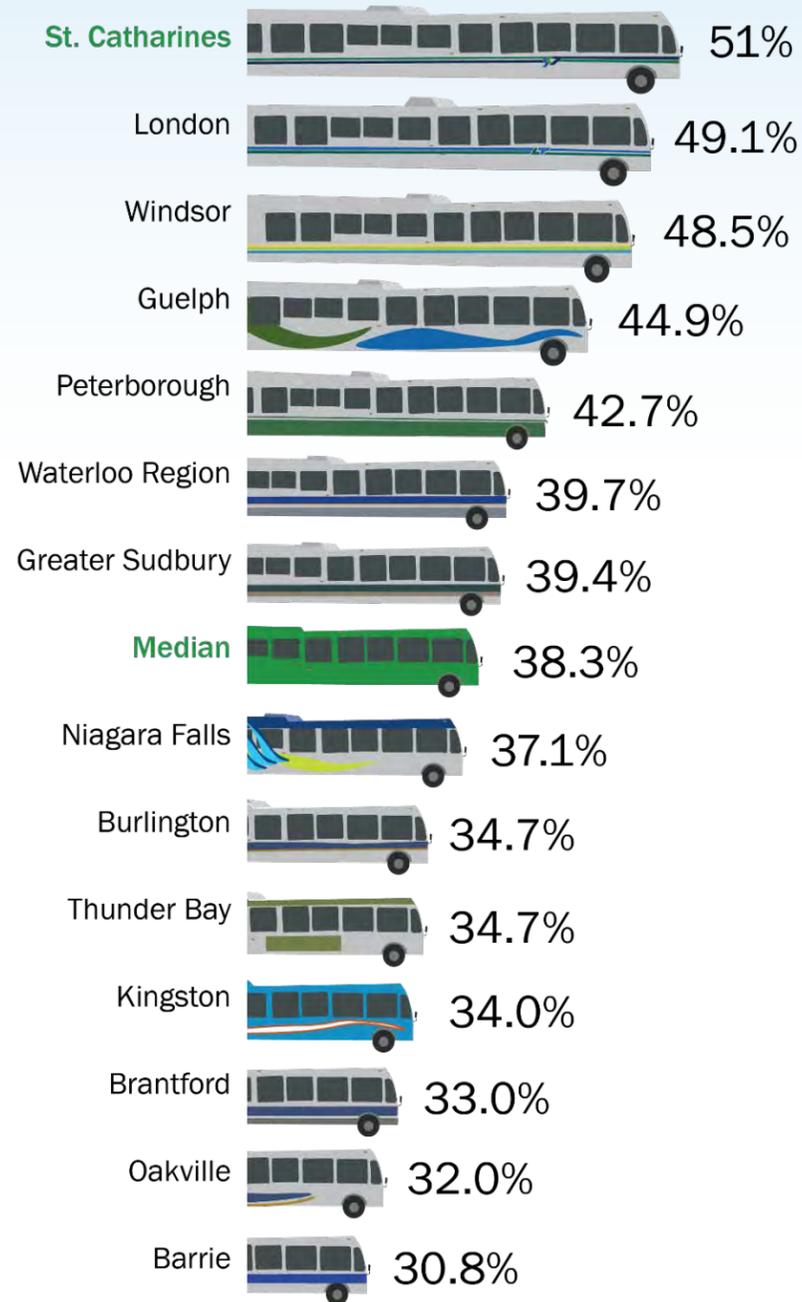
Given the geographic and built-form context of St. Catharines, transit likely offers the most feasible alternative to driving. As service expands in the future, consideration should be given to social equity of routing and technology advancements that can make transit more accessible and inclusive.



## Revenue to Cost Ratio

St. Catharines Transit is able to recoup 51% of its operational costs from fare revenue, well above the median of 38.3%.

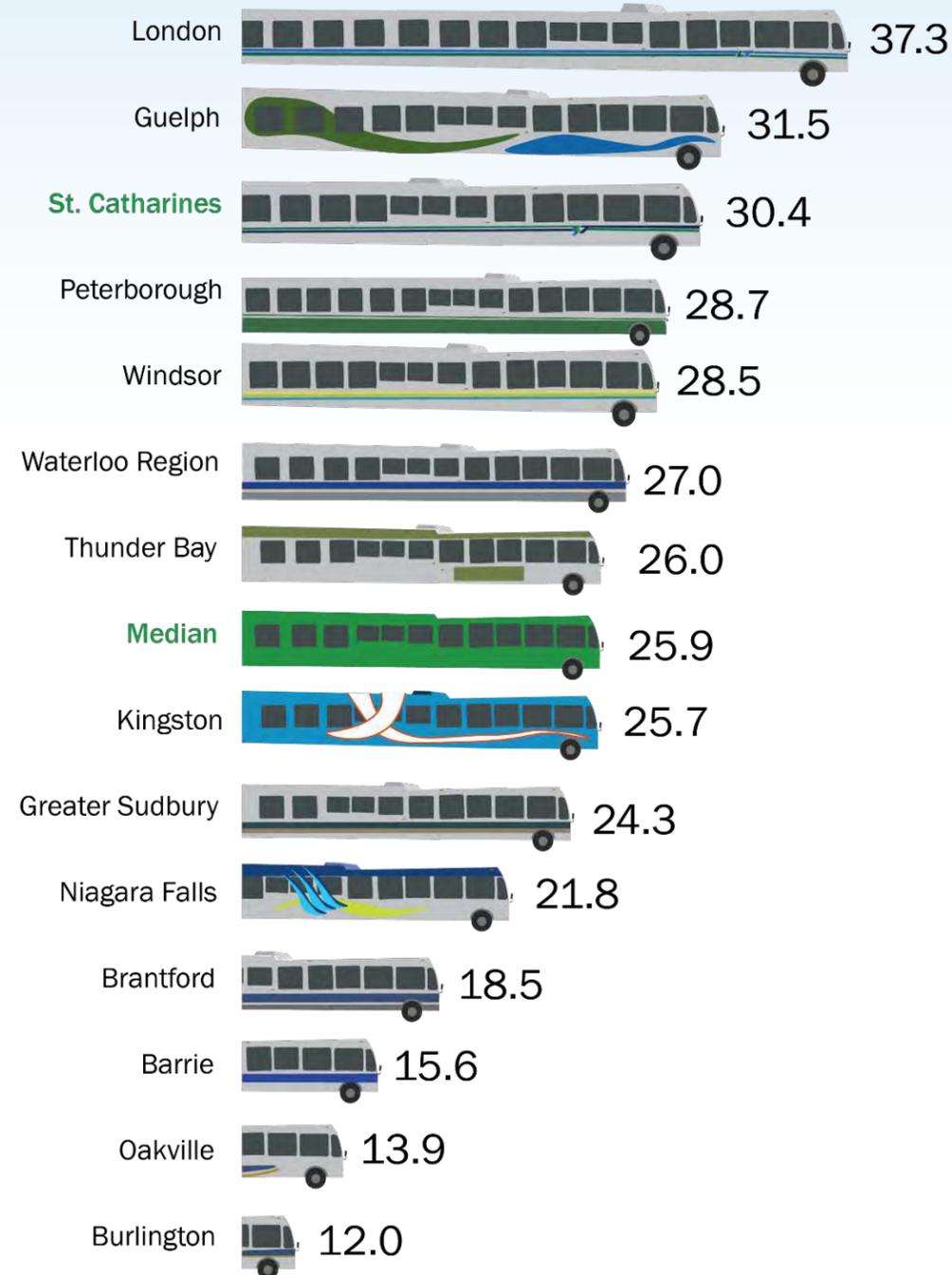
Figure 15. Comparison of revenue to cost ratio



## Revenue by Passenger

St. Catharines Transit carries about 30 passengers per hour on each route over one revenue hour, well above the median of almost 26 passengers.

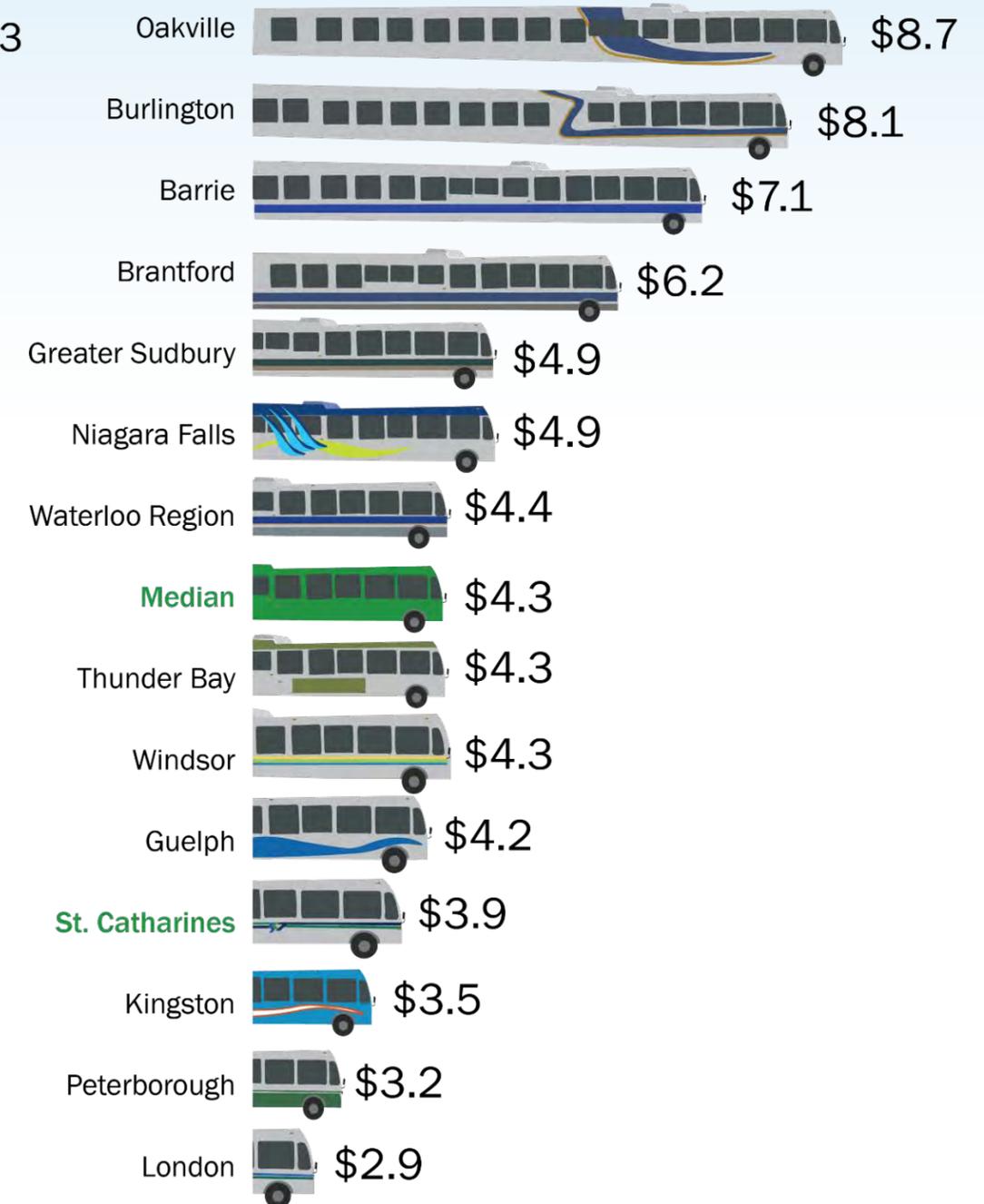
Figure 16. Comparison of revenue to passengers



## Operating Expense per Passenger

The operating cost is estimated at \$3.90 per passenger, below the median of \$4.30.

Figure 17. Comparison of operating expense per passenger



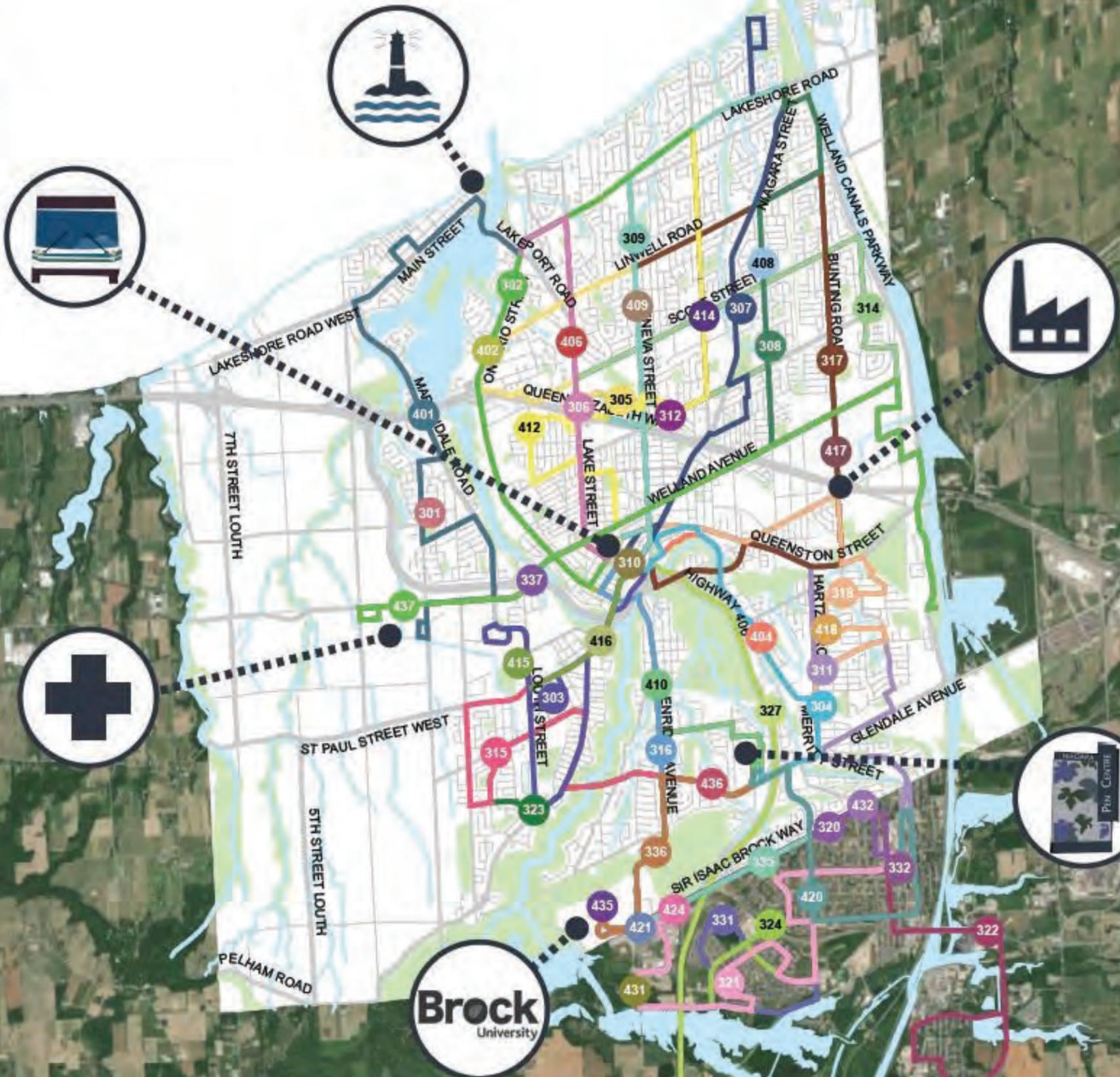
# Map 3 Existing Transit Routes

Included in U-Pass



\$3.00 per ride

\$92.00 per month



### LEGEND

-  Brock University
-  Transit Terminals
-  Pen Centre
-  Port Dalhousie
-  Hospital
-  Dieppe Industrial Area

- Existing Bus Routes (St. Catharines Transit Commission)
- 301 Hospital - Dalhousie
  - 302 Ontario Lakeshore
  - 303 Pelham Rd
  - 304 Oakdale - Pen
  - 305 Haig - Linwell
  - 306 Lake St
  - 307 Niagara St
  - 308 Grantham - Lakeshore
  - 309 Geneva St
  - 310 Glenridge - Pen Centre
  - 311 Hartzel Rd
  - 312 Vine St
  - 314 Scott St
  - 315 West St. Catharines
  - 316 Brock - Glenridge
  - 317 Bunting - Linwell
  - 318 Secord Woods
  - 320 Thorold - Pen Centre
  - 321 Confederation - Brock
  - 322 Thorold South
  - 323 West - Brock - Commuter
  - 324 Brock - Tupper
  - 327 Niagara College Welland Campus
  - 328 Brock - Towpath - Shuttle
  - 331 Brock - Winterberry - Shuttle
  - 335 Brock - Pen Centre
  - 336 Brock - Glendale - Pen Centre
  - 337 Crosstown
  - 401 Hospital - Port Dalhousie
  - 402 Ontario St
  - 404 Oakdale - Pen Centre
  - 406 Lake St
  - 408 Grantham - Port Weller
  - 409 Geneva St
  - 410 Glenridge - Pen Centre
  - 412 Vine St
  - 414 Scott St
  - 415 West St. Catharines
  - 416 Brock - Glenridge
  - 417 Bunting - Lakeshore
  - 418 Secord Woods
  - 420 Eve - Thorold - Pen Centre
  - 421 Eve - Confederation - Brock
  - 423 Brock - MacTurnbull Dr & Louth St
  - 424 Brock - Tupper
  - 428 Brock - Towpath
  - 431 Brock - Winterberry
  - 435 Brock - Pen Centre
  - 436 Brock - Glendale - Pen Centre
  - 437 Crosstown

## 2.2.4. Active Transportation

Active transportation (AT) is defined as any form of human-powered transportation – walking, cycling, using a wheelchair, in-line skating, scootering and skateboarding.

Active transportation can be used “anywhere” – either within the road right-of-way (sidewalks, on-road - bicycle lanes, signed routes or separated cycling lanes) or outside of the road right-of-way (off-road - in-boulevard multi-use pathways and off-road trails).

### Future Ready Considerations...

Currently, active transportation is not perceived by many as a viable option for day-to-day trips. Climate change trends and socio-demographic shifts show a future where people will need to use active forms of transportation to create lasting individual and community change. Research shows that a significant shift towards active transportation improves the environmental health of a municipality and improves connectivity. This reduces isolation and bridges the gap between the “have” and “have not” populations throughout the City. The City of St. Catharines should strive to make AT a viable option by designing a connected system that integrates e-bikes, bike share and a system of protected / separated routes and facilities.



The City of St. Catharines has a relatively comprehensive and well-connected set of active transportation routes and facilities. Existing routes have been implemented to provide access to major community destinations including the downtown core, Port Dalhousie, surrounding municipalities, the waterfront and neighbourhoods within the north and south ends of the City. Improvements have been made to provide dedicated and separated facilities, including bike lanes and off-road trails, to improve overall connectivity and overcome barriers to walking and cycling around the Welland Canal and Provincial Highways.

While significant investment has been made to support AT in St. Catharines, input generated through the TMP process indicated a desire for strategic enhancements to the existing system. These enhancements would help in efforts to create a meaningful shift towards active and sustainable travel. **Table 1** shows active transportation considerations based on this review of existing conditions.

The existing and previously proposed active transportation network is the foundation from which improvements and recommendations have been identified in **Chapter 3.0**. An overview of the existing AT routes and facilities can be found on the following page along with “key statistics” on the various components of the network including facility type, user accommodation and first and last mile access.



Table 1. Active transportation objectives based on review of existing conditions



Enhancements to the existing AT system including missing links and key corridors.



Crossings into and out of the downtown core as well as within the downtown core.



More separated infrastructure to increase user comfort and safety in appropriate locations.



Opportunities for end of trip facilities to enhance and encourage AT use for short-distance trips.



Meaningful and integrated wayfinding and signage to enhance local use and tourism.



Strategic improvements to accommodate more vulnerable users such as youth and seniors.



Consistent design guidelines and standards for on-and off-road facility design.



Supporting equity by providing more affordable options to critical community destinations.

# 109km

Off-Road Trail



# 62km

Bike Lane



# 16km

Paved Shoulder



# 8km

Signed Route with Sharrow



# 2km

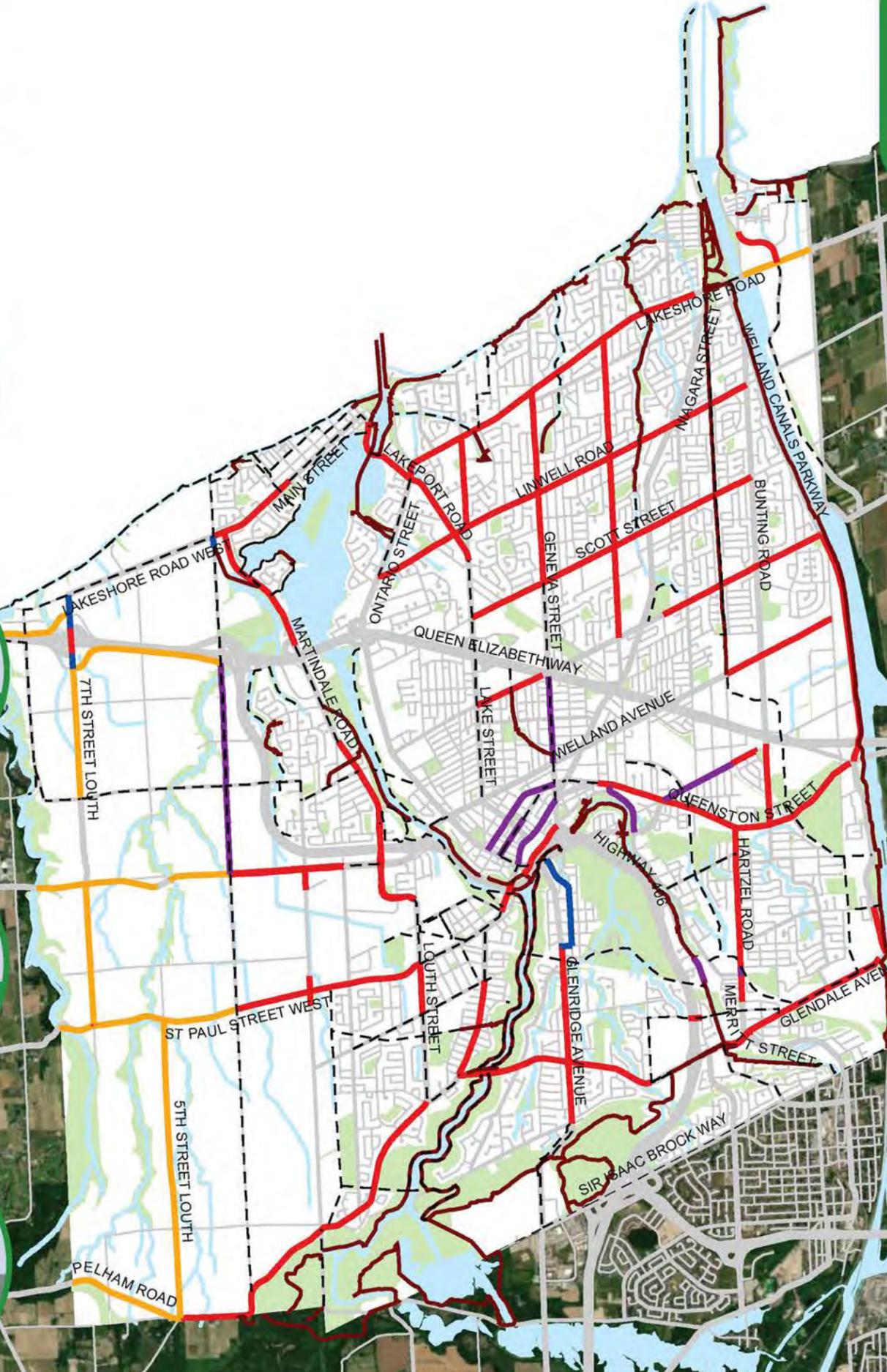
Signed Route



### Map 4 Active Transportation Existing and Previously Proposed Facility Types

# 130km

Previously Proposed Facilities



- Previously Proposed Route
- Existing
- Off-Road Trail
- Bike Lane
- Paved Shoulder
- Signed Route with Sharrow
- Signed Route

# CHAPTER

# 3

## Transportation

## Tomorrow:

### A Complete Streets Approach



**Chapter 3.0** introduces the “Complete Streets” framework of transportation planning in the City of St. Catharines. As a mature City with a well-established transportation network, the existing system serves current vehicle capacity needs and is expected to serve future vehicle capacity needs, with select enhancements to the network. A well functioning network for cars and trucks provides the opportunity to shift the focus of future plans to more sustainable modes of travel to help ensure that multiple modes of travel are convenient with a reasonable travel time and cost.

Mobility improvements and a better integration of a multi-modal uses is the future of transportation in the City. The City needs to provide accessible and affordable solutions by altering how the City plans, designs and implements transportation infrastructure.

The new transportation planning approach, presented in **Chapter 3.0**, is intended to help shift the paradigm to be people-first, meaning the transportation network will prioritize the people that move through the system via a framework of policy guidance, reimagining the road classifications through complete streets and community-based education and engagement to promote sustainable travel behaviour.

# Chapter 3.0 includes...

3.1

## Shift in Approach

Introduces the concept, vision and objectives of the Complete Streets approach and how this approach will be carried out in St. Catharines.

3.2

## Completing the Street

Provides a breakdown of the multi-modal considerations and classification process as well as an overview of the 10 complete streets classifications proposed for the City.

3.3

## Multi-modal Integration

Provides a breakdown of specific modal improvements for walking and cycling, transit and goods movement.

3.4

## Shifting Behaviour

Introduces community-based transportation demand management as a means to shift travel behaviours to be more multi-modal and sustainable.

3.5

## Sustainable Future

Discusses the future of sustainable and resilient transportation in St. Catharines.

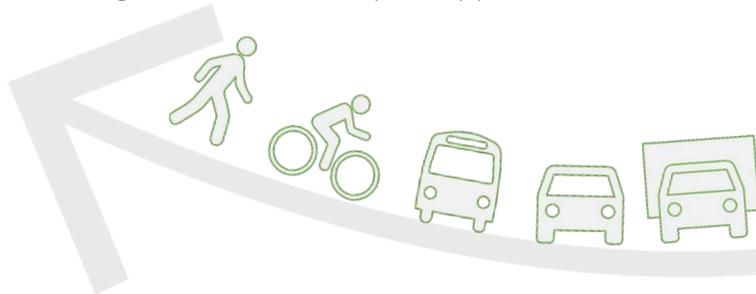
# 3.1.

## A Shift in Approach

A complete streets focused approach to transportation planning and design is embodied in the vision / opportunity statement for the TMP, which is:

*St. Catharines is looking to implement a Complete Streets approach that shifts towards a **user focused system**, placing emphasis on the **sustainable and strategic movement of people & goods**, inclusively and efficiently.*

This will require significant behaviour, systemic and process change. The contents of this section provide an overview of how the City of St. Catharines can address and integrate this shift into day-to-day practice.



## Chapter 3.0 | Transportation Tomorrow

The foundation of the City's integrated complete streets approach is the development and adoption of redefined assumptions around the hierarchy of modes. The redefined hierarchy protects and prioritizes the most vulnerable road users, fundamentally placing pedestrians at the top.

Bicycles, and other active modes, will also be prioritized; recognizing that when the most vulnerable road users are planned for, the road system becomes safer, more inclusive and a more comfortable space for people to function.

Given that the new hierarchy is rooted in a people-based approach, on-road modes that emphasize the movement of the greatest number of people, such as transit, will receive higher priority. Following pedestrians and cyclists, priority will be given to transit followed by on-road trucking / goods movement and vehicles.

The new transportation hierarchy creates an environment that provides a user-focused approach while also contributing to the sustainability of the future network.

While complete streets advocate for the safe integration of modes, it is necessary to acknowledge that not all roadways are appropriate for use by all modes of travel. Complete streets is about creating an interconnected network so that people can travel safely and conveniently by whatever mode they choose.



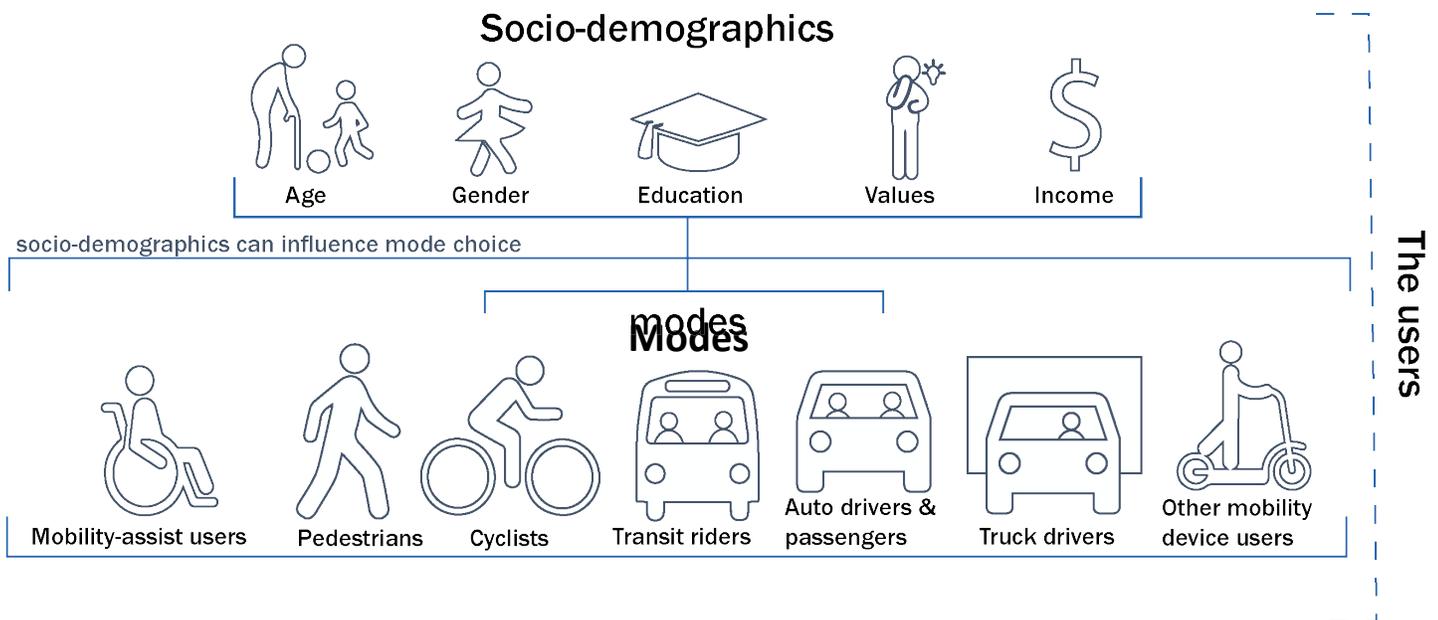
In order for complete streets to be an effective means of cultural shift, a wider definition of road user should be assumed:

*A road user shall be defined as any demographic or mode that interacts with the public right-of-way. These include pedestrians, cyclists, public transit users and motorists (including private vehicles, freight, commercial, and emergency services). Emphasis is placed on considering vulnerable groups such as children, seniors or people with disabilities, which can be users of any or some of these modes. As a general rule, a facility that supports the most vulnerable users will support everyone.*

however

The impact of socio-demographics on modal choice cannot be denied. Although the primary vision of this TMP is to consider and address each mode equally it also has been developed with the intent of making it accessible and attractive to all populations. To achieve this, it is important to note the strong impact socio-demographics plays in influencing the choices that we identify as our preferred modes. While there are a range of different factors which could influence modal choices and preferences, **Figure 18** illustrates some including age, gender, education, income and personal values.

**Figure 18. Different socio-demographic influences on modal choices**



## 3.1.1. The Complete Streets Framework

The complete streets framework will be the City's tool to support cohesion between the existing road network, transit routes, active transportation facilities and land-uses, while helping to achieve a more sustainable and resilient community.

The framework builds upon existing policies and guidelines that have been developed and adopted by Regional and City Council and seeks to provide the tools to realize and actualize those policies in the local context.

The framework is developed in response to a need for a systemic shift in thinking around transportation due to climate change and broader sustainability objectives.

The vision and objectives are supported and realized by three key elements:



**Guidance:** in addition to embedding complete streets policies into the foundation of the TMP and other municipal policy documents such as the Official Plan, a new **road classification** system will be the foundation for embedding complete streets into the planning and design process;



**Implementation:** the new classification system should be considered and applied in the context of new road projects, road reconstruction, or retrofitting projects. A process to determine the appropriate road classification such as **classification application** for the anticipated project has been defined to support the implementation of complete streets City-wide; and



**Education:** how transportation users' behaviours will be shifted towards more sustainable travel patterns by community focused and audience specific **promotion tactics**, also known as transportation demand management and community based social marketing.

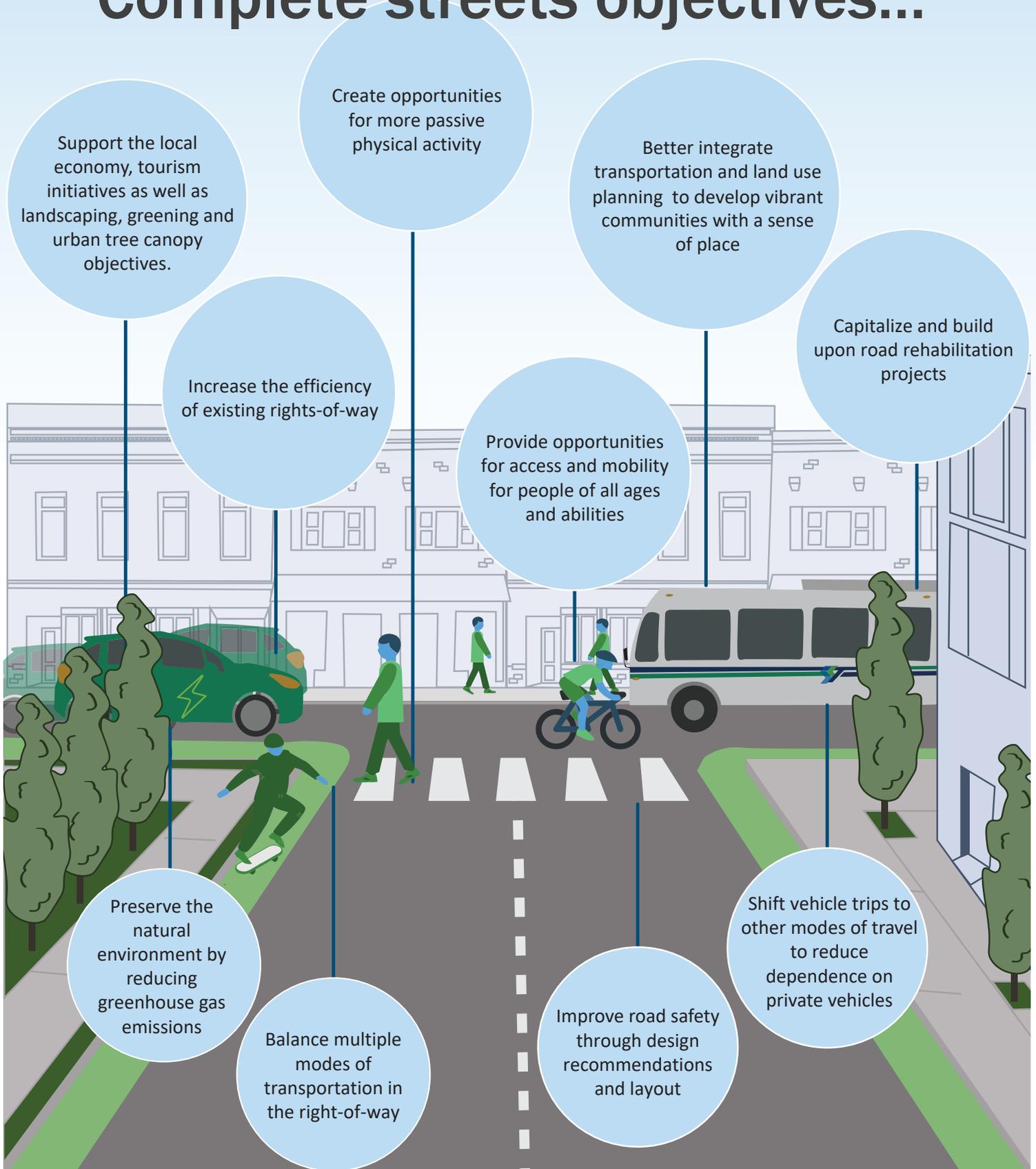
These three elements are fully described and presented on the following pages.

# Complete streets vision...

### In St. Catharines Complete Streets shall...

- Help achieve St. Catharines' community vision of being the most dynamic, innovative, sustainable and livable city in North America by improving upon the social fabric, environmental sustainability and cultural vitality of transportation in the City;
- Function as complete community corridors that vary according to their context and planned function; and
- Have an emphasis on moving people and goods, in all modes, with a balance that is appropriate to the context.

# Complete streets objectives...



# 3.2.

# The Art of Completing the Street

A city's road classification informs the street characteristics and ultimately how streets are designed, such as the posted speed, number of lanes, lane width and sidewalk requirements. The road classification is the basis upon which all roadway design decisions are made. To establish a multi-modal community, changes needed to be made to the City's existing road classification typographies as well as the overall approach to planning and design.

The approach that was used to identify and define the new road classification system and the outcomes of the process are summarized in the following sections. The updated road classification system focuses on the movement of people first followed by goods with underlying principles of user comfort, safety and land-use. This plan recognizes the importance of maintaining a compact and highly connected network of streets to promote walkability, network permeability and resiliency. The City will complete gaps in the street networks where feasible and will ensure that street patterns for new development are generally based on a connected grid pattern, characterized by short blocks and a high level of connectivity with adjacent streets. New private roads will generally be limited to small infill sites. Larger redevelopment parcels should be subdivided in order to establish a connected network of public streets rather than insular enclaves. In order to achieve a more complete active transportation network, the City will require, as a condition of development approvals, the provision of walkway connections and private road sidewalks to bridge the interface between the public and private realm.

### 3.2.1. Multi-modal Considerations

#### Changing the system one mode at a time...

The existing road classification defines how the street will operate for cars by focusing on the roadway width and the volume of vehicles.

The updated classification considered each transportation mode by anticipating the function each mode will play based on the context of surrounding land-use, major destinations, and typical users.

Within each classification there are considerations for pedestrian, cyclist, buses, trucks, and private vehicles on the street; with the understanding that each road type will accommodate modes differently. The following is a high-level description of how each of the modes has been considered.



#### Pedestrian Consideration

It is fundamental to plan for pedestrians with the understanding that pedestrians are the most vulnerable road users. In the St. Catharines context, pedestrian facilities consist primarily of sidewalks and off-road trails. The level of usage, destination access and connectivity are considered when determining the need for expanded or enhanced pedestrian facilities. It is important to provide infrastructure that links to residential areas, urban areas and nodes of development and services such as schools, hospitals and community centres. In rural areas, where there may be low volumes of pedestrians and the cross-section is not urbanized, a sidewalk is not required. However, a trail or off-road facilities to connect other parts of rural areas could be considered along with the potential for combined pedestrian and cyclist use within a paved shoulder space. Increasingly, paved shoulders are now being promoted as both cycling and pedestrian linkages and can be signed in a way to encourage connectivity between the rural and urban areas.

#### Cyclist Consideration

Consistent with Ontario Traffic Manual Book 18, the appropriate cycling facility is determined by the difference in operating speed between cyclists and motorists, average annual daily traffic volume, available space, the level of existing bicycle use and anticipated users. For example, when the operating speed between the cyclists and motorists is high and there is a large volume of vehicles on the roadway (greater than 15,000 vehicles a day), a separated or designated facility is recommended where the space is signed for exclusive use by a cyclist.

#### Transit Consideration

Local transit is fundamental for connecting multiple destinations and communities within St. Catharines. As transit continues to expand throughout the City and Region, an increased focus will be given to providing accessible infrastructure (concrete transit stop pads) and clear signage. Transit usage is typically determined by the destination, the directness of the route (the time spent travelling) and the frequency of the service. If there is a high commuter demand for a specific route, a more direct connection along major arterial and collector roads may be appropriate. Local connectivity should be assessed based on available space relative to the need for service.

#### Goods Movement Consideration

Goods movement is an integral part of the transportation system. While efficient and effective goods movement is important to support economic vitality and equitable access of amenities, it is also crucial to determine appropriate routes to mitigate the impact of goods movement through St. Catharines.

### 3.2.2. Complete Streets Guidance

Ten new road classifications were identified which reflect the varying and unique conditions found throughout the City. The classifications were determined through extensive research and discussions with City staff. A number of inputs were considered in the reclassification of the roadway network including:

- Alignment with strategic municipal documents;
- Optimization of the transportation network;
- Overall TMP objectives;
- The City’s previous road classification; and
- Overall goals for goods movement, active transportation and transit.

A total of ten typologies were identified for adoption by the City of St. Catharines. The ten typologies are further organized into five categories which were determined through the identification and consideration of criteria including annual average daily traffic, posted speed limits, rural versus urban rights-of-way design, right-of-way width, surrounding land-use, opportunities for new or planned development and the proximity to or location within the urban growth boundary.

An overview of the ten categories including detailed specifications are provided on the following pages including sample cross sections found later in this section. A map showing the City streets and their proposed road classifications is provided in **Map 5**. These specifications are meant to inform the types of infrastructure and modes that could be accommodated along the corridor, recognizing that the complete streets approach is on a network basis and does not mean that all modes can or should be accommodated along each and every road in the City.

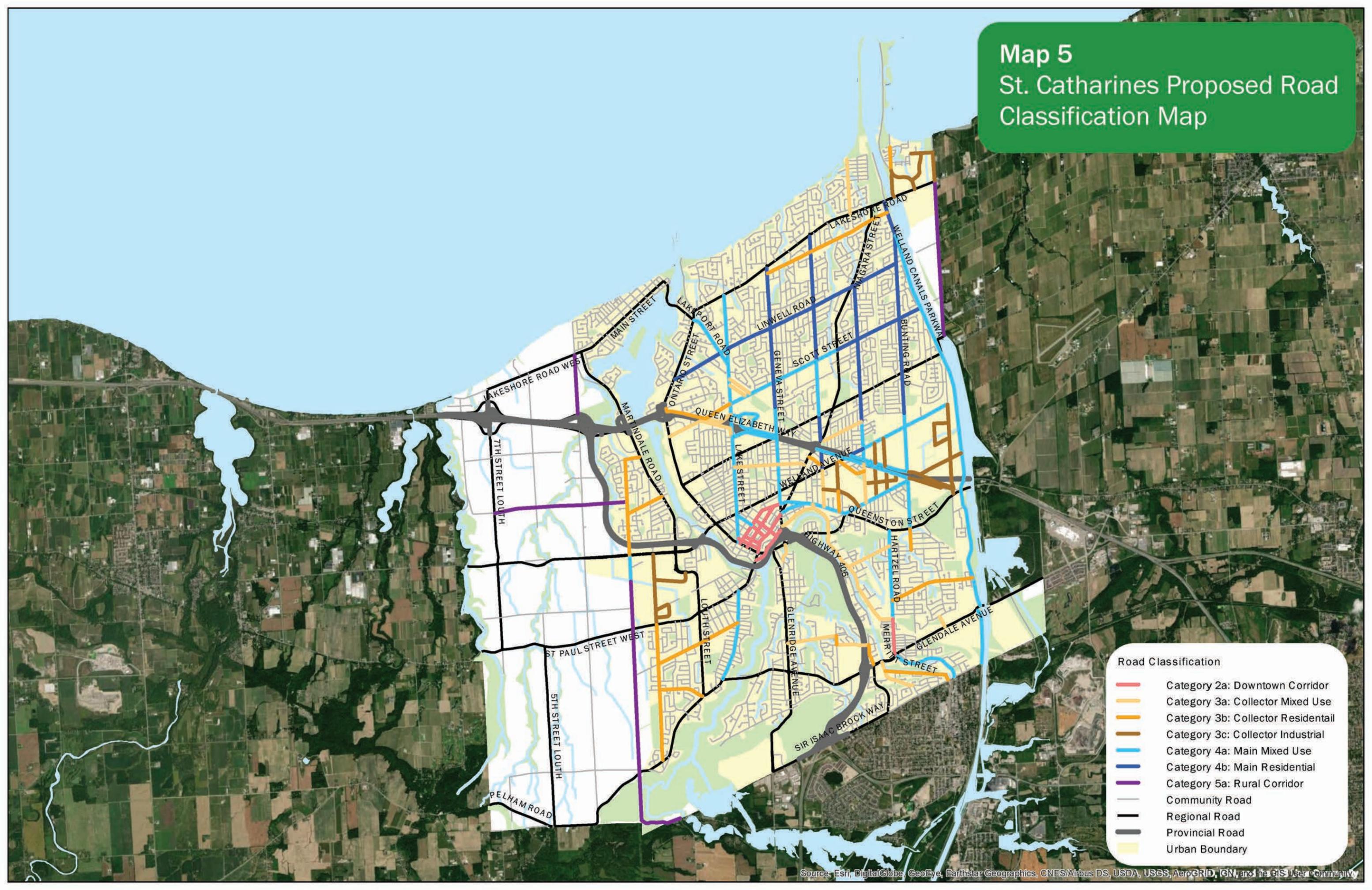
The complete streets road classification approach that has been identified for the City of St. Catharines acknowledges and accommodates users when the conditions and contexts are appropriate, that when combined create a cohesive network for all. The urban boundary is defined by the Urban Area in the Region of Niagara Policy Plan. This area is intended to provide urban development opportunities and support the majority of the projected growth. Similarly, Niagara Region has defined the Downtown area as an Urban Growth Centre. This area fosters a sense of walkability and supports public gatherings. As the area with the highest concentration, density and variety of entertainment, housing and employment, the projected growth in this area is also higher. New streets within this urban boundary are generally to be constructed with an urban cross-section. It is City policy to only convert arterial and major collector streets to an urban cross section, however exceptions may be made for local streets that experience issues such as drainage problems. While not identified as a street type in the road classifications, rear laneways are recognized as a desirable means to promote the creation of active and pedestrian friendly streets and may be most appropriate in locations where direct street access for private driveways should be avoided.

Sample cross sections shown are intended to be an adaptable guide. Specific dimensions and elements are to be determined through detail design on a case by case basis. Notwithstanding the right-of-way widths for the road classifications described in this plan, the City may, where appropriate, waive or reduce widening requirements where a road widening would otherwise result on a development pattern detrimental to the established character of the street.

This plan recognizes the importance of streets, particularly downtown streets, in accommodating festivals and special events through temporary closures. Such closures will be generally be supported where feasible.



**Map 5**  
**St. Catharines Proposed Road Classification Map**



**Road Classification**

- Category 2a: Downtown Corridor
- Category 3a: Collector Mixed Use
- Category 3b: Collector Residential
- Category 3c: Collector Industrial
- Category 4a: Main Mixed Use
- Category 4b: Main Residential
- Category 5a: Rural Corridor
- Community Road
- Regional Road
- Provincial Road
- Urban Boundary

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## 1a Community Streets

### 1a: Community Street

#### Description:

Community Streets are local roads that are expected to accommodate lower traffic volumes at low-speeds. These roadways are surrounded by residential, or small residential-oriented commercial.

Right-of-way Width:	20 m
Legal Speed Limit (km/h):	40 – 50
Minimum Peak Period Lanes:	Two

#### Complete Streets Application:

- Sidewalk on both sides of the street. Additional pedestrian realm enhancements may be explored / considered
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Preferred shared cycling facility including shared street or a bikeway boulevard where additional traffic calming and amenities / wayfinding and signage may be considered
- Limited transit
- In limited situations, on-street transit stops with accessible concrete pads
- Community traffic calming measures including on-street parking, narrowed lanes, chicanes, and signage
- Emphasis on local streetscaping including street trees
- Through trucks prohibited
- Local delivery allowed

**2a** Downtown Corridor

**2b** Downtown Community Street

## 2a: Downtown Corridor

### Description:

Downtown corridors may accommodate moderate volumes of traffic. They represent streets that play a vital role in the neighbourhood in St. Catharines transportation network and are a high priority for pedestrians, cyclists, and transit. They are surrounded by commercial, institutional, and mixed-use development. Merritt Street between Oakdale Avenue and Glendale Avenue and the City section of Lakeport Road/Main Street in core Port Dalhousie are considered under this classification as they share similar characteristics.

<b>Right-of-way Width:</b>	Min 20 m
<b>Legal Speed Limit (km/h):</b>	40 - 50
<b>Minimum Peak Period Lanes:</b>	Two

### Complete Streets Application:

- Sidewalks on both sides of the street
- In accordance with OTM Book 18, facilities could range from designated to separated facilities; however, the context may be appropriate for an enhanced bikeway boulevard if the posted / operating speed is lowered
- General pedestrian and cycling realm enhancements should be considered where appropriate including bicycle parking and repair stations, benches / rest areas, wayfinding and pavement markings
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Where transit is required refer to OTM Book 18 for additional design considerations to prevent conflict between separated facilities and transit routes
- Transit in mixed traffic, with transit given priority where feasible
- Covered transit shelters where ROW permits
- Transit queue jump lanes
- Accessible concrete pads at transit stops
- On-street transit stops
- Emphasis on enhanced streetscaping including street furniture, lighting, street trees and shrubbery
- On-street parking encouraged
- Prioritized candidates for re-imagining on-street parking in off-peak hours
- Prioritized candidates for public art streetscape improvements
- Prioritized candidate for placemaking initiatives
- Limited through trucks and off-peak deliveries only

## 2b: Downtown Community Street

### Description:

Downtown Community Streets may accommodate lower volumes of traffic. These roadways connect Downtown neighbourhoods to surrounding commercial areas, collector and arterial streets and are a high priority for pedestrians and cyclists.

<b>Right-of-way Width:</b>	Min 20 m
<b>Legal Speed Limit (km/h):</b>	40 - 50
<b>Minimum Peak Period Lanes:</b>	Two

### Complete Streets Application:

- Sidewalks on both sides of the street
- Where possible, consideration for the inclusion of a multi-use pathway in place of a sidewalk and on-road cycling facility. If route provides access to a major trail a multi-use trail may be considered
- Where the ROW permits, preferred shared or designated cycling facility including bicycle lane, buffered bicycle lane or advisory bike lane. For shared facilities additional signage may be considered to enhance awareness
- General pedestrian and cycling realm enhancements should be considered where appropriate including bicycle parking and repair stations, benches / rest areas, wayfinding and pavement markings
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Transit in mixed traffic
- Accessible concrete pads at transit stops
- On-street transit stops
- Emphasis on enhanced streetscaping including street furniture, lighting, street trees and shrubbery
- Community traffic calming measures including on-street parking, narrowed lanes, chicanes, and signage
- On-street parking encouraged
- Limited through trucks and off-peak deliveries only

**3a** Collector Mixed-use Corridor

**3b** Collector Residential Corridor

## 3a: Collector Mixed-Use Corridor

### Description:

These roadways are expected to carry higher volumes than Residential Collector Corridors. They are bounded by a variety of land-uses such as residential, commercial, industrial, or institutional.

<b>Right-of-way Width:</b>	Min 20 m
<b>Legal Speed Limit (km/h):</b>	40 – 50
<b>Minimum Peak Period Lanes:</b>	Two to Three

### Complete Streets Application:

- Sidewalks on both sides of the street
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15 within appropriate context
- Implementation of cycling amenities (bike racks) within appropriate context as well as complementary signage and wayfinding
- Transit in mixed traffic
- Accessible concrete pads at transit stops
- On-street transit stops
- On-street parking permitted
- Through trucks permitted

## 3b: Collector Residential Corridor

### Description:

Collector Residential Corridors are expected to carry a moderate volume of traffic. These roadways connect local neighbourhoods to arterial. A Collector Residential provides direct access to local residential neighbourhoods and institutions.

<b>Right-of-way Width:</b>	Min 20 m
<b>Legal Speed Limit (km/h):</b>	40 – 50
<b>Minimum Peak Period Lanes:</b>	Two to Three

### Complete Streets Application:

- Sidewalks on both sides of the street
- If lower posted / operating speed, consider a designated operating space within appropriate context including a buffered bicycle lane in accordance with OTM Book 18
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15 within appropriate context
- Transit in mixed traffic
- Accessible concrete pads at transit stops
- On-street transit stops
- On-street parking permitted
- Limited through trucks

## 3c: Collector Industrial Corridor

### Description:

Industrial corridors operate and connect industrial areas to the surrounding collector and arterial roadways. These roads carry moderate traffic, facilitating employee and heavy truck traffic movement throughout the industrial area.

Right-of-way Width:	Min 20 m
Legal Speed Limit (km/h):	50 – 60
Minimum Peak Period Lanes:	Two to Three

### Complete Streets Application:

- Industrial sidewalks where required on both sides of the street
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Where transit is required, refer to OTM Book 18 for additional design considerations to prevent conflict between separated facilities and transit routes
- Paved shoulders at 1.2 – 1.5m or paved shoulder with buffer 2.0 – 3.0m in accordance with OTM Book 18
- Where transit is required, refer to OTM Book 18 for additional design considerations to prevent conflict between separated facilities and transit routes
- Paved shoulders at 1.2 – 1.5m or paved shoulder with buffer 2.0 – 3.0m in accordance with OTM Book 18 or in urban areas
- Transit in mixed traffic
- Accessible concrete pads at transit stops
- On-street transit stops
- On-street-parking prohibited during peak hours
- Through trucks permitted

4a

Main Mixed-Use

4b

Main Residential

## 4a: Main Mixed-Use Corridor

### Description:

Main Mixed-use Corridors are the most vital connecting roadways in the city. These roadways are expected and built to carry the highest traffic volumes. Main Mixed-Use Streets are bounded by a variety of land-uses such as residential, commercial, industrial or institutional.

<b>Right-of-way Width:</b>	20 – 26m
<b>Legal Speed Limit (km/h):</b>	40 – 60
<b>Minimum Peak Period Lanes:</b>	Two to Four

### Complete Streets Application:

- Sidewalks on both sides of the street
- Preferred separated cycling routes in accordance with OTM Book 18 including separated bicycle lane, cycle track or multi-use path
- If lower posted / operating speed, consider a designated operating space including a buffered bicycle lane in accordance with OTM Book 18
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Intersections may require additional pavement markings for cyclists, including cross rides, green pavement and guidance sharrows through the intersection
- Implementation of cycling amenities (bike racks), complementary signage and wayfinding
- Where cycling facilities and transit routes operate together, refer to OTM Book 18 for additional design considerations to prevent conflict between these modes
- Transit in mixed traffic, with transit given priority when feasible
- Covered transit shelters where ROW permits
- Transit queue jump lanes if required and if ROW permits
- Accessible concrete pads at transit stops
- Emphasis on enhanced streetscaping including street furniture, lighting, street trees where ROW permits
- On-street parking in bays or in curb lanes during off-peak
- Through trucks permitted

## 4B: Main Residential Corridor

### Description:

Main Residential Corridors operate similar to Main Mixed-Use and Main Commercial Corridors. They can be surrounded and connect to residential neighbourhoods and institutions.

<b>Right-of-way Width:</b>	20 – 26 m
<b>Legal Speed Limit (km/h):</b>	40 – 60
<b>Minimum Peak Period Lanes:</b>	Two to Three

### Complete Streets Application:

- Sidewalks on both sides of the street
- Separated cycling facilities including separated bicycle lane, cycle track or multi-use pathway in accordance with OTM Book 18. In select locations a parallel route may be more appropriate
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15
- Intersections may require additional pavement markings for cyclists, including cross rides, green pavement and guidance sharrows through the intersection
- Where cycling facilities and transit routes operate together, refer to OTM Book 18 for additional design considerations to prevent conflict between these modes
- Transit in mixed traffic, with transit given priority when feasible
- Covered transit shelters, where ROW permits
- Transit queue jump lanes if required and if ROW permits
- Accessible concrete pads at transit stops
- On-street parking in bays or in curb lanes during off-peak
- Emphasis on streetscaping including lighting, street trees and landscaped medians where ROW permit
- Through trucks permitted

**5a** Rural Corridor

**5b** Rural Community

## 5a: Rural Corridor

**Description:**

Rural corridors are streets that have a rural cross-section and generally are higher speed roads.

<b>Right-of-way Width:</b>	Min 15 m
<b>Legal Speed Limit (km/h):</b>	60 – 70 or 80
<b>Minimum Peak Period Lanes:</b>	Two

**Complete Streets Application:**

- Paved shoulders at 1.2 – 1.5m or paved shoulder with buffer 2.0 – 3.0m in accordance with OTM Book 18 if on the AT network or near pedestrian generator
- If available, adjacent multi-use pathway could be considered in accordance with OTM Book 18
- On-street-parking prohibited
- Through trucks permitted
- Transit typically not provided

## 5b: Rural Community Street

**Description:**

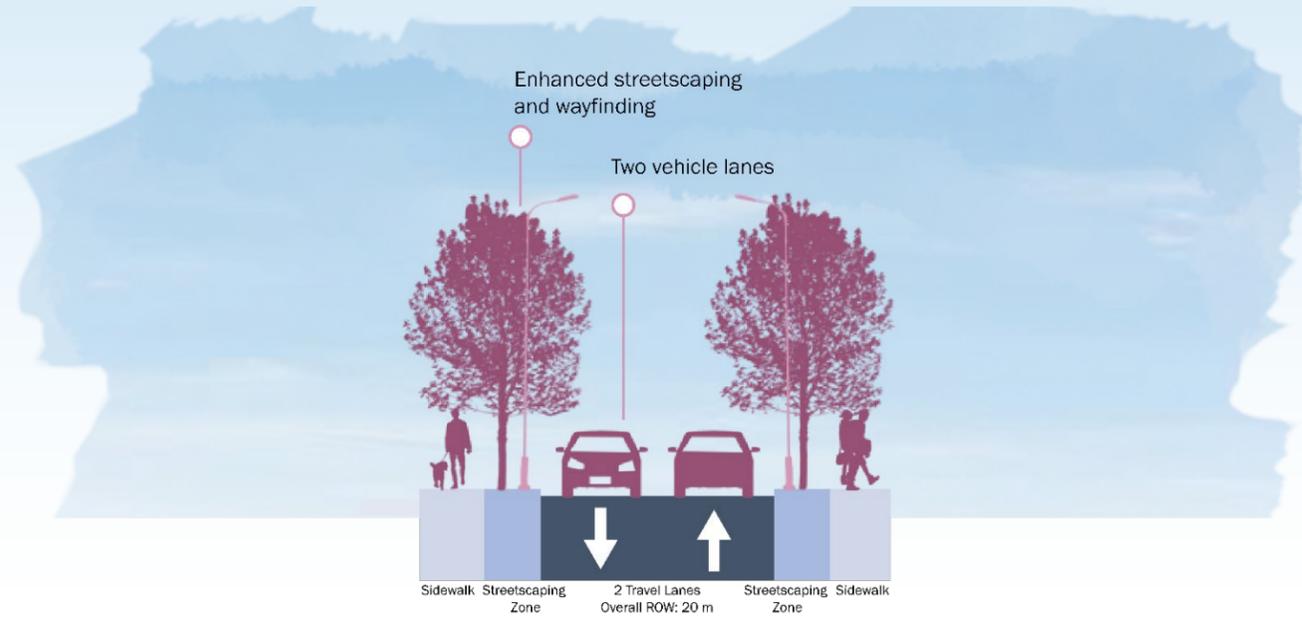
Rural Community Streets are links that generally move low volumes between rural neighbourhoods.

<b>Right-of-way Width:</b>	Min 15 m
<b>Legal Speed Limit (km/h):</b>	50 – 70
<b>Minimum Peak Period Lanes:</b>	Two

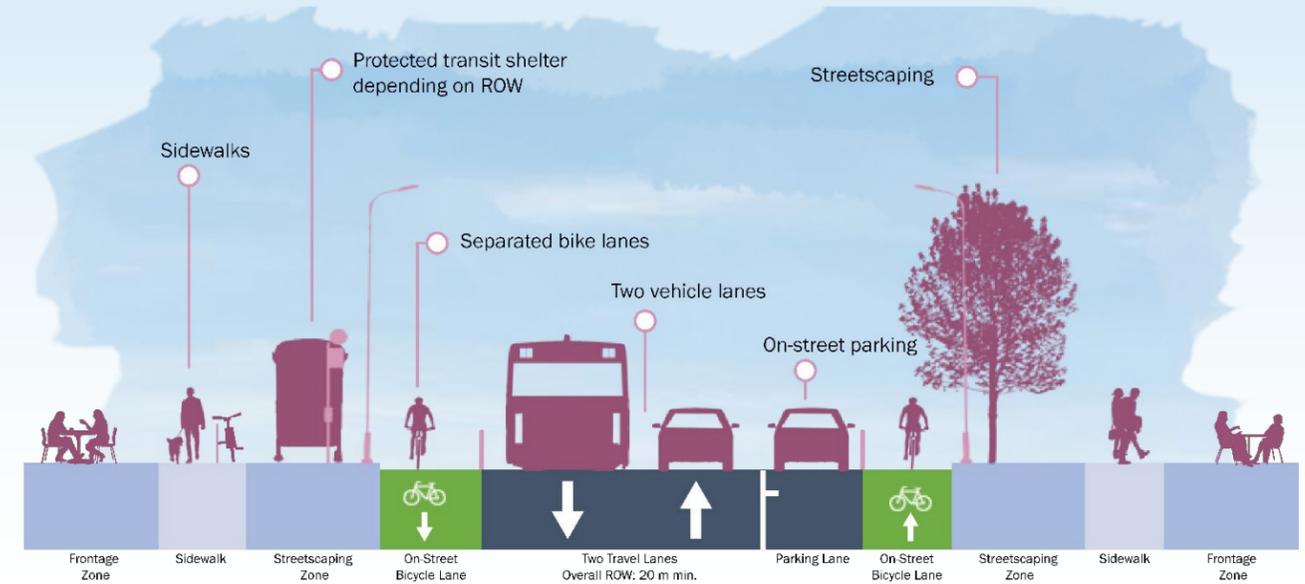
**Complete Streets Application:**

- Shared roadway to accommodate cyclists. Paved shoulders where feasible and based on actual operating speed and sightline conditions in accordance with Ontario Traffic Manual Book 18
- Pedestrians accommodated along parallel road or as part of the paved shoulder
- On-street parking prohibited
- Through trucks permitted
- Transit typically not provided

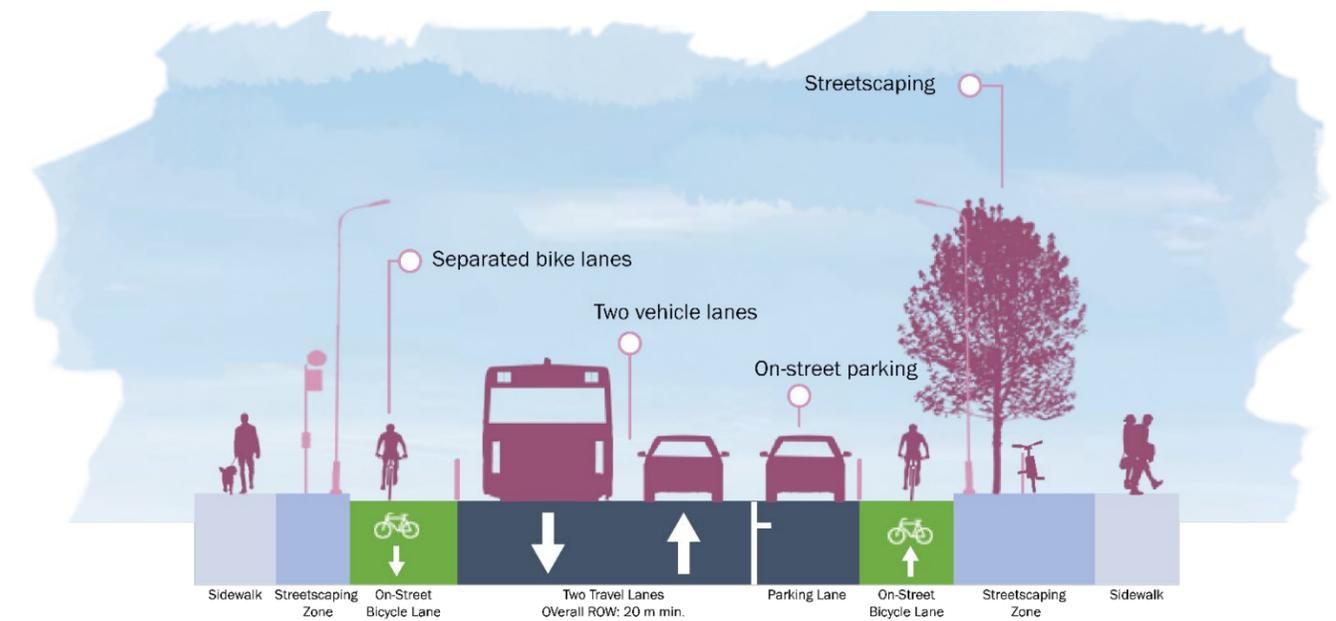
## 1a: Community Street



## 2a: Downtown Corridor



## 2b: Downtown Community Street

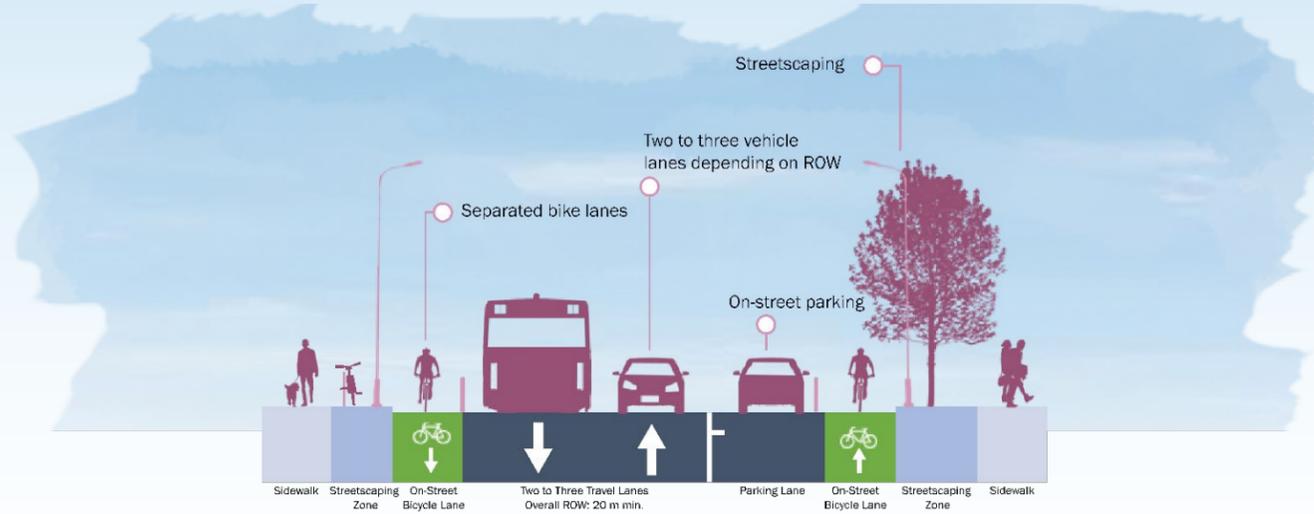


Note: On-street parking should be permitted in all urban classifications where feasible.

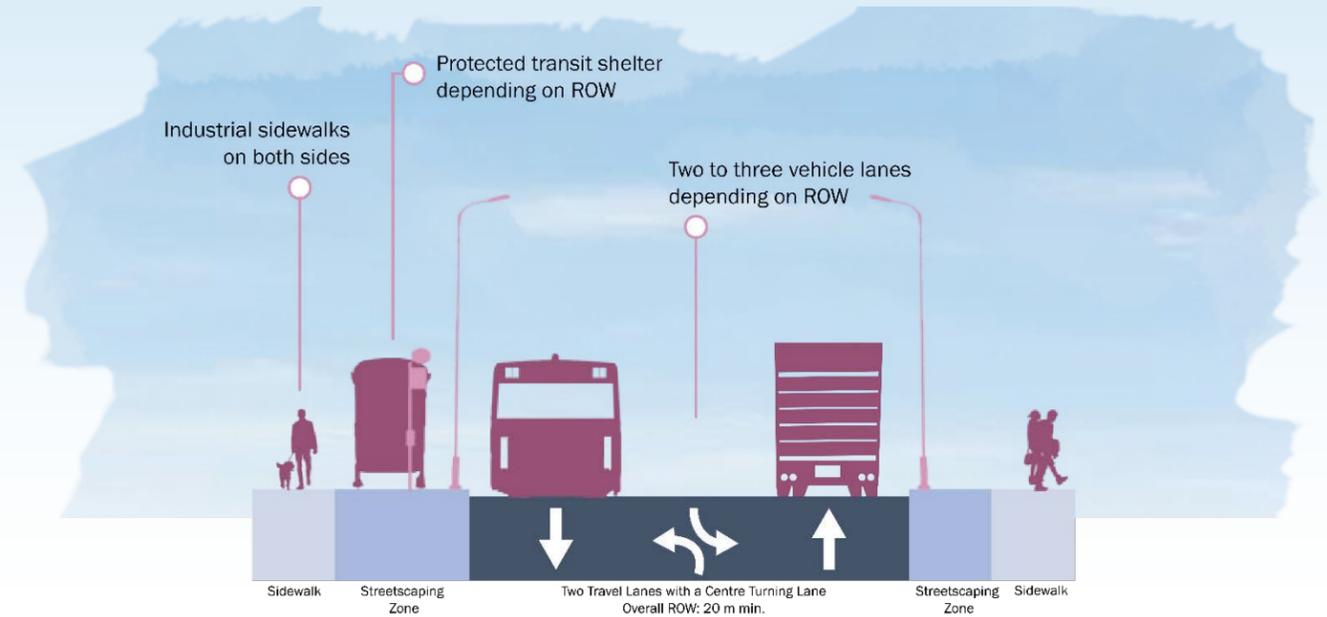
Pedestrian movement and comfort are the first priority within the downtown context.

Elements that support the use of streets for commerce (patios, sidewalk displays) are supported within the downtown context.

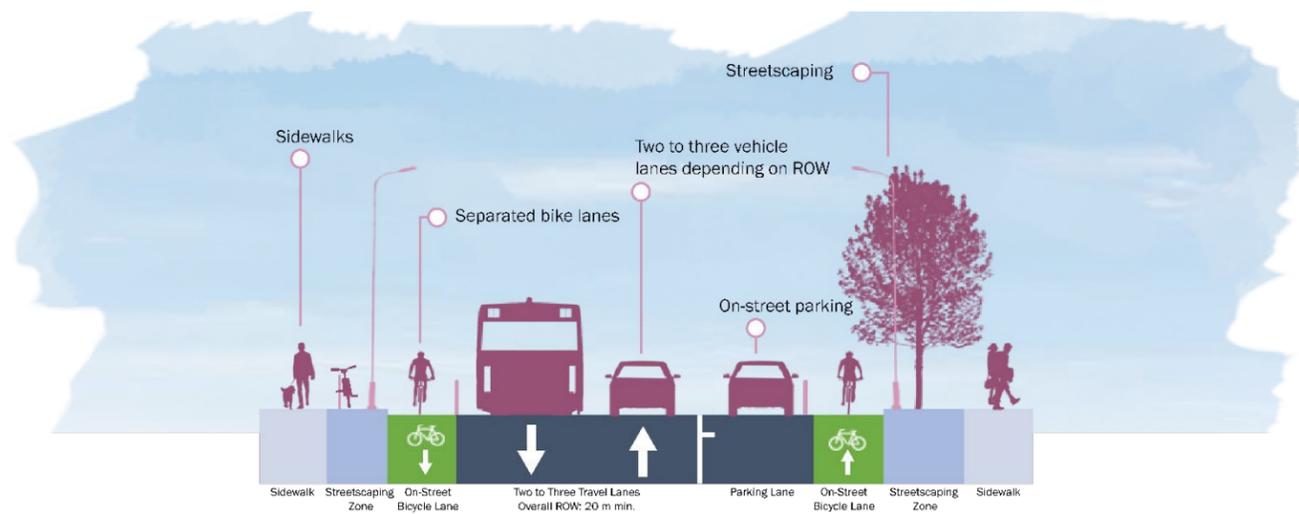
### 3a: Collector Mixed-use Corridor



### 3c: Collector Industrial

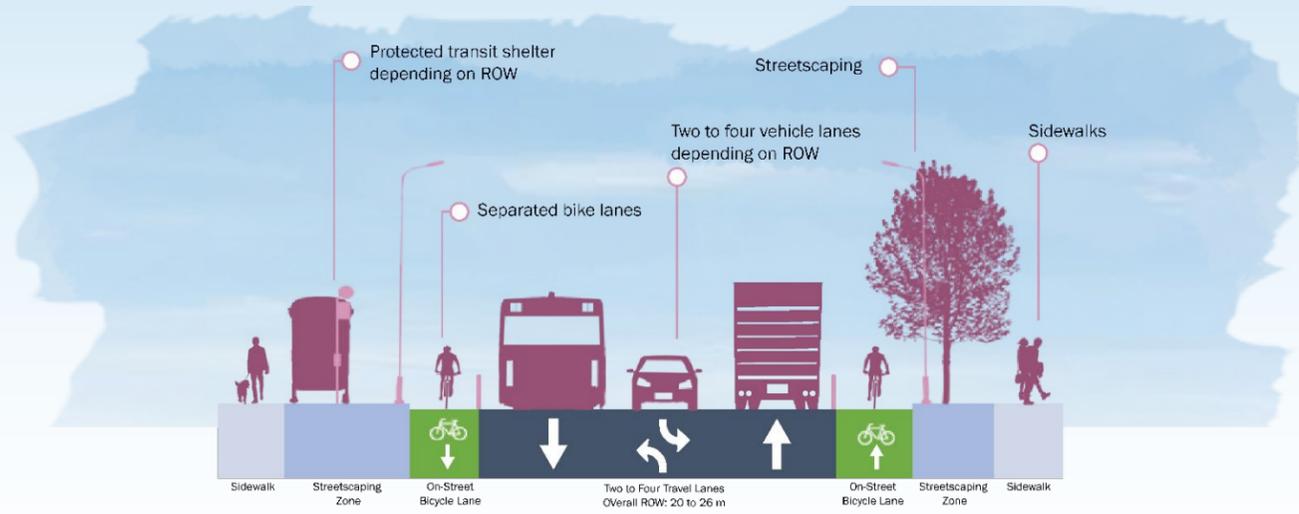


### 3b: Collector Residential Corridor

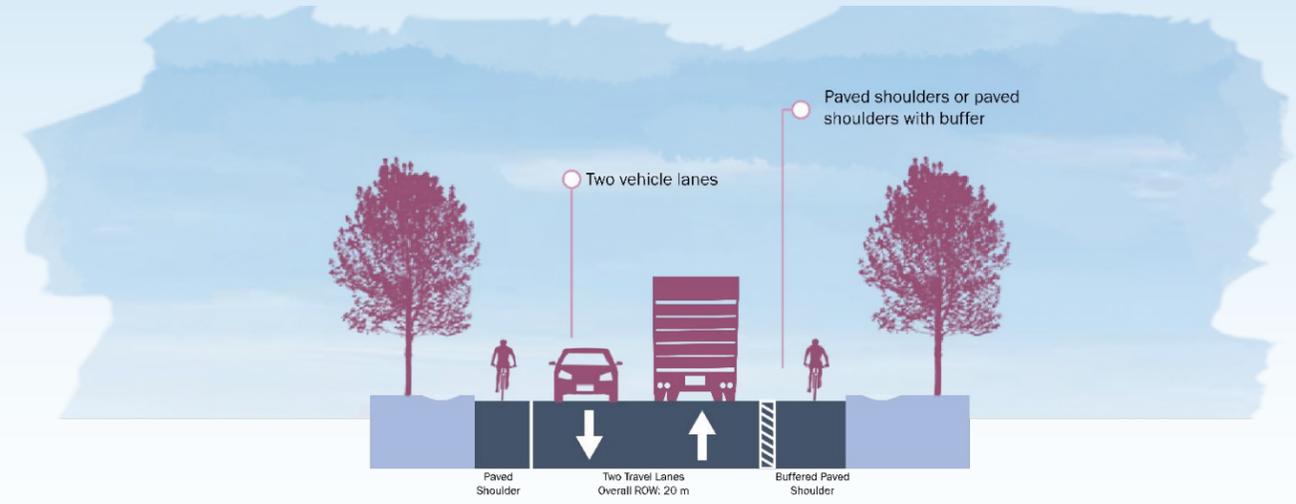


Note: On-street parking should be permitted in all urban classifications where feasible.

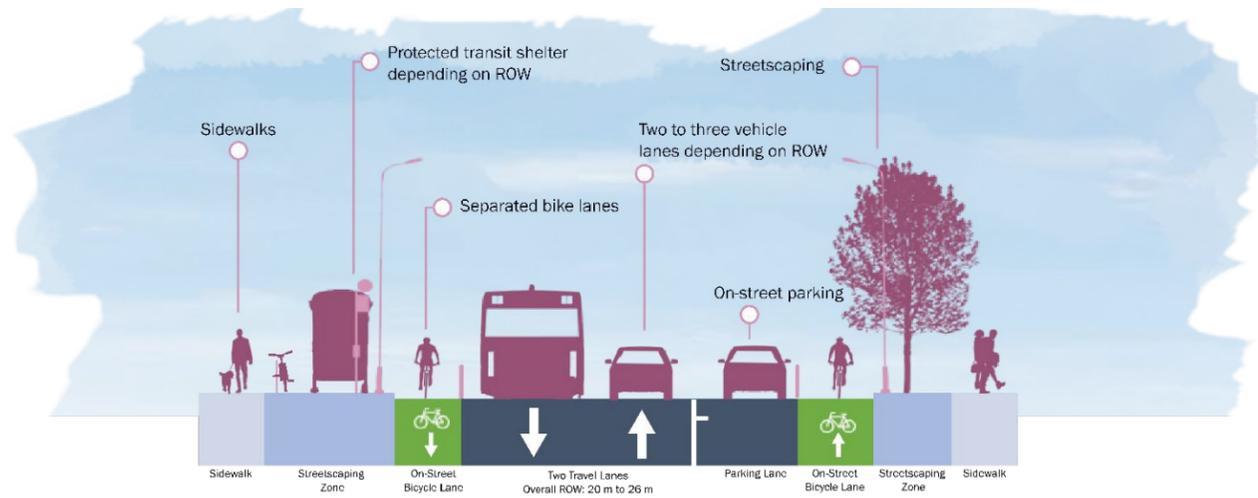
### 4a: Main Mixed-use



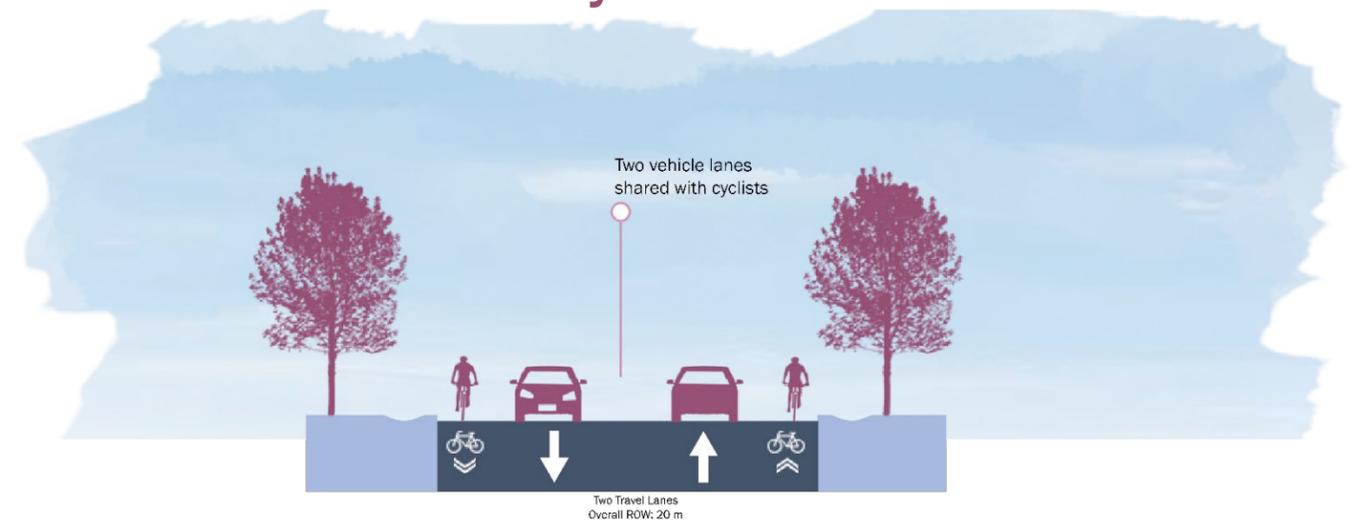
### 5a: Rural Corridor



### 4b: Main Residential



### 5b: Rural Community



Note: On-street parking should be permitted in all urban classifications where feasible.

### 3.2.3. Implementing a Complete Streets Network

The City of St. Catharines is committed to applying a complete streets lens to all new roadways or reconstruction projects. A three-stage approach was created to determine the road classification for these projects.

## STEP 1

Average annual daily traffic (AADT) volumes helped to distinguish higher-order streets from local streets. Road segments with high traffic volumes could be defined with the appropriate multi-modal considerations.

#### Legend

- 115 - 2276
- 2277 - 3613
- 3614 - 6391
- 6392 - 10624
- 10625 - 20154

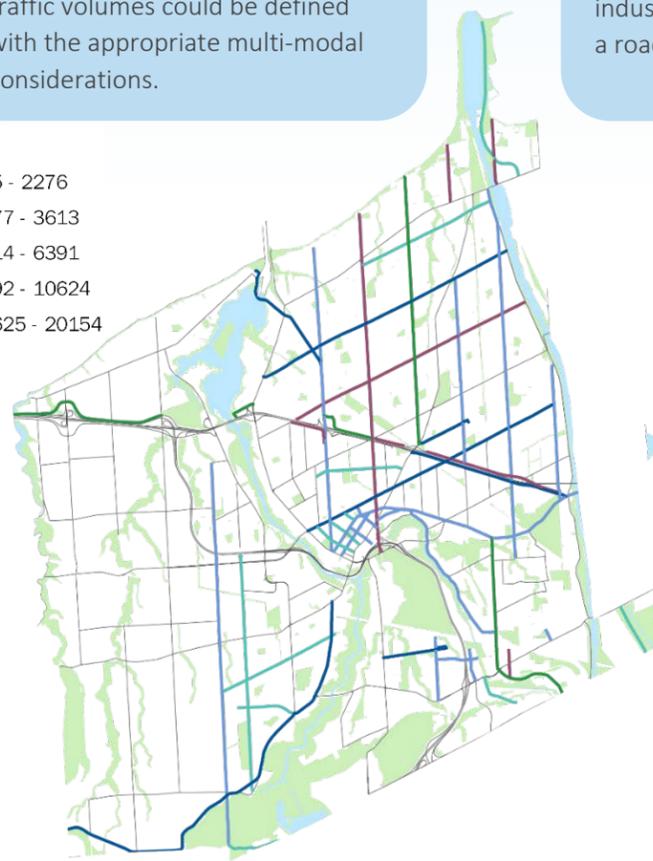
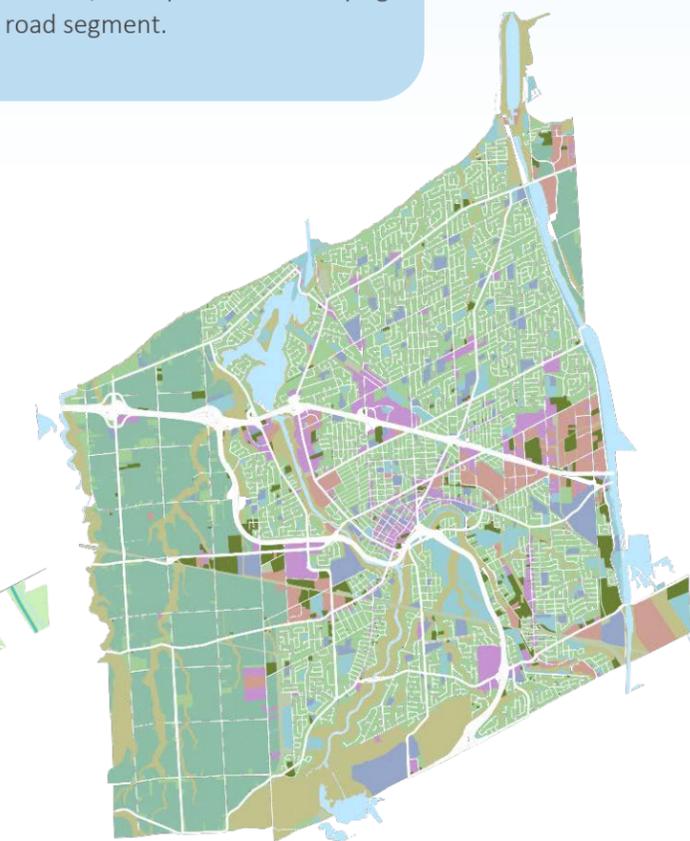


Figure 19. AADT volumes in St. Catharines

## STEP 2

Land-uses were used to determine the existing and future context of the road segment. In some cases, specific land-uses, such as industrial, were pivotal in classifying a road segment.



#### Legend Land-use

- |               |                        |                               |
|---------------|------------------------|-------------------------------|
| Agricultural  | Natural Open Space     | Rural Residential             |
| Commercial    | Parking                | Transportation Public Utility |
| Industrial    | Parks and Recreational | Vacant                        |
| Institutional | Residential            |                               |

Figure 20. Land use pattern in St. Catharines

STEP 1  
STEP 2  
STEP 3

## Road Characteristics

The annual average daily traffic and posted speed limit is the first layer of consideration for the road classification. High volume and high-speed roads are typically placed in road classifications that advise for comprehensive modal permissions (transit and goods movement supportive) with separated facilities for active modes. The urban structure and existing street connectivity influences the role of the street. The urban and rural context has a significant impact on how existing and future roadways are intended to function fluctuating in both the speed and the volume categories. A roadway that falls outside of the urban boundary would be identified as one of the rural street typologies. Further, the existing right-of-way width also helps to define the appropriate typology of a street, with wider rights-of-way receiving a higher-order than narrow rights-of-way.

## Land-Use

Once a preliminary assessment and potential classification has been identified through Step 1, the consideration of surrounding land-uses must be assessed. The surrounding land uses informs how a street will operate, and the different modes that should be prioritized. Again, the urban and rural context will influence the potential road classification. The street typology will be further defined by the land-use designation within the Garden City Plan and further determined based on the surrounding land-uses such as residential, commercial and industrial land-uses or the planned future land-uses.

## Confirmation of Appropriateness

Prior to implementation, a final review will need to be undertaken. Given that each new classification fits into one of the previous Garden City Official Plan categorizations, some streets may be able to transfer seamlessly without need for the methodology. For streets that are currently under or over performing within their existing classification; they could be reclassified into a new category. The confirmation of appropriateness should be completed by City staff to ensure that the classification best matches the context of the street segment and that there are no outstanding circumstances (such as environmental or accessibility concerns) that would disqualify the street from new complete streets elements. The City's unique road network may lead to adjustments at the site level. The TMP should consider the overall street pattern and connectivity at a larger scale. Additional intersection-specific treatments are to be determined on a case-by-case basis through additional studies during the detail design phase.

## 3.2.4. Educating: Creating Behaviour Change

A complete streets transportation planning paradigm can only do so much to influence lasting change. Travel mode choice is primarily influenced by behavioural patterns. The most crucial element of the complete streets framework is education to encourage a behavioural shift. Education and encouragement can successfully be undertaken through policies, incentives and programming, which is sometimes defined as transportation demand management (TDM).

Transportation demand management seeks to influence the way people travel to reduce single-occupant vehicle trips, lower carbon emissions, alleviate traffic congestion and decrease health-related problems due to sedentary lifestyles. The City of St. Catharines is adopting a community and individual focused approach to TDM that will introduce programming to educate and encourage the adoption of sustainable transportation in situations where they may have otherwise opted for the car.

The strategy has been developed based on five key objectives which were defined by public input and staff experience.

### Objectives...



#### Objective #1:

Increase transit accessibility to vulnerable populations, including youth and older adults.



#### Objective #2:

Shift commuting behaviours to be more sustainable.



#### Objective #3:

Plan built environments that support multi-modal transportation options.



#### Objective #4:

Change perceptions of active transportation as a viable mode of transportation.



#### Objective #5:

Facilitate a connected network of sustainable transportation options.

A user-focused approach requires a detailed understanding of the factors which influence decisions. While there are many unique factors, three themes tend to emerge as follows:

## Socio Demographics

Age, gender, education, income, and values all factor into the overall willingness of a person to try new sustainable modes.



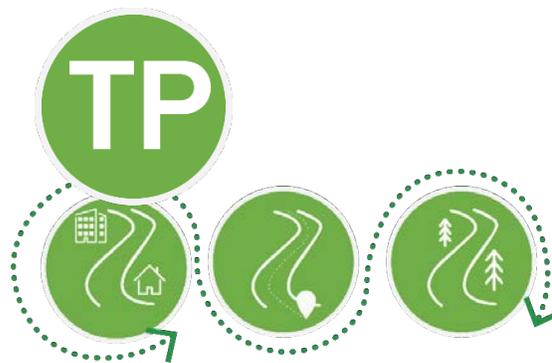
## Geographic Context

A person's location will impact how they choose to travel, whether they are a local resident, from an adjacent municipality or from outside the region.



## Trip Purpose

The type of trip (commuting, destination-bound or leisure) can influence mode choice.



There are numerous best practices programming to influence behavior change. Each objective noted in **Chapter 2** was reviewed to identify a set of suggested programs along with appropriate communities for implementation. An overview of these findings is provided on the following page.

# Potential Complete Street Education / Promotional Programs & Pilot Areas...

## Objective #1:

Increase transit accessibility to vulnerable populations including youth and older adults.

### Target Audiences

- SD** Older adults and youth populations
- G** St. Catharines residents
- TP** Destination-bound trips

### Potential Pilot Communities

GO Transit Station  
 Downtown Transit Hub  
 Communities with high youth/older adult populations

### Potential Programs

- + Provide enhanced end of trip facilities
- + Implement accessible wayfinding and signage
- + Implement community awareness campaigns
- + Provide weather-protected waiting areas and transit stops
- + Provide transit subsidies to older adults and youth
- + Community Awareness Campaigns

## Objective #2:

Shift commuting behaviours to more sustainable modes of transportation.

### Audiences

- SD** All employees who work within St. Catharines
- G** St. Catharines residents, commuters from adjacent municipalities and the GTHA
- TP** Commuting trips

### Potential Pilot Communities

Specific major employment bases  
 Downtown

### Potential Programs

- + Encourage employers to provide showers and secure bicycle parking
- + Encourage employers to provide transit subsidies to employees
- + Pilot parking maximums at new office developments

## Objective #3:

Plan built environments that support multi-modal transportation options.

### Audiences

- SD** All socio-demographics
- G** St. Catharines residents
- TP** Commuting trips, destination-bound trips, leisure trips

### Potential Pilot Communities

Brock University Campus  
 Specific new residential developments

### Potential Programs

- + Develop a TDM for Development Checklist
- + Encourage new developments to provide end-of-trip facilities
- + Support pedestrian connections within new subdivision developments
- + Ensure that new developments connect to bicycle networks
- + Support car share parking spaces
- + Support all active transportation modes and related infrastructures such as scooters, bikeshare, motorized wheelchairs and ebikes

## Objective #4:

Change perceptions of cycling as a viable mode of transportation.

### Audiences

- SD** All ages and abilities of cyclists in St. Catharines
- G** St. Catharines residents, tourists
- TP** Commuting trips, destination-bound trips, leisure trips

### Potential Pilot Communities

Brock University Campus  
 Communities with high youth/older adult populations  
 Employment areas

### Potential Programs

- + Pilot temporary bicycle parking at key destinations
- + Community Awareness Campaigns
- + Used bicycle drives

## Objective #5:

Facilitate a connected network of sustainable transportation options.

### Audiences

- SD** All socio-demographics
- G** St. Catharines residents, commuters from adjacent municipalities and the GTHA, tourists
- TP** Commuting trips, destination-bound trips, leisure trips

### Potential Pilot Communities

Downtown  
 Brock University Campus  
 Popular destinations

### Potential Programs

- + Implement wayfinding and signage for all modes
- + Pilot an online travel planning tool

# 3.3.

## Mode Specific Integration

The complete streets road classification is the foundation upon which modal change and behavior shifts will be made. The TMP also considers some unique, mode specific aspects and elements.

The recommendations in this section intend to improve the functionality of the transportation system. Each section has a defined goal to help increase the inclusivity and functionality of that mode within the St. Catharines complete streets context.

### 3.3.1. Active Transportation

As noted in Chapter 2.0 of the TMP, the existing active transportation conditions provide residents and visitors with a substantial system of on and off-road walking and cycling connections, providing access to the majority of the trip generating destinations within the city. As part of the TMP, the City required future direction on where and how active transportation improvements should be considered and prioritized throughout the city.

Utilizing input received from staff, the Active Transportation Advisory Committee (now the Transportation Advisory Committee), residents, interest groups and new strategic objectives identified through the Region’s TMP and other municipal planning documents, the consultant team worked through a six step network improvement process. This process was undertaken to strategically identify critical infrastructure connections supporting the active transportation objectives identified by the community. They include:

- A continuous and connected system of walking and cycling facilities;
- Improved facility designs that accommodate a wider range of users and improve the level of comfort for those who are not currently using AT, including those that are interested but have concerns, typically regarding safety;
  - Develop design guidelines for trail connections;
  - Develop design guidelines and implementation criteria for cycling and pedestrian amenities, including bicycle racks and water bottle filling stations, to improve end-of-trip experiences, especially at key destinations such as libraries and recreation facilities; and
  - An AT system that is well communicated to the general public to ensure that sufficient information is provided for both day-to-day activities such as for commutes, and for tourism.

An overview of the six steps is presented to the right with the input and outcomes of the process documented on the following pages. The intent is for these recommendations to provide some initial guidance to the City of St. Catharines on active transportation improvements to enhance user interest and experience.

The content of the TMP is not meant to take the place of a comprehensive active transportation master plan with a focus on encouragement and education. Following the completion and adoption of the TMP, the City should proceed with the development of an active transportation specific master plan to further assess and refine the infrastructure recommendations found within the TMP and

### Goals...

- Provide direction on strategic on and off-road improvements including key missing links and additional improvements.
- Identify a minimum grid system of more separated facilities to encourage use by a wider array of cyclists.
- Provide guidance on trail design through the development and adoption of trail standards.

identify education, encouragement, evaluation and enforcement strategies to ensure long-term coordination and collaboration to achieve the overall AT mode shift that is directed by Council and City staff.



The intent of the active transportation component of the TMP is to identify strategic improvements to guide future build-out of the on and off-road system. It also provides consistent design guidelines for on and off-road facilities and other amenities. In addition to the objectives noted within Chapter 1, combined with the input from members of the public, stakeholders, staff and agencies, there are two key elements that were used to shape the active transportation recommendations – **route selection criteria** and the **facility selection process**. These two elements are typically used when developing comprehensive active transportation networks and master plans. They are shaped by best practices, guidelines and lessons learned from comparable municipalities while ensuring context sensitive considerations for the City. The route selection criteria – in addition to the objectives and input – were used to inform Steps 1 through 4 of the process noted on page 66. An overview of the purpose of these elements and how they were used is provided to the right. Should the City of St. Catharines proceed with the development of a functional active transportation master plan, the route selection criteria and the facility selection process should be considered and utilized where appropriate.

Creating a context specific set of recommendations requires a sound process, consistent set of criteria and an understanding of existing conditions. As noted in Step 2, field investigations were undertaken to document the existing conditions as well as the potential for future improvements. GPS waypoints and photos were taken documenting context specific considerations which together form a comprehensive database of graphic references. This database can be used by staff to support future implementation and as a communication tool to other staff and stakeholders when projects are discussed.

## Route Selection Criteria...

### What are they?



Access & Potential Use



Connectivity, Directness & Physical Barriers



Environmental Sustainability and Protection



Attractiveness



Comfort & Safety



Costing & Phasing



Consideration & Accommodation for Future Use



Consistency with Local Tourism Objectives

### How were they used?

- Used in Step 2 to identify missing links which align with the overall objectives for the network and key values and principles for active transportation route design.
- Used in Step 3 to confirm the preferred routes that form part of the AT network.
- Used in Step 5 to help determine network priorities.

## Facility Selection Process...

### What is it?

The three-step process identified in Ontario Traffic Manual Book 18 was utilized to identify the appropriate facility for select routes. This included the selection of a level of separation based on the existing vehicle volumes and speed, an assessment of context specific factors and the review, recommendation and documentation of the outcome. The process is illustrated below.

### Step 1: Pre-Selection of Facility Types (Pick One)

Shared	Designated	Separated	Off-road
Low volume and low speed roadway	Moderate volume and moderate speed roadway	High volume and high-speed roadway	High volume and high-speed roadway or natural corridor

### Step 2: Examine Other Factors

On-road	Off-road
<ul style="list-style-type: none"> <li>Function of the roadway</li> <li>Vehicle mix and speed</li> <li>Collision history</li> <li>Available space</li> <li>Cost</li> <li>Anticipated use</li> <li>Type of improvement</li> <li>On-street parking</li> <li>Intersection frequency</li> </ul>	<ul style="list-style-type: none"> <li>Connectivity</li> <li>Environmental protection</li> <li>Safety</li> <li>Anticipated use</li> <li>User experience</li> <li>Topography</li> <li>Barriers</li> <li>Cost</li> <li>Maintenance</li> <li>Accessibility (AODA)</li> </ul>

### Step 3: Recommend & Document Results

### How was it used?

- Used in Step 1 to review and confirm the appropriateness of the existing and previously proposed active transportation routes.
- Used in Step 4 to determine the appropriate facility for proposed on-road linkages.

## Previously Proposed Routes...

With the completion of Steps 1 through 4, a proposed active transportation network was identified, which builds upon existing and previously proposed routes. Previously proposed routes and facilities were identified through several municipal sources including the City's Official Plan, the GO Transit Secondary Plan, Capital Projects identified by Niagara Region through their Capital Budget and Niagara Region's Transportation Master Plan (adopted in 2017).

Combined, the linkages identified within these documents significantly expand the active transportation on and off-road system within both the urban areas and rural corridors as well as providing access to areas of natural and cultural significance. An image illustrating the network including the previously proposed routes and their source is presented in **Figure 21**.

The TMP supports the existing routing and implementation strategies identified in the City and Regional planning documents noted above. Based on the outcomes of Step 1, no issues were identified with the existing and previously proposed facilities. No revisions are recommended to these routes / facilities.



Figure 21. Previously proposed routes

### Legend

--- Previously Proposed Route	2019 TMP	Previously Proposed Source
Existing	●●●● Off-Road Trail	St. Catharines Official Plan
— Off-Road Trail	●●●● In-Boulevard Trail	St. Catharines GO Transit Secondary Plan
— Bike Lane	●●●● Buffered Bike Lanes	Niagara Region Capital Budget
— Paved Shoulder	●●●● Bike Lane	Niagara Region TMP
— Signed Route with Sharrow	●●●● Paved Shoulder	
— Signed Route	●●●● Signed Route with Sharrow	
	●●●● Signed Route	

## Proposed Facilities & Priority Routes

Though the existing and previously proposed network provides a significant opportunity for on and off-road active transportation, there were still some missing links that needed to be added in order to achieve a fully continuous and connected City-wide network. Over the course of Steps 2 through 4, the missing links were identified and assessed based on overall network and project objectives. Next, the facility type was determined based on the proposed road classification typology and the three-step facility selection tool noted above.

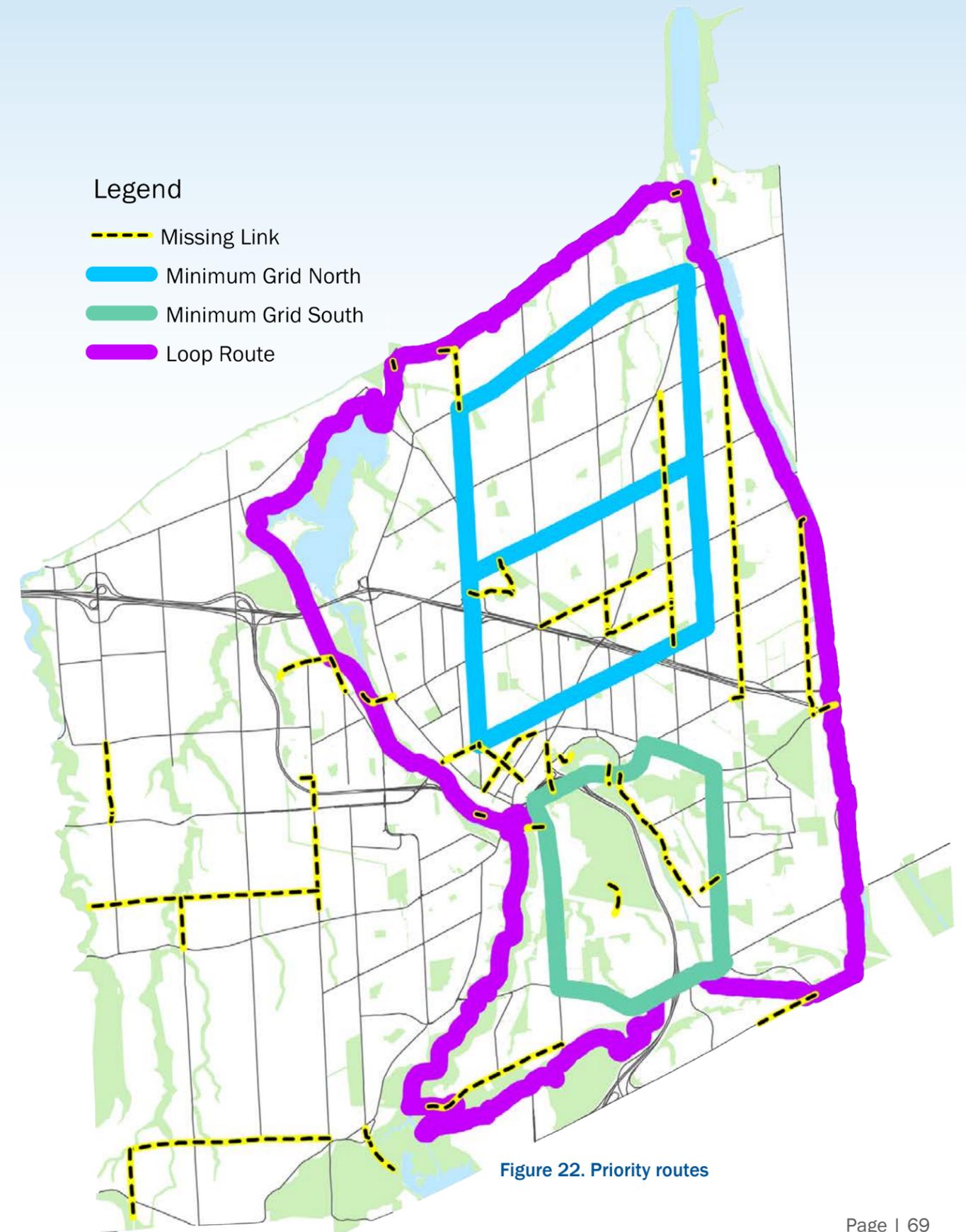
The result is the proposed AT network, which is presented in **Map 6**. A summary of the existing, previously proposed and current proposed facilities by kilometre is presented in **Table 2**.

**Table 2. Summary of proposed routes**

	Previously Proposed (km)	Current Proposed (km)	Total (km)
Signed Route	12.4	13.6	26.0
Paved Shoulder	7.7	3.1	10.8
Bike Lane	21.7	19.3	41.0
Buffered Bike Lane	3.1	4.3	7.3
In Boulevard Multi-use Trail	1.8	0.8	2.6
Off-road Trail	42.7	2.8	45.5
<b>Total</b>	<b>89.4</b>	<b>43.8</b>	<b>133.2</b>

It is important to note that this exercise did not focus on an assessment, evaluation and identification of missing sidewalk linkages or improvements to the pedestrian realm specifically. Pedestrian improvements have been identified as part of the road classification typologies for consideration when reconstructing existing or constructing new roadways. In addition, the City should consider pursuing a more detailed pedestrian strategy including the identification and prioritization of missing sidewalk linkages as well as other pedestrian enhancements for existing or perceived barriers.

The AT network has intentionally not been phased. The City of St. Catharines should be consistent with previously developed implementation and budgeting strategies that are outlined in existing City and Regional plans. There was clear need for some direction on future active transportation priority projects which could inform annual budget discussions and strategic planning. Based on input from staff, stakeholders and the public, three priority categories were identified including critical missing links, a minimum grid system and a loop route. These priorities are illustrated on **Figure 22** and described in further detail on the following page.



**Figure 22. Priority routes**

## Missing Links

The missing linkages refer to those connections that will support the development of a continuously connected active transportation system. Missing linkages represent on and off-road corridors in the urban and rural areas. They have been identified based on overall network objectives.

An overview of the proposed facility types that make up the missing links priorities is provided in **Table 3**.

**Table 3. Summary of missing link routes**

	Total (km)
Signed Route	13.5
Paved Shoulder	2.0
Bike Lane	17.1
Buffered Bike Lane	0.0
In Boulevard Multi-use Trail	0.8
Off-road Trail	2.7
<b>Total</b>	<b>36.1</b>

City staff should consider reviewing the list of missing links on an annual basis to determine if some of these projects could be identified as part of the capital budget.

## Minimum Grid Network

Based on recent Provincial design guidelines and standards, there is a shift towards the construction of separated cycling infrastructure to accommodate a wider audience of users. The largest concern of infrequent or hesitant cyclists is the lack of perceived comfort and safety and potential conflict with other vehicles.

The implementation of separated infrastructure helps to provide not only a designated space for cyclists but also includes physical or spatial separation to create a greater barrier between the cyclist and other road users. Within the built-up area of St. Catharines there are north-south and east-west existing routes that could be improved and new routes which could be constructed which establish a network of separated cycling facilities – also known as a minimum grid.

The proposed minimum grid networks found in the north and south end of the built-up area include the following existing and proposed facilities, as summarized in **Table 4**.

**Table 4. Summary of minimum grid network routes**

	Existing (km)	Proposed (km)	Total (km)
Signed Route	0.1	0.0	0.1
Paved Shoulder	0.0	0.0	0.0
Bike Lane	13.6	3.8	17.4
Buffered Bike Lane	0.0	1.7	1.7
In Boulevard Multi-use Trail	0.0	0.5	0.5
Off-road Trail	5.5	0.0	5.5
<b>Total</b>	<b>19.2</b>	<b>6.0</b>	<b>25.2</b>

Within the buffered bike lane category, the City should pursue additional separation such as a bollard, concrete precast curb or planter. Additional details on the types of separation and the rationale for implementation is provided on the right.

### Roll Curb / Mountable Curb

- +: Bicycle movement and turning movement, durability, greater flexibility for maintenance and minimal collision
- : May be less effective at deterring motor vehicle parking, may be expensive to install

### Rubber Delineator

- +: May be used in conjunction with bollards to add extra separation in specific locations
- : Less durable than concrete requiring more maintenance and may have greater exposure to damage from clearing

### Flex Bollards

- +: High visibility, bollards spacing may accommodate bicycle movement, waste collection, driveways. Comparatively easy to install, minimal safety risk
- : Not as durable, may not always discourage encroachment if there is a lot of separation, minimal aesthetic appeal

### Buffer Zone

- +: Inexpensive to implement, can be combined with strategic plants and / or flex bollards
- : Need to update markings, no physical separation

### Planters

- +: Aesthetic appeal, flexible spacing, high visibility
- : May reduce visibility, requires high maintenance, may need to be removed and stored in winter

### Concrete Barrier

- +: Very effective at preventing encroachment, low cost to maintain, high visibility, mounted planters increase aesthetics
- : May have negative impact on drainage, may reduce visibility of cyclists

Should the City pursue the design and implementation of a minimum grid system, the following should be considered:

- The review and confirmation of available space to accommodate a separated facility;
- The identification of a preferred level of separation including a potential pilot of different design treatments for different contexts;
- The development of an education and awareness campaign prior to or at the time of pilot implementation; and
- The development and implementation of appropriate promotional and directional signage to communicate the expected and anticipated location of the minimum grid system.

## Loop Route

The loop route is intended to leverage the existing trails system as it relates to providing residents and visitors with access to major community destinations including natural and cultural areas and major nodes. By filling in some of the key gaps on the off-road trails network, the City could establish a City-wide loop trail network linking the north and south areas of the built-up area.

Table 5 summarizes the length of different facility types that make up the proposed loop route.

**Table 5. Summary of loop routes**

	Existing (km)	Proposed (km)	Total (km)
Signed Route	0.0	0.1	0.1
Paved Shoulder	0.0	0.0	0.0
Bike Lane	1.4	0.8	2.2
Buffered Bike Lane	0.0	0.0	0.0
In Boulevard Multi-use Trail	0.0	0.2	0.2
Off-road Trail	39.1	3.1	42.2
<b>Total</b>	<b>40.5</b>	<b>4.2</b>	<b>44.7</b>

A loop route would not only include the implementation of missing infrastructure links, but would also require additional design, maintenance and promotion considerations in order for there to be a cohesive experience. These include:

- The development and implementation of a branded wayfinding and signage strategy which builds upon the Region’s wayfinding strategy as well as other regionally significant trail identification systems such as the Waterfront Trail. Consideration should also be given to preparing and implementing directional signage to identify the decision-making points where people can access major destinations;
- The development and adoption of consistent design standards and guidelines for the trail routes;
- The identification of preferred maintenance standards for seasonal maintenance of trail facilities to allow for year-round use of facilities; and
- The design of trail amenities such as benches, bicycle parking, rest areas, water fountains and waste receptacles, and the identification of locations for those amenities.

The last step in the process was establishing guidelines and standards for the design and implementation of AT facilities. There are a considerable number of on-road facility design guidelines and standards that have been adopted at the local, regional and provincial levels. There are four documents that provide the most up to date guidance for Ontario municipalities. These guidelines and standards are summarized in **Table 6** with references to the specific documents where this information was obtained. These documents also include details on the design of cycling-supportive infrastructure such as bike parking, which will also need to be reflected in the OP and Zoning By-laws. Specifics on the cycling widths and which facility is chosen will be determined in the design phase. There are trade-offs with each facility design, including the treatment of different materials or forms of separation. Cycling facilities are to be determined on a case-by-case basis to ensure that the facility is appropriate for the road and desired use and provides comfort for the users. Intersection treatments for cycling facilities are similarly determined at the design stage and should be consistent with the guidelines below.

**Table 6. Summary of cycling facility guidelines**

Guideline	Buffered Bike Lane	Bike Lane	Paved Shoulder	Signed Bike Route	In-Boulevard Trail
<b>OTM Book 15: Pedestrian Crossing Treatments (2016)</b>	n/a	n/a	n/a	n/a	n/a
<b>OTM Book 18: Cycling Facilities (2013)</b>	S. 2.3.1.4 (Separated Bike Lane) S. 4.2.2 (Separated Bike Lanes) S. 4.3.1 (One-way and Two-way Raised Cycle Tracks)	S. 2.3.1.3 (Conventional Bicycle Lane) S. 4.2.1 (Conventional Bicycle Lanes)	S. 2.3.1.2 (Signed Bicycle Route with Paved Shoulder) S. 4.1.2 (Signed Bicycle Route with Paved Shoulders)	S. 2.3.1.1 (Shared Roadway and Signed Bicycle Route) S. 4.1.1 (Shared Roadways and Signed Bicycle Route)	S. 2.3.2 (In-Boulevard Bicycle Facilities) S. 4.4 (In-Boulevard Facilities) S. 5.2.4 (In-Boulevard Facilities)
<b>MTO Bikeways Design Manual (2014)</b>	S. 4.4 (Separated Bicycle Lane)	S. 4.3 (Bicycle Lane)	S. 4.2 (Signed Bike Route with a Paved Shoulder)	S. 4.1 (Signed Bike Route)	S. 5.1 (Active Transportation Path) S. 5.2 (Off-Road Multi-Use Trail)
<b>AODA Built Environment Standards</b>	n/a	n/a	n/a	n/a	S. 2.2 (Recreational Trails)



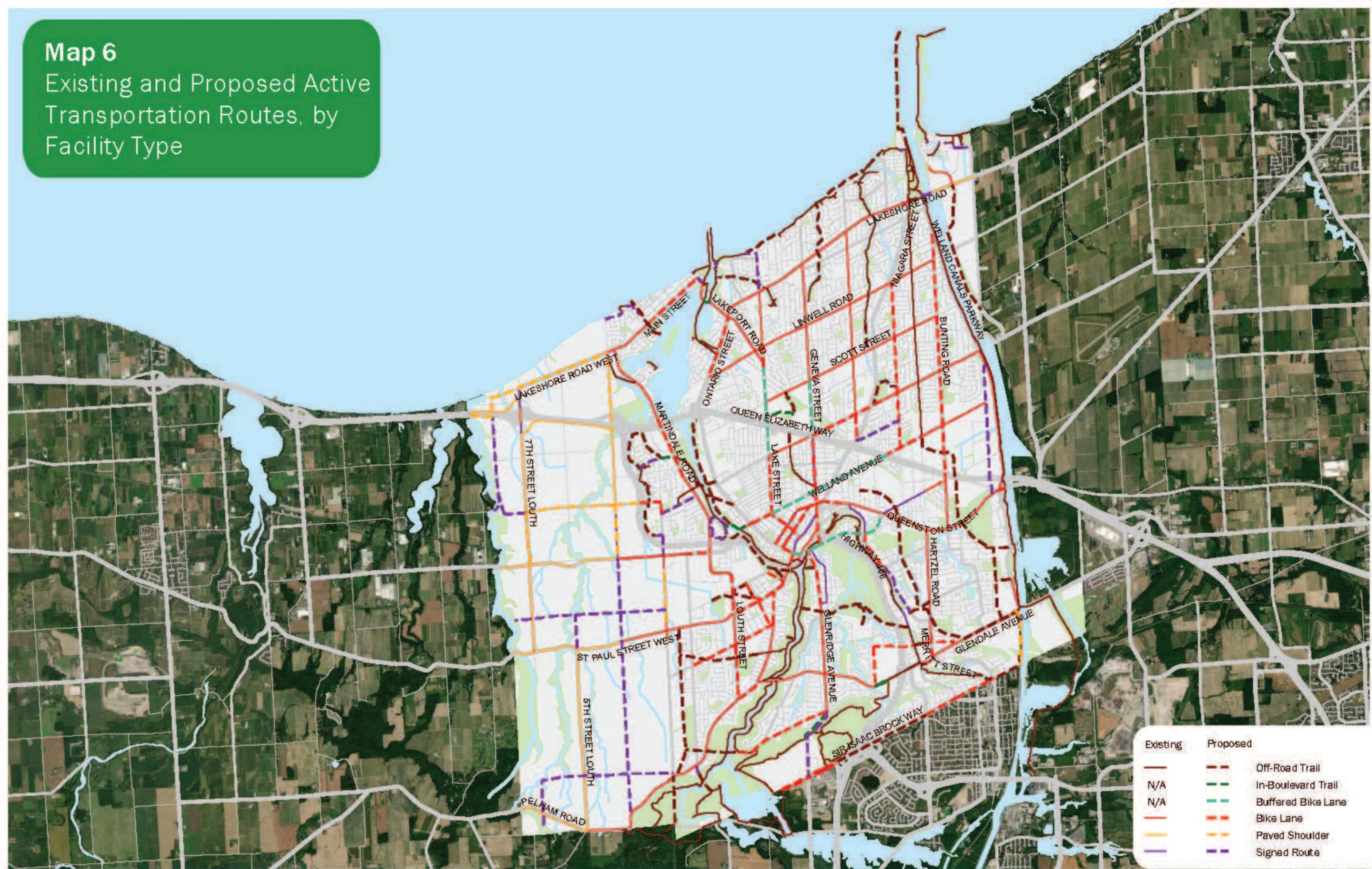
The design of off-road trail facilities can be a bit more complex and nuanced depending on the natural areas and conditions where they are being implemented. The City should consider the development and adoption of a consistent set of design standards for trail infrastructure. Typically, this is done by adopting a trail hierarchy and developing design standards that reflect that hierarchy. As part of the TMP, a preliminary trail hierarchy has been developed and is being recommended for the City’s review and consideration as part of a wider active transportation strategy or an independent trails initiative.

Table 7. Summary of design considerations for trails

Design Consideration	Type 1	Type 2	Type 3
<b>General Function</b>	Recreation, leisure and commuting functions, providing access to key destinations such as community centres, parks, key commercial areas, and schools. Includes loops in neighbourhood parks and access to park facilities, for example playgrounds	Primarily recreation and leisure. Although commuting is not a key function, secondary trails provide connections to active transportation routes	Recreation and leisure providing opportunities to ‘escape’ the urban environment and experience natural settings within City limits.
<b>Location</b>	Along the Waterfront, Utility Corridors in the Urban Area and Urban Parkland	Open Space / Natural Areas	Open Space / Natural Areas
<b>Width</b>	3.0m typical width (may be narrower in constrained locations such as limited property / parcel width)	2.4m typical width (may be narrower in constrained locations such as limited property / parcel width, topographic and environmental constraints)	1.0 – 2.0m (may be narrower in constrained locations such as limited property/parcel width, topographic and environmental constraints)
<b>Surface</b>	<ul style="list-style-type: none"> <li>Typically hard surface (asphalt, concrete)</li> <li>May include granular surface in context specific locations</li> <li>If current trails have granular surface consideration may be needed to upgrade select trails to hard surface depending on location and use of the trail / demand</li> </ul>	<ul style="list-style-type: none"> <li>Granular surface (limestone screenings, granite screenings)</li> <li>Granular A, clear stone, wood boardwalk in context specific locations</li> <li>Limestone screenings should not be used in floodplain areas or where drainage flows directly to watercourses. In these locations trail hardening with asphalt over short distances where erosion is an ongoing issue and cannot be mitigated by re-routing and for trails within floodplain areas</li> </ul>	<ul style="list-style-type: none"> <li>Natural surface (earthen, grass), woodchips</li> <li>May include granular (limestone screenings, granite screenings, granular A, clear stone), or wood boardwalk in context specific locations</li> </ul>
<b>Accessibility</b>	Meets or exceeds minimum accessibility requirements where feasible	Meets accessibility requirements where feasible. Maintaining natural heritage values takes precedence	Maintaining natural heritage values takes precedence over accessibility
<b>Amenities</b>	<ul style="list-style-type: none"> <li>Moderate-high frequency of amenities</li> <li>Benches at key locations, trash receptacles located to be easily accessed for service vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Moderate frequency of amenities</li> <li>Trash receptacles at trail entry points, seating opportunities at key locations. Seating opportunities include benches and natural materials for example flat boulders</li> </ul>	<ul style="list-style-type: none"> <li>Moderate frequency of amenities</li> <li>Trash receptacles at trail entry points, seating opportunities at key locations. Seating opportunities include benches and natural materials for example flat boulders</li> </ul>
<b>Lighting</b>	Lighting may be considered where use / demand is high (such as heavily used commuter routes)	Lighting not provided	Lighting not provided
<b>Wayfinding and Signage</b>	<ul style="list-style-type: none"> <li>High frequency, at trail entry points, trail intersections, key decision points</li> <li>At regular intervals where there are long distances between intersections</li> <li>Designed to meet AODA requirements at trail entrances</li> </ul>	<ul style="list-style-type: none"> <li>Moderate frequency, at all trail entry points, trail intersections and key decision points</li> <li>Occasional markers where there are long distances between trail intersections</li> <li>Designed to meet AODA requirements at trail and entrances</li> </ul>	<ul style="list-style-type: none"> <li>Low frequency, at trail entry points and key decision points</li> <li>May include occasional markers along long stretches between trail intersections (may include simple trail blazes)</li> <li>Designed to meet AODA requirements at trail and entrances</li> </ul>

## Map 6

### Existing and Proposed Active Transportation Routes, by Facility Type



### 3.3.2. Transit

Based on the existing conditions analysis, transit has a great opportunity to improve its ridership through routing and timing improvements. The opportunities for improvements were analyzed through a ridership analysis where data was obtained through the passenger counter equipment, which counts boardings and alightings separately. This data was broken down in terms of annual boardings, total revenue operating hours and operating costs. Outliers in the data were removed prior to analysis (typically stemming from errors with the automated passenger counter equipment, which involve unrealistic single-stop spikes in passenger volumes). **Table 8** ranks the performance of routes based on passenger trips per revenue hour. The recommendations for improvement follow.

**Table 8. Summary of transit route performance**

Routes	Evening Service	2018 Annual Total Boardings	2018 Annual Total Rev Hour	Passenger Trips per Revenue Hour	Cost per Passenger Trip	Rank	
324	Brock-Tupper	Y	143,965	1,786.0	80.6	\$1.4	1
331	Brock-Richmond	Y	163,833	2,088.2	78.5	\$1.4	2
316/416	Brock-Glenridge	Y	691,713	10,885.8	63.5	\$1.8	3
336/436	Brock-Glendale-Pen Centre	Y	276,541	4,541.5	60.9	\$1.9	4
328	Brock-Towpath-Shuttle	-	93,204	1,578.0	59.1	\$1.9	5
323	West-Brock-Commuter	Y	102,681	1,809.4	56.7	\$2.0	6
335/435	Brock-Pen Centre	Y	151,857	3,004.4	50.5	\$2.2	7
310/410	Glenridge-Pen Centre	Y	113,208	2,456.9	46.1	\$2.5	8
321/421	Confederation-Brock	Y	95,272	2,517.5	37.8	\$3.0	9
303	Pelham Rd.	-	81,038	2,235.7	36.2	\$3.1	10
312/412	Vine St.	Y	170,847	4,883.3	35.0	\$3.2	11
317/417	Bunting-Linwell/Bunting-Lakeshore	Y	198,607	5,968.2	33.3	\$3.4	12
320/420	Thorold-Pen Centre	Y	91,187	2,743.4	33.2	\$3.4	13
306/406	Lake St.-Port Dalhousie	Y	116,812	3,685.8	31.7	\$3.6	14
302/402	Ontario-Lakeshore/Ontario St.	Y	127,851	4,320.4	29.6	\$3.8	15
304/404	Oakdale-Pen Centre	Y	105,865	3,628.2	29.2	\$3.9	16
309/409	Geneva St.	Y	143,047	4,925.7	29.0	\$3.9	17
315/415	West St. Catharines	Y	167,986	5,889.2	28.5	\$4.0	18
311	Hartzel Rd.	-	96,885	3,642.1	26.6	\$4.2	19
318/418	Secord Woods	Y	145,877	5,613.5	26.0	\$4.3	20
307	Niagara St.	-	82,180	3,248.1	25.3	\$4.5	21
305	Haig-Linwell	-	114,134	5,252.2	21.7	\$5.2	22
308/408	Grantham-Lakeshore/Grantham-Port Weller	Y	100,352	4,689.5	21.4	\$5.3	23
314/414	Scott St.	Y	46,169	2,463.0	18.7	\$6.0	24
301/401	Hospital-Port Dalhousie	Y	127,246	7,309.2	17.4	\$6.5	25
337/437	Crosstown	Y	17,627	2,377.5	7.4	\$15.2	26

**Median**

32.5 passenger trips/revenue hour

### Goals...

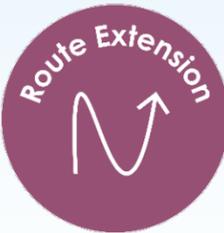
- Increase accessibility and convenience by an improved transit system throughout the City and to surrounding areas
- Improvements to routing and timing

Many of the routes that currently service Brock University make the bulk of the system’s highest ridership, a function of the available university pass and funding strategy with the University’s students union. However, of particular note are routes with lower ridership and high operating costs, which include routes 301/401 Hospital-Port Dalhousie and the newest route, the 337/437 Crosstown. We note that at the time of writing, the Crosstown route has not yet operated for one year, which is typically the time frame for a new route review in terms of ridership and financial performance.

## Route Recommendations

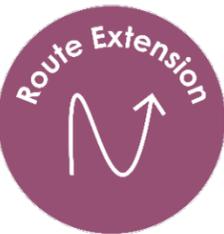
### Extend route 337/437 Crosstown

It is recommended that this route be extended to the Downtown terminal, as shown in **Map 7**, in efforts to improve the ridership on the route. Providing this link downtown will likely improve the overall utility of the route through connecting with other services. This is anticipated to add approximately 12 minutes (3 kilometres) to the route over one cycle without the need for additional vehicles to maintain the current route headway. Based on discussion with City staff, this change has been approved and implemented.



### Add Downtown Connection to Route 314/414 Scott

It is recommended that this route provide bi-directional service through most of the route, as shown in **Map 7**, rather than operating unidirectionally. This will connect the route to other services and provide opportunities for reduced travel time when travelling through unidirectional sections of the route.



### New GO-VIA Station shuttle

It is anticipated that in the future, GO service along the Niagara (extended Lakeshore West) line will be increased with additional trains serving the station during the a.m. and p.m. peak hours. A downtown circulator or shuttle option connecting the downtown terminal with the station should be further explored and officially recognized as part of the system map, rather than an unofficial train-meet bus. Coordination with Metrolinx is required as this is developed to ensure that GO Transit and St. Catharines Transit riders' needs are met.



### New Transit Hubs

Explore improvements, alternative locations or sites at the Downtown terminal, Pen Centre transit hub and Fairview Mall transit hub.

## Service Recommendations

### Frequency Improvements

It is recommended to add service (improve frequencies) during the p.m. peak period (2 to 6 p.m.) on weekdays to the 301, 302, 303, 308, 309 and 312 routes. Based on the preceding analysis, ridership volumes are consistently high, resulting in a large number of standees during the p.m. peak. Layover times and running times should be adjusted accordingly. Further, it is recommended that the service hours on 300-series routes be extended, such as to 8 or 9 p.m. versus 6 to 7 p.m. This is predicated on the peaking characteristics of last trips on most routes where the loads are higher than the previous trips. This change would not require additional buses. Study should also be made into consolidating the 300 and 400-series routes to transcend the temporal boundaries currently set. Finally, depending on ridership trends, it is recommended that a minimum service frequency of 15 minutes should be applied to most 300-series routes during the afternoon peak period to reduce overcrowding. This change would require about 33 additional buses. It is suggested that most of this additional fleet requirement would be articulated buses to accommodate increasing ridership.

### Operations and Maintenance Facility Needs Assessment

As the fleet expands, additional maintenance room (for example, hoists and bays) and storage room will be needed. An architectural review is being completed to see what can be completed within the envelope of the current site; however, with the above recommendations indicating a need for many more vehicles, a full assessment should be completed.

### Potential Operational Improvements

Transit signal priority, signal coordination on transit corridors and queue jump lanes are potential improvements for transit operations. These should be placed strategically at locations with high delays to transit.

## Future Ready Transit

### Continue Review of Electric and Hybrid Bus Feasibility

The Toronto Transit Commission and the Montreal Transit Corporation (Société de Transport de Montréal) have both entered into long term electric bus tests, which should be monitored by SCTC to determine the financial and operational feasibility, endurance and longevity of new electric buses in Canadian climates. Electric buses offer many operational advantages, such as quicker acceleration and increased hill-climbing ability, in addition to having a lower environmental impact compared to conventional buses.



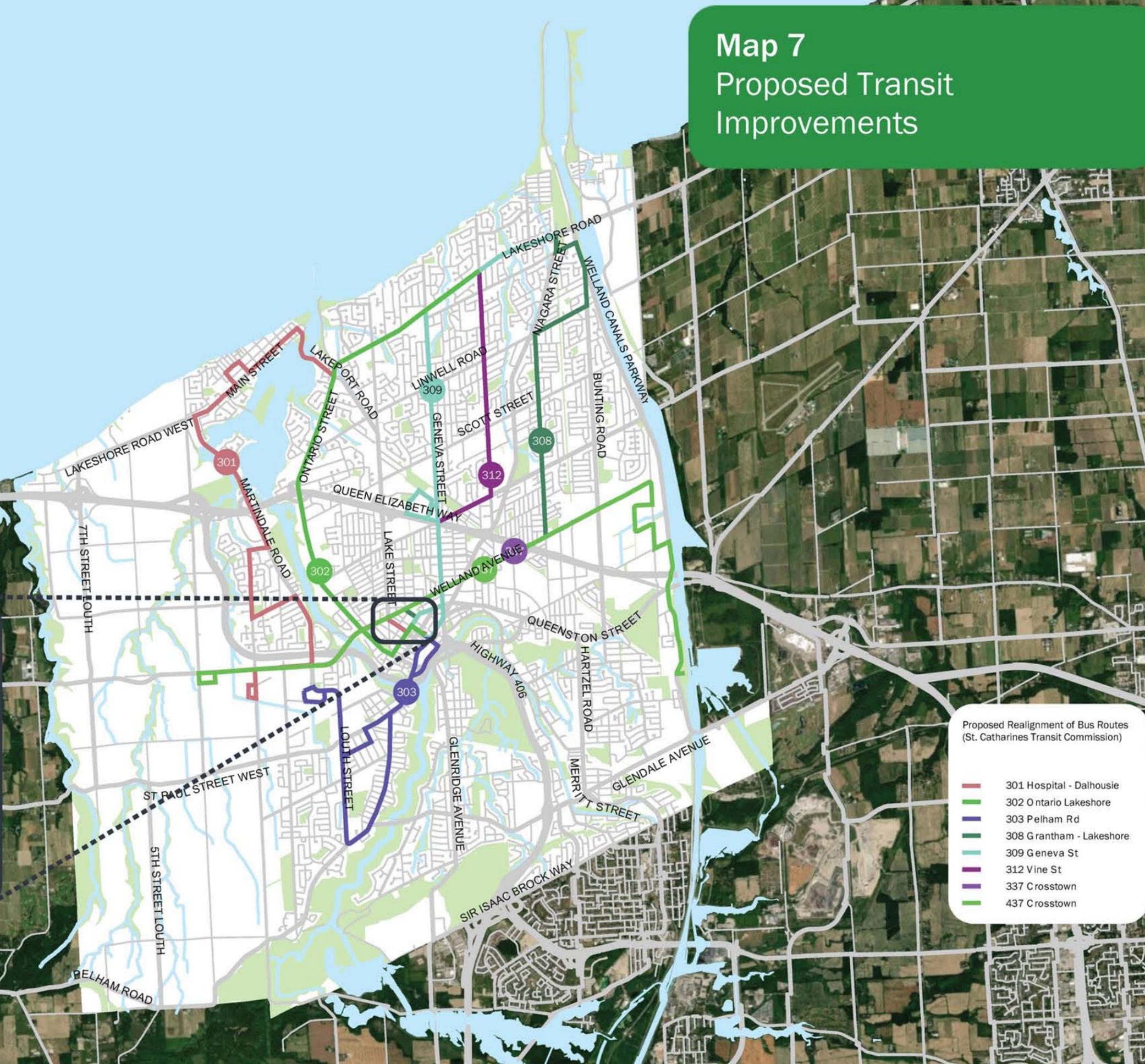
### Ferry Routes Feasibility

The possibility of using ferries to travel across Lake Ontario to destinations like Toronto has been discussed in preliminary stages. Looking to the future, the City should consider cost and time competitiveness and likely passengers (people, cargo, or both). Ferries could serve transportation needs for tourists or commuters. The City should not preclude the establishment of a ferry service and should be an active participant in any discussions to study and possibly implement such service. Ferry terminals will need to be linked to existing transit and active transportation facilities to increase their accessibility and utility.

# Map 7 Proposed Transit Improvements

**Proposed Transit Update**

- Proposed 337/437 Connection to Terminal
- Remove Section of 337/437

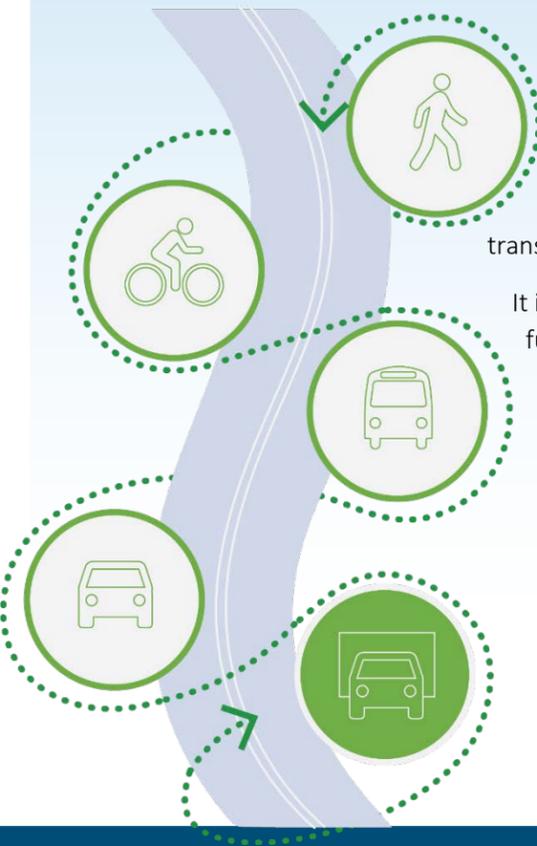


- Proposed Realignment of Bus Routes  
(St. Catharines Transit Commission)
- 301 Hospital - Dalhousie
  - 302 Ontario Lakeshore
  - 303 Pelham Rd
  - 308 Grantham - Lakeshore
  - 309 Geneva St
  - 312 Vine St
  - 337 Crosstown
  - 437 Crosstown

### 3.3.3. Goods Movement

The fundamental goal of goods movement planning in St. Catharines is to make it more efficient. The recommendations are based in policy directives that reflect a holistic approach to goods movement that will guide its integration into the larger transportation network and community.

It is recommended that goods movement be further planned within a comprehensive goods movement strategy.



#### Goals...

- Establish an efficient and sustainable goods movement network for internal and external goods movement trips
- Focus on forward thinking goods movement integration which accounts for the regional and local context

The opportunity for connected and automated trucking was identified within the Niagara Region TMP. These initiatives have the potential to improve road safety by removing human error. Although still early in the development process, the freight and logistics industry is poised to be an early adopter. Niagara Region recommended within their TMP that the Region support this emerging market via testing these vehicles and maintaining the Region’s infrastructure, such as pavement markings and signage, at a level that ensures the effective operation of these vehicles. This support can be continued at the municipal level in St. Catharines.

#### Integrate Goods Movement into Complete Streets

Goods movement should be considered as an element of the overall roadway system, with proper provisions and prohibitions depending on the street context. Each of these provisions would be subject to a confirmation of appropriateness. **Map 8** shows a conceptual goods movement network.

#### Introduce and Plan for Freight-Supportive Land-Uses

Freight-supportive land-uses help to prioritize goods movement routes, avoid modal conflicts, and retain employment uses within the City. Industrial areas could be considered key destinations for trucking and freight movement and should be prioritized for key truck routes. When confirming the appropriateness of different road classifications, careful attention should be given to the land-use characteristics and whether the street will need a higher order of goods movement.

#### Adopt the Niagara to Greater Toronto Area (NGTA) East Supportive Policy

Continue to support the Region in advocating the provincial and federal governments to advance the Niagara-Hamilton Trade Corridor and NGTA East Corridor, providing an efficient trade route connecting Niagara Region to the GTHA and USA. In the shorter term, it is recommended that the City encourage the Region to actively work with MTO for continuing improvements to the QEW and undertake a role and function study for Highway 20 / Regional Road 20 as an alternate provincial route that can accommodate longer-distance and interregional goods movement.

#### Continue Downtown Goods Movement Planning

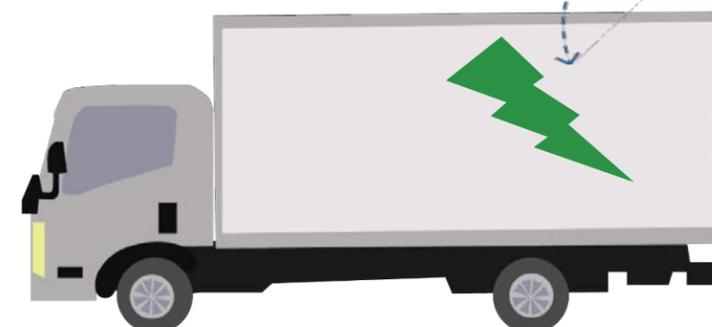
Goods movement is vital to the economic success of the downtown. The St. Catharines Downtown Creative Cluster Master Plan identifies the following policies for goods movement. These policies support the vision of goods movement in St. Catharines and should be upheld within the TMP.

- Eliminate current delivery practices (for example “double parking”) on St. Paul Street;
- Encourage rear access via alleyways and rear roadways or through established off-street parking areas. This will improve safety, traffic circulation and the general aesthetics of the streetscape from both the road user and pedestrian point of view;
- Establish loading zones of sufficient length to allow parallel vehicle access to as large a number of businesses in the area as possible, where curb zones are needed to provide space for the loading and unloading of commercial vehicles (when alleyway and off-street loading areas are inadequate or unavailable, and frequency of loading and unloading operations, and general curb-parking conditions might result in truck double-parking); and
- Install proper signage to enforce restrictions, identify on-street loading zones.

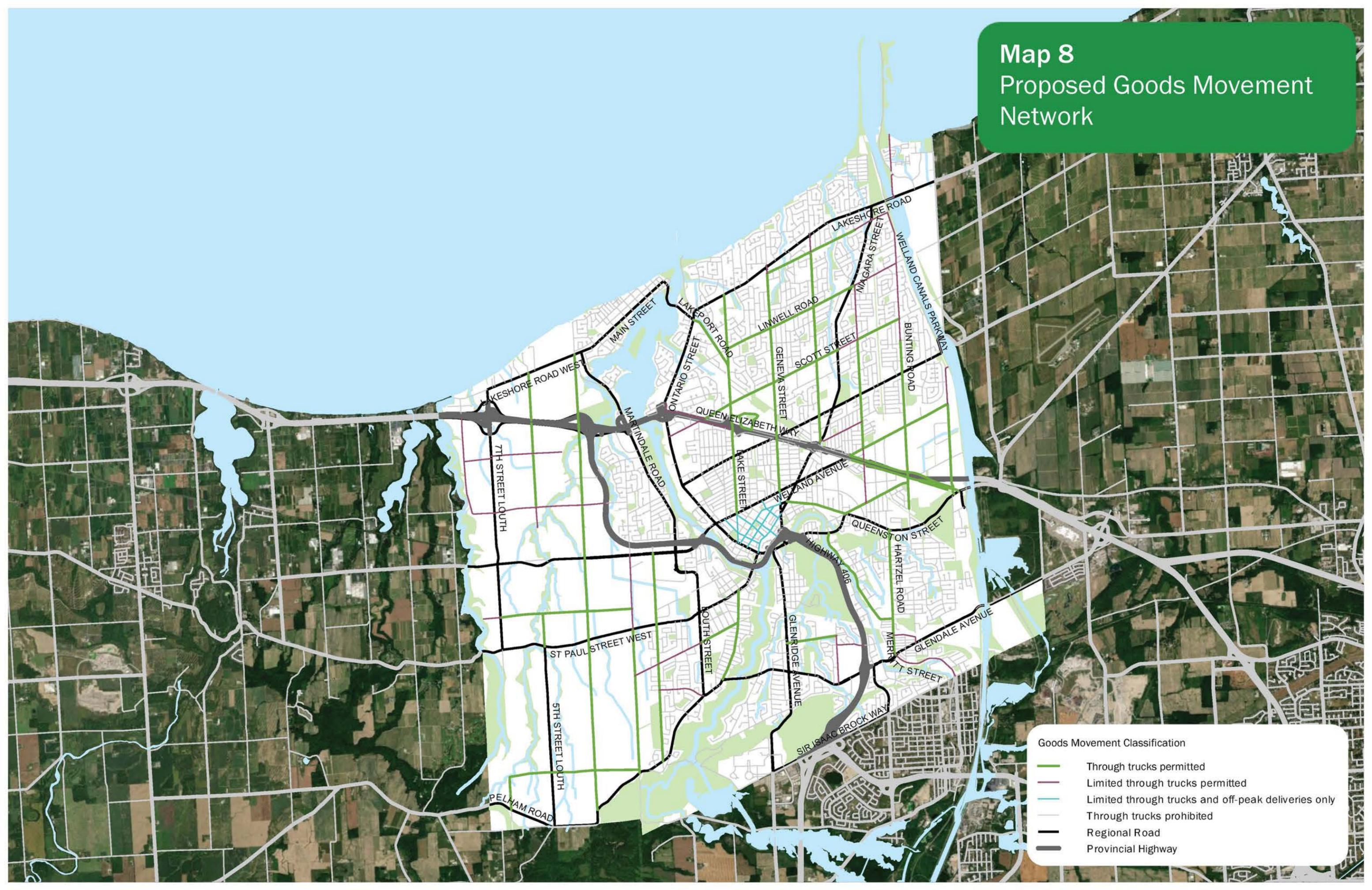
#### Future-Ready Goods Movement

In addition to preparing policies that can support the integration of existing goods movement, the City of St. Catharines is also looking towards the future of goods movement through identifying future trends. It is recommended that each of these areas be further explored in additional research white papers:

- 3D Printing;
- Commercial Drone Delivery;
- Electric Freight Vehicles;
- Cargo Bikes and Small Vehicles;
- Freight on Transit; and
- Autonomous and Connected Trucking.



# Map 8 Proposed Goods Movement Network



**Goods Movement Classification**

- Through trucks permitted
- Limited through trucks permitted
- Limited through trucks and off-peak deliveries only
- Through trucks prohibited
- Regional Road
- Provincial Highway

# 3.4. Improving Transportation Focus Areas

City staff identified seven transportation focus areas for initial review. The locations of these areas are shown on **Map 9**. As part of the initial technical analysis and first round of engagement, stakeholders and members of the public were asked to provide their input on challenges, opportunities for improvement and modes of transportation within each of the areas. Through input and further assessment, five of the seven areas were determined to be led by others and not the City. These five were not carried forward for further study. A more detailed assessment of focus area #5: Fairview Mall Area and #7: Chestnut Street Extension were determined to be City-led initiatives and were carried forward for further analysis. These areas are popular destinations but have identified challenges with multi-modal connectivity due to missing links in the transportation network.

Focus Area #1: Third Street Interchange	Focus Area #2: Martindale Road	Focus Area #3: Twelve Mile Creek Crossing	Focus Area #4: Rail / Road Grade Separation	Focus Area #5: Fairview Mall Area	Focus Area #6: GO Station	Focus Area #7: Chestnut St Extension
<p>The potential new interchange on Highway 406 at Third Avenue Louth would help relieve traffic at the Fourth Avenue interchange.</p> <p>This project would be led by Niagara Region and would need input from the Ministry of Transportation. As it would be led by others, it was not carried forward for a detailed assessment.</p>	<p>Martindale Road is a Regional road and road widening improvements have already been constructed. No additional input is needed from the City.</p>	<p>An assessment of a crossing of Twelve Mile Creek will consider a multi-modal connection, which includes the potential extension of Carlton Street to Martindale Road, both of which are Regional Roads, thereby making it a Region led initiative. An active transportation connection would fall under the City's jurisdiction.</p> <p>The City can support and advocate for such a crossing, which would provide great benefit to pedestrians, cyclists and transit riders, in addition to motor vehicles, as it would provide another crossing of the Creek and help avoid lengthy detours around it. Options should be further evaluated through the upcoming secondary plan study for this area.</p> <p>As a Regional transportation initiative, this project was not seen as a focus of the TMP.</p>	<p>The grade separation of a north/south street and the CN Rail line in the west end of St. Catharines has been previously identified as a potential benefit to facilitate uninterrupted emergency access in the area of the Hospital on Fourth Avenue. As such, the Region of Niagara, in partnership with the City, will be undertaking a Grade Separation Needs Assessment Study to confirm if a separation is required and, if so, on what street (Regional or City) it would be most beneficial and feasible to construct.</p>	<p>There is an opportunity to consider a new multi-modal connection to Scott Street from the Fairview Mall area. This would provide a formal facility for walking and cycling and would enable transit vehicles and other vehicular traffic to or from the north to avoid congested intersections on Lake Street or Geneva Street. Site observations reveal that this connection already is in use as an active transportation connection, as an informal path has been developed where grass has worn away due to pedestrian traffic. St. Catharines Transit has noted the challenges with buses accessing the mall during peak shopping periods and sees the benefit of an additional access option. The additional access for buses could also be made available for automobiles.</p>	<p>As GO Transit increases service to St. Catharines and ridership grows, additional City infrastructure improvements may be considered to enhance connectivity to the station. Improvements in this area are expected to be gradual and encompass a long-term horizon.</p> <p>This initiative would be expected to be led by Niagara Region with input from Metrolinx and participation by the City.</p>	<p>A multi-modal connection could be considered on Chestnut Street, which would improve multi-modal connectivity by potentially serving walking, cycling, transit and vehicle traffic.</p>

**Map 9**  
St. Catharines Transportation Hotspots

A potential new interchange at Highway 406 and Third Avenue Louth

Capacity improvements on Martindale Road

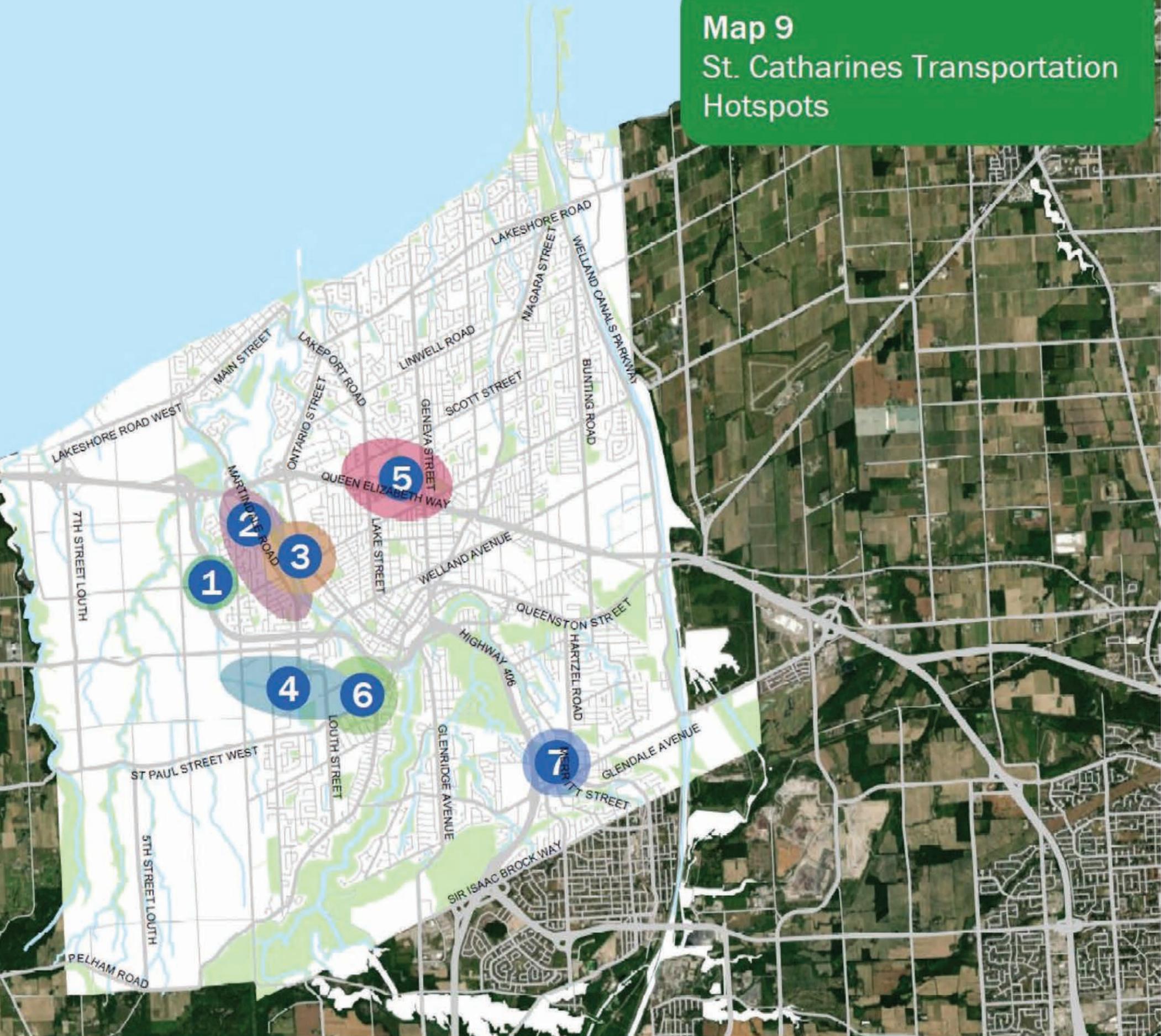
A bridge crossing 12-mile Creek to connect Carlton Street and Grapeview Drive

Potential rail / road grade separations

Access improvements around Fairview Mall with a new connection to Scott Street

Improvements around the GO Train Station

Chestnut Street and Moffat Street extensions around the Pen Centre





## What we heard

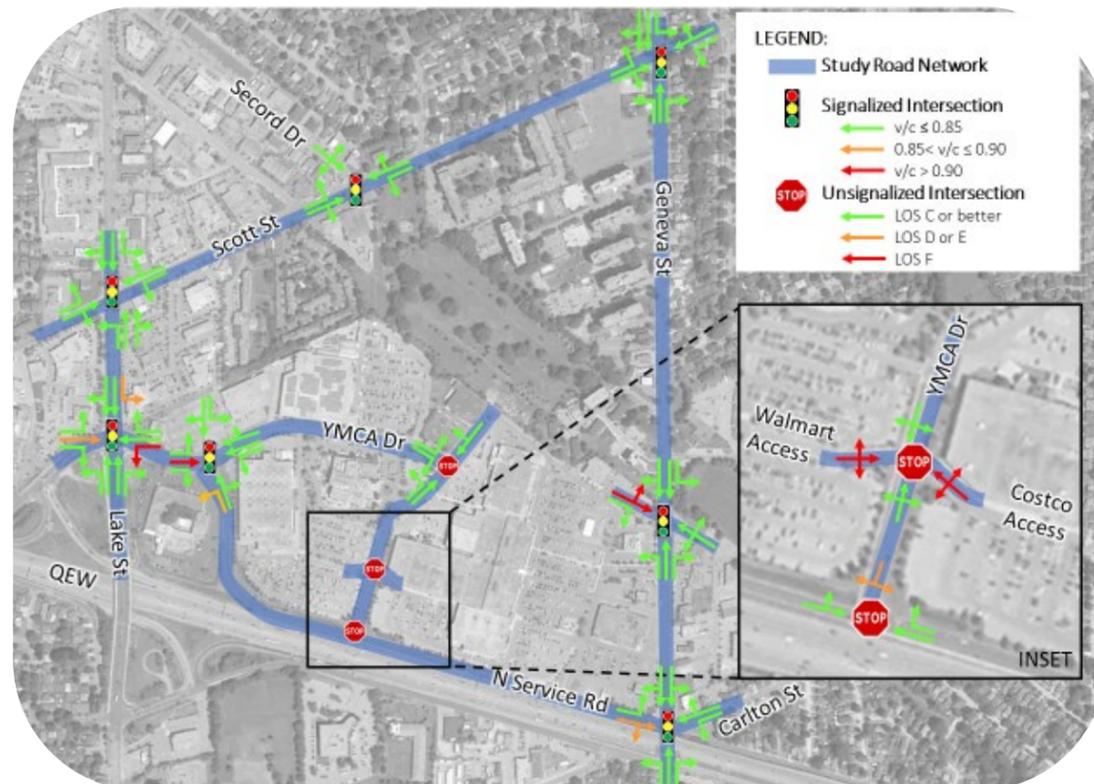
One of the primary concerns heard was the heavy vehicle congestion on YMCA Drive and Geneva Street. Respondents noted that congestion can be attributed to traffic signals and suggested that the City promote continuous flows of traffic through synchronizing signalized intersections, adding designated turn lanes or reducing the number of signalized intersections. St. Catharines Transit Staff mentioned experiencing difficulties maneuvering buses through the parking lot and the road network due to the roadway design and congestion levels, as well as challenges with on-time performance due to vehicle congestion.



## What we saw

During a field observation of the study area, a distinct worn pathway was found through John Page Park from the intersection of Scott Street and Secord Drive to Fairview Mall. The footpath indicates a desire line of travel for pedestrians and/or cyclists.

Figure 23. Traffic analysis for Fairview Mall area

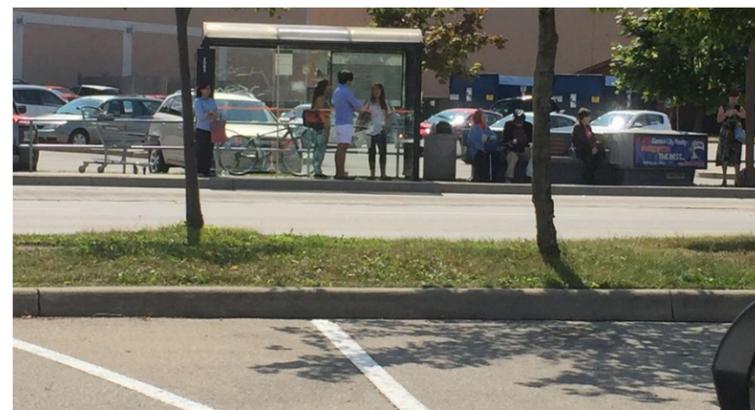


## Traffic Operations Assessment

The traffic analysis was conducted in accordance with Niagara Region Guidelines for Transportation Impact Studies. At signalized intersections, through and / or through-right and / or right-turn movements with a volume-to-capacity (v/c) ratio greater than 0.85 are deemed to be “critical” in terms of operations; dedicated left-turn movements with a v/c ratio greater than 0.90 are deemed to be “critical”. For unsignalized intersections, movements that operate at LOS “D” or worse and / or where the estimated 95th percentile queue length exceeds the available storage length are deemed to be “critical”. Movements that experience a v/c ratio noted as “critical” or greater would be considered for geometric and / or other improvement(s).

The operation of the intersections within the study area was analyzed using the Highway Capacity Manual (HCM) 2000 methodology within the Synchro 10 software. The analysis was completed for the weekday p.m. peak hour (5:00 p.m. – 6:00 p.m.) and Saturday midday peak hour (12:00 p.m. – 1:00 p.m.). Of the two, the Saturday midday peak hour was determined to be more critical; the existing operations are depicted in Figure 23.

The majority of the vehicle turning movements operate within capacity, however a number of critical movements were identified at the Fairview Mall accesses and surrounding intersections. Movements experiencing capacity issues are primarily movements entering and exiting the mall.



## Identified Issues

Traffic volume and congestion experienced by vehicles accessing Fairview Mall impact the operations of the boundary roadways. This congestion causes delays to transit operations within and surrounding Fairview Mall. Optimizing or implementing network improvements which would provide improved level of service and / or an additional connection to the Fairview Mall should be explored.

## Alternatives Analysis

Three scenarios were developed to improve operations within the study area. A new connection to Fairview Mall from Scott Street was reviewed to determine the impact to the network operations. The connection would originate from Secord Drive at Scott Street and finish at YMCA Drive east of the PetSmart. Three scenarios were considered.



Figure 24. Potential Fairview Mall area connection

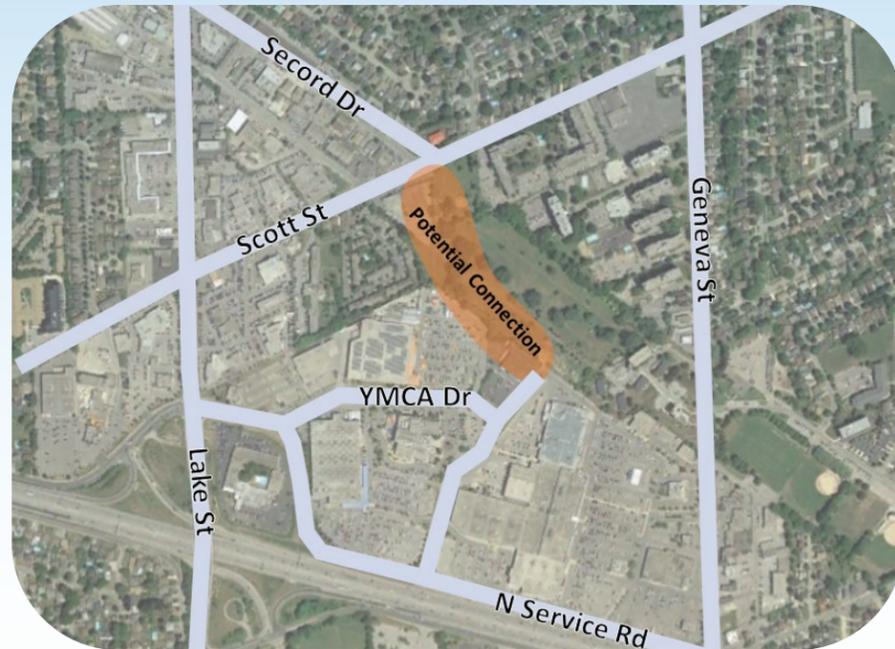
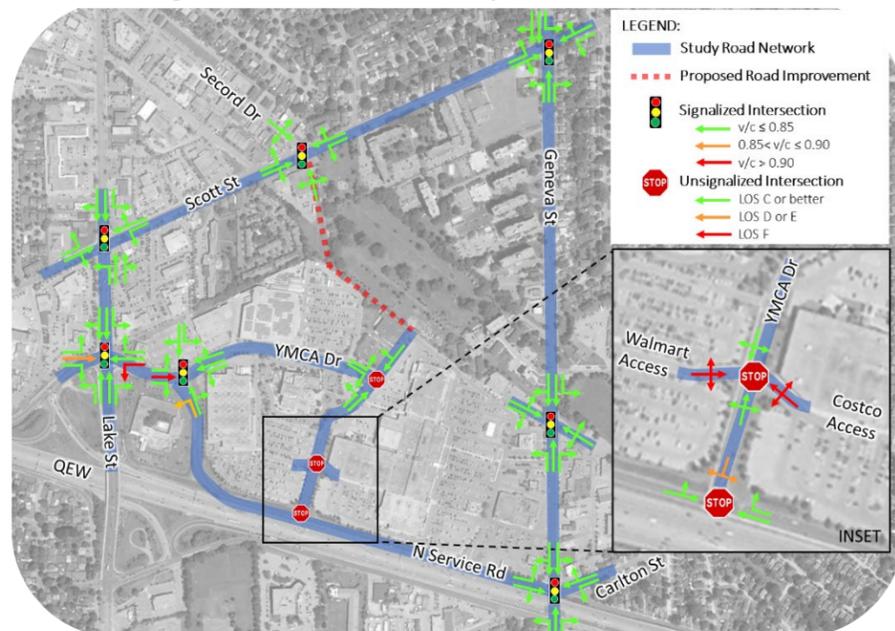


Figure 25. Future traffic analysis for Fairview Mall



### Preferred Alternative

The preferred alternative is Scenario 1 – Active Transportation Link. A formal active transportation link will provide a direct connection for pedestrians and cyclists to/from the north while minimizing the impact on John Page Park. No further study is required to implement the active transportation link

### Scenario 1 – Active Transportation Link

As identified in the field visit, a distinct footpath through John Page Park indicates a desire line for pedestrians and cyclists. Constructing active transportation infrastructure along this link will improve conditions for current users as well as promote active modes of travel within the area. The new link will improve the connectivity of the active transportation network and significantly increase accessibility to the mall for the residential population north of Scott Street. Furthermore, a permanent route could make active transportation a more attractive mode and in turn can help reduce vehicle congestion. In this scenario, the impacts to the natural features of John Page Park are limited while safety and comfort for active transportation users are increased.

### Scenario 2 – Transit and Active Transportation Link

Currently, the Fairview transit hub is located at the mall and allows connections between various bus services, including St. Catharines Transit Commission, Niagara Region Transit, and GO Transit. By providing a dedicated transit access to the Fairview transit hub from Scott Street, it will allow transit vehicles to by-pass the congestion along Lake Street, YMCA Drive, Geneva Street and North Service Road and possibly realign routes to remove the need to travel through the Fairview Mall parking lot. The new transit roadway link can help buses maintain their schedules and improve transit service.

However, additional resources may be required by the City to maintain the transit only access. Signage will be required as well as enforcement personnel on site to ensure only transit vehicles are using the new access. As discussed in Scenario 1, the addition of active transportation facilities along this proposed roadway will provide an added benefit for pedestrians and cyclists as well as help reduce vehicle congestion.

### Scenario 3 – Full Access Link

The last scenario tested was a full access link to include active transportation, transit and private vehicles. To assess the impact of the new roadway link for vehicle traffic, a Synchro analysis was conducted to compare existing conditions with projected future conditions. In order to project future conditions, a growth rate was applied to the existing midblock (average annual daily traffic volumes) and intersection (turning movement volumes) traffic counts. The projected volumes were assigned to the roadway network which included the new roadway link.

The weekday p.m. peak hour (5:00 p.m. – 6:00 p.m.) and the Saturday midday peak hour (12:00 p.m. – 1:00 p.m.) were analyzed under future conditions, with the Saturday results illustrated in Figure 25. Even with the projected growth, optimizing the signal timings along with the new connection provided an overall operational improvement.

The redistributed traffic due to the new roadway link helped to alleviate some congestion at previously critical movements. In existing conditions, the eastbound through-left movement at the Fairview Mall access to Geneva Street operates at a v/c greater than 0.90. With the proposed Scott Street connection, northbound vehicles have a second option to exit the mall, which will help improve operations at the Fairview Mall access to Geneva Street. Similarly, the southbound left movement at Lake Street and YMCA Drive improved to a v/c less than 0.85. The addition of transit and active transportation facilities along the proposed roadway will benefit all modes of transportation. The overall improvement in traffic operations will help Transit maintain their schedules. Allowing both transit and vehicle traffic will avoid the need for the City to invest in additional resources to enforce a transit-only access.





## What we heard

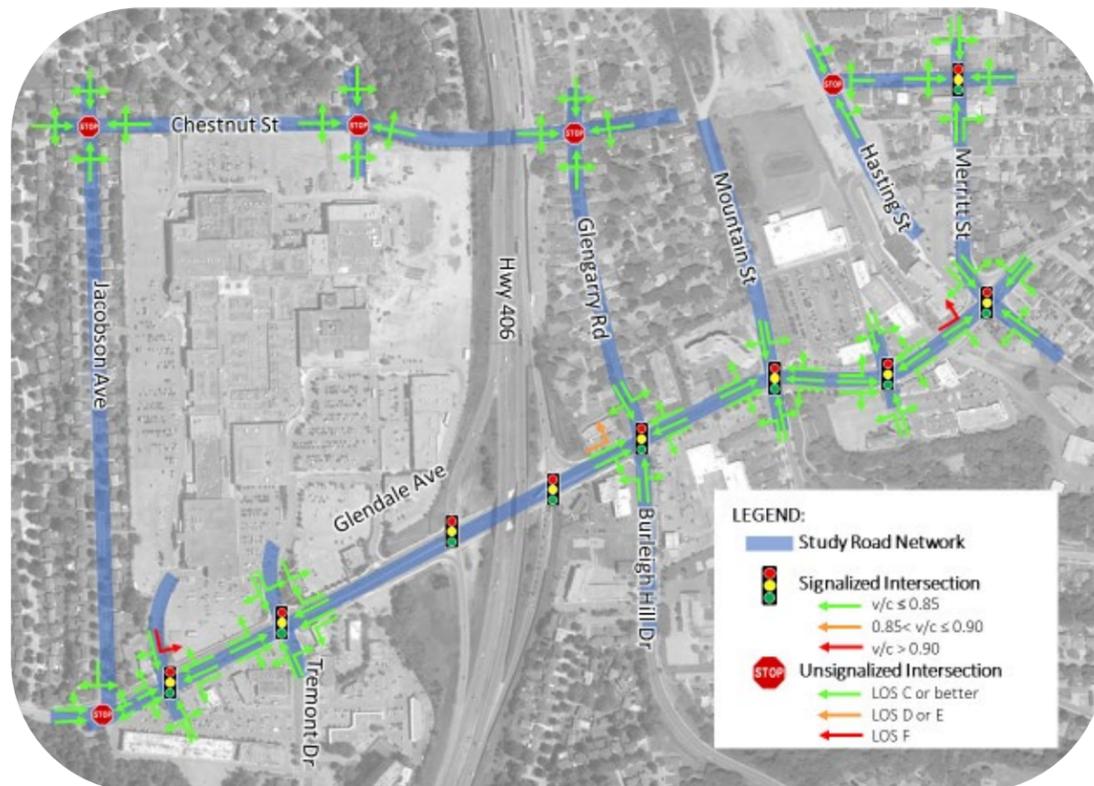
The Chestnut Street Extension area currently experiences connectivity challenges with Highway 406 acting as a barrier to east-west travel in this part of the city. Public comments noted heavy traffic volumes on Glendale Avenue and difficulties turning onto Glendale Avenue from surrounding plazas due to insufficient distance between traffic lights. This area was also noted by transit staff to be very busy with constant construction activities reducing roadway capacity and introducing lengthy detours. The focus area is a very busy area with minimal opportunity for additional transportation connectivity.



## What we saw

During a field observation of the study area, queuing and driver frustration were a common across Glendale Avenue. The intersection of Glendale Avenue and Merritt Street was of noted concern, specifically the eastbound left turn from Glendale Avenue to Merritt Street north. The missing link on Chestnut Street is a short, straight connection through City-owned land that would enhance multi-modal connectivity in this neighbourhood.

Figure 26. Traffic analysis for Chestnut Street Extension area



## Traffic Operations Assessment

Similar to Fairview Mall, intersection operations were analyzed utilizing the HCM 2000 methodology within the Synchro 10 software and following the Region's Guidelines for Transportation Impact Studies. The weekday p.m. peak hour (5:00 p.m. – 6:00 p.m.) and Saturday midday peak hour (12:00 p.m. – 1:00 p.m.) were analyzed.

As shown on **Figure 26**, the majority of the vehicle turning movements operate within capacity, however a few critical movements were identified along Glendale Avenue. Turning movements experiencing capacity issues are primarily left turn movements at major intersections and at the accesses exiting the mall.



## Identified Issues

Traffic volume and congestion experienced by vehicles in this focus area impact the operations of the boundary roadways. This congestion causes delays at the Merritt Street and Glendale Avenue intersection. Optimizing or implementing network improvements which would provide improved level of service and/or an additional connection to the to the focus area should be explored.

## Alternatives Analysis

Based on what we saw and heard, three scenarios were developed to improve operations within the study area. A new connection through the extension of Chestnut Street was reviewed to determine the impact to the network operations. The connection would link Chestnut Street to Merritt Street.

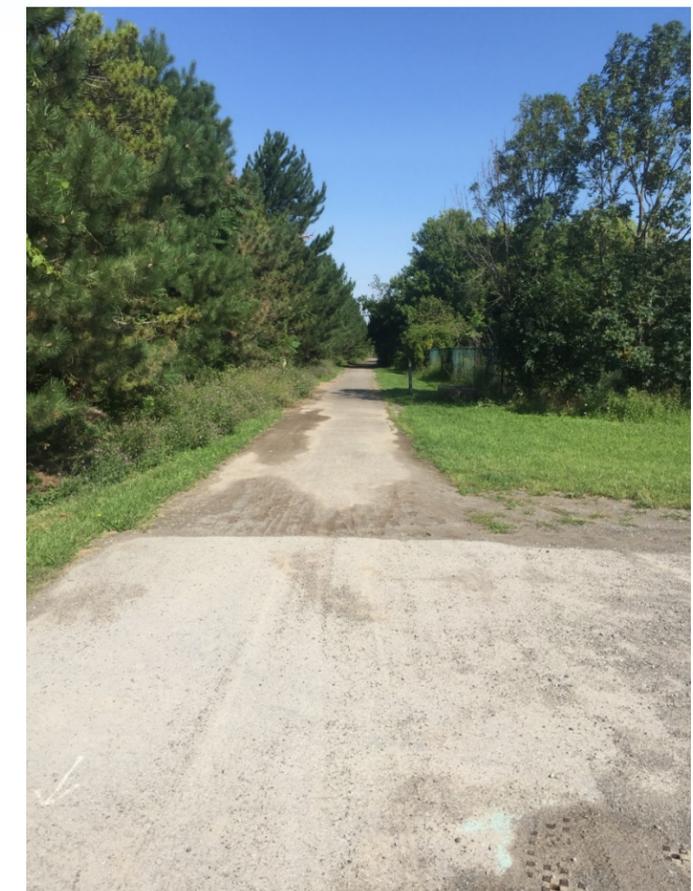


Figure 27. Potential Chestnut Street connection

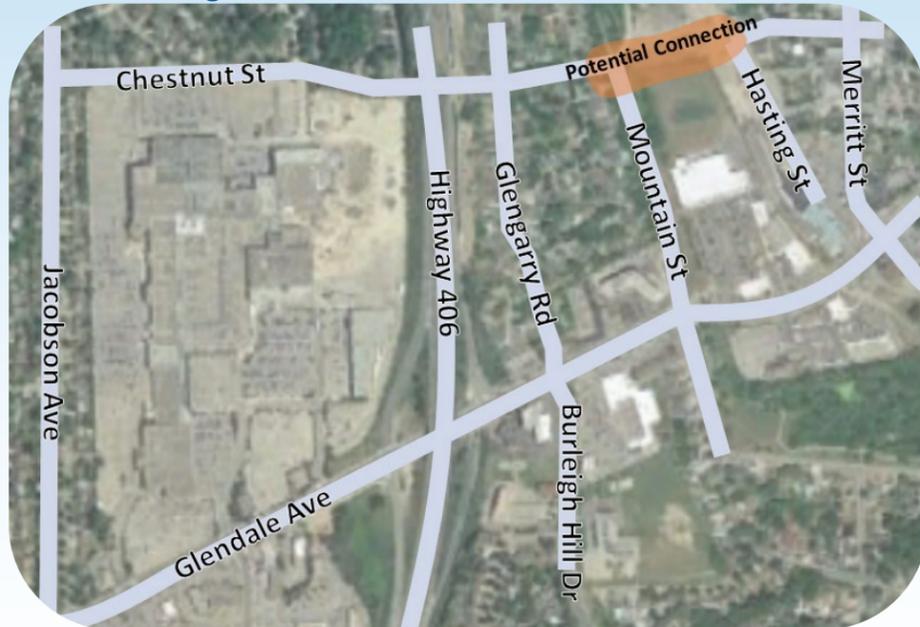
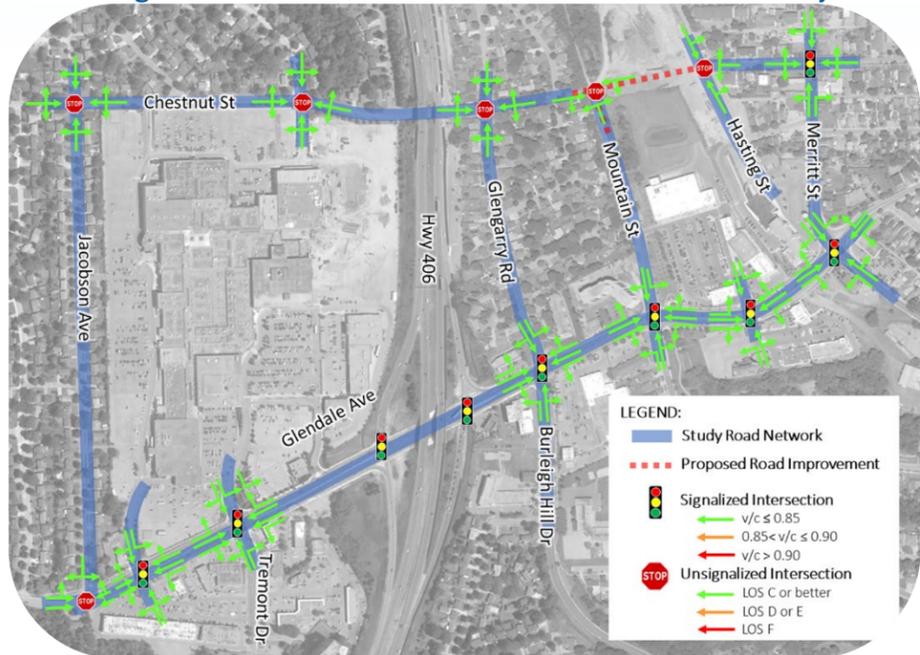


Figure 28. Chestnut Street Extension future conditions analysis



### Preferred Alternative

The preferred alternative is Scenario 3 – Full Access Link. A full access road extension of Chestnut Street from Mountain Street to Hasting Street, and the connection of Mountain Street to Chestnut Street is expected to improve traffic operations and network connectivity for all modes of travel. Further study is required to confirm the need and determine the alignment of the proposed roadway link.



### Scenario 1 – Active Transportation Link

Constructing an active transportation facility along the proposed Chestnut Street extension will improve the connectivity of the active transportation network in the area. Furthermore, the extension provides pedestrians and cyclists a safer east-west route alternative to Glendale Avenue, which is an arterial roadway with high vehicle traffic volumes.



### Scenario 2 – Transit and Active Transportation Link

By providing transit an additional east-west route alternative, transit vehicles can by-pass congestion on Glendale Avenue during peak periods. The new transit roadway link can help buses maintain their schedules. However, additional resources may be required by the City to enforce this transit only access. Signage will be required as well as enforcement personnel to ensure other vehicles do not use the new transit roadway.



The addition of active transportation facilities along this proposed roadway will provide the added benefit for pedestrians and cyclists as well as help reduce vehicle congestion.



### Scenario 3 – Full Access Link

The last scenario tested was a full access link to include active transportation, transit and private vehicles. To assess the impact of the new roadway link for vehicle traffic, a Synchro analysis was conducted to compare existing conditions with projected future conditions. In order to project future conditions, a growth rate was applied to the existing midblock (average annual daily traffic volumes) and intersection (turning movement volumes) traffic counts. The projected volumes were assigned to the roadway network which included the new roadway link.

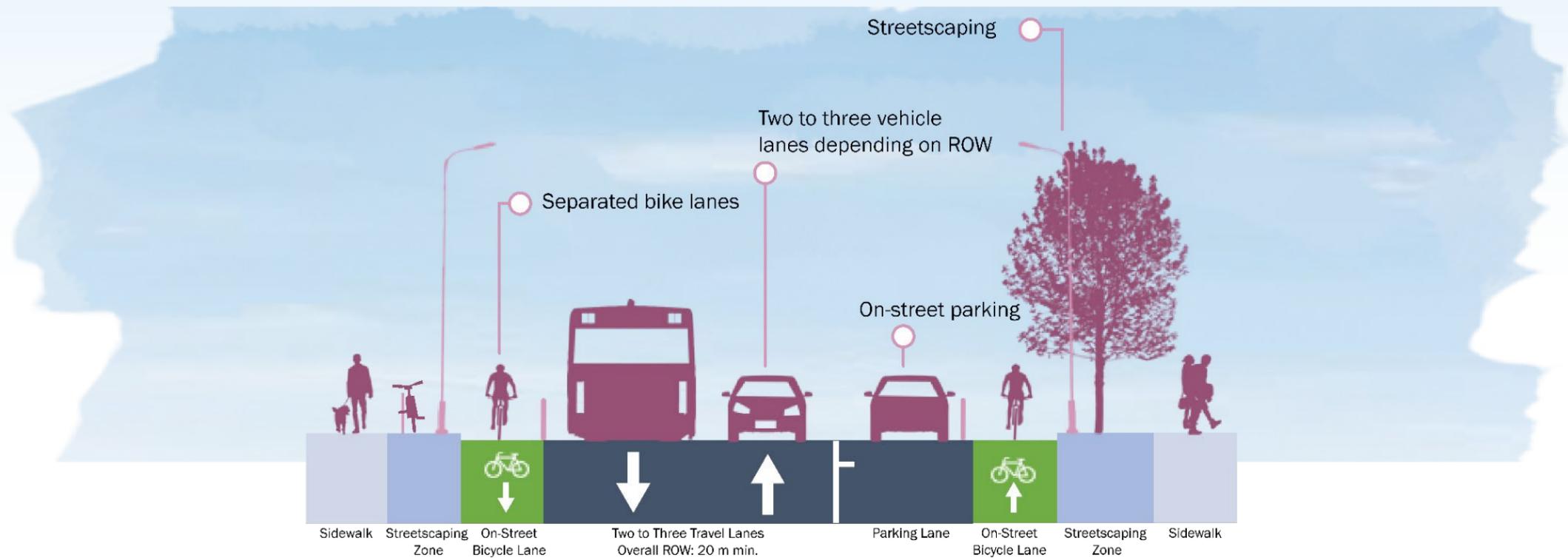


The weekday p.m. peak hour (5:00 p.m. – 6:00 p.m.) and the Saturday midday peak hour (12:00 p.m. – 1:00 p.m.) were analyzed under future conditions. Even with the projected growth, optimizing the signal timings along with the new connection resulted in all movements operating within capacity, as shown on Figure 28 Figure 26.

# Reclassifying the Chestnut Street Extension...

The Chestnut Street connection is recommended to be classified as a Collector Mixed-Use Corridor. The complete street elements that could be considered for the Chestnut Street extension include:

- Sidewalks on both sides of the street;
- Where possible, consideration for the inclusion of a multi-use pathway in place of a sidewalk and on-road cycling facility. If route provides access to a major trail a multi-use trail may be considered;
- Where the ROW permits, preferred shared or designated cycling facility including bicycle lane, buffered bicycle land or advisory bike lane. For shared facilities additional signage may be considered to enhance awareness;
- Pedestrian crossings at signalized intersections or unsignalized intersections in accordance with OTM Book 15;
- Considerations for cycling amenities as well as wayfinding and signage to guide / encourage use;
- Transit in mixed traffic;
- Accessible concrete pads at transit stops;
- On-street transit stops;
- On-street parking where appropriate;
- Emphasis on enhanced streetscaping including street furniture, lighting, street trees and shrubbery;
- Limited through trucks; and
- Local delivery allowed.



# 3.5. Creating A Sustainable & Resilient City

This TMP recognizes that transportation planning is a dynamic exercise that needs to be flexible and adaptable to future trends. The complete streets process as well as the mode specific recommendations outlined within Chapter 3.0 were developed with the intent of establishing and supporting a sustainable and resilient future for the City of St. Catharines that accounts for:

- Environmental Trends;
- Community Trends;
- Social Trends;
- Economic Trends; and
- Technology Trends.

The premise of resilience is reinforced by the City's Official Plan and other City and Regional documents. A long-range TMP should effectively address the existing conditions and the anticipated future. This section provides an overview of some of these critical considerations and how the City can address them.



# Chapter 3.0 | Transportation Tomorrow

Sustainable and resilient planning decisions can be informed by several key trends within the St. Catharines context. Research shows that resiliency can be developed through a multi-faceted community focused approach which focuses on the health of five key indicators.



A resilient transportation system is no different; however, the directives should, where possible, be implementable, trackable and ambitious. There are six directives that have been identified that have been shaped by learnings from the transportation master planning process. The directives, as well as the applicable indicators, are illustrated below.

1. Adopt new approaches to transportation planning that reflect the people first hierarchy outlined within the TMP. 
2. Plan for inclusive transportation infrastructure that accounts for the abilities of an aging population. 
3. Support new technology advancements that can reduce environmental impacts of the transportation system. 
4. Support new technology advancements that can increase the social equity and accessibility travel modes. 
5. Plan for new infrastructure and modes that will support an on-demand economy. 
6. Acknowledge the relationship between land-use and transportation by supporting infrastructure that connects communities sustainably and enhances an accessible and inclusive public realm. 

Suggested approaches to achieve a sustainable and resilient planning process and City are identified on the following pages to support the six directives identified for the City.

## New Mobility

**Ride-sharing platforms**, such as Uber and Lyft, offer transportation services operated by private vehicle owners. These services are accessed through smart phone and mobile applications that allow users to request pick-up and drop-off locations. In many jurisdictions, the carpool feature allows multiple passengers traveling in similar directions to ride in a single, dynamically routed vehicle providing a service that is considerably more cost competitive than a taxi, though usually less cost competitive than transit.

**Electric vehicles** are motor vehicles with electric engines instead of traditional combustion engines. These vehicles do not generate point source emissions and make a positive contribution toward reducing transportation emissions. These vehicles, however, require charging infrastructure, and the provision of public charging locations can encourage more motorists to consider switching to this technology.

**Autonomous vehicles (AVs)** use advanced sensors and artificial intelligence to perform all driving-related tasks. This technology is under development and it is not clear when it will be widely deployed. When they are introduced on a wide-scale, it is expected that AVs will improve road safety, reduce the cost of ride-sharing and enable more flexible use of time for drivers. The potential to reduce the need for vehicle ownership, reduced parking demand and greater opportunities for shared parking are among the important implications of this technology for cities like St. Catharines.

**Micro-transit** as defined by Metrolinx, “refers to on-demand, dynamically-routed transit services typically using smaller vehicles (such as vans) than conventional buses, supported by an online application.” Examples include Chariot, which operates in several U.S. cities, and ride-share services such as UberPool, UberPool Express and LyftLine which operate in the City of Toronto and surrounding municipalities.



These companies offer a service that is generally considered to be more convenient than conventional transit and usually less expensive than a taxi. In low density areas with limited transit service, micro-transit has the potential to significantly improve mobility options for individuals who do not own a vehicle and may be a more cost-effective approach to providing conventional transit. Some municipalities, such as Innisfil, Ontario, have chosen to subsidize private micro-transit operators in specific areas. Micro-transit can also complement existing transit, particularly regional services, by making it easier for individuals to reach key terminals. In areas with moderate or extensive conventional transit service, private micro-transit operators can have the opposite effect. This complex relationship between micro-transit and conventional transit means that an effective regulatory environment is key to leveraging its potential benefits.

**Micromobility** includes all small human and electric powered mobility options such as e-bikes, e-scooters, hoverboards and segways. Specifically, e-bikes and e-scooters represent an important emerging sector of micromobility, especially when combined with shared mobility systems. Throughout the US, shared e-scooter and e-bike systems have introduced new means of travel and have displayed significant opportunity to address existing transportation gaps, such as the first and last mile transit dilemma.

- **E-bikes** include both bicycle-style e-bikes, which resemble traditional bicycles and scooter-style e-bikes, which resemble mopeds, but have functional pedals the rider can use to propel themselves. These different models have varying characteristics and capabilities, including their motor functioning, power and weight. Currently e-bike are regulated provincially as power-assisted bicycles and can travel up to 32km/h.
- **E-scooters** resemble traditional kick-scooters but are equipped with small electric motors. Effective January 1, 2020, the Province of Ontario has initiated a new pilot to evaluate the use and operation of e-scooters. E-scooters are permitted as part of this pilot on bicycle lanes. Where the highway is located in a tunnel or underpass, e-scooters may be operated on a sidewalk, except where prohibited by municipal by-law.



## Tactile Urbanism

Tactile Urbanism refers to temporary installments that reimagine existing physical infrastructure to enhance the public realm. This can include on-street-patios and public art installations in on-street parking spots, reuse of surface parking lots for events and festivals, and pedestrian-only street days.

As transportation options and the existing modal-split evolve, the impact will likely also affect the built form by redefining the needs of existing parking supply.



# Safe Systems Approach

Road safety is integral to the functionality, usability and enjoyment of the overall transportation system. Deaths or serious injuries shouldn't be considered acceptable consequences of mobility. The contemporary Vision Zero / Safe Systems perspective of road safety encourages the long-term goal of eliminating road traffic deaths and serious injuries. The Vision Zero and Safe Systems Approach can work alongside the complete streets mentality to promote safety for all road users, focusing on vulnerable road users (both in modes and demographics). Generally, Vision Zero is implemented through Road Safety Action plans that guide interim road safety goals and mitigation measures. Vision Zero envisions these goals and outcomes as a shared responsibility between road users and system designers such as traffic engineers, transportation planners, land-use planners, public health professionals, police enforcement and emergency response teams. Through a mix of collaborative efforts, safe infrastructure design and policies (which account for human error and vulnerability), key directives for a Vision Zero are proposed:

- Focus in KSI (Killed-and-Serious-Injury) collision analysis;
- Design a road system that accounts for human error and vulnerability;
- Implement the safe system approach, which considers the multiple influences of road safety; and
- Understand road safety as a shared responsibility between system designers and users.

The proposed evidence-based and collaborative action items for road safety seek to enhance St. Catharines mobility systems towards a safer, healthier and more resilient future. Adopting Vision Zero requires a long, mid and short-term understanding of road safety, so that interventions that reduce (and eventually eliminate) road traffic deaths and serious injuries can be appropriately monitored and evaluated. Adaptable interventions are a key element to the longevity of Vision Zero plans. The Vision Zero Road Safety Action Plan should be contextual, flexible and contain achievable steps that will impact change in road safety.

The following summary of planning initiatives are opportunities for the City to consider in order to achieve the five key indicators for a sustainable and resilient city.



<b>New Mobility</b>					
Review zoning bylaw parking requirements and consider where it may be appropriate to reduce parking minimums due to potentially lower demand over the full building lifecycle; identify strategies to reduce parking demand in the interim on case- by- case basis.			✓	✓	
Implement electric charging infrastructure at public parking lots / garages for electric vehicles					✓
Consider ways that new mobility can be facilitated through design incorporation for any major construction investments.			✓	✓	
Provide as much separated cycling infrastructure on major streets as possible to mitigate future conflict between cyclists and AVs.	✓	✓	✓		
Identify areas of the City where there is an unmet need for better transit service and explore opportunities for a coordinated program with Niagara Region and a ride share provider to improve mobility options				✓	
Create a regulatory environment together with Niagara Region that integrates micro-transit and ride-sharing services in a manner that complements			✓	✓	✓
Draft a municipal by-law that defines the differences between the two e-bike typology and defines infrastructure permissions for each type.			✓	✓	✓
Undertake an e-scooter or e-bike share pilot project.	✓		✓		✓
Undertake an AVs pilot project.	✓		✓		✓
<b>Tactile Urbanism</b>					
Continue piloting pedestrian street programming such as “Open Streets St. Catharines”	✓	✓	✓		
Pilot artist partnerships with local artists and craftsmen to create new public art		✓	✓		
<b>Safe Systems Approach</b>					
Concurrently create a database of KSI collision analysis and a St. Catharines Road Safety Action Plan. Providing evidence-based collision analysis is fundamental to the informed development of Road Safety Action Plans.	✓	✓	✓		
Continue to participate in a road safety committee with the Niagara Region and local area Municipalities.	✓	✓	✓		
Coordinate efforts with Niagara Region to strengthen programs and continue to align objectives and data-collections methods.	✓	✓	✓		

**CHAPTER**

**4**

**Implementing  
the TMP**



**Chapter 4.0** sets out the plan for how the recommendations of the TMP can be implemented in policies, programming and projects. Policies are the foundation of any long-lasting changes to the planning process. The momentum of this master plan needs to be continued through ongoing funding and prioritization of education, encouragement and evaluation of complete streets initiatives.

Chapter 4.0 is meant to provide staff, decision makers and stakeholders with a clear understanding of what needs to be done to implement the TMP and provides supportive tools to be able to do so on an annual basis.

## Chapter 4.0 includes...

4.1

### Municipal Policies

Provides a breakdown of complete street policies that can be adopted into municipal policies and guidelines to support achieving the complete streets vision in St. Catharines.

4.2

### Timeline & Strategy

Provides a breakdown of recommendation phasing for complete streets and each of the modal considerations, including the tools intended to support the implementation of the TMP.

4.3

### Next Steps & Costing

Provides an overview of the financial resources needed to implement the recommendations of the TMP as well as suggested next steps.

# 4.1.

# Municipal

# Policies

Policies guide and inform infrastructure investment as well as the planning and design of the built environment including transportation.

To facilitate a stronger complete streets foundation within the existing policy structure, there should be a standardized process of designing, constructing and maintaining the street network to ensure that it accommodates all modes of travel and all types of users. If effectively integrated, the process can help to channel decisions and public investment to make streets more equitable by balancing infrastructure for the needs of different modes of travel. Complete streets policies are found throughout this TMP.

To help shape the complete streets policies for the City of St. Catharines, research and resources from the Complete Streets for Canada and National Complete Streets Coalition (NCSC) were reviewed. Both organizations define ten common elements that should be addressed when developing complete streets policies to lay the foundation for successful outcomes. These ten elements are presented on the following page.

## Embodies Community Vision



States St. Catharines' community vision and intent of how and why complete streets elements will be implemented.

## Defines All Users & Modes



Gives equal consideration to different users regardless of age or ability, especially those who walk, cycle and ride transit.

## Applies to New & Retrofit



Recognizes opportunities of application to new and retrofit transportation projects as well as existing maintenance operations.

## Identifies Exceptions



Accounts for any appropriate exemptions due to legislative, topographical, technical, cost-benefit limitations or others.

## Encourages Connectivity



Promotes continuous integration and connectivity throughout St. Catharines' street network and between modes.

## Adaptable by Agencies



Conveys an approach that can be adoptable and understood by all City departments and / or agencies that may be involved in the process.

## Utilizes Current Design Guides



Utilizes existing work in complete streets undertaken by the Region and other complete streets best practices.

## Acknowledges Context



Recognizes that solutions will be context-sensitive to St. Catharines' different urban, suburban and rural environments.

## Defines Performance Standards



Establishes qualitative or quantitative performance indicators in order to evaluate and monitor policy impacts over time.

## Proposes Implementation Steps



Lists specific steps for an implementation strategy according to a set time scope.

The following section introduces model policies that when adopted in the appropriate planning documents, could help to create a municipal planning process where complete streets are fundamentally considered at the forefront of planning decisions. During the next Official Plan update, it is recommended that the following policies be considered, or that policies be added to the existing Official Plan through the amendment process. In addition, some of the proposed policies would be most appropriate for design guidelines, by-laws or site plan control. The policy categories are explained followed by a matrix of the model policies and how they should be adopted in the applicable planning policy, master plan or control tools.

## Applicability of Complete Streets Policies

Understanding the applicability of this complete streets guidance is crucially important in implementation and internal municipal discussions. The City will look to “complete the street” in all its road works on City-owned transportation facilities and public right-of-way. The implementation and maintenance of Complete Streets should be achieved via both new road construction projects and repair, retrofit or rehabilitation projects.

## Context Sensitivity and Exception Mechanism

Any complete streets project needs to reflect the existing transportation network, community values and land-use. While the City is committed to promoting a complete streets approach, it also acknowledges circumstances that may hinder its full applicability.

## Integration and Connectivity of All Modes

A key element of complete streets planning is ensuring the multiple road network modes work conjunctly together. This consideration is already supported in the Official Plan and the shift towards sustainable and integrated mobility should be expanded through the policies for the TMP.

## Streetscaping and Wayfinding

Improving the public space and cultural vitality of St. Catharines streets is already a recognized priority within the Official Plan. Streetscaping and wayfinding make the street more user friendly for multiple modes of travel. Metrolinx has developed a Regional Wayfinding Standard that discusses and encourages the coordination between local and regional municipalities.

## Economic Development

Implementing complete streets will drive broader economic outputs, including increased employment, higher property values and attraction of new businesses. This will go alongside the City’s Economic Development Strategy to find new and innovative technological opportunities for St. Catharines to emerge in the mobility sector.

## Art and Culture

Beyond just streetscaping, the relationship between street-life and art should be fostered to better support community activity. The Niagara Region Complete Streets Model Policy Handbook states that public art is a reflection of the history and true culture of an area and that integrating public art in developments, streetscaping or parks has the ability to stimulate the interest of locals and tourists alike.

## Utility Infrastructure

The utility infrastructure that is built on the street has an equal impact to the overall experience of the place. Niagara Region’s Model Urban Design Guidelines provide guidance on how utilities can be managed to better align to the complete streets framework.

## On-Street Parking

Complete streets require balance. Niagara Region identified a concern for on-street parking provisions detracting from other streetscaping and complete streets interventions. At the same time, on-street parking can act as a natural traffic calming method and support the complete streets policy.

## Land-Uses

The relationship between the street and land-use is interdependent; the changes to the land-use will affect the street and vice-versa. Policy recommendations can be adopted into planning documents and design guidelines to ensure that complete streets interventions are cognizant of the surrounding land-use.

## Accessibility

Complete streets are designed for all road users, including those with physical disadvantages or those who are otherwise less-able.

# Complete Street Policy Considerations...

	Official Plan	Functional Master Plan	Downtown Urban Design Guidelines	Future St. Catharines Design Guidelines	Municipal By-law	Site Plan Control
<b>Applicability</b>						
Any complete street implementation will be subject to internal and cross-departmental collaboration, including: Public Works, Planning and Economic Development and Recreation.	✓					Supported within the TMP Implementation Strategy
Any complete streets work will be considered with Regional Complete Streets implementation.	✓					Supported within the TMP Implementation Strategy
<b>Context Sensitivity</b>						
<b>Complete Street Initiatives</b>						
Will accommodate safe and attractive pedestrian and cyclist travel in a “context sensitive” manner taking into account the capacity and speed of the road (sidewalks and bike facilities on higher speed and volume arterials should be buffered from motorists).	✓					Supported within the TMP,
Reflect the context and character of the surrounding built and natural environments, and enhance the appearance and operations of the built environment and street without significant impact to surrounding Natural Heritage Features.	✓					Confirmation of appropriateness for Complete Streets Process
Be developed in context to not only the existing transportation conditions, but also the future transportation trends as to be prepared for potential shifts in transportation modes and preferences.	✓					
Consider the land-use context (rural, suburban or urban).	✓					
<b>Exception Mechanisms</b>						
The project demonstrates that benefits or expected use shows considerable discrepancies with the cost of construction; or the project exhibits topographical limitations where it is not technically feasible or where supporting more than one mode of transport is not warranted given the potential hazard to users.	✓					Supported within the TMP,
The nature of the road class legally prohibits the placement of infrastructure for non-motorized users.	✓					Confirmation of appropriateness for Complete Streets Process
A reasonable and / or equivalent transportation alternative in the corridor or neighbourhood already exists or is programmed as part of a separate project.	✓					
The project’s proposed geometry or facility affects any routine maintenance operations such as for mowing, sweeping, spot repair or surface treatments; and / or accessibility of emergency or service vehicles.	✓					
<b>Integration &amp; Connectivity of All Modes</b>						
Complete Streets should support the connectivity and integration of modes throughout the City’s local road network. Whenever possible, connectivity and integrations should be facilitated.	✓					Supported within the TMP

	Official Plan	Functional Master Plan	Downtown Urban Design Guidelines	Future St. Catharines Design Guidelines	Municipal By-law	Site Plan Control
Infrastructure at end-of-trip facilities or locations where multiple travel modes converge should be implemented. These include park/kiss-and-ride facilities at major travel nodes, secure bicycle parking at key travel nodes or public amenities (libraries, community centres, sports complexes) and bicycle facilities such as bike racks/parking for customers, or showers for employees who commute in that mode.	✓	Promoting complete streets behaviour change				
A continuous sidewalk network.	✓	Road classification				
A continuous on and off-road bicycle or multi-use trail network to support utility or recreational trips. The networks should connect natural areas and popular destination points such as schools, shopping centres, sports complexes, offices, and other amenities. Given the St. Catharines' context, which often has narrow or varying rights-of-way, shared facilities, such as sharrows, are encouraged whenever dedicated facilities are infeasible.	✓	Road Classification, AT improvements and Active Transportation Plan (ATP)				
Infrastructure and programming supporting the mobility and accessibility needs of all users (especially for pedestrians and people with disabilities), particularly at public transit facilities (bus stops, shelters, stations) and their respective crossings. This includes, where applicable, slip resistant flooring, tactile paving, curb and boarding ramps, or other elements that address this purpose.	✓		✓	✓		
Implement street furniture (waste receptacles, benches, street lamps, shelters, plants, trees, or other relevant elements) in a way that it does not interrupt or block pedestrian/cycling pathways.	✓		✓	✓		
Multiuse public parking with the flexibility to support bicycles, motorbikes, electric -charging docking stations, accessible spaces and carpooling/taxi stands.	✓	Future Ready considerations				
<b>Streetscaping &amp; Wayfinding</b>						
Street furniture shall be placed and oriented in a way which does not deter regular maintenance, waste collection, snow removal or accessibility.			✓	✓		
Clear and legible street signage shall be provided across St. Catharines to provide information on the location of transit service, parking lots, local attractions, community services, linkages to trails and pathways, cultural or historical sites and / or public amenities.			✓	✓		
Wayfinding and signage should be provided in alternate formats to accommodate citizens with visual, audible or physical disabilities.		Concurrent with Regional Initiatives and ATP	✓	✓		

	Official Plan	Functional Master Plan	Downtown Urban Design Guidelines	Future St. Catharines Design Guidelines	Municipal By-law	Site Plan Control
<b>Arts &amp; Culture</b>						
Placemaking is the concept of creating a sense of place on streets that encourages comfortable mobility for all road users. There are many opportunities for placemaking on the street. In St. Catharines, programming such as “Open Streets St. Catharines” should be encouraged to help foster sense-of-place and community vibrancy throughout the City’s Streets.	✓				✓	
The inclusion of public art within the public-right-of-way is encouraged as a way to establish the identity of a community or neighbourhood.	✓					
Local artists, craftsmen and schools may be encouraged to submit public art and street furniture to local streetscaping initiatives.	✓	Public Art Master Plan				
<b>Utility Corridors</b>						
Wherever possible, above-ground utilities should be located away from intersections, day-lighting triangles and visual axes such as the end of T-intersections or other view corridors.			✓	✓		
Where possible, street grade public utilities such as transformer pads, telephone switching stations and junction boxes should be screened through treatment similar to the landscape theme and treatment of the surrounding neighbourhood.			✓	✓		
Where appropriate, the City, in consultation with the appropriate utility authority, shall support the installation of visually appealing utility and telecommunications infrastructure.			✓	✓		
<b>On-Street Parking</b>						
Through City by-laws, on-street parking spaces may be repurposed for local businesses, bicycle parking or landscaping.	✓				✓	
<b>Land-Uses</b>						
Encourage high quality redevelopment of properties along mixed-use streets. Buildings should be oriented to front, face and feature the road. Large parking areas should be located behind or at the side of buildings and, where visible from the road, must include substantial landscape treatment.	✓	Road classifications supported within the TMP				
Pedestrian paths will be provided as part of new developments in order to link centres of activity such as parks, shopping areas and schools, as well as the public sidewalk network	✓	TDM supported within the TMP				✓
In key community areas such as schools, healthcare facilities and commercial centres, accessible walking, cycling and transit facilities should be provided.	✓					✓
Streets in proximity to public service facilities and schools shall be a priority for complete streets enhancements.	✓					

	Official Plan	Functional Master Plan	Downtown Urban Design Guidelines	Future St. Catharines Design Guidelines	Municipal By-law	Site Plan Control
<b>Accessibility</b>						
Sidewalks are required on both sides of all streets where feasible, in order to promote walkable neighbourhoods and have regard for the Accessibility for Ontarians with Disabilities Act.	✓					
The City shall strive to improve the mobility of all persons by making conditions safe for walking, persons using mobility devices, including wheelchairs and scooters, and people utilizing conventional transit, specialized transit and accessible taxis.	✓					
When renovating or repairing a street in areas containing social services and medical facilities, additional accessibility and mobility enhancements shall be considered to support the movement of persons with disabilities, wheelchairs, scooters and walkers.	✓					

# 4.2.

## Implementation Timeline

The TMP is founded on the development and adoption of a new road classification system that is intended to support the reconstruction of existing roadways and the construction of new roadways. This component of the plan is considered an immediate priority to be reviewed, adapted (as necessary) and adopted by City staff within a year or two of the TMP adoption and continued until the next time the TMP is updated.

In addition to the adoption and immediate implementation of the new road classification typologies, Chapter 3.0 also identifies some mode specific improvements which have been identified to support and achieve mode specific objectives and priorities for staff, decision makers and the community. A recommended timeline for implementation has been identified for each of these projects based on a three-phase approach – short, medium and long-term.

For the purposes of capital budgeting, the City is to assume that the short term generally is defined as the next five years, with the medium term through the year 2031 and the long term seen as the year 2032 and beyond. The following is a summary of the recommendations identified within each of these phases.

## 4.2.1. Short Term Recommendations



**0-5  
years**

### Complete Streets

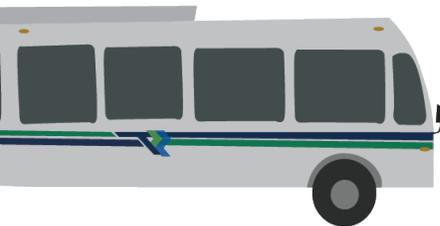
- Implement Complete Street Design Guidelines
- Update Official Plan to reflect changes to road classifications
- Chestnut Street Extension Class Environmental Assessment Study
- Chestnut Street Extension
- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based Traffic Demand Management (TDM)
- On-going Official Plan updates
- Fairview Mall area active transportation connection

### Active Transportation



- Prepare and adopt an active transportation specific master plan
- Update promotional mapping to reflect most up-to-date route information
- Allocate annual budget to implement select missing AT links
- Continue to monitor the Region's wayfinding and signage program
- Refine, adopt trail standards and update infrastructure where needed
- Pursue discussions with the community about the design of a minimum grid pilot system to the north and south of downtown
- Work with the health unit to identify opportunities for community education around safe active transportation use
- Work with the health unit and school transportation services to identify pilot active and safe routes to school programs

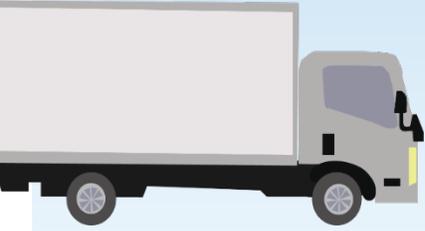
### Transit



- Route 337/437 Crosstown extension
- Route 314/414 Scott Downtown connection
- Frequency improvements during the p.m. peak hour (2 to 6 p.m.) on weekdays for certain routes
- Introduce GO-VIA Station shuttle
- Transit hub evaluation
- Electric hybrid bus feasibility

### Goods Movement

- Implement a comprehensive Goods Movement Strategy
- Update Official Plan to introduce freight-supportive land-uses



## 4.2.2. Medium Term Recommendations



6-10  
years

### Complete Streets

- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based TDM
- On-going Official Plan updates
- Transportation Master Plan review

### Active Transportation



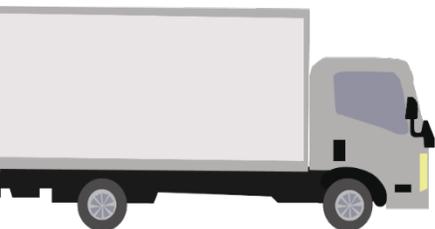
- Continue to prioritize the implementation of the parkway / pathway trail system for continuous loop of off-road facilities
- Prepare and implement a coordinated municipal and regional AT-specific wayfinding and signage program
- Explore external partnerships to prioritize the implementation of a bike share system
- Implement both minimum grid systems as permanent projects within the core of the City
- Expand upon the separated cycling network (minimum grid) to implement permanent solutions within the downtown core
- Pursue additional crossings of major barriers for active transportation users
- Continue to work with partners to identify opportunities for community based social marketing initiatives focusing on a shift towards sustainable modes of transportation

### Transit

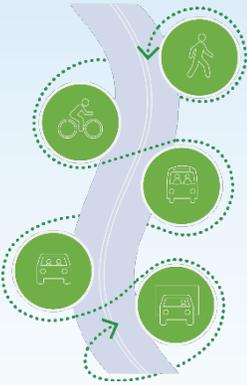
- Service hours extension for specific routes

### Goods Movement

- Research emerging goods movement sectors



## 4.2.3. Long Term Recommendations



**11+**  
years

### Complete Streets

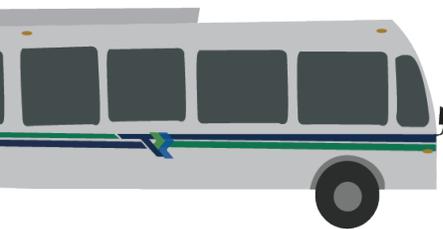
- On-going Complete Streets road construction and rehabilitation projects
- On-going pilots of Community-based TDM
- On-going Official Plan updates
- Transportation Master Plan Update

### Active Transportation



- Continue to prioritize the implementation of missing trails including the design of accessible trail connections linking major communities to the downtown core
- Identify opportunities for enhance design and implementation of amenities including bicycle parking within major community areas as well as trailheads
- Work with surrounding municipalities to establish a continuous and connected system of AT facilities in the bordering areas

### Transit



- Explore operational improvements (queue jump lanes, signal improvements)
- Long-Term Operations and Maintenance Facility Needs Assessment
- Long-Term Frequency Adjustments

# 4.3.

## Next Steps & Costing Infrastructure

Beyond the process of implementing the phased projects / initiatives, there are three other critical components which typically make up a master plan implementation strategy. They include:

- **Roles & Responsibilities** – the identification and clarification around who will be responsible for specific elements of the master plan’s implementation and the potential impact on day-to-day activities;
- **Costing & Funding** – the anticipated cost that will need to be assumed for the implementation of specific transportation projects as well as opportunities for both internal and external funding of those projects; and
- **Monitoring & Maintenance** – the indicators and approaches that could be used to assess the success of the TMP’s implementation as well as maintenance considerations as new infrastructure is implemented.

In the following sections these three components will be discussed in more detail with some supportive recommendations for consideration by the City of St. Catharines.

## 4.3.1. Roles & Responsibilities

The implementation of the TMP will require the efforts of numerous staff members, decision makers and community members. . This section describes the roles and responsibilities.

### Council

City Council approves budget for projects related to the TMP and will play a role during the implementation of the recommendations through consultation and project development.

- Approve projects and budgets

### Staff

City staff will be the primary implementation body. Depending on the implementation measure, multiple different staff departments will take lead and be engaged throughout the implementation process. Key departments include:

- Engineering, Facilities and Environmental Services
- Planning and Building Services
- Economic Development and Tourism Services
- Parks, Recreation, and Culture Services
- Municipal Works

The primary roles of City staff will include:

- Identifying opportunities for Complete Streets works within their departmental responsibilities
- Prioritizing Complete Streets works based on phasing and funding availability
- Organizing appropriate involvement from the Region or technical agencies
- Directly relaying information regarding implementation and on-going projects to the Complete Streets Committee

### Technical Agencies

Technical agencies will advise City staff on specific projects and ensure standards and/or requirements are met. A list of potential technical agencies is included below:

- Ministry of Transportation
- School Boards
- Niagara Peninsula Conservation Authority
- Niagara Escarpment Commission
- St. Catharines Transit Commission
- Niagara Region Transit

Depending on the location and nature of the project, the types of technical agencies, and their involvement will differ.

- Advise on implementation projects to ensure they meet the required standards or requirements of the technical agency
- Remain engaged in the monitoring and evaluation process of the TMP

### Region

The Region's primary role will be to coordinate municipal multi-modal projects with Regional efforts. When a St. Catharines transportation project intersects with a Regional corridor, the Region should be engaged to ensure that complete streets initiatives are aligned. The main Regional departments that will be engaged include:

- Niagara Region Planning and Development
- Niagara Region Public Works
- Niagara Region Public Health
- Niagara Region Police Services

### Stakeholders

Stakeholders should be engaged throughout the process to advise upon specific regional and local concerns that could be impacted by the implementation of this TMP. Like the other implementation roles identified in this section, stakeholders will vary depending on the project context. Some stakeholders could include:

- Regional stakeholders such as Trans Canada Trail Association and Share the Road Cycling Coalition
- Can-BIKE program
- Ontario Parks
- Local Advocacy Groups/ Organizations

## 4.3.2. Costing

Efficient prioritization and allocation of financial resources are required to implement the recommendations of this TMP successfully. The following high level costs have been estimated for the active transportation, transit and road capital projects. As a living document, these costs will need to be reviewed and updated as the projects approach implementation. As the timeline progresses, additional studies, detailed designs and technical assessments are required to identify the unique requirements of each project.

### Active Transportation Costing

The estimated cost to implement the AT network is intended to guide the future decision making for budgets. These unit prices reflect 2019 dollars and are based on best practices and recent projects of similar scope in Ontario. However, each project and the level of effort or additional work required will vary based on the context. The unit costs do not include any cost of property acquisitions, signal modifications, utility relocations or any site-specific project costs, including extreme environmental or topography conditions.

A summary of the estimated capital costs are included in **Table 9** and categorized by type of facility.

**Table 9. Active transportation costing summary**

Facility	Length (km)	Unit Cost (\$)	Subtotal Cost (\$)	Design (15%)	Contingency (10%)	Estimated Total (\$)
Signed Route	26	\$1,200	\$31,200	\$4,680	\$3,120	\$39,000
Paved Shoulder	11	\$150,000	\$1,650,000	\$247,500	\$165,000	\$2,062,500
Bike Lane	41	\$53,000	\$2,173,000	\$325,950	\$217,300	\$2,716,250
Buffered Bike Lane	7	\$65,000	\$455,000	\$68,250	\$45,500	\$568,750
In-Boulevard Multi-Use Trail	3	\$325,000	\$975,000	\$146,250	\$97,500	\$1,218,750
Off-Road Trail	46	\$200,000	\$9,200,000	\$1,380,000	\$920,000	\$11,500,000
<b>Total</b>	<b>134</b>	<b>-</b>	<b>\$14,484,200</b>	<b>\$2,172,630</b>	<b>\$1,448,420</b>	<b>\$18,105,250</b>

Annual operating costs for AT facilities, including the maintenance and operation of these infrastructures are based on the ranges in **Table 10** and assumptions in **Table 11**.

**Table 10. Estimated AT network maintenance costs**

Facility Type	Per kilometre cost (per year)
Signed Route	\$260 - \$260
Paved Shoulder	\$6,260 - \$7,660
Bike Lane	\$6,650 - \$8,050
Buffered Bike Lane	\$8,050 - \$9,650
In-Boulevard Multi-Use Trail	\$4,235 - \$4,860
Off-Road Trail	\$1,060

**Table 11. Cost assumptions for additional maintenance**

Item	Assumptions
Painted Line Markings	Unit price is for a single 100 mm wide painted line marking, therefore assume \$5 / m for both sides of the road. Maintenance cost assumes that painted line markings are fully replaced / renewed on an annual basis.
Cold Plastic Line Markings	Unit price is for a single 100 mm wide cold plastic line marking, therefore \$10 / m for both sides of the road. Maintenance cost assumes that plastic line markings are replaced every 5 years (or 20% annually). See calculations below: » \$5 / m x 20% = \$1 / m
Painted Stencils	Assumes stencils are placed every 75m as per OTM Book 18, therefore 26 stencils / kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be replaced / renewed on an annual basis. This equates to \$400 per year. See calculations below: » \$50 x 26 = \$1,300 » \$1,300 x 30% = \$400
Cold Plastic Stencils	Assumes stencils are placed every 75m as per OTM Book 18. 26 signs in 1 kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be placed / renewed on an annual basis. This equates to \$2,200 per year. See calculations below: » \$275 x 26 = \$7,150 » \$7,150 x 30% = \$2,200
Route Signs	Assumes 26 signs per kilometre (13 on both sides of the road / route). Maintenance cost assumes 5% of all signs will need to be replaced annually. This equates to \$260 annually. See calculations below: » \$200 x 26 = \$5,200 » \$5,200 x 5% = \$260
Sweeping Costs	Assumes sweeping frequency of 6-10 times a year (uni-directional, one side of the road)

An annual provision to allow for the future rehabilitation and replacement of the new infrastructure should also be implemented to ensure that the facility is up to standards. The aggregate operating impact of such facilities is considered in planning exercises such as the Fiscal Impact Study.

## Transit Costing

The proposed transit service recommendations include extended service hours and frequency improvements. Both the capital and operating budget for transit services would be impacted throughout each time period. The “Operations and Maintenance Facility Needs Assessment” recommendation requires an architectural review in the future, depending on the additional maintenance and storage room required as the fleet expands. Transit costs are summarized in **Table 12**.

**Table 12. Transit costing summary**

	Recommendation	Estimated Total (\$)
Short	Route 337/437 Crosstown Improvements	
	Route 314/414 Scott Improvements	Capital: \$2,600,000
	Increased P.M. service frequency	Annual Operating: \$900,000
	GO-VIA Shuttle	
Medium	Service Hour Adjustments	Annual Operating: \$950,000
Long	Service Frequency Adjustments	Capital: \$21,450,000 Annual Operating: \$1,900,000
	Operations and Maintenance Facility Needs Assessment	-
Total	-	Capital: \$24,050,000 Annual Operating: \$3,750,000

## Roads Costing

The road network recommendations from the TMP led by the City of St. Catharines are the Fairview Mall and Chestnut Street connections. These costs are summarized in **Table 13**.

**Table 13. Road costing summary**

	Segment Road	Length (km)	Cost per km (\$)	Subtotal Cost (\$) <sup>1</sup>	Design (15%)	Contingency (20%)	Estimated Total (\$)
Short	Chestnut Street Extension from Mountain Street to Hasting Street	0.19	\$2,600,000	\$494,000	\$74,100	\$98,800	\$666,900
	<b>Total</b>	<b>0.19</b>	<b>\$2,600,000</b>	<b>\$494,000</b>	<b>\$74,100</b>	<b>\$98,800</b>	<b>\$666,900</b>

<sup>1</sup>Note: The Ontario Ministry of Transportation Parametric Estimating Guide, 2016 provides costing guidance based on lowest bid prices for tendered construction projects from 2010 to 2016. For widening, the cost estimates include grading, drainage, paving, granular material, markings, landscaping, traffic control and roadside safety improvements. They do not include electrical and structural works, and traffic detection equipment. For new construction/extending roads, the estimates include grading, drainage, granular base, paving, traffic control, illumination, noise barriers (if applicable), traffic control and realignment of intersecting roads. They do not include structural work or property acquisition. In some cases, too few data points were available in the estimating guide to provide a reliable average. Professional judgment and previous bid experience were used to provide an estimated cost per centre line kilometre in these cases.

### 4.3.3. Funding

The recommendations included within the TMP require ongoing City investment to achieve the vision of an age friendly, enhanced multi-modal future in St. Catharines. These investments should be prioritized alongside other requirements of the transportation program such as asset renewal and rehabilitation, the assumption of local roadways through subdivision agreements, as well as other corporate program areas. For additional funding opportunities beyond the annual capital budget process, the City should closely monitor opportunities at the federal, provincial, and regional levels for any new or incremental funding sources to support future projects.

#### Active Transportation Funding

Additional investments will be needed on an annual basis to implement active transportation infrastructure. The following describes the different funding sources to explore to proceed with the implementation of the AT network.

## Federal, provincial and regional governments

Some current funding opportunities made available at the provincial and federal levels include:

- Federal gas tax fund;
- NBCF – provincial-territorial infrastructure component;
- Provincial gas tax fund; and
- Corporate environmental funds.

Furthermore, Niagara Region can be a funding partner in projects on Regional roads or that would benefit Regional facilities.

## Development

The installation of certain AT infrastructure can be undertaken and funded by the development community, and the City would assume responsibility for the ongoing maintenance and future replacements of these developer-constructed facilities after inspection. In addition, cash-in-lieu when collected as a part of the development application process (where parkland dedication does not occur) and when not required for other park investment can also create opportunities for future projects such as trail development.

## City

The City could identify active transportation improvements as a part of the overall cost of the capital projects that are identified on an annual basis that typically address transportation or other servicing improvements required such as road rehabilitations, and sidewalk replacement programs. By doing so, the City can potentially benefit from an increase in the project delivery efficiencies and overall cost savings.

Ultimately, whether delivered as a part of an existing project, or as a standalone AT initiative, the prevalent source of funding currently for these AT projects would be the City's property tax base.

## Transit Funding

To expand and improve St. Catharines' current transit system to generate higher transit use and meet future transit demand, the City should be prepared to explore beyond the existing funding sources. Potential sources of additional capital and operating funding for new transit services include:

## Federal, provincial and regional governments

As transit demand grows and becomes a more significant policy issue in Canada, an increasing number of federal, provincial (including Metrolinx), and Niagara Region funding sources may become available or expand under existing or future grant programs. The City should monitor for opportunities of recurring or one-time grants for transit services (such as the Public Transit Infrastructure Fund program) and continue to advocate at all levels of government for additional funding for services and facilities tied to GO rail and GO bus services. Currently, eligible municipal transit programs are supported by the Province of Ontario through the provincial gas tax program on a combination of population and transit ridership base. Should

St. Catharines' transit system continue to grow, an increase in funding could materialize to help support new services.

### Development Charges

Similar to the construction of roadways, the City can expect the development charges to support the initial capital costs associated with the expansion of the transit system.

### Roads Funding

#### Federal, Provincial and Regional Governments

As part of the New Building Canada Plan, the New Building Canada Fund (NBCF) was established in 2014 to fund projects from 2014 to 2024. In the NBCF, there is \$2.7 billion designated for Ontario projects and an estimated \$8.12 billion under the Federal Gas Tax Fund. Federal gas tax funding often is already allocated to transportation projects through the annual budget process. TMP recommendations will have to be prioritized and balanced against the existing needs identified for the gas tax funding.

With respect to any application-based funding awarded through the NBCF or alternate programs, the City will have to continue to identify opportunities to submit projects as program intakes become available. The City can also consider applying for Infrastructure Ontario's loan program for long-term financing of infrastructure renewal projects. The loan program applies to any capital investments including roads, bridges, and other projects that enhance mobility for all transportation users, and is advertised by Infrastructure Ontario as benefitting from:

- Affordable rates;
- Access to capital market financing without any fees or commissions;
- Longer loan terms designed to match the life of the asset;
- No need to refinance over the life of the loan; and
- Online application with access to dedicated and experienced staff.
- Furthermore, the City can also continue to look for opportunities to partner with Niagara Region for new sources of funding and new ways of delivering services to help achieve cost savings and improve project efficiencies.

### Development Charges

The City should use development charges to the fullest extent under provincial legislation to recover any eligible capital cost expenditures necessary to service new developments in St. Catharines. If a new subdivision were to be developed, the initial construction costs of local roads are also undertaken and funded by the development community prior to the City assuming responsibility for the ongoing maintenance and future replacements of these local infrastructure.

### City

The primary cost of on-going provision of roadways within St. Catharines, after application of funding from the sources above, is anticipated to be the property tax revenues collected by the City.

## 4.3.4. Monitoring

It is important that City staff monitor the impact of public policy and recommendations discussed in the TMP. These recommendations should be measured through an integrated monitoring strategy. St. Catharines will want to evaluate the progress of policy applications translated into the outcomes that are align with the Complete Streets process. Monitoring this growth will guide decision making and policy application and resource distribution through benchmarks, needs and results. Additionally, the monitoring process will allow the City the opportunity to focus the TMP based on future events or outcomes. The monitoring process will ensure that the TMP will consistently deliver guidance on a more multi-modal and complete streets community.

### Data collection framework

A data collection framework was developed to inform the potential monitoring process for city staff. Developing a list of indicators, as shown in **Table 14**, is foundational for implementing a monitoring strategy. These indicators measure the various aspects of multi-modal performance, user population, facilities and safety.

The progress can be monitored by developing a benchmark built on historic and existing data and maintaining stewardship over the data over time, either through a municipal database or online dashboard. Providing this information publicly may empower the public to be more aware of the positive impacts of complete streets and multi-modal travel, which may lead to further contributions to their development.

**Table 14. Data collection framework**

	Mode	Indicator	Unit	Data Source	Frequency
1	Active Transportation	Total kilometres of on-road and off-road cycling facilities	Km	City of St. Catharines Niagara Region	Every 2 years
2	Active Transportation	Total kilometres of new sidewalks	Km	City of St. Catharines Niagara Region	Every 2 years
3	Active Transportation	Number of collisions or accidents to pedestrians or cyclists	Unit Frequency	Niagara Regional Police OPP	Every year
4	Active Transportation/ Transit	Number of existing and new bicycle end-trip facilities (bike parking, bike share, bus units with bike racks)	Unit Frequency	City of St. Catharines	Every year
5	Transit	Number of kilometres of existing and new transit routes (Transit coverage)	Km	St. Catharines Transit Commission	Every 2 years

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	Mode	Indicator	Unit	Data Source	Frequency
6	Transit	Ridership	Ridership	St. Catharines Transit Commission GO Transit	Every year
7	Transit	Effective kilometres travelled by transit units	Km	St. Catharines Transit Commission GO Transit	Every year
8	Transit	PKI – Passenger-fares per effective kilometre index	Index (Pax/km)	St. Catharines Transit Commission GO Transit	Every year
9	Car	Private vehicle ownership per 1000 inhabitants	Index (registered vehicles / 1000 people)	MTO/Census Canada (population)	Every 5 years
10	Car	Number of collisions or accidents (motorists)	Unit Frequency	Niagara Regional Police OPP	Every year
11	Car	Total lane kilometres of new, repaved or newly-treated roads	Lane km	City of St. Catharines Niagara Region	Every 3 years
12	All modes	Number of daily trips	Trips	Transportation for Tomorrow Survey (TTS)	Every 5 years

