



City of St. Catharines Active Transportation Master Plan



 St. Catharines



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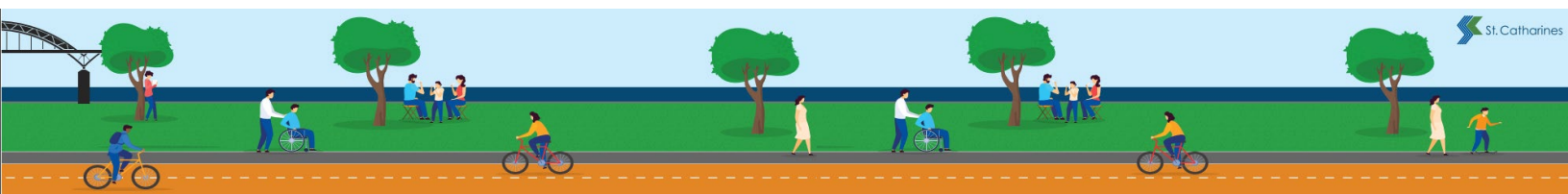
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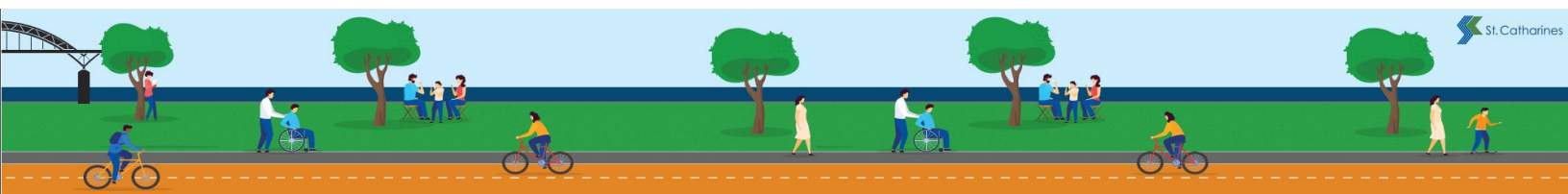
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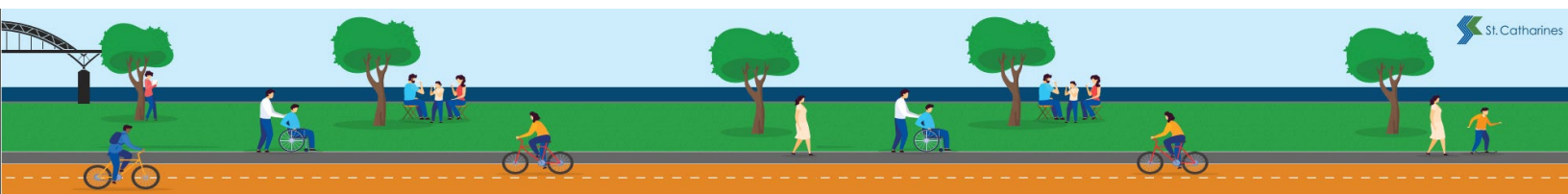
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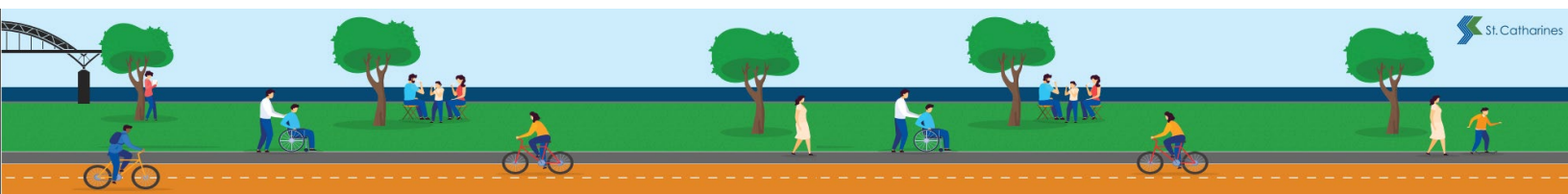
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Chapter 1: Introduction, Vision, and Objectives

1.1 Active Transportation Overview

Active transportation and active recreation consist of all forms of movement that is performed at a human scale. This includes walking, cycling, wheeling (using a wheelchair or other mobility-support device) and rolling (blading, skateboarding, scooting etc.), as well as a variety of other active recreation and transportation modes. Active transportation also takes into consideration assisted transportation devices such as motor assisted wheelchairs, throttle and pedal assisted e-bikes, as well as micro mobility devices such as kick-style electric scooters.

1.2 What is an Active Transportation Master Plan?

The City of St. Catharines is seeking to create a plan that will support the growth of both physical and social infrastructure to active transportation within the City. The Active Transportation Master Plan (ATMP) will leverage the strong foundations of existing active transportation infrastructure across the City, building off the Complete Streets framework developed as part of the Transportation Master Plan (TMP). The ATMP will be a community-focused plan that helps residents use active transportation more often, strengthens political support, and establishes new partnerships with community stakeholders to support those who rely on active transportation modes and to enable further uptake of multi-modal transportation within the City.

The ATMP will develop new networks of physical and social infrastructure to support active transportation users across the City. The City of St. Catharines is largely built out, with limited to no space for new roadway capacity to be added. For the City to be able to grow its population, and to meet its Sustainability goals, the City must become a model of **doing more with less** with regards to transportation – which means using more efficient forms of mobility like walking, cycling and wheeling to expand access across the community. The City is seeking to build upon its existing network of bike lanes, multi-use trails and sidewalks by:

- **Applying the Complete Streets Approach** defined in the recently approved TMP to identify corridors where walking, cycling, and wheeling should be given a higher priority,



- **Improving existing routes** to bring them up to an All Ages and Abilities (AAA) standard,
- **Closing gaps in the network** to ensure continuous, connected routes across the City,
- **Partnering with the Region of Niagara** to enhance mobility choice across the City by upgrading facilities on Regional Roads, and;
- **Creating new capacity** for community organizations to support residents who rely on active transportation and promote its wider adoption as a viable mode of travel.

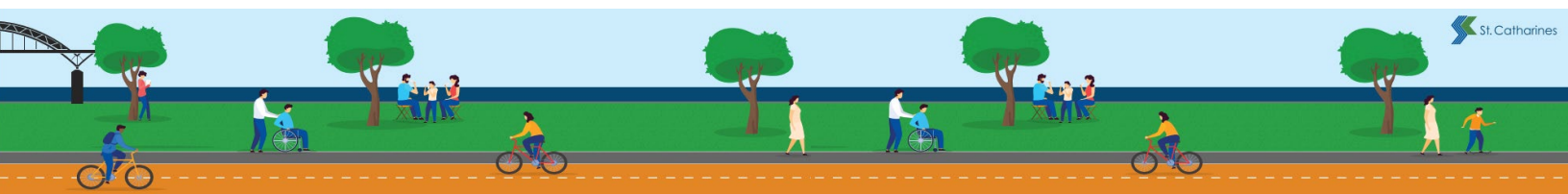
The St. Catharines Active Transportation Master Plan has been developed by placing the community at the centre of the plan, focusing on supporting existing users who rely on active transportation modes, increasing uptake of active transportation by residents, strengthening political support for more people-oriented transportation options and establishing new partnerships with community stakeholders to support implementation. To build this sense of community ownership that is necessary to support a Plan of this scale, residents and stakeholders had several opportunities to engage in the process of developing the Plan. The ATMP will also create an accountability process that will allow the City and any relevant partners to check the progress of the actions against the baseline assessment and the goals contained within the Plan.

The ATMP will function best when considered within the broader policy context of the City, Region, Province and Country, which will help to provide the strategic foundations. This chapter provides an overview of existing policies and plans that are relevant to active transportation and that may inform the recommendations that emerge from the final plan. Additionally, the identified policies help define the vision for the ATMP by aligning itself with the goals and objectives of the City St. Catharines.

1.3 Building the Policy Foundation

This chapter builds on previous municipal, provincial, and federal planning documents to ensure that the ATMP contributes to the goals and vision previously established by different levels of government.

Throughout the last decade there has been an increase in support for funding and developing more active communities from all levels of government.



Federal, provincial, and municipal governments are working together and establishing policies, research, strategies, and initiatives that provide support for investments and improvements for active transportation. The following is an overview of all plans and policies that were reviewed to inform the development of the ATMP.

1.3.1 Federal Policies and Supporting Documents

The Government of Canada has recently begun supporting active transportation initiatives through policies, funding programs and language that supports active transportation. The intent of these programs is to help guide and assist municipalities to transition to sustainable modes of transportation. The following documents reviewed include:

Policies and Documents Reviewed:

- National Active Transportation Strategy (2021);
- Federal Sustainable Development Act (2008);
- Federal Sustainable Development Strategy (2019 – 2022);
- Transport Canada 2021 – 2022 Departmental Plan (2021); and,
- Transportation 2030: A Strategic Plan for Transportation in Canada.

Policy Considerations:

- The National Active Transportation Strategy (2021) created a \$400 million Active Transportation Fund that is provided by the federal government for municipalities to use. The purpose of the fund is to aid municipalities in creating AT facilities and education programs and outreach programs. The strategy notes that in order to qualify for the fund, municipalities must demonstrate that their planned projects will create community connections, improve user experience, assist in a modal shift, and increase equity across the region; and
- The Transport Canada 2021-2022 Departmental Plan (2021) and Transportation 2030: A Strategic Plan for Transportation in Canada (2016) includes actions for improving the safety, accessibility, efficiency, and environmental sustainability of Canada's transportation systems. The Transportation 2030 (2016) plan acts as the overarching blueprint for developing Canada's transportation systems over the next decade and it highlights the need for a mode-shift to sustainable transportation methods.



1.3.2 Provincial Policies and Documents

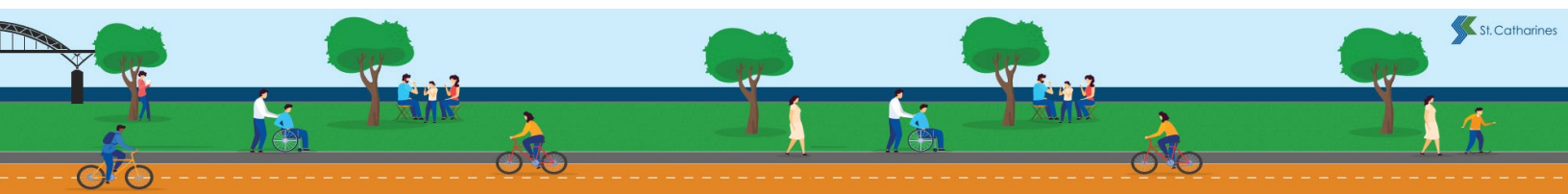
The Province of Ontario has a suite of policies that support the adoption of active transportation. These policy documents provide guidance to local municipalities which can range from suggested actions to legislated requirements. However, legislated requirements for active transportation is seldom used, as most documents provide suggestions, guidance and support for AT development. Reviewed documents include:

Policies Reviewed:

- Accessibility for Ontarians with Disabilities Act (2005);
- Ontario Province-wide Cycling Network (2018);
- A Place to Grow; Growth Plan for the Greater Golden Horseshoe (2020);
- Provincial Policy Statement (2020);
- Ministry of Transportation Ontario Bikeways Design Manual (2014);
- Tour By Bike: Ontario's Cycling Tourism Plan (2017);
- #CycleON Strategy (2013) and Action Plan 2.0 (2018);
- Minimum Maintenance Standards for Municipal Highways O.Reg.239/02 (2018);
- Ontario Traffic Manual Book 15: Pedestrian Crossings (2016); and,
- Ontario Traffic Manual Book 18: Cycling Facilities (2021 update).

Policy Considerations:

- Increase collaboration between governments and industry partners to develop and enhance products and experiences that support cycling tourism (e.g. heritage trails, trail tourism programs), particularly in rural regions of the province (Ontario's Cycling Tourism Plan, 2017);
- Plan and provide for a full range and equitable distribution of publicly accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and, where practical, water-based resources (Provincial Policy Statement, 2020, s.1.5.1.b);
- Ensure that the detailed design for active transportation facilities comply with the Bikeways Design Manual (2014) and are guided by best practices outlined in Ontario Traffic Manual Book 15 (2016) and Book 18 (2021);



- Promote the use of active transportation and transit in and between residential, employment (including commercial and industrial), and institutional uses and other areas (s.1.8.1.b – Provincial Policy Statement);
- The Growth Plan for the Greater Golden Horseshoe (2020) promotes enhancing connections and developing active transportation infrastructure in growth centres and major transit station areas. The Plan recommends achieving these goals by:
 - Adopting a complete street approach to roadway development and reconstruction (s.3.2.2.3);
 - Developing and implementing a transportation demand management strategy to encourage a shift to a multi-modal transportation system (s. 3.2.2.4); and
 - Ensuring that active transportation infrastructure is developed in tandem with new developments and is integrated to compliment existing transit corridors (s.2.2.4).

1.3.3 Regional Municipality of Niagara Policies

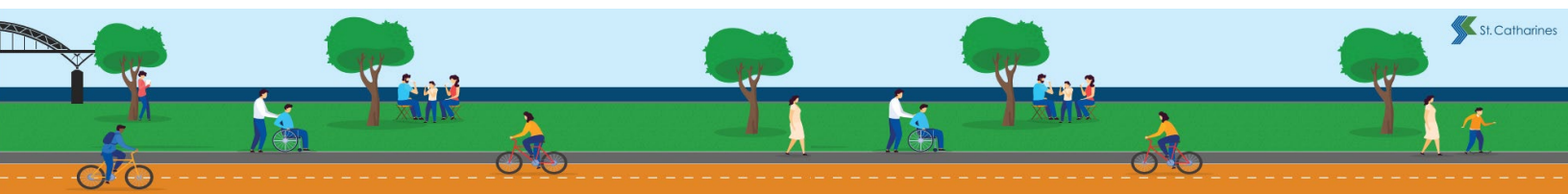
Regional policies directly shape the planning, design, implementation and operation of AT facilities along regional roads. Niagara Region has a number of existing policies that provide specific guidance on AT projects such as the draft 2022 Official Plan, Transportation Plan, and Cycling and Pedestrian Master Plan Study.

Policies Reviewed:

- Regional Municipality of Niagara Official Plan (2014 and 2022 Draft);
- Niagara Strategic Plan 2019 – 2022;
- Niagara Region Transportation Master Plan (2017);
- Strategic Cycling Network Development Technical Paper (2017);
- Climate Change Framework (2018);
- Complete Streets Design Guidelines (2017);
- Bikeway Identification and Destination Signage for Cyclists (2017); and,
- Bikeways Master Plan (2003).

Policy Considerations:

- Support active transportation through enhancing connections, facilities, and integration with other modes of transportation. Ensure that both inter- and intra-municipal routes are well connected to each other and ensure



- that facility design is high-quality and remains consistent between jurisdictions (Regional Municipality of Niagara Official Plan, 2022 Draft).
- Expand active transportation facilities by re-purposing abandoned railway, hydro corridors, and other linear corridors as multi-use trails (Regional Municipality of Niagara Official Plan, 2022 Draft).
 - “The Niagara Region will develop guidelines for local Official Plans and Zoning By-laws that outline minimum provisions for accommodating active transportation-friendly facilities in new development, redevelopment, and public work projects.” (Regional Municipality of Niagara Official Plan, 2022 Draft)
 - Ensure that a complete streets approach is accounted for in local official plan and zoning by-law policies. (Regional Municipality of Niagara Official Plan, 2022 Draft)
 - Ensure that streets are design to prioritize the movement of people through creating complete streets and improving active transportation infrastructure (Niagara Strategic Plan 2019 – 2022).
 - “Encourage pedestrian- and cycling-supportive site design that provides safe pedestrian and cycling opportunities for all ages and abilities in all new developments.” and “Promote safe walking, cycling and driving through education, engineering, engagement, evaluation and enforcement” (Niagara Region Transportation Master Plan, 2017)
 - Ensure that adequate connections are made between local and regional roads to support active transportation in dense urban areas (Strategic Cycling Network Development Technical Paper, 2017).

1.3.4 City of St. Catharines Municipal Policies

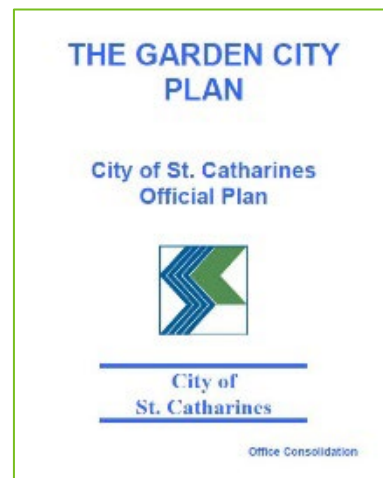
The Active Transportation Master Plan will be influenced by policies at the municipal level such as the City's Official Plan, Transportation Master Plan, Strategic Plan, and other planning documents. The City's Official Plan provides the most guidance on future development due to its statutory nature as a requirement under the Planning Act and the Provincial Policy Statement. The City's recently approved Transportation Master Plan also provides a strong foundation upon which the Active Transportation Master Plan will be built upon. Policies that have the highest degree of relevance to the Active Transportation Plan are referenced below.



The Garden City Plan: City of St. Catharines Official Plan (2012)

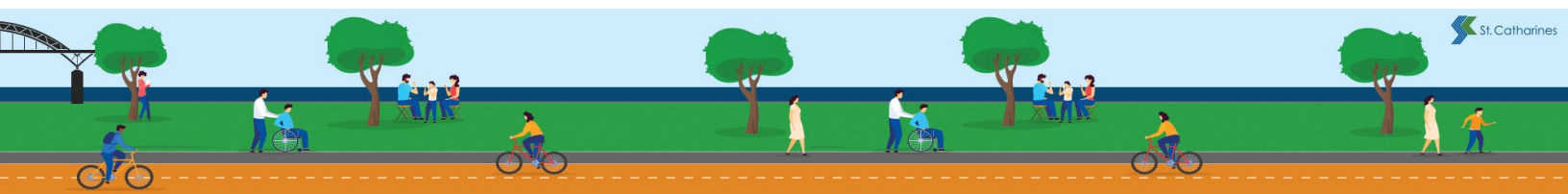
Relevant Fundamental Principles

- “The City’s natural beauty - its **gardens and parks**, its historical setting, its **natural amenities**, and its agricultural lands all have contributed to creating the “**Garden City**” image. Residents of St. Catharines are proud of this image”
- “Committing necessary **funds** to create and maintain **high quality** public buildings, structures, **streetscapes**, and **open spaces** that reflect the “Garden City” image.”
- “Urban design opportunities to enhance the **quality** of the **public realm** shall be encouraged as part of the design of all municipal undertakings, including **public parks** and buildings, **public streets**, natural areas, and **all municipal engineering projects related to public spaces**”

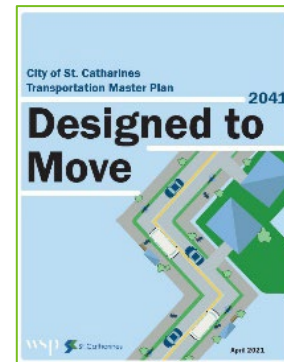


Relevant Active Transportation Objectives

- “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.**”
- Components of **complete streets** may include but is not limited to: **sidewalks, trails, bike lanes** (or wide paved shoulders) ... **greening**, street furniture, **wayfinding**, streetscape amenities, and travel demand measures.”
- “To facilitate a greater multi-modal split, with less emphasis on the automobile, the City will balance the provision of a safe, functional, and attractive pedestrian and cycling oriented environment with an acceptable level of vehicular traffic.”
- “The City will encourage and facilitate **alternative forms of transportation** that **promote** energy conservation and **a healthy lifestyle.**”
- “The City shall require, provide, and maintain a continuous, well signed, clearly visible, and attractively landscaped network of cycling trails and facilities.”



Designed to Move: Transportation Master Plan (2021)



Relevant Short-Term Recommendations

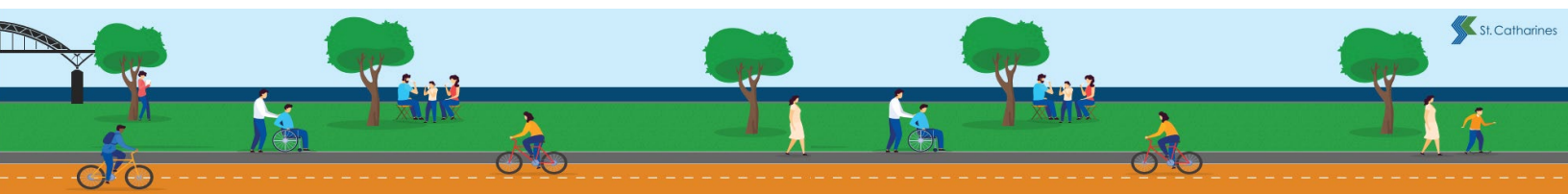
- “Implement Complete Street Design Guidelines”
- “Fairview Mall area active transportation connection”
- “Prepare and adopt an active transportation specific master plan”
- “Allocate annual budget to implement select missing AT links”
- “Work with the health unit to identify opportunities for community 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.”
- “Continue to monitor the Region’s wayfinding and signage program”

Relevant Medium-Term Recommendations

- “Continue to prioritize the implementation of the parkway / pathway trail system for continuous loop of off-road facilities”
- “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”

Relevant Long-Term Recommendations

- “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.”



Strategic Plan 2023 – 2027

Relevant Vision and Guiding Principles

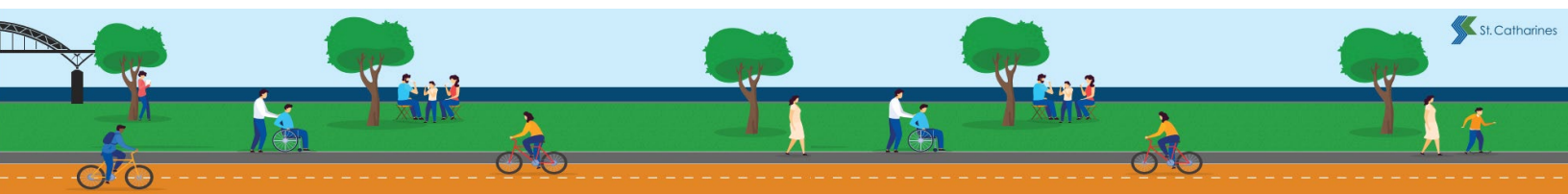
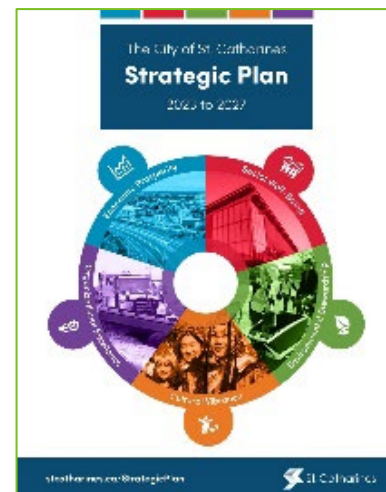
- “St. Catharines will be a **safe**, innovative, **sustainable**, and caring city today and for future generations.”
- “**Safe** environments for all”
- “Commitment to diversity, equity, and inclusion”

Social Well-Being Goals

- “St. Catharines will strengthen neighbourhoods and communities through quality-of-life opportunities that are **accessible to all**”
- “Enhance neighbourhoods through regeneration, particularly in the downtown core”
- “Develop and promote a diverse **system of connected** parks, open spaces and **trails**”

Environmental Stewardship Goals

- “St. Catharines will be recognized as a leader in environmental sustainability and resilient in the face of escalating climate change events”
- “Work toward an integrated multi-modal transportation network that facilitates the movement of people and goods”
- Priority Initiative: “Active Transportation Plan Development, Resourcing, and Implementation”



Corporate Climate Change Adaptation Plan (2021)

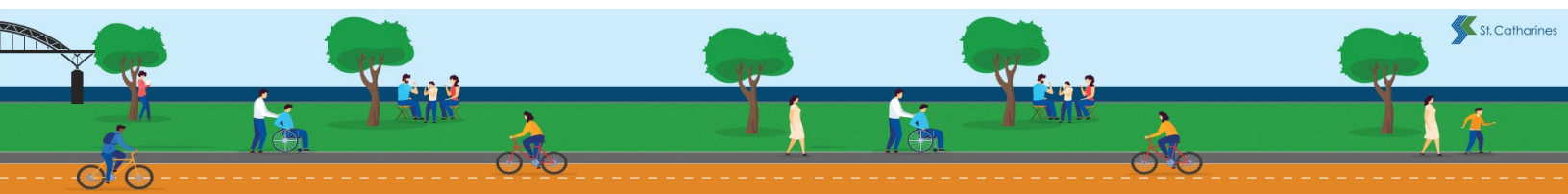
Relevant Vision and Guiding Principles

- “St. Catharines will mitigate and adapt to climate change through the integration of plans, policies, and procedures to ensure the City of St. Catharines takes action to remain innovative, sustainable and livable.”
- Goal Number 6: “Re-think how the City addresses Climate Change.”
- “The City will provide effective asset management to ensure the long-term availability and sustainability of corporate assets for infrastructure, services, and programs to achieve the best value from available capital funding resources.”



Relevant Impact Statements and Assessments

- “Less Ice Days [allow for] increased opportunity for active transportation within the city and higher uptake for cycling facilities”



Recreation Facility & Programming Master Plan (2015)

Relevant Trail Acquisition Projects

Acquisition Priority One

- Lake Ontario Waterfront Trail
- Extension of Welland Canal Parkway North to St. Lawrence Seaway Authority Piers
- Port Master Park to Dalemere Park
- Green Ribbon/Merritt Trail extension to EPA lands along 406 east corridor
- Burgoyne Woods Trails
- Joe McCaffrey Sports Park hydro corridor
- Southerly extension of Participark Trail/Laura Secord Trail along Twelve Mile Creek, including discussions with Ontario Power Generation



Acquisition Priority Two

- CNR spur line rail-to-trail conversion
- Centennial Gardens connection to Merritt Trail
- Yale Crescent rail conversion corridor
- Walker's Creek trail improvements

Acquisition Priority Three

- Green Ribbon/Merritt Trail extension to EPA lands along Highway 406 east corridor crossing the Q.E.W.
- CNR south to hydro corridor, crossing Q.E.W. to Merritt and Bruce Trails
- Centennial Gardens connection to Merritt and Bruce Trails, crossing Highway 406

Trail Enhancement Recommendations

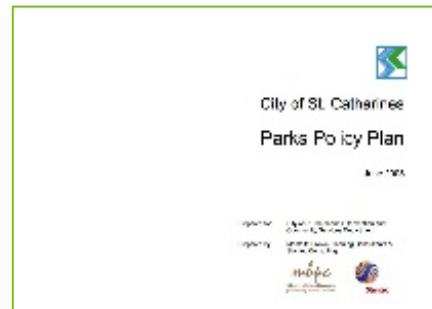
- Continue to enhance the design and redesign of parks and trails through strategic improvements focused on accessibility for persons with disabilities and special needs, user comfort, safety, wayfinding, and interpretative signage, at a minimum.



Parks Policy Plan

Relevant Statements

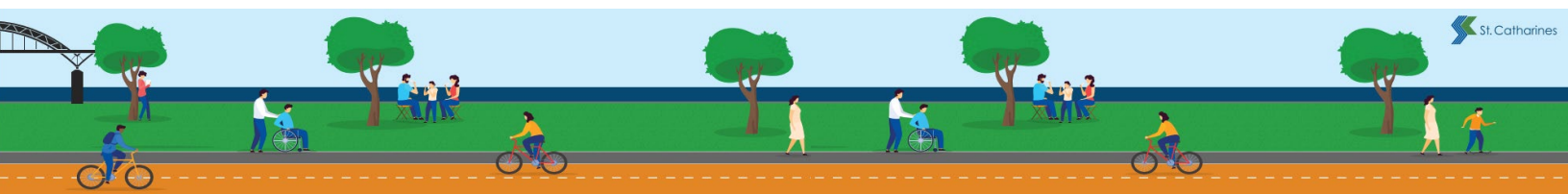
- “A parks and linkage system that promotes walking, cycling and in-line skating is good for people’s health as well as the environment.
- “Parks Promotion. People in St. Catharines need to be made aware of the City’s great park assets. Provide better signage, more days in the park, cycling tours, newspaper articles on the City’s unique parks”



Speed Reduction By-Law

Overview

- On September 21, 2022 the City of St. Catharines Council unanimously approved a by-law to lower the speed limit along local city streets from 50 km/h to 40 km/h.
- The city added a \$262,000 line item to the 2023 budget requiring that all 50 km/h signs along local city streets are lowered to 40 km/h by the end of 2024.



1.4 The Vision & Objectives

A vision statement and relevant objectives were developed a review of the City of St. Catharines' existing policy documents. The themes contained in these documents highlight what the City's guiding principles are and help to ensure that the ATMP aligns with those previously approved statements in a clear manner. The vision statement for the ATMP is:

The City of St. Catharines will become a more livable, equitable, accessible, and sustainable City for all residents by rapidly embracing investment in active transportation.

To ensure the vision statement is carried out, actionable objectives have been created based on the City's existing policy directives that includes:

- Create a network of Spine Routes - high-comfort active transportation routes that seamlessly connect residents to most destinations in St. Catharines.
- Improve connectivity for people walking by closing gaps, improving crossings and reducing vehicle speeds and volumes near key destinations.
- Prioritize investments to support the mobility of equity-deserving communities in the City.
- Embrace innovation and iteration, including the use of pilot projects, pop-up projects and creative partnerships.
- Support mobility choice by making walking, cycling and wheeling as easy as driving.
- Build upon St. Catharines' potential as a destination for active transportation by improving local and Regional connections with its neighbouring municipalities.
- Develop new trails within the City to build upon St. Catharines' reputation as the Garden City, connecting residents to nature and their neighbours.

As the recommendations for this plan begin to be implemented, the vision and objectives will provide an important accountability tool – they can be used as guiding principles to ensure that the City is meeting the objectives as laid out in the Plan.



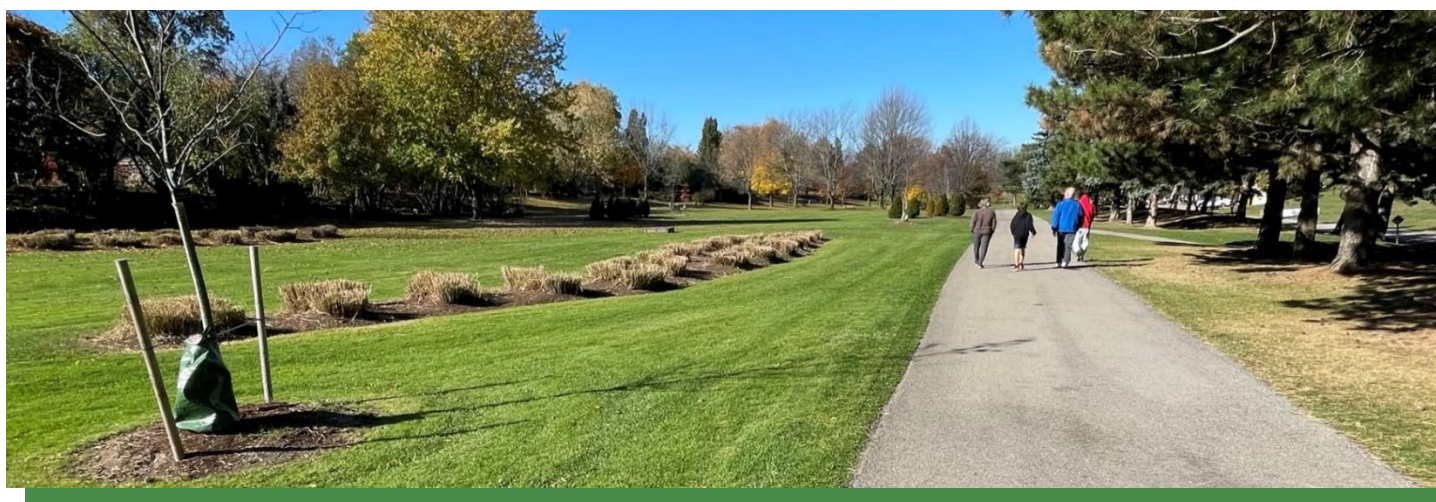


Chapter 2: Existing Conditions & Active Transportation Potential

2.1 Developing The Foundations

Creating an interconnected and easily accessible active transportation system is crucial for supporting those who rely on these modes as their primary form of transportation and making active transportation a more viable transportation option. The proposed active transportation network in the City of St. Catharines is being developed with an equitable lens, which means that consideration is being given to ensuring that the network is accessible and beneficial to communities that have historically been underserved or marginalized. This includes, but not limited to, low-income communities, communities of color, and people with disabilities. By considering the needs of these communities, the City aims to ensure that everyone has the opportunity to access the active transportation network and enjoy the benefits it provides. The goal of the proposed network is to make it universally accessible to all people, regardless of their age or abilities.

The existing conditions of St. Catharines' current active transportation network have been reviewed and investigated in the field to inform mapping and confirm where infrastructure is present, and to identify potential missing links in the City. Data regarding current community trends have also been assessed to understand where people are traveling to, how people are getting around, and which areas would benefit the most from active transportation investment. By analyzing the data, the city can understand where the needs of the community lie and make strategic investment decisions to improve active transportation in the area.



2.2 Network Development Process

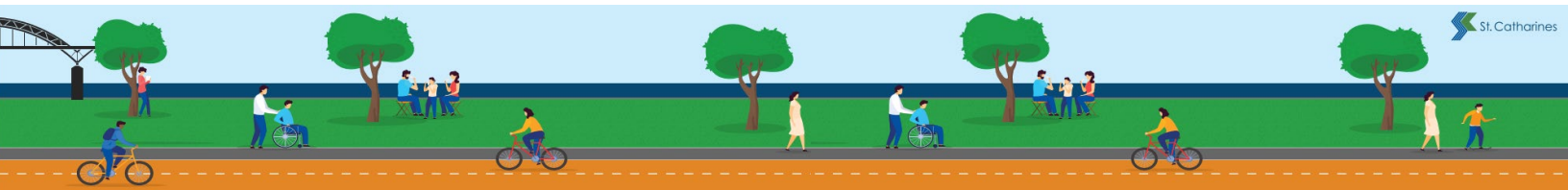
The process of developing the City's active transportation network involved both technical evaluations and input from stakeholders, city staff, and members of the public. It followed the guidelines outlined in the Ontario Traffic Manual (OTM) Book 18: Cycling Facilities (2021). The next chapter will focus on the progress made in the first five steps of the network development process and will further refine the recommended routes and types of facilities. This will result in the creation of a draft network and an implementation plan, including proposed timelines and high-level cost estimates for implementation.

Table 2.1: Six steps of the active transportation network development process.

1	Identify existing conditions and routes that have been proposed in the past planning documents.
2	Identify a list of route selection criteria to help select, assess, and refine candidate routes and prioritize future investments.
3	Identify candidate routes to be included in the City's active transportation network.
4	Conduct desktop and field work to verify the candidate routes' existing conditions and facilities. Local surroundings and key destinations are also captured in proximity to the candidate routes.
5	Verify candidate routes with City Staff, stakeholders, and the public.
6	Confirm the City's preferred active transportation network including the proposed facility types.

2.3 Existing Pedestrian Network

Data collected from the City of St. Catharines and Niagara Region were used to create a database of existing and previously proposed routes that are included in approved planning documents, such as the St. Catharines Transportation Master Plan (2021) and Niagara Region's Transportation Master Plan (2021). These data have been regularly updated throughout the duration of the project to account for existing conditions and to refine proposed facilities as the network development work progresses.



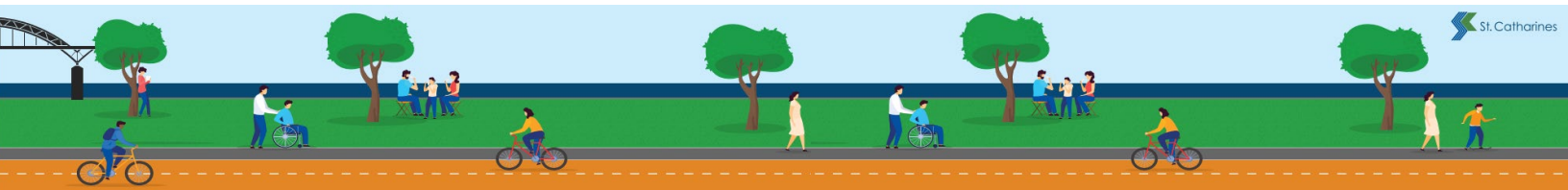
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- Improve connectivity for people walking by closing gaps, improving crossings and reducing vehicle speeds and volumes near key destinations.
- Prioritize investments to support the mobility of equity-deserving communities in the City.
- Embrace innovation and iteration, including the use of pilot projects, pop-up projects and creative partnerships.
- Support mobility choice by making walking, cycling and wheeling as easy as driving.
- Build upon St. Catharines' potential as a destination for active transportation by improving local and Regional connections with its neighbouring municipalities.
- Develop new trails within the City to build upon St. Catharines' reputation as the Garden City, connecting residents to nature and their neighbours.

2.3.1 Pedestrian Network

Sidewalks and trail networks are essential components of the pedestrian network, providing safe and accessible pathways for people to walk, run, and wheel around the city. These facilities should be designed to accommodate people of all ages and abilities to ensure that everyone can use and access them with ease. This includes building AODA-compliant sidewalks that are wide enough to accommodate mobility devices and designing crossings with safety in mind and with enough frequency to be convenient and comfortable.

To inform the planning of pedestrian facility improvements, the project team first assessed the existing conditions of the City's sidewalks, trails, and crossings. **Map 1** was developed using GIS (Geographic Information Systems) data from the City of St. Catharines that provides information on the existing sidewalk and trail network. This map was further refined through site assessments, which were conducted to explore the quality of the existing network and identify where additional connections could be made.



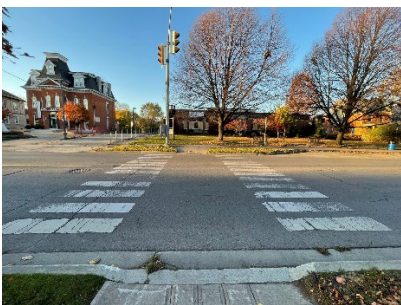
2.3.2 Existing Pedestrian Network Facility Types

The following are examples of typical pedestrian and trail facilities found across the City of St. Catharines.



Sidewalk

Sidewalks are intended for use by pedestrians, people using a wheelchair, or people using another type of slow wheeling device. They are typically aligned parallel to the roadway. Many roads in St. Catharines have sidewalks on at least 1 side.



Pedestrian Crossing

Mid-block pedestrian-controlled crossings are located on busy roadways and grant pedestrians the right-of-way. This seamlessly and safely connects users from one side of the road to the other.



Off-Road Hiking and Multi-use Trails

A recreational trail in an area that is outside of the roadway and usually passes through parks and other green spaces. Hiking trails are generally narrower, single-track trails that are not designed to accommodate cycling or other modes of active transportation like multi-use trails.

2.3.3 Trail Network

St. Catharines boasts an impressive trail network, which is a major active transportation asset that can serve both utilitarian and recreational purposes. The City's Merritt Trail, Grantham Rail Trail, Terry Fox Trail, and Welland Canals Parkway Trail provide off-road options for users who want to explore the city's natural beauty while also providing connections to destinations. These trails offer easy access to scenic and natural areas, making them popular for people who walk, bike, roll, and wheel.

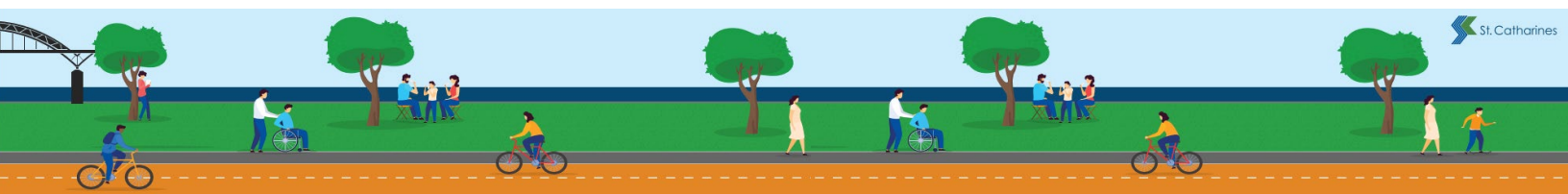
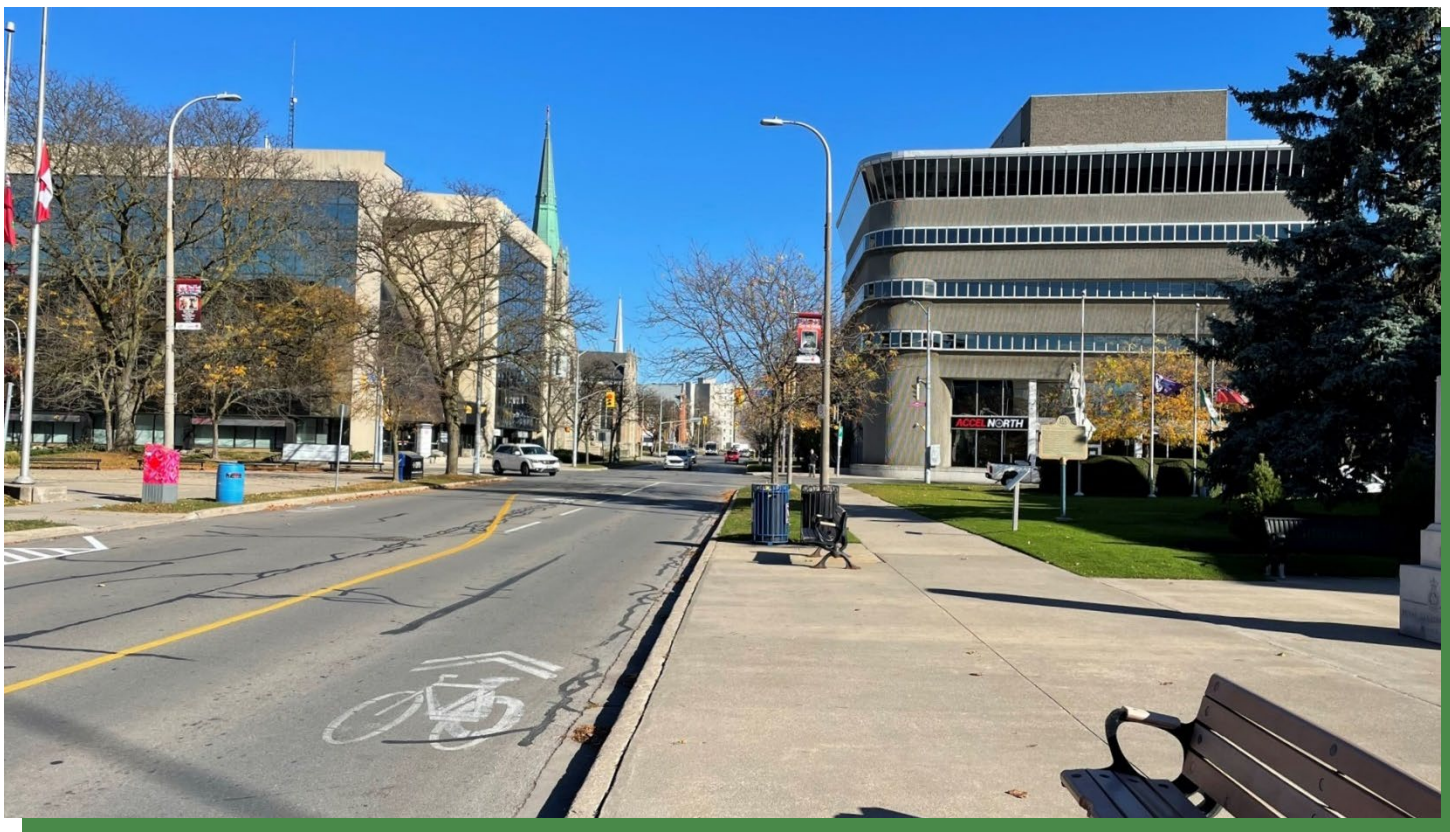


Field observations have highlighted the need for enhanced trail maintenance, especially in improving trail access and crossings. Many of the City's trails also lack connectivity, leaving users without a comfortable option to continue along their route.

Supportive amenities such as wayfinding, signage and rest areas are also available along the City's trails, but the quantity, quality and consistency of these amenities could be enhanced to provide a more comfortable experience for all users, particularly those with lower stamina or users that are unfamiliar with the City's trails.

2.3.4 Pedestrian Network Gaps

Gaps were identified based on an analysis of arterial and collector roads and roads within walking distances of schools. Arterial and collector roads without sidewalks on both sides of the were identified as major gaps in the pedestrian network. The project team also established that sidewalks need to be present on at least one side of a local road within 800m of elementary and secondary schools.





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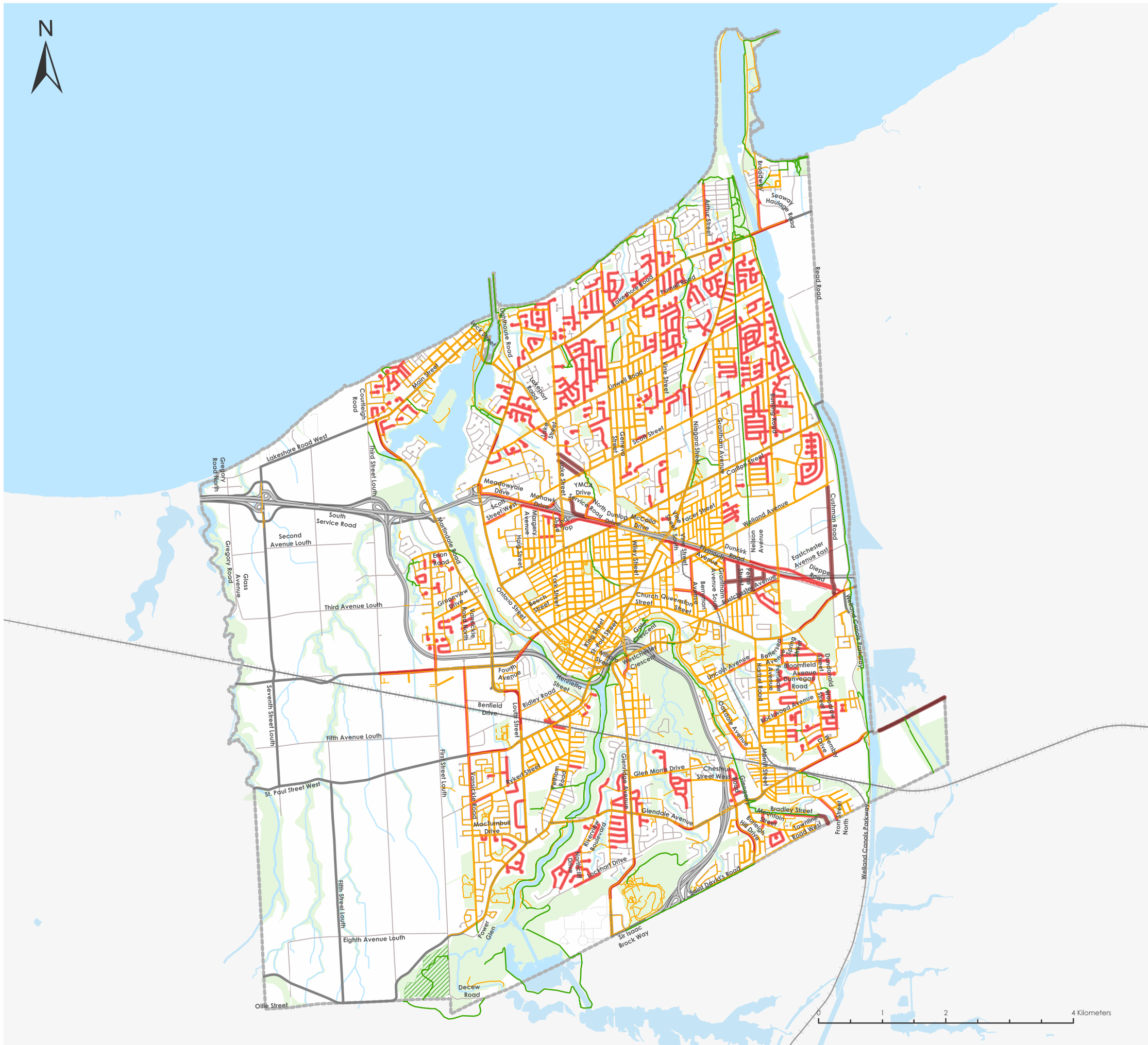
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MAP 1

Existing Pedestrian Network

Pedestrian Facilities & Priorities

- Existing Sidewalk
- Sidewalk Gap One Side
- Sidewalk Gap Both Sides



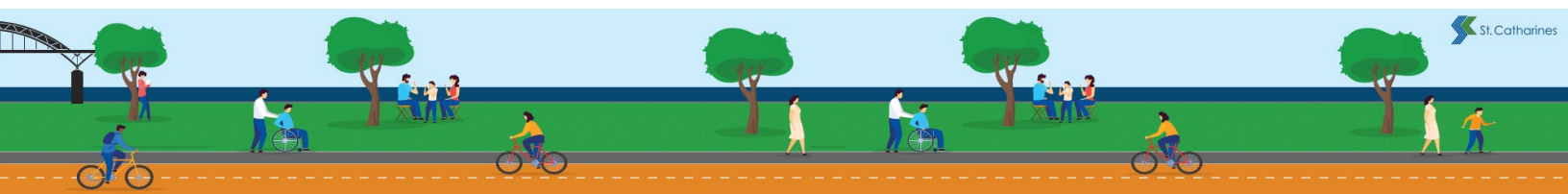
Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



2.4 Existing Cycling and Multi-Use Network

The City of St. Catharines has been implementing cycling facilities and multi-use trails for many years, with several of the City's existing cycling routes predating the first edition of OTM Book 18 on cycling facility design (2013). Design philosophies have evolved considerably since those early installations, with the updated OTM Book 18 (2021) placing a much higher priority on the comfort and safety of the “interested but concerned” population of potential cyclists. These people tend to be uncomfortable sharing space with automobiles, especially in high-speed conditions. They will tend towards use of multi-use trails, physically separated cycling facilities and low-speed, low-volume residential streets. They have the highest potential for change, especially for in-town trips between 1 and 5km, which represents a significant portion of journeys taken in St. Catharines today.

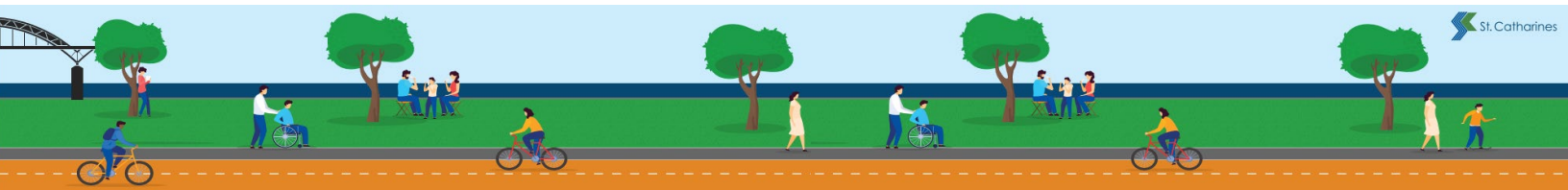
As we evaluate the City's existing cycling and multi-use trail network, it is important to keep these users in mind, while also respecting that the City's existing facilities were built to the design standards at the time when they were implemented. This plan aims to chart a path forward where this early leadership demonstrated by the City can be leveraged to create a network of high-comfort cycling facilities, elevating the experience for people of all ages and abilities as the ATMP is implemented.



DESIGN CYCLIST			
	Interested but Concerned	Somewhat Confident	Highly Confident
	<ul style="list-style-type: none"> Strong preference for separated cycling facilities or very low-volume and low-speed streets Cycling frequency depends heavily on having a network of low-stress facilities Can generally negotiate simple low-speed interactions with motor vehicles at intersections 	<ul style="list-style-type: none"> Comfortable cycling on-street and interacting with moderate-speed traffic Preference for separated cycling facilities or low-volume and low-speed streets Cycling frequency increases as network of low-stress facilities expands 	<ul style="list-style-type: none"> Comfortable cycling on-street and interacting with higher-speed traffic Preference for cycling facilities that allow for easy overtaking and efficient movement Cycling frequency not necessarily affected by network
% of population	• 51–56%	• 5–9%	• 4–7%
Stress tolerance	• Low	• Moderate	• High
Skill level	<ul style="list-style-type: none"> Experience varies Ability to anticipate and mitigate basic hazards 	<ul style="list-style-type: none"> Comparatively experienced Ability to anticipate and mitigate common hazards 	<ul style="list-style-type: none"> Highly experienced Well-developed ability to anticipate and mitigate most hazards
Typical demographic profiles	<ul style="list-style-type: none"> Age: All* Gender: any Ability: includes individuals who may have a disability or are new to cycling 	<ul style="list-style-type: none"> Age: 18–65+ Gender: women are under-represented Ability: individuals with a disability are under-represented 	<ul style="list-style-type: none"> Age: 18–65+ Gender: women are under-represented Ability: individuals with a disability are under-represented
Typical travel speed	• 10–25 km/h	• 15–25 km/h	• 20–35 km/h

* Children under 12 are an essential cycling demographic but their abilities vary significantly and they may not yet have the cognitive ability to detect risks, negotiate conflicts or ride a bike independently. Many municipalities have by-laws allowing children to cycle on sidewalks for this reason.

Figure 2.1: Characteristics of Different Types of Cyclists (OTM Book 18)



2.4.1 Existing Cycling Facility Type

The following are the typical cycling and multi-use facility types that exist in the City of St. Catharines



Bike Lanes

Bike lanes are located on a portion of the roadway with designated space that is to be used exclusively by cyclists. They are typically marked by a bicycle symbol and pavement markings.



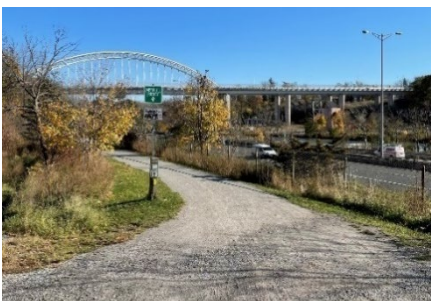
Paved Shoulder

A paved shoulder is a portion of a roadway which is contiguous with the travelled way and provides lateral support for the pavement structure. It provides cyclists an area that is separated from motor travel with a pavement marking. Typically, paved shoulders are located on rural roads.



Shared Roadway

Designated shared roadways are predominantly found in the downtown area. These routes typically have supportive signs and/or pavement marking treatments for wayfinding and to promote safer interactions between cyclists and motorists.



Off-Road Multi-Use Trail

A recreational trail in an area that is outside of the roadway and usually passes through parks and other green spaces.

Map 2 provides an overview of existing cycling facilities across St. Catharines.





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MAP 2

Existing Active Transportation Network

Existing Active Transportation Network

-  Trail
-  Bike Lane
-  Paved Shoulder
-  Signed Route
-  Major Cycling Network Barriers



Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



2.4.2 Existing Network Gaps and Barriers

The existing active transportation network in the City contains many gaps and barriers that result in a disconnected network. Existing cycling facilities are discontinuous and do not provide opportunities for cycling between different areas of the City. Barriers within the City create challenges for creating a continuous active transportation network. Most arterial roads in the City are Regional Roads, limiting the City's ability to plan and implement cycling facilities on logical routes for crossing the City.

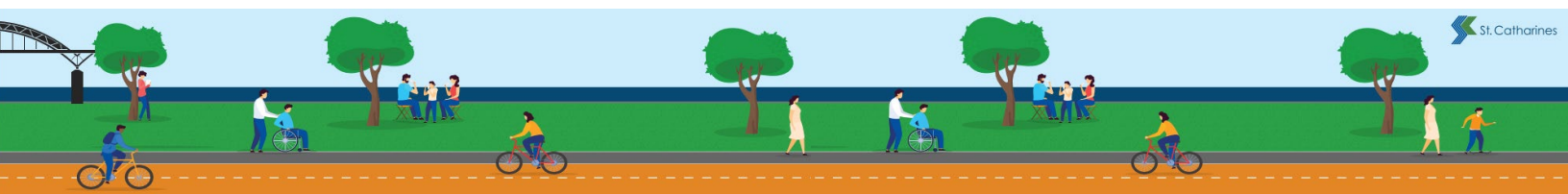
Two Provincial highways divide the City and there are limited opportunities for crossings. Twelve Mile Creek splits the City into east and west parts and the Niagara Escarpment is a topographic barrier to accessing Brock University and Thorold. Finally, the Welland Canal separates the east part of Port Weller from the rest of the City and is a barrier to accessing Niagara College and Niagara-on-the-Lake. These barriers are highlighted in hatched red as Major Network Barriers on **Map 2**. Creating high-quality cycling crossings of each of these barriers is made even more challenging since most of the existing roads crossing them are Regional Roads.

Addressing the Major Network Barriers in the City is a key aspect of this Plan. Existing City-owned infrastructure that cross these barriers will be leveraged as opportunities for crossings. Where no City-owned infrastructure exists, considerations will be made for new major infrastructure projects, which may require future studies.

2.4.3 Traffic Volumes

Traffic volume data was received from City of St. Catharines staff based on the City's rolling traffic data collection program. With its relatively stable population and established mobility patterns, many City roads have not experienced significant increases in traffic volumes since the early 2000s. Traffic volumes for Regional roads were retrieved from the Niagara Open Data portal and were last updated in 2021.

Unsurprisingly, the highest traffic volumes are observed on major arterials and Regional roads in the City. Major north-south routes for vehicular traffic consist of: Martindale Road/Louth Street, Ontario Street, Lake Street, Glenridge Avenue, Geneva Street, Niagara Street, Merrit Street/Hartzel Road, and Bunting Road.



Major east-west routes for vehicular traffic consist of Lakeshore Road, Linwell Road, Scott Street, Carleton Street, Fourth Avenue/Welland Avenue, Westchester Crescent, Queenston Road, and Glendale Avenue. Traffic volumes on these roads are typically greater than 10,000 vehicles per day. Traffic volumes on local roads tend to be less than 5,000 vehicles per day.

Due to high traffic volumes on collectors, arterials, and Regional roads, a greater degree of physical separation will be required to create comfortable facilities for cyclists. Greater separation than existing painted bicycle lanes will be required to create a active transportation network that complies with OTM Book 18 and to create a network that is appropriate for people of all ages and abilities.

2.4.4 Traffic Speeds

Traffic operating speeds were not available, so all analysis was based on the assumption that the operating speeds match the posted speed limit (however, it is acknowledged that some roads experience traffic speeds on average 5 km/h to 10 km/h above the posted speed limit during certain times of day). Posted speed limits for City and Regional roads within the urban boundary are currently 50 km/h. Outside of the urban boundary posted speed limits increase to 60 km/h or greater. It is noted that City council recently approved a speed limit reduction policy for local roads, where the speed limit for all local roads will be reduced to 40 km/h. Reductions in vehicle operating speeds on local roads creates the potential for more comfortable shared spaces between cyclists and motorized vehicles.

2.4.5 Level of Traffic Stress Analysis

A Level of Traffic Stress (LTS) analysis is a method developed to estimate the discomfort that people riding a bicycle close to traffic, although the results can be applied to. LTS is calculated based on typical daily traffic volumes, typical traffic operating speeds, the number of lanes on the roadway, and type of existing cycling facility. The analysis determined the LTS based on the following three categories:

- Low LTS: The target conditions for a facility to be considered suitable for use by people who are interested but concerned in cycling and active transportation (about 50% of the population).



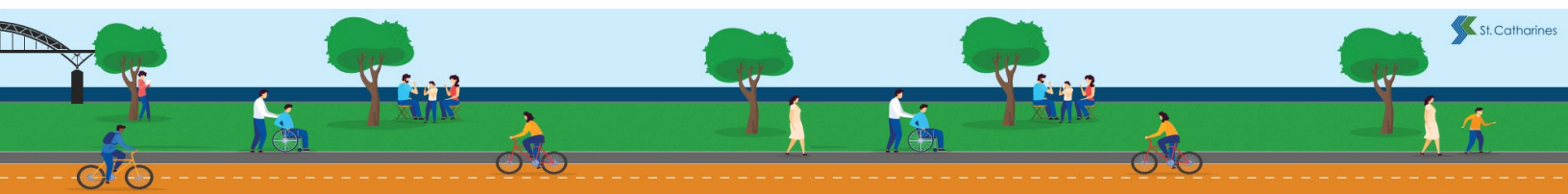
- Medium LTS: Conditions that are only suitable for some adults who are confident active transportation users (5% to 9% of the population).
- High LTS: Conditions are only suitable for the most confident cyclists and active transportation users (4% to 7% of the population).
- Where higher LTS conditions currently exist, a lower LTS can be achieved by either creating physical separation between active transportation users and vehicles or by creating conditions that slow or reduce the volumes of vehicles.
- A LTS analysis was conducted for the City using the available data. Data was not available for vehicle operating speeds, so the road speed limit was used as an alternative. However, this may not accurately reflect locations where drivers typically drive at speeds lower than the speed limit, such as narrow local roads or some downtown streets. Since the downtown area is an important destination for active transportation, the results of the LTS analysis should be further considered when determining any improvements for active transportation. The results of the LTS analysis are shown in Map 3.

2.5 OTM Book 18 (2021) Compliance

Currently, only a handful of facilities in the St. Catharines meet modern OTM Book 18 standards, notably along multi-use pathways of located in Jaycee Gardens Park and along the Grantham Trail. Additionally, the shared roadway located along the downtown section of St. Paul's aligns with Book 18 requirements for shared roadways, however increasing traffic volume along the road may require additional treatments in the future. Map 4 provides an overview of St. Catharines cycling facilities and their compliance with OTM Book 18 (2021).

Based on vehicle speeds and volumes, the City's current inventory of on-road cycling facilities do not meet the standards set by the updated OTM Book 18 (2021). The most common cycling facility in the city is a standard on-road bike lane, however these are frequently located on roads with high traffic volumes, and a speed limit of 50km/h.

Traffic speeds and volumes along roads such as Linwell Road, Scott Street and Geneva Street create the requirement for a higher degree of separation to not only protect current cyclists, but also to encourage future users. The City of St.



Catharines has already taken the step to reduce the speed all of local roads from 50km/h to 40km/h. A reduction in the speed limit alone may result in reduced operating speeds on some roads, but others may require further measures, such as traffic calming, to reduce speeds to a point where cyclist feel more safe sharing the lane with vehicles.

Reducing vehicle speeds is only one part of the equation, however, since a reduction in speed does not equate to a reduction in volumes. Even with a reduced speed limit, corridors such as Linwell Road would still lie outside of the recommended parameters where a bike lane would be recommended without physical separation. Higher traffic volumes and speeds require physical separation to provide a comfortable experience for the Interested but Concerned riders, as demonstrated in **Figure 2.2**.

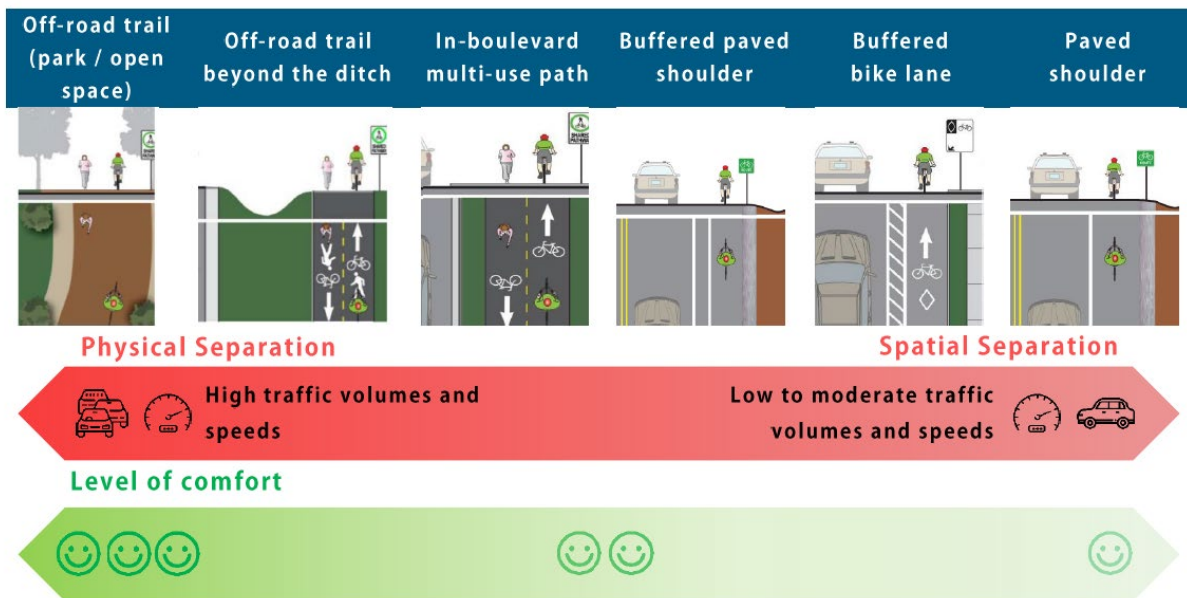


Figure 2.2: Physical separation techniques for cycling according to vehicle volume and speed.





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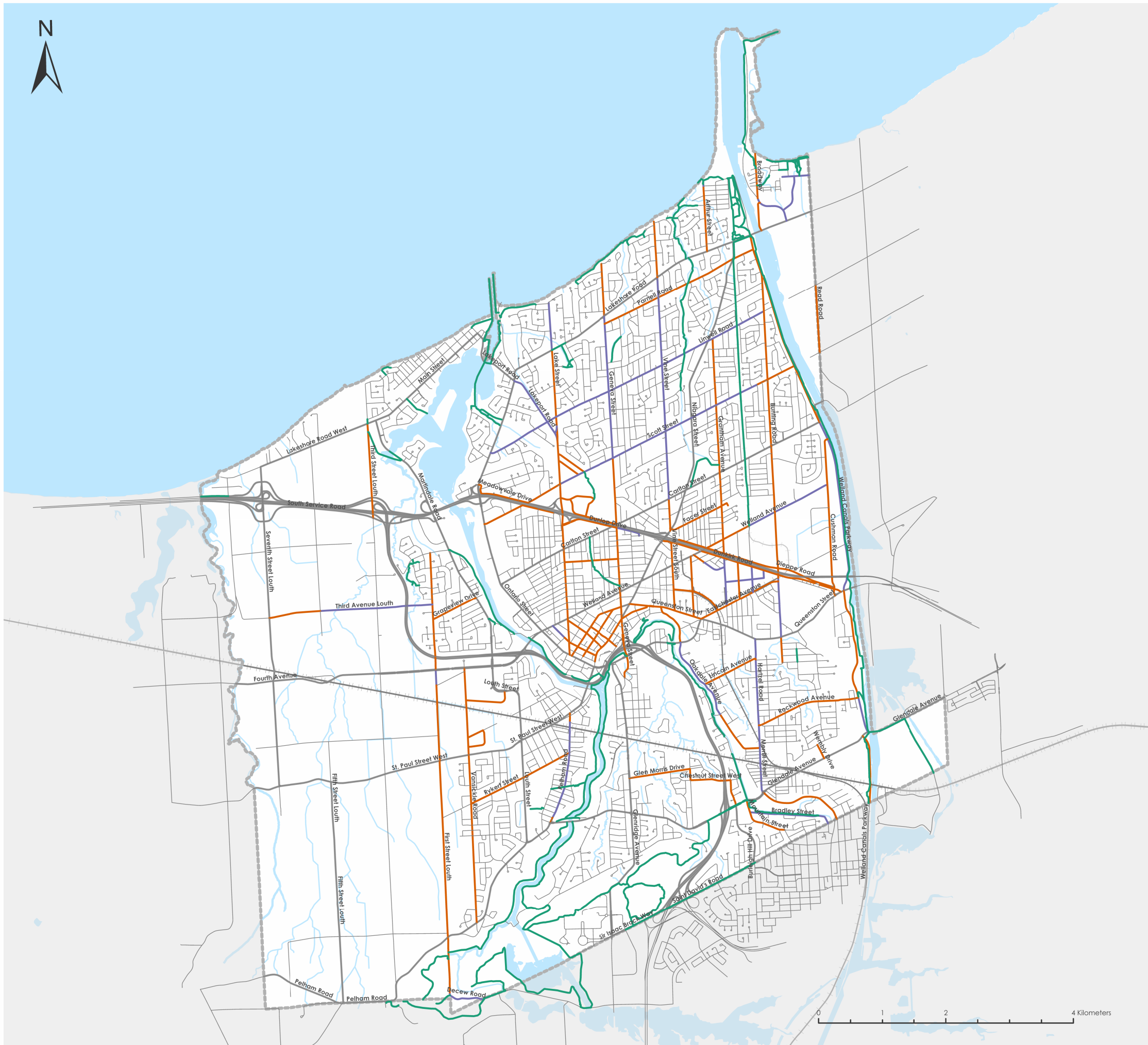
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MAP 3

Level of Traffic Stress Analysis

Level of Traffic Stress (LTS)

- Low Stress
- Medium Stress
- High Stress



Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



2.5.1 Intersections

Statistical data and research consistently show that intersections are the primary locations where collisions between cyclists and drivers occur. The nature of intersections, which require multiple road users to navigate shared spaces, often increases the probability of conflicts and collisions.



Figure 2.3 – (Left) Existing intersection at Scott Street and Vine Street. (Right) Protected intersection for cyclist identified in OTM Book 18.

Most of the bike lanes in St. Catharines do not offer continuous connectivity through intersections. Historically, the city adopted the approach of demarcating bike lanes with dashed lines accompanied by a 'bike lane ends' sign as cyclists approach intersections. The discontinuous bike lanes exacerbate the risk as cyclists often have to merge with vehicle traffic without clear direction or dedicated space. This design may lead to confusion among road users and is notably non-compliant with the updated OTM Book 18.

Intersection design plays a pivotal role in ensuring the safety and efficiency of all road users. High-quality designs cater to the needs of every user, from drivers and cyclists to pedestrians and public transit users. Prioritizing intersection design can:

- Reduce Conflicts: By clearly defining spaces for each user and minimizing areas where interactions might lead to conflicts, a well-designed intersection can significantly reduce the risk of collisions.
- Improve Visibility: Ensuring that cyclists are easily visible at intersections helps drivers anticipate their movements and reduces chances of collisions.



- Facilitate Predictable Movements: With a clear design, all road users are more likely to move in predictable patterns, further decreasing the chances of sudden or unexpected maneuvers that could lead to collisions.
- Benefit All Users: While the primary focus here is on cyclist safety, it's worth noting that a well-designed intersection benefits all users, including drivers. Efficient traffic flow, reduced congestion, and fewer crashes are in the interest of everyone on the road.

Additional details on proposed Intersection design elements are included in **Chapter 5**.





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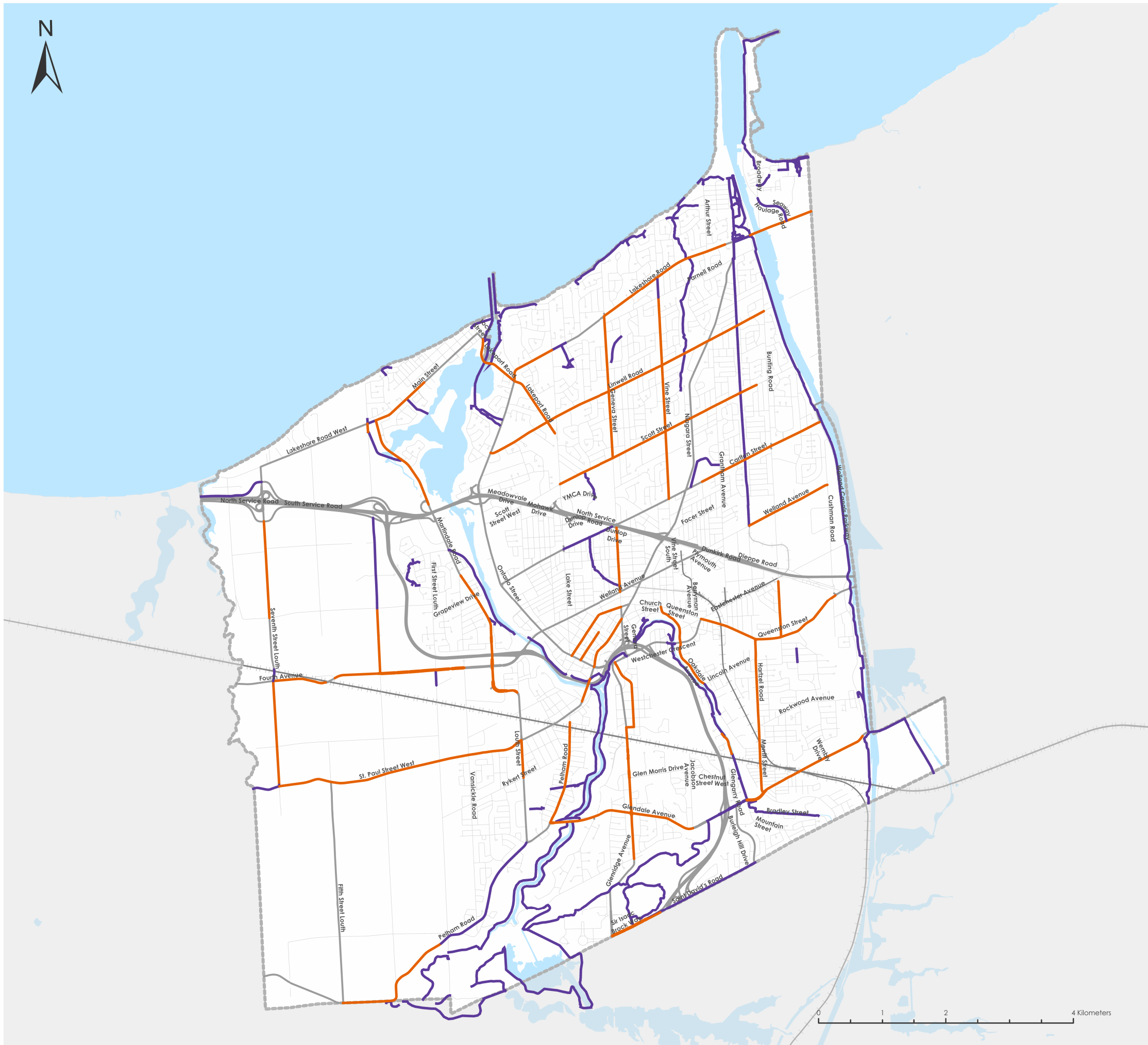
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MAP 4

Existing Active Transportation Network Quality

Existing Active Transportation Network

- Meets OTM Book 18 Guidelines
- Does Not Meet OTM Book 18 Guidelines



Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



2.6 Socio-Economic Patterns

To develop an active transportation network that is tailored to St. Catharines, a comprehensive understanding of the local context is essential, particularly regarding demographic and socio-economic characteristics and trends. This knowledge serves as the foundation for ensuring that the recommendations and strategies comprising the ATMP align closely with the City's Strategic Plan and are well-suited to meet the needs of both current and future residents who will rely on this network. A review of the socio-demographic and transportation data was completed as part of an equity-focused approach to building the network.

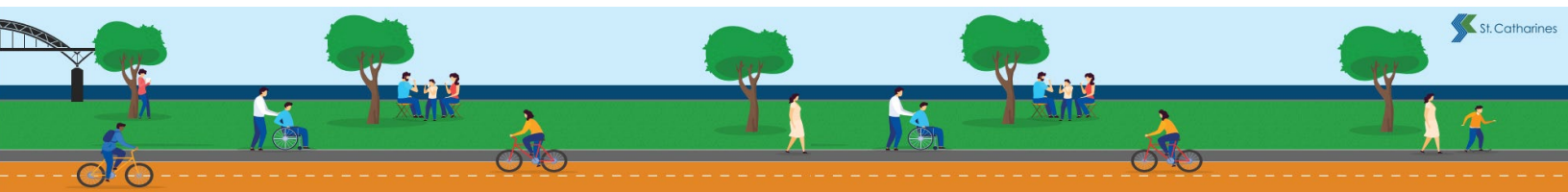
This section includes a series of maps to show the city's current demographic patterns based on spatial data from the 2021 Statistics Canada Census, City of St. Catharines, and Land Information Ontario.

2.6.1 Demographic Profile

Understanding population and the growth is an important consideration when assessing the existing conditions and the potential for active transportation in the City. St. Catharines' population is just over 142,500 in the 2021 Census and the City website reports at 2022 population of 144,829. The City is expected to grow to 143,800 by 2036.

Figure 2.4 shows the changes in population from 2011 to 2021 and the expected growth of St. Catharines. The City's Official Plan will accommodate projected population growth to urban areas that support mixed-use and compact land use, all the while preserving natural areas.

The City is divided into two primary planning areas – the Urban Area and the Agricultural Area. As noted in the 2018 Official Plan, 70% of the municipal planning area is the Urban Area and the remaining 30% of the municipal planning area is the Agricultural Area. The Official Plan notes that the Urban Area is intended to provide urban development opportunities to accommodate anticipated future population and growth. There is desire to preserve the characteristics of the rural lands and to support local agriculture activities. The ATMP network should prioritize the connection of key destinations and areas within the Urban Area Boundary.



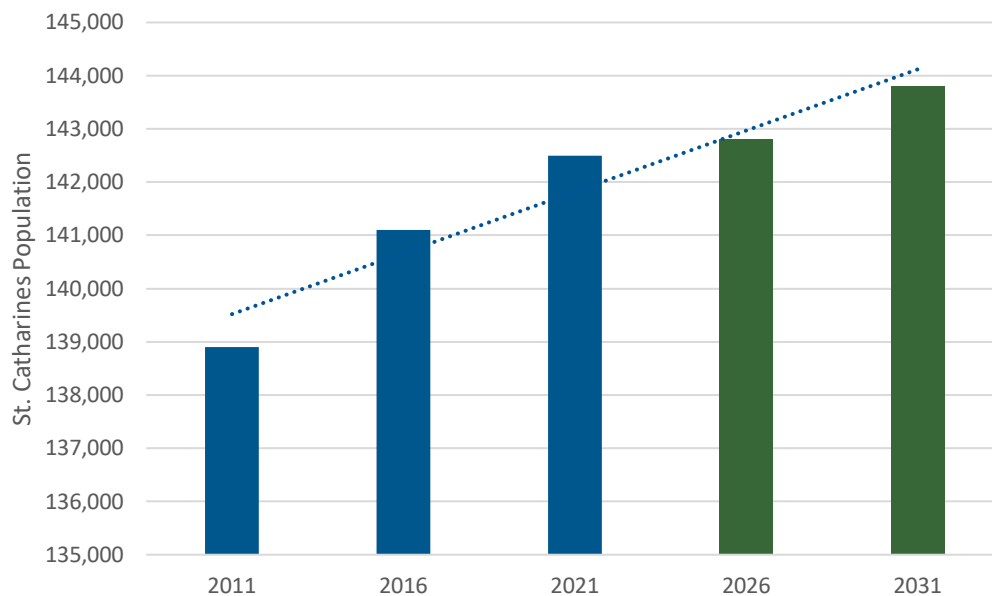
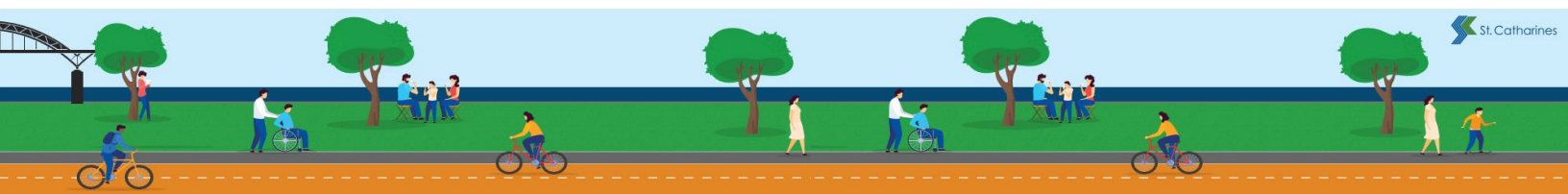
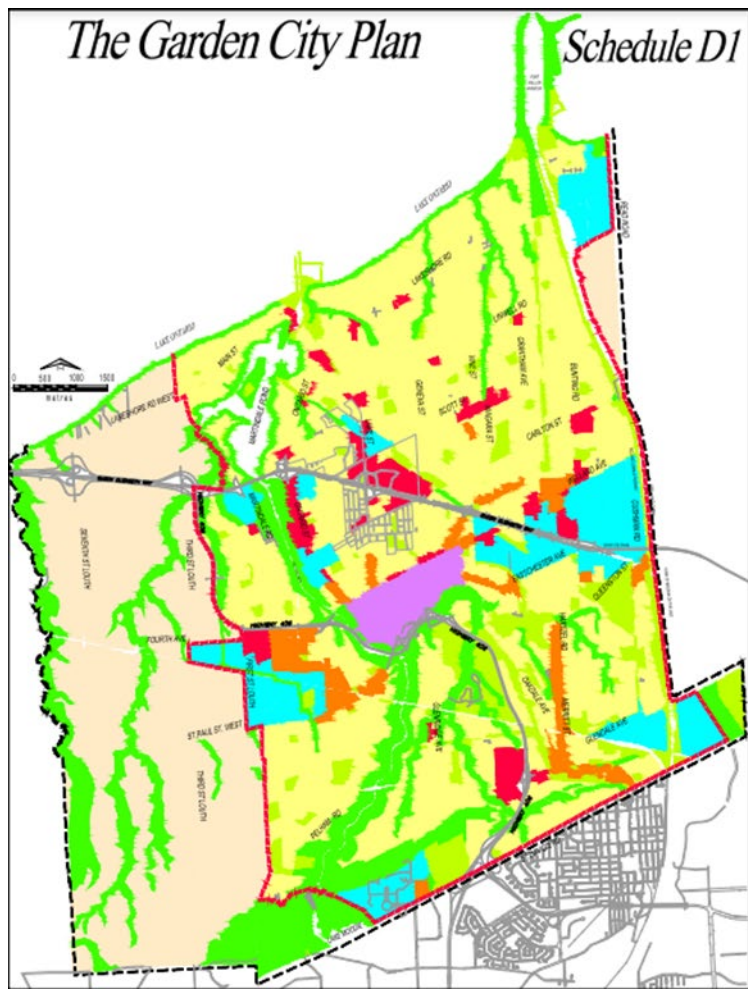


Figure 2.4. Population Growth and Growth Forecast in the City of St. Catharines. (Data Source: 2018 City of St. Catharines Official Plan and Statistics Canada Census)

The City of St. Catharines population is not centered around one particular location, rather the urbanized area of the City has medium-large pockets of dense communities separated by low-density single detached homes. The highest density areas of the City include Downtown St. Catharines and Western Hill. Smaller pockets of density are found in Port Dalhousie and the Grantham neighbourhood.





General Land Use Plan

- Neighbourhood Residential
 - Employment
 - Commercial
 - Mixed Use
 - Natural Areas
 - Parkland & Open Space
 - Agriculture
 - Downtown
- Urban Area Boundary

Figure 2.5. St. Catharines General Land Use Plan (Source: St. Catharines Official Plan (2018))



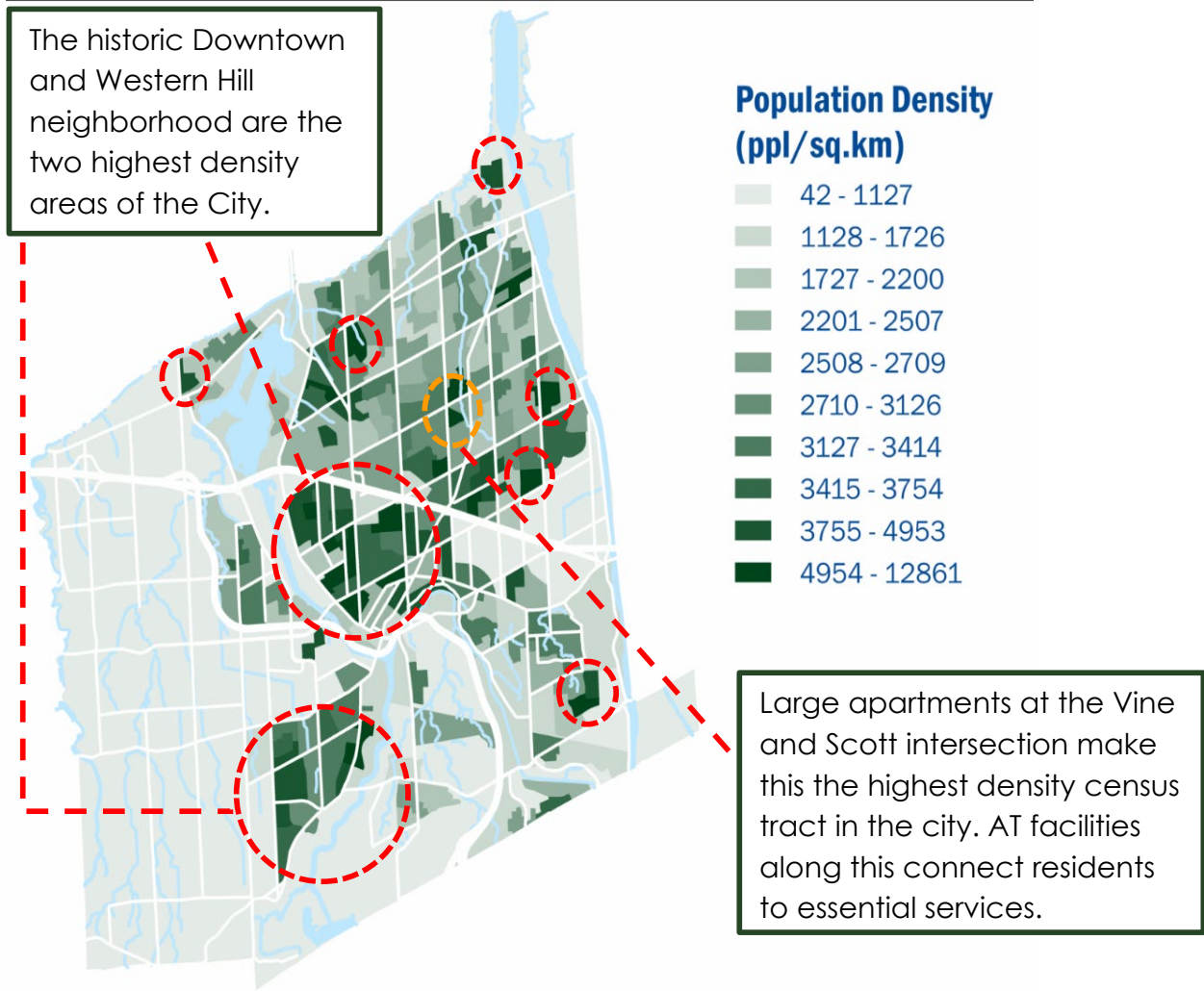


Figure 2.6: St. Catharines Population Distribution (Data Source: 2021 Census)



2.6.2 Population Distribution by Age

Enhancing active transportation infrastructure can improve the quality of life and accessibility experienced by both Youth and Seniors as these two groups are often the most limited by not having access to a car for mobility purposes. These two maps demonstrate the distribution of where seniors and youth aged 0-14 are primarily located. These maps will inform the development of where enhance all ages and accessibilities will need to be built. This follows the idea that if facilities are built for youth and seniors then it will improve the likelihood of all other residents using the facilities.

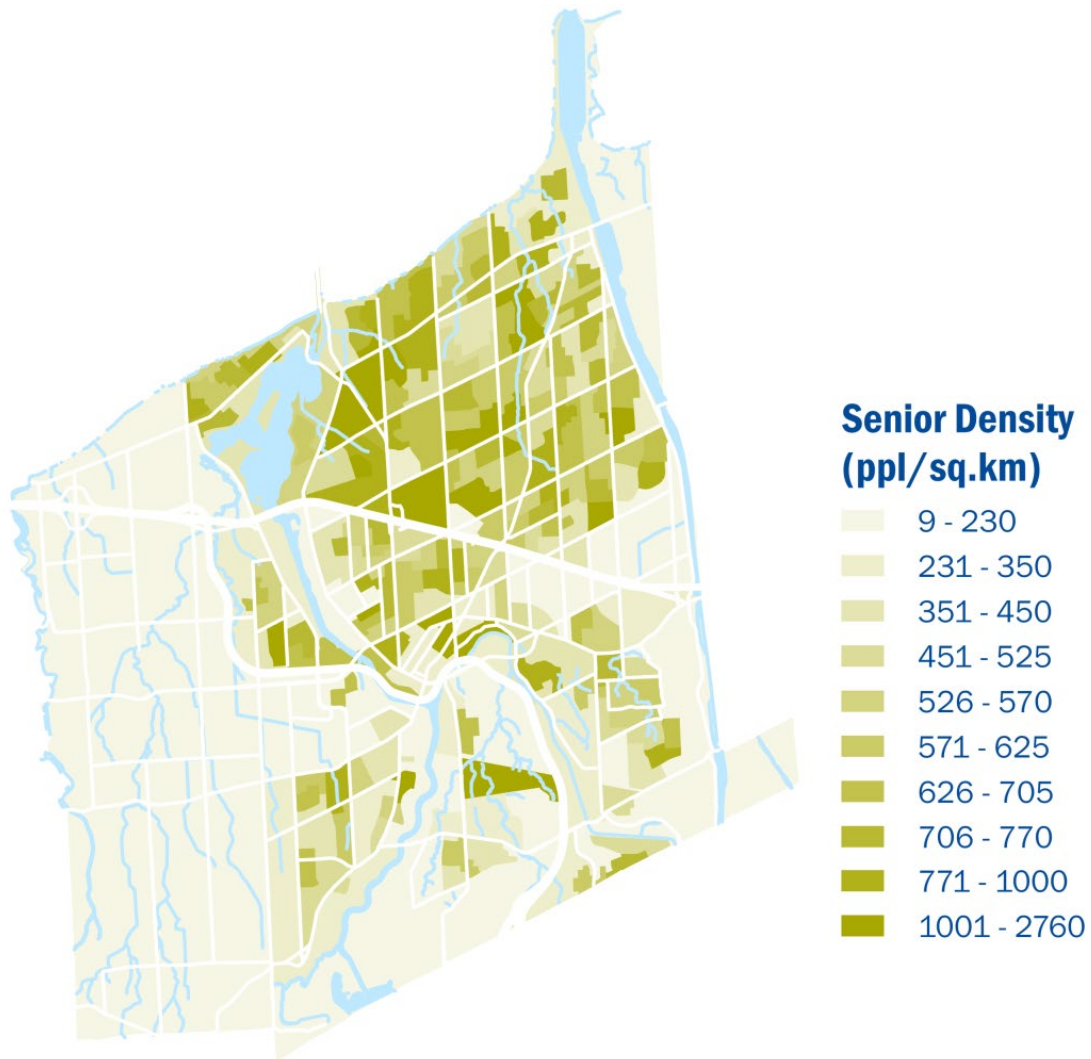


Figure 2.7. Senior Density (Data Source: 2021 Census)













Residents over the age of 65 are predominantly located in the Northeast-quadrant of the city north of the QEW with pockets of long-term care homes existing downtown and towards the escarpment. This highlights the importance of active transportation connections within the grid system to amenities, parks and essential services.

School Locations and Buffers

-  Schools
-  800m School Buffer
-  1.5km School Buffer

Youth Density (ppl/sq.km)

-  7 - 140
-  141 - 220
-  221 - 275
-  276 - 320
-  321 - 365
-  366 - 435
-  436 - 485
-  486 - 595
-  596 - 730
-  731 - 2535

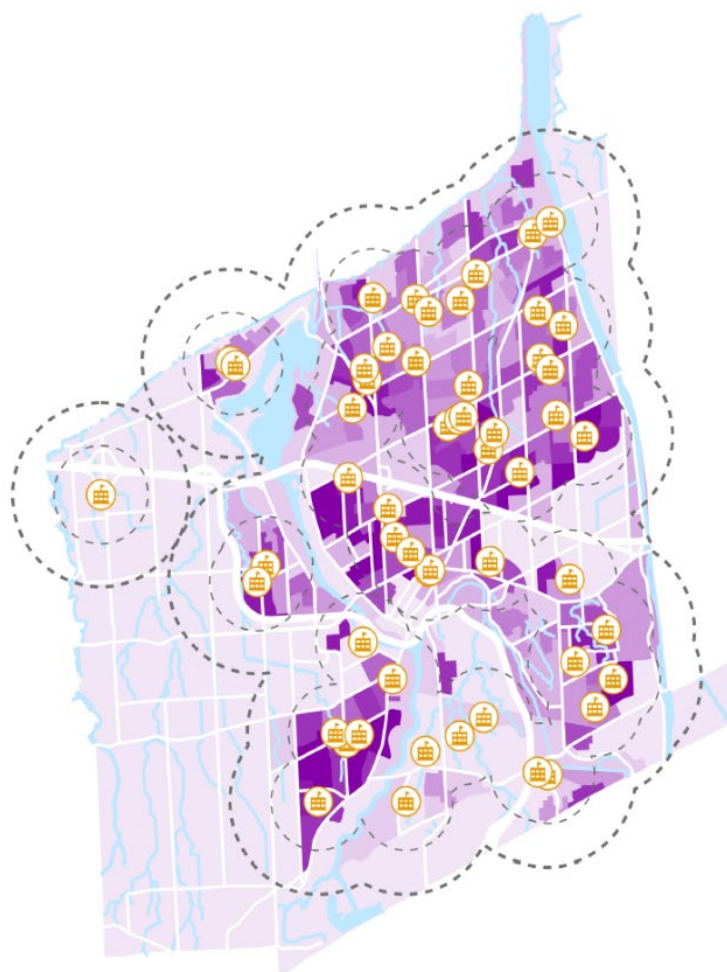


Figure 2.8. Youth Density and Access Range for Schools (Data Source: 2021 Census, City of St. Catharines)

As of 2020 the highest density of youth are located in the Northeast quadrant, adjacent to downtown, and in the Western Hill neighbourhood immediately south of the downtown area. With most of the schools in St. Catharines located within the urban area of the City, most of the City's young people live within 800m of a school, with nearly 100% of youth living within 1.5km of a school – a distance that represents an easy bike ride for most students and their caregivers.



Population Distribution Key Takeaways

St. Catharines is largely an urban community, with most residents living within 5km of major employment areas, activity hubs such as the Downtown core and major transit centres. The City's focus on creating Mixed Use neighbourhoods lends itself well to creating the conditions where active transportation is a routine part of people's daily lives. Where density already exists, or where future infill development is expected, the City should focus on expanding mobility choice to build upon the existing assets and create more sustainable, connected communities.

St. Catharines' areas of highest existing population density are primarily located near schools, areas with mixed use designations and downtown areas. Improving active transportation options in these areas provide families and youths with viable and sustainable alternatives for getting around the neighbourhood. The urban area also exhibits a higher presence of senior citizens, who are a key demographic group for active transportation as they may choose to walk and cycle as a form of low impact exercise and may also require assistive mobility devices and therefore additional accessibility considerations.



2.6.3 Visible Minority and Immigrant Population Distribution

Visible minority and immigrant communities may not have benefitted as much as other groups in terms of access to transportation routes and connections to transit or other supportive infrastructure. The distribution of these population groups was reviewed as part of an equity-focused approach and their options for transportation within St. Catharines.

The visible minority group captured by the 2021 Census includes following population groups: South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean, Japanese, and people of multiple visible minorities.

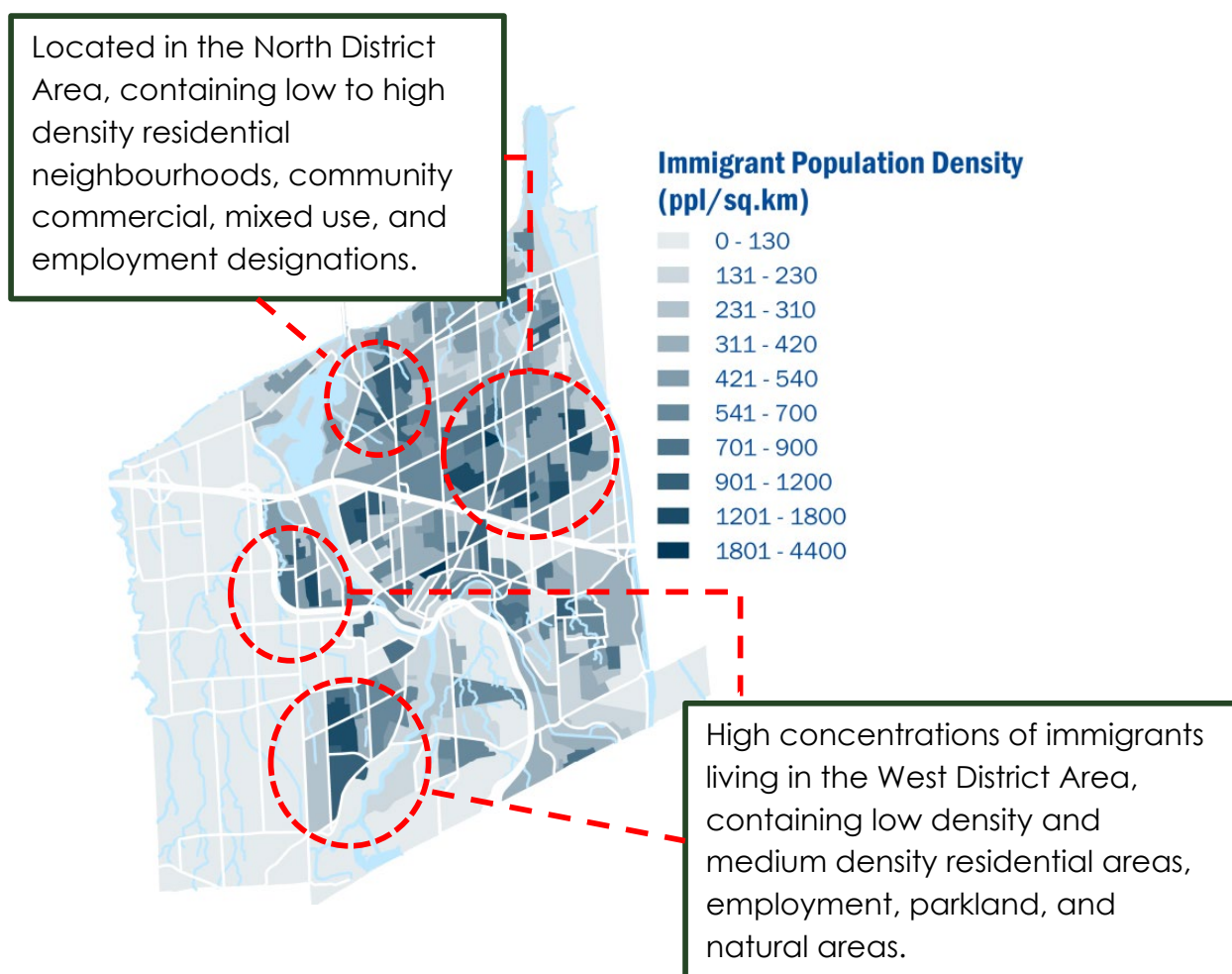


Figure 2.9. Distribution of Immigrant Population (Data Source: 2021 Census)



2.6.4 Economic Profile

2020 census data reveals that St. Catharines has a diversity in average median household incomes. The Historic Downtown and the Western Hill neighbourhoods have the lowest average median household income levels across the city, which is correlated with higher densities compared with other neighbourhoods in the city. Neighbourhoods on the periphery of the city such as Port Dalhousie, Port Weller, Glenridge and Merriton have higher than average median household incomes.

Lower-income households greatly benefit from improved active transportation infrastructure as it can improve mobility choice without requiring access to a car. Active transportation modes are more affordable and reliable than other modes, particularly for short trips within the City.

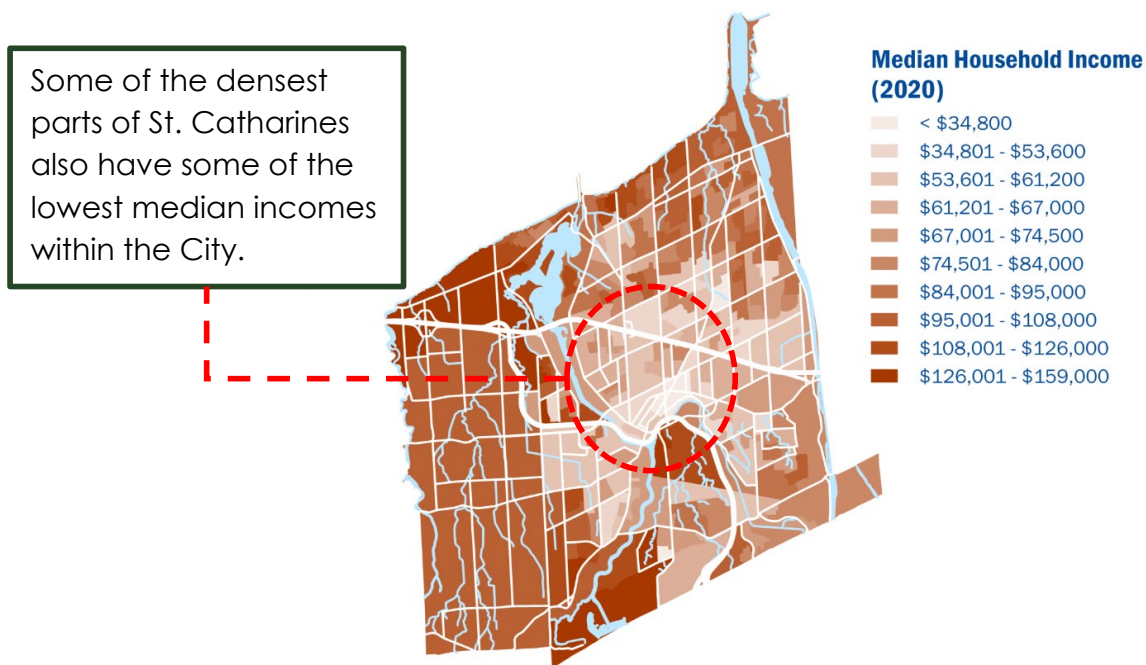


Figure 2.10. Median Household Income Distribution (Data Source: 2021 Census)

Investing in active transportation in areas with low median household income provides benefits for the entire community. It can enhance social equity, reduce greenhouse gas emissions, improve health and well-being, and support local businesses, resulting in a more inclusive and sustainable transportation system for all.

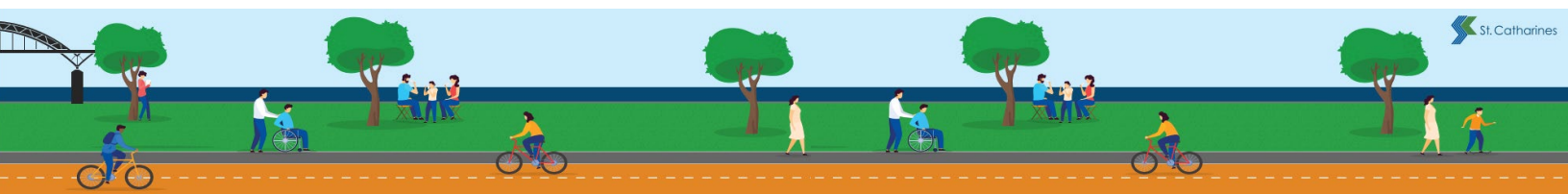


2.7 Route Selection Criteria

Based on the Vision and Objectives of the ATMP in **Chapter 1** and informed by the City existing policy documents, the route selection criteria were refined as part of the network development process. These criteria are used to identify candidate routes and to prioritize future investments into active transportation projects. By evaluating potential routes through these criteria, the ATMP will recommend investments that support active transportation and advance the City's strategic goals.

The route selection criteria are based on established best practices, while also considering the context and existing policies of the City of St. Catharines. However, these criteria should not be seen as a barrier for projects that have high levels of public demand or have been identified in previous planning processes. They are meant to serve as a foundation for the candidate route evaluation and guide the selection of active transportation projects that align with the City's goals. The route selection criteria include:

- *Safety and Accessibility:* Active transportation routes should be designed to improve safety and enhance accessibility. Active transportation routes are prioritized based on their degree of safety improvement compared with current conditions.
- *Connected and Continuous:* Active transportation routes should provide a consistent user experience, providing comfortable, continuous routes throughout the City of St. Catharines. Routes that close gaps in existing routes or provide an opportunity for a consistent active transportation corridor should be prioritized.
- *Feasibility:* Projects will be evaluated based on the level of capital investment required, their alignment with existing capital works projects and property ownership constraints to ensure that proposed routes have a high degree of constructability during the lifespan of this Plan
- *Support Multi-Modal Needs:* Routes that support the development a multi-modal transportation system by providing connections to transit facilities and other key destinations should be prioritized. First and last mile connectivity to transit service will improve accessibility and convenience for all users.



- *Connects and Expands upon Existing Trails:* The City's existing Trails system should be expanded, with on-road and in-boulevard facilities providing a comparable level of safety, comfort and accessibility to the existing off-road trails. Routes that connect to the City's existing trails should be prioritized.
- *Connections to Green Space:* Active transportation facilities should provide connections to parks and green spaces and enhance opportunities for residents to engage with natural areas on a regular basis.

2.8 Active Transportation Potential

The City of St. Catharines is committed to creating a safe, comfortable, and convenient active transportation network that connects people to their destinations and addresses their transportation needs. To maximize the impact of the City's investments in active transportation, the project team developed an active transportation potential map to guide decision-making when financial resources are limited. The map identifies the areas of the city that have the highest potential demand for active transportation, based on a variety of factors that influence people's travel choices and preferences. These factors include:

- The percentage of short trips (less than 5 km) made by location, based on the 2016 Transportation Tomorrow Survey.
- The population density, employment density and density of destinations (such as retail, services, recreation and entertainment) within each neighbourhood, based on the 2016 Census and land use data.
- The proximity to key destinations for demographic groups that can benefit from active transportation such as schools and seniors' residences.
- The demographic characteristics of the residents, such as age, income, newcomer status, employment and levels of disability, based on the 2016 Census and the 2016 Transportation Tomorrow Survey results.

The results of the Active Transportation Potential analysis are shown in **Map 5**.





ACTIVE TRANSPORTATION MASTER PLAN

FINAL | JULY 2024

MAP 5

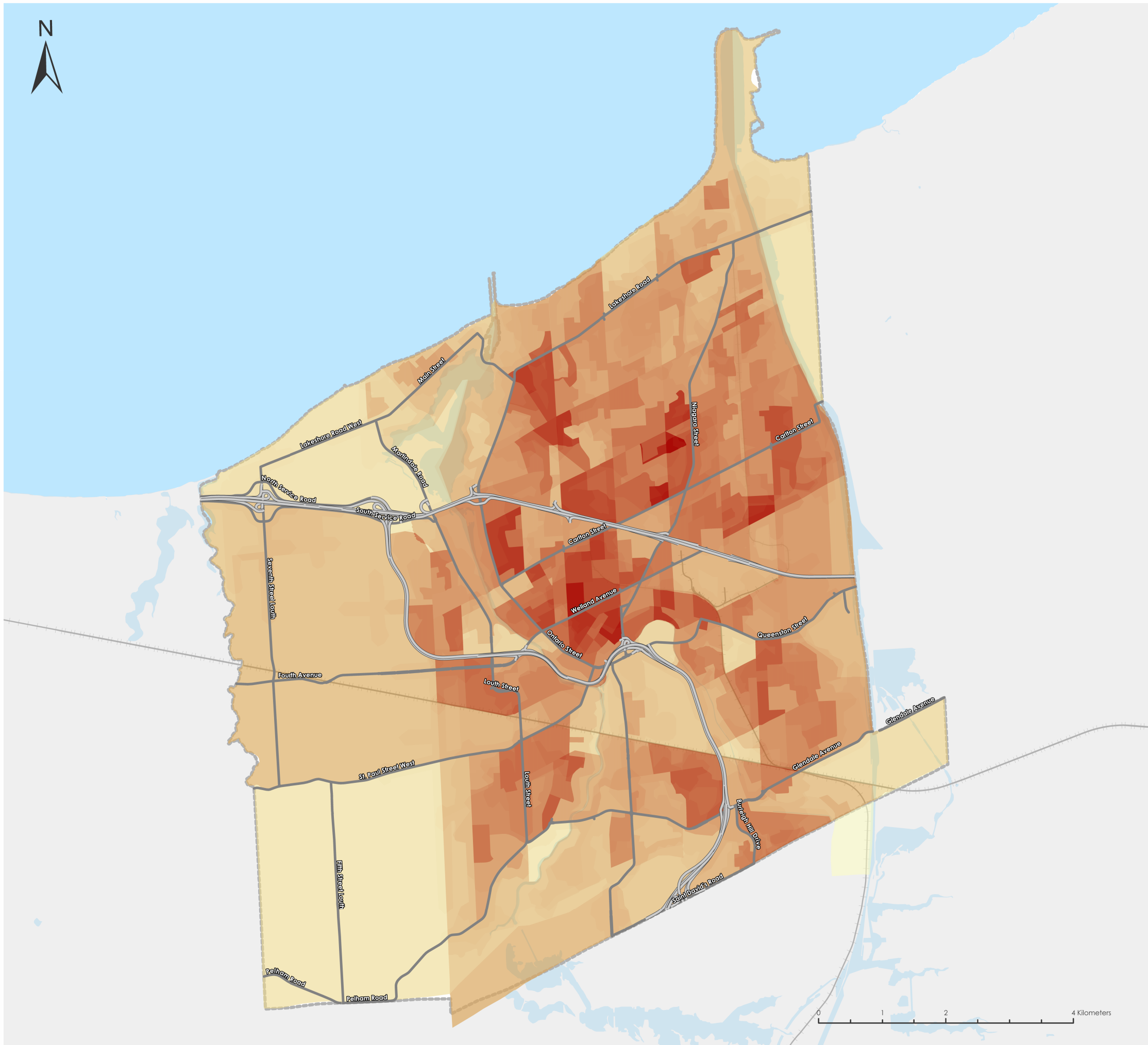
Active Transportation Potential

Active Transportation Potential

Lower Potential



Higher Potential

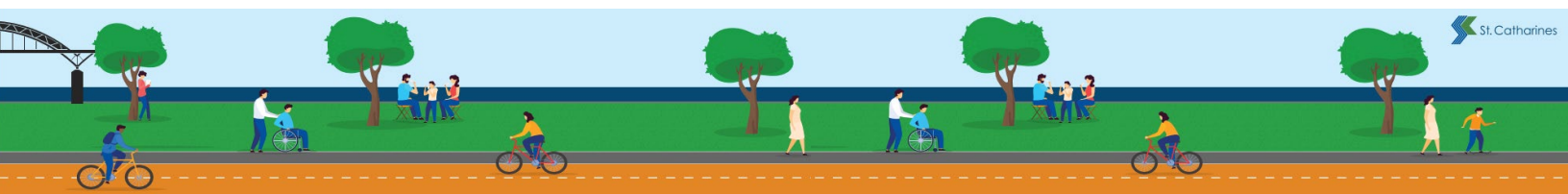


Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



Map 5 highlights locations where there is high potential for uptake of active transportation and where there are high numbers of residents who may benefit from safe active transportation infrastructure, or residents who are more likely to already rely on active transportation. Based on the analysis, areas of the City that have a high potential for active transportation include the Downtown area, Western Hill and several neighbourhoods in the northeast area of the City. Many of these areas have gaps in the active transportation network, barriers to access, or low-quality facilities that discourage people from choosing active transportation modes.

By focusing on these areas, the City can improve the level of service and attractiveness of the active transportation network, and increase the mode share of active transportation. It should be noted that the active transportation potential map is not intended to be the sole criterion for selecting and prioritizing routes for implementation. The map is meant to be only one component of the analysis of the network, and it should be used in conjunction with the other route selection criteria established above. While it can guide investments in the short term, it should not preclude investments in other connections across the City from being made when opportunities arise.





Chapter 3: Active Transportation Routes

3.1 Route Types

The Active Transportation Master Plan aims to provide the City of St. Catharines with an actionable plan that implements the City's **Complete Streets** approach as outlined in the Transportation Master Plan (2021). Building off the lessons in the TMP and the understanding of what a Complete Streets approach means in practice, this Plan aims to identify which roads should be prioritized for walking, cycling and wheeling within the City to provide a connected, continuous and comfortable network for all road users. When routes are prioritized for comfort and connectivity, it allows for a more targeted approach to implementation, maximizing the utility of the City's network.

The purpose of the development of a Hierarchy of active transportation facilities is to prioritize investments and create a cost-effective network throughout the City. Creating connected, comfortable routes that bring residents to key destinations will have a higher degree of impact on mobility patterns in St. Catharines than spreading investments out without consideration given to how design users will experience those corridors. As a result of this user-focused approach, the City will be able to maximize its return on investment as it proceeds with implementation.

This chapter outlines the different types and functions of proposed active transportation routes in the City, identifying what types of design and maintenance considerations each route type should have. The network hierarchy does not prescribe specific facility types to each route but describes how the route may be used to guide implementation. In order to create a safe, comfortable, and functional network for St. Catharines, four types of on-road and four types of off-road routes are described here:

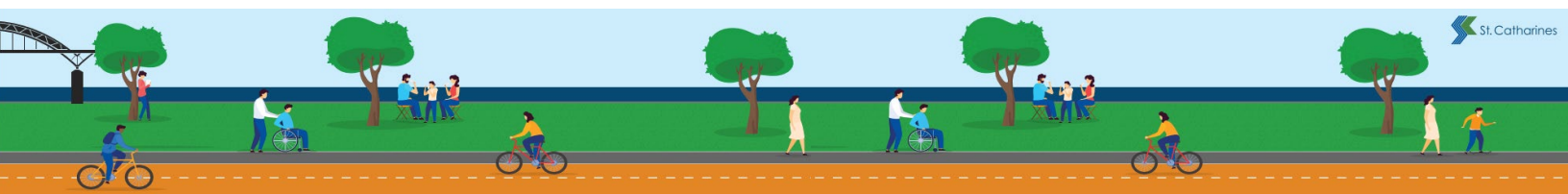
On Road Routes:

- Spine Routes
- Connector Routes
- Neighbourhood Greenways
- Rural Routes

Off Road Routes:

- Paved Spine Trails
- Paved Connector Trails
- Granular Connector Trails
- Recreational Trails

These route types serve different needs as users travel through the City, but they all should be designed and implemented with the overall objective of keeping



active users on the most comfortable route for as much of their journey as possible.

3.2 Active Transportation Network Hierarchy

3.2.1 On-Road Hierarchy

Spine Routes

Spine Routes are major routes for active users to access key destinations and other parts of the City. They connect to commercial areas, employment centres, educational institutions and greenspaces throughout the City, providing a direct, continuous route to walk, bike or wheel. Most of the Spine Routes within this Plan will be located on arterial or collector roadways, reflecting the important destinations and amenities that often exist along those corridors.

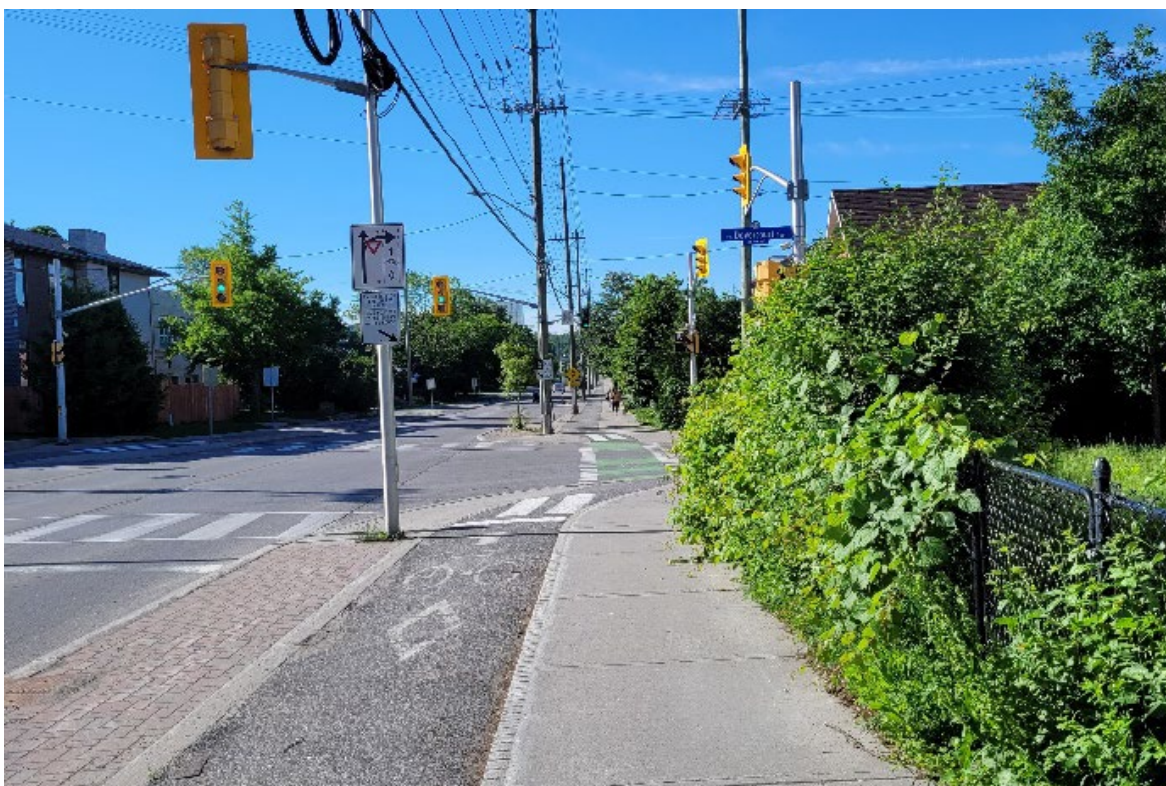
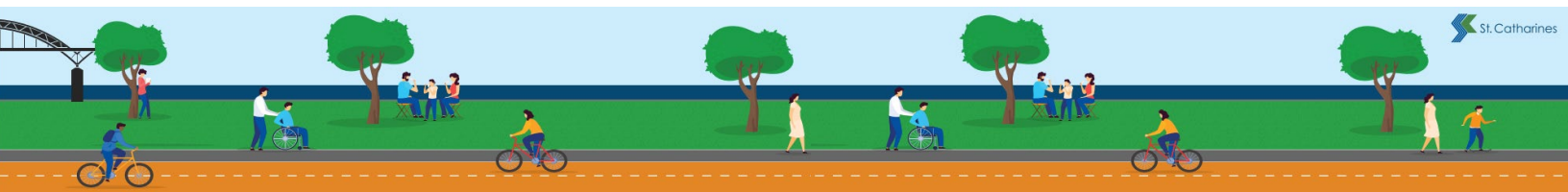


Figure 3.1: Cycle Tracks, Ottawa

Spine Routes should be designed to serve people of all ages and abilities, creating comfortable conditions for people to walk, bike or wheel. In practice,



this means that when a Spine Route is due for reconstruction, best practice design for active transportation infrastructure should be applied. Wide sidewalks, curb-separated cycle tracks, protected intersections and continuous crossings at minor intersections and driveways will help to create an environment where active users feel safe and comfortable, helping to grow the number of people using active modes within the City.



Figure 3.2: Parking Protected Bike Lane

Given their importance to the active transportation network, some Spine Routes have been identified as priority routes for Retrofit installations. Many of the routes



identified as Spine Routes may not be due for reconstruction for several years, which could significantly delay the implementation of a complete, connected network within the City. To create a consistent, connected network in the short term, retrofit conditions can be applied to several of the key corridors within this plan. Retrofitting routes should be done with the goal of providing as much comfort as possible for active users typically using barriers, bollards and other methods of providing physical separation. Where Spine Routes utilize lower traffic stress roads, traffic calming and traffic diversion measures may be implemented to create safe conditions for shared operating space. Guidance on facility selection is provided at the end of this Chapter. More details on the suggested materials and designs for retrofits in St. Catharines can be found in **Chapter 4**. Renderings of Spine Routes are shown in **Figure 3.4** to **Figure 3.7**.

Maintenance Considerations

Spine Routes, as the name implies, are of the utmost importance to the active transportation network in St. Catharines. As a result, these corridors should be subject to an elevated level of maintenance, both in the winter and non-winter months.

In Winter, Spine Routes should be cleared with the same level of priority as an arterial roadway within the City. Efforts should be taken to maintain these routes to bare asphalt as much as possible to prevent the buildup of snow and ice. For a community with a relatively mild winter climate like St. Catharines, the key concerns are removing snow when major snowfall events occur and preventing the development of ice.

The implementation of Spine Routes must be accompanied by the necessary resources to remove snow within an appropriate time, and should be supplemented by a “Brush and Brine” winter maintenance regime, which has been shown to both use less salt than traditional salt applications and to reduce ice formation more effectively.

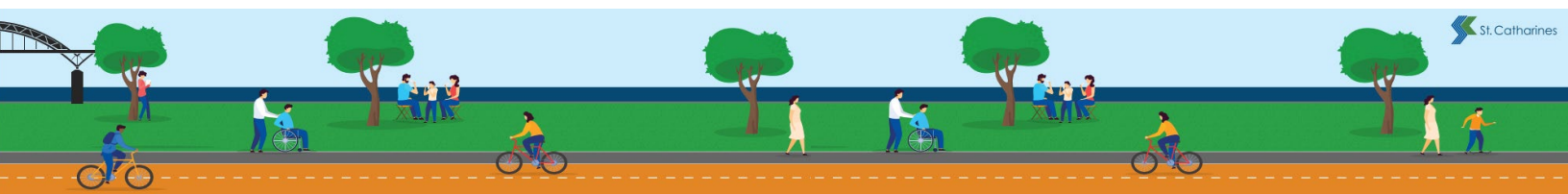




Figure 3.3: Retrofit Bidirectional Physically Separated Bicycle Lane

During non-winter months, Spine Routes should be inspected regularly. Retrofit routes should be swept monthly to remove debris, and any elements of the on-road infrastructure that is damaged or moved should be repaired or replaced promptly – ideally within 48 hours of a report.

Additional details on the recommended level of service and approximate annual costs for maintenance is included in **Chapter 5**.

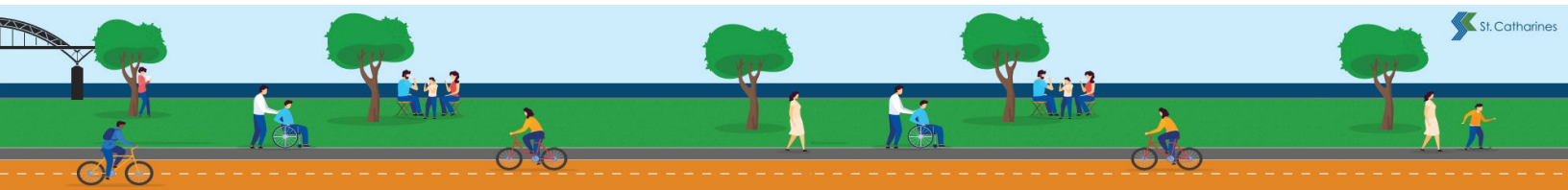




Figure 3.4: Lake Street Spine Route - Reconstruction with Cycle Tracks



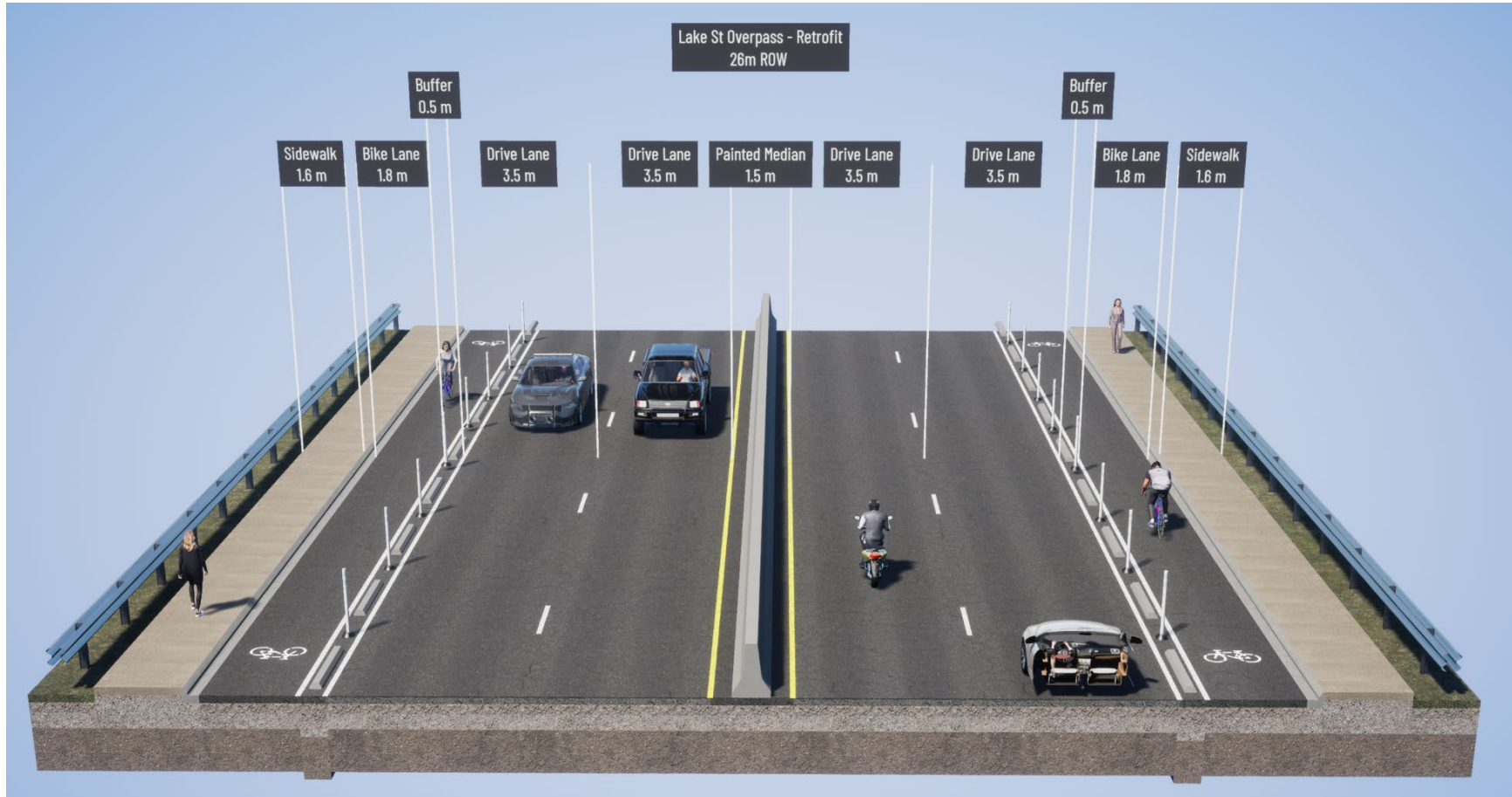


Figure 3.5: Lake Street QEW Overpass - Retrofit with Protected Bike Lanes



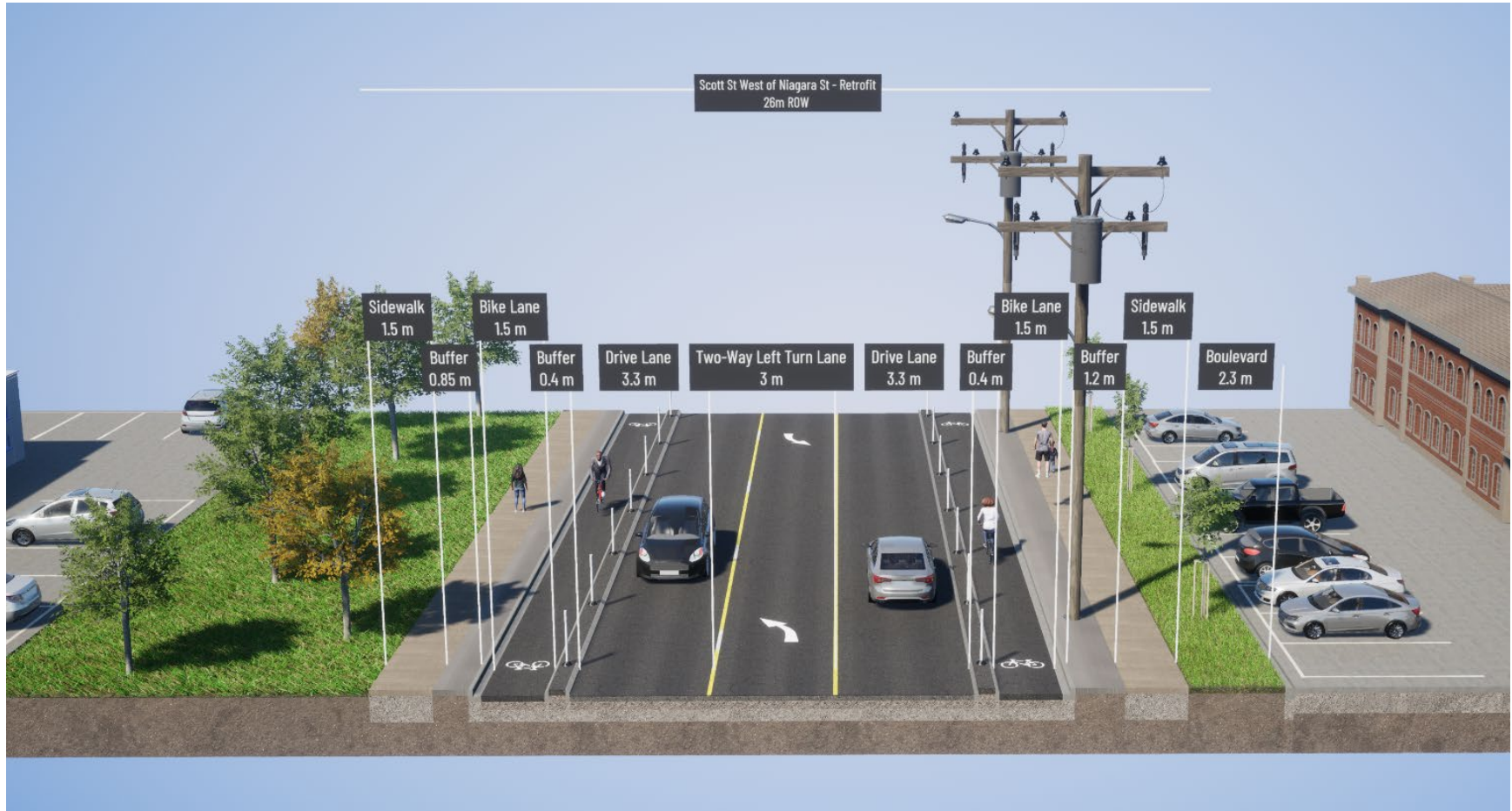


Figure 3.6: Scott Street Spine Route - Retrofit with Protected Bike Lanes





Figure 3.7: Scott Street Spine Route - Reconstruction with Cycle Tracks



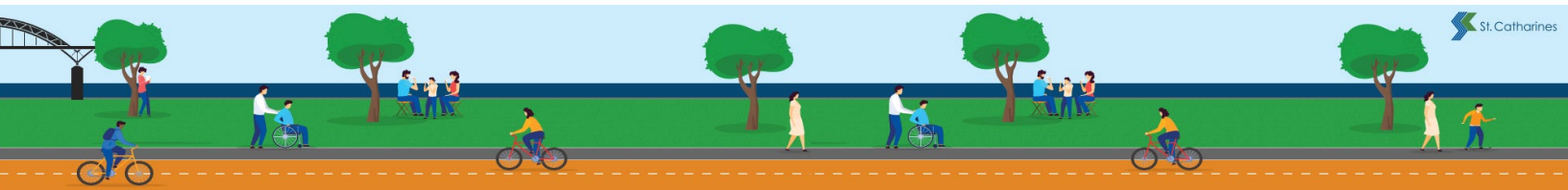
Connector Routes

Connector Routes are designed to help active transportation users to get to and from Spine Routes quickly, easily and in comfort. Connector Routes will typically be on roads with lower vehicular volumes and speeds than Spine Routes, allowing for the creation of facilities that do not provide physical separation between active users and motor vehicles.



Figure 3.8: Painted Bike Lane

The core concept of Connector Routes is to provide a short, direct connection between Spine Routes. The design user for these routes is not an All Ages and Abilities User, but rather is what this plan defines as a **Mainstream User**. A Mainstream User would still largely fall into the “Interested But Concerned” category, but may not have the same design needs as an All Ages and Abilities User in every situation.



As these Connector Routes are scheduled for reconstruction, consideration should be given to how the rebuilt corridor can elevate the active user experience and serve the needs of AAA users, but these corridors would not have as high a priority for implementation as Spine Routes identified within this Plan.



Figure 3.9: Contraflow Bike Lane

Maintenance Considerations

Connector Routes will largely be located within the existing roadway surface, so their maintenance should be done to the same standard as the adjacent roadway.

Non-winter maintenance should include annual repainting of lines and wayfinding and inspections of surface conditions.



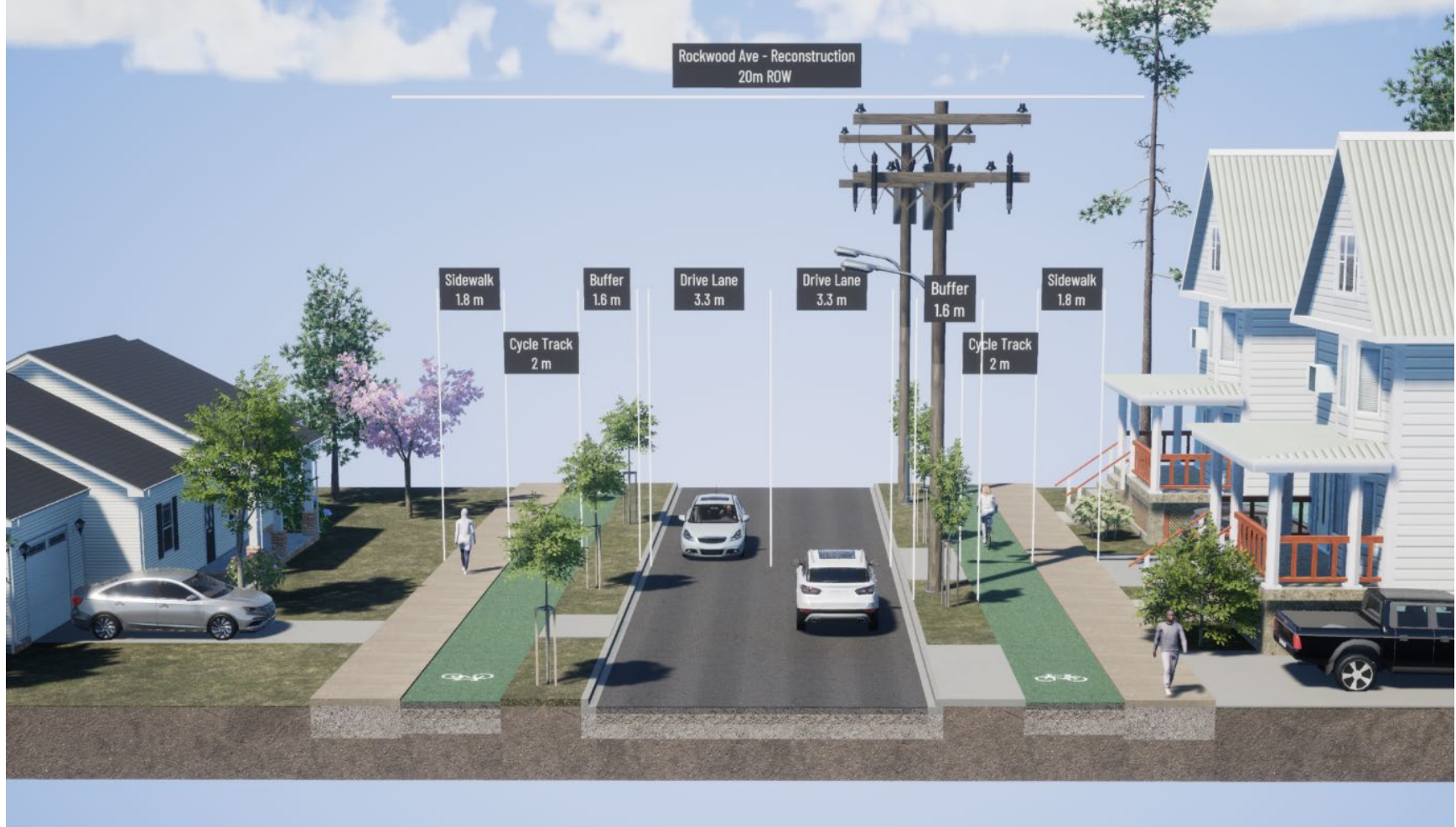


Figure 3.10: Rockwood Avenue Connector Route - Reconstruction with Cycle Tracks





Figure 3.11: Mac Turnbull Drive Connector Route - Retrofit with Protected Bike Lanes





Figure 3.12: Chetwood Street Connector Route - Retrofit with Advisory Bike Lanes



Greenway Network Routes

The proposed Greenway Network forms local connections and alternative routes for cycling on neighbourhood streets that are designed for low traffic speeds and low traffic volumes. The facility type associated with these types of routes are often referred to as neighbourhood bikeways or greenways, an example of which is shown in **Figure 3.13**. These types of routes are suitable for All Ages and Abilities use, but only when designed to reduce both the speed differential between users and reduce the priority given to automobile traffic in these areas. The idea of the Greenway Network is that cars are still permitted on these routes, but are not the priority design user. They prioritize mobility for people walking, cycling and wheeling while still allowing access for local residents, on-street parking and access for service and emergency vehicles.

Vehicle operating speeds on Greenways should be limited to 30 km/hr through traffic calming measures to create safe conditions for mixing vehicles and other road users. Changes to speed limits and signage are not sufficient on their own to create a Greenway; physical changes to the street are required. Traffic calming measures may include speed cushions, chicanes, roadway narrowing or centreline bollards. The goal of all traffic calming measures on these corridors is to reduce vehicle speeds to reduce the differential between motor vehicle speeds and active users, creating more comfortable conditions for active users.

In addition to traffic calming, Greenways should also incorporate elements of traffic diversion, including modal filters, directional closures, one-way streets and full closures at certain areas to reduce through movement by automobiles. Greenways should aim for a maximum daily traffic volume of 500 vehicles per day or less to provide an All Ages and Abilities active transportation experience for all users.

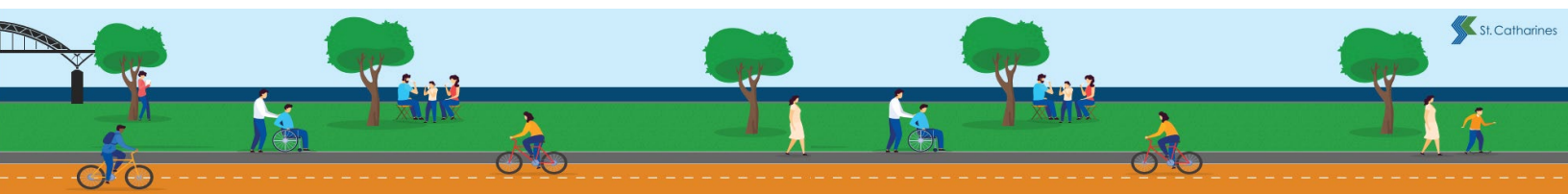




Figure 3.13: Neighbourhood Greenway, Ottawa



Maintenance Considerations

Greenways are exclusively located on residential streets in St. Catharines, so the maintenance standards for those corridors (especially in the winter) tend to be lower than corridors that would otherwise make up the City's active transportation network.

Given their importance to active mobility, Greenways could be subject to an elevated standard of maintenance as the network develops, to provide reliable routes during the winter months for commuters.

Non-winter maintenance for Greenways can be similar to maintenance standards for residential streets, but should include a faster response time for reports, especially if reported conditions could create unsafe conditions for the design user of these corridors.

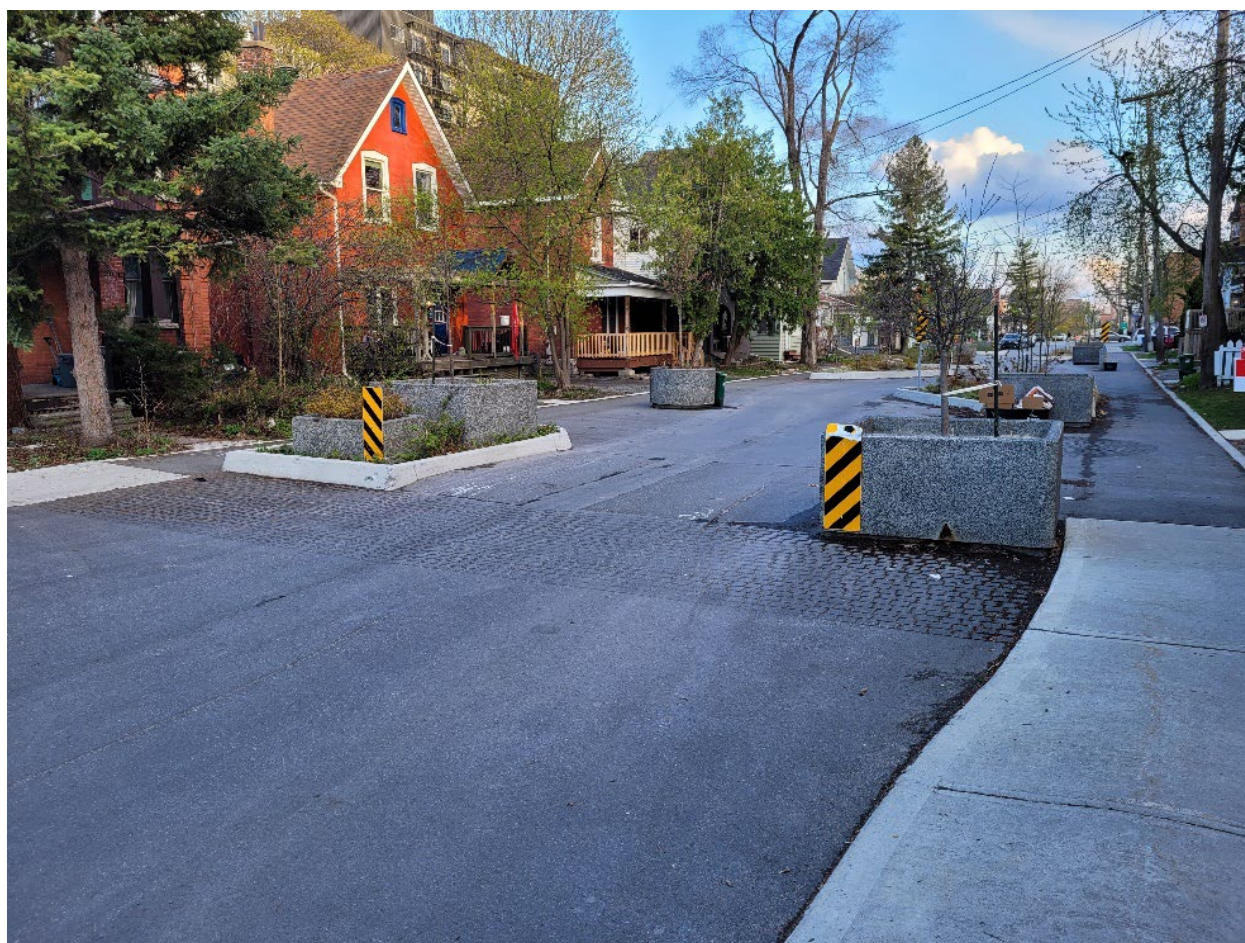


Figure 3.14: Transition to Neighbourhood Greenway, Ottawa



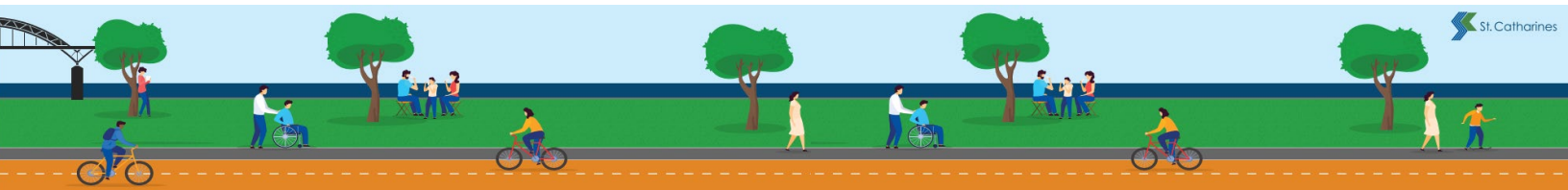
Rural Routes

Rural routes provide cycling connections outside of the urban area, typically connecting to neighbouring municipalities or agricultural employment areas. Rural routes may be used for both recreation and utility purposes. People working in rural areas and those who live in rural areas of St. Catharines or in adjoining communities may cycle using rural routes as a practical transportation mode.

Vehicle operating speeds are typically higher in rural areas, so physical separation from vehicle lanes is important for creating comfortable and safe cycling facilities. Rural routes are typically recommended to include a paved shoulder (with or without a buffer) or a separate multi-use path depending on the characteristics of the roadway and the anticipated usage of the route.



Figure 3.15: Paved Shoulder, Aurora



Maintenance Considerations

Rural Routes are generally maintained to the same standards as the adjacent roadway during the winter, frequently cleared merely by extending the wing of the snowplow.

During non-winter months, the build up of debris, gravel and other materials can create hazardous conditions for people cycling, so sweeping should be performed routinely – ideally monthly to maintain a clear, safe path of travel.



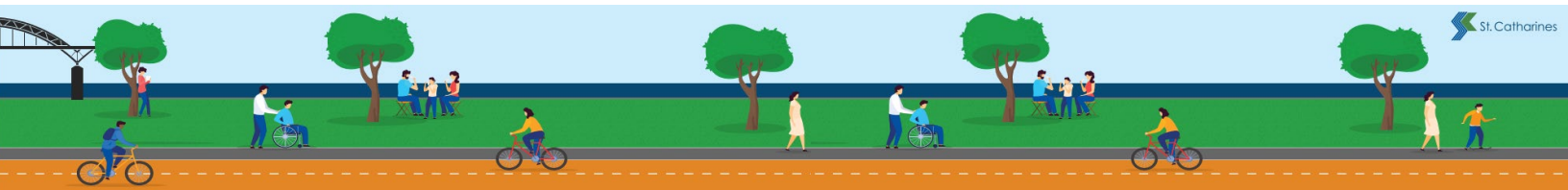
Figure 3.16: Buffered Paved Shoulders, Penetanguishene

3.2.2 Trails Hierarchy

Spine Trails

Spine Trails are major routes for active transportation users to access key destinations and other parts of the City. These Trails connect directly with the on-road Spine Routes to create a seamless network that takes advantage of St. Catharines existing trails while providing direct, comfortable connections all across the City. These Trails accommodate AAA Users by virtue of their location away from vehicular traffic, and are already popular routes within the City. Spine Trails should be designed to accommodate a higher volume of users, with a desired width of 3.5 – 4.5 m to facilitate comfortable passing operations.

Spine Trails should be considered for lighting and enhanced security features such as call boxes to improve comfort at night. All Spine Trails should be paved,



allowing for four-season use by people walking, cycling and wheeling in the City.

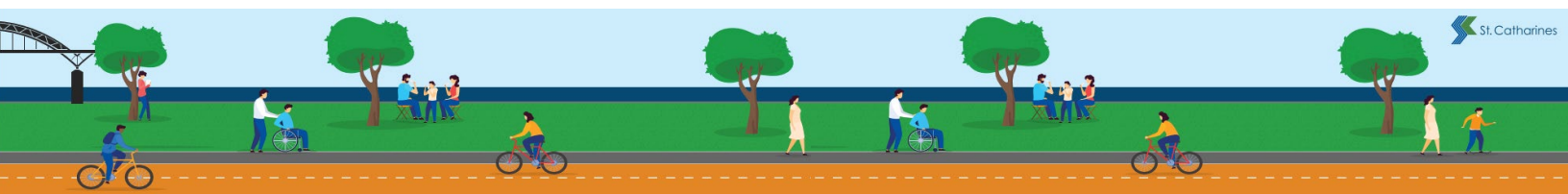
Maintenance Considerations

Spine Trails should have the same maintenance standards as on-road Spine Routes to recognize their importance in the overall network within the City. These trails can often be cleared by a pick-up truck with a plow in the winter, especially when designed to a 3.5 m width or higher.

During non-winter months, Spine Trails should be inspected regularly, with vegetation maintained to ensure that it does not interfere with the path of travel or with sightlines at intersections. Reports should be addressed within 48 hours to ensure that these important corridors remain comfortable for all users.



Figure 3.17: Welland Canals Trail, St. Catharines



Connector Trails

Connector Trails create connections to the Spine Network. They often provide less direct alternatives to Spine Routes and experience lower volumes of active transportation users. They are typically physically separated from vehicle traffic and not located within a road right-of-way.

Connector Trails may be paved or unpaved. The desired width for Connector Trails is 3.0 metres but should be monitored and considered for widening as volumes of active transportation users increase.



Figure 3.18: Terry Fox Trail, St. Catharines



Maintenance Considerations

Connector Trails are not the priority for winter maintenance. These routes typically require annual inspections, ensuring their structural integrity and safety standards are met as well as drainage is being retained. In addition, annual vegetation removal is essential to prevent any obstructions that may impede users' path of travel or sightlines at intersections during non-winter months. Reports on maintenance issues should be promptly addressed to guarantee the uninterrupted comfort and functionality of these crucial corridors for all trail users.

Recreational Trails

Recreational Trails are typically not used for transportation or utility purposes; their main purpose is to provide comfortable spaces for recreation and activity. They are not typically connected to the Spine or Connector networks and may be located in parks or natural areas. The widths of Recreational Trails vary based on location and user volumes. The surfacing of Recreational Trails could be natural soil, granular, or paved.

Maintenance Considerations

Recreational trails are designed primarily for leisure and not commuting resulting in sparse maintenance as they are not a major part of the ultimate cycling network. Notably, these trails do not undergo winter maintenance due to their recreational focus. Instead, their maintenance revolves around annual inspections to assess their overall condition and safety. This approach ensures that these trails remain well-suited for their intended purpose of providing recreational enjoyment throughout the year.

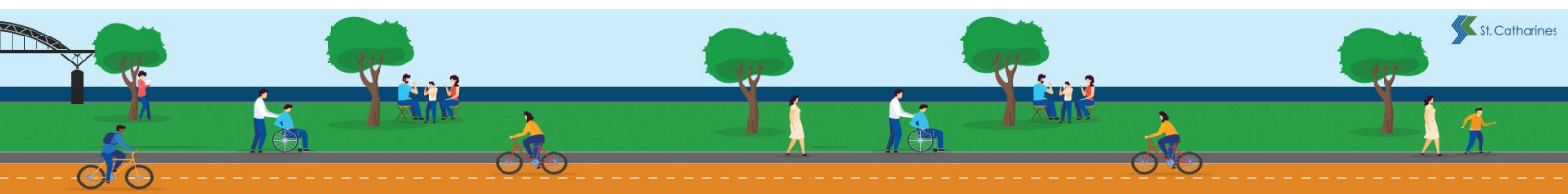




Figure 3.19: George Nicholson Trail, St. Catharines

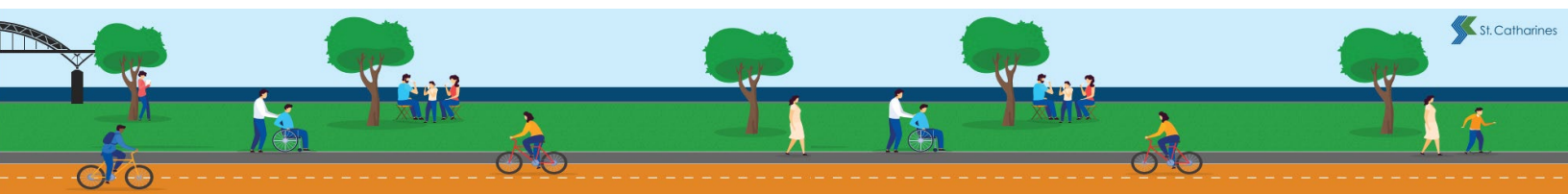
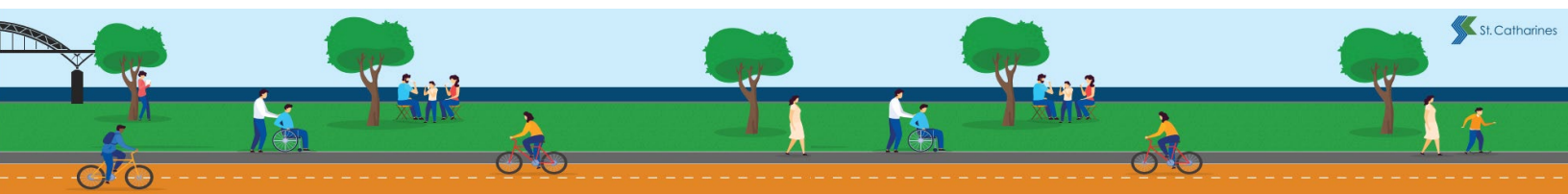




Figure 3.20: Bruce Trail, Niagara-on-the-Lake



3.3 Facility Selection

It is important to consider that the proposed network hierarchy for the Proposed Cycling Network does not necessarily dictate the facility type that will be implemented, but rather the goal for the level of comfort and the function that the route will provide for active users. High levels of comfort will be achieved by minimizing the level of traffic stress, either by increasing separation on routes that experience high traffic volumes and speeds, or by reducing traffic volumes and speeds through traffic calming or diversions.

The existing level of traffic stress should be reviewed during the design of the route to determine the type of treatment needed. Where the existing level of traffic stress is high, the target comfort level and degree of separation should also be high, requiring separated facilities. Roads with moderate levels of traffic stress do not require as high of a degree of separation to achieve medium to high levels of comfort. Local roads with low traffic stress can achieve a high level of comfort by simply slowing vehicle speeds and diverting through traffic to create conditions that are safe and comfortable for shared operating space.

Table 3.1 shows the facility type appropriate for each level of traffic stress.

Table 3.1: Minimum facility type based on Level of Traffic Stress (LTS)

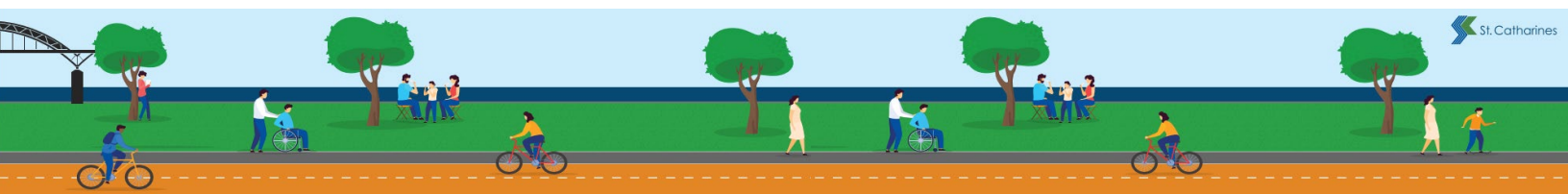
Existing Level of Traffic Stress	Minimum Facility Type
High	Physically Separated Facility: Separated bicycle lane with concrete and bollards, multi-use path.
Moderate	Designated Space: Bicycle lane, buffered bicycle lane, contraflow bicycle lane.
Low	Greenways: Traffic calming measures and traffic diversion measures.



Applying this approach to the Proposed Cycling Network, Spine Routes are often on arterial roads with high levels of traffic stress, requiring a high degree of separation and physically separated facilities. However, Spine Routes may also utilize local neighbourhood roads, where traffic calming and traffic diversion measures that create safe shared operating space can provide a high-quality cycling route. The matrix below in **Table 3.2** shows the existing levels of traffic stress that may be present each route type of the on-road hierarchy, which in turn informs the appropriate facility types.

Table 3.2: Existing levels of traffic stress along each type of route for the on-road hierarchy

	Low LTS	Medium LTS	High LTS
Spine Routes	✓	✓	✓
Connector Routes	✓	✓	
Greenways	✓		
Rural Routes		✓	✓





Chapter 4: Rapid Implementation Network

4.1 What is the Rapid Implementation Network?

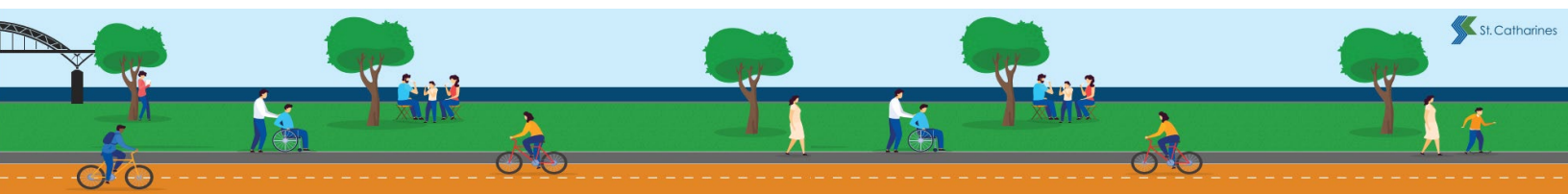
The Rapid Implementation Network is a set of priority routes selected from the ultimate active transportation network that are slated to receive treatments to make a city-wide all-ages and abilities network within 3 years of adopting the ATMP. The system will feature a series of low-cost solutions such as prefabricated bollards, barriers, and intersection treatments used on spine routes, connector routes and Greenways to allow for the benefits of a complete, connected active transportation network to be realized in the near future while the Ultimate Active Transportation Network is developed over time as outlined in **Chapter 5**.

The cost-effective nature of the Rapid Implementation Network creates opportunities to create a complete, connected network in the short-term, leveraging the benefits that arise when a network provides seamless connectivity. As more residents gain experience using all-ages and abilities routes, support for the complete build-out of the ultimate network will grow, supporting the City as it moves towards a stronger culture of sustainable mobility.



Figure 4.1: A typical example of the 4 stages of All Ages and Abilities facility development. The Rapid Implementation Network expedites the development process by going straight into the quick-build phase.

Figure 4.1 demonstrates that a common four-step process that municipalities take when developing all ages and abilities active transportation infrastructure – especially new active transportation routes. Moving from temporary demonstration of how All Ages and Abilities facilities will look and feel, communities frequently move towards a pilot project to evaluate how solutions impact behaviour, developing an interim solution based on those lessons learned, and then finally to building a permanent facility. The rapid

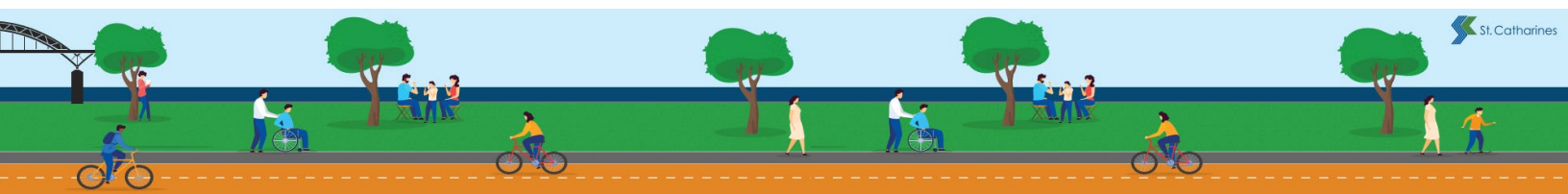


implementation approach proposes developing the interim design in the immediate future, saving time and resources in the long run while also creating a comfortable, connected active transportation network. The benefits of building a network using interim design principles is that it allows for adjustments to be made and impacts to be assessed before building out the more costly implementation of permanent facilities. Refining the use of All Ages and Abilities standards using quick-build solutions allows the City to iterate on its designs and approach to supporting active transportation while also building new community support and capacity to help justify long-term investments as the City's culture of active transportation matures.

4.2 Selecting Rapid Implementation Network Routes

The Rapid Implementation Network was designed to provide a high level of connectivity city-wide to areas identified as having a high degree of active transportation potential. The selection of routes involved a thorough analysis of demographics and travel trends, as discussed in **Chapter 2**, emphasizing selecting routes that will benefit the most amount of potential active transportation users.



Determining what areas of St. Catharines had the highest degree of active transportation potential directly informed what routes were prioritized in the immediate future. Routes were also assessed based on whether they had existing active transportation infrastructure and if they could be upgraded using quick-build materials to All Ages and Abilities active transportation infrastructure. The proposed Rapid Implementation Network provides a balance of proposed Spine, Connector and Greenway routes to create seamless connections between neighbourhoods, as seen in **Map 6**.



MAP 6

Rapid Implementation Network





Proposed Active Transportation Network

-  Spine Route
-  Connector
-  Greenway

Existing Active Transportation Network

-  Existing Spine
-  Existing Connector
-  Major Cycling Network Barriers

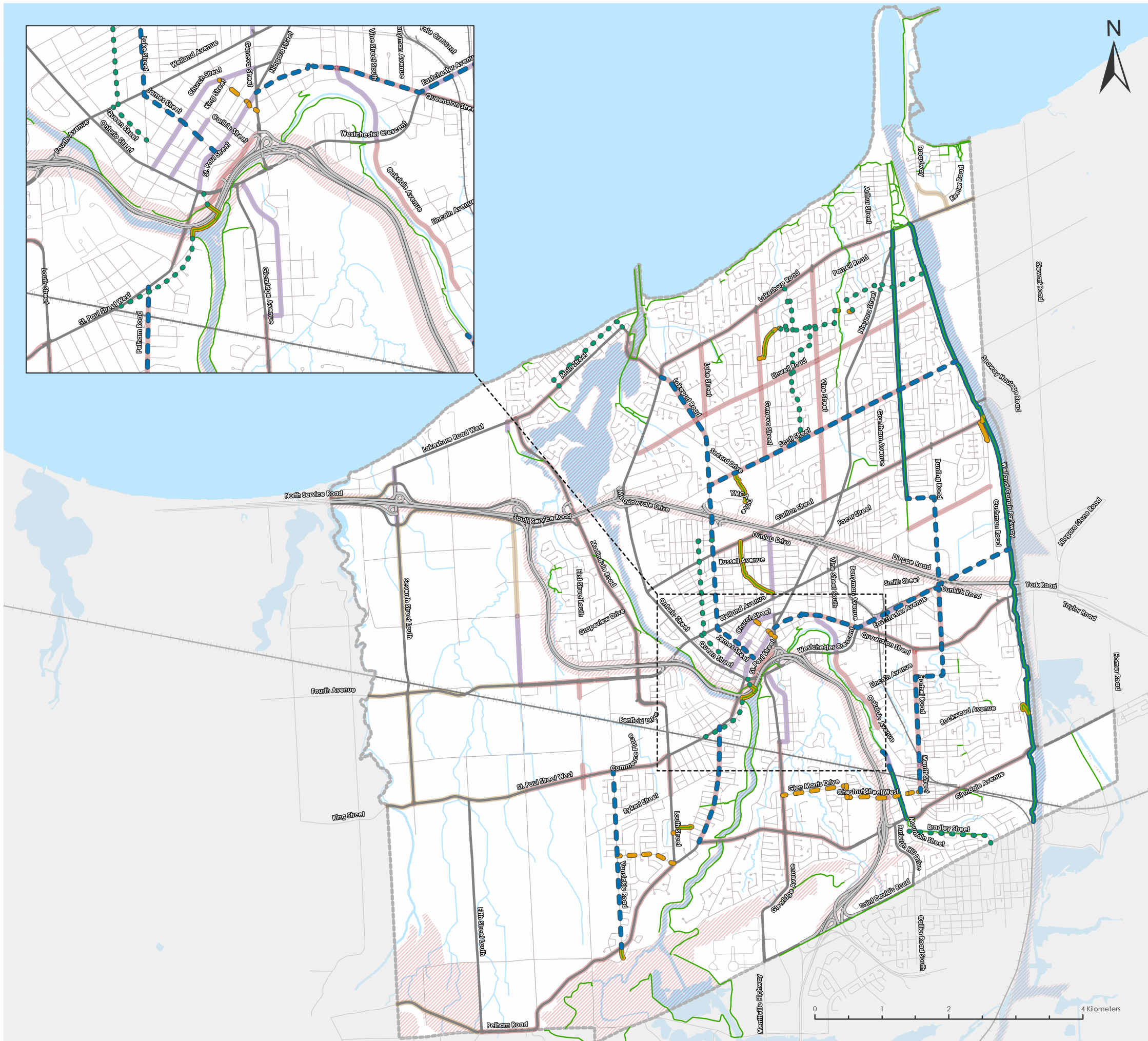
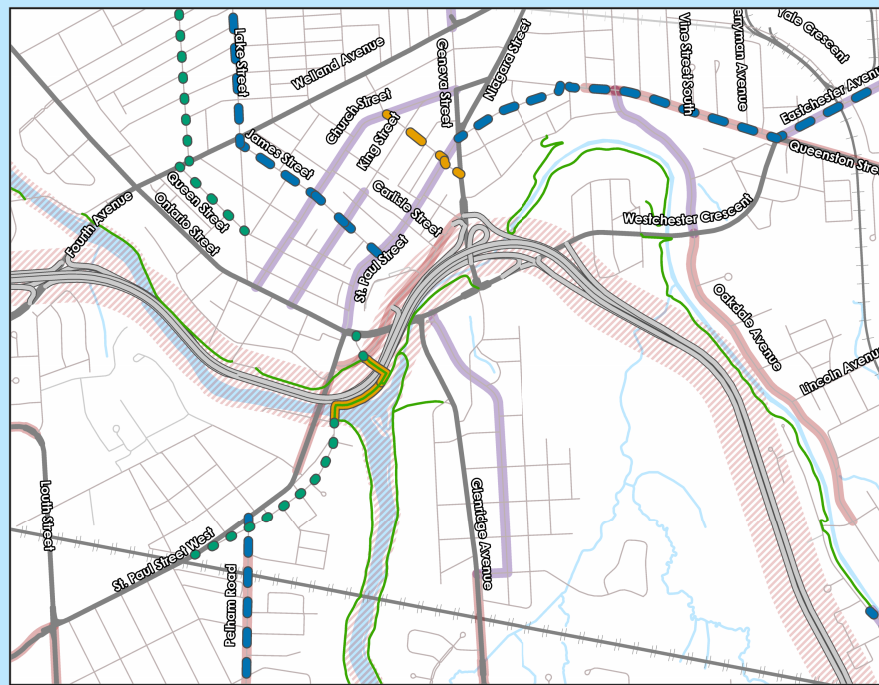
Existing Active Transportation Facilities

-  Bike Lane
-  Paved Shoulder
-  Signed Route
-  Existing Trail

Existing Roads

-  Private/Unknown
-  City Roads
-  Region/Seaway
-  Provincial Highway

Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



4.3 Building the Rapid Implementation Network

Implementing active transportation facilities can look different depending on the context of the street and the type of facility that is desired. When designing and building new roadways, it is typically easier to implement physically separated bikeways from the outset when compared with implementing high-quality facilities on existing roadways. For existing roadways, active transportation facilities may be accommodated through a retrofit that involves either reconstruction – where elements of the roadway such as curbs and drainage are being rebuilt - or through the reallocation of existing on-road space without additional capital projects being undertaken. In either case, when retrofitting existing roadways, physical constraints may result in some trade-offs that need to be evaluated. Depending on the context of the corridor, including scheduled capital works, the corridor's existing conditions and its importance in the overall network for St. Catharines' active transportation network, a number of different solutions could be explored when implementing retrofit projects to develop AAA infrastructure.

In the case of the Rapid Implementation Network, the City of St. Catharines' existing foundation for active transportation will support the expedited development of quick-build solutions to creating AAA infrastructure. Creating the network will be a low-cost and efficient effort as it may be built using quick-build materials within existing curbs or minor retrofit construction, such as constructing multi-use pathways.

Table 4.1 notes the materials and treatments that may be used to facilitate the rollout of the Rapid Implementation Network.



Table 4.1: Rapid Implementation Materials and Treatments

Level of Traffic Stress (existing)	Materials/Treatments Recommended to create AAA facilities
High	Concrete barriers, precast concrete curbs, bollards, signage.
Medium	Road paint, traffic signage, vehicle access restrictions
Low	Vehicle access restrictions, traffic calming measures, planter boxes, road paint.

4.4 Rapid Implementation Intersections

One of the challenges noted during the existing conditions review was the abrupt ending of bicycle lanes within 100m of intersections along existing routes. This results in cyclists going from having a protected facility to requiring negotiating with traffic when crossing busy intersections, creating a risky and uncomfortable scenario for cyclists. To improve upon this, the Rapid Implementation Network should be designed to ensure that cyclists are provided with adequate protection at intersections across the city. The benefits of Protected Intersections extend beyond safety for cyclists, however. Reduced curb radii lead to slower turning movements, while curb extensions also reduce crossing distances for pedestrians. Improved sightlines create safer conditions for all users, which leads to an overall improvement in safety for drivers, cyclists and pedestrians alike.

The Rapid Implementation Network will comply with Ontario Traffic Manual Book 18 (2021) requirements for protected intersections, making crossings safer for all involved. In the short-term rollout of the plan, this will begin with continuing the bicycle lanes to the intersection and providing bollards and precast concrete barriers right up to the intersection. Precast concrete islands can also be installed at select intersection to reduce the turning radius of vehicles, creating slower speeds and protecting pedestrians, as shown in **Figure 4.2**.

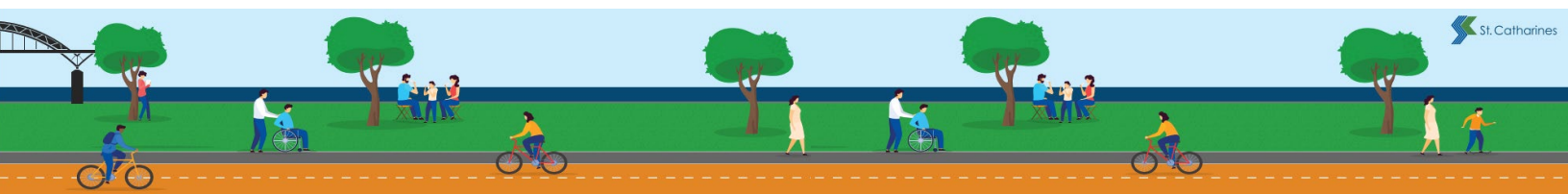




Figure 4.2: Turn Calming with Precast Concrete Islands, Halifax

Retrofits for protected intersections can also be completed with minimal construction. Recent examples have just included the construction of concrete protected corner islands while maintaining existing curbs, with minimal modifications to signal poles. An example of this retrofit is shown in **Figure 4.3**.

A quick-build design approach allows adjustments to be made at a low cost based on public feedback. Quick-build materials such as paint, bollards, or pinned curbs are effective at producing a protected intersection corner. The graphic below depicts the use of paint and bollards in creating an intersection that protects cyclists and pedestrians from oncoming turning traffic.





Figure 4.3: Retrofit Protected Intersection Corner, London, ON (Source: City of London)



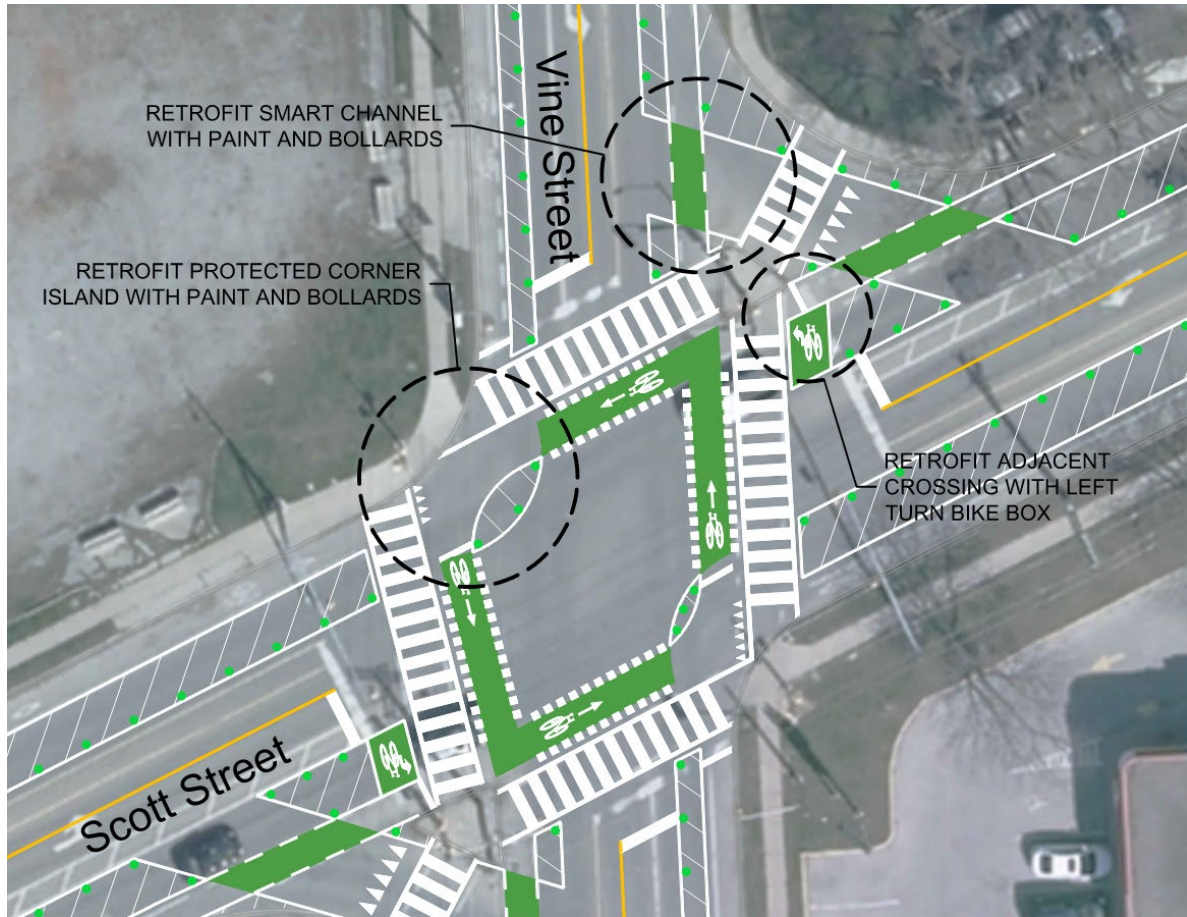
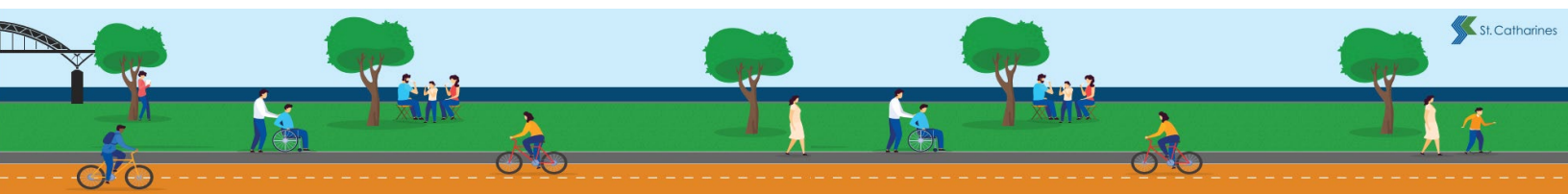


Figure 4.4: Concept of a protected intersection at Vine Street and Scott Street



Centreline hardening is another method to retrofit intersections using quick-build materials. These may include the installation of a speed bump on the inside of the crosswalk or crossside or installing bollards along the centreline. The graphic below shows an example of this treatment.

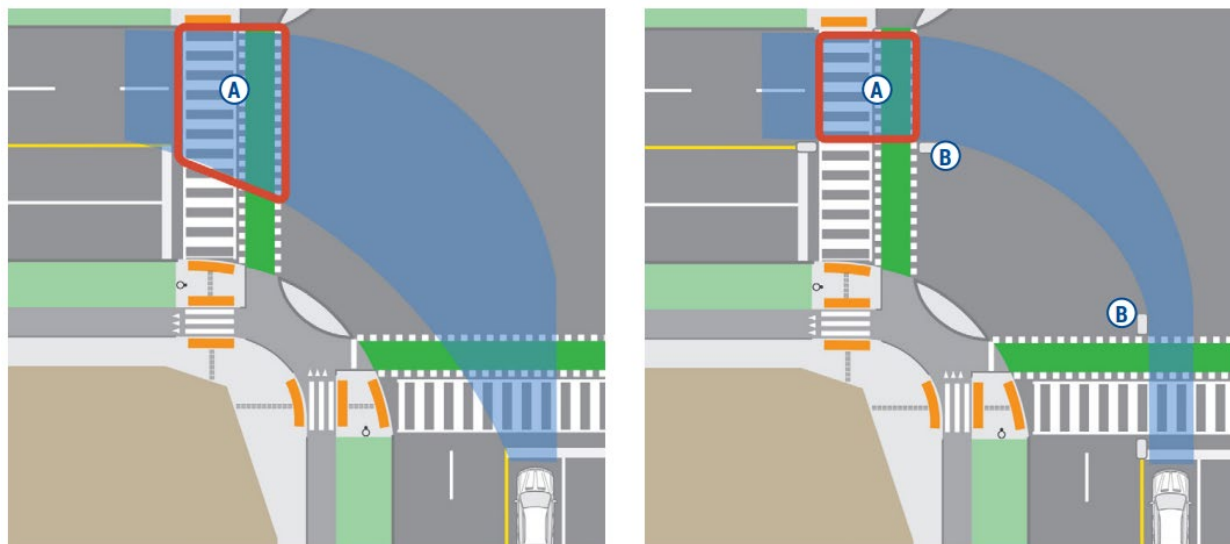


Figure 4.5: Centreline hardening impact on turning radius (Source: Ottawa Protected Intersection Design Guide)

4.5 Cost and Implementation

The Rapid Implementation Network will add 38.2 km of new facilities to the City of St. Catharines active transportation network, expanding on the existing 17.76 km of existing facilities. The entire project will cost approximately \$2,440,000 to \$4,750,000 over a 3-year implementation window that will begin upon the adoption of the ATMP. **Table 4.2** provides a cost breakdown for the types of facilities that will be required to deliver the Rapid Implementation Network identified in **Map 6**.

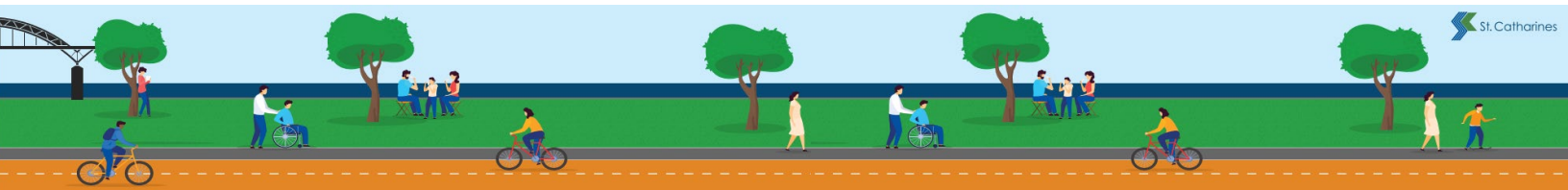


Table 4.2: Rapid Implementation Network Costing

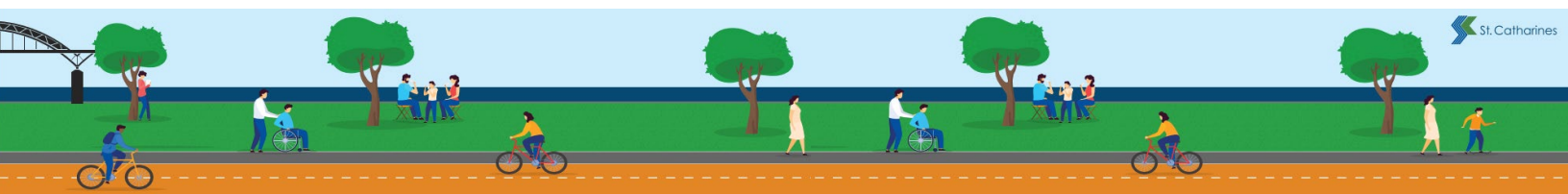
Facility Category	Length (km)	Cost (Range)
Physically Separated	21.4	\$1,820,000 - \$3,870,000
Designated Space	2.5	\$170,000 - \$222,000
Neighbourhood Greenways	13.1	\$220,000 - \$320,000
Shared Space	0.2	\$2,000 - \$3,000
Trails	1.0	\$220,000 - \$330,000
Subtotal		\$2,440,000 - \$4,750,000
Contingency (40%)		\$960,000 - \$1,900,000
Total	38.2	\$3,410,000 - \$6,650,000

The City of St. Catharines benefits from having 17.76 km of existing spine and connector trails that were identified in the Rapid Implementation Network already built up to AAA standards. To complete the Rapid Implementation Network, an additional 31.39 km of AAA facilities have been identified within this Plan to expand access to AAA facilities all across the City, firmly establishing St. Catharines as a leader in the provision of active transportation facilities in Ontario.

The budgeted amount of \$3,565,208 will support the creation of high-quality active transportation facilities including a multi-use path along Vansickle Road, adding protected bicycle facilities along Linwell St. and creating protected intersections across the City. Quick-build solutions manage to reduce the cost of implementing active transportation friendly infrastructure that will help build momentum behind the full implementation of the Ultimate Active Transportation Network. However, capital costs are only one part of the equation when it comes to supporting an AAA network, maintenance considerations must be made during the onset and lifespan of the network.

4.6 Maintenance Considerations

In order to support the Rapid Implementation Network as a year-round active transportation system the City will need to add resources – both in terms of new equipment and new human resources – to keep the Rapid Implementation Network clear and usable all year round. These resources will also support the



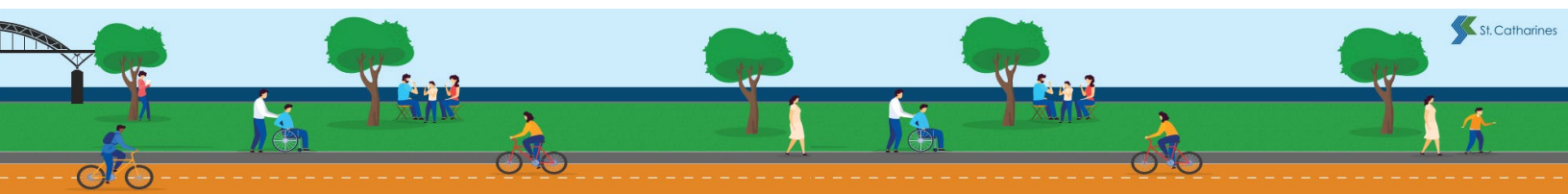
City as it expands the ultimate active transportation network, building towards a future where all residents are able to use active transportation 12 months a year.

As the Rapid Implementation Network is implemented, it will be important for the City to remain communicative with residents about expectations and flexible with the maintenance practices as they learn more about what works. With most of the elements of the Rapid Implementation Network being identified within existing roadways through the addition of curbs and bollards, it is likely that maintenance activities will need to be performed by a dedicated vehicle (a sidewalk plow or similar) and coordinated with roadway clearing to ensure that the windrow from the road is not moved into a newly cleared active transportation facility. The process of learning to maintain these new facilities will require some willingness to learn and adapt, which is why communications between City departments and externally to members of the community, will be essential.

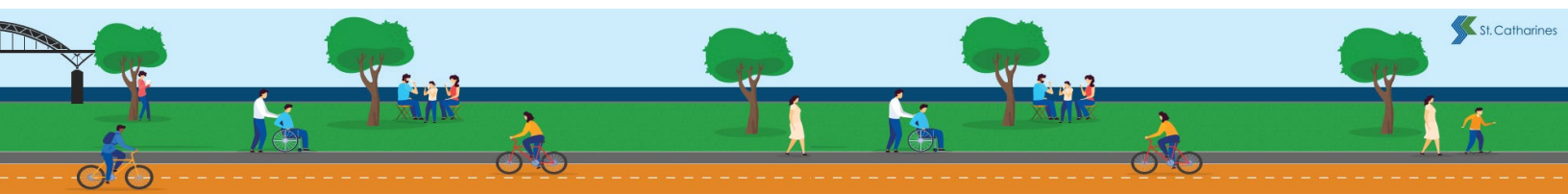
Rapid implementation projects can serve as a testing ground for new facility types, so it is essential that municipal staff are well-versed in the chosen materials and equipped with the necessary tools and capacity to address operational and maintenance needs. This includes tasks such as watering planters, clearing snow or leaves, meeting new equipment requirements, managing material damage, and supporting winter maintenance. Key considerations for operations and maintenance involve:

- Ongoing engagement with Municipal Works to ensure adequate resources are provided during the entire project lifecycle—from planning and implementation to post-implementation phases. Clearly communicate the project's objectives to establish expectations, emphasizing the integral role of flexibility and adaptation throughout the process.
- Involve Municipal Works staff in the project's design phase, involving them in decisions related to material selection, identification of traffic impacts, necessary signage, and any adjustments to signal timing and activation.

It is recommended that the City undertake a review of the anticipated resourcing needs to maintain the Rapid Implementation Network for the first year of operations, and provide the necessary resources to the Municipal Works department to meet those needs. Following the first year, the City should



evaluate the resource needs based on real-world experiences and adjust resourcing to suit the ongoing expansion of the network. If resource constraints mean that the entire network cannot be fully maintained, it will be important for the City to clearly communicate which priority routes **will be** maintained, and to provide a high level of service on those routes rather than a lower level of service across the entire network.





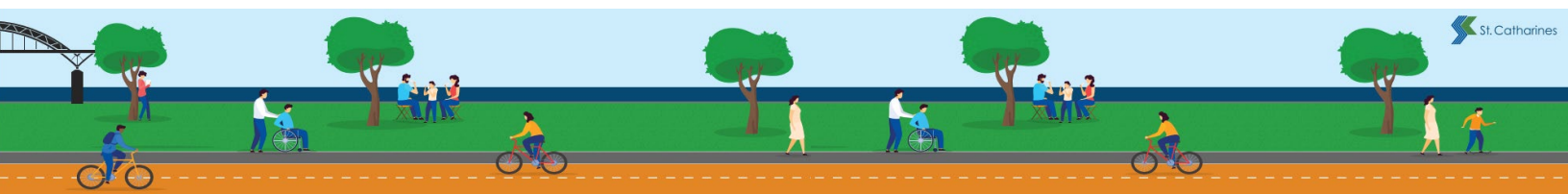
Chapter 5: The Ultimate Active Transportation Network

5.1 What is the Ultimate Active Transportation Network?

The Ultimate Active Transportation Network builds on the Rapid Implementation Network to provide safe and comfortable active transportation routes to all parts of the City. While the Rapid Implementation Network will largely be built with quick-build materials, the Ultimate Active Transportation Network requires construction to implement permanent facilities. Construction of active transportation facilities may be aligned with the City's capital construction schedule for the reconstruction of roads. Active transportation facilities may also be constructed by retrofitting existing roads without a full reconstruction. The Ultimate Active Transportation Network is shown in **Map 7**.

The Ultimate Active Transportation Network will be constructed in phases to align the implementation of each route with the approximate phasing of road reconstruction. Aligning these construction activities would be more cost effective than separate construction. The phasing presented later in this chapter is approximate and based on planned reconstruction projects or anticipated reconstruction timelines based on the existing pavement condition of roads. The City may also choose to accelerate road reconstruction or retrofit an existing road to advance the construction of priority routes.

The Ultimate Active Transportation Network follows the same network hierarchy and cycling facility selection process presented in **Chapter 3**.



MAP 7

Ultimate Active Transportation Network

Proposed Active Transportation Network

- Spine Route
- Connector
- Greenway
- Rural Route
- Planned Regional Facility
- Long-term Bridge/Trail Project

Existing Active Transportation Network

- Existing Spine
- Existing Connector
- Major Cycling Network Barriers

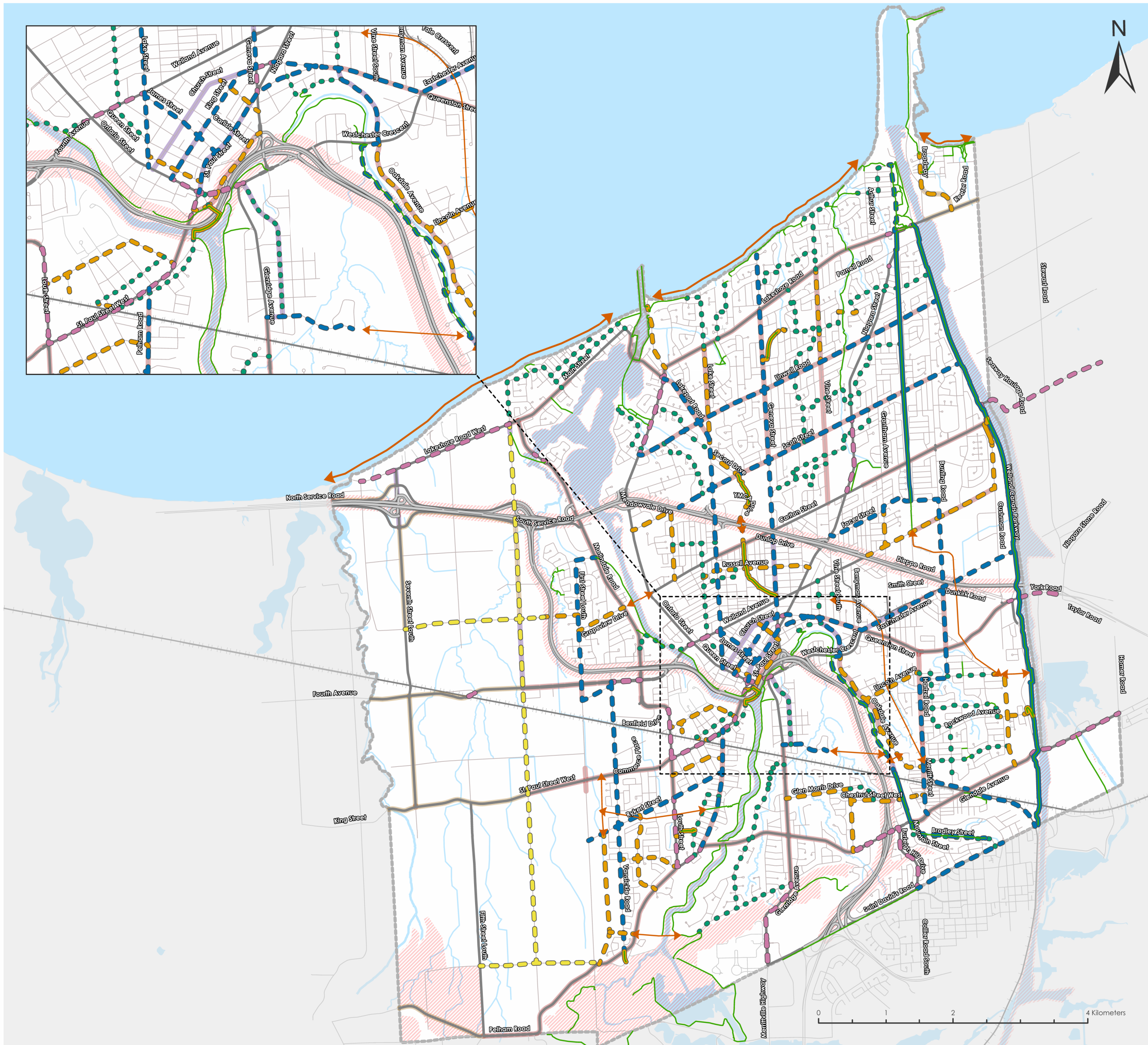
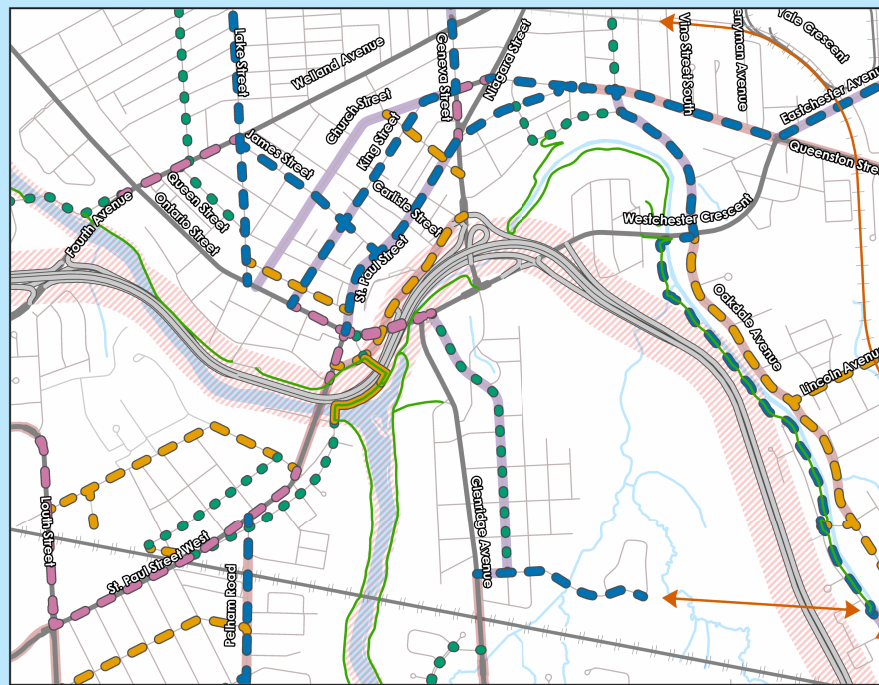
Existing Active Transportation Facilities

- Bike Lane
- Paved Shoulder
- Signed Route
- Existing Trail

Existing Transportation

- Private/Unknown
- City Roads
- Region/Seaway
- Provincial Highway
- Abandoned Railway
- Active Railway

Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.

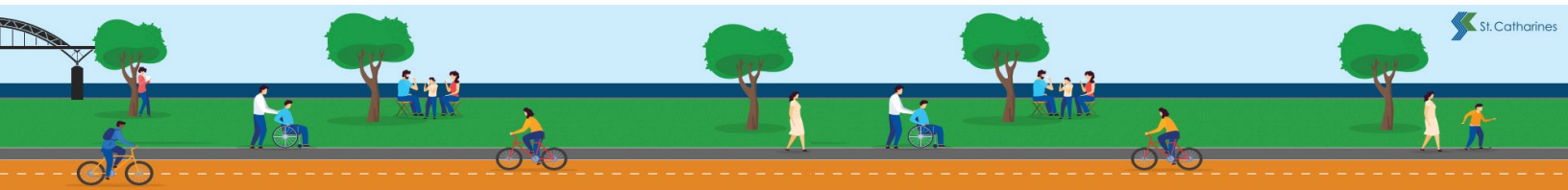


5.2 Permanent Active Transportation Facilities

The Ultimate Active Transportation Network will be implemented using permanent treatments for active transportation facilities, which will replace the quick-build materials in the Rapid Implementation Network. Different street contexts—and stressors—call for different separation materials in varying layouts: the level of comfort experienced by users depends heavily on the context of the roadway and its respective material treatment. Streets with high levels of vehicle speed and traffic or higher levels of curbside activities require more robust and distinct separation between active transportation users and motor traffic.

OTM Book 18 provides a nomograph with guidance for selecting desirable active transportation facilities based on average daily traffic volumes and posted speed limits. The nomograph that applies to an urban/suburban context is shown in **Figure 5.1** and the nomograph that applies to a rural context is shown in **Figure 5.2**.

The preferred facility selection process for All Ages and Abilities active transportation facilities should use the nomographs above based on the context. Future changes in traffic volumes should also be considered. When traffic volumes are expected to grow over the lifecycle of the cycling facility, the future traffic volumes should be used. When the result is in the transition zone between two groups of facility types, the facility type offering more separation should be strongly considered, applying professional judgement based on context and other factors in Step 2 of the OTM Book 18 facility selection process. Where existing constraints limit the feasibility of implementing a cycling facility, measures should be explored to reduce traffic speeds or traffic volumes (or both), which would create operating conditions that make it more comfortable for cyclists to share the road space with vehicles. As major roads come up for reconstruction, the design speed should be reviewed and consideration should be made to lower it to encourage safer vehicle operation and create safer conditions for active transportation users.



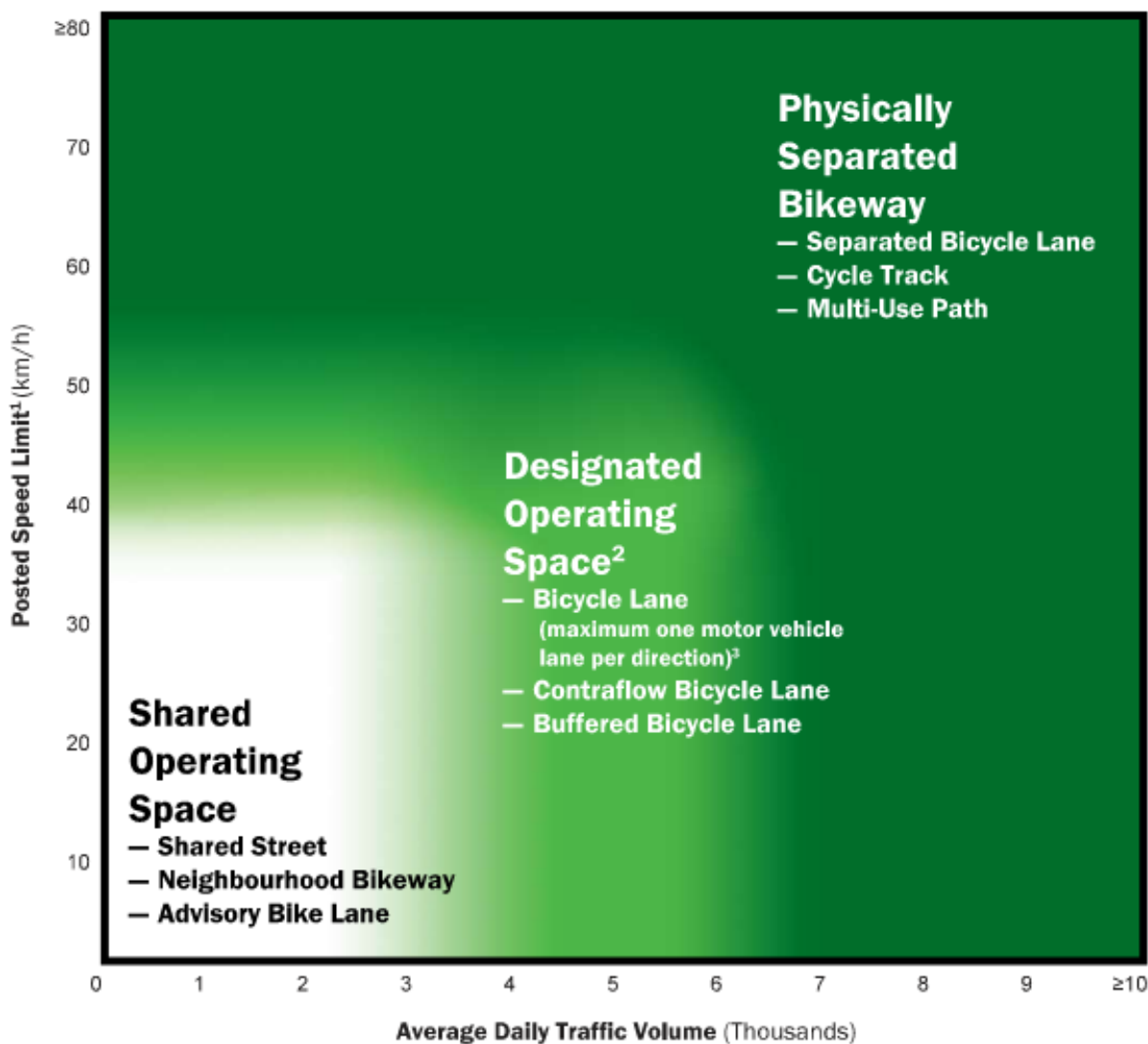
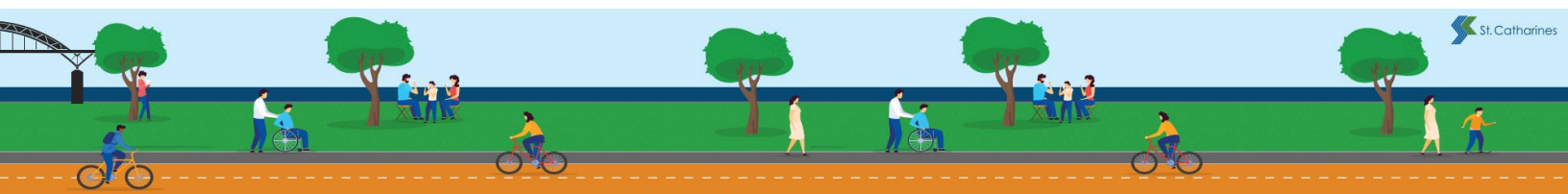


Figure 5.1: Desirable Cycling Facility Pre-Selection Nomograph for Urban/Suburban Context (Source: OTM Book 18)



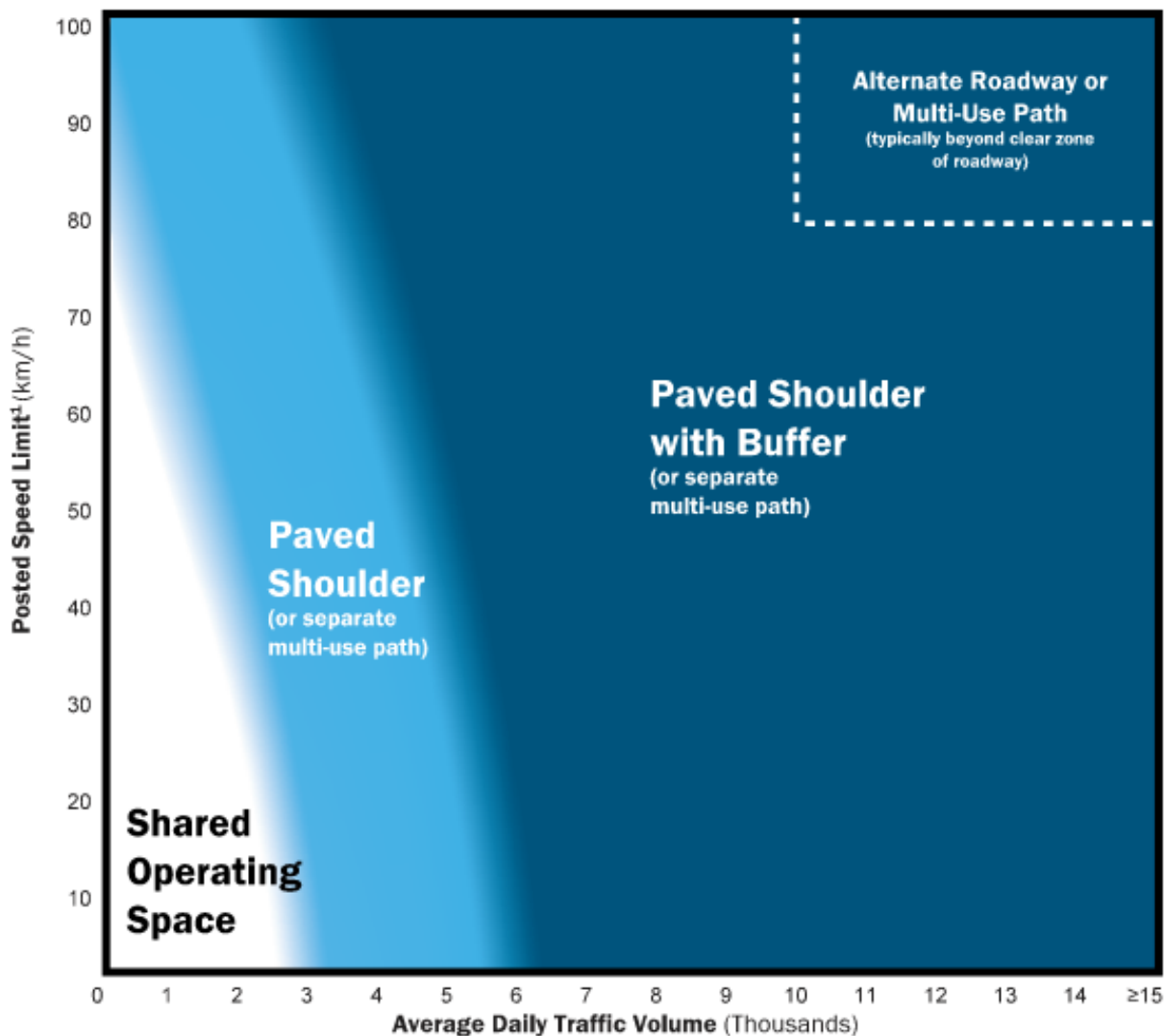
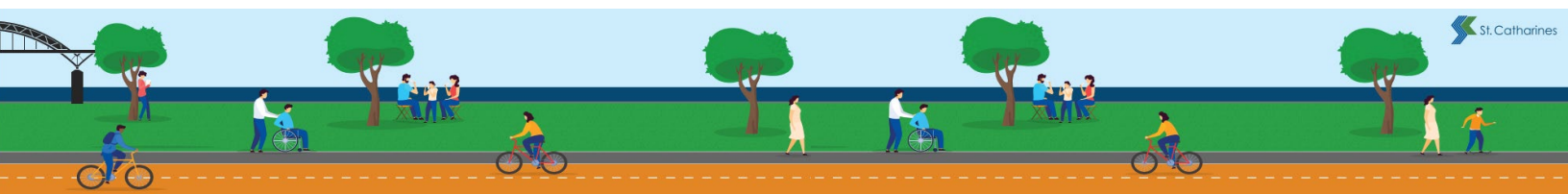


Figure 5.2: Desirable Cycling Facility Pre-Selection Nomograph for Rural Context
(Source: OTM Book 18)

The facility type groups have been applied to the Ultimate Active Transportation Network in **Map 8**. Facility type groups have been applied instead of specific facility types to provide flexibility to address constraints when the cycling facility is being designed. If one facility type is not feasible due to a constraint, another facility type can be designed or traffic speeds and volumes can be reduced.

The following subsections provide an overview of each facility type for the urban/suburban and rural contexts along with key design considerations for each, which are informed by guidance from OTM Book 18.



MAP 8

Minimum Facility Categories

Proposed Active Transportation Facilities

- Designated Operating Space
- Physically Separated Bikeway
- Greenway
- Paved Shoulder
- Shared Space
- Multi-Use Trail
- Long-term Bridge/Trail Project

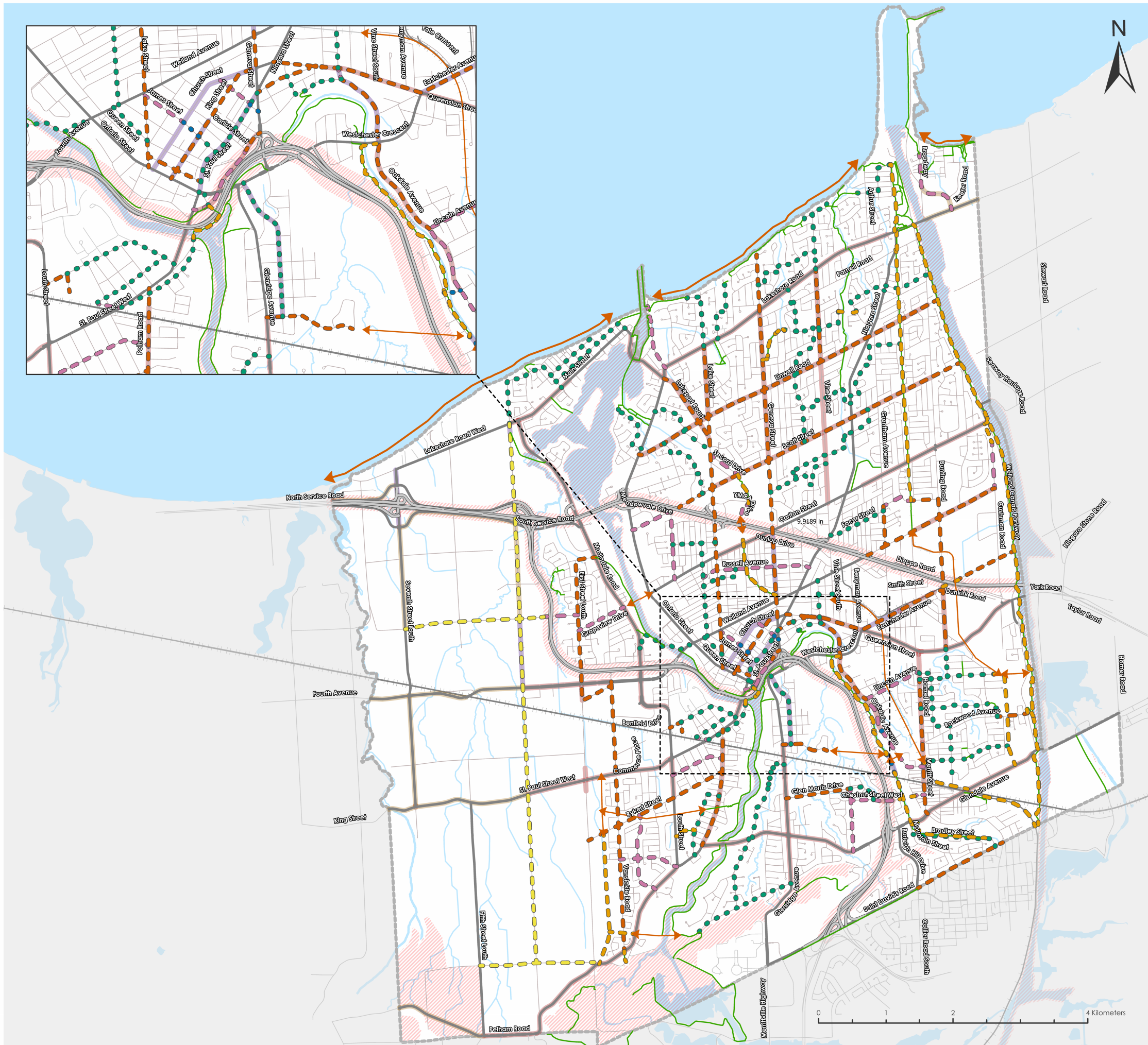
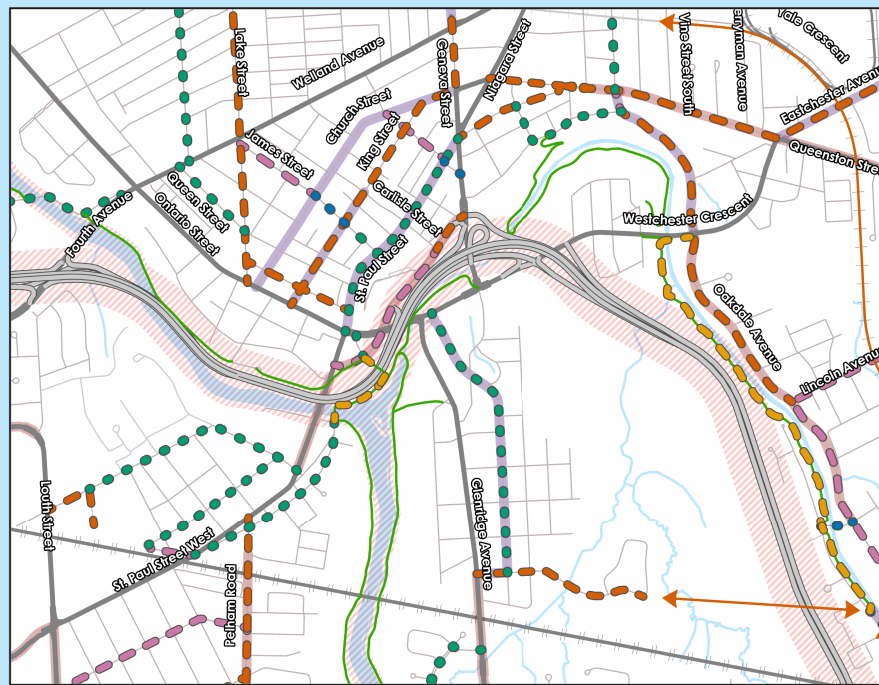
Existing Active Transportation Network

- Major Cycling Network Barriers
- Bike Lane
- Paved Shoulder
- Signed Route
- Existing Trail

Existing Roads

- Private/Unknown
- City Roads
- Region/Seaway
- Provincial Highway

Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.



5.2.1 Physically Separated Bikeways

Cycling facilities that fall under the category of “physically separated bikeways” are separated from vehicle traffic by horizontal buffers and physical barriers that restrict vehicle encroachment. This facility type is appropriate for streets on the Ultimate Active Transportation Network with moderate to high vehicle volumes and speeds, which require permanent treatments that offer cyclists with the highest level of comfort and protection. Three options for this facility type are described below.

Separated Bicycle Lane

Provided on road with horizontal buffer containing vertical elements to provide separation from vehicle traffic.

- Separation techniques: parking lane, flex bollards, planters, concrete curb (pre-cast or cast-in-place), rubber curb, concrete barrier, guide rail.
- Install separation elements continuously with gaps as needed for access points, curbside activity, transit stops, and drainage.



Figure 5.3: One-Way Separated Bicycle Lane With Planters, Toronto

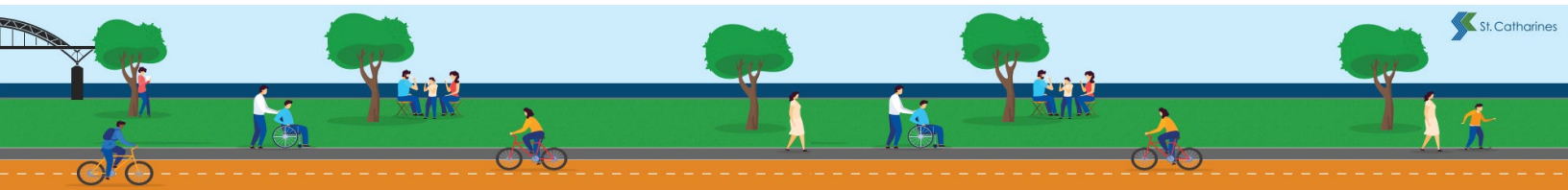


Configuration and spacing:

- One-way lane width: 1.8 m (desired), 1.5 m (minimum), may be wider when considering higher cyclist volumes to accommodate passing.
- Two-way lane width: 3.5 m (desired), 2.7 m (minimum).
- Horizontal buffer width from vehicle traffic: 1.0 m (desired), 0.3 m (minimum), may be wider depending on type of separator.
- Consider effective unobstructed width available, anticipated cyclist volumes, and requirements for maintenance equipment.
- Can be used to retrofit existing roads without full reconstruction.



Figure 5.4: Two-Way Separated Bicycle Lane Retrofit With Curb, Montreal



Cycle Track

- Provided in the boulevard with vertical and horizontal separation from vehicle traffic
 - Vertical separation provided with curb, which may be at the same level as the sidewalk or at an intermediate level between the roadway and the sidewalk
 - Techniques to provide horizontal buffer from vehicle lanes: splash strip, grass strip or median, and street furniture
- Configuration and spacing:
 - One-way width: 2.0 – 2.5 m (desired), 1.5 m (minimum)
 - Two-way width: 3.5 – 4.0 m (desired), 3.0 m (minimum)
 - Consider need for overtaking, side-by-side riding, types of bikes anticipated, and requirements for maintenance equipment
 - Curb: mountable/semi-mountable curb or barrier curb (height of 100 – 150 mm)
 - Horizontal buffer width from vehicle traffic: 0.6 m (minimum), exclusive of curbs
- Separation technique from sidewalk: cane-detectable curb, continuous detectable tactile buffer strip, landscaping, or street furniture
- Should enable two-way travel within corridor



Figure 5.5: One-Way Cycle Track With Mountable Curb, East Gwillimbury

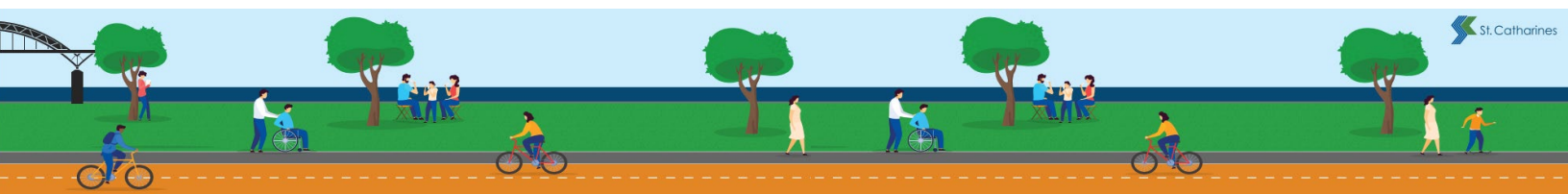
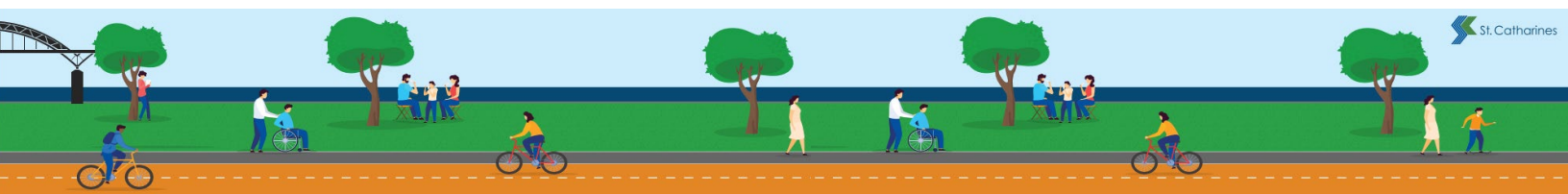




Figure 5.6: One-Way Cycle Track Separated From Sidewalk by Continuous Detectable Tactile Buffer Strip, Vaughan

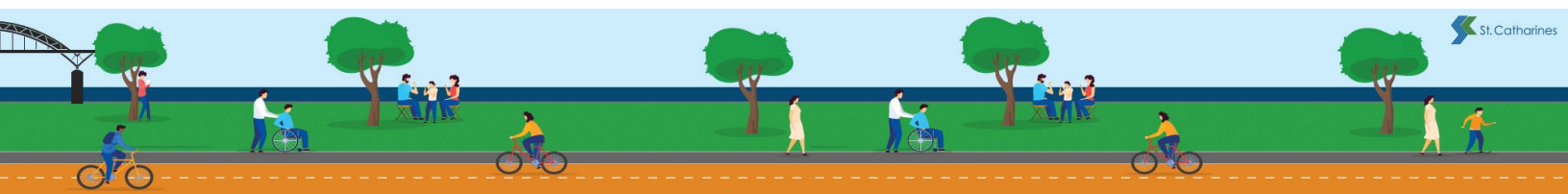


In-Boulevard Multi-Use Path

- Two-way path shared by cyclists and pedestrians that is provided in the boulevard with vertical and horizontal separation from vehicle traffic
 - Vertical separation provided with curb
 - Horizontal separation provided typically by grassy boulevard or paved splash strip
- Configuration and spacing:
 - Low to moderate volume (< 100 users / hour): 3.5 m (desired), 3.0 m (minimum)
 - High volume (> 100 users / hour): at least 4.0 m (desired), 3.0 m (minimum)
 - Consider expected pedestrian and cyclist mode split
 - Horizontal buffer width from vehicle traffic: 0.6 m (minimum), exclusive of curbs; can add continuous vertical element if minimum cannot be achieved
 - Provide 0.5 m (or 0.3 m if constrained) buffer from lateral obstacles, including signage, fencing, and utility poles
- Can be routed around significant obstacles and grade can be levelled to improve cyclist comfort
- Not preferred where there are high frequencies of accesses, due to drivers not expecting traffic from both directions



Figure 5.7: Multi-Use Path Separated by Grassy Boulevard, Newmarket



5.2.2 Designated Operating Space

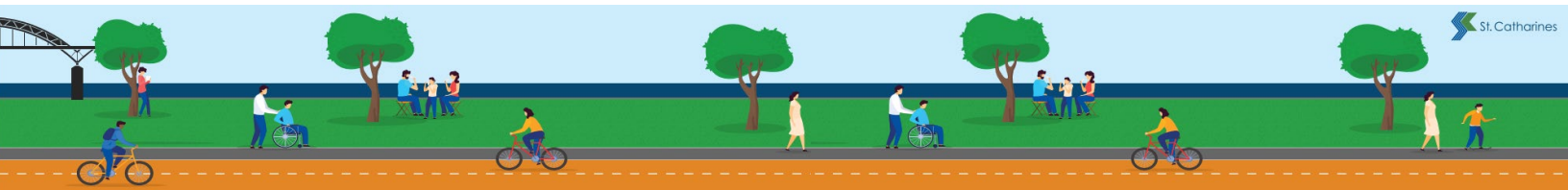
Cycling facilities that fall under the category of “designated operating space” are provided within the street right-of-way for exclusive use by cyclists without any physical separation from vehicle traffic. This facility type is preferred along streets on the Ultimate Active Transportation Network with relatively low vehicle volumes and speeds. Three options for this facility type are described below.

Conventional Bicycle Lane

- Designated by pavement markings and signage for preferential or exclusive use by cyclists
- Separated from vehicle traffic by white painted line
- Configuration and spacing:
 - Lane width: 1.8 m (desired), 1.5 m (minimum)
 - Lane width when splitting two vehicle travel lanes: 2.0 m (desired), 1.8 m (minimum)
 - When adjacent to on-street parking: 1.5 m lane + 1.0 parking buffer (desired), 1.5 m lane + 0.6 m parking buffer (minimum)
- Suitable for one-way travel only



Figure 5.8: Conventional Bicycle Lane, Ottawa



Contraflow Bicycle Lane

- Operates in the opposite direction of vehicle traffic, enabling two-way travel for cyclists on streets with one-way operation for vehicles
- Horizontal separation from vehicle traffic can be provided by painted line only, by a buffer, or by a form of physical separation
- Configuration and spacing:
 - Lane width: 2.0 m (desired), 1.8 m (minimum)
 - Adjacent to on-street parking: 1.8 m lane + 1.0 m parking buffer (desired), 1.8 m lane + 0.6 m parking buffer (minimum)
 - Consider frequency of intersecting driveways and streets on the side of the street



Figure 5.9: Contraflow Bicycle Lane Separated By Bollards, Toronto



Buffered Bicycle Lane

- Similar to conventional bicycle lane, but provides painted buffer for additional horizontal separation from vehicle traffic without any vertical elements
- Configuration and spacing:
 - Typical buffered bicycle lane: 1.8 m lane + 1.0 m buffer (desired), 1.5 m lane and 0.3 m buffer (minimum)
 - Adjacent to on-street parking: 1.0 m parking buffer + 1.5 m lane + 0.3 m buffer from adjacent vehicle lane (desired), 0.6 m parking buffer + 1.5 m lane (minimum)
 - Buffer may be used by cyclists for passing and/or navigating around obstacles
 - Combined width of bicycle lane and buffer should not exceed 2.8 m to avoid motorists mistaking space for a vehicle lane



Figure 5.10: Buffered Bicycle Lane With Painted Buffer, Toronto



5.2.3 Shared Operating Space

Cycling facilities that fall under the category of “shared operating space” expect cyclists and motorists to share traffic lanes, indicated using pavement markings and/or signage. This facility type is most appropriate for streets on the Ultimate Active Transportation Network with low vehicle volumes and speeds, infrequent or no truck traffic, and where additional traffic calming measures can be provided. Three options for this facility type are described below. Note: a neighbourhood greenway is the focus to provide for the Ultimate Active Transportation Network.

Shared Street

- Mixed traffic operation with supportive signs and pavement markings to improve wayfinding and promote safer interactions between cyclists and motorists, including in areas with on-street parking
- Recommend 4.5 m lane width (minimum 4.3 m) so vehicles may pass cyclists with 1.0 m gap (designated cycling facilities for lanes over 4.9 m)
- Preferred design approach: provide narrowed travel lane with traffic calming techniques and use signage and pavement markings that encourage cyclists to ride in the centre of the lane to minimize likelihood of unsafe passing by motorists
- Not preferred to provide wider travel lanes that allow for side-by-side operation as it may encourage faster motor vehicle speeds and increase in heavy vehicle traffic



Figure 5.11: Narrow Shared Lane with Sharrows, Newmarket



Neighbourhood Greenway

- Appropriate for low-volume, low-speed streets with treatments that encourage through movements for cyclists while discouraging or prohibiting similar through movements by vehicle traffic
- Treatments to prioritize cyclist travel:
- *Traffic reduction*: where volumes exceed 2,500 vehicles / day; aim for less than 1,500 vehicles / day and ideally less than 500 vehicles / day; some examples include median islands, diagonal diverters, and road closures for vehicle traffic
- *Priority*: when crossing minor street, consider providing stop control for vehicles with no stop control for cyclists to give cyclists priority (should be combined with access limitations for vehicles on the Greenway at the intersection – see **Figure 5.13**)
- *Speed management*: Target vehicle operating speeds of 30 km/h with traffic calming features; some examples include speed humps, raised crosswalks, curb extensions, and narrowed vehicle travel lanes. Rapid implementation measures can include bollards, centreline speed signs, and alternating side street parking on each block to create chicanes.
- *Signs and pavement markings*: compliment physical design interventions by signing Greenways to indicate priority for active transportation users



Figure 5.12: One-way closure and Traffic Calming, Ottawa

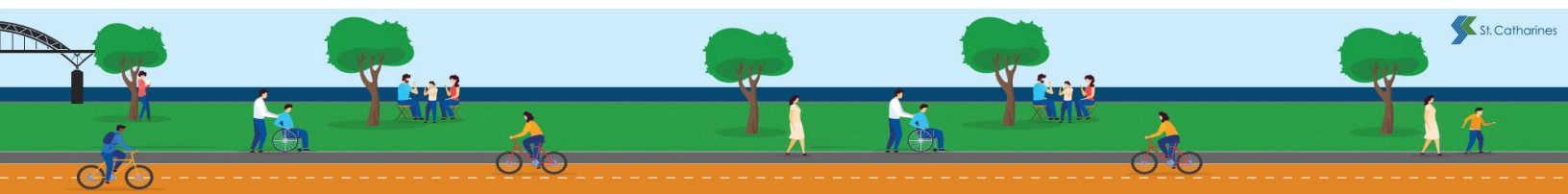
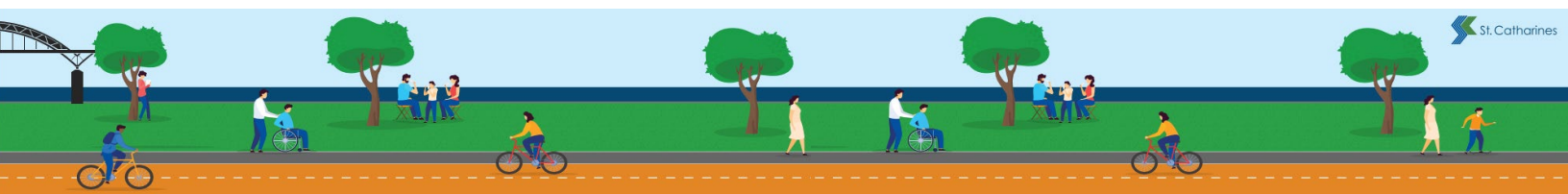




Figure 5.13: Cyclist-priority at an intersection, Peterborough

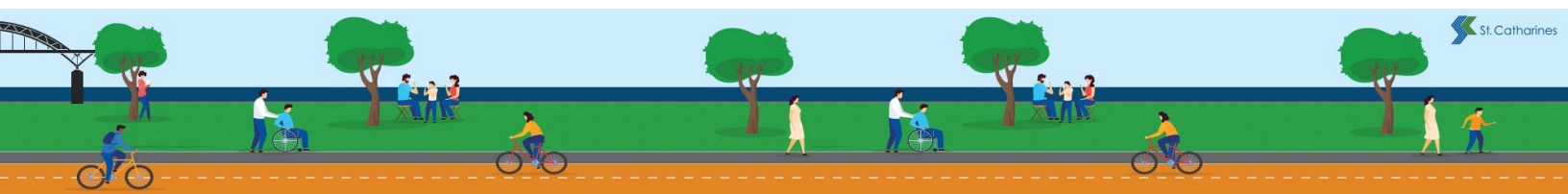


Advisory Bike Lane

- Provides dashed outer lane lines with bicycle stencils and directional arrows to visually delineate cycling space, no centreline for roadway
 - Motorists share centre roadway space for two-way travel and may enter into advisory bike lane (after yielding to cyclists) for turning, approaching, and passing manoeuvres
- Configuration and spacing:
 - Typical advisory bicycle lane: 1.8 – 2.0 m (desired), 1.5 m (minimum)
 - Adjacent to on-street parking: 1.8 m lane + 1.0 m parking buffer (desired), 1.5 m lane + 0.6 parking buffer (minimum)
 - Two-way travel lane: 3.0 – 4.0 m or 5.0 – 5.7 m (desired), 2.7 m (minimum)
 - Alignment should closely follow that of the roadway as much as possible to avoid confusion
 - If parking lanes are present, should be coupled with frequent curb extensions to discourage cyclists from riding in empty parking lanes



Figure 5.14: Advisory Bicycle Lane on Urban Street With No On-Street Parking, Newmarket



5.2.4 Paved Shoulders

A paved shoulder is a portion of the roadway adjacent to the vehicle travel lane that can be used for cycling and walking as well as by motorists to temporarily stop and for emergencies. They are typically on rural roads. Paved shoulders may be considered “bicycle accessible” if they provide sufficient operating space, a pavement marking separation from the adjacent vehicle traffic lane, and a smooth surface clear of snow and debris. Note that paved shoulders do not offer the exclusivity, protection or consistent quality of a separated bikeway facility.

Paved shoulders are typically provided on rural roads and can be combined with a buffer for additional separation from adjacent vehicle traffic and to minimize the aerodynamic effects from heavy vehicles. Recommended dimensions for a rural paved shoulder are:

- No buffer: 1.5 – 2.0 m operating space (desired), 1.2 m operating space (minimum)
- With buffer (either marked or with rumble strips): 1.5 – 2.0 m operating space with 0.5 – 1.0 m buffer (desired), 1.5 m operating space with 0.5 m buffer (minimum)

Other key considerations for a rural paved shoulder include:

- On rural roads without curbs, avoid the creation of edge drop-offs
- Regularly maintain paved shoulders, specifically at driveway locations where pavement deterioration tends to occur

Examples of a rural paved shoulder are provided below.

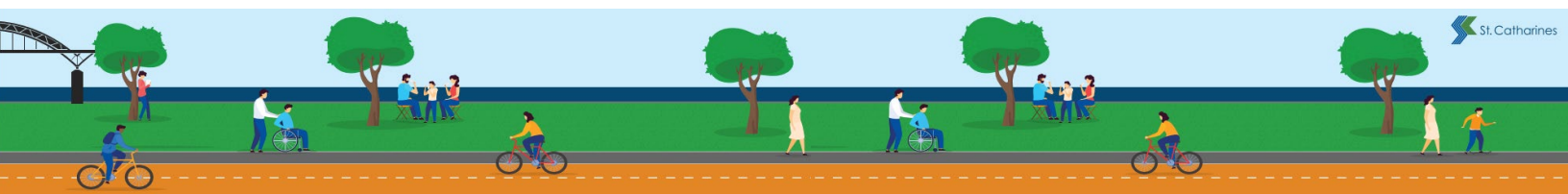
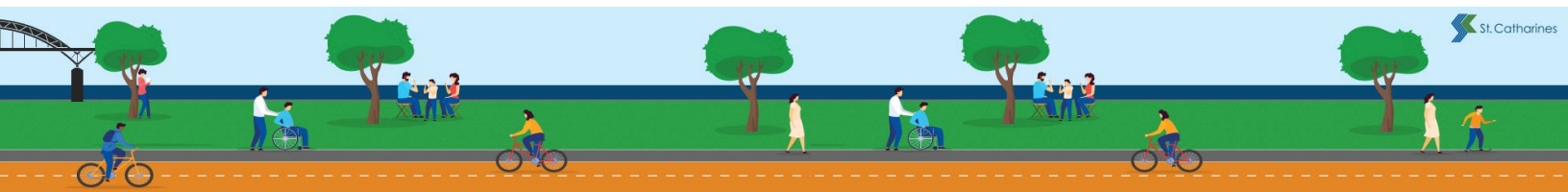




Figure 5.15: Rural Paved Shoulder, Aurora



Figure 5.16: Rural Paved Shoulder With Rumble Strips, Essex County



5.2.5 Intersection Treatments

Intersections are locations with high potential for conflicts between active transportation users and motor vehicles and the ultimate design of intersections on the cycling network should mitigate these conflicts. Permanent construction of intersections and implementing bicycle signals allows for designs that protect cyclists from conflicts in space or in time. The following treatments at intersections may be applied to minimize conflicts:

- **Adjacent Crossings:** The cycling facility is physically separated from the motor vehicle lane with little offset.
- **Setback Crossings:** The cycling facility is offset from the parallel motor vehicle lane as a buffer. Cyclists are more visible since a motor vehicle will have mostly completed its turn when it crosses the path of a cyclist.
- **Protected Intersection:** Where two setback crossings intersect, a corner of a protected intersection is formed. Protected intersections include additional elements that improve safety of pedestrians and cyclists at an intersection.
- **Leading Bicycle Intervals (LBI):** Provide an advanced protected bicycle phase to give cyclists a head start in space, making cyclists more visible to turning vehicles.
- **No Right Turn on Red (NRTOR):** Restricting right turns on reds leads to a reduction in collisions between vehicles and pedestrians/cyclists.

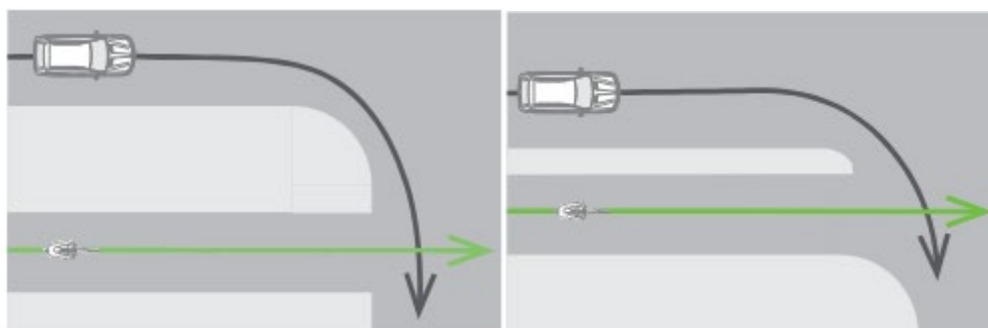
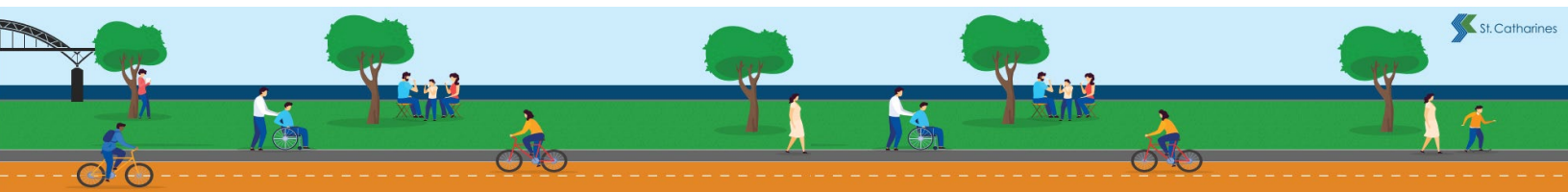


Figure 5.17: Setback Crossing (Left) and Adjacent Crossing (Right) (Source: OTM Book 18)



Protected intersections provide key features that improve safety for cyclists and pedestrians. Elements that improve safety include:

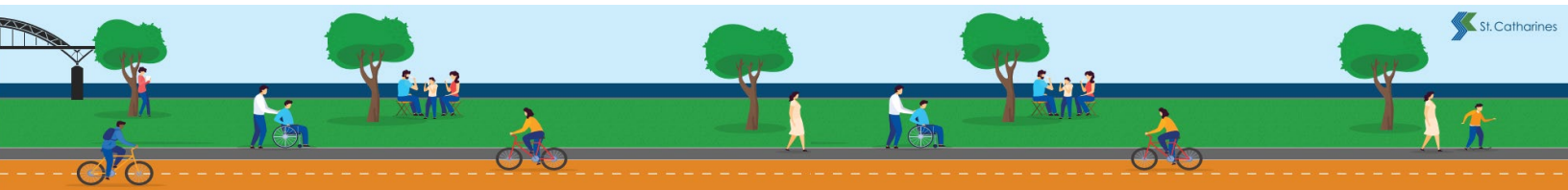
- Pedestrian refuge areas that reduce crossing distance
- Corner islands that separate turning traffic from queued cyclists
- Setback crossings that offset cyclists and pedestrians from turning vehicles
- Forward cyclist queuing areas that allow cyclists to enter the intersection first and improve visibility

Many municipalities in Ontario are starting to implement protected intersections throughout their cycling networks. The OTC Protected Intersection Guide provides guidelines for the design and implementation of protected intersections.



Figure 5.18: Protected Intersection Reconstruction, Kingston (Source: City of Kingston)

Protected intersections may be implemented during full road reconstructions or existing intersections can be retrofitted by reconstruction of each corner. Intersections can remain operational for vehicle traffic with temporary closures of each corner for reconstruction.



5.2.6 Accessibility Guidance for Active Transportation

The addition of new cycling facility types requires additional consideration for accessibility treatments.

Multi-use Paths

Attention Tactile Walking Surface Indicators (TWSIs) should be provided at intersections curb ramps, following the same requirements as sidewalks.

Areas where the multi-use path transitions to separates facilities should also be treated with caution and additional directional TWSI placement. Some municipalities have started providing these directional tactile features with narrow elongated raised bars in sidewalks to provide the direction of the path of travel. These have been implemented at skewed intersections so people with low to no vision can find the opposite end of a crosswalk. If someone follows a perpendicular path of travel and is not aware of the skew they will not find the opposite end of a crosswalk.



Figure 5.19: TWSIs at Multi-use Path crossing, Peterborough



Below is the guidance from OTM Book 18 where it is recommended to add double wide directional TWSIs to alert pedestrians to the correct path of travel.

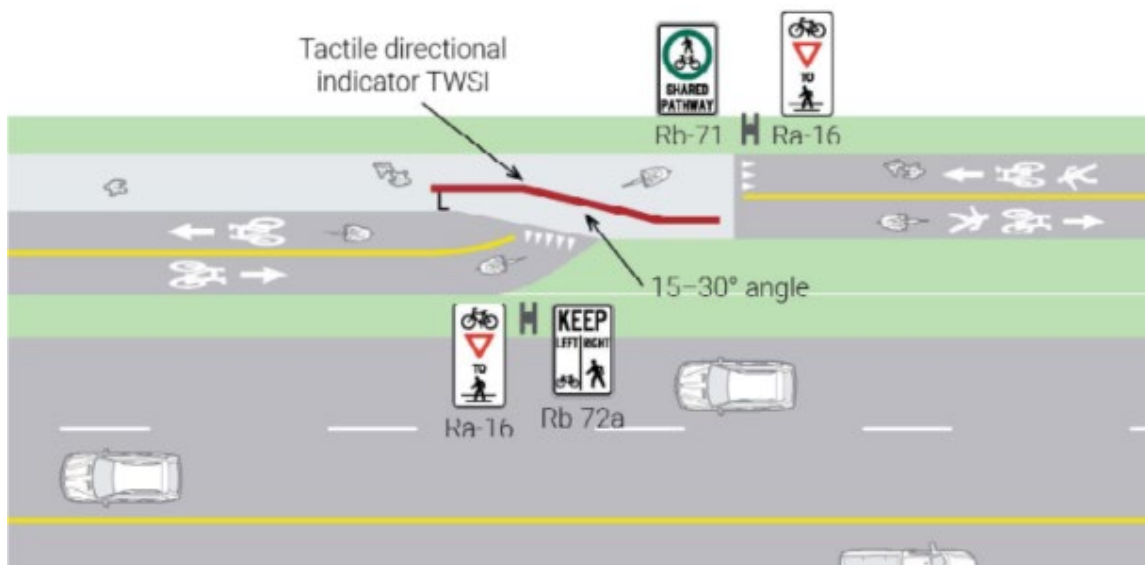


Figure 5.20: OTM Book 18 on transitions between MUP and separated pedestrian/cycling facilities



At protected intersections, where MUPs transition to separated cycling and pedestrian facilities, additional TWSIs are also provided to alert pedestrians to the correct path.



Figure 6.2. Standard protected corner showing directional TWSI at transition from MUP to separated facilities where pedestrians have the straight path of travel (preferred)

Design Features

- (A)** Double-wide directional TWSI at MUP alerts pedestrians to correct path at transition
- (B)** Double-wide directional TWSI alerts pedestrians of a intersecting path
- (C)** Single-wide direction TWSI keeps pedestrians on correct route
- (D)** Gutter curb to provide additional delineation between cycling facility and MUP

Figure 5.21: Transition between MUP and separated active transportation facilities (Source: Ottawa Protected Intersection Design Guide)



Cycle Track Crossings

It is best practice to provide TWSIs at any location where the pedestrian path of travel crosses cycle tracks, including at intersections, midblock locations, and bus stops.

At intersections, attention TWSIs and zebra crossings should be provided at the crossing location.



Figure 5.22: Beckwith Street & Russell Street, Smiths Falls (OTC Protected Intersections Guide)

At midblock, directional and attention TWSIs are to be provided. The directional TWSIs should extend to the back of the curb to guide pedestrians with sign loss. However, on the cycle track the directional TWSI can connect the two attention TWSIs on concrete (like the sidewalk) or zebra marking can be provided instead for color contrast on asphalt pavement.



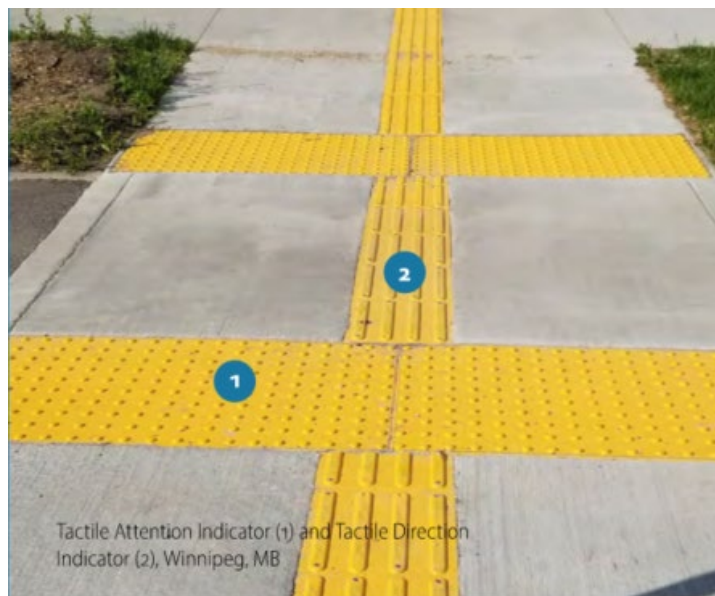


Figure 5.23: Application of directional and attention TWSIs (Source: BC Active Transportation Design Guide)

At Bus Stops

According to the CNIB's recommendations, TWSIs should be used for crossing cycling facilities at floating island bus stops. A combination of directional and attention TWSIs are to be implemented. For near side stops, an additional square attention TWSI is to be placed at decision making points (where a pedestrian would decide to cross the intersection or go to the bus stop).

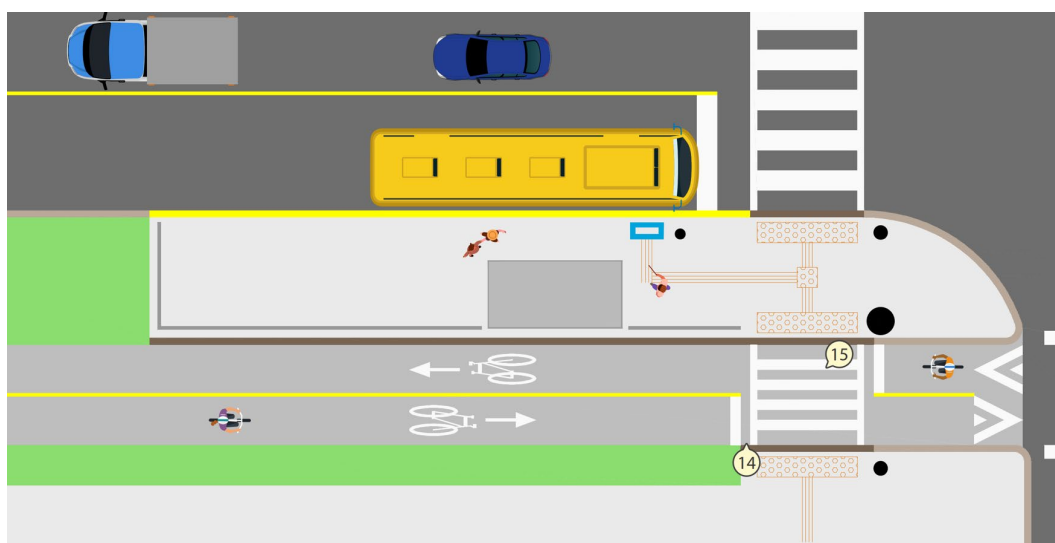
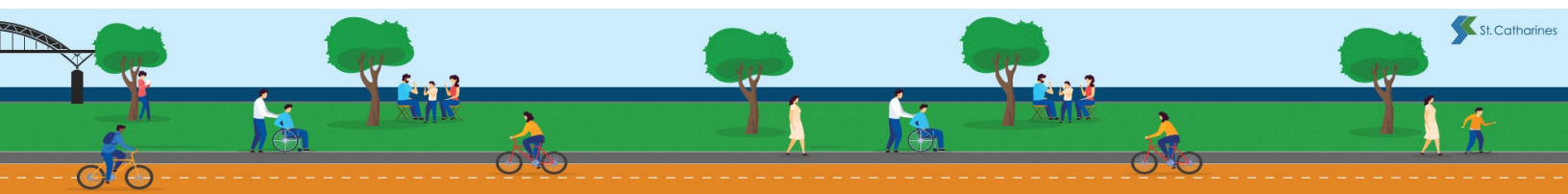


Figure 5.24: Bus Stop design for a near side stop (Source: CNIB)



Cycle Track Separation

Tactile delineation should be provided between sidewalks and cycle tracks if they are adjacent to each other. A half-height barrier curb or beveled curb with a height of at least 60 mm have been used to provide cane-detectable tactile delineation between the two facilities. Where possible, grass buffers are to be used instead while maintaining sidewalks of appropriate width to ensure accessibility for wheelchair users.

Bike Lanes With On-Street Parking

A common practice (also known as a “floating parking lane”) where an on-street parking lane is used to separate cyclists from moving traffic, specifically, where the bike lane is situated against the curb, with a parking lane on the left. This introduces a new challenge where users with mobility aid need to cross the bike lane to reach the sidewalk, this is more pressing when small buffers are used or where flex posts are used in the center of the buffer. It is recommended to use adequate buffer width that can be used for travel and to move the flex posts or barriers closer to the parked cars to increase the usable space.



Figure 5.25: Path of travel of a users of mobility aid devices on a wide buffer or with flex posts moved to the side (source: San Francisco Vision Zero Coalition Getting to the Curb Guide)



5.3 Addressing Network Gaps and Major Barriers

The Ultimate Active Transportation Network includes construction projects that will address the Major Network Barriers within the City, which are shown on **Map 7**. As previously discussed in **Chapter 2**, the City contains several major barriers that create challenges for a well-connected cycling network. Opportunities for crossing barriers that could utilize existing infrastructure were identified and major long-term infrastructure projects were suggested at locations without existing opportunities. Key routes for addressing the Major Network Barriers are described in **Table 5.1**.

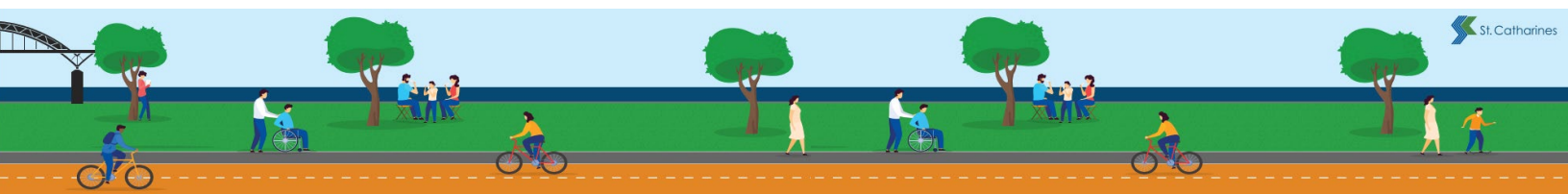


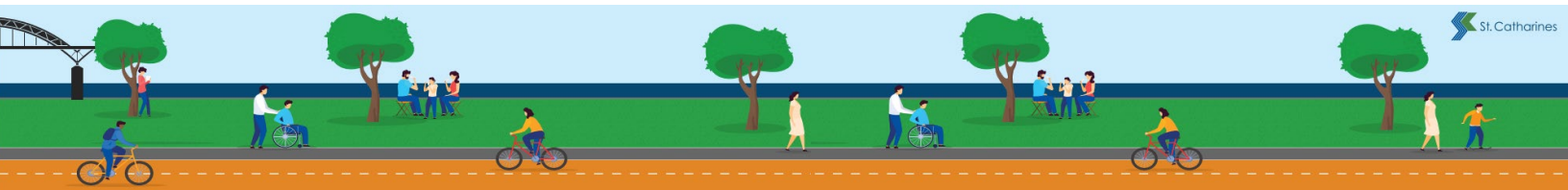
Table 5.1: Major Network Barriers

Major Network Barrier	Proposed Routes
Twelve Mile Creek	<p>Martindale Road/Ontario St. Pedestrian Bridge: An opportunity to construct a new pedestrian and active transportation bridge between Martindale Road and Ontario Street should be investigated further as a feasibility study. The ongoing Ontario Street Corridor Secondary Plan Study presents an opportunity to include a bridge and active transportation corridor through the former GM lands.</p> <p>St. Paul Crescent Bridge & Merritt Trail: The old bridge at the bottom of St. Paul Crescent presents an existing opportunity for a more comfortable cycling alternative to the Burgoyne Bridge. Paving the Merritt Trail between the St. Paul Crescent Bridge and McGuire Street and providing winter maintenance is recommended.</p>
QEW	<p>Lake Street Overpass: Reallocate median and/or lane width on the Lake Street overpass to provide physically separated cycling facilities over the QEW.</p> <p>Terry Fox Trail/YMCA Dr Pedestrian Bridge: Conduct a feasibility study to review the opportunity to extend the Terry Fox Trail north to the QEW and construct a pedestrian bridge to YMCA Drive.</p> <p>Eastchester Active Transportation Underpass: Review opportunities with the Ministry of Transportation to provide a multi-use path under the Garden City Skyway along the alignment of Eastchester Avenue and Eastchester Avenue East</p>



Major Network Barrier	Proposed Routes
Highway 406	<p>Burgoyne Woods Park/Moffatt Street Pedestrian Bridge: Conduct a feasibility study for the construction of a new pedestrian and active transportation bridge between Burgoyne Woods Park and the Moffatt Street neighbourhood.</p> <p>Chestnut Street Extension: Provide physically separated cycling facilities along Chestnut Street and the proposed extension as a more comfortable cycling alternative to Glendale Avenue.</p>
Niagara Escarpment	<p>Merritt Trail: Pave the Merritt Trail between Westchester Crescent and the top of Bradley Street to provide a high comfort alternative to other constrained Escarpment access roads. The Merritt Trail alignment along Bradley Street follows the old canal along a more gradual slope up the Escarpment than other roads and experiences much lower traffic volumes, creating a more comfortable all ages and abilities alternative.</p>

Many of the above network barriers have few City-owned roads or trails that cross them. The Welland Canal is one major barrier in the City with no proposed active transportation routes that cross it since all of the bridges are owned by the Region. The Niagara Escarpment is also a major challenge, with the most direct routes also being Regional Roads. Regional Roads will have an important role in addressing these barriers. As Niagara Region updates the Regional Strategic Cycling Network, the City should identify priority Regional Roads that connect areas of the city by addressing Major Network Barriers and provide direct connections to key destinations.



5.4 Retrofit and Road Reconstruction Strategies

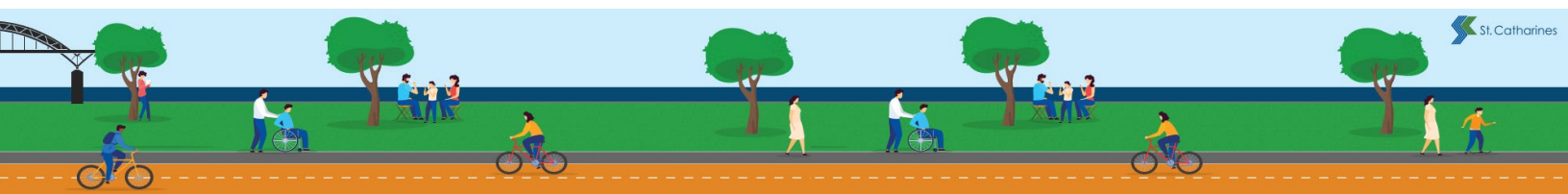
Several strategies may be used to accelerate the construction of permanent facilities in the Ultimate Active Transportation Network. It is recommended that the City take the following approaches to implementation:

Retrofitting Roadways: Funding opportunities may arise that allow for the accelerated implementation of permanent cycling facilities of the Ultimate Active Transportation Network. Roadways may be retrofitted with protected cycling facilities within the existing curb to curb width or behind the existing curbs, allowing for permanent cycling facilities to be completed before an opportunity to align the construction with infrastructure renewal arises.

Bundling with Other Infrastructure Projects: The City of St. Catharines should integrate the construction of all ages and abilities cycling infrastructure to be coordinated throughout all infrastructure projects on City roads, where possible. Wherever construction is planned on the Ultimate Active Transportation Network, whether it is for a road, sewer or watermain project, the construction of permanent cycling facilities should be integrated into the scope of work.

Bundling Multiple Projects as a Single Procurement: Bundling multiple projects for a single procurement is administratively more efficient and can reduce per-item costs by increasing quantities. This method is best suited for a group of projects with similar materials and design treatments.

Take Advantage of Resurfacing Contracts: Resurfacing a street creates a blank canvas and can be the most cost-efficient way to implement a new bikeway. Many cities use on-call markings contracts for routine markings work after resurfacing, paying by the linear foot as needed. These contracts can be written to include additional materials and means of separation, as well as pavement colour treatments for bikeways, bus lanes, and pedestrian spaces.



5.5 Maintaining the Active Transportation Network

Constructing a cycling network with physically separated cycling facilities requires an investment in maintenance to enable the safe and convenient use of the network year-round. The maintenance of active transportation facilities can help leverage capital investments, mitigate a user's exposure to risk, minimize potential conflict between users, mitigate liability exposure for the City and maximize the lifespan of the facility.

The ATMP is meant to not only provide a plan for the development of the cycling network, but also for the required operations and maintenance of the network. When new cycling facilities are in the early stages of design, cost considerations need to be made for both the upfront construction cost and the annual maintenance costs of the cycling facilities. It is important that resources, time and budget be allocated for the operations and maintenance in advance of the cycling facility being constructed.

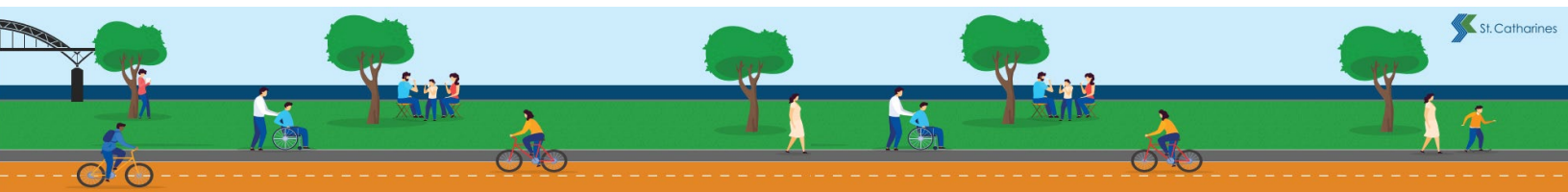
There is no “one-size fits all approach” to maintenance and operations. As the cycling network continues to expand, maintenance practices should adapt to reflect new routes and expectations for safe and comfortable facilities. The information contained in the following sections is intended to be used as a reference as the cycling network continues to be implemented over time.

5.5.1 Planning for Maintenance Costs

To support the year-round use of the cycling network, budgets for enhanced summer and winter maintenance should be reviewed in advance of adding new cycling facilities. It is recommended that the City use the information contained in this chapter regarding maintenance considerations to help confirm and refine the minimum maintenance standards and budgets for cycling facilities.

Maintenance of the cycling network should include budgeting for repairs and replacements for potholes, shoulders, pavement cracks, line markings, and route signage. Sweeping and snow clearing should be planned for seasonally.

Typical maintenance costs can be applied to the phases of the Rapid Implementation and Ultimate Active Transportation Networks to develop an estimate of annual maintenance costs. Approximate annual operating costs for



maintaining the network were developed working with City Municipal Works staff, which are shown in **Table 5.2**. Costs for additional fleet vehicles will also be required, however the fleet costs do not include additional required space for storing vehicles. Costs were based on the maintenance level of service proposed in the Maintenance Policy in **Chapter 6**.

Table 5.2: Estimated Annual Operating and Fleet Costs

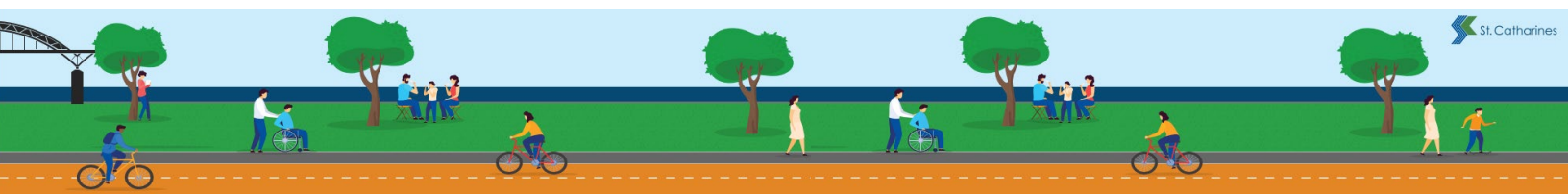
Phase	Lane Kilometres	Annual Operating Costs	Capital Fleet Purchases
Rapid Implementation	56.55	\$900,000	\$1,420,000
Short-term	12.53	\$250,000	\$370,000
Medium-term	33.84	\$550,000	\$820,000
Long-term	39.69	\$475,000	\$970,000
Total	142.61	\$2,175,000	\$3,580,000

Notes:

- Costs are in 2024 dollars and do not include inflation
- Annual operating costs are based on the complete network at the end of each phase
- No plowing of gravel trails
- Use of higher cost ice melt through environmentally sensitive park areas may increase operating costs
- Costs exclusive of annual reinstatement in parks

5.6 Amenities at Multimodal Hubs

A cycling network must be supported by amenities that provide important resources for the network users. Multimodal hubs are physical locations that support several modes of transportation. They may include key connections to higher order transit or locations where a user may change their mode of transportation, such as a bike rack. Multimodal hubs become strategic locations to provide amenities for people cycling or using another active mode, supporting them in their trips. Supporting amenities include bike racks, bike repair stations, charging stations for e-bikes and e-scooters, seating, shelters, water refill stations, and public washrooms. Due to the electrical and water servicing requirements of some of these amenities, it becomes strategic to



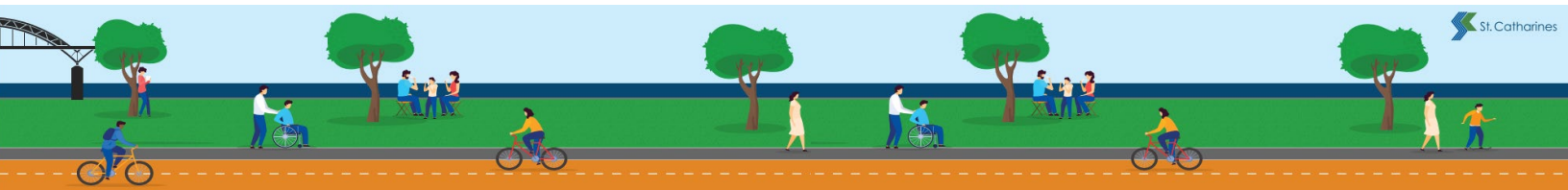
locate major hubs around existing public facilities, such as libraries, transit terminals, or recreation centres. Minor hubs can provide amenities that don't require servicing. They should be located near intersections of Spine Routes in the cycling network and can be aligned with other public locations, such as parks, trails and schools. Costs for typical amenities at hubs are provided in **Table 5.3**.

Table 5.3: Typical Amenity Costs

Amenity	Cost
Bench	\$2,000
Bicycle Rack (post and ring, 2 bikes)	\$150 - \$250
Bicycle Rack (coat hanger, about 6 bikes)	\$1,800
Bicycle Repair Station	\$2,500
Waste Receptacle	\$3,000
Water Refill Station (connected to existing water service)	\$3,000

5.7 Network Phasing

The Rapid Implementation Network and Ultimate Active Transportation Network will be completed over different timeframes. The Rapid Implementation Network, as the name suggests, is recommended to be prioritized and completed in the very short term (four years or less) to provide a basic network built with quick-build materials that can support cycling trips to key destinations. The Ultimate Active Transportation Network is recommended to be completed through construction activities over twenty-five years. The phasing for the Ultimate Active Transportation Network is presented in **Map 9** and is divided into the rapid implementation phase (0-3 years), short term (3-8 years), medium term (8-15 years) and long term (15-25 years) phases. As the Ultimate Active Transportation Network is built out in phases, the ultimate cycling routes that are built through road reconstruction activities will continue to be supported by the Rapid Implementation Network. As cycling trends shift in the city, it may become apparent that some projects will need to be accelerated. City staff should not refer to the network phasing map as a strict guideline for when active transportation routes should be constructed; they should accelerate the construction of routes as the need arises, through full construction to the ultimate condition or through the rapid implementation of quick-build materials.



The Ultimate Active Transportation Network includes various major infrastructure projects throughout the city that address major network barriers or require a very long-term approach to implementation. These projects require further study to determine the feasibility of implementation and have much more uncertainty in the timeline for implementation. Therefore, these projects have not been included in the phasing of the Ultimate Active Transportation Network.

Table 5.4 provides a summary of the overall cost of implementing the Ultimate Active Transportation Network for each phase of implementation.

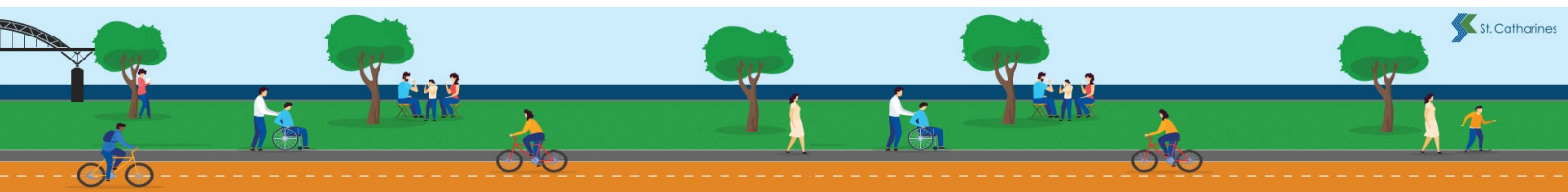


Table 5.4: Ultimate Cycle Network Cost Estimates

Facility Category	Short-term Length (km)	Short-term Cost	Medium-term Length (km)	Medium-term Cost	Long-term Length (km)	Long-term Cost
Physically Separated	8.1	\$2,300,000 - \$3,540,000	22.8	\$7,130,000 - \$10,780,000	20.7	\$6,440,000 - \$9,850,000
Designated Space	3.2	\$1,160,000 - \$1,790,000	9.5	\$2,350,000 - \$3,480,000	3.3	\$560,000 - \$810,000
Neighbourhood Greenways	3.6	\$350,000 - \$750,000	19.7	\$1,610,000 - \$3,440,000	21.1	\$1,900,000 - \$4,040,000
Paved Shoulders	1.6	\$180,000 - \$340,000	8.4	\$970,000 - \$1,810,000	0.4	\$40,000 - 80,000
Shared Space	0	0				
Trails	4.4	\$1,100,000 - \$1,760,000	3.7	\$960,000 - \$1,670,000	2.4	\$750,000 - \$1,490,000
Subtotal		\$4,710,000 - \$7,540,000		\$13,020,000 - \$21,180,000		\$9,680,000 - \$16,270,000
Contingency (40%)		\$1,880,000 - \$3,020,000		\$5,210,000 - \$8,470,000		\$3,870,000 - \$6,510,000
Total	20.9	\$6,590,000 - 10,560,000	64.1	\$18,230,000 - \$29,650,000	47.9	\$13,550,000 - \$22,780,000



MAP 9

Network Phasing

Proposed Active Transportation Network

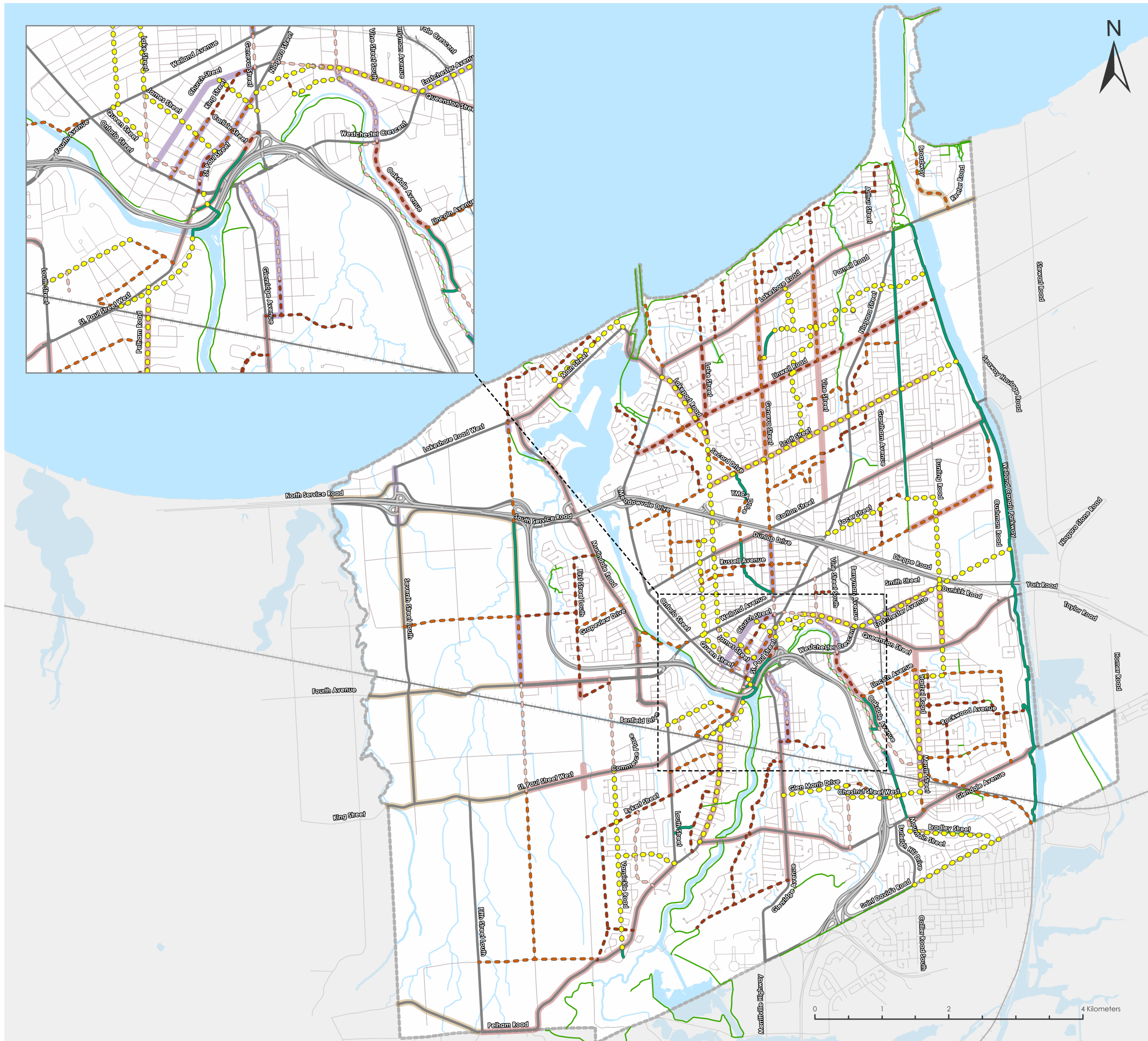
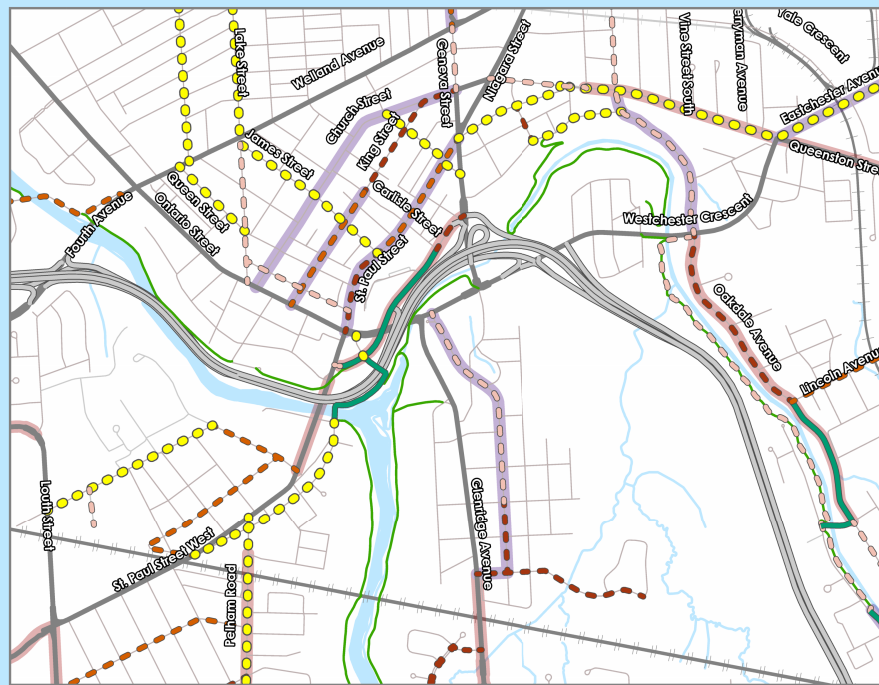
- Rapid Implementation (0-3 Years)
- - - - Short Term (3-8 Years)
- - - - Medium (8-15 Years)
- - - - Long (15-25 Years)
- Existing
- <all other values>

Existing Active Transportation Network

- ▨▨▨▨ Major Cycling Network Barriers
- Bike Lane
- Paved Shoulder
- Signed Route
- Existing Trail

Existing Roads

- Private/Unknown
- City Roads
- Region/Seaway
- Provincial Highway



0 1 2 4 Kilometers

Data retrieved from the City of St. Catharines, Niagara Region, and Ontario Geohub.





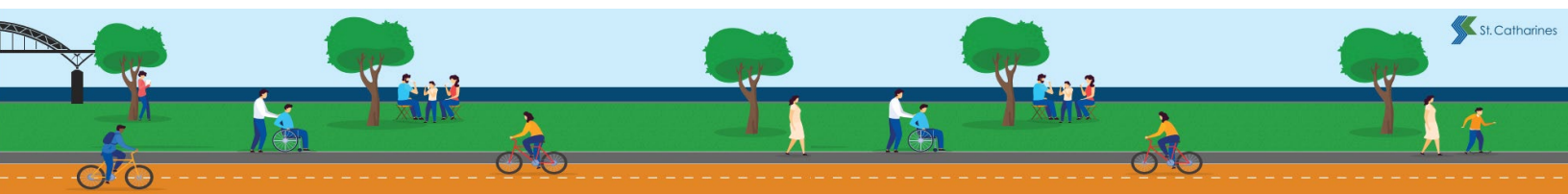
Chapter 6: Active Transportation Supportive Policies

6.1 Supporting Active Transportation through Policy

Supporting the ATMP will require the City of St. Catharines to enable active transportation through both physical and social infrastructure. To start this process the City needs to effectively implement the proposed pedestrian and cycling networks identified in the ATMP. This requires a creative and collaborative approach between the City, the Region and local champions consisting of advocates and supportive businesses. As physical infrastructure projects are developed to make cycling, walking, and rolling easier, the City should also implement initiatives that motivate and inform new and existing active transportation users. This will enhance the value of the larger and more costly investments.

Strategic plans and documents, while often ambitious, can sometimes lack specificity and fail to address the practical aspects of implementation. This section aims to avoid that mistake by proposing policies and strategies that can effectively support the implementation of the ATMP and match the needs of the City of St. Catharines. These policies directly reflect the vision statement and objectives of the St. Catharines ATMP and are aligned with the existing policy framework of the City. These recommendations aim to enhance and align with the existing design guidelines, ensuring a cohesive and comprehensive approach.

The following five policies target key elements for supporting the growth and uptake of active transportation within the City of St. Catharines. These five policies include actions aimed at Improving the Pedestrian Network, Building the Ultimate Cycling Network, Maintaining the Network, Transportation Demand Management, and Supporting Micromobility. This chapter provides details on how each policy and its recommendations can help transform St. Catharines into an active transportation leader within Ontario.



6.2 Policy #1: Improving the Pedestrian Network

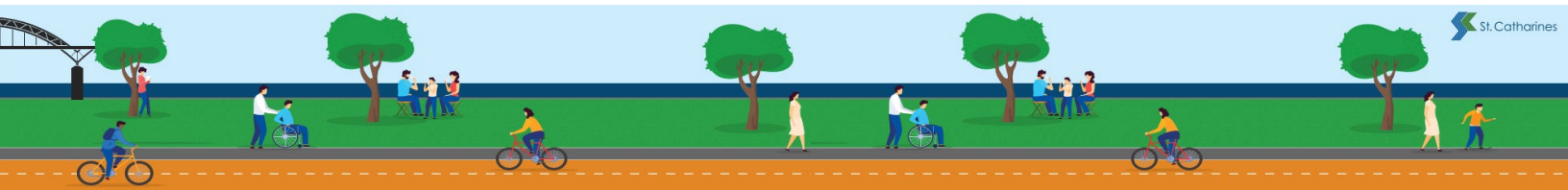
Improving the conditions for those walking and rolling throughout the City of St. Catharines is a key component of supporting active transportation.

“Walkability” can act as a key indicator of a community’s health, vibrancy, and commitment to sustainable transportation. The term “walkability” as an indicator includes travel using a wheelchair, mobility devices, and all other forms of self-propelled travel.

Supporting walkability throughout St. Catharines will introduce a number of health, economic, social equity, and environmental benefits including:

- Improving both physical and mental health of residents by giving the option to walk for utilitarian and recreational purposes. Walking can lead to improved cardiovascular health and the reduction in chronic diseases as well as improving mental health conditions such as decreasing stress, mitigating social isolationism and loneliness.
- Introducing unrealized economic benefits from new consumers who would not be able to easily access businesses without a vehicle or conventional transit.
- Advancing transportation equity by making walkability a safe and reliable transportation choice, lowering costs of day-to-day transportation and increasing access to opportunities across the City; and
- Creating a healthier environment by helping residents shift away from motor vehicle usage for short-to-medium length trips, reducing greenhouse gas emissions and noise pollution as a result.

Several municipalities in Ontario are exploring and implementing additional features to improve accessibility at complex intersections. Tactile walking surface indicators (TWSIs) are required at curb ramps for pedestrian crossings under the Accessibility for Ontarians with Disabilities Act (AODA) and new practices are emerging for the use of directional TWSIs at complex intersections, as shown in **Figure 6.1**. Some municipalities are using directional TWSIs where multiple crossings are required at an intersection and pedestrian refuge islands are provided. Directional TWSIs can also be used to provide directional wayfinding at skewed crosswalks, where someone living with low to no vision may have challenges finding the opposite end of a crosswalk if they follow a



perpendicular path. Additional intersection treatments such as raised crosswalks, raised intersections, and continuous sidewalks can improve accessibility for pedestrians at intersections by eliminating the need for curb ramps, while also improving safety through traffic calming effects. The City of St. Catharines should monitor these emerging practices and develop their own standards as best practices and guidelines are developed.



Figure 6.1: Tactile Features at a Protected Intersection

Existing gaps in the pedestrian network as identified in **Chapter 2** are required to be addressed to fully realize these benefits. The following recommendations aim to address these existing barriers to make St. Catharines a more walkable city.

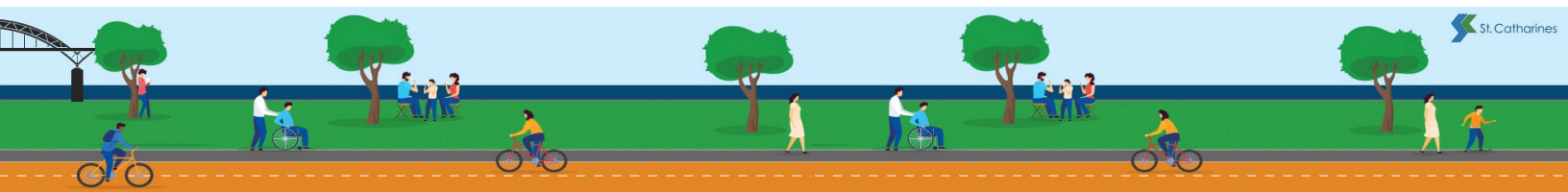
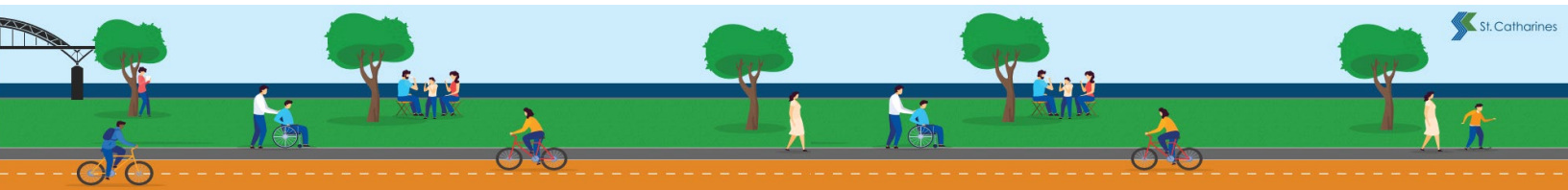


Table 6.1: Policy #1 Actions

Action	Objective
1.1 – Complete Pedestrian Network Gaps	Complete the sidewalk network across the City of St. Catharines by providing sidewalks on both sides of all Arterial and Collector network roadways. Prioritize providing sidewalks on at least one side for retrofits of Local roads that are within walking distance of schools or implement Greenways to facilitate All Ages and Abilities active transportation trips. Once the priority sidewalk gaps have been completed, construct additional sidewalks on both sides of local roads where feasible.
1.2 – Sidewalks in New Developments	Sidewalks should be provided on both sides of all roads in new developments.
1.3 – Provide Accessible Sidewalk Widths	Update standards to provide a minimum sidewalk width of 1.8 metres on all roads. Sidewalk widths of 1.5 metres should only be considered where site or physical constraints exist. Where sidewalks are implemented immediately adjacent to curbs or are combined with the curb, the desired width for the sidewalk should be 2 metres.
1.4 – Accessible Intersections	Ensure that intersections support the use of mobility devices by introducing appropriate curb-cuts and tactile walking surface indicators (truncated domes) to improve access when entering/exiting an intersection. Develop standards for using directional tactile walking surface indicators at intersections where appropriate.
1.5 – Accessible Pedestrian Clearance Intervals	Ensure that appropriate timing is used for pedestrian phases at signalized intersections. Use a walking speed of 1.0 m/s to calculate the pedestrian clearance interval. Consider using a slower walking speed in areas with high volumes of pedestrians or crossings frequently used by young children or seniors.



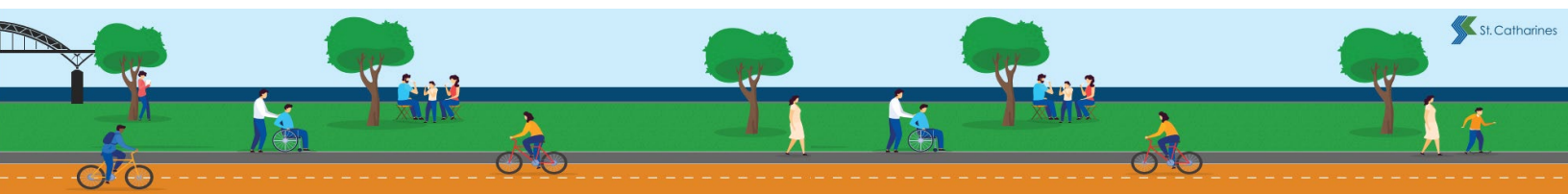
Action	Objective
1.6 – Develop Pedestrian Crossing program	Develop a program for the review and installation of new pedestrian cross-overs (PXOs) or mid-block pedestrian signals outside of priority areas such as schools, seniors residences, and high-density areas.

6.3 Policy #2: Building the Ultimate Active Transportation Network

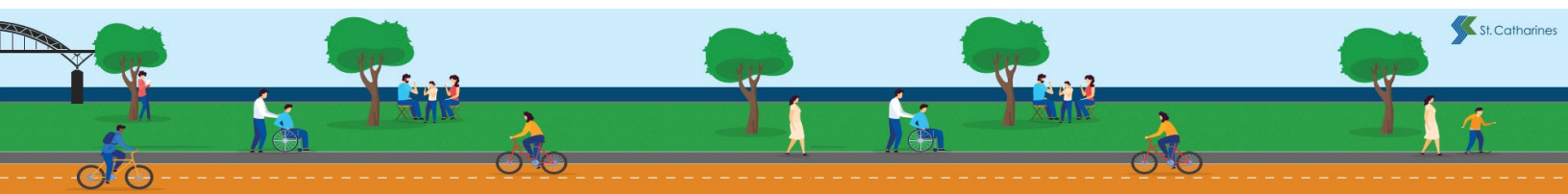
Building the Ultimate Active Transportation Network will involve strategies and policies to construct permanent cycling facilities for the Ultimate Active Transportation Network in Chapter 5 and embedding the Ultimate Active Transportation Network into the planning framework of St. Catharines. Delivering the Ultimate Active Transportation Network will improve the conditions of the All Ages and Abilities network across the City, helping inspire more residents to continue to take up the use of active transportation. The following policy actions are designed to guide the City of St. Catharines to achieve the fully realized implementation of the Ultimate Active Transportation Network.

Table 6.2: Policy #2 Actions

Action	Objective
2.1 – Support Complete Streets	The guidance outlined in the ATMP operationalizes the City of St. Catharines' commitment to developing complete streets. The City should compare any pending capital project against this plan to ensure that they provide the user experience that is outlined and identified in the proposed facility types.
2.2 – Adopt the Long-Term Implementation Plan	Adopt the long-term implementation plan and include it as a schedule in the Municipal Official Plan and Transportation Master Plan. These plans should be updated every five (5) years to include provisions for All Ages and Abilities active transportation facilities and infrastructure, specifically within areas of mixed land use and high population densities to support a



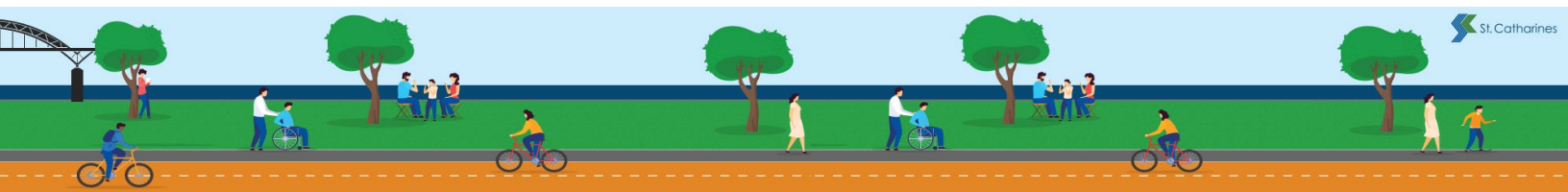
Action	Objective
	greater number of people engaging in active forms of travel on a more frequent basis.
2.3 – Retrofit Cycling Facilities in Coordination with Capital Projects	Where infrastructure replacement and rehabilitation projects are planned on the Ultimate Cycling Network, construction of the permanent cycling facilities shall be included in the scope of the design and construction contracts. Bundling construction contracts will allow for cost efficiencies in the implementation of the cycling network, reducing the overall cost to implement the network. The cycling facility to be implemented should be reviewed in detail by City staff, requiring All Ages and Abilities facilities for any construction project on a Spine Route.
2.4 – Retrofit Priority Cycling Routes with Permanent Facilities	Develop a program to accelerate the construction of permanent cycling facilities with minor construction activities. Retrofits may include minor surface works to install permanent concrete medians as protection for cycling facilities and minor adjustments for drainage. These construction projects should be considered for roads where no other infrastructure replacement or rehabilitation projects are planned in the lifetime of this Plan or where there is a desire to accelerate key routes for increase connectivity.
2.5 – Regional Coordination	Recognize that implementation of the St. Catharines ATMP requires coordination between the City and Niagara Region for implementation to be consistent and funded effectively. The City of St. Catharines should leverage existing partnerships between the City and the Region to build cost sharing commitments to complete gaps in the network created by Regional Roads.



Action	Objective
2.6 – Amenities at Multi-modal Hubs	Provide active transportation supportive amenities at major and minor hubs. Provide a minimum of a bench, bike rack, and repair station at minor hubs near intersecting Spine Routes. Coordinate with other agencies to provide amenities for major hubs at strategic connections to transit and at existing municipal facilities.
2.7 – Bicycle Parking	Work with the business improvement area, Niagara Region, Niagara Region Transit, and Metrolinx to provide safe and secure bicycle parking at key commercial destinations and transportation hubs.
2.8 – Safe Intersections for Active Transportation	Develop municipal guidelines and engineering standards for improved intersection cycling treatments, including setback crossings, adjacent crossings, and protected intersections. Provide No Right Turn on Red (NRTOR) and/or Leading Pedestrian and Bicycle Interval (LPI/LBI) phasing at intersections on the cycling network where there is a high potential for conflicts with turning motor vehicles.

6.4 Policy #3: Maintaining the Network

Maintenance is imperative to supporting high quality routes and facilities, and encouraging and promoting comfortable, safe and convenient use of an active transportation network all year-round. The maintenance of active transportation facilities help leverage capital investments, mitigate a user’s exposure to risk, minimize potential conflict between users, mitigate liability exposure for the City, and maximize the lifespan of the facility. Maintenance of the active transportation network requires both frequent maintenance, including sweeping and snow clearing, and annual inspections and monitoring for damage. The costs associated with frequent maintenance activities are discussed in Chapter 4, while the policies for maintenance and asset management are discussed below.

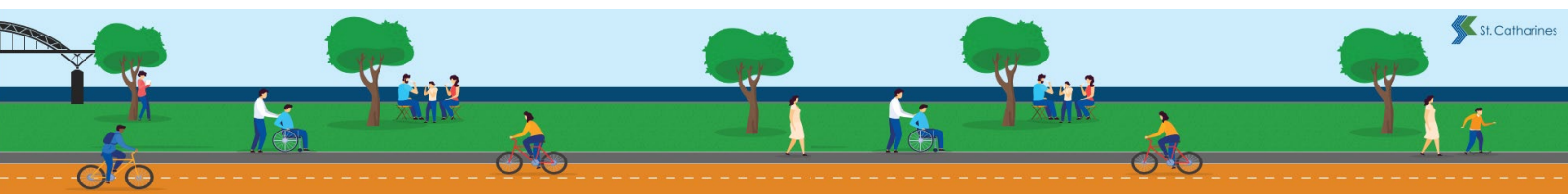


6.4.1 Minimum Maintenance Standards

Minimum Maintenance Standards for active transportation facilities may be developed from the Minimum Maintenance Standards for Municipal Highways. Many of the same maintenance activities that apply to roads will be applied to on-road active transportation facilities. In-boulevard separated active transportation facilities, including cycle tracks and multi-use paths, should be held to the same or higher standards to create a consistently comfortable cycling facility for those who rely on active modes for transportation and to encourage mode shift to active transportation modes. **Table 6.3** provides the minimum recommended maintenance service levels for non-winter maintenance activities for in-boulevard cycling facilities.

Table 6.3: Minimum Recommended Service Levels for Non-Winter Maintenance Activities

Activity	Service Level Criteria
Patrol	3 times every 7 days to once every 30 days
Sweeping	Scheduled sweeping particularly in Spring and Fall or during major construction activities; deploy resources outside of scheduled sweeping as soon as practicable after becoming aware of debris
Surface Discontinuities	Greater than 2 cm height within 2 to 21 days after acquiring knowledge of the discontinuity
Signage and Pavement Markings	Refreshed as needed
Cracking	Greater than 2 cm wide and 2 cm deep
Potholes	600 cm ² by 8 cm deep within 4 days after acquiring knowledge of the pothole
Surface Drop-off at Shoulders	Deeper than 8 cm
Vegetation Management	Routine mowing including daylight triangles at intersections; annual trimming of bike path trees



Many municipalities in Ontario have expanded maintenance activities on active transportation routes for year-round use, by outlining clear and achievable winter maintenance standards. **Table 6.4** provides the recommended minimum maintenance standards for winter maintenance for in-boulevard cycling facilities.

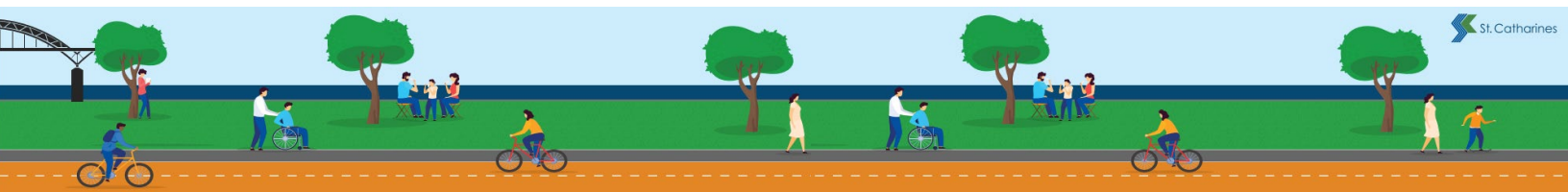
Table 6.4: Recommended Service Levels for Winter Activities

Activity	Spine Network	Connector Network
Snow Clearing	Maintain to 2.5 cm within 8 hours	Maintain to 2.5 cm within 24 hours
Ice Treatment	Treat within 3 hours by 7 am and by 3pm on a weekday	Treat within 8 hours
Ice Prevention	Proactive anti-icing approach applied within 8 hours prior to a storm event	Proactive anti-icing approach applied within 24 hours prior to a storm event

The active transportation network can be well maintained, supporting year-round use by implementing the following actions and through adequate funding to support maintenance activities:

Table 6.5: Policy #3 Maintenance Actions

Action	Objective
3.1 – Adopt the Recommended Minimum Maintenance Standards for the Active Transportation Network	Provide a maintenance standard that enables year-round use of active transportation facilities, removing barriers to those who rely on active transportation as a mode of transportation and enabling others to shift to active modes.
3.2 – Routine Maintenance	Schedule maintenance activities to meet minimum maintenance standards.
3.3 – Tracking Costs	Maintain a database of actual costs of facilities for budgeting for future projects and replacements.



6.4.2 Asset Management

It is crucial to assess and manage both the existing active transportation assets and future expansions using effective asset management practices, alongside well-defined strategies, and relevant policies. Active transportation infrastructure is an asset for the City and its partners. Asset management can help to address growth, improvements and maintenance of the St. Catharines active transportation network, while achieving the desired standards for level of service. Asset management also seeks the most cost-effective way to establish desired levels of service while optimizing resources.

The useful life of active transportation facilities should be included in asset management planning. Typical useful life estimates for facility types are included in .

Table 6.6: Typical Useful Life for Active Transportation Infrastructure

Type	Useful life
Granular Surface Pathway	10 years
Asphalt pathway	20 years
Concrete pathway	50 years
Bridge (AT or motor vehicle)	AT only – 30 years Motor vehicle – 50 years
Culvert	50 years
Painted Line Markings	2 years
Durable Line Marking and Symbols	5 years
Signage	Wood – 15 years Wood/Metal, Metal – 20 years Stone – 50 years
Physical separation	Until damaged

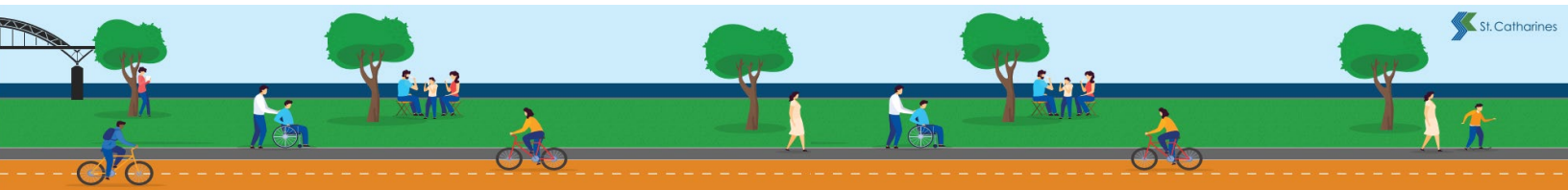


Table 6.7: Policy #3 Asset Management Actions

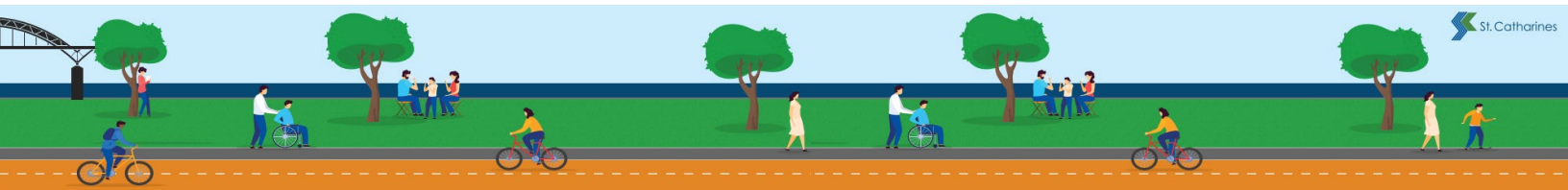
Action	Objective
3.4 – Coordinating Maintenance Assets	Work with maintenance staff during the planning and design stages to ensure they have the equipment and resources available to maintain new St. Catharines active transportation routes.
3.5 – Tracking and Monitoring Physical Assets	Maintain a GIS inventory to track active transportation infrastructure and other elements like bollards, bridges, pavement markings, parking, etc.
3.6 – Asset Inspection Frequency	Conduct inspections for sidewalks, multi-use pathways, and cycling facilities every 12 months to damage and surface discontinuities developing from annual cycles.

6.5 Policy #4: Transportation Demand Management

Supporting active transportation uptake goes beyond simply building physical infrastructure and increasing the supply of the All Ages and Abilities network. A culture of active transportation must be fostered, encouraging people to take up and feel comfortable using active transportation as a transportation mode.

One way of incentivising this change is by rolling out a Transportation Demand Management (TDM) strategy that seeks to shift user travel choice away from vehicles and onto more sustainable modes of transportation. TDM utilizes incentives, promotional initiatives, education, and various measures to influence the who, when, why, where, and how of people's travel decisions. TDM plays a pivotal role in shaping travel behavior, aligning with key objectives such as reducing reliance on single-occupancy car trips, promoting travel outside peak periods, and fostering the adoption of sustainable transportation modes.

TDM initiatives support the uptake of sustainable transportation modes through the use of partnerships, policies, and incentive programs. Examples of common TDM measures include ridesharing programs, parking management, transit, and active transportation facilities. The TDM policies in this Plan will be focused on the scope of active transportation supportive TDM measures and policies, which will include programs, partnerships, and end-of trip facilities.



6.5.1 Bicycle Parking and End-of-Trip Facilities

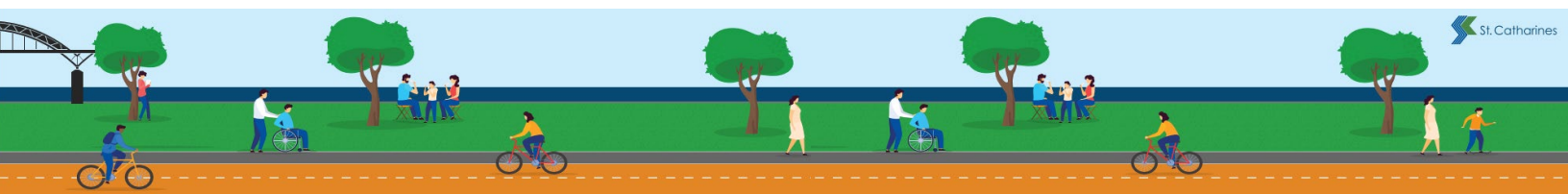
Bicycle parking and end of trip facilities provide essential facilities for active transportation users at their destinations. End of trip facilities typically include showers, lockers, change rooms, repair stations, and bicycle cleaning stations. Long-term bicycle parking should be located in secure access-controlled rooms, while short-term bicycle parking should be visible and located at the entrance to the building. Typical ranges for bicycle parking rates based on best practices are shown in **Table 6.8**.

Table 6.8: Typical Bicycle Parking Rates

Use	Bicycle Parking Rate
Multi-residential uses	0.7 – 0.8 long-term spaces per unit 0.1 short-term spaces per unit Provide a minimum 5% of long-term spaces as accessible, no less than one
Commercial Uses	1.0 – 2.0 long-term spaces per 1,000m ² (GFA) 2.0 short-term spaces per 1,000m ² (GFA)
Office Uses	1.0 – 2.0 long-term spaces per 1,000m ² (GFA) 1.0 – 2.0 short-term spaces per 1,000m ² (GFA)
Industrial Uses	0.5 – 1.0 long-term spaces per 1,000 m ² (GFA)
Institutional Uses	1.0 – 1.5 long-term spaces per 1,000m ² (GFA) 1.0 – 1.5 short-term spaces per 1,000m ² (GFA)
Elementary/Secondary Schools	0.6 – 1.0 long-term spaces per 1,000m ² (GFA) 0.6 – 1.0 short-term spaces per 1,000m ² (GFA)
Post-Secondary Schools	6.0 – 10.0 long-term spaces per 1,000m ² (GFA of offices & classrooms) 2.0 – 3.0 short-term spaces per 1,000m ² (GFA of offices & classrooms)

Note: Best practices based on rates from the Town of Ajax, City of Mississauga, City of Ottawa, and City of Toronto,

Showers, changerooms, and bicycle maintenance facilities are typically required in buildings with uses other than residential, containing more than 4 to 5 long-term bicycle parking spaces. Additionally, a minimum of 5% of long-term bicycle parking spaces should be designed to accommodate larger or accessible bicycles, including cargo bicycles, adaptive bicycles, or tricycles.

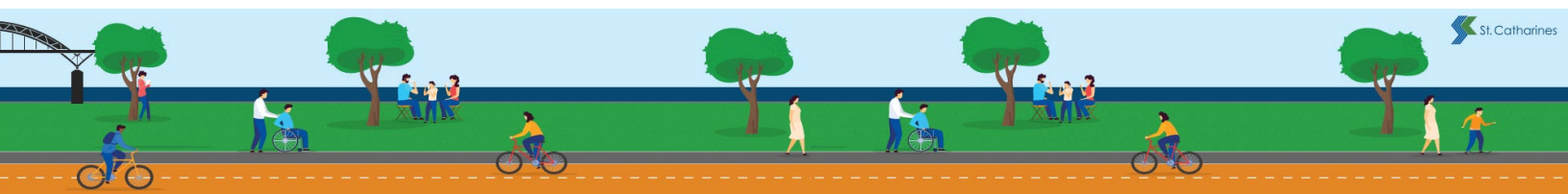


Bicycle parking spaces for these larger bicycles should be horizontal and located on the ground (not stacked) with a space at least 1.5 m wide and 2.4 m long.

TDM measures that are beyond the scope of this Plan should also be reviewed and developed into a TDM Strategy. Other measures may include carsharing, ridesharing, reductions of parking minimums, The City of St. Catharines should implement the following to help encourage sustainable travel choices throughout the city.

Table 6.9: Policy #4 Actions

Action	Objective
4.1 – Support Local Partnerships	<p>Identify and support local community groups and champions that are promoting active transportation use.</p> <p>Enhance partnerships and collaboration through supporting workplace TDM champions, leveraging community groups, and working with the development community to promote TDM.</p>
4.2 – Review Bicycle Parking Minimums	Update the Zoning By-law with minimum recommended bicycle parking rates and end-of-trip facilities.
4.3 – Bike Parking at Municipal Facilities	Support active transportation by providing end-of-trip facilities such as bike rooms, lockers, bike repair stations etc. at municipal buildings for enhancing the user comfort and experience.
4.4 – TDM Evaluation	Establish a method for quantifying the benefits of TDM within project development and incorporating an evaluation process into planning documentation and the development review process.

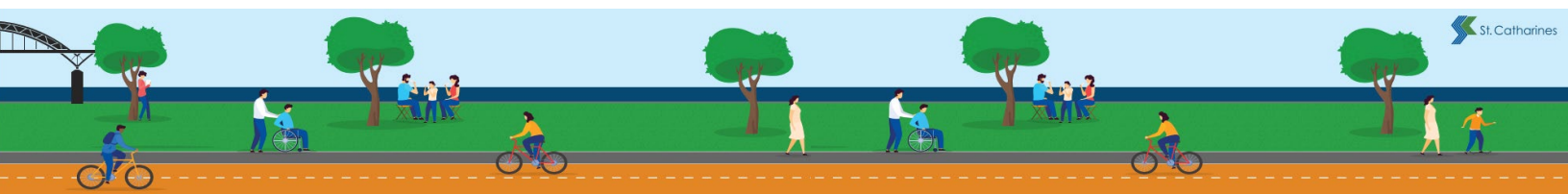


<p>4.5 – TDM Awareness</p>	<p>Coordinate with developers and property managers to distribute transportation options information to residents encouraging sustainable transportation.</p> <p>Active transportation and transit options should be particularly promoted when residents and businesses move locations, as this is typically when travellers are most amenable to considering new travel options.</p>
<p>4.6 – Active School Travel</p>	<p>Encourage Active School Travel (AST), preferably through a designated full-time staff member who creates AST programs and partnerships across the City.</p>

Following the implementation of these policies, the City of St. Catharines can begin rolling out additional TDM strategies to further develop an active transportation community. The City's stated values – being dynamic, sustainable, and livable – provides an opportunity for a transition towards a transportation system that has less reliance on automobiles, which have significant environmental, social, and economic costs.

6.6 Policy #5: Supporting Micromobility

While electric vehicles have dominated public discourse on the electrification of mobility, the quiet success of e-bikes is reshaping Canada's mobility landscape. Outselling electric cars in North America, e-bikes are fast becoming a viable solution for diverse mobility needs and filling transportation network gaps. E-bikes significantly extend the range of riders and introduce cycling to new demographics. Individuals who might not consider a traditional bike are now exploring e-bikes for both recreation and transportation. The surge in interest and awareness of e-bikes has sparked questions from practitioners and municipalities, particularly due to the lack of uniform information about e-bike types, their regulation, and permissible usage areas. In response to this trend, municipalities may need to formulate regulations or policies addressing e-bike usage, including where they can be used and how they should be operated. E-



bikes also hold the potential to contribute to carbon emission reduction and enhance air quality in urban areas. As such, municipalities might want to consider incentives to encourage residents to adopt e-bikes as a sustainable transportation mode. Related devices like e-scooters, hoverboards and segways can all enhance travel options, particularly for shorter trips.

6.6.1 Shared Micromobility

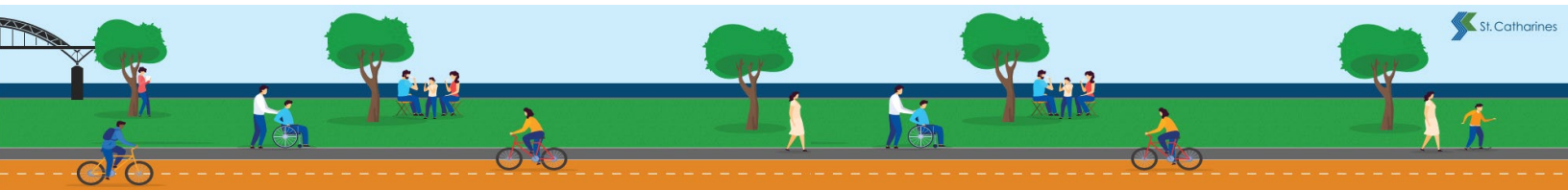
Micromobility also can be operated as a shared program within the City's jurisdiction such as bikeshare program or an e-scooter share program. Currently many North American cities, including Ontario municipalities, have piloted these programs or launched a permanent program to enhance the mobility options for residents and move towards reducing greenhouse gas emissions from the transportation sector, as well as establishing more sustainable and equitable communities.

Shared micromobility programs can be implemented through various ownership models, involving public, non-profit or private entities. Achieving a successful launch and operation of such programs requires careful attention to several critical factors, including securing sufficient funding, allocating necessary resources, optimizing internal staff allocation, and implementing streamlined promotional strategies.

Privately owned and operated micromobility programs have recently become more common, which reduces the financial risk for municipalities. However, company closures or decisions may impact the long-term feasibility of shared micromobility programs, which have led to some programs ceasing operations or shifting to other models. Long-term municipal funding should be planned for to ensure the longevity of a shared micromobility program in the City.

6.6.2 Equity Considerations

Shared micromobility programs can provide opportunities to improve transportation equity in the City for those who experience social barriers to transportation. Equity-based programs can be supported with municipal funding and other funding sources to provide subsidized memberships to equity-deserving communities. Smaller numbers of adaptive and accessible shared bicycles can be provided to provide transportation options for people who live with disabilities.

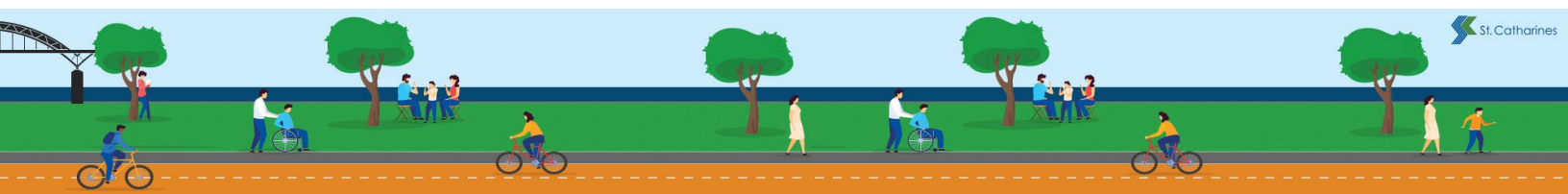


6.6.3 Shared Micromobility Strategy

The success of a shared micromobility program will depend on the availability of All Ages and Abilities active transportation infrastructure in the city. Considerations should be made for the implementation of a shared micromobility program with the implementation of the Rapid Implementation Network, giving potential users safe and protected cycling facilities to use. Micromobility should be planned for and coordinated with the Region and neighbouring local municipalities to ensure there is a consistent approach to regulation of these devices across jurisdictions.

A strategy to implement a shared micromobility program in St. Catharines should include:

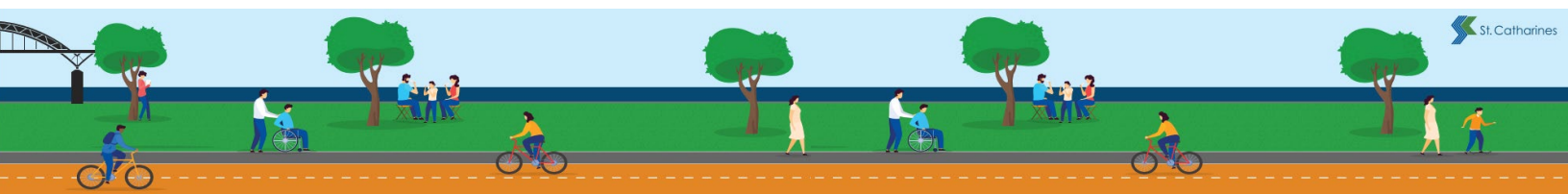
- Develop a by-law for where and how e-bikes and e-scooters can be used. Coordinate with Niagara Region and neighbouring local municipalities to ensure consistency in regulation on City and Regional roads and across shared municipal boundaries.
- Implement a pilot program for shared micromobility with a privately owned and operated micromobility system.
- Study and monitor usage of the shared micromobility program to identify key origins and destinations for users. Include metrics and surveys throughout the pilot program to understand the demographics of users.
- Allocate budget to provide subsidized or free-ride programs specifically tailored to support equity deserving communities and individuals in mobility-reliant professions, such as healthcare workers, emergency responders, etc.
- Review and allocate funding to be contributed to ensure the long-term success of the shared micromobility program.



It is important to ensure that shared micromobility devices do not create hazards or sidewalk obstructions to ensure that sidewalks remain accessible. Designated parking locations should be clearly marked and available to ensure that devices are not parked on the sidewalk. An example of a designated parking area is shown in **Figure 6.2**.



Figure 6.2: Shared e-bike and e-scooter parking, Ajax



The City of St. Catharines should adopt the following policies to support the growth of micromobility.

Table 6.10: Policy #5 Actions

Action	Objective
5.1 – Secure e-bike parking and charging	Provide secure parking and charging infrastructure. E-bikes can be charged with standard household outlets, which can be stipulated in the requirements for bicycle lockers.
5.2 – Design public bike racks to accommodate e-bikes	Public bike racks should accommodate bicycles of all common shapes and sizes. Parking at popular destinations should accommodate spaces where batteries can be stored separately from the bicycle where appropriate.
5.3 – Clarify e-bike and e-scooter rules for cycling facilities, trails, and sidewalks	The City of St. Catharines should permit traditional-style e-bikes (that is, any e-bike that <u>does not</u> resemble a motorcycle or electric scooter) on all facilities where standard bicycles are permitted. E-bikes, whether powered by pedal assist or throttle, are currently restricted to a top speed of 32 km/h in Ontario, meaning that they operate at a similar speed to many standard bicycles.
5.4 – Explore shared micromobility programs	Introducing a bike, e-bike, or e-scooter sharing pilot program based on the recommended strategy above. Monitor and report on the usage and operations of the pilot.





Chapter 7: Wayfinding, Education, and Encouragement

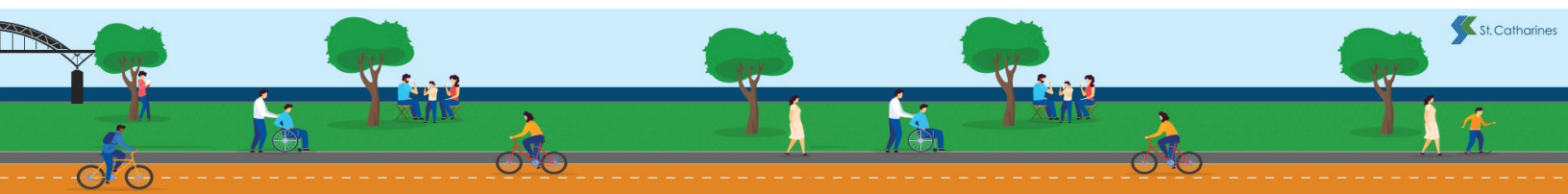
7.1 Wayfinding Strategy

7.1.1 Importance of Wayfinding

Effective wayfinding strategies are critical for promoting active transportation and encouraging a shift towards active transportation modes. Wayfinding is the process by which people orient themselves in physical space and navigate from one location to another. A good wayfinding system equips residents and visitors with easy-to-read information allowing a logical, intuitive experience by which to explore a local area, its services, and attractions. Clear and concise navigation information creates a welcoming experience and signage is an effective investment to encourage tourism and improve access to local destinations. Furthermore, it encourages safe and comfortable use of the active transportation network by all ages, abilities, and cultures. Effective wayfinding is important as residents and visitors explore the City through different modes of transportation and from different entry points.

The use of active transportation networks requires clear information on how to use the infrastructure, where to go, and how to interact with other users, among other things. The wayfinding signage should identify the routes that are prioritized for active transportation users, help visitors and residents alike navigate the city effectively, direct people towards areas where amenities are located, and provide additional encouragement for residents to consider active transportation as opposed to taking a vehicle.

The design and construction of the network should incorporate a “family” of signs, each with a different purpose and message. This “family” contains unifying design and graphic elements and materials. When designing a wayfinding strategy every effort should be made to provide users with sufficient information to feel both safe and comfortable. This can be achieved through the design and placement of the wayfinding signage that eliminates any potential gaps in the overall network, using progressive disclosure. This unified system becomes immediately recognizable by the user and can become a branding element.



7.1.2 St. Catharines Wayfinding Strategy

Various plans and policies guiding St. Catharines transportation network development and enhancement include reference to the importance of wayfinding signage to improve the active transportation network for their residents and visitors. Recommendations for the inclusion of wayfinding implementation, monitoring and enhancement from the City are outlined below.

Current Wayfinding Signage

The current wayfinding signage in the City includes many best practices for wayfinding. Directional signs provide distances to destinations with time estimates for walking and cycling and symbology showing activities at the destination, as shown in **Figure 7.1**.

Trail information signs provide information on regulations and reporting contact information and emergency contact information, as shown in **Figure 7.2**.



Figure 7.1: Existing Directional Signage



Figure 7.2: Existing Trail Information Sign



Additional trail-specific wayfinding signage is provided for the Waterfront Trail, Welland Canals Trail and Greater Niagara Circle Route. The Welland Canals Trail wayfinding system provides both route maps, showing intersecting trail systems and trail etiquette (Figure 7.3), and directional signage with distances and times to key road connections and bridge crossings (Figure 7.4).



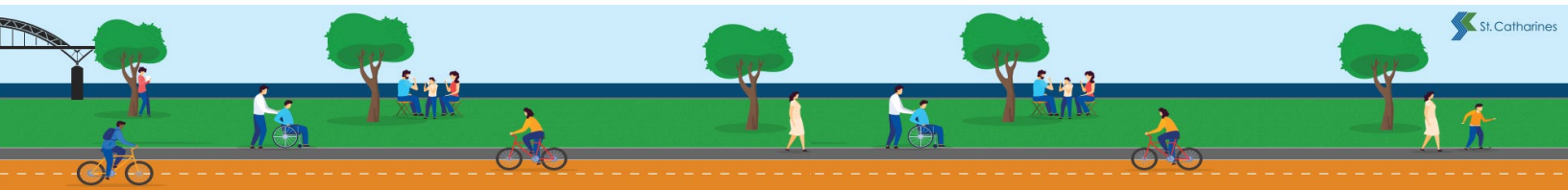
Figure 7.3: Welland Canals Trail Map



Figure 7.4: Welland Canals Trail Destination Sign

Accessible Wayfinding Improvements

Making wayfinding signage accessible for all users is a priority stated in the City's Recreation Master Plan. In March 2023 a pilot program looking to include the American Sign Language (ASL) alphabet and common language and phrases on City recreational facilities and parks entrance signage was launched by the City. Initiated by hearing-impaired resident Avril Hertneky, this pilot was implemented to improve communication between the hearing and deaf residents and visitors of St. Catharines in public spaces. This improved approach to wayfinding is helping St. Catharines become a place where everyone can play, and the Accessibility Advisory Committee's objectives and



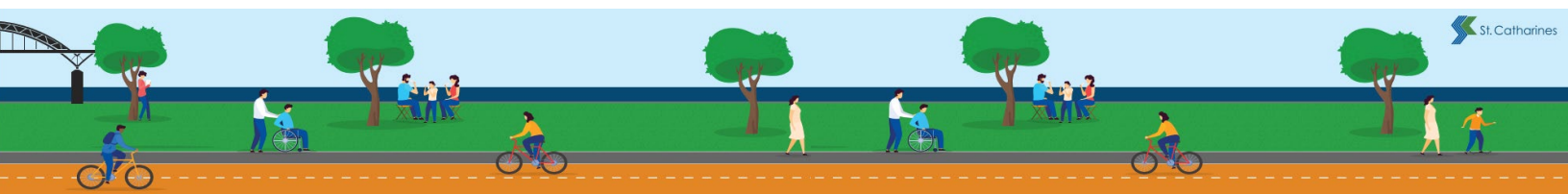
goals towards promoting inclusive and barrier-free environments for all. Select parks across the City saw this ASL signage installed in the summer of 2023.

Recommendations

Wayfinding and signage have been identified as an opportunity for improving active transportation, thus additional wayfinding amenities should be incorporated along a route to offer improved navigation guidance to facility users. The City of St. Catharines has stated their desire to address gaps in pedestrian wayfinding for residents, commuters and tourists who are looking to find Downtown attractions and destinations. This can be achieved through a more frequent and consistent inclusion of wayfinding features for all modes of active transportation and by applying high quality designs and materials to improve their visibility and effectiveness. Wayfinding features can consist of instructional signage, informational kiosks, identification signage, or pavement markings.

The design of the wayfinding strategy should follow the principles as outlined below:

- **Connecting places:** Wayfinding signage should consist of directional information in which guides users to a broader connected network. Connecting points of interest and destinations along this wider network, rather than towards scattered interventions, allows users the opportunity to explore the area.
- **Maintaining movement:** It is important to place signs in advance of major decision points and repeat as necessary to ensure that signs are quickly understood so that all those utilizing an active transportation mode can maintain motion. To ensure this, best practice is to have a directional sign on approach to a decision point, a turn sign at decision point, and a confirmation sign after the turn. Thus, a total of 3 sign types to maintain movement.
- **Keeping information simple:** Providing enough information to allow users to make decisions without overloading them (otherwise known as progressive disclosure) will help improve wayfinding and navigation of the network by a variety of users. The longer someone needs to stop and decipher something, the less likely it will be used as it's intended. Developing a hierarchy of information (regional attractions, local

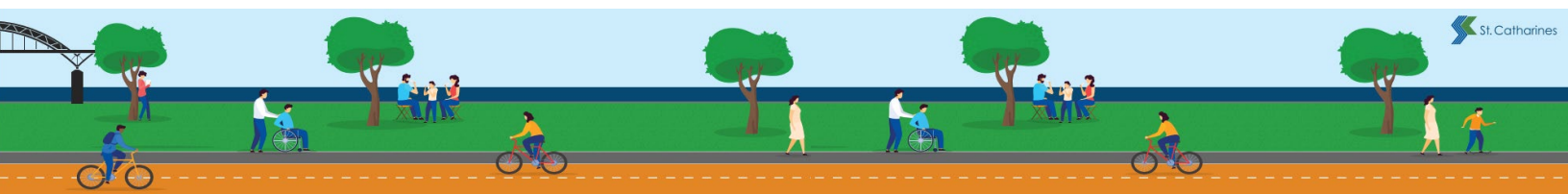


destinations and neighbourhood points of interest) that get introduced progressively can assist in keeping information simple and decrease signage clutter.

- **Being consistent:** Wayfinding signage should be consistent in graphic design, materials and symbology used, and placement. Consistency of wayfinding signage helps users not only establish an intuitive understanding of the network and universal comprehension of the information presented on the signage, but it also creates a sense of trust. The user will trust that the signage will guide them to their destination without having to double check using additional navigation tools.
- **Staying relevant:** Provide connections to places that residents and visitors want to go to. This can be determined via a public survey or engagement program in conjunction with destination hierarchy best practices. It is important to remember that the population is diverse with varying interests, thus it is not possible to identify all points of interest. Helping to generally orient users within the wider network to support them in navigating to their desired destination is key. The use of information kiosks and maps at high-use areas are a great way to incorporate additional points of interest that may not be included in the overall wayfinding signage.

Any updates to the wayfinding system currently in place within the city and introduction of new signage should build upon and complement each other, eliminating any existing gaps. It is recommended that any new signage concepts include distance and directional arrows to key destinations that can be accessed from the active transportation network. Modular signage designs can allow future linkages with points of interest to be included as the network expands. Opportunities for investment include:

- **Developing a List of Key Destinations and Destination Hierarchy:** Develop a list of key destinations and points of interest that have been established without the provision of wayfinding. Addition of wayfinding signage would provide immediate benefit, particularly for destinations such as transit hubs and popular public spaces. An inventory of these unassigned assets would be required. A destination hierarchy should be established to

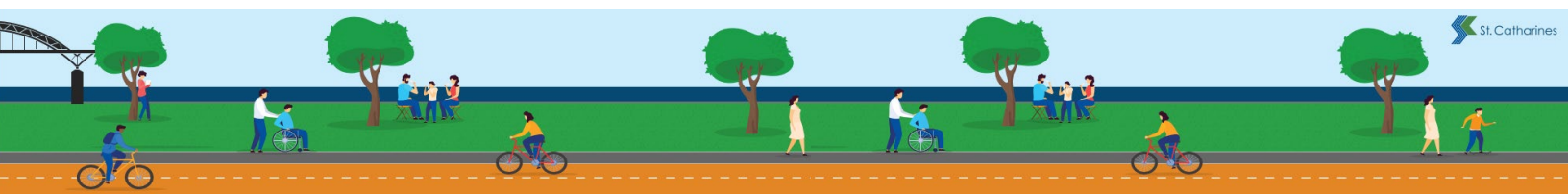


determine what types of destinations should be prioritized for wayfinding signage and to minimize sign clutter.

- **'Key Decision Point(s)' Information Enhancement:** In many crucial locations, such as at key decision points (a fork in the trail or road, an intersection, the entrance to a trail system, etc.) or on local streets that may be suggested connections, more information is needed to make navigating the network easier. This could include a directional arrow for various key locations within a defined travel time or distance (ex. Only potential destinations within 2 km on the network are included).
- **Establish Cohesive Network Awareness:** Create a system that is easy to recognize, especially for people new to engaging with a mode of active transportation or those unfamiliar with an area. This can be done through recognizable design and branding, using universal symbols and icons, as well as signage placement. It can also allow users to discover easier/ more direct routes that can be taken by bike, foot, etc. in place of busy routes taken by personal vehicles.
- **Expand Destination Promotion:** Information on wayfinding signs helps to build awareness about public assets such as parks, recreation facilities, community centres, public libraries, civic buildings, landmarks, and attractions. As facilities are updated/ constructed, such as a new park and/or local community centre, engagement and participation of that facility can greatly increase through increased exposure of being included as a destination. Temporary signage can be utilized to promote events and seasonal programming at key destinations.

7.2 Encouragement and Education Initiatives

When it comes to supporting cycling, the importance of physical infrastructure is generally well understood. The trails, cycle tracks and bike lanes that connect people from where they are to where they want to go are both vital to improve the safety and comfort of riders, and visual reminders of a community's support for cycling. What is often less visible, and less well understood, is the value of social infrastructure to support cycling. This can be referred to as Social Infrastructure, defined as the network of people, organizations and institutions that make cycling more visible, more accessible and more normalized within a community, often through encouragement and education initiatives. A recent report authored by the international organization BYCS, Strengthening the



Human Infrastructure of Cycling (2022) highlights how communities that invest solely in physical infrastructure see lower rates of everyday cycling than peer communities that invest both in physical and social infrastructure, even when they build higher-quality cycling facilities.

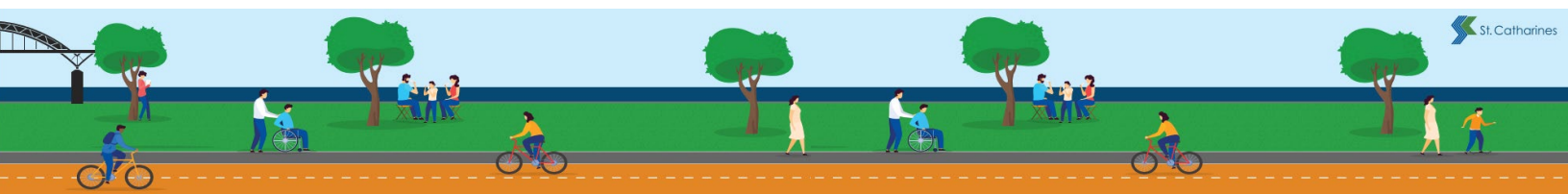
Social Infrastructure represents the sum of a community's activities, services, programs and interpersonal connections that give people a reason to cycle, an opportunity to cycle more or the skills to cycle more safely. Social infrastructure often 'builds itself' in a community as more people begin to cycle – advocacy groups, school cycling programs, seniors' riding clubs and other forms of community outreach naturally form as more residents discover the joy of cycling. Without addressing barriers to the development of a 'cycling community', such as access, ability, perceptions and awareness, many potential cyclists will continue to be excluded.

For the City of St. Catharines, the investments in physical infrastructure in the Active Transportation Master Plan will create a higher number of accessible, connected routes throughout the City in a short timeframe. By making investments in social infrastructure, a parallel priority to investments in physical infrastructure, the City can grow its cycling culture and create even higher value for its investments in mobility.

7.2.1 Existing Community Assets

Events, programs and partnerships such as annual cycling events and bicycle skills training programs for school aged children, families, and seniors can help these groups realize the potential and convenience of using a bicycle as a form of travel. St. Catharines already has various existing programs and partnerships that foster active transportation in the community, including:

- **Cycling Groups:** There are a variety of St. Catharines and Niagara wide cycling clubs that host frequent community rides through St. Catharines.
- **Cycling Stores:** St. Catharines is home to various independent cycling stores. Some bicycle shops will run programming, clubs or cycling related community events from their store fronts.
- **Cycling Programs:** Can include any on-going or one-off program(s) that support the physical or cultural infrastructure that make up cycling. For



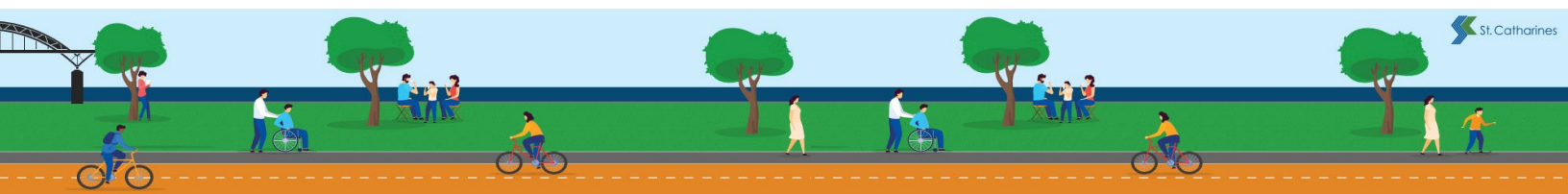
example, in the summer and fall of 2023, CAA Niagara provided free bike valet services, which consist of secure and facilitated bicycle parking, at Downtown Signature Events in St. Catharines including the Grape and Wine Parade After Party and the Holi Festival of Colour.



Figure 7.5: ATMP Engagement Event with Niagara Glowriders

St. Catharines clearly already has a presence of meaningful community active transportation initiatives underway, although however the City must expand their capacity to support these initiatives to help create meaningful change to help grow a culture of active transportation within the City. Initiatives the city can undergo to help grow this presence includes:

- **Making more residents aware** - Connecting residents, who are often keenly interested in improving their community, with agencies that need volunteer support is an easy way to boost the capacity of existing organizations making cycling more visible in St. Catharines. This connection also allows residents to identify gaps within in the system, start



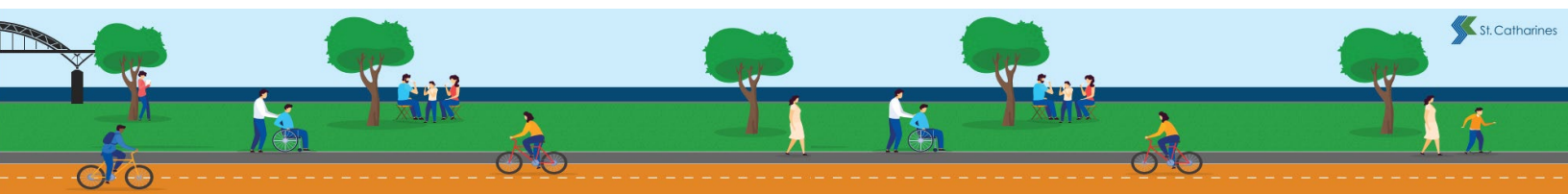
their own project(s), connecting with other community members to meet the needs they identify.

- **Supporting diverse community-led initiatives** - The hallmark of a community with strong social infrastructure to support active transportation is not the presence of one agency carrying the entire load – its the creation of a robust, resilient network of partners servicing a diverse population. Working in tandem to build support, provide new financial and logistical support where requested, ultimately building capacity and interest in active transportation. The City should ensure they are promoting visibility, accessibility and inclusivity in all community lead initiatives it supports, this including raising cultural and racial awareness with those staff who will be supporting these initiatives. It is critical to facilitate the dissemination of more than one type of initiative and its cyclist's stories and experiences.
- **Taking a step back** - There are some areas where the City will be better to lead while there will be other programs best led by community organizations and local champions. For many people of differing backgrounds and life experiences, it will be more impactful to have a group where they feel welcomed, seen and understood lead an activity. This is especially true in a cycling environment, which for many may be new, and can bring up a variety of challenges, both physical and emotional.

The more people across various ages, backgrounds, and abilities who use active transportation in a community, the more the travel form becomes normalized and accepted. In the North American context, where the default choice for transportation has become the automobile, this shift in mindset is an important step for a community to expand its mobility landscape.

7.2.2 Building a Culture of Active Transportation

A municipality such as St. Catharines can play a supportive role in developing the social infrastructure that is required to make active transportation more visible, accessible and normalized within the community. They can do this by providing resources and support to build capacity, accelerating the presence in proven effective programs to get more people using active transportation more frequently in a safer manner. The City can also play a leadership role in



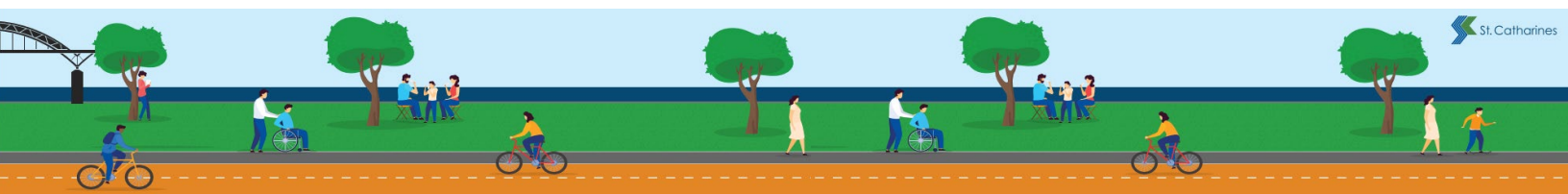
recognizing the potential for active transportation to open up social and economic mobility to previously marginalized groups in the City. For example, for low-income residents a bike can mean the difference between getting to work on time every day and relying on transit or taxis to ensure punctuality. Access to bikes when combined with high-quality cycling infrastructure can open new travel options and create a more equitable City.

Based on the growing body of data about the most successful social programs and in-depth discussions with other municipalities in Ontario, various programs have been identified as having the highest estimated level of impact in developing social infrastructure to support cycling in the near term. Various programming options were reviewed including parades celebrating cycling to non-profit organizations partnering with municipalities to offer school-aged bicycle skills training courses. The major takeaways and recommendations from this assessment for the City to focus on are as follows.

Municipalities that have dedicated staff supports for active transportation have seen a higher increase in cycling rates compared to those without that staffing support. It is recommended that the City of St. Catharines can support Social Infrastructure programs through the hiring of an Active Transportation Coordinator and ensuring that a portion of that person's time is dedicated specifically to growing, managing, and supporting the development of new social infrastructure for cycling, as discussed in **Chapter 8**.

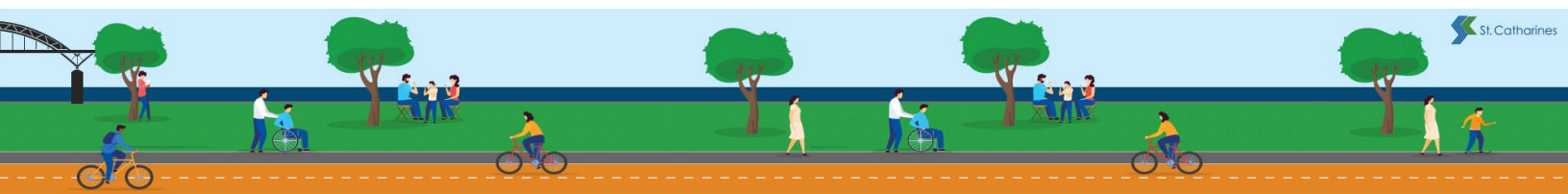
The most impactful types of Social Infrastructure are those that:

- **Connect with children and educators:** Active School Travel Programs are one of the most well-researched and proven methods to boost active travel and create positive outcomes. Showing youth how to cycle safely through understanding the rules of the road, cycling techniques and their rights as a cyclist at an early age can foster confidence, provide freedom and increase the likelihood of an active lifestyle as they age. Additionally, children can have a significant influence over the behaviours of their parents, so by empowering youth with the skills and knowledge to walk, bike or roll to school, a community can also see impacts in the adult population as they start to be more active with their kids. Cycling education programs increase confidence, active school travel programs identify barriers and create concrete plans to address them and after



school cycling programs can expose low-income kids to new experiences through activities such as mountain bike trips.

- Create more equitable access to bikes through:
 - *Supporting the development of a community cycling hub:*
Community bike shops or bike hubs have been an effective tool to get bikes into the hands of those who need them most from small towns like Cobourg to large urban centres like London and Hamilton, community bike programs have proven to be places where cycling culture can grow. They offer volunteer opportunities for high school students, develop transferable skills and confidence for people with exceptionalities and create spaces where women, LGBTQIA+ populations and people of colour can gather and learn about cycling in a space set aside just for them. Bike donation and repair programs can also help to keep materials out of landfill by recovering bikes that were destined for the dump and salvaging parts, further enhancing their contribution to sustainability.
 - *Dedicating funding to partners:* This can support non-profits and community organizes in sustaining current and developing new programs and projects. Most importantly, be prepared to provide long-term, stable funding to those partners so that they can continue to deliver programs that have proven to be successful. Non-profits cannot build capacity without predictable funding, so a municipality's support can be the key that unlocks new potential for growth. By dedicating funding into streams focused on the key areas of social infrastructure, the City can maximize the impact of its investments, build capacity within the community and grow the number of riders using the new facilities being built through the City's ATMP.
 - *Make cycling a social, community-focused event:* Riding bikes allows people to talk, enjoy their community and get exercise all at once – it's an excellent way to bring people together to share a common experience, even if that experience is as simple as riding to a popular ice cream shop for a cold treat on a hot summer day. When events tap into a community's existing interests and social groups, they can become new ways for people to experience things they already like. Hosting rides can give people a reason to



try cycling again. Rides that focus on groups with shared identities – seniors, women or new Canadians, can also help to foster a sense of community and open up cycling to new audiences.



Figure 7.6: ATMP Public Engagement Downtown Group Ride

St. Catharines already has many of the key components of effective social infrastructure in place – meaning that the City does not have to start from scratch. With some support and predictable funding, the City's existing programs are primed to grow and serve even more residents. The wheels have already started to turn in St. Catharines – now it is up to the City to decide how it wants to continue to grow into a cycling destination and foster its growing cycling community.





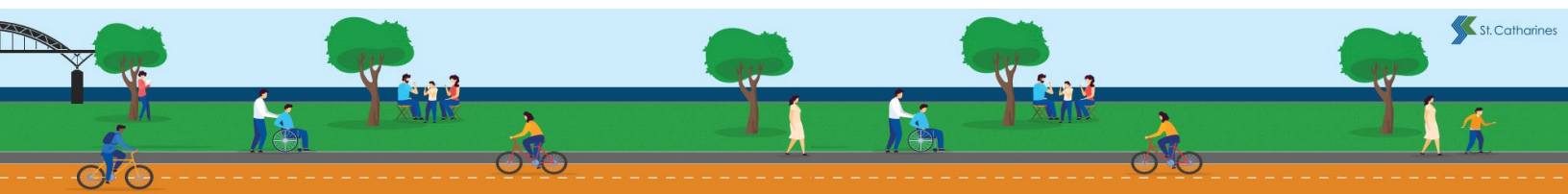
Chapter 8: Implementation, Monitoring and Reporting

8.1 Active Transportation Coordinator

The implementation of the ATMP requires cohesion and coordination across multiple departments and committees. Therefore, a critical component of ATMP coordination is the development and implementation of a dedicated AT Coordinator role. To ensure an adequate provision of human resource and attention is dedicated to ATMP actions, the City is advised to hire one full-time employee to directly support the implementation of the ATMP. Conducting an analysis of what departments are currently responsible for various AT roles and consolidating this work under one AT Coordinator position would enhance efficiency of communication and coordination.

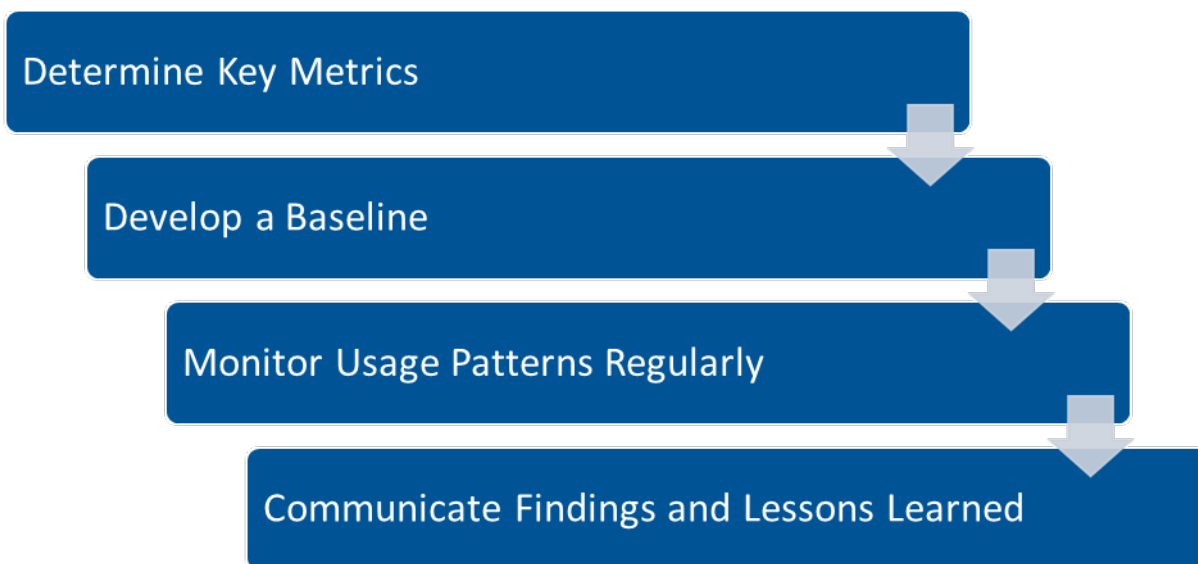
The AT Coordinator would play a crucial role in the implementation of the ATMP recommendations, reviewing the design of planned cycling facilities, implementation of programs, and adherence to policies. These responsibilities require a broad range of skills, which may not all be found in one candidate for the position. The AT Coordinator should bring expertise in active transportation and coordinate with other departments for applying their expertise for different aspects of the ATMP. The AT Coordinator's responsibilities may include, but are not limited to, the following tasks:

- Support the identification, development and planning of active transportation initiatives and programs;
- Provide input on budgets and funding applications for active transportation programs;
- Liaison between City departments, stakeholders and Regional staff involved in administering different cycling initiatives;
- Apply for funding opportunities for active transportation infrastructure;
- Review of preliminary designs of active transportation facilities, ensuring that they meet the intent of the ATMP and current design guidance;
- Reviewing development applications for adherence to the TDM policy;
- Monitoring and reporting on the implementation of the ATMP, including coordinating with other staff and departments for data used to report on key performance indicators; and
- Coordinate the review and update of the ATMP on a five-year review cycle.



8.2 Monitoring and Reporting

The implementation of a monitoring strategy is essential to evaluating the success of the ATMP overtime. Monitoring and reporting involve tracking attitudinal and behavioural changes towards AT after the implementation of facilities and different programs using a data-driven approach. This involves a four-step process:



Determine key metrics: The City should identify a set of indicators used to evaluate the plan and proceed with data collection and information gathering to inform the monitoring program after 1-2 years of implementation. Data collected from these reviews could help to inform decision making and may also contribute to the identification of future priorities and budget allocation. These metrics indicators should be monitored and reported on an annual basis to develop annual data trends for AT activities in the City. Regular updates can keep the community informed about the status of AT facilities.

Key metrics to consider as part of this tracking are outlined in **Table 8.1**.

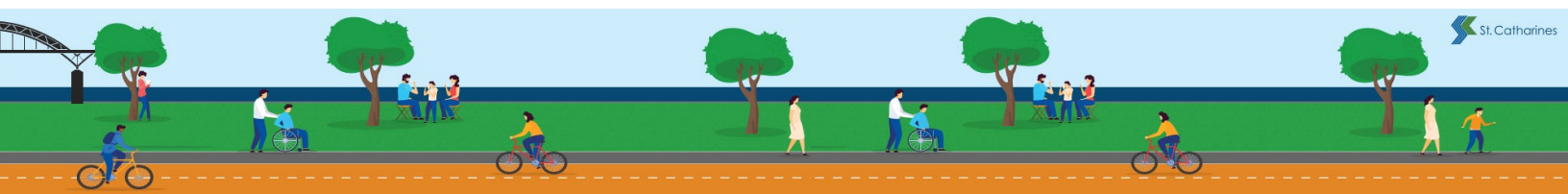
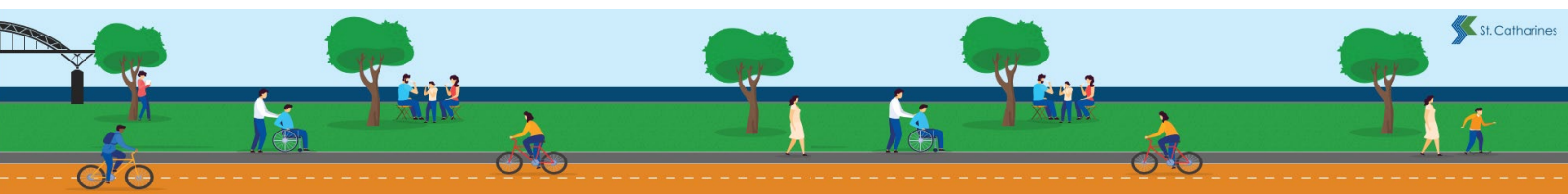


Table 8.1: Key Indicators

Indicators	Description / Methodology
Cyclist and pedestrian counts	Collect and document cyclist and pedestrian activity within the City. Manual counts should be collected in the summer during peak hours and on weekends. Permanent counters should also be considered to get seasonal trends and determine adjustment factors for the short-duration counts.
Annual reporting on collision data	Use collision data to identify locations where safety is a concern and identify locations for more protected cycling facilities.
Total length of active transportation facilities constructed	Annual monitoring of the length of active transportation facilities constructed and the percentage of each phase of the AT network that has been completed.
Surveyed attitudes and opinions	Qualitative data regarding perception of safety, comfort, and quality of active transportation facilities.
Percentage of active transportation facilities maintained	Determine the length of active transportation facilities where the minimum maintenance standards are being met. Identify challenges and budget gaps preventing the maintenance of the network.
Annual budget allocated towards active transportation projects	Review the total budget for active transportation projects in comparison with the percentage complete for the phase.

Develop a baseline: Baseline data should be collected before the initiation of construction work to understand the existing conditions. Data collected after the project completion can then be compared to the baseline data to interpret the impacts of the AT implementations on each metric.

Monitor usage patterns regularly: Since usage patterns may not change immediately after a facility is implemented, it is essential to consider monitoring activities over the long-term to allow AT usage patterns to stabilize (e.g. six



months after implementation). Evaluation of operations in different weather conditions and seasons are important to ensure the AT network and facilities operates adequately under different circumstances. City Staff may consider leveraging survey tools in the monitoring strategy to gain a better understanding of public perception.

Communicate findings and lessons learned: It is important to communicate the outcomes from the monitoring process to Council, the public and stakeholders. Annual reporting should be used to identify areas where the ATMP is under performing and the budget for each area should be reviewed to determine how to achieve the targets and policies set out in the ATMP.

8.2.1 Transportation Equity

Transportation systems have historically not been designed in an equitable way, leading to some groups and communities having less access to transportation options. Transportation poverty prevents some groups of people from traveling to their destinations more efficiently than others. These groups may include Indigenous people and people of colour, women, seasonal migrant workers, low-income households, older adults, persons with disabilities, and people with language barriers. Transportation equity focuses primarily on the fair distribution of transportation resources, recognizing the injustices within the system that have affected the level of usage and comfort for all users.

Some research has shown that gender equity can act as an indicator of the safety and quality of the active transportation network for people of All Ages and Abilities. Proportions of self-identified women cycling are typically lower than men, with concerns of safety and security often being self-reported as primary reasons that women are less likely to cycle. This trend might be rooted in historically patriarchal norms that limit women cycling including how women are not socialized to take up space like their male counterparts. Additionally, gendered employment patterns (part-time and caregiving centered responsibilities) that prompt them to use the cycling network for different types of local trips in neighbourhoods. Increasing proportions of women cycling could indicate that a cycling network is being implemented with well-protected cycling facilities and local street connections. This too would likely to be true for trans, non-binary and gender diverse folks, who experience similar but nuanced barriers to cycling.



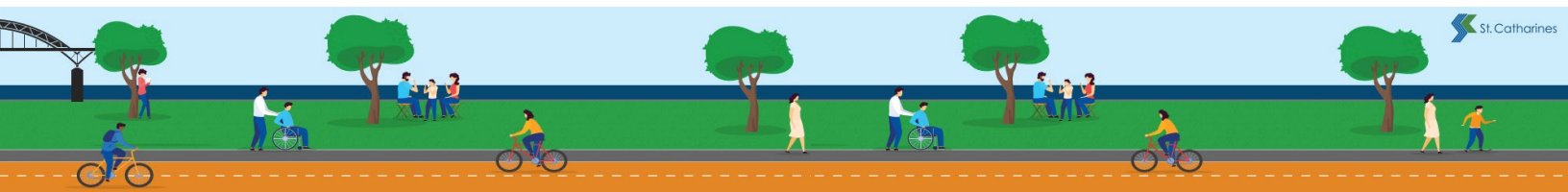
A collection of post-implementation data that consists of qualitative, quantitative and participatory data collection methods is necessary to understand the equity performance of the AT network. The following key performance indicators should focus on ensuring equitable access to AT modes for all users, especially those in equity-deserving areas.

Table 8.2: Monitoring Methods

Indicators	Monitoring Methods
Geographic Distribution of Active Transportation Infrastructure	Measure and report on the lengths of active transportation infrastructure across different neighbourhoods to ensure equitable access for all residents. Report on the lengths of active transportation infrastructure that is installed in low income neighbourhoods, high immigrant population neighbourhoods, and high senior population neighbourhoods.
Surveying Active Transportation Users	Conduct quick in-person surveys and online surveys of active transportation users that includes questions asking their gender, ability, and employment and perception of the active transportation network. Include surveys on both Spine Routes and parallel Greenway Routes to capture users of all confidence levels.
Perception of Safety	Conduct on-site user surveys in equity-deserving areas to assess user comfort and perception of safety.

As the City continues to grow rapidly, its transportation network must adapt accordingly and prioritize the needs of underrepresented groups that face travelling barriers. Measures and programming that could be incorporated from an equity lens include:

- Providing pedestrian and cycling infrastructure that is consistently well-lit and maintained with direct connections to key destinations, which can help to improve perceived safety for those who may avoid public places out of fear of harassment;



- Strengthening the cycling culture with education and outreach (e.g. cycling skills workshops, cycling mentorship, group rides, cyclist education campaign) to encourage “interested but concerned” people to incorporate cycling into their travel habits and create a sense of belonging within the community;
- Collect data on a continuous basis. Conduct surveys to understand the public perception regarding the equity aspect of the current AT network.

