



City of Cornwall

BICYCLE AND PEDESTRIAN MASTER PLAN

FINAL REPORT

JULY 2010



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CITY OF CORNWALL TECHNICAL COMMITTEE

Norm Levac (City Project Director)

Enrique Kamm (City Project Manager)

Mark Boileau

Karl Doyle

Tom Gemmell

Jean Lemire

Stephen Wintle

ADVISORY COMMITTEE MEMBERS

Steven Bacher, Citizen

Patrick Clarke, Cornwall Waterfront Committee

Mark Dubuc, Bicycle Shop

Pat Finucan, Heart of the City

Ron Flaro, Municipal Accessibility Advisory Committee

Mike Lalonde, Cornwall Seaway and Tourism

John St. Marseille, MEAC

Shawn Pilon, Eastern Ontario Health Unit

Len Tapp, Division Manager, Cornwall Transit

IBI GROUP CONSULTING TEAM

Brian Hollingworth, Project Director

Norma Moores, Project Manager

David McElroy

Laura Cham

Neluka Leanage

EXECUTIVE SUMMARY

Introduction and Study Objectives

The City of Cornwall Bicycle and Pedestrian Master Plan was initiated in September 2009 in order to create a document on which the City will largely base its bicycle and pedestrian related decisions in the next decade and beyond. IBI Group was selected to prepare this plan. The study was undertaken over the period between September 2009 and June 2010, engaging staff and members of the community in formulating the plans, policies and proposed practices that make up this final plan.

The over-arching goals of the plan are to:

- Create an environment that encourages people to cycle and walk more for work, school and other trips;
- Make cycling and walking a safe, comfortable and convenient alternative for everyone, young and old alike;
- Reduce greenhouse gas emissions and energy consumption; and
- Support economic development and quality of life.

Cornwall's is often described as 'a great place to live and work' and many of the City's economic initiatives are tied to this theme. Promoting Cornwall as a great place to live and work is very much tied to creating a walkable and bicycle-friendly community. In fact, whether one's interest is in retaining youth in the City, enhancing the quality of life of residents, promoting the environment, growing business opportunities, or increasing tourism potential, there are strong links to the goals of the bicycle and pedestrian master plan.



Choose
Cornwall

Cornwall is a place
where **you** can *succeed* -
and where your family
will *thrive*.

Study Approach and Consultation

The bicycle and pedestrian master plan consisted of five main work streams as follows:

- Part 1: Vision, Goals and Objectives
- Part 2: Cycling Network, Infrastructure and Design Guidelines
- Part 3: Pedestrian Network, Infrastructure and Design Guidelines
- Part 4: Policies and Programs
- Part 5: Funding, Implementation, Operation and Maintenance

Public and stakeholder consultation was central to the development of this plan and included two public open houses, focus groups, stakeholder meetings, a cycling tour, working with the Youth Committee and an on-line survey.

It was clear from all of the consultation activities that Cornwall is ready for this plan. Virtually all people that were engaged in the consultation activities showed honest enthusiasm for improving cycling and walking opportunities and the benefits to the community that go along with this.

Why Promote Walking and Cycling?

The benefits of walking and cycling are far-reaching and affect all people in Cornwall. Walking and cycling, and more generally any form of “active transportation” helps to:

- **Ensure healthy citizens** by improving health and well-being, contributing to quality of life, increased accessibility and generally more liveable and safe communities;
- **Improve the Environment** through reduced air pollution, reduced greenhouse gas emissions and reduced land required for roads and parking; and
- **Contribute to a Vibrant Economy** by ensuring the workforce is happy, healthy and productive, attracting new employers seeking out communities with a sustainable and green image, increasing opportunities for tourism, and reducing the amount of money spent by residents on transportation (i.e. fuel, insurance, ownership) and car-oriented infrastructure.



Existing Conditions

Cornwall is an ideal place to nurture a strong cycling and walking culture. With its traditional grid system of streets and a relatively compact, mixed-use urban form, people can walk and cycle most places within thirty minutes.

The Lake Ontario Waterfront Trail is a great asset for residents and visitors to Cornwall, continuous across the waterfront and connecting many destinations near and on the lake. Cornwall already has an established sidewalk network, which means steps are needed to enhance conditions for pedestrians as opposed to starting from scratch. On-road bikeways are limited in Cornwall. The potential to build an effective and efficient cycling network is significant given residents' existing travel behaviour, i.e., more people bicycle to work in Cornwall compared to the rest of Ontario. There are also opportunities for tourism development given Cornwall's waterfront and international gateway location.



Few major physical barriers exist in Cornwall for pedestrians and cyclists. Highway 401 and the mainline railway through the northern portion of the City segment some residents from the City south of these corridors. The Brookdale rotary and Pitt Street can be improved to facilitate crossings and to connect to key shopping and recreational amenities. Similarly, access to the northeast side of the city, and particularly the employment area, is also challenging.

Plan Elements

The Cornwall Bicycle and Pedestrian Master Plan was designed to meet the needs of current and potential pedestrians and cyclists getting to and from work or school, and for errands, social and recreational pursuits. Both pedestrian and bikeway networks are realistically achievable and can be implemented over time with minimal disruption to traffic, business and people.

The Cornwall Bicycle and Pedestrian Master Plan is a comprehensive series of recommendations addressing needed policy, practice and programmatic changes that better accommodate the planning and implementation of pedestrian and cycling interventions in Cornwall, as well as a network plan. This Plan was developed with considerable input from the public and City staff and therefore reflects the priorities identified in public workshops and of concern to municipal planners / engineers and elected officials.

Recommendations to improve the bicycle network include addressing:

- Network gaps, with particular attention to specific areas e.g., downtown, Brookdale Avenue, and the employment areas;
- Street- and intersection-specific design guidance; and,
- Implementation of bike lanes, multi-use trails, shared use lane markings, paved shoulders, and trail crossing and bikeway intersection improvements.

Exhibit ES.1 illustrates the proposed long term bicycle network and the recommended facility types by location. Some of the key projects involve providing dedicated bikeways along the entire length of Second Street, with the exception of the downtown area where parking is considered paramount, and the establishment of several new multi-use trails around the outer portions of the City. The expansion of the multi-use trail network will result in “looped” bicycle trips, a desire expressed by many recreational cyclists during public consultations.

Recommendations to improve the pedestrian environment include:

- Efforts to eliminate gaps in the sidewalk network by adding sidewalks where there exists a sidewalk on only one side, and adding sidewalks to both sides of high activity roads (e.g., transit routes, school areas and employment lands);
- Enhancing intersections for pedestrian, i.e. countdown signals, push buttons, high visibility crosswalk markings, etc.
- Implementing pedestrian-oriented streetscape and urban design treatments in the downtown areas.

Exhibit ES.2 shows the planned pedestrian system improvements, mainly consisting of sidewalks and multi-use trails, as well as a number of crossing improvements.

Exhibit ES.1: Proposed Cycling Network



City of Cornwall
Bicycle and Pedestrian Master Plan



Proposed Bicycle Network

- Destination
- School
- Industrial park
- Cornwall Waterfront Plan boundary

- Existing Bicycle Network
- Existing bicycle lane
 - Existing boulevard multi-use trail
 - Existing multi-use trail

- Proposed Bicycle Network
- Bicycle lane
 - Boulevard multi-use trail
 - Multi-use trail
 - Bicycle boulevard
 - Marked shared lane

- Paved shoulder with bicycle lane
- Signed route
- Proposed traffic signal
- Proposed crossing improvement

- Special treatment area
- Future residential development *

* Bicycle facilities and supporting features to be included

Exhibit ES.2: Proposed Pedestrian Network



City of Cornwall
Bicycle and Pedestrian Master Plan



Proposed Pedestrian Network

- Destination
- School
- Industrial park
- Cornwall Waterfront Plan boundary

- Existing Pedestrian Network
- Existing sidewalk
 - Existing boulevard multi-use trail
 - Existing multi-use trail

- Proposed Pedestrian Network
- Sidewalk - one side only
 - Sidewalk - both sides
 - Proposed boulevard multi-use trail
 - Proposed multi-use trail
 - Proposed crossing improvement

- Special treatment area
- Future residential development *

* Pedestrian facilities and supporting features to be included

It is important to note that despite the accuracy implied by the maps, the location of recommended routes or their design typology may be subject to change through more detailed technical studies, changes in local conditions, and community consultation, where warranted, prior to the implementation of individual routes. At the same time however, the extensive community effort that established the overall directions of this plan and the recommended network must be respected. The network should be considered flexible within the goals of the Master Plan, with revisions being made as conditions under which it was developed change. That is, as the network is implemented, new opportunities or constraints may be identified and alternative routes sought to connect destinations, fill gaps and bridge barriers. Specific changes to the recommended Bicycle and Pedestrian Master Plan work should be evaluated in the context of such a decision's impact upon the overall network vision for cycling and walking in Cornwall. It is particularly important that the City adopt a strong position on proposed sidewalk improvements as historical experience has shown that the voices of a few can sometimes undermine the implementation of improvements that benefit a larger community.

Supporting Policies

The following supportive active transportation policies, practices and programs are recommended to integrate the needs of pedestrians and cyclists into all aspects of the City of Cornwall:

- **Make Cornwall a bicycle and pedestrian-friendly community** by adopting a pedestrian charter and the criteria for bicycle-friendly communities;
- **Raise the profile of walking and cycling** by articulating that pedestrians and cyclists will be consistently planned for in municipal decisions and given priority in some cases;
- **Encourage compact communities and a greater mix of land uses** that support more walking and cycling compared to segregated land uses and sprawling urban development;
- **Review the role of parking** with the goal of reducing automobile dependency and explicitly promote urban form that encourages more efficient parking utilization, while providing secure and convenient bicycle parking facilities;
- **Collaborate across departments and partner** to build awareness and capacity to support more walking and cycling needs, leading by example;
- **Make walking and cycling a visible part of public facilities**, including basic amenities for users;
- **Systematically coordinate, integrate, and improve walking and cycling conditions** within the City's transportation infrastructure, services and programs;
- **Develop urban design guidelines** that address the needs of pedestrians and cyclists;
- **Support a cycling and walking advisory committee** to review projects and monitor the progress of implementing the Bicycle and Pedestrian Master Plan; and
- **Develop programs aimed to improve the skills and knowledge** within Cornwall of cyclists' and pedestrians' safety and amenities.

As described more fully in the main report, these policies can be implemented or refined over time through various documents including existing and future strategic planning exercises, the Official Plan and Cornwall's Site Plan Process document.

Financial Implications

The net cost of implementing the infrastructure components of the Bicycle and Pedestrian Master Plan is dependent on several factors including whether or not any projects can be implemented in conjunction with other development, capital or road rehabilitation projects, as well as the level of financial support that can be garnered from other levels of government and community partners. It is highly likely that many of the major projects would qualify for funding from senior levels of government under various “green infrastructure” programs meaning that Cornwall might only pay one-third of the costs on some of the major projects.

In order to help quantify the potential costs, the network recommendations were classified into three phases:

- Short Term (1-5 years or between 2011-2015)
- Medium Term (6-10 years or between 2016-2020)
- Long Term (beyond 10 years or 2021)

A summary of our opinion of the probable cost to implement the recommended short-term, medium-term and long-term phases is presented in **Exhibit ES.3**. These costs reflect an ideal implementation plan, unadjusted for potential budget constraints or contributions from senior levels of government.

Exhibit ES.3: Financial Implications of Ideal Plan – Gross Costs

Phase	Cost ¹ (2010 Dollars, millions)			Total Costs (\$)
	Bikeway Network	Pedestrian Network	Crossings	
Short Term	1.1	3.3 ⁽¹⁾	0.55	5.0
Medium Term	5.9	2.0	0.80	8.7
Long Term	5.1	0.4	0.55	6.1
Totals	12.1	5.7	1.9	19.8

⁽¹⁾ Includes sidewalk improvements already identified and considered by Council but not yet implemented.

In order to illustrate the potential cost implications for annual budgetary processes, **Exhibit ES.4** presents a range of possible scenarios. Under the ideal plan, the gross expenditures for the short term improvements (first five years of the plan) would be approximately \$1 million per year. If matching funding could be obtained from other levels of government, these costs could be reduced by up to two-thirds; that is just over \$300,000 per year.

Although it is suggested that Council should strive to implement the recommended ideal plan, decisions on year-by-year expenditures would be subject to regular budget processes. For illustration purposes, an alternate plan is shown whereby half of the short-term expenditures on sidewalks (the major cost component in the short term) would be distributed to the medium term, and the medium term costs spread over 10 years as opposed to 5 years. In this case, the gross annual costs would be reduced to \$620,000 for the short term, or much lower with two-thirds funding from other sources.

¹ Opinion of cost of construction only in 2010 dollars; does not include planning, design, maintenance, property, utilities, taxes

Exhibit ES.4: Range of Potential Annual Expenditures

Phase	Cost (\$ millions per year)			
	Ideal Plan (Gross Annual)	Ideal Plan (with two-thirds outside funding)	Alternate Plan ⁽¹⁾	Alternate Plan (with two-thirds outside funding)
Short Term (2011-2015)	1.00	0.33	0.62	0.21
Medium Term (2016-2020)	1.74	0.58	1.06	0.35
Long Term (2021-20)	1.22	0.41	1.22	0.41

⁽¹⁾ Based on implementing only 50% of recommended sidewalk improvements in the Short Term and extending the implementation of the medium term improvements to 2025 (i.e. over 10 years instead of 5 years)

Making it Happen

The process for implementing the Bicycle and Pedestrian Master Plan and its recommended actions requires continuous effort on the part of Council, staff, key advisors and the general public. The adoption of the Bicycle and Pedestrian Master Plan is the first step in the overall implementation process. Following this, policies, programs and recommendations on infrastructure will be carried through **to annual programming exercises** including the annual budgeting process wherein investment priorities and timings are established. The **planning and design phase** for future infrastructure begins once priorities are set. Physical implementation occurs with **construction**, and continues into the **operation and maintenance** of the facilities. **Monitoring** is undertaken to gauge the effectiveness of the policies, programs and infrastructure improvements in achieving the master plan's goals and objectives. Shifts in underlying assumptions or achievement of objectives signal the need for a review of the basic policy direction, and the process starts again.

Another way to ensure that the momentum established during the preparation of this plan continues is to implement some of the key short-term projects soon after the plan is adopted. Implementing these “quick win” projects can help to:

- Leverage funding from other levels of government;
- Engage community interest;
- Highlight and resolve design challenges; and
- Provide visible actions.

Subject to Council direction, some of the short-term projects that offer the potential to “kick-start” the plan include:

- Improve the Brookdale Avenue rotary and adjacent streets so that they are more comfortable and accessible for pedestrians and cyclists in the interim prior to the anticipated changes to the bridge approaches,
- Implement the proposed improvements to Second Street transforming it into a major east-west bikeway across the City; and

Second Street Concept: Before and After



- Construct new sidewalks on Seventh Street east of Cumberland Street where current usage patterns suggest an immediate need.

In addition there are many other initiatives that can bring visibility to the plan at relatively low cost such as adding bicycle parking at key destinations, continuing to improve the streetscape and furniture in the Heart of the City Community Improvement Area, and working with community groups and major employers to increase awareness of the benefits of walking and cycling.

Meeting the objectives of the Bicycle and Pedestrian Master Plan will be challenging. It requires the dedication of not only funds to construct and maintain the routes and programs, but also human resources to plan and design the routes, seek outside funding, implement policies and programs, monitor progress, and engage stakeholders and the public in supporting it. The more people that are involved, the better the outcome will be. To this end, it is recommended that Cornwall define staff requirements, maintain and foster the Advisory Committee established for this project and adopt a performance monitoring process to measure and report on successes. It is recommended that the Bicycle and Pedestrian Master Plan be reviewed at least every five years for its relevance and effectiveness, and updated if necessary.

1. INTRODUCTION

1.1 Study Purpose and Approach

There is growing awareness that our current auto-dependent lifestyles are not environmentally sustainable and are having negative, long-term health impacts. While the problems surrounding auto-dependency are complex with no single solution, it is clear that they could be mitigated by significantly increasing how often we use non-motorised modes. Research is also showing that people who commute using active modes are healthier and less stressed. Cycling and walking:

- Promote safer and more liveable communities;
- Increase accessibility;
- Contribute to an improved quality of life;
- Reduce air pollution;
- Increase productivity at work and school;
- Increase land values;
- Make more efficient use of existing infrastructure;
- Revitalise urban centres; and
- Support local business and tourism.

The main challenge is creating a culture and physical environment that will make most people feel comfortable using active modes for more of their trips in cities that have been built around the automobile. In order to encourage cycling and walking, it is certainly essential to have safe, comfortable, comprehensive and convenient infrastructure in place. However, even if the infrastructure is in place, it can be very difficult to encourage residents to choose active modes due to the wide range of factors influencing travel behaviour. To make active modes a realistic choice for a wider variety of trips and people, the barriers must be well understood and targeted through a variety of strategies, including:

- Social marketing and promotion through wide-reaching or targeted campaigns or with the support of local groups and stakeholders;
- Educating and informing cyclists and motorists about the rules of the road and legal rights of cyclists;
- Achieving symbiotic land uses through policy and cooperation with developers, and
- Developing pedestrian and cycling infrastructure that best suits the local context.

A good cycling and pedestrian master plan provides a balance of “hard” facilities and “soft” programs. One can not encourage people to cycle and change their behaviour without first providing the necessary infrastructure. Similarly, there is more to nurturing a walking and cycling

culture than just building sidewalks and bike lanes. Involving the community and staff in the development of a plan is one of the best ways to begin this process.

1.2 Public and Stakeholder Consultation

At the outset of the project, a public and stakeholder consultation program was outlined to maximize input on the plan and involved the following major activities:

- A first series of Public Open Houses held in December 2009 at the Aquatic Centre and Library;
- Establishment of an Advisory Committee which held three meetings throughout the study;
- Focus Group sessions with:
 - Cornwall Hospital
 - St. Laurence College
 - The two downtown BIAs, La Village and Downtown Cornwall
 - The Youth Committee
- Creation of a project website with feedback;
- Creation and promotion of an on-line survey to seek residents' input on key destinations, travel patterns, mode splits, attitudes and priorities; over 200 people responded;
- A bicycle tour with staff and the advisory committee to see first hand some of the needs and opportunities; and,
- A second and final series of Public Open Houses held at the Aquatic Centre and Cornwall Shopping Centre in May 2010.

Each of the public consultation events was successful and contributed valuable input to the study. It is estimated that between the two public open houses, the focus groups and the web-survey, at least 300 people were engaged in the study.

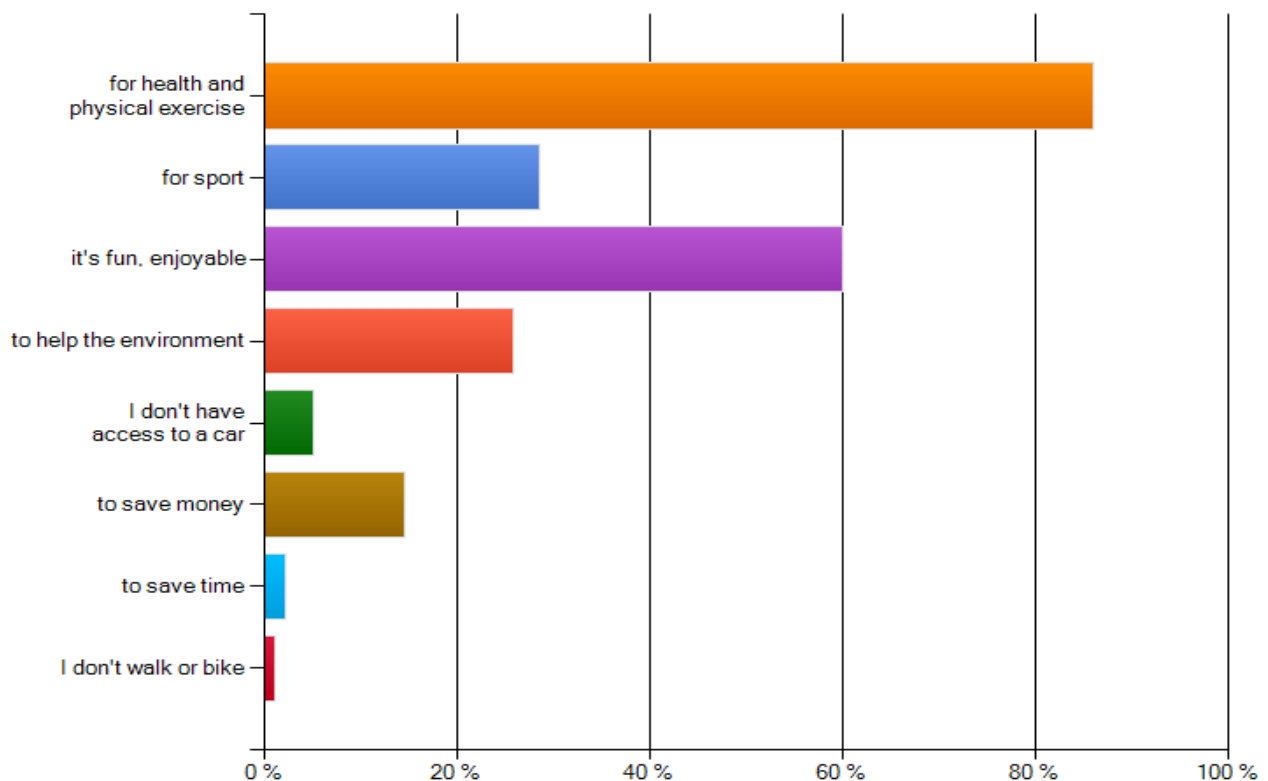
Key outcomes from the public and stakeholder consultation activities can be summarized as follows:

- Many people in Cornwall already walk or cycle for daily activities and do so for a variety of reasons including health, the environment and personal enjoyment (see Exhibit 1).
- Almost all people consulted felt that improving conditions for walking and cycling was a good thing to do, and would help the City achieve its strategic goals. Many felt that a “bold plan” could help re-shape Cornwall.



- People are very proud of the Waterfront Trail, use it often, and believe that it should be an anchor for the entire network. However, year-round maintenance is desired as are more amenities along the trail.
- Many of the newer employment areas, and even some residential areas, are not fully accessible by walking and cycling, and this needs to be addressed both in terms of providing connecting facilities as well as ensuring that future developments incorporate provisions for pedestrians and cyclists. Similarly, the downtown presents many challenges for cyclists because of the one-way street system.
- There is significant potential for Cornwall to promote itself as a cycling community in order to attract tourists; because of its location, it makes an ideal starting point for longer distance trips. The concept of creating one or more loops around the City is attractive.
- Most people acknowledged Cornwall residents are fairly tied to their cars, and it would not be possible to compete with the car in terms of time efficiency, so there is a need to play up the other benefits of cycling and walking including health impacts, social impacts and cost savings. However, it is also acknowledged that younger residents have different ideals, and they are who we should be designing for.

Exhibit 1: Results of On-line Polling Question “What are the main reasons you walk or ride your bike?”



1.3 A Vision for Cycling and Walking in Cornwall

Based on the initial goals and objectives of the study and input received through the consultation processes, the following Vision was developed for the Bicycle and Pedestrian Plan:

Cornwall is a community that values family, neighbourliness and a high quality of life on the beautiful St. Lawrence River. Cycling and walking in Cornwall should be safe, convenient, accessible and enjoyable for all segments of the population, including children and the elderly, for both recreation and utilitarian travel. We recognize the importance of promoting and encouraging walking and cycling as an integral part of Cornwall's development into an environmentally and economically sustainable region.

Cycling and walking contribute to Cornwall's strong community character and are compatible with a compact, mixed-use urban development pattern, the enhancement of older residential, commercial and mixed-use areas, and the promotion of environmentally and economically sustainable growth. Further, cycling and walking are considered to be part of a fully integrated transportation system that should be developed to promote the desired land-use pattern in both new and existing neighbourhoods, for all housing types and living environments. We also recognise the role of cycling and walking in promoting energy conservation through land-use planning.

We value the preservation and enhancement of a strong parks and recreation trail system with strengthened connections to the City that will enhance the urban and rural balance in the Cornwall, create strong ties with the City's natural amenities, promote economic development and tourism, and contribute to an improved quality of life for all residents of Cornwall.

The promotion of progressive community development that encourages cycling and walking through improved safety measures and compatible land-use patterns will contribute to an environmentally and economically sustainable future for Cornwall, providing a high quality of life for future generations.

This Vision served to guide the development of the network plans as well as the updating and creation of supporting policies, plans and program recommendations.

1.4 Organization of Report

This report is a summary of findings from initial public consultation sessions, and stakeholder and advisory committee meetings, beginning with our vision for cycling and walking in Cornwall. An overview of cycling and pedestrian enhancements from North American cities is provided, and current conditions relevant to cycling and walking in Cornwall are summarized. Our understanding of the opportunities for improving conditions for cyclists and pedestrians in Cornwall, and the priorities that emerged from the public consultation sessions, are presented. Finally, a series of recommendations related to policy, infrastructure development, program and practices are identified to assist Cornwall in becoming pedestrian and bicycle-friendly and increase the numbers of Cornwall residents walking and cycling.

2. BENEFITS OF WALKING AND CYCLING

The benefits of walking and cycling are far-reaching and affect all people in Cornwall.

2.1 Healthy Citizens

There is growing research about the benefits of active transportation in promoting healthy lifestyles and reducing the risk of disease. With this has come an interest in communities that, by design encourage more physical activity and reduce automobile use. Other health benefits of reduced automobile dependence include reduce air emissions, accidents, and noise pollution as well as increased social opportunities. Those with high body mass indices (BMI)² face considerably higher risk of heart disease, asthma, arthritis and high blood pressure. Although there are many factors that contribute to our weight, regular physical activity is well established as an important influence.



One of the most significant contributors to declining levels of physical activity is the design of communities and the associated dependence on automobiles. There are clear connections between how urban sprawl affects our travel patterns and behaviour, and can subsequently contribute to health problems. A recent U.S. study suggests that a sprawling versus compact built environment could account for as much as a 2.9 kg (almost 6.5 pounds) difference in average body weight of residents³.

One of the largest areas of concern is with children. On a national basis, 25% of children between the ages of 5 and 19 are considered overweight and this proportion is increasing. Furthermore, the activity levels of Canadian children dropped by 30% between 1990 and 1998⁴. Accordingly, Cornwall's schools are critical hubs for promoting active transportation and encouraging healthy habits early in life.

There is large potential to encourage more travel by walking and cycling among children. For example, a survey found that nearly 75% of Ontario children would prefer to walk or cycle to school on a regular basis⁵. Furthermore, 91% of school-aged children have access to a bicycle, and almost 45% of Canadian children live two kilometres or less from the school they attend; however, 64% never cycle and 47% never walk⁶.

² BMI = Weight (kg) / Height (m) Based on this ratio, Public Health Services defines the following categories:

Underweight: BMI less than 18.5

Normal: BMI between 18.5 and 24.9

Overweight: BMI between 25.0 and 29.9

Obese: BMI of 30.0 or greater

³ Ewing, R. et al. Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity. *Journal of Public Health Promotion*, 18(1), 47-57, 2003

⁴ WHO (1996) Health Behaviour Survey, A Cross-National Study

⁵ Ontario Walkability Study (2001) Trip to School: Children's Experiences and Aspirations.

⁶ Go for Green (1999) The Case for Active and Safe Routes to School.

2.2 Quality of Life and Happiness

Many people view physical activity, particularly when incorporated into daily activities, as important to their overall level of satisfaction. A recent Statistics Canada study revealed that 19% of cyclists reported their commute as the most pleasant activity of the day, whereas only 2% of drivers felt the same⁷. This suggests that improvements to active transportation facilities could result in happier commuters.

Research also suggests that firms which are not accessible to other activities within a close walking distance deal with significant decreases in employee satisfaction as these employees struggle to re-organize non-work activities which they used to take care of during lunch or on the way home from work. Banking, dry cleaning, grocery shopping, etc. are often pushed to the weekend, meaning there is less time to relax.

Walking and cycling are feasible in compact, mixed-use communities, and supportive environments help us to manage our schedules more efficiently. This ultimately improves our quality of life.



It's easy to imagine the playful sense of adventure that children bring to walking trips. They are very much engaged in the journey. They are living in the moment, the very thing that we aim to achieve through the practice of mindfulness (now shown to be linked to positive emotions and physical well-being)

O'Brien, C., *Planning for Sustainable Happiness: Harmonizing Our Internal and External Landscapes*, 2005

2.3 Accessible for All

Active modes are the most equitable forms of transportation because they are available to everyone. Conversely, planning transportation systems around the automobile degrades mobility for those who do not have a driver's license or cannot afford a vehicle. Such vulnerable populations might also include low-income families that are pushed into poorly accessible neighbourhoods to be able to afford housing. As a result, an already overburdened segment of the population must devote significant portions of its time and income to transportation. In some cases these people have no choice but to own a private vehicle. Investment in cycling facilities and neighbourhood walkability, along with transit improvements, offers a tremendous opportunity to improve access to employment and services for everyone, particularly the region's most vulnerable.

2.4 Sustainable and Liveable Communities

It is widely recognized that pedestrians tend to feel more secure and comfortable walking where there are more people out on the street and walking (more "eyes on the street"). Areas that create comfortable environments for active modes help to foster the area's social inclusiveness and sense of place. This support can come in many forms, such as convenient connections between destinations; street lighting, cleanliness, street furniture, and trees; mixed land uses; calm motorized traffic; and neighbourhood social-mixing.

2.5 Reduced Emissions and Energy Use

In the past few years, there has been a significant increase in media attention on climate change issues as well as the potential for energy shortages in the near future. All levels of government are

⁷ Statistics Canada (Nov, 2007) The Daily: How workers perceive their daily commute to work.

now under substantial pressure to introduce programs that will help achieve greenhouse gas (GHG) emission targets and improve air quality.

Since cycling and walking produce no emissions, they can play a significant role in helping to meet the aggressive targets starting to emerge from various levels of government. Active transportation modes are particularly beneficial in that they usually replace short, cold start trips for which internal combustion engines have high emissions rates. Therefore, each 1% of automobile travel replaced by active modes reduces motor vehicle air pollution emissions by 2% to 4%⁸.

2.6 Reduced Travel Costs

Active modes of transportation are the most cost-efficient, from both a personal and community perspective. While difficult to quantify, the potential community-wide cost reductions from increased walking and cycling are extensive and include health care costs due to air pollution, water pollution and collisions, traffic congestion, and parking provision. Personal travel cost savings are also significant. CAA estimates that the average annual cost of owning and operating a vehicle is as much as \$14,000 per year when both ownership and operating costs are factored in (www.caa.ca). Therefore, investments that allow residents to walk or cycle to their destination, including transit, go a long way to improve personal transportation affordability. Go For Green has estimated that commuting by walking and cycling saves Canadians over \$800 million per year compared to commuting by automobile⁹. This works out to approximately \$180 in annual savings per walk commuter and \$570 per bicycle commuter. If the ability to walk or cycle to work allows one to own fewer vehicles, the cost savings would obviously be much higher.

2.7 Reduced Infrastructure Costs

Infrastructure costs for active transportation are minimal compared to the roadway expenditures required to support travel by motorized vehicles. For example, widening roads for bicycle lanes costs in the order of \$150,000 per kilometre, paved pathways cost approximately \$225,000 per kilometre, while adding cycling lanes without road widening (i.e., re-striping) costs approximately \$20,000 per kilometre¹⁰. These costs are significantly lower than the approximately \$1.3 million per kilometre to widen a two lane urban arterial road to four lanes¹¹.

The cost differential is compounded when one considers that cyclists and pedestrians make more efficient use of infrastructure. A roadway can carry seven to twelve times as many people per metre of lane per hour by bicycle compared to by automobile at similar speeds in urban areas. Paths for pedestrians can handle 20 times the volume per hour than roads for cars in mixed urban traffic¹². While adding bicycle lanes or a paved pathway alongside a roadway may not remove the need for road widening, these costs and statistics demonstrate that walking and cycling trips make more efficient use of the existing transportation system than auto trips and are more cost-effective to accommodate.

⁸ Komanoff, C and Roelofs, C. (1993) The Environmental Benefits of Bicycling and Walking, National Bicycling and Walking Case Study No. 15, U.S. Department of Transportation, FHWA-PD-93-015.

⁹ Go for Green (2004) The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling.

¹⁰ City of Toronto Bike Plan (2001).

¹¹ Go for Green (2004) The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling.

¹² Go for Green. Active Transportation Community Solutions for Climate Change.

2.8 Economic Development and Tourism

Supporting cycling and walking can enhance several sectors of the economy by creating a healthier work force, improving the quality of life in the city, supporting recreational activities of residents with the investment remaining local, and creating an activity-based tourism sector.

Bicycle friendly and walkable communities are good for retail, revitalise urban centres and create new business opportunities. In addition, mixed-use, compact, walkable communities tend to support small, local businesses, further supporting the economic growth of the community. Creating more attractive pedestrian spaces will also contribute to making Cornwall a more vibrant place to live, encouraging local residents to support local businesses. Such improvements to the urban environment, along with the excellent existing recreational bike paths, will enhance the overall quality of life in Cornwall and strengthen the City's ability to attract business and a skilled and educated workforce.

Improving the walkability of the city will also further promote and support tourism. Most tourists are pedestrians and are more likely to spend time (and money) in a city that provides attractive and vibrant pedestrian-friendly streets and public spaces. Improving the bicycle network within the City will also promote cycle tourism. Situated along the St. Lawrence Recreation Path, Cornwall already has a strong foundation in recreational cycling and associated facilities. Expanding upon this base by strengthening connections to the city centre and other areas of the City will further enhance tourism and economic growth by encouraging cycle tourists to visit other parts of the City.

Regional cycling tourism networks elsewhere in North America have succeeded in attracting local and international tourists:

- La Route Verte, a 4,000 km network of bicycle routes linking more than 230 municipalities in Quebec, is an inspiring example of how promoting cycling can result in economic benefits. Between 1978 and 2005, the government of Québec invested over \$60 million in the development of La Route Verte. Cycle tourists on La Route Verte spent a total of \$95.4 million in 2000 alone, and Vélo Québec's travel agency serves 6,000 cyclists a year.
- The Government of Maine reported in 2001 that self-guided bicycle tourists spend \$55/day, guided tourists spend \$115/day, day trippers \$25/day and local residents \$4/day. Multiple-day bicycle tours constitute 2% of the total number of cyclists but 17% of the total expenditures.
- A study of bicycle facilities in North Carolina reported in 2004 indicated that the Government had invested \$6.7 million of public funds to construct off-road paths and add wide paved shoulders to roads in the Outer Banks region. Bicycling in the Outer Banks benefits the area annually at an estimated US \$60 million and bicycle facilities are an important factor for many tourists in deciding to visit the area.

3. ENHANCING CONDITIONS FOR CYCLISTS AND PEDESTRIANS

A variety of enhancements at different scales can be made to improve the conditions for cyclists and pedestrians. Interventions addressing the dynamic between physical, social and individual factors will have the greatest potential to increase cycling and walking i.e., combining infrastructure and promotional strategies are key. Any promotional strategies will be in vain if a supportive network of continuous, convenient and safe bicycle routes and pedestrian facilities is not developed in parallel. Without supportive infrastructure that provides the feeling of comfort and safety, it will be extremely difficult to convince even the most well-intentioned resident to walk or cycle to work, school, or for errands, and it will be almost impossible to significantly increase the cycling and walking mode share.

This section is separated into planning for cyclists and planning for pedestrians.

3.1 Planning for Cyclists

Cycling master plans completed in Ontario since the early 1990s have focused on simply finding a hierarchy of roads on which to include bike routes, from neighbourhood signed routes to busy roads with wide lanes or bike lanes. Although a hierarchy of routes is still desirable, implementation strategies have evolved and we now recognise the need to create dedicated facilities for cyclists. Bike lanes that are safe and comfortable for all segments of the population, including children and the elderly, are necessary to increase the cycling mode share beyond a few percent.

It is also essential to provide safe, direct routes to areas where people actually want to go to increase the number of people cycling for utilitarian purposes. Direct routes are necessary to reduce the distance a cyclist must travel and to avoid confusion created by meandering routes. It is no longer adequate to simply direct cyclists on to less busy roads; a good cycling master plan will incorporate cycling infrastructure into desirable commercial areas.

Finally, it is essential to have a complete bicycle network in place that links most areas of the city, with safe access points. People will not cycle on dangerous roads to access even a good cycling route; gaps in the network will discourage people from cycling. Traffic calmed, bicycle priority streets can help promote bicycle friendly environments in local neighbourhoods and provide safe access to the bicycle network. Similarly, multi-use pathways must be integrated into the on-road network with good signage and access.

Contemporary approaches to active transportation planning that have changed the way cycling networks and roadways are being developed include:

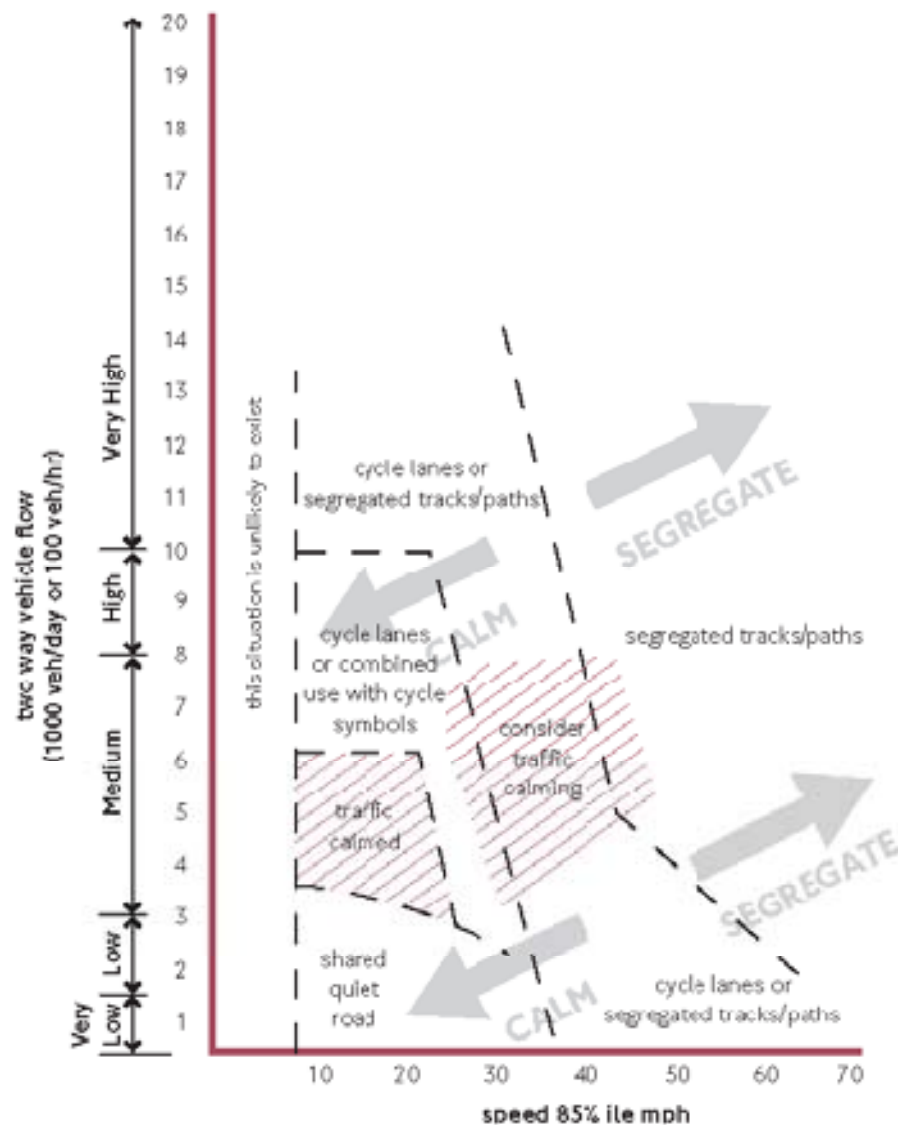
- European-style bicycle lanes, or bike lanes that are segregated from traffic
- Using shared-use lane markings (“sharrows”) to indicate where cyclists should ride
- Implementing contra-flow bike lanes on one-way streets
- Incorporating innovative intersection treatments that can improve comfort for cyclists
- Bicycle boulevards, or bicycle priority streets
- Complete streets, which consider the needs of all road users, including cyclists, pedestrians and automobiles, at every stage of the planning process.

3.1.1 BIKEWAY TYPES AND TREATMENTS

A summary of the major conventional and innovative bikeway types that can be considered in the implementation of a bicycle and pedestrian master plan are outlined in the following sections. Bikeway design should be based on the application of current bikeway planning and design guidelines, taking context into account while addressing cyclist safety and comfort. The needs of cyclists should be taken into account in all transportation projects, such as the planning and design of new collector and arterial roadways, interchanges, and railway, freeway and other crossings.

Some of the design issues related to context include traffic volume and speed, available right-of-way and pavement width, horizontal and vertical alignment (curves, grades, and hills), sight lines, truck volumes, transit provision, traffic control, and intersection and driveway spacing. For example, Transport for London's 2005 Cycling Design Standard recommends traffic volume and speed as the guiding criteria for making initial decisions between mixed traffic provisions, bike lanes, and segregated bikeways (see Exhibit 2)

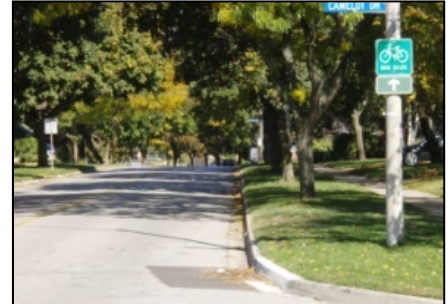
Exhibit 2: Transport for London's Diagram of Cycling Facility Solutions



The remainder of this section discusses some conventional and emerging bikeway types. Specific guidelines for North American bikeway design are listed in the Reference Section of this report.

3.1.1.1 Signed Routes

Signed routes are typically local streets posted with a “bicycle route” sign to indicate that they are a link in a cycling network, connect to a key destination, or provide a continuous or direct route for cyclists in a neighbourhood. Signing bicycle routes on local streets with no other features to improve the comfort or safety or coherence for cyclists is not recommended.



However, way-finding, destination and distance signing on local streets as part of an overall signage strategy or as part of a bicycle boulevard bicycle priority street is recommended.

3.1.1.2 Bike Lanes and Paved Shoulders

Bike lanes on urban roadways (with curb and gutter) and paved shoulders on rural roadways provide space for cyclists to ride in their own reserved lane, increasing their comfort particularly on higher speed and higher volume roads with truck and transit traffic. These types of bicycle lanes can be implemented as part of a road retrofit or road diet, in which existing road space is reallocated to make room for bicycles, pedestrians or transit, and the road re-stripped with bike lanes. Road diets can reduce vehicle speeds and improve safety.



In addition to improving safety for cyclists, paved shoulders in rural areas have been demonstrated in the past to provide benefits in erosion control, pavement life, and collision reduction when traffic volumes exceed 3,000 vehicles per day. Rumble strips coincident with painted edge lines when the posted speed is greater than 50 km/h should be considered.



Design criteria recommended for bike lanes and paved shoulders are as follows:

- Retrofit to an existing roadway: 1.0 m bike lane plus 0.3 m wide gutter adjacent to a 3.20 - 3.25 m wide travel lane, on both sides of the roadway;
- New construction of roadway widening: 1.2 m wide bike lane minimum (1.5 m preferred on truck and transit corridors), plus 0.3 m wide gutter adjacent to 3.35 m wide travel lane, on both sides of the roadway; and
- A minimum of 1.2 m wide paved shoulder on rural roads with traffic volumes great then 3,000 vehicles per day.

3.1.1.3 Boulevard Multi-Use Trails

These are recommended when space within the boulevard right-of-way exists for a multi-use trail and is generally parallel to the road. Trail users on boulevard multi-use trails must yield right-of-way to vehicles crossing the trail at driveways. Concrete has a longer life cycle than asphalt and should be used so that it appears as a pedestrian path with associated regulations and rights-of-way at intersections and driveways. Expansion joints can be spaced every 30 m and contraction joints every 2.5 m, saw-cut (not trowelled) to improve rideability for people with mobility devices. A grass or landscaped buffer between the trail and the roadway is preferred as opposed to a curb-faced trail. They are typically at least 2.5 m wide, preferably 3.0 m wide.

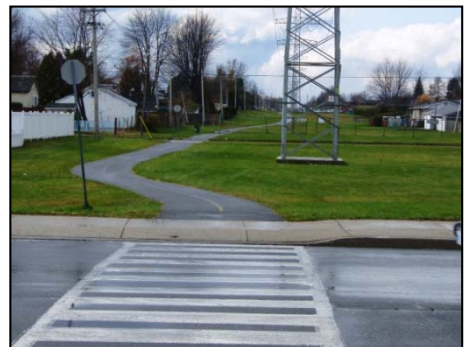
Due to safety issues concerning higher speed trail users and right-of-way at driveways and side streets, boulevard multi-use trails should only be implemented along roadways where driveways and side street intersections are spaced 300 m or more. Boulevard multi-use trails are perceived by some as much more comfortable to ride on being away from motorists. Commuting and utilitarian cyclists often find boulevard multi-use trails inefficient and dangerous.

Generally being constructed on one side of the roadway makes them difficult to access if one's origin or destination is on the other side of the street. The lack of right-of-way rules, and poor visibility of the cyclist on the trail riding against the direction of adjacent motorists increases their risk at intersections and driveways. "Wrong-way" cyclist going unnoticed by motorists turning in and out of side streets and driveways is a real safety concern particularly as the number of cyclists (exposure) increases.

3.1.1.4 Multi-Use Trails

Multi-use trails can be developed in parks, open spaces, and along utility corridors independent of road rights-of-way for a wide variety of users e.g., in-line skaters, pedestrians, utilitarian or recreational cyclists, persons with mobility devices, dog walkers, etc. Connecting with destinations and other routes is important; otherwise the trail will be underutilised and will create a gap in the overall network. Thus, access points to destinations and crossings must be designed such that they are easy to find, safe and accessible for pedestrians and cyclists. Implementation of multi-use trails must consider the surface type and width to accommodate a range of user needs and comfort, e.g., safe allowances for passing of slower moving users. Safe and convenient crossings of roadways must be provided.

Granular trails are typically at least 2.5 m wide, however, asphalt multi-use trails require a 3.5 m width to allow for a wide range of users. A width of 4 to 6 m may be warranted in heavy use areas such as along waterfront near downtown or tourist districts. In heavy use areas, pedestrians can either share space or have a separate path.



3.1.1.5 Marked Shared-Use Lanes

In the past some municipalities have endorsed the use of wide lanes, 4.0 to 4.5 m wide, generally along the curb, as a means for cyclists to share with motorists with or without signage and pavement markings. However, these are not recommended due to the higher motorists' speeds that they induce.

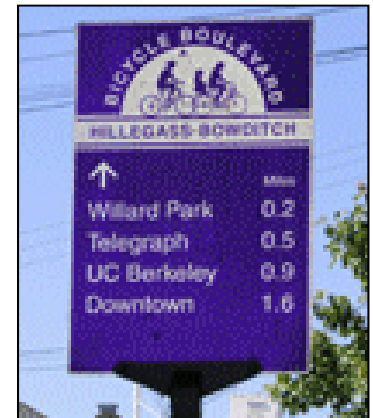
A preferable approach to wide lanes is to use marked shared lanes. Lanes marked with a "shared-use lane" marking or "sharrow" are recommended for low speed roadways (50 km/h or less) where there is insufficient pavement width for bike lanes. These may also be implemented as part of a bicycle boulevard or bicycle priority street treatment. Sharrows increase motorist awareness of cyclists and the correct position for cycling in the lane, validate their right to use the roads, and can improve safety through conflict zones.



Markings are applied where there is on-street parking to encourage cyclists to ride out from the "door zone", where bike lanes are discontinuous because of roadway narrowings, to mark wide lanes with moderate volumes at posted speeds of 50 km/h or less, to continue bike lanes through intersections, and in bike lanes where weaving may occur (i.e., adjacent right-turn lane tapers). New construction should not include wide lanes with "sharrows" because of the higher motorists' speeds that the wider lanes induce.

3.1.1.6 Bicycle Boulevard or Bicycle Priority Street

Bicycle boulevards are traffic-calmed, local streets that have been optimized for through bicycle traffic, but discourage other non-local traffic. Sometimes they are called "Local Bicycle Streets", and build on the comfort of cycling on local streets. Traffic controls such as signals, stop signs and yield signs are placed to control conflicts with motorists and give priority to cyclists. Traffic control or features are provided so cyclists can cross major streets. They enhance neighbourhood liveability and traffic safety. For cyclists who do not want to cycle on busy roads, bicycle priority streets can route them through neighbourhoods to their destinations. Cities with a network of bicycle priority streets include Vancouver BC, Berkeley and Eugene CA, Albuquerque NM, and Portland OR.



Bicycle boulevards should also include features such as way-finding, destination and distance signage, pavement markings such as sharrows, traffic calming features such as small traffic circles, features and strategies to minimize stop signs along the route, and features to allow cyclists to cross arterial roads along the route. The bicycle boulevard design concept is illustrated in Exhibit 3.



Bicycle boulevards can be implemented as part of neighbourhood improvements or traffic calming plans, and can be implemented in stages by applying features in series, from way-finding signs to pavements markings, traffic calming features, strategies to minimise stops along the route, and features to allow cyclists to cross arterial roads along the route. They can be implemented as part of new construction,

reconstruction, resurfacing or retrofit. An example of how to gradually implement a bicycle boulevard over time is illustrated in Exhibit 4.

Exhibit 3: Bicycle Boulevard Design Concept

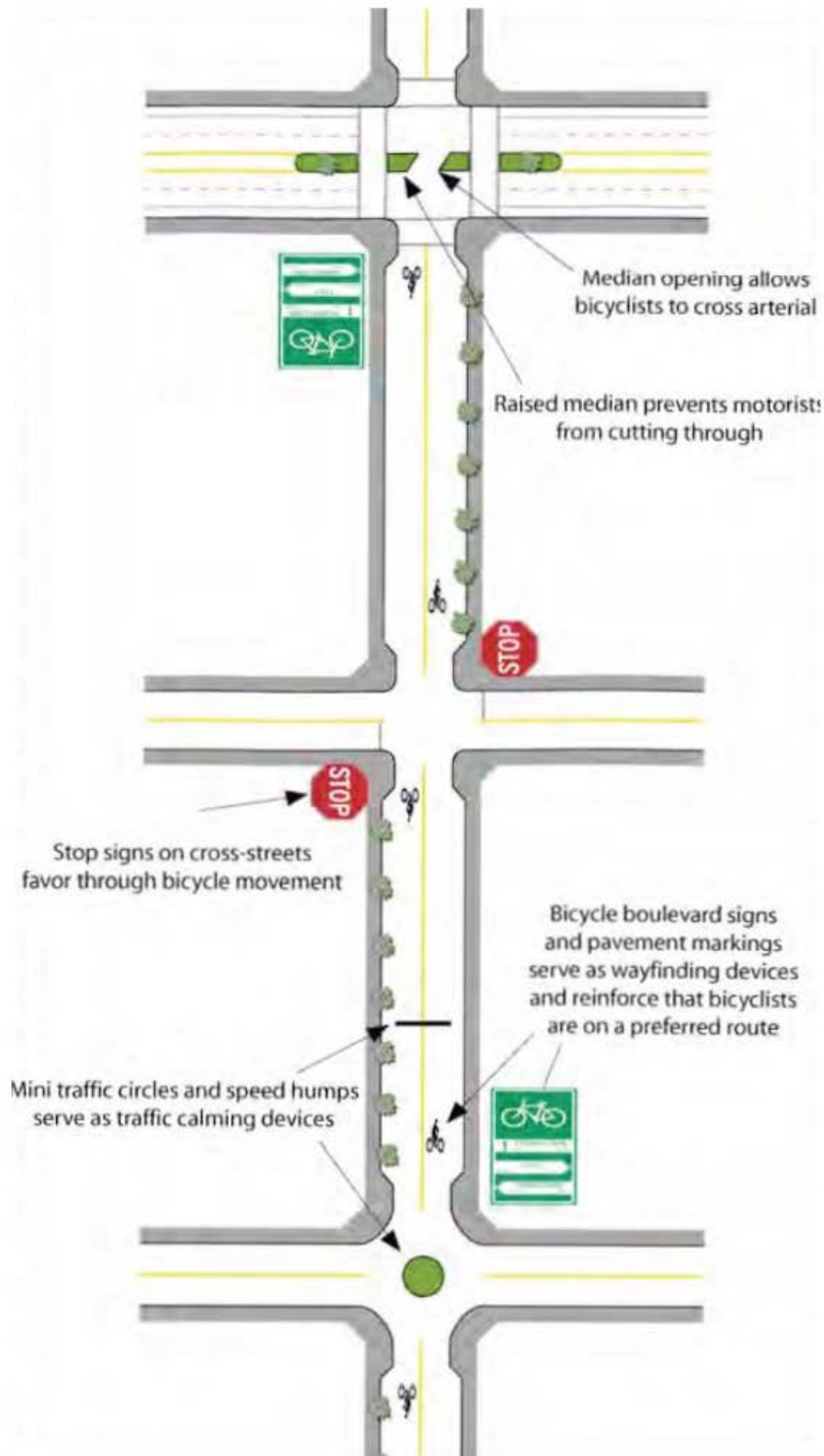
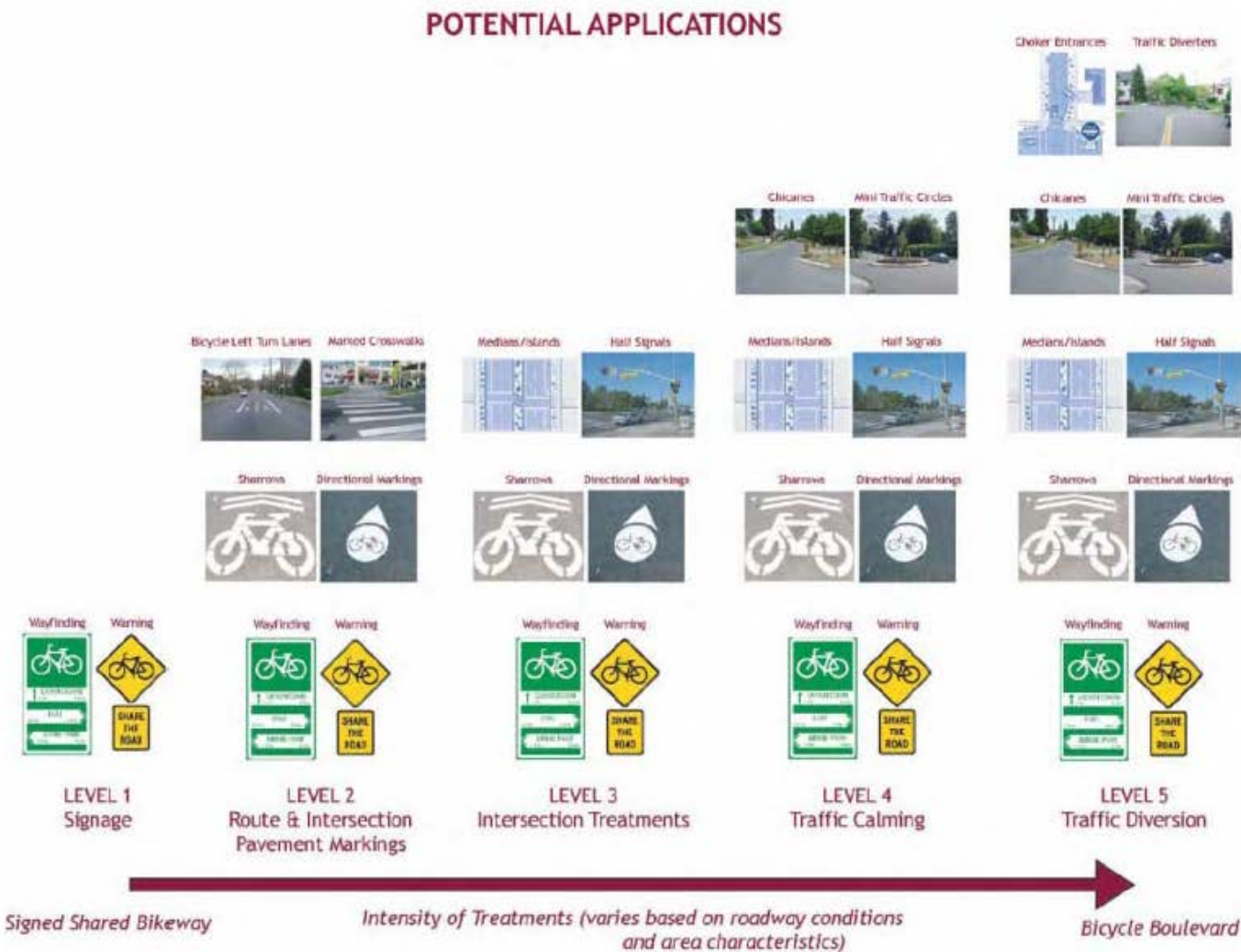


Exhibit 4: Bicycle Boulevard Implementation Strategies



3.1.1.8 Contra Flow Bike Lanes

Contra-flow bike lanes on one-way streets allow bikes to travel against traffic. This reduces travel distances for cyclists, improving connectivity, and can offer a safer alternative than riding with traffic on a busier street. Traffic diverters that allow the passage of bikes but prevent access by automobile can also be used in conjunction with contra-flow lanes. Installation of contraflow bike lanes should be well signed and marked, and avoided beside “right way” parking to reduce risks. In Ontario, current legislation prevents the use of “one-way, bicycles excepted” signs since the one-way regulation applies to all traffic including cyclists; instead municipalities are using “do not enter, bicycle excepted”.



3.1.1.9 European Cycle Tracks or Segregated Bike Lanes

A few North America cities are implementing segregated bike lanes or “cycle tracks” based on European bikeway designs. Cycle tracks are bike lanes separated from automobile travel lanes, parking lanes and sidewalks by pavement markings, pavement colouring, bollards, curbs, raised medians, or a combination of these elements. They are intended for use by cyclists only, unlike multi-use trails, and generally operate in one-direction on both sides of the street, although they can operate in two-directions, particularly on one-way streets. They are considered to be the safe and comfortable for all segments of the population. Cycle tracks differ from boulevard multi-use trails as follows:

- **Design quality**—The surface, width, drainage, traffic control, signage and overall layout are well thought-out. Main intersections often include traffic signals for cyclists, bike boxes, or other features to protect cyclists from motorists turning across their path. This requires a higher investment in design and construction than bike lanes or boulevard multi-use trails.
- **Maintenance quality**—Cycle tracks along busy routes are afforded the level of summer and winter maintenance that permit them to be used 24 hours a day, 7 days a week, 365 days a year. Being segregated from the main roadway requires a higher investment in maintenance, i.e., they cannot be maintained by the same equipment and at the same time as the adjacent travel lanes.
- **Legislative environment**—Cycle tracks are defined as part of the main roadway and cyclists using the cycle track are provided with the same rights-of-way as motorists on the main roadway. Side street and driveway traffic must yield to cyclists in the cycle track. Cyclists that ride on sidewalks or boulevard multi-use trails in Ontario are expected to behave like pedestrians at side street crossings, dismounting



to use crosswalks as per Ontario's *Highway Traffic Act*.

Design guidelines from various Northern European countries suggest that cycle tracks would be appropriate as traffic volumes rise above 10,000 vehicles per day with speeds of 30 km/h, and above 5,000 vehicles per day when speeds are at 55 km/h or higher. These thresholds for separating cyclists from motorists would result in many collector and most arterial roadways in North America being recommended for cycle tracks. An understanding of the design and legislative environments under which these types of facilities can work in North America is surfacing, as exemplified by projects in New York, Vancouver, and Montreal. They should be implemented as part of major reconstruction or new construction projects. Streets can be retrofitted by removing a travel lane and adding barriers, a curb or other delineation. Guelph constructed a cycle track by saw-cutting the barrier curb to create a mountable curb and gutter and constructing the segregated bike lane behind the curb

3.1.2 ACCESS AND STREET CROSSING MEASURES

The quality of the cycling and trails network relies not only on the type of bikeway provided on the road or the trail design, but also the quality of access and street crossings. A variety of treatments are being used throughout North America to improve access to local bicycle streets, multi-use trails, and bikeways at intersections, and improve safety and comfort where multi-use trails cross arterial or collector roadways. These features are illustrated in Exhibit 5.

Exhibit 5: Design Treatments that Improve Access and Street Crossings

Bicycle Detection at Traffic Signals

- Pavement markings—A symbol is put on the pavement to identify the most sensitive area of a detection loop where a bicycle will activate the traffic control signal
- Push Button—A push button that activates the traffic control signal is mounted where is accessible to cyclists riding on the road

Bicycle Detection Pavement Marking, Vancouver →



Traffic Control Signal Push Button for Cyclists, Vancouver →



Photo credit: Richard Drdul

Bike Box

- An area just in front of the stop bar for motorists at a traffic signal for cyclists to wait in and, when the signal turns green, proceed ahead of motorists; when the traffic signal is green, cyclists proceed through the intersection conventionally without using the bike box
- Reduces conflicts with right-turning motorists; accommodates high left-turning cyclist volumes

Bike Box, Victoria →

**Bicycle Only Traffic Signals**

- Traffic control signals that allow cyclists to proceed through an intersection while motorists are stopped by a conventional red light on a separate traffic signal head

Bicycle Traffic Control Signals, Montreal →

**Raised Trail Priority Crossings**

- Where a trail crosses a roadway, a speed hump is installed to slow traffic and increase visibility of the crossing
- Traffic control can be installed to give priority to the trail traffic over the street traffic

Galloping Goose Trail Raised Priority Crossing, Saanich →

**Cyclists Left-turn Lane**

- Left-turn pocket provided in median on major roadway so cyclists can access side street or trail

Cyclist Left-turn Lane access for Galloping Goose Trail, Saanich →



<p>"Crossbike" or "Crossride"</p> <ul style="list-style-type: none"> Crossing area for cyclists adjacent a crosswalk. The Ontario Highway Traffic Act requires cyclists to dismount in pedestrian crosswalks; the "crossbike" provides an defined crossing area but without the requirement to dismount <p>Crossbike marked by "elephant's feet" squares, Vancouver →</p>	
<p>Sharrows in Conflict Areas</p> <ul style="list-style-type: none"> Intersections and bike lanes adjacent right-turn lanes or ramp merges / diverges can be marked with "sharrows" (double chevron and bicycle symbol) where weaving with motorists occur. The symbol brings attention to both users of the conflict area <p>Cycle track through intersection marked with "sharrows", Montreal →</p>	
<p>Other Innovative Treatments</p> <p>Bike Lane Treatment across Narrow Bridge, London ON →</p>	

3.2 Planning for Pedestrians

Well-designed pedestrian infrastructure should address not only pedestrian safety, but also comfort, convenience and attractiveness. Pedestrian safety is a real factor that influences where and how often people choose to walk, however conditions are often perceived as being unsafe are actually only uncomfortable or inconvenient. Such perceptions are equally important in influencing how often people choose to walk, and should be addressed as part of any pedestrian plan. Conversely, walking conditions may be perceived as being safe when in fact they are not.

Properly planned pedestrian facilities are essential in providing for the safe mobility of all segments of the population, from children to the elderly and impaired. Safe facilities are also important from a social equity point of view, providing all citizens with access to transit, services, recreational facilities, and employment opportunities.

Most automobile collisions involving pedestrians occur when pedestrians are crossing the roadway either mid-block or at an intersection, with the most common type of collision being when the driver

of a turning vehicle fails to yield the right-of-way to a pedestrian in a crosswalk who has the “walk” or “flashing don’t walk” signal. Collisions are much more likely to occur on streets without sidewalks, and pedestrians are five times less likely to be involved in a collision when walking on a sidewalk than when crossing the roadway. In addition, higher vehicle speeds are much more likely to result in pedestrian deaths in the event of a collision under any circumstances.

The needs of pedestrians should be routinely considered in transportation projects, including the ability of pedestrians to move along and across any new or existing roadways, barriers such as waterways and freeways, and intersections and interchanges.

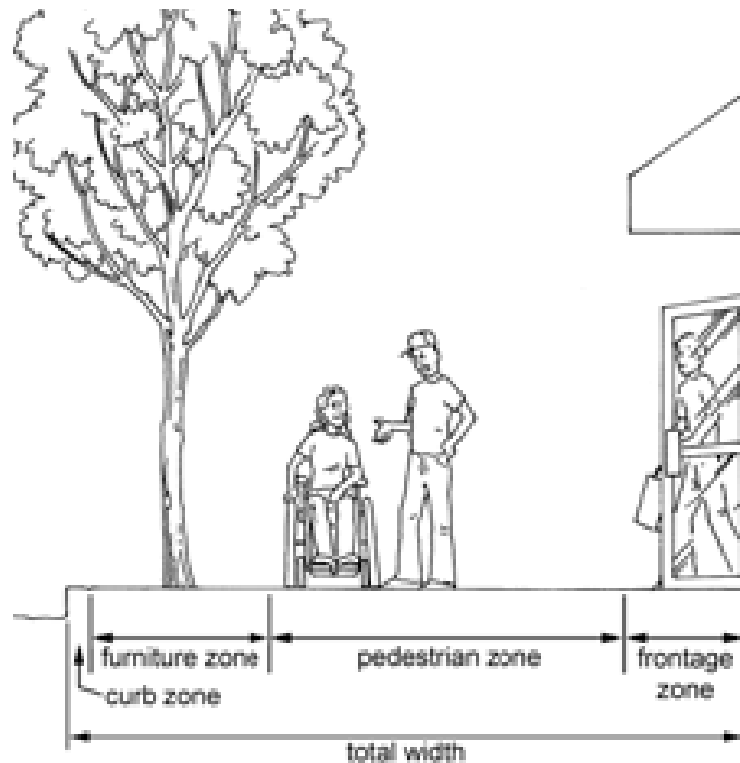
Some of the common treatments are discussed in the following sections. References are provided at the end of this report.

3.2.1 SIDEWALKS

North American guidelines generally recommend sidewalks on both sides of all industrial, commercial and residential streets in urban areas (10 residential units per hectare). In rural residential areas (2.5 to 10 residential units per hectare), sidewalks on both sides of the street are preferred, but one side is acceptable if constraints are documented. In rural areas (less than 2.5 units per hectare), 1.2 m wide shoulders on both sides of the road are recommended, but a sidewalk on one side is preferred.

A typical sidewalk corridor zone system consists of the curb zone, a furniture or buffer zone, the pedestrian travel zone, and the frontage zone (see Exhibit 6).

Exhibit 6: Sidewalk Corridor Zones



3.2.1.1 Furniture or Buffer Zone

North American guidelines recommend providing a buffer between pedestrians and moving traffic, such as through a landscaped boulevard, on-street parking, bicycle lanes, or extra sidewalk width that can also provide space for plantings, streetlights and poles, litter receptacles, benches, traffic signs, bicycle racks, and other pedestrian amenities. Buffer zones can also serve to provide snow storage, splash protection for pedestrians, protection from opening doors of cars parked curb-side, and space for curb ramps.

The recommended buffer zone width is: 0.6 to 1.2 m for local and collector streets, and 1.5 to 1.8 m for arterial streets.

Boulevard buffer widths greater than 3 m in residential areas where there are driveways for low-density residential dwellings are not desirable because cars can park on the driveway within this space, sometimes overhanging the sidewalk and blocking the travel zone.

3.2.1.2 Pedestrian Travel Zone

The absolute minimum width of any pedestrian travel zone is 1.2 m, in order to accommodate people using a guide dog, crutches or walkers. In urban or rural areas when retrofitting sidewalks in existing neighbourhoods, the recommended minimum width is at least 1.5 m, which allows a wheelchair user to turn around, and at least 1.8 m along arterial roadways. Sidewalk widths of at least 2.4 m are recommended in areas where higher volumes of pedestrians are expected, such as in central business districts, commercial areas or town centres.

Sidewalks that are flush against barrier curbs are recommended to be at least 1.8 m wide in residential areas and 2.4 m wide in commercial areas or along arterial roadways to provide an adequate buffer zone.

Ontario's *Initial Proposed Accessible Built Environment Standard* (June 2009) recommends a minimum 1.8 m wide sidewalk. This minimum width should apply to all new roadways within urban areas.

3.2.1.3 Frontage Zone

The frontage zone is the area between the pedestrian travel zone and the front of stores, and should generally be at least 0.6 m in width or greater in commercial areas to provide space for opening doors, sandwich board signs, etc. Level, concrete landings are required in the frontage zone at building entrances.

3.2.2 PEDESTRIAN STREET CROSSING MEASURES

Pedestrians want and need safe access to all destinations that are accessible to motorists. Pedestrians must be able to cross streets at regular intervals and should not have to walk more than 100 m out of their way to take advantage of crossing locations. *Alternative Treatments for At-Grade Pedestrian Crossings* (Institute of Transportation Engineers, 2001) documented the state of practice in innovative treatments for pedestrian accommodation for intersection and mid-block crossings, including both controlled crossings where the pedestrian has the right-of-way, and uncontrolled crossings where approaching vehicles have the right-of-way. Use of unmarked crossings are not recommended given their potential to cause right-of-way confusion between motorists and pedestrians. Several recommended treatments for pedestrian crossings are described in the following sections.

3.2.2.1 Crosswalks

Crosswalk markings should only be provided where motor vehicle traffic is regulated by traffic controls that give the right-of-way to pedestrians at that location. A traffic control signal, however, still does not necessarily provide safety for a pedestrian obeying the signal, especially when the pedestrian is crossing a lane with a permitted vehicular crossing movement such as a permissive left turn on a green light or a right turn on a red light. Drivers are more likely to respect the crosswalk as pedestrian space if it is clearly visible.



3.2.2.2 Countdown Signals

Pedestrian countdown signals provide a numeric display that indicates the number of seconds remaining for a pedestrian to complete the crossing of the street. Countdown signals are more effective at reducing conflicts with vehicles, and are easier for pedestrians to understand, than the traditional flashing “DON’T WALK” indicator.



3.2.2.3 Intersection Pedestrian Signal

An intersection pedestrian signal (IPS) is a device that assists pedestrians crossing major streets, and includes standard traffic signal indications to control through traffic on the major street, a stop sign to control traffic approaching from the minor street, and a standard pedestrian signal indicating “walk” or “don’t walk”. An IPS is more effective than a standard pedestrian crossover and less expensive to install and maintain than a full traffic signal.

3.2.2.4 Refuge Islands

Pedestrian refuge islands are medians that are placed in the centre of the roadway separating opposing lanes of traffic, allowing pedestrians to cross one direction of traffic at a time. They are particularly well suited to roadways with four lanes since the cognitive requirements to select a gap in four lanes of bidirectional traffic is considerably higher than that required to select a gap in two lanes of traffic approaching from one direction. They can also be used to improve the function and comfort of trail and pedestrian crossings of two-lane roadways.



3.2.2.5 Curb Extensions

A curb extension, or bulb-out, is an intrusion of the curb into the roadway that results in a narrower section of roadway and reduces the crossing distance for pedestrians. In addition, they have been found to reduce vehicle speeds, improve sightlines for both pedestrians and motorists, prevent parked cars from encroaching on the sidewalk, and create additional space for curb ramps and landings.

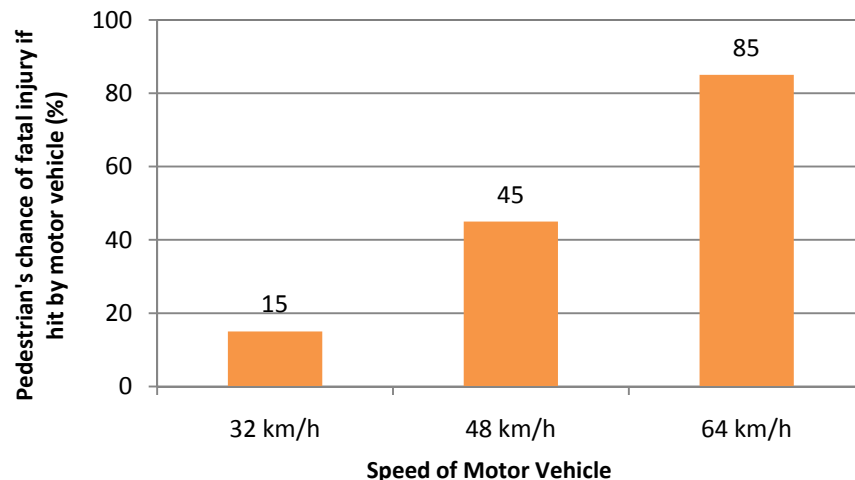


3.2.3 TRAFFIC CALMING

Reducing vehicle travel speeds is an essential part of providing a safe and comfortable pedestrian environment. Higher vehicle speeds discourage people from walking and are much more likely to result in pedestrian death in the event of a collision under any circumstances (see Exhibit 7). Several ways of reducing vehicle speeds in pedestrian areas and at intersections are presented below. Given the uniqueness of each road and surrounding neighbourhood, the City of Cornwall may wish to consider developing technical criteria and a process to rank requests for traffic calming. This could help to facilitate decision-making and the application of suitable treatments on a case-by-case or road classification basis. Appropriate traffic calming measures can be selected from a range of options with attention to emergency routes and other important considerations. A menu of traffic calming options is shown in Exhibit 8.

Typically, most cities adopt criteria whereby traffic calming is only considered when volumes and speeds exceed specific thresholds. Volume thresholds are typically 900-1000 vehicles per day for local roads and 2,000 vehicles for collector roads whereas. Speeding is considered problematic when 85th percentile speeds are more than 5 km/hr over the posted speed, or more than 55 km/hr on local and collector streets.

Exhibit 7: Chance of Pedestrian Death in a Motor Vehicle Collision by Vehicle Speed



Source: Department of Transport (United Kingdom). "Killing Speed and Saving Lives." As reported in Oregon Department of transportation, *Oregon Bicycle and Pedestrian Plan*, 1995.

3.2.3.1 Curb Return Radii

The design of the curb return at intersections depends on the types of vehicles expected to be using the intersection, the dimensions that make up the approaching and receiving lanes, and the curb radius itself. A compromise must often be made between a small curb radius, which is

desirable to reduce the speed at which vehicles turn the corner, and a larger curb radius to prevent large vehicles from travelling across the curb and into the pedestrian zone when making a turn.

3.2.3.2 Pedestrian-Friendly Channelized Right Turn Lanes

Channelized right-turn lanes are never recommended in any pedestrian environment due to the high vehicle speeds they induce, however when they are deemed absolutely necessary or in political climate that does not support walking and cycling, there are some design features that can improve the pedestrian experience. The objectives of pedestrian friendly channelized right-turn lanes are to reduce driver workload by reducing the angle of shoulder check and entry; to improve visibility of pedestrians by reducing the viewing angle; and to reduce turning speeds to be more consistent with yield conditions that may require a full stop. Ottawa, Burlington and Region of Waterloo are implementing these so called “smart channels”.

3.2.3.3 Other Traffic Calming Devices

Other traffic calming devices such as small neighbourhood traffic circles, curb extensions, and speed humps can be employed to reduce vehicle speeds on local roads while maintaining pedestrian accessibility and safety.

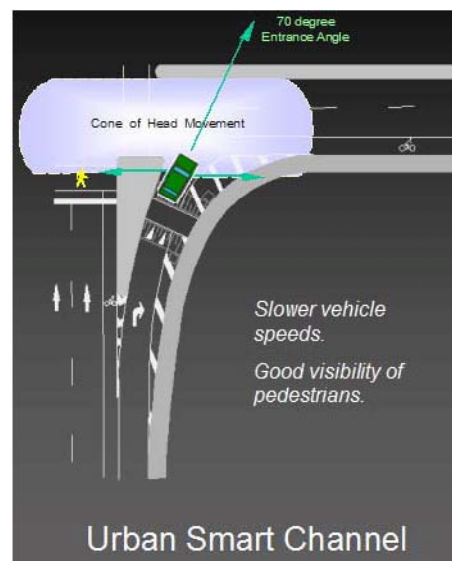


Exhibit 8: Menu of Traffic Calming Options

Measures		Local Road	Low-Volume Collector	Other Collector	Tertiary Arterial
Horizontal Deflection	Curb Extension	✓	✓	✓	✓
	Traffic Circle / Mini Roundabout	✓	✓	◆	×
	Raised Median Island	✓	✓	✓	✓
	Corner Radius Reduction	✓	✓	✓	◆
	Chicane, 1-Lane	✓	×	×	×
	On-Street Parking	✓	✓	✓	◆
Vertical Deflection	Speed Hump / Table	✓	◆	◆	×
	Speed Cushion	×	◆	◆	×
	Raised Crosswalk	✓	◆	×	×
	Raised Intersection	◆	×	×	×
Obstruction / Closure	Directional Closure	✓	◆	×	×
	Right-In/Right-Out Island	✓	◆	×	×
	Raised Median	✓	✓	×	×
	Intersection Channelization	✓	✓	◆	◆
	Full Closure	◆	×	×	×
Signage (when primarily application is traffic calming)	Traffic-Calmed Neighbourhood	✓	✓	◆	◆
	Turn Prohibited	◆	◆	◆	◆
	Through Traffic Prohibited	◆	◆	◆	◆
	One Way	◆	◆	×	×
	Warning signs (playground, school, etc)	◆	◆	◆	◆
	Maximum Speed	◆	◆	◆	◆
	Yield	×	×	×	×
	Stop	×	×	×	×
✓ = Appropriate Measures ◆ = Use with Caution × = Not Recommended					

3.2.4 ACCESSIBLE DESIGN CONSIDERATIONS

Pedestrians affected by mobility, hearing, visual or cognitive impairments can become disabled in their environment unless it is designed to be accessible. Considerable information is available on accessible design standards as listed in the Reference Section. It is also noted that Ontario will soon finalize its Accessible Design Standards for the Built Environment under the Accessibility for Ontarians with Disabilities Act (AODA).

Some of the key considerations that should be incorporated into sidewalk and street crossing design include:

- **Minimizing Grade:** A maximum of 5% is recommended;
- **Minimizing Cross Slope:** A maximum cross slope of 2% is recommended;
- **Providing a Firm Surface:** Stable and fairly slip-resistant surfaces when dry. Consistent colour and texture aid the visually impaired who may not be able to distinguish a change in colour or texture from a drop-off or change in level;
- **Minimizing Changes in Elevation:** Vertical rises in sidewalks should not exceed 6 mm; and
- **Ensuring Objects do not Protrude into the pedestrian travel zone:** Objects protruding into the pedestrian travel zone above 2 m in height are not a problem for pedestrians with visual impairments. Between 0.7 m to 2 m in height, objects should not protrude more than 10 mm into the pedestrian travel zone.

The characteristics of an accessible sidewalk described above should continue through a driveway. Changes in the driveway grade to match the street grade should occur outside the sidewalk or pedestrian travel zone.

To maintain an accessible sidewalk, the pedestrian travel zone should consist of broom finished concrete with a defined edge. This could include a barrier curb or using material of differing texture for the buffer zone such as grass, stamped concrete, interlocking pavers, painted surfaces, or stone. The concrete sidewalk then becomes a defined area that adjacent property owners realise must be kept clear of obstructions such as signs, furniture, newspaper boxes, etc. The pedestrian travel zone should be defined by a distinct material even through public plazas, transit stops and areas with adjacent benches

3.2.4.1 Curb Ramps and Detectable Warnings

Curb ramps provide access from the street to the sidewalk for pedestrians who use mobility devices. Wherever the sidewalk is at the same level as the street, such as at the bottom of a curb ramp, a detectable warning is required to indicate to the visually impaired that they are entering the street. Ontario's *Initial Proposed Accessible Built Environment Standard* (June 2009) recommends a detectable indicator at the top and bottom of curb ramps consisting of truncated domes with tonal contrast to the adjoining surface.



3.2.4.2 Audible Pedestrian Signals:

Audible pedestrian signals (APS) provide visually impaired users with information on when they have the right-of-way to cross the street and in which direction they may cross an intersection. The Canadian National Institute for the Blind recommends that an APS be installed at signalised intersections that have pedestrian activated walk signals, a lead pedestrian phase, an advanced left-turn phase, mid-block crossings, or at T-intersections. National guidelines for the understanding, use and implementation of APS are available from the Transportation Association of Canada.

3.3 Cycling Network Signage Strategies

The Transportation Association of Canada's (TAC) *Bikeway Traffic Control Guidelines for Canada* (December 1998) indicates that bikeway guide and informational signs convey information to cyclists for route selection, for locating off-road facilities, or for identifying geographical features or points of interests. These *Guidelines* indicate that on shared rights-of-way, separate signing for cyclists is not necessary; however, guide and informational signs are intended to help cyclists find their way in unfamiliar areas and provide insight into the coherence of a network of bikeway routes.

3.3.1 CYCLISTS' NEEDS

Street name signposting, and guide and informational signs for motorized traffic are not ideal from the cyclist's viewpoint, in terms of positioning and information:

- Some bikeways are designed to take advantage of low traffic speeds or volumes, or scenic routes and as such may not remain on any given street. The bike route will take turns and short-cuts not intended for motorists but of great advantage to cyclists. Separate signing of these routes is required for way-finding.
- Cyclists generally travel shorter distances than motorists and are more concerned with direct connections to destinations within those smaller areas. They may require information on the exact route to the frontage of the property or building that is bicycle-accessible. For example, circulating by bike around a shopping or transit centre to find bike parking or bicycle lockers could be very frustrating.
- Time and distance along bike routes to destinations can indicate to the traveling public that the trip is quite manageable by bicycle.
- Advance signing for a cyclist on a roadway or trail approaching a roadway with a bike lane, wide lane, or other type of bikeway on it is needed. The cyclist will not be aware that the bikeway exists until they pass through the intersection or they may not detect the bikeway at all. If they do detect it at the intersection, they may not be in a position that allows them to turn directly onto the bikeway, and then will have to expend additional personal energy to go out of their way to turn around.
- A coherent and consistent system of way-finding signs for cyclists is lacking in Canada. Some of the shortcomings of bicycle route signage programs include:
 - Signs are inconsistently implemented across a network such that some routes are well marked and others are not.
 - Useful information from a cyclist's perspective, such as destinations, directions, distances, amenities, is lacking or inconsistent across a network.

- Signs are not maintained on an annual or as-needed basis with signs disappearing over time.
- Initial implementation of bicycle route network signage is not continued as the network expands over time such that older sections are signed and newer sections are not. The reverse can also happen if older signs are not maintained but newer signs are installed as the network expands.
- Sign placement is poor so that it is not easily visible to cyclists.
- Signage types are lacking, i.e., route confirmation signs at regular intervals, change in route direction signs, intersection signs of two or more bicycle routes, advance or access signs from major roadways or trails to bicycle routes.

Bicycle route signage is important for integrating the on-road network with the multi-use trail network, and with adjacent communities to create a co-ordinated network. The signage should be easy to integrate into bicycle route maps, and address the features such as route confirmation, route intersections, connectivity, advance route signing, destinations, directions, distances (or time), and amenities. Such a signage plan would go beyond the basic guide and information signs recommended by TAC. Consistency with Provincial sign design principles is also recommended.

3.3.2 SIGNAGE EXAMPLES

Examples of bicycle route signage from North America and Europe are provided in Exhibit 9. These illustrate the basic bike route guide signing to more complex signing that provides useful information on destinations, distances and amenities.

Exhibit 9: Examples of Bikeway Signage

Basic bicycle route sign	
<p>Not very useful without additional information about the bicycle route network. Note that TAC's recommended Bicycle Route Marker Sign includes the word "ROUTE" below the bicycle symbol.</p> <p>Photo by Richard Drdul</p>	
Bicycle route marker sign with destinations	
<p>Plus direction at decision points in the bicycle route network.</p> <p>Photo by Richard Drdul</p>	
<p>Additional information provided includes direction, distance and average time by bicycle at decision points in the bicycle route network.</p> <p>Photo by Richard Drdul</p>	

Bicycle route marker sign with route number	
Additional information provided includes cardinal direction.	
Street name blade with bicycle logo	
Identifies a street as a bikeway to cyclists and motorists. Photo by Richard Drdul	
Bicycle boulevard signage	
Identifies the street as a priority street for cyclists with a route name and includes destinations, distances and directions. Photo from City of Berkley, CA	

European bicycle route signage	
<p>Includes region name, node number, destinations, directions, distances, amenities, and map.</p>	
<p>Includes destinations, directions, distances, and amenities.</p>	

3.4 Site Design Guidance to Support Walking and Cycling

The Canadian Institute of Transportation Engineers (CITE) published a reference document called **Promoting Sustainable Transportation Through Site Design**. This document was developed to provide planning authorities and the land development industry with site design practices and planning processes that help promote sustainable transportation. Drawing on the CITE Guideline, for which IBI Group was the lead author, this section highlights suggested practices that would be applicable in Cornwall for improving site design for active transportation.

3.4.1 SITE ORGANIZATION

Site organization is one of the first stages of site design and has a significant impact on elements that affect sustainable transportation. Typical decisions that are made at this stage include building location and placement, parking lot size and configuration (e.g. at grade, above, grade or below grade) and entrance locations.

3.4.2 SITE LAYOUT

Site layout determines how pedestrians, cyclists, transit users and motor vehicle drivers and passengers will arrive at the site and travel through the site. As a result, site layout has a significant impact on whether users of different modes can safely and comfortably co-exist. Major decisions at this stage of the design process include determining the internal road configuration (where internal roads or driveways are required), parking layout and configuration, and the location of transit facilities, bicycle facilities and passenger pick-up and drop-off areas in relation to buildings and the internal and/or adjacent street network.



3.4.3 SITE INFRASTRUCTURE

Site Infrastructure is typically designed in greater detail once the general layout of buildings, parking, access and internal roads has been established. The design of site infrastructure, which includes decisions on road and sidewalk widths, materials and treatments, has can influence the “pedestrian-friendliness” of a site.



3.4.4 SITE AMENITIES

Site amenities are generally considered later in the site design process, but are no less important for sustainable modes than other site design aspects. It is important that amenities for pedestrians, cyclists and transit riders be considered as part of the initial site design, rather than after a project is completed. Factors such as landscaping, bicycle parking and bicycle changing facilities can make the difference between a person choosing to walk, cycle or ride transit and taking their vehicle. While some of these features may involve extra upfront costs, the long term financial benefits can be covered by improved employee satisfaction, increases site value and reduced need for auto facilities.



The City of Cornwall may wish to provide incentives to encourage the provision of amenities in proposed developments during the site plan control process. Incentives could include a reduction of required parking in lieu of bicycle parking and pedestrian or public spaces, increases in density, increases in height and increases in lot coverage.

3.5 Promotional Strategies

Numerous studies have recognized that transportation choices are not purely based on objective factors such as the time it takes to get from an origin to a destination. Instead, a variety of subjective social and cultural factors related to how we perceive our own needs, also play a major role in the decision of which mode we take.¹³ For example, a 1994 study by the U.S. Department of Transportation suggested the following are subjective factors: distance, traffic safety, convenience, cost, valuation of time, valuation of exercise, physical condition, family circumstances, habits,

¹³ For example, see Lyons & Urry (2006) Foresight: The place of social science in examining the future of transport.

attitudes and values, and peer group acceptance. Infrastructure alone cannot effectively address such potential barriers.¹⁴

Gatersleben and Uzzell (2002) provide a list of four criteria to elicit behavioural change towards a social good, such as walking or cycling more often. These criteria include:

- Clearly defining the social good, including its costs and benefits;
- Increasing awareness;
- Creating a sense of personal responsibility; and
- Creating a sense of self-efficacy.¹⁵

These four criteria can be addressed through education, providing information, and support for civil society organizations and employers.

3.5.1 AWARENESS

Increasing awareness of the benefits of walking and cycling will help set the stage for actively encouraging behavioural change. Any information distributed by the City for events and programs having themes related to cycling and walking, such as healthy lifestyles, or that could involve using a form of active transportation to arrive at a location, should emphasize the reasons for walking and cycling in event directions and promotion. For example, both costs of usual modes such as driving as well as the benefits of alternative modes can be communicated in an attention-getting format. Other awareness programs could include:

- Active and Safe Routes to School programs that encourage children, youth, their families and employees to cycle or walk to school;
- Bicycle Friendly Business designations and awards;
- Car-free Sundays or Open Streets banning automobiles on streets and opening them to pedestrians and cyclists;
- Cycling Ambassadors are teams of skilled cyclists who offer programs, campaigns, or deliver information at community events during the summer promoting cycling skills and share the road messages; and
- Crossing-guard programs.

3.5.2 CIVIL SOCIETY

Community groups can be key in promoting changes in behaviour because they provide an avenue for expression and leadership, and create a sense of efficacy. Advocates can also do much of the legwork that helps the City identify important areas of intervention. While most groups are limited in their scope, supporting diverse civil society participation ensures better representation of the overall public interest from engaged individuals. The establishment of community groups should be encouraged in support of the Bicycle and Pedestrian Master Plan.

Bicycle User Groups (BUGs) exist to encourage and support cyclists who wish to improve conditions for cycling in their workplace, neighbourhood, community, or school. Some BUGs form in order to further specific goals such as acquiring secure bike parking, while others simply wish to

¹⁴ Federal Highway Administration (1994) National Bicycling and Walking Study Five Year Status Report by the U.S. Department of Transportation, cited by Dill and Carr (2003) Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look.

¹⁵ Gatersleben, B. and Uzzell, D. (2002). Sustainable transport and quality of life. In Black, W. R. & Nijkamp, P. (eds.) Social Change and Sustainable Transport. Bloomington: Indiana University Press, pp. 135-140.

come together for casual group rides or group commutes to work. In the City of Toronto, there are 112 registered BUGs. The City provides free information on how to start a BUG, tips on commuting by bicycle, and resources such as maps and videos.

Funding channels, or at least priority access to resources, such as meeting rooms, can be provided to support these groups. Any additional opportunity for involvement, such as in planning processes, public meetings, and through volunteering for events can go a long way to improve the quality of their engagement in civic processes.

3.5.3 EDUCATION

Encouraging responsible driving, cycling, and walking through driver education, driver licensing requirements, and public education are the domain of the Province. Licensing cyclists would also be under the jurisdiction of the Province and currently research does not clearly show value in establishing a licensing program for cyclists. Marketing strategies, such as buying short advertisement slots on local radio stations following traffic reports, or flyers in correspondence such as tax bills, can be used by the City to remind drivers to be respectful of cyclists and pedestrians. The City could support programs through local school boards, promote safety and skill training at active transportation-related events, or administer CAN-BIKE programs¹⁶ or Kids CAN-BIKE summer camps as part of their recreation programs, for example. The Ministry of Transportation, Ontario, provides two publications free of charge on-line or in print: *Cycling Skills—Ontario's Guide to Safe Cycling* targeted at young adult and adult cyclists, and *Young Cyclist's Guide* targeted at the age 9 up youth¹⁷.

What do Bicycle User Group members do? BUG activities are based on the interests of its members. Here are just some of the activities that BUGs are involved in:

- Encourage people to cycle
- Post notices and newspaper articles about cycling for others to read
- Go on bicycle rides/tours
- Ride Matching Programs - match less experienced cyclists with veterans
- Try to get secure bicycle parking, change rooms/showers
- Mileage for commuting and cycle journeys on work-related business
- Neighbourhood bicycle planning initiatives
- Organize Bike Week events
- Host cycling seminars on nutrition, cycling safety, bicycle repairs, and commuting tips
- Recycle/repair bicycles for others
- Take CAN BIKE courses to increase confidence and safety on the road.

Source: <http://www.toronto.ca/bug/index.htm> (July 2010)

Pedestrian and cycling safety and enforcement programs often focus on behaviour such as jay-walking or helmet use. To the contrary, the majority of reported pedestrian collisions occur when pedestrians are crossing intersections with the right-of-way, and bicycle helmets, although an asset, do not prevent collisions. Any safety and enforcement programs intended to support more walking and cycling should address changing pedestrian, cycling and motorist behaviours that result in injury and fatal collisions. This requires collecting and analyzing collision data in a meaningful way, supporting pedestrian and cycling skills training, motorists education and enforcement of those rules of the road that truly affect collision potential.

3.5.4 EMPLOYER INCENTIVES

Employer incentives can be very effective in encouraging walk or bike commuting. Establishing ways of engaging employers, such as through parking space credits, support for BUGs (see

¹⁶ CAN-BIKE is a program of the Canadian Cycling Association. It is a series of courses on all aspects of cycling safely and enjoyably on the road; it is oriented toward recreational and utilitarian cycling. The CAN-BIKE cycling safety program provides a nationally standardized set of courses that can be taught through a variety of organizations who are interested in education, safety and health http://www.canbike.net/cca_pages/index.htm (July 2010).

¹⁷ <http://www.mto.gov.on.ca/english/pubs/cycling-guide/index.shtml> and <http://www.mto.gov.on.ca/english/safety/cycling/youngcyclist.shtml> (July 2010).

Section 3.4.2), or smart commute programs, can be made a part of promotion and awareness strategies.

3.5.5 ADVICE AND COORDINATION

To formalize cooperation and include others who have not yet found a way to participate, a Cycling and Walking Committee could be convened to meet monthly or bimonthly to discuss relevant issues alongside the implementation of the Bicycle and Pedestrian Master Plan. The Committee could formalize involvement from civil society groups, Business Improvement Associations and employer incentives, as well as staff from relevant City departments. Such a Committee could aim to act as an important channel for citizen input to improve community investment in the plan, to ensure accountability in its implementation, and to avoid any unwarranted “NIMBY” reactions to its implementation. Many cities formalize a terms of reference or mandate for their advisory committees, along with defining membership, selection processes, length of terms, responsibilities and codes of conduct.

4. EXISTING CONDITIONS AND NEEDS

Cornwall is a City of 46,000 people and the centre of a region of almost 60,000 people. Incorporated as a town in 1834, Cornwall has a rich history, and its rapid growth as industrial centre prior to the Second World War established a traditional grid system of roadways and a relatively compact, mixed-use urban form that continues to serve as the foundation for much of modern day Cornwall. Such a physical built form makes Cornwall an ideal place to nurture and develop a strong cycling and walking culture.

4.1 Trip Making Characteristics

Most streets in central Cornwall are regularly spaced in both directions at intervals of less than 200 m, and many streets, particularly in the east end, are spaced at less than 100 m intervals. This grid network of streets is conducive to walking and cycling, which in combination with the relatively short travel distances between destinations in Cornwall contributes to a relatively high walking and cycling mode share. Work trip mode shares for the City of Cornwall and for the Cornwall Region are shown in Exhibit 10 and corresponding modes shares for the province of Ontario and the Townships of South Glengarry and South Stormont are shown in Exhibit 11 for comparison.

The overall walk and bike mode share for the City of Cornwall is significantly higher than the Ontario average at 10.1% compared to 6.8% respectively. The high non-motorised mode share indicates that there is a strong foundation for walking and cycling in Cornwall, and that with improved conditions the mode share could increase significantly, particularly for cycling.

Exhibit 10: Work Trip Mode Shares for the City of Cornwall and the Cornwall Region

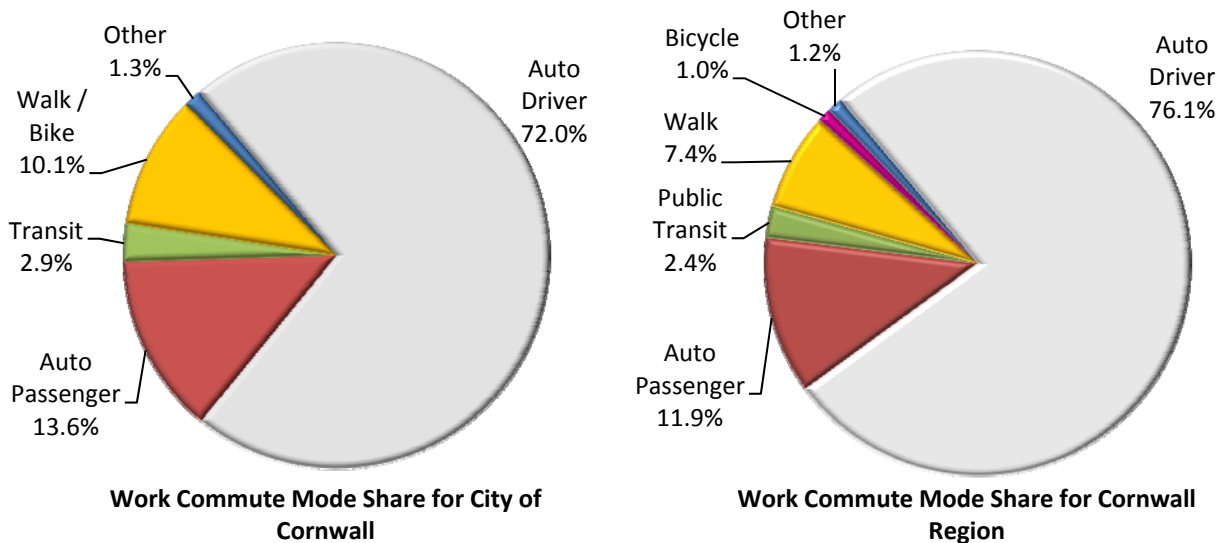
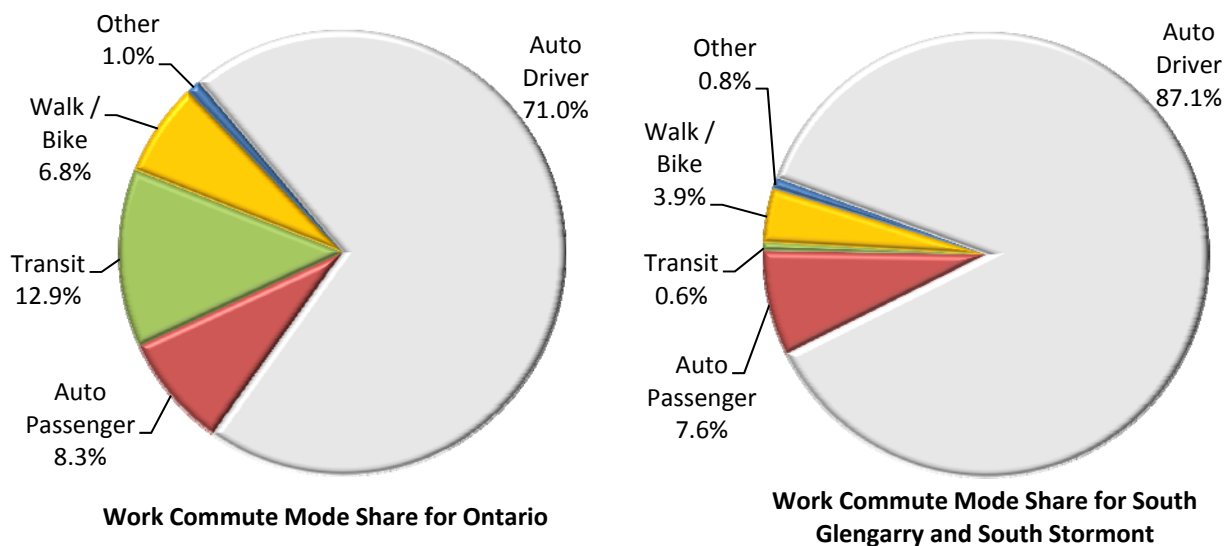
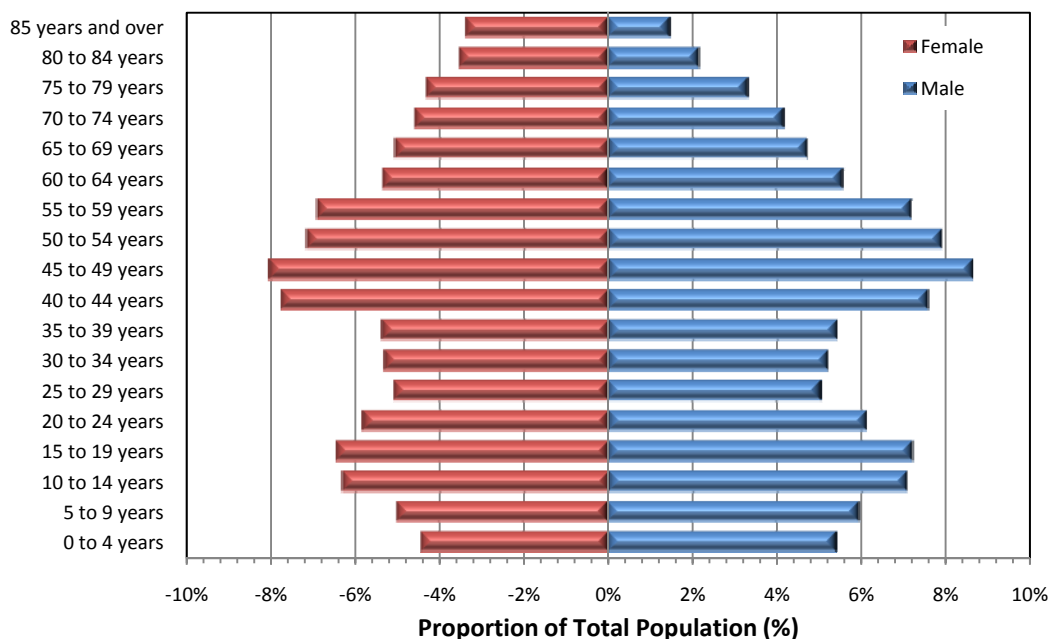
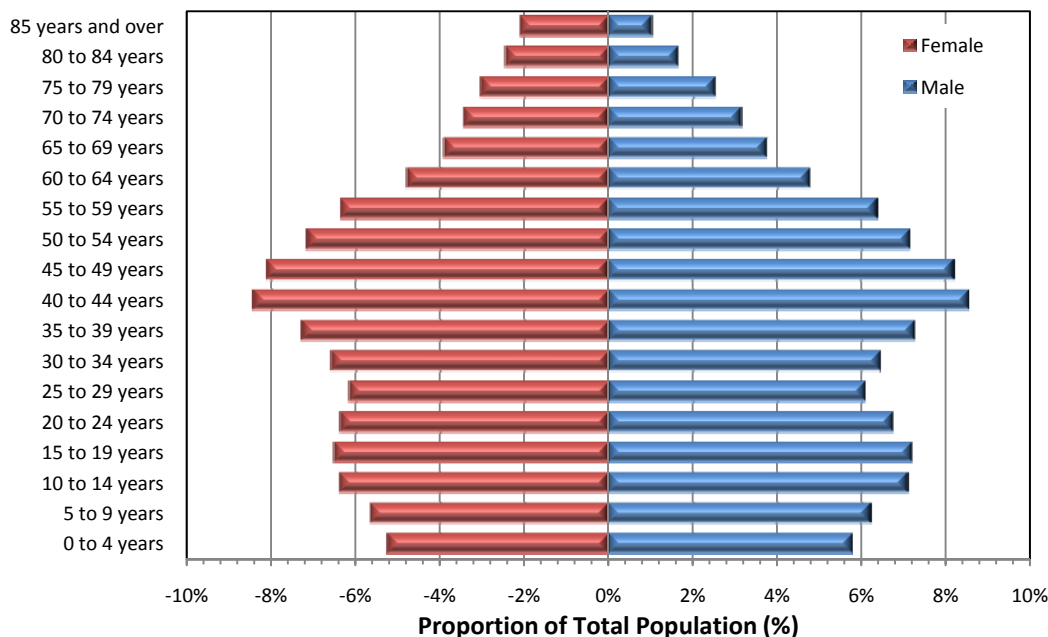


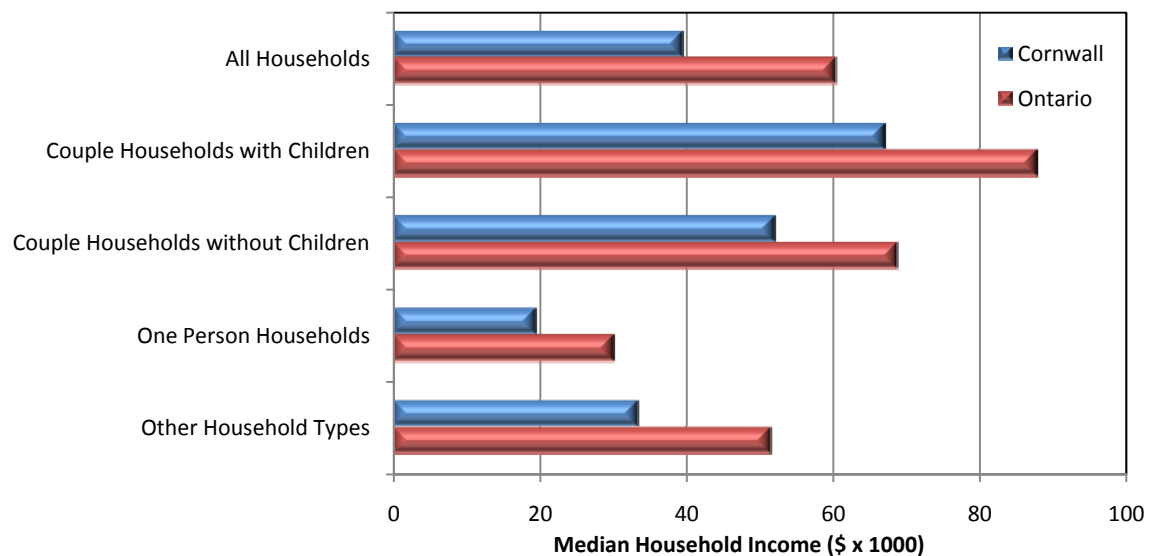
Exhibit 11: Work Trip Mode Shares for Ontario, South Glengarry and South Stormont

4.1 Demographic Characteristics

Another important factor affecting cycling and walking rates is age. Population distributions by age are shown for Cornwall in Exhibit 12 and for Ontario in Exhibit 13. Cornwall has a relatively high proportion of people over 65 years of age than the Ontario average. Since many elderly people are unable to drive, they are more likely to walk at least short distances to services, shopping or to public transit. As such it is important to improve walking conditions and the pedestrian environment for this vulnerable segment of the population. A large segment of Cornwall's population is also under 25 years of age. This younger demographic are less likely to be able to afford a car, and hence are more likely to cycle or walk instead. Walking and cycling are the first modes of independent travel for youth and pre-driver's licensed teens. Improving conditions for this segment of the population may encourage them to continue cycling or walking by choice as they enter adulthood and their working years.

Exhibit 12: Age Distribution of Cornwall Population**Exhibit 13: Age Distribution of Ontario Population**

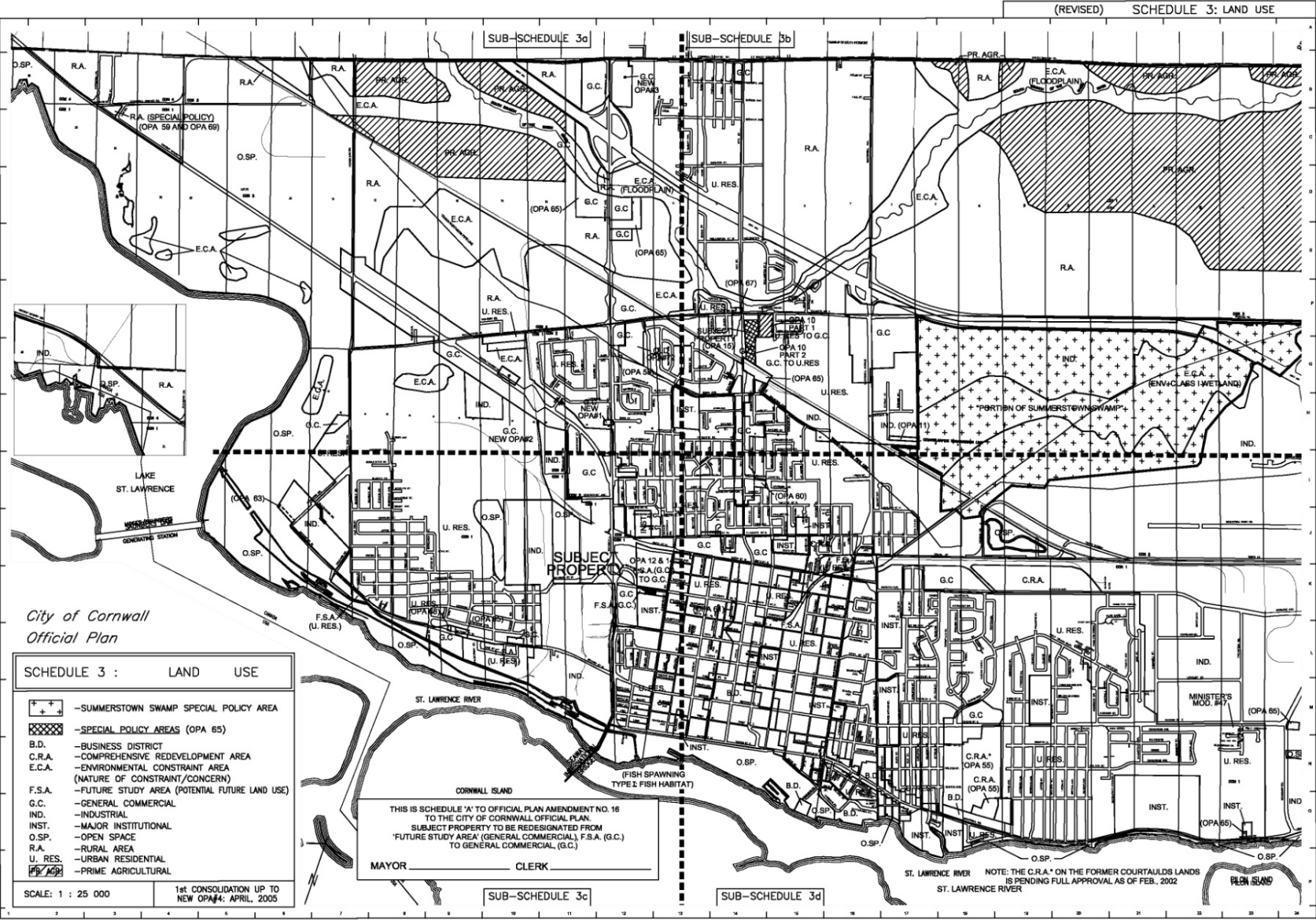
Income is another important factor affecting the cycling and walking mode share of a community. The median household income for Cornwall is shown compared with the Ontario average in Exhibit 14. It is clear that median household incomes in Cornwall are significantly lower than the Ontario average, and hence cycling and walking are likely to be more important mode shares in Cornwall due to their low or zero cost. Beyond the health or environmental benefits of active transportation, there is a real need to provide safe and convenient cycling and pedestrian facilities from an equity point of view, in order to ensure that poorer segments of the population have access to services and employment opportunities.

Exhibit 14: Median Household Income for Cornwall and Ontario Households

4.2 Land Use and Geography

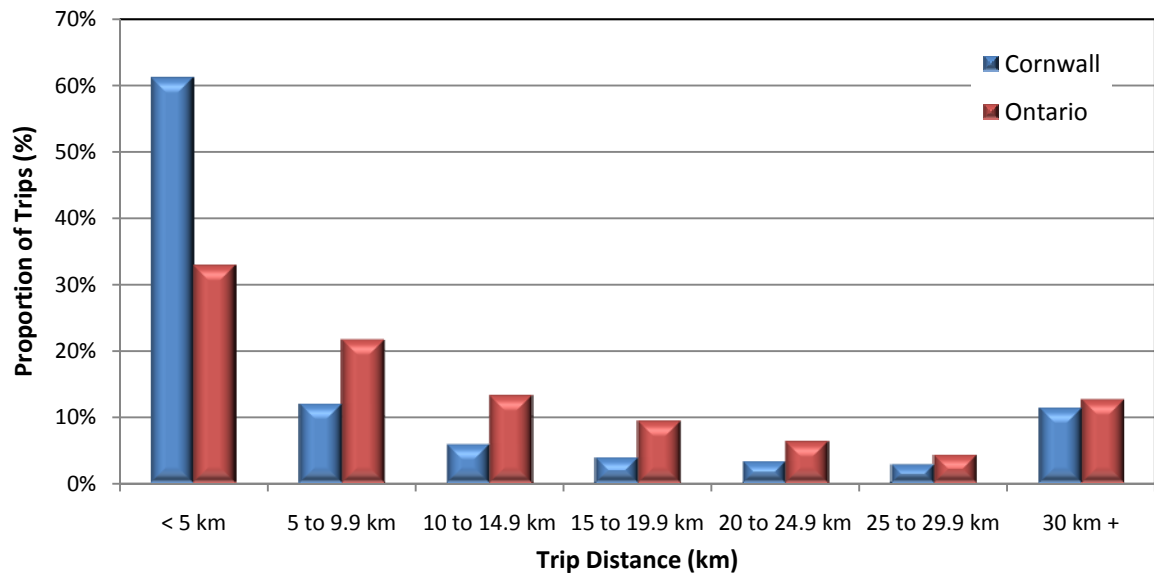
Land-use types in Cornwall are relatively mixed, with industrial, institutional, commercial and business areas dispersed among residential areas on a relatively small geographic scale. A map of existing land-use types from the Cornwall Official Plan is shown in Exhibit 15. A variety of land-use types in close proximity to each other makes walking or cycling a realistic option for the daily work commute and for other utilitarian purposes such as shopping or errands, as distances between origins and desirable destinations are short.

Exhibit 15: Existing Land Use Types in Cornwall



The City of Cornwall has an area of 61.5 k², which corresponds to a rectangle of about 6 km by 10 km. Most of the population of the City, however, lives within an area that is approximately 7 km by 4 km. Thus, most residents live within easy cycling distance of most work, school or shopping destinations in the city. The proportion of work trips made in Cornwall by commuting distance is shown in Exhibit 16 along with average Ontario work trip commuting distances for comparison. More than 60% of all work trips made in Cornwall are less than 5 km long, which is an easy distance for most people to cycle. About 73% of trips are less than 10 km in length, a distance that many people can easily cycle in less than 30 minutes. This is especially true in Cornwall, which is relatively flat.

Exhibit 16: Work Trip Commute Distance for Cornwall and Ontario



4.3 Physical Barriers

The geography and layout of Cornwall makes it ideally suited to trips on foot and by bicycle. There are very few major physical barriers that need to be bridged. Most of the developed area of Cornwall lies to the south of Highway 401 and the CN railway line. Communities to the north of the railway line and Highway 401 are connected to the City centre via Brookdale Avenue and Pitt Street. There is no interchange and associated high-speed ramps at Pitt Street and both streets are grade-separated at the railway. Since Highway 401 passes through the less developed portion of the City, it is not commonly used by commuters in Cornwall. This is an advantage when trying to encourage more walking and cycling because there is no competition from a high-speed freeway. Cycling is more competitive with the relatively lower automobile speeds seen on urban streets.

Brookdale Avenue and the Brookdale rotary are significant barriers. As a major arterial roadway serving commercial development, it is currently an unfriendly pedestrian environment that is difficult to cross, prohibiting residents to the east accessing destinations on the west. It also presents a significant barrier to safe east-west travel for cyclists entering or leaving the city centre. Areas that will need to be addressed in particular along Brookdale Avenue include the Highway 401 interchange and associated high-speed entry and exit ramps, the intersection with Vincent Massey Drive, the distance between signalized crossings between Second Street West and Tollgate Road, the rotary, and the area near Brookdale Mall, Pitt Street and south of 7th Street approaching the Seaway International Bridge.

Another area of concern for the safety and comfort of pedestrians and cyclists is the Highway 401 interchange at McConnell Avenue.

The CN railway line poses a significant barrier to accessing the business park to the north-east from the City. At present, the business park can only be accessed from Boundary Road to the east, which means that commuters from residential areas of the City must go significantly out of their way. This, in particular, discourages people who work in these areas from cycling to work. Boundary Road is a busy arterial with no bikeway or sidewalk, and poses a barrier to walking and cycling in the area. Providing exclusive pedestrian and bicycle access to the business park from the south-west would make active transportation much more attractive and competitive with the automobile for commuters from the city.

A number of other roads lacking or with poor shoulders that are problematic for cyclists and pedestrians include:

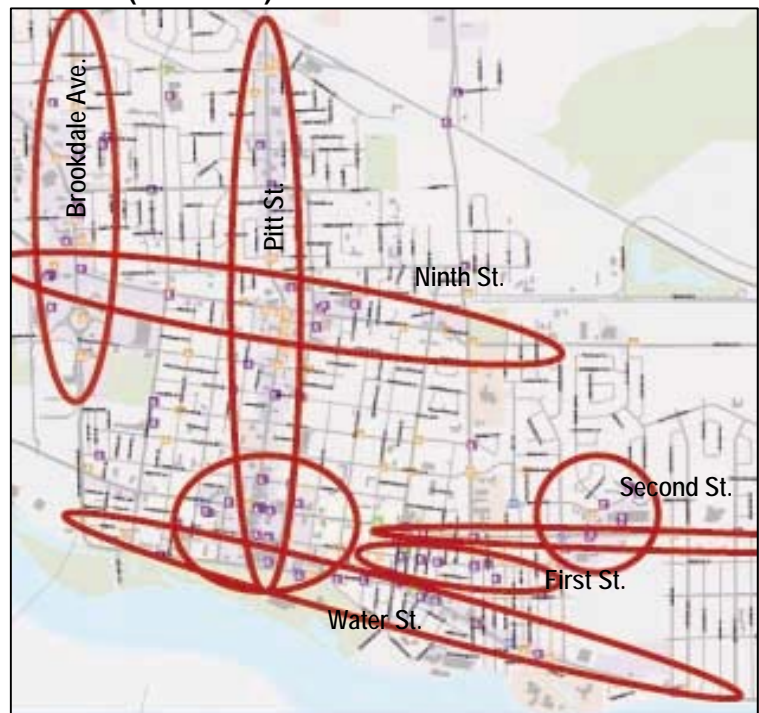
- Marleau Road east of McConnell has no shoulders;
- Second Street east of Billington Road has no shoulders;
- Tollgate Road has no paved shoulders; and
- Boundary Road has only gravel shoulders.

4.4 Safety

Pedestrian and cycling collision data from Cornwall shows that the risk of fatality by walking and cycling is extremely low with only one pedestrian fatality between 2004 and 2008. Pedestrian and cyclists are involved in approximately 19 non-fatal collisions each year between 2004 and 2008. These collisions are clearly clustered at or near intersections along major corridors with high traffic and in built up areas of the City (see Exhibit 17). The following intersections, corridors and areas of the City are particularly problematic:

- Ninth Street;
- Pitt Street;
- Water Street;
- First Street;
- Second Street; and
- Brookdale Avenue.

Exhibit 17: Pedestrian and cyclist collision clusters in Cornwall (2004-2008)



4.5 Existing Pedestrian and Bicycle Facilities

4.5.1 PEDESTRIAN FACILITIES

Although many of the older residential neighbourhoods in Cornwall have sidewalks, they are often discontinuous, on only one side of the street or in poor condition. Intersections may also lack visible pavement markings or signals to facilitate pedestrian crossings. Walking is a very common activity in Cornwall and, due to gaps in infrastructure, people are often forced to walk on the street or cross where it may be convenient yet dangerous. Many areas are lacking safe facilities for pedestrians, notably the area around Brookdale Mall, the Brookdale Avenue rotary, the area around the new multi-sport complex, and the new Catholic high school on Boundary Road. Quite a few transit routes lack continuous sidewalks on both sides of the streets serving transit stops. A map of existing sidewalks in Cornwall is shown in Exhibit 18.



4.5.2 MULTI-USE TRAILS

The spine of the multi-use trail network in Cornwall is the Lake Ontario Waterfront Trail, which forms a continuous, dedicated cycling and pedestrian route along the waterfront through the entire City. The Waterfront Trail connects with a northerly east-west route along the hydro corridor just south of Vincent Massey Drive. The hydro corridor trail extends east of Brookdale Avenue, connecting many schools in the residential area south of the CN railway line and north of Ninth Street. There are a couple of isolated paths along ravines in the north of the city. Off-street facilities are heavily used by recreational cyclists.

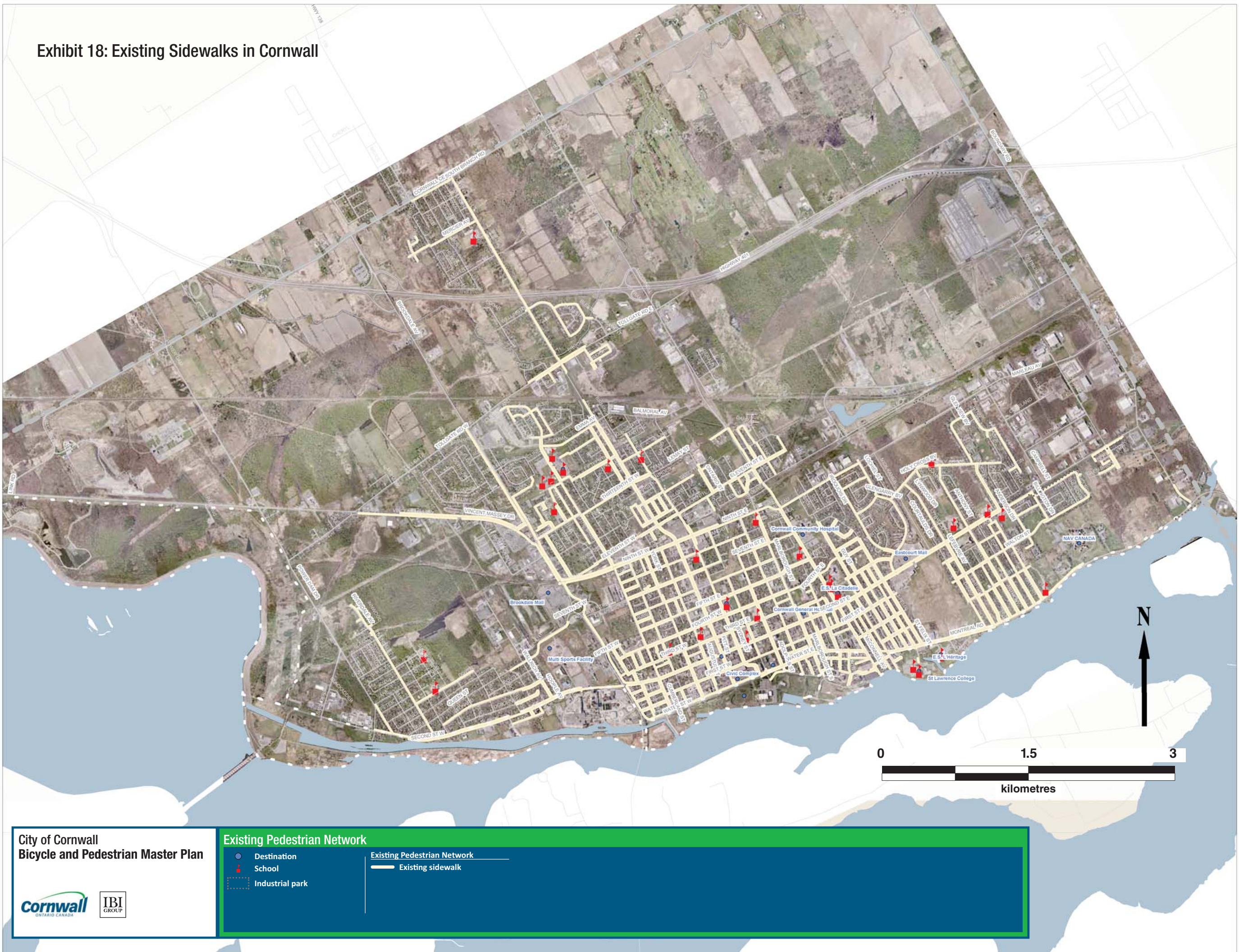


4.5.3 CYCLING FACILITIES

Most streets in Cornwall do not have any bikeways. There are a few on-street bicycle lanes, notably on Boundary Road between Toll Gate Road and Henry Street, on Vincent Massey Drive connecting the hydro corridor multi-use trail to Brookdale Avenue, and on Second Street between Anthony Street and Anderson Drive. In addition, a boulevard multi-use path parallel to Nick Kaneb Drive connects Marleau Avenue with Second Street. A map of existing bikeways is shown in Exhibit 19.



Exhibit 18: Existing Sidewalks in Cornwall



City of Cornwall
Bicycle and Pedestrian Master Plan



Existing Pedestrian Network

- Destination
- School
- Industrial park

Existing Pedestrian Network
Existing sidewalk

Exhibit 19: Existing Bikeways and Trails in Cornwall



City of Cornwall
Bicycle and Pedestrian Master Plan



Existing Bicycle Network

- | | |
|--|---|
| <ul style="list-style-type: none">DestinationSchoolIndustrial park | <p>Existing Bicycle Network</p> <ul style="list-style-type: none">Existing bicycle laneExisting boulevard multi-use trailExisting multi-use trail |
|--|---|

4.6 Existing Provincial Policy Framework

Recommended policies for the Cornwall Bicycle and Pedestrian Master Plan are framed in the context of provincial policies that guide development of more compact and healthier built environments that support greater use of active modes of transportation. These provincial policies alongside Cornwall's existing policies and strategic directions are the framework for supporting implementation of cycling and walking interventions.

4.6.1 PROVINCIAL POLICY STATEMENT (2005)

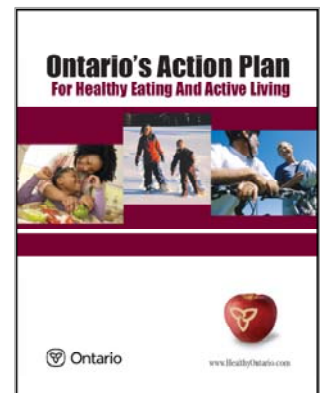
Ontario's Provincial Policy Statement (PPS) provides high-level policy direction on matters of provincial interest related to land use planning and development. The PPS asserts that long-term prosperity and social well being have been inextricably linked to the building and maintaining of strong communities, a clean and healthy environment and a strong economy.

The PPS validates cycling as an integral component of the "transportation system" and that "Healthy, active communities should be promoted by... planning public streets... to be safe, meet the needs of pedestrians, and facilitate pedestrian and non-motorized movement". Land use and development patterns, liveability, public health, public spaces and public streets as well as multi-modal transportation planning directives are found in Section One of the PPS directly support and promote active modes of transportation.

4.6.2 ONTARIO'S ACTION PLAN FOR HEALTHY EATING AND ACTIVE LIVING (2006)

This Action Plan is a Provincial policy that sets the framework for creating a healthier province of Ontario, addressing the potential future health costs associated with obesity and physical inactivity and creates a framework within which healthy and complete communities can be understood when these terms are used in the Provincial Policy Statement and Provincial Plans.

This Action Plan "responds to our challenge to create a healthier province for all Ontarians, including those who are most at risk; builds on foundations of strategies and programs already in place; defines strategic directions and launches a set of investments and activities that lay the ground work for future initiatives; and is a catalyst and a call to action to our partners to take collective action to remove barriers and coordinate efforts to promote healthy eating and active living."¹⁸



4.6.3 ACTIVE2010: ONTARIO'S SPORT AND PHYSICAL ACTIVITY STRATEGY

This Strategy includes a number of key components, including the Ontario Trails Strategy, which supports convenient, affordable and health-enhancing physical activity on Ontario's province-wide network of trails and bikeways, such as walking, hiking, jogging, rollerblading, cross-country skiing, cycling and other activities.

In order to increase participation in walking, jogging, cycling and other forms of activity the Ministry of Health Promotion supports community-level changes to "enabling" environment. Support includes:

- Developing and implementing the provincial trails strategy



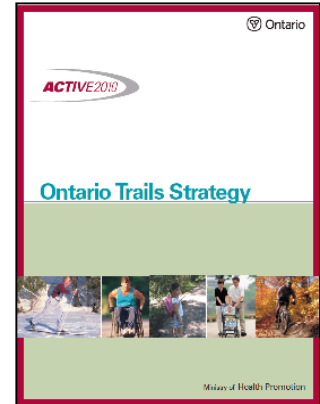
¹⁸ Ontario's Action Plan for Healthy Eating and Active Living, Ministry of Health Promotion, 2006.

- Supporting alternative transportation initiatives to encourage cycling and walking (and reduce automobile emissions)
- Researching and disseminating “Best Practices” in the area of alternative transportation and urban planning
- Supporting programs and campaigns that encourage walking or cycling to school

4.6.4 ONTARIO TRAILS STRATEGY

The Trails Strategy is a long-term plan that establishes strategic directions for planning, managing, promoting and using trails in Ontario. The Strategy was launched in October 2005 and included \$3.5 million in funding over five years for implementation. The Strategy will focus on all single and shared-use outdoor designated trail networks in urban, rural and wilderness settings that are used for recreation, active living, utilitarian and tourism purposes including but not limited to:

- Trails with natural (e.g. hiking, cross-country skiing) or treated surfaces (e.g. bicycle greenways/paths/lanes)
- On-road bicycle routes
- Walkways, boardwalks and sidewalks
- Trails located on transportation and utility corridors
- Access roads (i.e. for forestry and mining) “designated” for trail use
- Trails that are integrated with public transit services
- Waterway routes (e.g. along designated Canadian heritage rivers including the French, Humber, Mattawa, Rideau and Thames Rivers) and portage routes.



To date, a Coordinating Committee has been established, the Ministry of Health Promotion and the Ministry of Natural Resources have signed a Memorandum Of Understanding to map Ontario trails, a review of legislation affecting trails is under way, a review of off-road vehicle use is under development, and a total of 17 trails-related grants were issued in 2005 -2006 and 17 grants have been issued in 2006 - 2007, totalling \$440,000.

4.7 Existing Supportive Policies in Cornwall

4.7.1 OFFICIAL PLAN OF THE CITY OF CORNWALL (2004)

The Official Plan includes numerous guidelines that are supportive of cycling and walking through general, long term measures that promote higher density, mixed use development, as well as infill development. Closer destinations, multiple types of destinations that are closely spaced (schools, shops, services), and more attractive and varied built environments are intrinsically more appealing and conducive to cycling and walking. Specific guidelines and recommendations included in the official plan include:

- A recognition that considerable new growth can be accommodated through infill, and that public transit should be encouraged as a more important and accessible mode of travel.

- The plan espouses the principal and fundamental planning concept that a fully integrated transportation system should be developed to promote the desired land-use pattern, and in turn, future land use should be directed to serve the objectives of modern transportation planning.
- Major planning goals include the development of a safe, efficient and convenient transportation system, providing for all modes of travel and reinforcing an orderly and compact development pattern.
- Major goals for the waterfront include developing a continuous system along the waterfront which links major park areas and allows the development of activities such as cycling, cross-country skiing, jogging and walking.
- Major transportation goals include continuing to develop a comprehensive bikeway/recreational trail and pedestrian system, and integrating transportation and land-use planning.
- Transportation policies should encourage subdivisions that are designed on the basis of accepted transportation planning principles, and provide for all modes of travel on streets, including transit, bicycles, and pedestrians, and include appropriate provision of sidewalks or walkways.

4.7.2 ECONOMIC DEVELOPMENT STRATEGIC PLAN UPDATE (SEPTEMBER 2006)

This Strategic Update recognises the value of promoting cycling, identifying the waterfront as a focus for active recreation, as a strength affecting Cornwall's ability to expand economic growth and development, and the importance of waterfront redevelopment and of improving linkages with downtown.

4.7.3 CORNWALL RECREATION MASTER PLAN (2020)

The Recreation MP discusses the importance and value of physical activity and recreation, including the use of parks and trail facilities. This is relevant to the bicycle and pedestrian plan potential trail system, including the waterfront trail. The Master Plan also includes many specific recommendations and guidelines, such as:

- Completing a bicycling and walking master plan to establish a City-wide trail network complete with development priorities and policies.
- Designing trails to be multi-seasonal facilities.
- Ensuring that future residential subdivisions take into consideration their integration into the Master Trails network.
- Continuing to re-invest in the maintenance and upkeep of its pathways, bikeways and trails in order to create a long-term sustainable transportation system.

4.7.4 ACCESSIBILITY PLAN (2009)

This plan identifies and ranks priorities, issues and roles of responsibility to improve accessibility throughout the City of Cornwall. Equipping traffic signals with audible signals and sidewalk snow clearing are listed as priorities.

4.7.5 BY-LAWS AND GUIDELINES

- *Cornwall Transit Bicycle Racks Guide*—Provides instructions on how to use the bicycle racks on busses. Cornwall has three busses with bicycle racks.
- *Subdivision flow chart manual*—Flow chart showing the proper time sequence and responsibilities of the developer and the City for taking a subdivision plan from the draft to final approval. This can identify key steps and parties that need to be involved when integrating cycling and pedestrian provisions into new subdivisions.
- By-law to provide for licensing, regulating, governing and inspecting rickshaws (2005)—Potentially relevant when considering how to integrate rickshaws into any future dedicated bicycle facilities.
- *Traffic and parking by-law* (1989, updated 2009)—Includes a section dedicated to pedestrians, bicycles and wheelchairs.
- By-law to amend the traffic and parking by-law by adding the definitions and interpretations of “pedestrian” and “wheelchair” (2004)—Details the rights and responsibilities of users of wheelchairs and motorised scooters on City streets and sidewalks.
- By-law regulating the uses of public property (streets by-law, 2003)—Details the regulation of streets and sidewalks.
- *Databook* (2008)—Provides details concerning Cornwall's population, labour market, residential and commercial data, public services and facilities, transportation service, and industrial data. Also includes traffic counts on major routes.

5. OPPORTUNITIES AND PRIORITIES

There are many opportunities to significantly improve conditions for cyclists and pedestrians in Cornwall, and to increase the number of people walking and cycling to work, school, shop, errands, and social and recreational trips. It is always a challenge to change people's behaviour and attitudes towards active transportation, particularly in cities with a strong car culture, relatively low levels of congestion and relatively high availability of free or inexpensive parking. Cornwall, however, already has a higher than average walking and cycling mode share, a compact, mixed-use urban form, and short travel distances, providing a solid foundation upon which to build a strong cycling and walking culture and supportive infrastructure.

Furthermore, situated in the middle of the St. Lawrence Recreation Path / Lake Ontario Waterfront Trail connecting Iroquois to the Quebec border, Cornwall already has a strong foundation in recreational trail use. Expanding upon this base by strengthening connections to the City centre and other areas of the City will form the skeleton of the future cycling and trail network. The existing trail network allows for travel over longer distances and can be integrated with a street-based network to create a more complete, multi-purpose transportation system. Recreation trails also provide a place to safely and comfortably improve one's cycling skills, particularly for children, before venturing out into the city streets.

The main challenge will be to increase the number of work, shopping and other non-recreational cycling and walking trips made by Cornwall residents. This will be achievable by building upon the strong base of recreational cyclists and people walking to destinations by adding key infrastructure in high employment areas, along major travel corridors and transit routes, and to important destinations.

5.1 Needs of Cornwall Residents

Participants attending the first round of public information sessions for this study were asked to identify their top priorities for improving conditions for pedestrians and cyclists. The results of the informal survey highlight the importance of providing infrastructure and supportive programs. There appears to be less interest in pedestrian issues, enforcement and gathering data or information. In particular, the priorities of survey respondents were:

- Provide winter maintenance of sidewalks, trails and bikeways
- Provide a dedicated, continuous network of bike lanes and trails
- Provide adequate bicycle parking
- Properly signing bicycle routes
- Commit to implementing the bicycle and pedestrian plan
- Support advocacy organisations and clubs
- Support safe and active routes to schools

There is a strong emphasis on taking action and on building and maintaining appropriate facilities.

Providing adequate bicycling and pedestrian infrastructure is also important from a social equity point of view, and participants at the public open houses expressed the need to connect poorer areas of the city, such as the east end, as well as Native communities. The Bicycle and Pedestrian Master Plan is an opportunity to connect the City both physically and spiritually by closing both infrastructure and socio-economic gaps.

5.2 Need for Pedestrian Facilities

There are many gaps in the sidewalk network that need to be filled in order to provide a complete network of safe space for pedestrians, particularly for children, the elderly and the impaired. Particular areas of concern identified at the public information sessions include:

- Sydney Street, east side north of 5th Street
- 9th Street north side, east of Canadian Tire
- 2nd Street west, north side, west of Brookdale Avenue
- 13th Street, north side, west of Pitt Street
- 7th Street, from Cumberland Street to Brookdale Avenue
- 7th Street extension, north side, west of Hoople Avenue
- Cumberland Street, west side south of 9th Street
- Water Street, south side, from Brookdale Avenue to near the curling rink
- Cornwall Centre

The rotary near Brookdale Mall and the areas adjacent to 7th Street east and west of Brookdale Avenue are particularly dangerous for pedestrians and a challenging environment in which to implement solutions. Access to the Mall and to retail services in the area gives priority to automobiles; provisions for pedestrians are lacking. A new multi-sport complex will be opening just to the south-west of the Brookdale Avenue rotary, however, creating an opportunity to improve the pedestrian realm in the area and provide safe access across Brookdale Avenue from the east.

The area near Marleau Avenue and Boundary Road was also identified as a dangerous environment for pedestrians, particularly because of the high school. It is currently unsafe for pedestrians to cross Boundary Road from the bus stop.

5.3 Need for Trail Loops

A priority identified in the consultation process was to complete an off-street trail system north and west of the City to form a continuous loop around the periphery of the City. This would involve:

- Extending the current path along the hydro corridor north of 15th Street west into the business park, either to Boundary Road or along the rail corridor to a suitable north-south corridor
- Improving the connection along Vincent Massey Drive and across Brookdale Avenue to improve continuity and safety
- Connecting the western portion of the Waterfront Trail north along Boundary Road or a suitable north-south corridor. A Boundary Road route would connect the high school.

The completion of the loop could also be accomplished with on-street bicycle lanes along McConnell Avenue and Marleau Avenue.

The off-street trail system should be well connected with the rest of the City and the future on-street network of bicycle lanes. Adequate signage should be provided throughout the trail system that direct cyclists onto the trail system from the City streets, and that provide information about important destinations, other geographic landmarks such as street names, and distances. The public consultation process also identified the need to provide more connectivity between the City and the waterfront trail, which would make it more useful for utilitarian cyclists. Particular areas in

need of improved connections included the section of the trail east of Brookdale Avenue north of the canal. Residents of these neighbourhoods are unable to access the trail to bicycle into the City centre. An alternative to building a bridge in this area would be to provide a safe on-street bicycle lane on 2nd Street.

5.4 Need for Bicycle Facilities

The current network of bikeways and trails in Cornwall is used primarily for recreational purposes. A network of bikeways is needed that addresses the concerns of utilitarian cyclists, cycling to work, school, shops, errands and social trips. There are many opportunities to create a grid of continuous bikeways on collector and arterial roadways that would serve most residential and employment areas, and encourage commuter cycling by providing safer and convenient infrastructure on fast and direct routes.

There is a need to provide bicycle access to the business park north-east of the city, north of the rail corridor. The area is only accessible from Boundary Road at present, which is dangerous and inconvenient for cyclists coming from the City. Providing a direct bikeway to the business park from the south-west would not only improve convenience and safety for bicycle commuters, but would make cycling much more competitive with the automobile for those living in Cornwall due to reduced travel distances. Such a route would follow the abandoned rail line north-west out of the City from McConnell Avenue, or would be an extension of the Nick Kaneb Drive boulevard multi-use trail north into the business park using existing ATV trails. Both routes would connect with the new northerly portion of the completed peripheral trail loop.

The public consultation process also emphasised the need to provide a complete north-south and east-west network of continuous, on-street bike lanes that would address the needs of utilitarian cyclists. Priority streets for bicycle lanes identified through the public consultation process include:

- 2nd Street across the entire City
- 9th Street and Marleau Avenue
- Brookdale Avenue from Cornwall Centre Road to the Waterfront Trail
- Nick Kaneb Drive from the northerly east-west portion of the loop trail to the Waterfront Trail
- Pitt Street from Cornwall Centre Road to the Waterfront Trail
- McConnell Avenue from the northerly east-west portion of the loop trail to the Waterfront Trail

Other needs and possible alternate routes that will be taken into consideration include:

- Providing bikeways to the future multi-sport complex from the east and west. This was also identified as a social issue for youth coming to the complex from the poorer areas to the east. In particular, there needs to be a way to safely cross Brookdale Avenue.
- Toll Gate Road was identified as a possible alternate east-west route to the hydro corridor trail, as it is difficult to cross Vincent Massey Drive. and Brookdale Avenue. This would allow for better connections to north Cornwall.
- Signage needs to be improved throughout the cycling network.
- Provide a paved shoulder on Power Dam Road.
- A northern route, possibly following the Raisin River, could connect Brookdale Avenue and McConnell Avenue with the business park.

- Provide a bike lane along Marlborough Avenue, which has a relatively wide right-of-way.

5.5 Summary of Priority Needs Identified in Public Consultations

A summary of priorities and “take home” messages established through the public consultation process include the following:

- Accessing the employment areas by walking and cycling is extremely difficult.
- There is a need to maintain recreational trails and sidewalks year round.
- There are many commuter and year-round cyclists in Cornwall.
- Promoting Cornwall as a starting point for cycling tours has some potential as it is well situated on the Lake Ontario Waterfront Trail.
- Use walking and cycling to link the Native community on Cornwall Island to “build social bridges”. Literally, consider a bicycle and pedestrian bridge to the island.
- Work with schools to educate youth on safe cycling and walking skills, providing safe and active routes to school.
- Think bold in terms of improvements – walking and cycling improvements have the potential to re-shape Cornwall.
- Cornwall is the perfect size in that most points are within an easy walking or cycling distance.
- Everyone uses the recreational trail, but not everyone bikes or walks on the streets. This demonstrates that people will walk and bike if the facilities are great. People are very proud of the Waterfront Trail.
- We will not compete with the car in terms of time efficiency in this compact City, so we need to play up the other benefits of cycling and walking including health impacts, social impacts and cost savings.
- The need to support and create activist groups or advocacy organisations.
- There is a need for better utilitarian cycling routes, both north-south and east-west.

6. THE CYCLING NETWORK

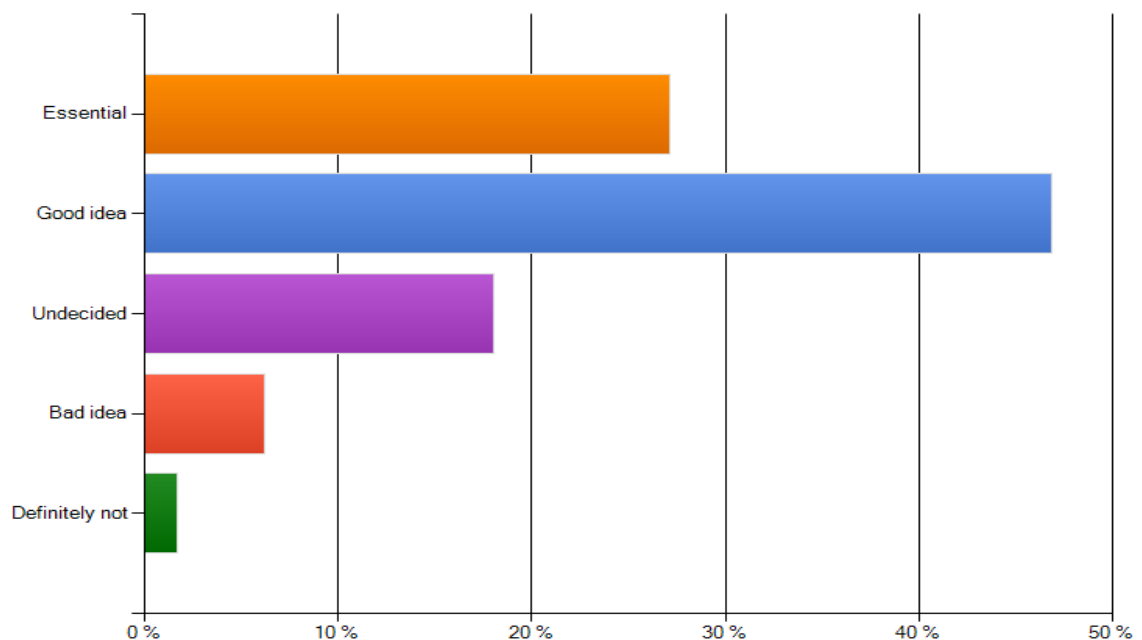
The Cornwall cycling network was developed with the following broad goals in mind:

- Encourage more people to use their bicycle more often to get to work, school, shops, errands and social trips
- Enhance recreational cycling in Cornwall and encourage more people to try cycling
- Build on the success of Cornwall's Waterfront Trail to promote cycle tourism and bring bicycle tourists into the City

The Cornwall cycling network is designed to meet the needs of most current and potential utilitarian and recreational cyclists. At the same time, the network is realistically achievable and was developed such that it could be implemented with minimal disruption to traffic or parking, with minimal road widening requirements, and hence with little public resistance or controversy. Input from City staff helped to identify feasible routes, and alternate routes were found in a few cases where necessary.

Results from an on-line poll show high support for bikes lanes in Cornwall (see Exhibit 20). The recommended network builds on the principles of coherence, directness, safety or comfort and addresses the needs of cyclists. The network will also be visible, contributing to creating a shift in attitude, perception and cycling culture in Cornwall.

Exhibit 20: Results of On-line Polling Question: “What do you think about installing bike lanes, even if it means removing some on-street parking or a lane of traffic?”



6.1 General Approach

A good cycling network should encourage people to use the bicycle more often. In the Netherlands, this is achieved by understanding the needs or so called requirements of the cyclist, as follows:

- **Coherence and Connectedness:** Every bikeway is easy to follow, and connected to destinations in the City. There are few “dead ends”, with the exception of Seventh Street, which ends at McConnell Avenue at the Cornwall Community Hospital, and Pitt Street and McConnell Avenue at their respective northern terminuses at South Branch Road. Thus a cyclist following a marked or signed route will almost never be “abandoned”, or forced to continue along an unsafe or unmarked route. During implementation of the network, segments of bikeways may have to be implemented over time that may be disconnected. However, they will still function for trips in those areas. Implementation should not be delayed because gaps exist as the network is being built.
- **Safety:** This is a starting point for planning and design of bikeways. Road situations must always be safe. The safety applies also to situations in parks where public safety can be an issue. All children in *the Netherlands are taught cycling safety as part of the education curriculum.*
- **Directness:** Cyclists want to move on. Stopping is costing them energy and results in delays. There are many situations where cyclists take a high risk in road safety in order to save travel time.
- **Comfort:** The road surface must be smooth and comfortable.
- **Attractiveness:** An attractive surrounding is desired along the route.

Most of all, people cycle because they enjoy it, therefore, the cycling network must meet their needs to have fun.

The Cycling Network is based on a combination of policy, program, design, practice and implementation recommendations that:

- Create connections to the Waterfront Trail and other sections of multi-use trail. This will improve safety for those accessing the trail from the City, especially for recreational cyclists and families; enhance its usefulness as a route for utilitarian cyclists; and encourage bicycle tourists to come into the City
- Close gaps in the existing network
- Identify future residential development areas, planned road construction and road reconfiguration projects to ensure that cycling infrastructure is included
- Integrate suggestions and priorities identified by staff and the public where possible
- Develop a “loop” trail encircling Cornwall to provide more recreational options and build on the success of the Waterfront Trail
- Prioritize projects where the highest demand is anticipated, targeting key corridors and destinations

- Aim to provide an equitable and comprehensive distribution of bikeways throughout the City, enabling all residents to access the network and allow them to reach any other part of the City comfortably by bicycle

The proposed cycling network showing recommended bikeways is shown in Exhibit 21 and an enlarged view of the proposed changes to the area surrounding the Brookdale Avenue rotary is provided in Exhibit 27.

Exhibit 21: Proposed Cycling Network



City of Cornwall
Bicycle and Pedestrian Master Plan



Proposed Bicycle Network

- Destination
- School
- Industrial park
- Cornwall Waterfront Plan boundary

- Existing Bicycle Network
- Existing bicycle lane
 - Existing boulevard multi-use trail
 - Existing multi-use trail

- Proposed Bicycle Network
- Bicycle lane
 - Boulevard multi-use trail
 - Multi-use trail
 - Bicycle boulevard
 - Marked shared lane

- Paved shoulder with bicycle lane
- Signed route
- Proposed traffic signal
- Proposed crossing improvement

- Special treatment area
- Future residential development *

* Bicycle facilities and supporting features to be included

6.2 Highlights of the Recommended Cycling Network

6.2.1 BIKEWAYS BY THE NUMBERS

The recommended bikeways consist of 178 km with the addition of 143 km of proposed bikeways, and 33 bikeway intersection enhancements. The length of the existing and recommended network by bikeway type for roads in the City of Cornwall are summarized in Exhibit 22.

Exhibit 22: Existing and Proposed Bikeways and Intersection Enhancements

Bikeway Type	Total Length (km)	
	Existing	Proposed
Bicycle Boulevard (traffic calmed local street)	-	10
Bicycle Lane	1	33
Bicycle Lane One Side on one-way street	-	10
Boulevard Multi-Use Trail	1	5
Marked Shared-use Lane	-	12
Multi-Use Trail	33	25
Paved Shoulder	-	41
Signed Route	-	5
Special Treatment	-	2
Subtotal	35	143
Total Recommended Cycling Network	178	
Total Bikeway Intersection Enhancements	33	

6.2.2 CONNECTIONS TO THE WATERFRONT TRAIL

The Waterfront Trail is a high profile facility and source of pride in Cornwall, and was a major focus of discussion throughout much of the public consultation process. Providing safe connections to the waterfront Trail was consistently identified as a priority by the public, as families are often forced to access the trail via busy roads.

A key element of the plan is to create connections to the Waterfront Trail and other sections of multi-use trail. This will improve safety for those accessing the trail from the City, especially for recreational cyclists and families; enhance its usefulness as a route for utilitarian cyclists; and encourage bicycle tourists to come into the City. The proposed bicycle network provides 14 new north-south bikeways that connect with the Waterfront Trail.

Other priorities include:

- Providing bicycle parking along the trail
- Long-term widening and resurfacing of the Waterfront Trail should be considered as usage increases.

6.2.3 SECOND STREET

Second Street is the only east-west road in Cornwall that passes through the City and is continuous through its entire extent, from Power Dam Drive to Boundary Road. In addition, Second Street

passes through downtown Cornwall, runs adjacent to Le Village, and connects many important employment, retail, entertainment and other destinations. As such, it is an important route for cyclists. Second Street will form the spine of the proposed cycling network and play an essential role in encouraging utilitarian bicycling in Cornwall.

Second Street currently operates as a four-lane arterial roadway through most of the central part of the City, from Lynwood Drive to Yates Avenue. On-street parking is currently permitted between Cumberland Street and Yates Avenue, with metered parking between Amelia Street and Augustus Street. It operates as a two-lane arterial roadway west of Brookdale Avenue and east of Lynwood Drive, and parking is permitted west of Hoople Avenue.

The proposed bikeway would basically reduce the four travel lanes from Yates Avenue to Lynwood Drive / Lafebvre Avenue to two travel lanes and a centre two-way left-turn lane, with bike lanes on both sides as illustrated in Exhibit 23, with exceptions noted below. This type of lane reconfiguration, known as a “road diet”, has been successfully implemented on arterials in North America that carry up to 20,000 vehicles a day and more. Conversion of Second Street could be done with minimal, if any, disruption to traffic flow. Annual average daily traffic on Second Street is about 6,000 vehicles per day between Cumberland Street and Marlborough Street, about 8,600 vehicles per day between Marlborough Street and McConnell Avenue, and increases to a maximum of about 12,500 vehicles per day east of McConnell Avenue. In addition, Second Street effectively operates as a two-lane roadway in areas where parking is permitted.

Proposed changes to transform Second Street into a high-quality cycling corridor are as follows with selected segments illustrated on cross-sections in Appendix A:

- West of Hoople Avenue the preferred modification would be to remove on-street parking and stripe bike lanes. However, if maintaining parking is a priority, then it is possible to re-stripe with narrower travel lanes and parking on one side only to accommodate bike lanes. Example cross sections of these two treatments are shown in Appendix A.
- The intersection of Second Street and Brookdale Avenue is busy with additional auxiliary lanes introduced for turning traffic. The bike lanes should not be dropped prior to the intersection but continue through the intersection approach. At present there are four travel lanes, a left-turn lane and a right-turn lane on Second Street. The preferred modification would be to remove the dedicated right-turn lane in order to accommodate bike lanes. Alternatively, the turn lanes could be narrowed, which would allow for continuation of the bike lanes on the intersection approach.
- Reduce the number of lanes on Second Street from Yates Avenue to Augustus Street, and Amelia Street to Marlborough Street from four lanes to either two travel lanes, one parking lane and bike lanes; or two travel lanes, a centre two-way left-turn lane and bike lanes, as illustrated on cross-sections in Appendix A.
- Metered parking from Augustus Street to Amelia Street will not be altered, and bike lanes will not be provided through this section. Shared-use lane markings or “sharrows” are recommended through this section to remind drivers to share the road with cyclists, and direct cyclists to ride out from the parked car “door zone”.
- Marlborough Street to Lynwood Drive / Lafebvre Avenue, where on-street parking is not permitted, reduce the number of lanes from four lanes to two travel lanes, a centre two-way left-turn lane and bike lanes, as illustrated on a cross-section in Appendix A.

- East of Lynwood Drive / Lafebvre Avenue, the two wide travel lanes can be marked with shared-use lane markings (“sharrows”) or paved shoulders can be provided. If this section of roadway is urbanized (reconstructed with curb and gutter), bike lanes are recommended so that the bikeway is continuous to Boundary Road.

Exhibit 23: Proposed Second Street Transformation



6.2.4 CONNECTIONS TO CENTRAL CORNWALL

Central Cornwall, or the area bounded by Brookdale Avenue to the west, Ninth Street to the north, and McConnell Avenue to the east, is already relatively bicycle friendly, with its grid network of streets providing a range of alternative, often quieter, streets. Accessing the central area is difficult for cyclists. The proposed cycling network includes providing bikeways on all streets making connections through to and across the central Cornwall boundary. This improves conditions for cyclists on these major routes, providing direct connections to key employment, retail and

entertainment destinations. Principal connections are provided by the following proposed bike routes:

- Fourth Street / Fifth Street one-way pair: A bike lane is recommended on one side of each street for most of their extent, with shared-use lane markings (“sharrows”) used in the narrower and less busy sections. Connections are provided to Brookdale Avenue via Fifth Street, and across McConnell Avenue via Fourth Street. A bike lane on one side of McConnell Avenue between Fourth Street and Fifth Street allows cyclists travelling east or west to use the Fourth Street connection across McConnell Avenue. An example cross-section is provided in Appendix A.
- Second Street, as described above, provides a continuous east-west connection through the City
- Seventh Street: Although Seventh Street does not provide a connection across the central City boundary, bike lanes connect the Cornwall Community Hospital in the east with Brookdale Avenue in the west
- Cumberland Street provides a continuous north-south connection across Ninth Street, from Emma Avenue to the Waterfront trail. The road is too narrow to provide bicycle lanes in both directions without prohibiting parking. Traffic volumes are relatively low, peaking at less than 6,000 vehicles per day in both directions, and thus shared-use lane markings (“sharrows”) are recommended.
- Pitt Street / Sydney Street one-way pair: Bike lanes on one side of Pitt Street (southbound) and Sydney Street (northbound) are proposed to provide a continuous north-south route from Thirteenth Street, across Ninth Street and to the Waterfront Trail. North of Thirteenth Street, bike lanes are recommended in both directions on Pitt Street all the way to Cornwall Centre Road. South of Fifth Street, the southbound bicycle route on Pitt Street is diverted to adjacent Augustus Street because Pitt Street is too narrow to provide bike lanes without removing parking. An example cross-section is provided in Appendix A.
- Marlborough Street is a north-south bike route from Eleventh Street through Ninth Street to the Waterfront Trail using a combination of bicycle lanes and shared-use lane markings (“sharrows”).
- Eleventh Street: Although Eleventh Street is outside of the central Cornwall area, it is an important route, providing an alternative to Ninth Avenue, connecting Brookdale Avenue, McConnell Avenue, and points east, as well as linking the Cumberland Street, Pitt Street / Sydney Street, and Marlborough Street north-south routes. An example cross-section is provided in Appendix A.

6.2.5 PAVED SHOULDERS

It is proposed that all rural roads with paved shoulders be marked as bicycle lanes, and that rural roads with 5,000 vpd or more with granular shoulders include paving of shoulders when resurfaced or reconstructed. This will promote cycle tourism, rural recreational / training cycling, and accommodate cyclists living in areas farther from the City centre.

6.2.6 SUBURBAN RESIDENTIAL ROUTES

There are four proposed bicycle boulevards or bicycle priority streets (lower speed, traffic calmed streets) through suburban residential areas. These bikeways provide alternatives to cycling on

busier roads with bicycle lanes, connect to other routes, and provide local neighbourhood access for cyclists.

- A bicycle priority street along Queen Street would provide a through connection between Second Street / Power Dam Drive and the Seventh Street multi-use trail / Brookdale Mall, as well as a local route for residents of Riverdale and Dover Heights.
- A bicycle priority street along Anderson Drive and Holy Cross Boulevard would connect Second Street with the Nick Kaneb Drive boulevard multi-use trail through the Glenview Heights neighbourhood, as well as connecting east-west across Nick Kaneb Drive to the north-south St. Felix Street bicycle priority street.
- A north-south bicycle priority street along Iroquois Drive, St. Felix Street and Belmont Street would connect Marleau Avenue with the Waterfront Trail, as well as connecting with the Fourth Street bikeway through McConnell Avenue to the west, the Holy Cross Boulevard bikeway to the east, Second Street, and the Walton Street bicycle priority street to the east south of Second Street.
- An east-west bicycle priority street along Walton Street and Concorde Avenue would connect via a multi-use trail the St. Felix Street bicycle priority street to the west and the east-west multi-use trail to the Waterfront Trail in the east. The route is a quiet alternative to Second Street for most of its length through eastern Cornwall, and provides local access to the Waterfront Trail via five north-south routes.

6.2.7 BROOKDALE AVENUE

Brookdale Avenue is an important and very busy arterial connecting Cornwall Centre Road in the north with Water Street and the Cornwall waterfront. Since there are many important destinations along this road and few other continuous north-south roads, it is important to accommodate cyclists along its entire length.

- Paved shoulders are proposed north of Tollgate Road, with bicycle lanes painted where the road crosses the railway tracks and Highway 401.
- South of Tollgate Road to Ninth Street, bicycle lanes are recommended. A bicycle lane exists on one side from Tollgate Road to Fourteen Street, and there is room to accommodate a bicycle lane on the other side in an existing paved shoulder.
- Brookdale rotary: This is an important junction for pedestrians and cyclists to access the Mall and the multi-sport complex and is especially difficult to cross Brookdale Avenue from the east. In the short-term, it is recommended that multi-use trails along Seventh Street west of Brookdale Avenue, and around the rotary on one side connecting with a multi-use trail to the south. In the long-term, the rotary is recommended to be re-designed as a modern roundabout, with low motorists' entry and exit speeds (see Section 7.2.2. for additional description of improving accessibility at the rotary)
- Multi-use trail south of Seventh Street to Cornwall's waterfront.
- An alternative is a multi-use trail parallel to Brookdale Avenue to the west, from Tollgate Road to the Cornwall's waterfront or along Cumberland Street to the east.

6.3 Multi-use Trails Highlights

6.3.1 THE "TRAIL LOOP"

In public consultation events, the completion of a continuous, multi-use trail around the outskirts of Cornwall that would connect with the existing Waterfront Trail was repeatedly identified as a priority. Although a continuous off-road loop was not feasible, the proposed combination of multi-use trails and bikeways goes a long way towards closing gaps and creating more comfortable alternatives for a variety of trail users. These include:

- A multi-use trail along the south branch of the Raisin River, from Cornwall Centre Road to McConnell Avenue, part of which already exists. The trail can be accessed from the western Waterfront Trail via paved shoulders on Power Dam Drive and Cornwall Centre Road. This would also provide access to the South Stormont Trail north of Cornwall Centre Road. To the east, bike lanes along proposed future roads through the industrial park connect with paved shoulders on Boundary Road to connect with the western part of the Waterfront Trail. Alternatively, paved shoulders on McConnell Avenue connect with a shorter loop through the eastern part of the City.
- The hydro corridor trail is recommended to be upgraded, providing better connections across Brookdale Avenue, and expanded easterly to McConnell Avenue, southerly to Twelfth Street, and then east to Virginia Drive. From there, the Waterfront Trail can either be accessed via bike lanes and paved shoulders on Tenth Street and the future Industrial Park Drive to Boundary Road; or directly south along a future road with bike lanes to the Nick Kaneb Drive boulevard multi-use trail, and proposed multi-use trail connection south of Second Street.

6.3.2 CONNECTING THE INDUSTRIAL PARK

A multi-use trail along an abandoned rail corridor will connect the industrial park in the north-east of the City with downtown. For residents living west of Nick Kaneb Drive, this will provide a much more direct route to the industrial park than possible at present, from Boundary Road to the east. The multi-use trail will terminate just south of Seventh Street at the southbound Amelia Street bikeway, the Adolphus Street bicycle priority street and the northbound Sydney Street bike lane.

7. THE PEDESTRIAN NETWORK

7.1 General Approach

The recommended pedestrian network consists primarily of adding sidewalks to existing streets, in addition to the multi-use trail network described in Section 6. Sidewalk provisions by road classification makes clear under which circumstances sidewalks will be implemented and facilitates decision-making. Recommendations by road classification or characteristics are as follows:

- All arterial roads to have sidewalks on both sides of the street
- Collector roads to have sidewalks on both sides of the street
- New local streets within the urban area to have sidewalks on both sides of the street
- Transit routes to have sidewalks on both sides of the street
- Sidewalks to be on at least one side of existing local streets near schools
- The provision of sidewalks on both sides of existing local streets to be considered on a case-by-case basis

In addition, the following objectives are considered paramount:

- Providing pedestrian streetscape enhancements and facilities at major destinations, particularly downtown and at Brookdale Mall
- Ensuring that newly built communities have sidewalks on both sides of the streets

The existing and recommended Pedestrian Network is shown in Exhibit 25.

7.2 Highlights of the Recommended Pedestrian Network

7.2.1 PEDESTRIAN FACILITIES BY THE NUMBERS

The recommended pedestrian network consists of 230 km of sidewalks including an additional 53 km of proposed sidewalks on one or both sides of the street, as summarized in Exhibit 24.

Exhibit 24: Length of Existing and Proposed Sidewalks

Sidewalks	Total Length (km)	
	Existing	Proposed
One Side	-	49
Two Sides	-	4
Subtotal	175	53
Total	228	

Exhibit 25: Recommended and Existing Pedestrian Network



City of Cornwall
Bicycle and Pedestrian Master Plan



Proposed Pedestrian Network

- Destination
- School
- Industrial park
- Cornwall Waterfront Plan boundary

- Existing Pedestrian Network
- Existing sidewalk
 - Existing boulevard multi-use trail
 - Existing multi-use trail

- Proposed Pedestrian Network
- Sidewalk - one side only
 - Sidewalk - both sides
 - Proposed boulevard multi-use trail
 - Proposed multi-use trail
 - Proposed crossing improvement

- Special treatment area
- Future residential development *

* Pedestrian facilities and supporting features to be included

7.2.2 PEDESTRIAN CROSSINGS

Pedestrian street crossings and crosswalks warrant special attention given the higher rates of conflicts between pedestrians and motorists as well as greater opportunity to significantly reduce risk to pedestrians at these locations. In Cornwall, high visibility crosswalks (see Section 3.2.2.1), “yield to pedestrians” signage, trail crossings with traffic calming features, and enhancing existing pedestrian signals are recommended. Multiple intersection improvements are proposed consistent with the pedestrian collision clusters shown in Exhibit 17 along the following corridors:

- Brookdale Avenue, Pitt Street and Water Street
- Fifteenth, Eleventh, Ninth, Seventh, Fifth, Fourth and Second Streets
- High volume/higher traffic downtown areas

The type and number of proposed crossing improvements is shown in Exhibit 26.

Exhibit 26: Type and Number of Proposed Pedestrian Crossing Improvements

Crossing Type	Number of Locations
Intersection Pedestrian Signals (IPS)	7
Trail Crossing with Traffic Calming Features	23
Retrofit Pedestrian Signal	1
Total	31

7.2.3 BROOKDALE AVENUE AND MULTI-SPORTS ARENA

The Brookdale rotary and connecting streets are a challenge for pedestrians to cross. Ideally, this rotary should be reconfigured, with conversion to a more compact, modern roundabout with low motorists' entry, circulating and exit speeds. However, until such time as the International Bridge is replaced and the customs functions relocated, major changes are neither appropriate nor physically possible. In the interim, there are several minor improvements that would help to improve accommodations for pedestrians and cyclists as shown in Exhibit 27 and listed below:

- Provide a paved shoulder on the south side of Seventh Street and a new sidewalk on Seventh Street and its northerly extension in front of the Ramada Inn
- Install a traffic signal on the west side of the rotary to facilitate pedestrian access to/from the south end of Brookdale Mall, as well as the planned multi-sports complex
- Install pedestrian actuated traffic signals and high visibility crosswalks with “yield to pedestrians” signage at the south and east sides of the rotary
- Construct three multi-use trails around the west side of the rotary linking with the proposed high visibility crosswalks and what would be Seventh Street if it extended west of the rotary

It is anticipated that these improvements would extend to the multi-sports complex as shown in Exhibit 28.

Exhibit 27: Concept for Accessibility Improvements at Brookdale Rotary

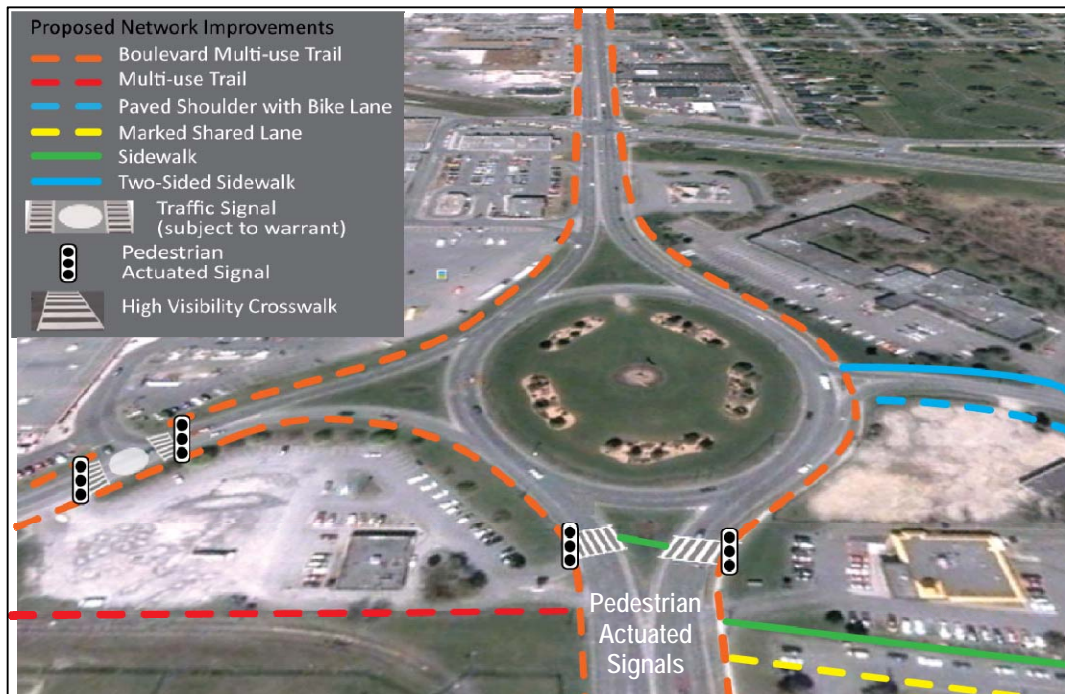


Exhibit 28: Concept for Accessibility Improvements at the Multi-sports Complex



7.2.4 SEVENTH STREET

As a major east-west corridor connecting residential, shopping and recreational areas, it is recommended that the following intersection and network improvements for pedestrians be made along Seventh Street and particularly around the Brookdale rotary:

- Sidewalks on both sides of the street between Cumberland Street and Brookdale Avenue
- High visibility crosswalks and links creating an accessible route between Seventh Street and the proposed westerly multi-use trail along the rail line (shown in Exhibit 24)
- Trail crossing improvements where Seventh Street meets the rail line and proposed multi-use trail at Second Street
- Intersection improvements along Seventh Street West

7.2.5 PITT STREET

Pitt Street is a major north-south corridor connecting to Cornwall's downtown and waterfront, as well as a connection for future residents of projected infill development areas along Pitt Street. Numerous intersection improvements are recommended.

7.2.6 LA VILLAGE

To improve the pedestrian-friendliness of La Village, it is recommended that a combination of special design treatments, as well as network and intersection improvements be provided within and surrounding the downtown core to facilitate access and develop a vibrant area for all ages:

- Special design treatments include streetscaping with trees and planters, the use of consistent pavement surface treatments, signage, lighting, garbage and seating standards
- Three intersection improvements are recommended along Water Street connecting to the existing Waterfront Trail to feature and create needed downtown-waterfront access
- The provision of sidewalks on both sides in the downtown will address the gaps in the pedestrian network of La Village

7.3 Prioritizing Pedestrian Projects

Resources for pedestrian projects are typically limited. The City of Cornwall has already approved sidewalk construction in the short term over the next one to two years. However, to address sidewalk deficiencies and pedestrian safety i.e., gaps in the existing sidewalk network, poor conditions, the provision of sidewalks in future developments, and pedestrian-motorists collisions, a longer-term strategy needs to be established to identify priorities. It is recommended that the City of Cornwall adopt the following criteria to facilitate decision-making, giving priority to:

- Projects likely to generate significant walking trips between two destinations e.g., schools, parks, shopping, entertainment or downtowns
- Locations with higher rates of pedestrian collisions, high traffic volumes and/or high speeds in heavily walked areas e.g., downtowns, intersections and major arterials (shown in Exhibit 17)

- Projects that are part of a continuous sidewalk / trail network
- Locations with evidence of a missing link e.g., a worn path
- Where there are walking hazards e.g., hills, poor sightlines
- Projects where it is not possible to redirect funding to another program e.g., redevelopment or roadway infrastructure renewal

8. IMPLEMENTATION

8.1 Over-arching Directions

8.1.1 EXISTING CORNWALL POLICY DIRECTION

The City of Cornwall has clearly adopted strategic directions that align with walking and cycling becoming viable transportation choices and means of recreation for residents, employees and visitors. Policies adopted in 2004 express clearly the direction in which the City intends to develop to support walking and cycling. Despite these efforts, there are few on-road bikeways developed by the City over that time period and significant gaps in the pedestrian network remain.

Cornwall's current objectives and policies are valid yet lack elements that allow the following:

- Policy, processes or institutional structure that would lead to actual implementation of approved objectives and policies
- Updated design concepts to reflect current knowledge and innovation
- Commitment to appropriate treatments on all roads (many quiet local streets may require no special treatments to be suitable for cycling)
- Approaches to retrofit existing roadways with appropriate pedestrian and bikeway infrastructure
- An articulation of effective signage and way-finding strategies
- Strengthened and effective partnerships and programs that focus on behavioural shift programs to encourage people to travel on foot and by bicycle
- Financial commitment for implementation and maintenance

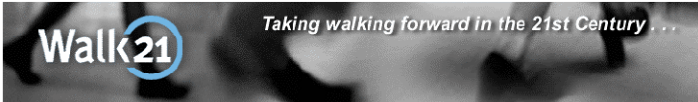
Policies can be strengthened so that bigger picture objectives can be enforced, ultimately resulting in higher number of trips on foot and by bicycle. For example, bicycle parking and end-of-trip policies and guidelines can be incorporated into parking supply by-laws; design criteria can be updated to require sidewalks on all new roadways in urban areas; traffic impact studies can be required to address the pedestrian, trail and bikeway network in new communities; etc. Complementary policies that discourage auto use, such as auto parking maximums can also be considered.

Overall, a general approach to making Cornwall truly pedestrian and bicycle-friendly is recommended.

8.1.2 CREATING A PEDESTRIAN AND BICYCLE-FRIENDLY COMMUNITY CHARTER

Several communities in Ontario and elsewhere have adopted a Pedestrian Charter based on the International Charter for Walking created by Walk 21¹⁹, and Cornwall could do the same. Though not binding, these charters help to ensure that all existing and new policies as well as municipal practice take pedestrians into account. The principles of the international charter are illustrated in Exhibit 29. The Charter identifies the needs of people on foot and provides a common framework to help authorities refocus their existing policies, activities and relationships to create a culture where people choose to walk.

¹⁹ <http://www.walk21.com/> (July 2010)

Exhibit 29: International Charter for Walking


International Charter for Walking

**Creating healthy, efficient and sustainable communities
where people choose to walk**

I/We, the undersigned recognise the benefits of walking as a key indicator of healthy, efficient, socially inclusive and sustainable communities and acknowledge the universal rights of people to be able to walk safely and to enjoy high quality public spaces anywhere and at anytime. We are committed to reducing the physical, social and institutional barriers that limit walking activity. We will work with others to help create a culture where people choose to walk through our commitment to this charter and its strategic principles:

1. ***Increased Inclusive mobility***
2. ***Well designed and managed spaces and places for people***
3. ***Improved integration of networks***
4. ***Supportive land-use and spatial planning***
5. ***Reduced road danger***
6. ***Less crime and fear of crime***
7. ***More supportive authorities***
8. ***A culture of walking***

Signed _____

Name _____

Position _____

Date _____

www.walk21.com

Similar to the International Pedestrian Charter, the League of American Bicyclists started a program in 1996 to recognize communities in the US working towards becoming more bicycle-friendly. A similar program is being considered for Ontario communities by the Share the Road Coalition. A Bicycle Friendly Community (BFC) welcomes cyclists by providing safe accommodation for cycling and encouraging people to bike for transportation and recreation. The BFC application provides a comprehensive picture of a community by asking questions across five categories often referred to as the “Five Es”. These are Engineering, Education, Encouragement, Enforcement, and Evaluation & Planning. A community must demonstrate achievements in each of the five categories in order to be considered for a designation. Communities with more



significant achievements in these areas receive superior designation.

The program requires an in-depth assessment of what's really going on in the community related to bicycling. The program enables communities to truly benchmark their progress against similar sized or comparable places. A renewal process has been built into the program to ensure no community is able to coast or rest on its laurels. And the four levels of designation (bronze, silver, gold and platinum) provide a clear incentive to keep doing more. A simplified version of the criteria used to examine a community's efforts in becoming more bicycle-friendly is provided in Exhibit 30. The recommendations contained within this report will go a long ways to helping Cornwall achieve Bike-friendly community status.

Exhibit 30: Criteria from the League of American Bicyclists Bicycle-friendly Communities Award Program

Engineering:	Encouragement:
Routinely accommodate cycling in roadway planning, design, construction and maintenance	Promote Bike Month
Train City engineers and planners on how to accommodate cyclists	Promote Bike to Work Day
Make bridges accessible to cyclists	Promote an annual bike tour or ride to the general public
Provide bike racks at places of employment, retail and community	Support community cycling clubs and advocacy organizations
Permit bikes on all public transit	Support Safe Routes to School programs
Provide bike lanes on major streets	Centre a youth recreation or intervention program around cycling
Provide multi-use pathways	Publish a bike map
Sign bike routes	Enforcement:
Maintain bikeways and routes	Support a police liaison with the cycling community
Provide showers/change rooms at places of employment	Train police regarding traffic laws as they apply to cyclists
Evaluation and Planning:	Target enforcement to encourage cyclists and motorists to share the road safely
Know how many trips are by bicycle	Support on-bike public safety employees
Know how many cyclist/motor vehicle fatalities occurred in the last 5 years	Education:
Know how many cyclist/motor vehicle crashes occurred in the last 5 years	Campaign for motorists to share the road with cyclists
Provide a point of contact for cyclists to submit ideas/concerns	Provide adult cycling education
Update the City's comprehensive bicycle plan and provide funds to implement it	Provide bicycle safety programs for children in schools
Commit to implementing the bicycle plan	Make bicycle safety materials available to the public
Plan and implement an integrate cycling network of trails, bike lanes, and routes	Include bicycle safety education in local activities such as tax or parking fine payments, utility bill inserts, etc.
Evaluate the transportation network and prioritize bicycle improvements based on hazards and needs	

8.2 Recommended Policies, Guidelines and Programs for Cornwall

8.2.1 ACTIVE TRANSPORTATION POLICIES

Broad AT-supportive policies are recommended to support cyclists and pedestrians in the City of Cornwall and can be focused on the following objectives:

- Create pedestrian and bicycle-friendly new communities and developments within Cornwall
- Implement the Pedestrian and Cycling Networks
- Make the City's practices supportive of walking and cycling
- Expand and create programs that shift behaviours to encourage more people to walk and cycle

These are explained in Exhibit 31 below and are tailored to Cornwall-specific policies in Appendix B.

Exhibit 31: Active Transportation Supportive Policies, Practices and Programs

Objective	Recommended Policy, Practice or Program
Create walkable and bicycle-friendly new communities and developments within Cornwall	<ul style="list-style-type: none"> • Adopt by-laws on bicycle parking and end-of-trip facilities, i.e. showers and change rooms • Update design criteria on the type and design of bikeways on new roads, trail widths, bike lane on collector roads, etc. • Update design criteria on the location, design and accessibility of sidewalks, i.e. sidewalks needed on both sides of the street, etc. • Ensure the building of walkable and bicycle-friendly developments through the review of site plans including site organization, building placement, bicycle parking, cycling and pedestrian routes and amenities
Implement the Pedestrian and Cycling Networks	<ul style="list-style-type: none"> • Implement the networks over time with funding • Develop and support an active transportation advisory committee • Develop a Sidewalk Prioritization Program to address requests for sidewalks on local streets • Develop , implement and maintain a trails and cycling route way-finding signage strategy • Audit existing routes and implement a process for continual improvement • Create a program and design guide to provide bicycle end of trip facilities, and pedestrian amenities, i.e. bike parking, seating, showers, change rooms, etc., at existing public and private developments
Make the City's practices supportive of walking and cycling	<ul style="list-style-type: none"> • Routinely consider the needs of pedestrians and cyclists in transportation projects and services, including planning, design, traffic data collection, traffic calming programs, safety audits and construction / traffic management • Review and update roadway maintenance practices to better accommodate cycling • Consider changes to sidewalk and trail winter maintenance to better support walking in transit and other high-use corridors • Create a reporting system for cyclists and pedestrians to use to report poor roadway / bikeway / trail / sidewalk conditions • Provide training on how to better accommodate pedestrians and cyclists in the City's decisions and responsibilities

Objective	Recommended Policy, Practice or Program
Expand and create programs that shift behaviours to encourage more people to walk and cycle	<ul style="list-style-type: none"> • Tailor existing programs to better support cycling and walking • Provide new programs to deal with gaps in the stages of changing behaviour • Collaborate with Safe Routes to School programs • Support a pedestrian and cycling coordinator to oversee the implementation of the plan

8.2.2 SUMMARY OF RECOMMENDATIONS FOR THE CORNWALL OFFICIAL PLAN

Below are recommendations for incorporating active transportation into Cornwall's Official Plan and other strategic documents as appropriate. Teference to particular chapters in the Official Plan are noted in Appendix B.

- Raise the profile of walking and cycling by articulating that pedestrians and cyclists will be consistently planned for in municipal decisions and given priority in some cases
- Encourage compact communities and a greater mix of land uses that support more walking and cycling compared to segregated land uses and sprawling urban development
- Review the role of parking with the goal of reducing automobile dependency and explicitly promote urban form that encourages more efficient parking utilization, while providing secure and convenient bicycle parking facilities
- Collaborate across departments and partner to build awareness and capacity to support more walking and cycling needs, leading by example
- Make walking and cycling a visible part of public facilities, including basic amenities for users
- Systematically coordinate, integrate, and improve walking and cycling conditions within the City's transportation infrastructure, services and programs
- Develop urban design guidelines that address the needs of pedestrians and cyclists

8.2.3 SITE PLANNING AND DESIGN PROCESS

Site Plan Approval is a site-specific type of development control authorized under Section 41 of the Planning Act. The Site Plan By-law of the City of Cornwall was approved by Council July 13, 1981 to establish Site Plan Control within the City. The City of Cornwall's Site Plan Approval works in conjunction with other approvals such as Zoning or Building Permit approval to provide for well designed and functional sites. The process is explained in the Site Plan Process Submission Requirements and Design Guidelines Document (Revised 2009).

A site plan sensitive to pedestrians and cyclists is one in which they are recognized as a significant factor in shaping the arrangement of facilities and the relationship of those facilities to others nearby. The key to creating active communities is to ensure that every site plan considers and addresses the needs of pedestrians and cyclists from the beginning—not ignoring them or treating them as an afterthought—and follows through by creating a truly pedestrian and bicycle-friendly site.

Unfortunately, there are many past and current examples of where site planning has failed to adequately consider the needs of pedestrians and cyclists. The reasons typically include:

- Lack of concern for or recognition of pedestrian and cyclists' needs
- Lack of established policies or procedures for requiring and evaluating planned facilities during site plan review
- The economics of site development priorities and market competition
- The fragmented ownership of land parcels and jurisdictional responsibilities over the development of these parcels
- Variations in design standards for development projects
- Difficulties in demonstrating the cost-effectiveness of pedestrian or bicycle facilities
- Overriding interests in promoting development at the expense of good design
- A long-standing, automobile-oriented approach to access
- Difficulties faced by public agencies in rapidly developing areas in coping with the scale and rate of new development.

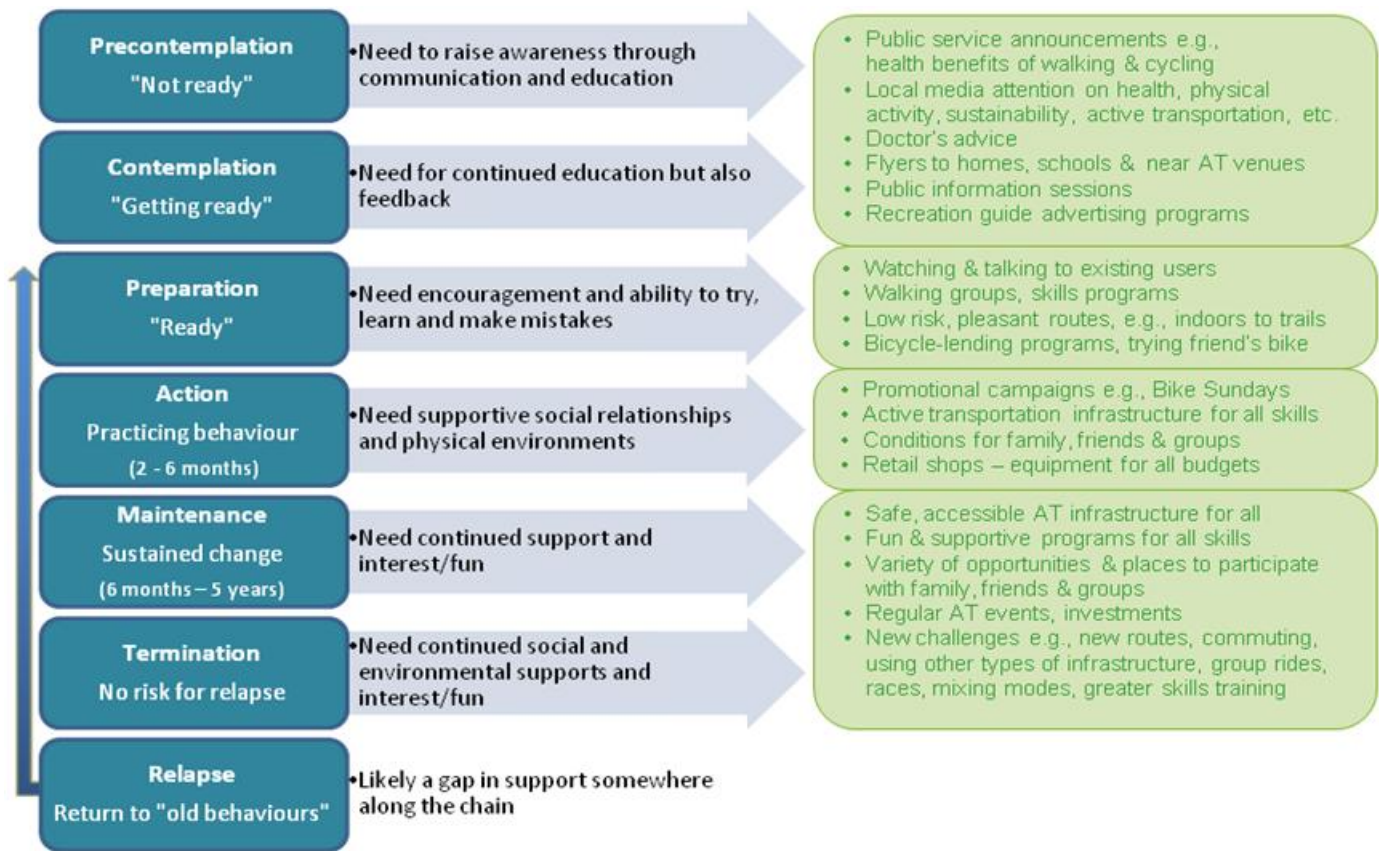
It is recommended that the City review their Site Plan Process Submission Requirements & Design Guidelines to incorporate additional elements specifically aimed at improving conditions for pedestrians and cyclists. Suggested changes are provided on Appendix B.

8.2.4 BEHAVIOURAL SHIFT INITIATIVES

Behaviour change can be described as progressing through six stages that unfold over time, as illustrated in Exhibit 32. Tailoring programs to each stage has the potential to dramatically increase recruitment of non-walkers and non-bicyclists, increase retention (establish behaviour change) which results in more people walking and cycling.

An important focus of the Cornwall Cycling and Pedestrian Master Plan will be the promotion of walking and cycling as forms of active transportation to serve purposes other than leisure, such as to run errands, get to school, or commute to work. Based on an understanding of some barriers to utilitarian walking and cycling and identification of opportunities for Cornwall, there are numerous strategies that can be used to effectively change attitudes, behaviours and skills. These strategies, described in Section 3.5, include:

- Increasing awareness of the benefits of walking and cycling
- Supporting citizen engagement and advocacy
- Building on existing events to encourage more utilitarian walking and cycling
- Increasing education and skills
- Establishing a cycling and pedestrian committee

Exhibit 32: Behavioural Shift Model

Any promotional strategies will build on existing conditions in Cornwall that are already conducive to walking and cycling, including the following:

- Travel distances in Cornwall are short, and most areas of the city are within 4 to 5 km
- The city is relatively compact with a complete grid system and relatively mixed use urban form
- There is a strong base of recreational cycling in Cornwall
- A large proportion of commuters already walk or cycle to work, creating an atmosphere of acceptance

The stages in the behavioural shift model can be reached through various efforts including education, information, and support for community organizations.

Social marketing is use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify or abandon behaviour for the benefit of individuals, groups or society as a whole.²⁰ To change individual travel decisions, there must first exist alternative travel choices, individuals must be aware of them, and they must want to use them. "Make it fun, easy and popular."²¹ Social marketing allows the investigation of what influences people's actions, identification of the barriers to these actions, classification of individuals according to the barriers they face, selection and testing of measures to remove barriers, and implication and monitoring of

²⁰ Kotler, P and Lee, N.R. (2008) *Social marketing – Influencing behaviours for good* (3rd edition). Thousand Oaks, CA: Sage Publications

²¹ Smith, W.A. (1999). Marketing with no budget. *Social Marketing Quarterly*, 5(2), 6-11.

solutions on a wider scale. Changing behaviour of people is a slow process. If less than 25% of the population have a certain behaviour it is hard to shift others to that behaviour. An 8% change in a year would be considered dramatic. After 65% of the population have shifted their behaviour, it is difficult to make further gains.

The following strategies for behavioural shift programs are recommended based on an understanding of some of the barriers to walking and cycling in Cornwall, recognition of current initiatives, and identification of opportunities. They are intended to build on existing programs to more effectively promote active transportation.

Awareness: Increasing awareness of the benefits of engaging in active transportation will help set the stage for encouraging more active transportation.

- Any information distributed by the City for events and programs that either have themes related to active transportation, such as healthy lifestyles, or that could involve using a form of transportation to arrive at a location, should emphasize the reasons for walking and cycling in event directions and promotion.
- The audience can be encouraged to visit an online repository for more information, located on the City's website or another appropriate location. This repository can provide a single source for relevant local information, such as links to resources such as bike and shoe stores, calendars of relevant events, and a way to provide the Town with feedback on how better to support walking and cycling.

Community Groups: Community groups can be key in promoting changes in behaviour because they provide avenues for expression and leadership, hopefully creating a sense of efficacy. Advocates can also do much of the legwork that helps the City identify important areas of intervention. Although existing groups have their own niche interest, supporting diverse community participation ensures better representation of overall public interest from engaged individuals.

- Utilize existing structures for user groups to increase advocacy. For example, Bicycle User Groups (BUGs) at places of employment are a way to organize and support cycling as a form of transportation to work. BUGs represent a well-established organization, comprising "groups of cyclists who provide training for new riders, encourage employees to cycle to work, and advocate for the needs of cyclists."²²
- Funding channels, or at least priority access to resources, such as meeting rooms, could be provided to support these and new groups. Any additional opportunity for involvement, such as in planning processes, public meetings, and through volunteering for events can go a long way to improve the quality of their engagement in civic processes.

Programs/Events: Expand on existing programs that currently highlight walking or cycling as a form of physical activity to more broadly incorporate both modes. Programs that are currently focus more on fitness and recreation can be adjusted to promote active transportation.

- Partner with the Cornwall Community Hospital on promoting the Cornwall Triathlon, focusing on promoting active transportation at the events organized for the less-trained, general public to participate in.

²² "Cycling and Walking." Smart Commute. From <http://www.smartcommutedurham.ca/cyclewalk.htm>, August 2009

- Event and program materials could include details on getting to the event via walking or cycling and could emphasize the benefits of doing so. Events can be designed to be more walking and cycling friendly, such as bike parking valet service for festivals.
- Supporting cycling tourism with the associated economic and social benefit spinoffs can continue through the successful The Great Waterfront Trail Adventure.

Education: Encouraging responsible driving, cycling, and walking through driver education, driver licensing requirements, and child education are the domain of the Province. However, the City could support programs delivered at the community level.

- Create a cycling or walking ambassadors program over the summer months. Toronto's former Cycling Ambassador program was "a team of cycling experts who reach out to communities across Toronto with programs and campaigns to deliver safety messages and to encourage cycling"²³, is a good example of such support.
- Consider supporting youth cycling skills and pedestrian safety programs through local school boards. Youth summer day camps are a great way to deliver Kids CAN-BIKE cycling skills training.
- Build on the development and delivery methods that other communities have tried, such as the City of Toronto and Region of Waterloo, to accelerate Cornwall's initiation into cycling-skills and pedestrian safety training programs. Promote skills training and safety at active transportation-related events.

Employer Incentives: Employer incentives can be very effective in encouraging walk or bike commuting. However, this is a particularly challenging time to request that employers dedicate resources to incentives, such as parking space credits for those that do not use them or to support for BUGs. Nonetheless, in the long-term it would be useful to consider how to engage employers further. Pedestrian and cycling-supportive efforts do not have to be expensive, and starting small can lead to more dramatic changes later.

Advice and Coordination: Some individuals are already informally working together across groups or agencies to participate in programs and events relevant for walking and cycling. Through collaboration, the social marketing focus of the Physical Activity Strategy could be harmonious with the goal of promoting active transportation. To formalize cooperation and include others who have not yet found a way to participate, an Active Transportation Committee could be convened to meet monthly or bimonthly to discuss relevant issues alongside the implementation of the Pedestrian and Bicycle Master Plan, as has been done in several other similarly sized municipalities such as Guelph, Prince George, and Fredericton. The Active Transportation Committee could formalize involvement from community groups, the Regional Health Unit, and Business Improvement Associations, as well as staff from relevant City departments. Such a Committee could build on existing informal cooperative efforts or be structured 'from scratch' and should aim to act as an important channel for citizen input to improve community investment in the plan, to ensure accountability in its implementation, and to avoid any unwarranted NIMBY (not in my backyard) reactions to its implementation.

Social marketing to shift travel behaviours can start with a simple audience analysis and segmentation, as illustrated in Exhibit 33. This could be applied to specific programs within the recommended strategies.

²³ <http://www.toronto.ca/cycling/ratsa/index.htm>, August 2009

Exhibit 33: Social Marketing Audience Analysis and Segmentation

<i>Define the specific audience</i>	What you want them to do:	
	Those who have adopted the behaviour	Those who have not
Demographic data		
Why would they? (benefits)		
Why not? (barriers)		
Who has an influence on them? (influencers, leaders)		
Media habits, participation at events, membership groups and places where the audience can be reached		
Segmentation: Among those who have not yet adopted the behaviour, can you identify specific segments that are more receptive than others?		

Add factual information;
avoid assumptions
Use real numbers, not
percentages

8.3 Policy Implementation

All levels of government spend considerable time and effort to develop policies, to ensure that policies are in the best interests of the public and other stakeholders, and that they are achievable publically, politically, financially and institutionally. All policies require as a minimum budget allocation for staff to administer the policy, and many require additional resources to undertake actions to meet objectives, whether it is collecting data, communicating ideas, running programs, or building and maintaining infrastructure. Governments can underestimate or not dedicate resources needed to implement policies, to overcome implementation barriers, and to ensure that policy goals are met and public impacts are realized.

Decision-makers need tangible tools to support policy implementation—to move from ideas to execution and results. Such tools should assist in implementation, address obstacles as they come up, and allow adaptation as needed to changing circumstances while still meeting the policy goals

8.3.1 CONVENTIONAL INSTITUTIONAL STRUCTURE

It was observed in the early 1990s that bicycle-friendly communities had the following elements in common—the “three-legged stool” supporting a shift to a cycling culture:

- **Staff leaders**—Until the planning and design of bicycle-friendly communities is routine within a municipality, a strategy of dedicating resources to cycling initiatives is required. There are two ways to structure staff commitment: a part- or full-time cycling coordinator or senior staff with shared responsibilities for implementation.
- **Political champions**—taking political leadership and making fiscal commitments to implement recommendations of the master plan
- **Public supporters**—an active and effective cycling committee or independent advocacy group that can provide a link between the community and the City.

Each partner in this powerful and stable “three-legged stool” has its natural areas of strength, and these can be effectively leveraged by coordinating activities such as community outreach, media advocacy, government services, public funding, political support, legislation and so on. The short-comings to the three-legged stool model is that sometimes one of the legs is weak: staff

responsibilities can shift or individuals change employers; political champions can get voted out perhaps on other issues; and public groups offer up ranting, sketchy web-surfing knowledge, or become sidetracked by the strengths and issues of one member.

Many communities have fostered and assembled the champions, leaders and supporters needed to create change and we see their success in Canada: Montreal, Toronto, Guelph, Saskatoon, Whitehorse, Kamloops, Vancouver, Victoria, and emerging in Cape Breton, Ajax, Minden, Edmonton and Winnipeg to name a few.

8.3.2 PERFORMANCE MONITORING AND EVALUATION

An alternative to having the right “partners” or people resources championing, leading and supporting policy implementation is to have in place a “process” that monitors progress, evaluates deficiencies and strengths, and reports on actions. Report-based monitoring and evaluation processes have been in use by health organizations, water and wastewater providers, the recycling industry, aid agencies, etc. It is designed to help people who are trying to improve social conditions in our communities.

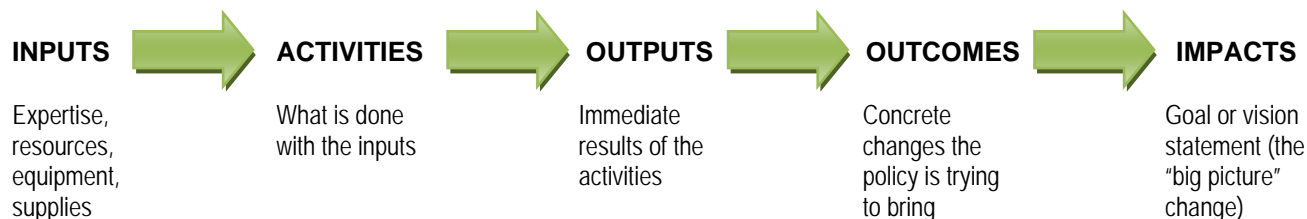
The Transportation Association of Canada’s Briefing on *Strategies for Sustainable Transportation Planning* identifies “measure performance” as one of four key principles under the theme “the way ahead”.

The Briefing explains that:

Most transportation plans start to become obsolete soon after they are approved: external conditions change, action plans are adjusted, costs rise or revenues fall, and early initiatives shift the playing field for later ones. Given this fact, one way to provide decision makers with continuously relevant guidance is to follow a rigorous performance measurement process. This process would focus on actions taken and progress made toward strategic objectives (both qualitative and quantitative), but could also identify changes in analytical assumptions, shifts in social or economic circumstances, and updated financial positions. The major elements of a thorough transportation plan performance measurement strategy include key targets and indicators to be monitored, data collection activities and schedules, reporting parameters and frequencies, and required resources.

Reporting is a key aspect of performance measurement, because the knowledge generated by monitoring and analysis is only useful if decision makers and stakeholders are aware of it. Reports presenting readable information in a way that effectively communicates successes and ongoing challenges can capture the attention of community groups and the media, helping to raise public awareness of results achieved and the need for continued action.

Performance measurement and evaluation entails developing a framework with a sequence of results that would be expected from the Cycling Master Plan policy goals. This “results chain” is usually expressed as a flowchart from inputs to outputs to outcomes to impacts, as illustrated in Exhibit 34.

Exhibit 34: Results Chain for Performance Monitoring

The performance measurement framework should be structured according to the strategic objectives of the Cycling and Pedestrian Master Plan. An initial framework could be developed as part of the implementation plan.

Ideally, a performance monitoring process would be combined with strategies that raise the institutional and public profile of walking and cycling so that progress (or lack of progress) is given greater attention. The ability to use any strategy, however, will depend on the readiness and capacities of the institution— within the bureaucracy and elected body. An Active Transportation Advisory Committee could be set up reporting to Council and working with staff. The Committee could develop and oversee a mini performance monitoring “report card” with checklists associated with the Bicycle and Pedestrian Master Plan goals, and remarks on the progress being made towards those goals. Alternatively, a non-governmental organization with an interest in sustainable communities could act as “watch dog” and report on progress and performance. Performance monitoring can also be assigned as a responsibility of staff, with annual, department or project-based reporting.

9. PHASING AND COST OF CYCLING AND PEDESTRIAN NETWORK

It is important to note that despite the accuracy implied by the network maps, the location of recommended routes or their design typology may be subject to change through more detailed technical studies, changes in local conditions, and community consultation, where warranted, prior to the implementation of individual routes. At the same time however, the extensive community effort that established the overall directions of this plan and the recommended network must be respected. The network should be considered flexible within the goals of the Master Plan, with revisions being made as conditions under which it was developed change. That is, as the network is implemented, new opportunities or constraints may be identified and alternative routes sought to connect destinations, fill gaps and bridge barriers. Specific changes to the recommended Bicycle and Pedestrian Master Plan work should be evaluated in the context of such a decision's impact upon the overall network vision for cycling and walking in Cornwall. It is particularly important that the City adopt a strong position on proposed sidewalk improvements as historical experience has shown that the voices of a few can sometimes undermine the implementation of improvements that benefit a larger community.

9.1 Crossing Improvements for Cyclists and Pedestrians

Proposed crossing improvements for both cyclists and pedestrians that have been described in Sections 6 and 7 and recommended for the City of Cornwall are summarized in Exhibit 35.

Exhibit 35: Estimated Costs of Proposed Crossing Improvements by Type

Crossing Type	Number	Cost / unit (\$)	Total Cost (2010 Dollars)
Bikeway Intersection Enhancements	33	15,000	\$495,000
Intersection Pedestrian Signal (IPS)	7	150,000	\$1,050,000
Trail Crossing with Traffic Calming Features	23	12,000	\$276,000
Retrofit Pedestrian Signal	1	50,000	\$50,000
Total			\$1,870,000

9.2 Phasing and Cost of the Cycling Network

It is suggested that improvements to the cycling network be made by phasing in the short- (1-5 years), medium- (5-10 years) and long-term (beyond 10 years). This will enable the City of Cornwall to incrementally expand and budget for the improvements. This approach is also more likely to coincide with attitudes and behaviours that take time to shift. The cost of the recommended bikeways by phase and length is presented in Exhibit 36 with a map of the proposed bikeway network implementation in Exhibit 38.

Exhibit 36: Cost²⁴ of Recommended Cycling Network by Phase and Bikeway Type

Phase	Bikeway Type	Total Length (km)	Total Cost (2010 Dollars)
Short-Term (1-5 years)	Bicycle Boulevard	3	\$225,000
	Bicycle Lane (paint)	7	\$71,000
	Bicycle Lane (reconfigure)	3	\$39,000
	Bicycle Lane One Side (paint)	3	\$12,000
	Marked Shared Lane	10	\$146,000
	Multi-Use Trail	2	\$564,000
	Paved Shoulder with Bike Lane	1	\$73,000
	Signed Route	1	\$3,000
	Subtotal	30 km	\$1,133,000
Phase	Bikeway Type	Total Length (km)	Total Cost (2010 Dollars)
Medium Term (5-10 years)	Bicycle Boulevard / Priority Street	7	\$571,000
	Bicycle Lane (paint)	1	\$14,000
	Bicycle Lane (reconfigure)	7	\$159,000
	Bicycle Lane (widen)	0.5	\$85,000
	Bicycle Lane One Side	9	\$201,000
	Boulevard Multi-Use Trail	4	\$736,000
	Marked Shared Lane	2	\$29,000
	Multi-Use Trail	8	\$2,516,000
	Paved Shoulder with Bike Lane	20	\$1,556,000
	Signed Route	3	\$8,000
	Subtotal	62 km	\$ 5,875,000
Long Term (10 years +)	Bicycle Lane (new roads, no cost to City)	15	\$-
	Boulevard Multi-Use Trail	1	\$213,000
	Multi-Use Trail (3 km within developments, no cost to City)	14	\$3,408,000
	Paved Shoulder with Bike Lane	20	\$1,504,000
	Special Treatment	2	-
	Subtotal	52 km	\$ 5,128,000
Total		144 km	\$ 12,136,000

The costs of implementing bikeway improvements are based on estimated unit costs of construction shown in Exhibit 37.

²⁴ Opinion of cost of construction only in 2010 dollars; does not include planning, design, maintenance, property, utilities, taxes

Exhibit 37: Estimated Unit Costs of Construction

Estimated Unit Costs / km (2010 Dollars)	
Bicycle Boulevard / Priority Street	\$80,000
Bicycle Lane (paint)	\$10,000
Bicycle Lane (reconfigure)	\$23,000
Bicycle Lane (widen)	\$200,000
Boulevard Multi-Use Trail	\$200,000
Marked Shared-use Lane	\$15,000
Multi-Use Trail	\$300,000
Pave Existing Shoulder	\$76,000
Signed Route	\$2,300
Special Treatment	To be determined

Exhibit 38: Implementation of Proposed Bicycle Network



City of Cornwall
Bicycle and Pedestrian Master Plan



Proposed Bicycle Network

- Destination
- School
- Industrial park
- Cornwall Waterfront Plan boundary

- Existing Bicycle Network
- Existing bicycle lane
 - Existing boulevard multi-use trail
 - Existing multi-use trail

- Proposed Bicycle Network
- Short-term
 - Medium-term
 - Long-term
 - Planned future road

- Proposed traffic signal
- Proposed crossing improvement

- Special treatment area
- Future residential development *

* Bicycle facilities and supporting features to be included

9.3 Phasing and Cost of Pedestrian Network

Like the implementation of the cycling network, pedestrian improvements are suggested to be phased in the short-, medium- and long-term.

The City of Cornwall has already identified a list of recommended sidewalk projects, although budget has not been allocated to complete all of these. Never the less, these approved sidewalks are included in Exhibit 39 and are considered to fall within a short and medium-term horizon. The remainder of the sidewalk improvements would be implemented as budget becomes available.

Exhibit 39: Cost²⁵ of Recommended Pedestrian Network by Phase and Sidewalk Location

Phase	Sidewalk Location	Total Length (km)	Approved Cost* (2010 Dollars)	Proposed Cost** (2010 Dollars)
Approved by Council	One Side	23	\$3,218,000	
	Two Sides	0.2	\$74,000	
Medium to Long-term	One Side	27	-	\$2,009,000
	Two Sides	1	-	\$171,000
Total		51	\$3,292,000	\$2,180,000

*Note: This is the cost approved by Cornwall City Council. Average is \$146/m

**Note: \$75,000/km estimate, one side only.

9.4 Funding Sources

Cornwall's Bicycle and Pedestrian Master Plan can be funded through a variety of sources including but not limited to:

- Operations Budget
- Planning and Development Capital Budget
- Bikeways along new roads within new subdivisions will be built and funded by development through subdivision agreements with the City
- Bikeways on existing roads in established areas of the City can be funded through the Capital Works program
- Other funds are available from Provincial and Federal programs and grants, such as the Gas Tax transfers, Ministry of Transportation's TDM funding, Ministry of Health Promotion grants, and infrastructure renewal programs

City of Cornwall staff may wish to consider identifying both annual and forecast capital and operation budget implications for Council's consideration as cycling and pedestrian projects move forward through the implementation phases.

²⁵ Opinion of cost of construction only in 2010 dollars; does not include planning, design, maintenance, property, utilities, taxes

10. REFERENCES

10.1 Pedestrian Design and Accessibility

Jolicoeur, Marc, *Planning and Design for Pedestrians and Cyclists: A Technical Guide*, Vélo Québec Association, Montreal, Québec, 2010, available from <http://www.velo.qc.ca/english/bikewaysdesign.php?page=handbook> (June 2010)

Accessible Sidewalks and Street Crossings—An Informational Guide, US Department of Transportation, Federal Highway Administration, FHWA-SA-03-019

(Provides summary information on making sidewalk corridors and street crossings accessible based on the US Access Board's draft guidelines, and includes a checklist (http://www.bikewalk.org/pdfs/sopada_fhwa.pdf)).

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practise, Institute of Transportation Engineers, 2006.

(Includes guidance on pedestrian-related design of the roadside and travelway, and intersections of major arterial roadways (<http://www.ite.org/bookstore/RP036.pdf>)).

Design and Safety of Pedestrian Facilities: A Recommended Practise of the Institute of Transportation Engineers, Institute of Transportation Engineers, Traffic Engineering Council, March 1998.

(Discusses guidelines for the design and safety of pedestrian facilities to provide safe and efficient opportunities for people to walk near streets and highways. Includes recommendations for roadway, sidewalk and path design, signing, signalization, crosswalks, refuge islands, grade-separated crossings, transit stops, work zones, and pedestrian environments near schools, in neighbourhoods and business districts (http://safety.fhwa.dot.gov/PED_BIKE/docs/designsafety.pdf)).

Guide for the Planning, Design and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials (AASHTO), July 2004.

(Covers characteristics of pedestrians, planning strategies, and facility design, operation and maintenance).

Alternative Treatments for At-Grade Pedestrian Crossings (Institute of Transportation Engineers, 2001).

Accessible Built Environment Standards, Ministry of Municipal Affairs and Housing (anticipated to be published in 2010)

10.2 Bikeway Design

Jolicoeur, Marc, *Planning and Design for Pedestrians and Cyclists: A Technical Guide*, Vélo Québec Association, Montreal, Québec, 2010, available from <http://www.velo.qc.ca/english/bikewaysdesign.php?page=handbook> (June 2010)

American Association of State Highway and Transportation Officials (1999) *Guide for the Development of Bicycle Facilities*. Third edition expected in 2010.

Transportation Association of Canada (1998) Bikeway Traffic Control Guidelines for Canada.
Update anticipated in 2010.

Alta Planning + Design (2009) Fundamentals of Bicycle Boulevard Planning and Design, Initiative
for Bicycle & Pedestrian innovation.

APPENDIX A

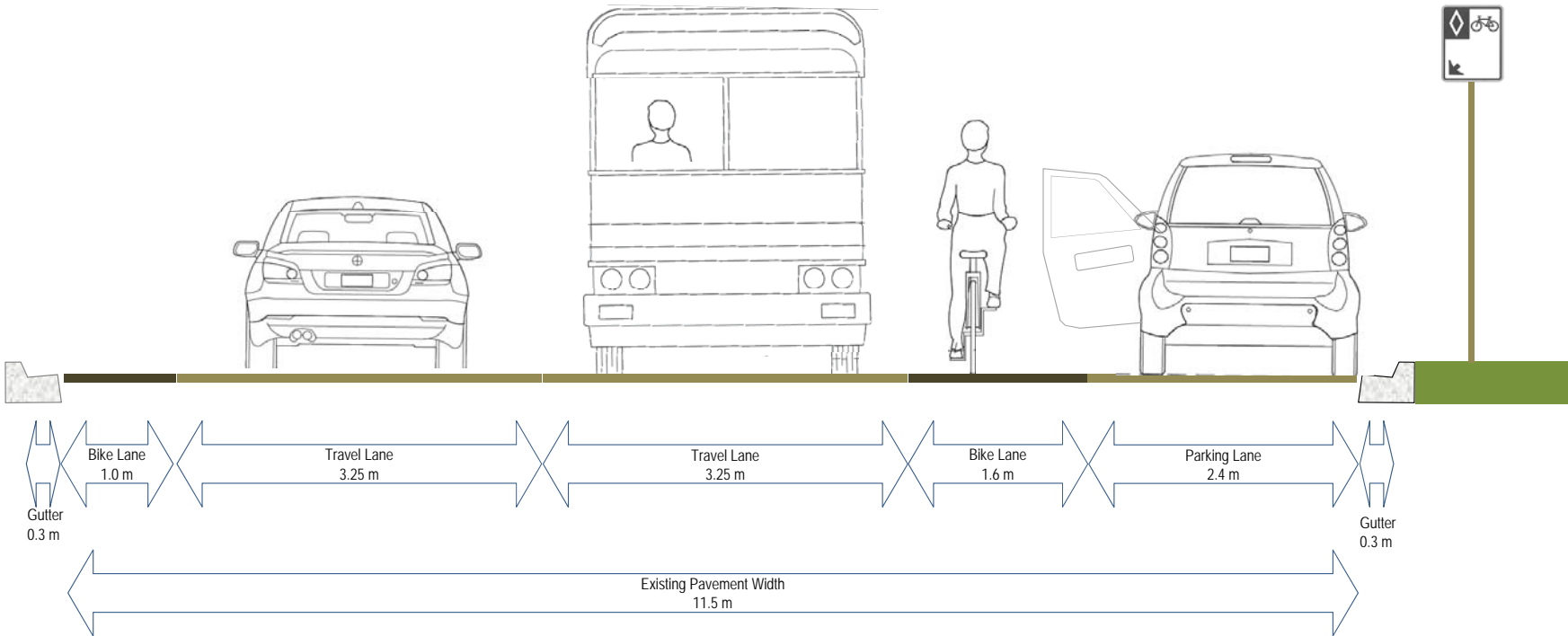
SAMPLE CROSS SECTIONS – RETROFITTING FOR BIKE LANES

Example: Second Street, West of Hoople Avenue

Existing two-lane roadway, parking permitted both sides, 11.5 m wide pavement

Re-stripe Existing Road with Two Travel Lanes, Parking Lane One Side and Two Bicycle Lanes

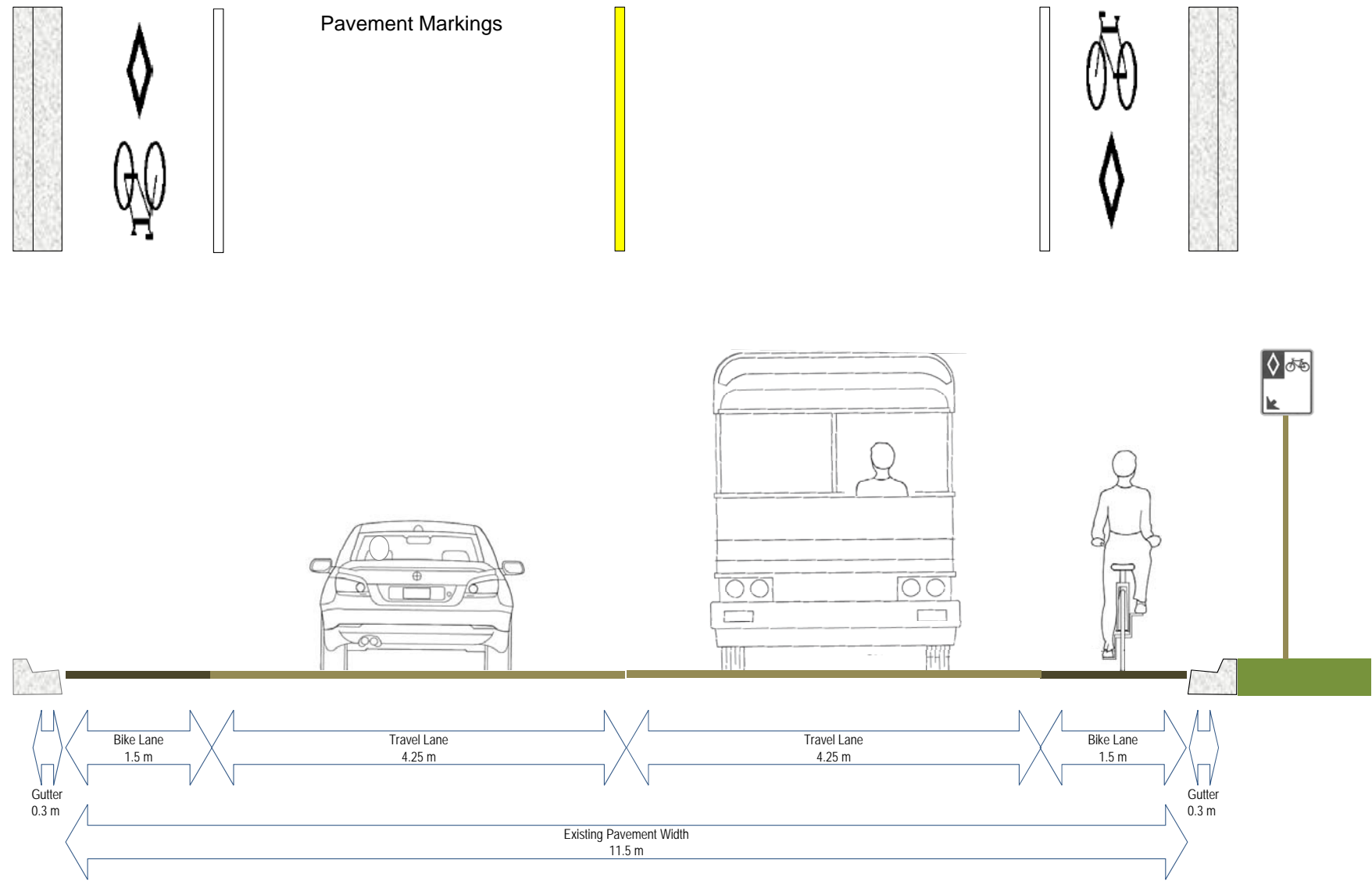
Pavement Markings



Example: Second Street, West of Hoople Avenue

Existing two-lane roadway, no parking, 11.5 m wide pavement

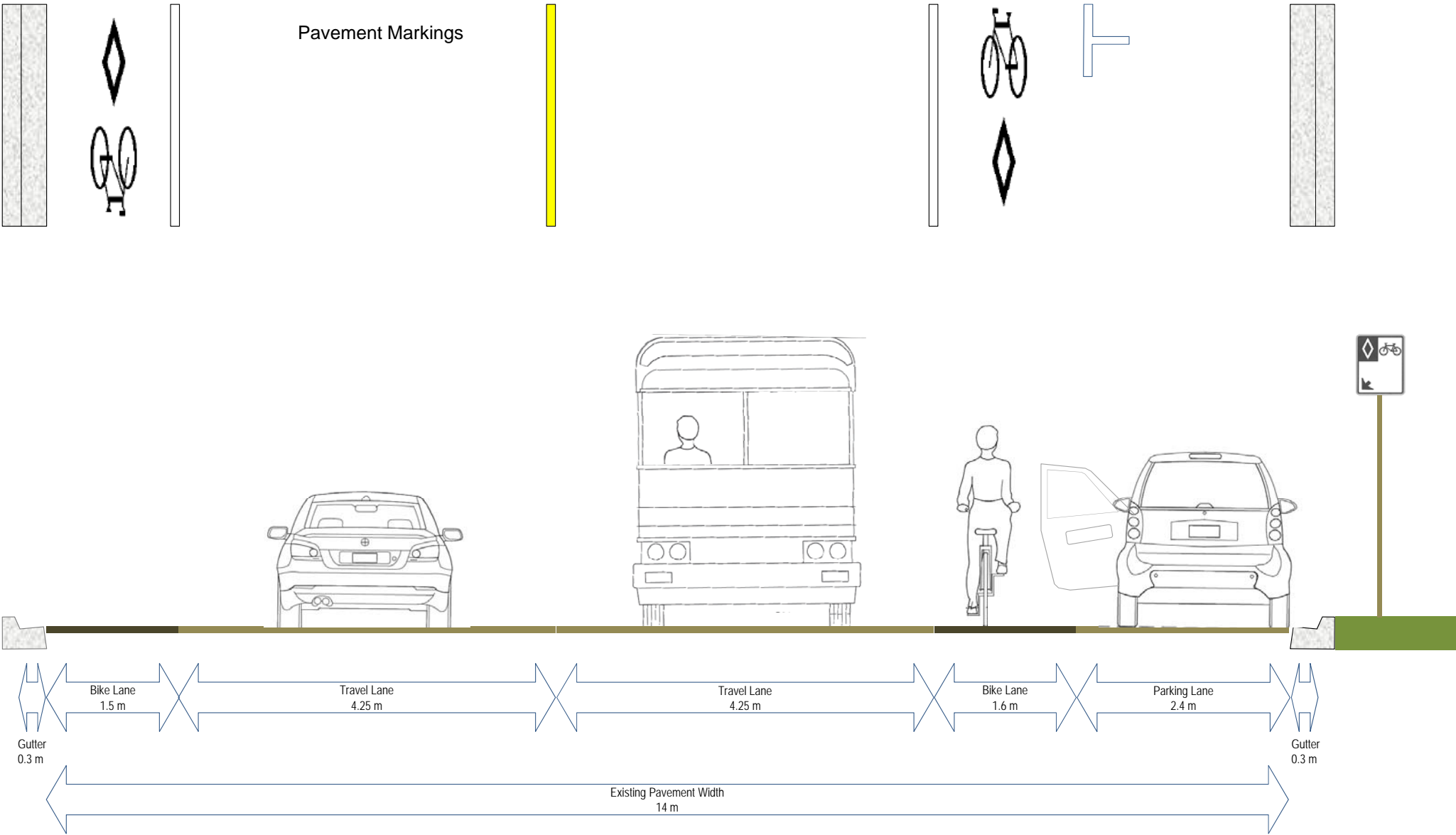
Stripe Existing Road with Two Bicycle Lanes, no parking



Example: Second Street, Augustus Street to Sydney Street

Existing four-lane roadway, parking permitted both sides off peak, 14 m wide pavement

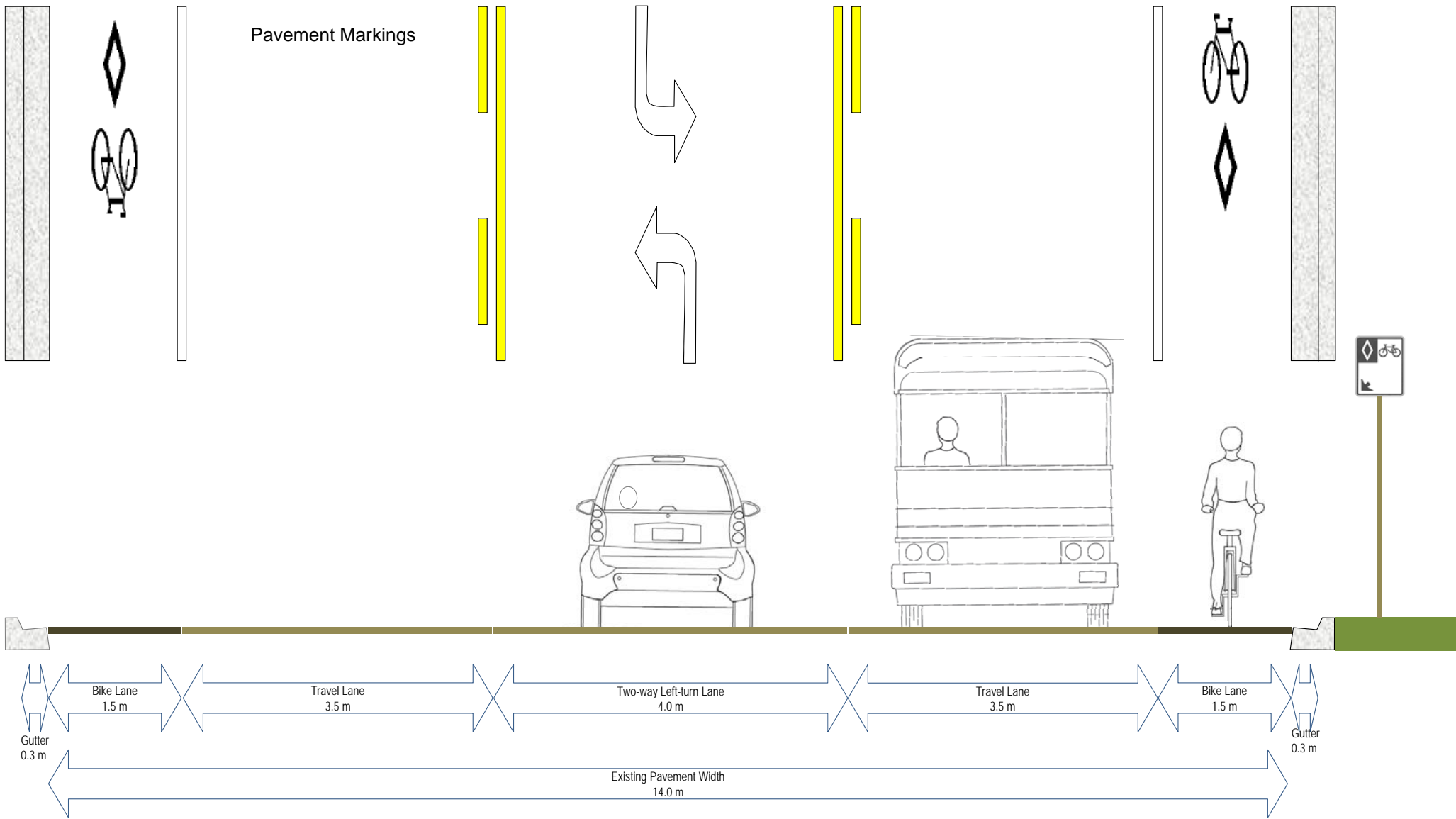
Re-stripe Existing Road with Two Travel Lanes, Parking Lane One Side and Two Bicycle Lanes



Example: Second Street, Augustus Street to Sydney Street (Alternate)

Existing four-lane roadway, 14 m wide pavement, parking on both sides permitted

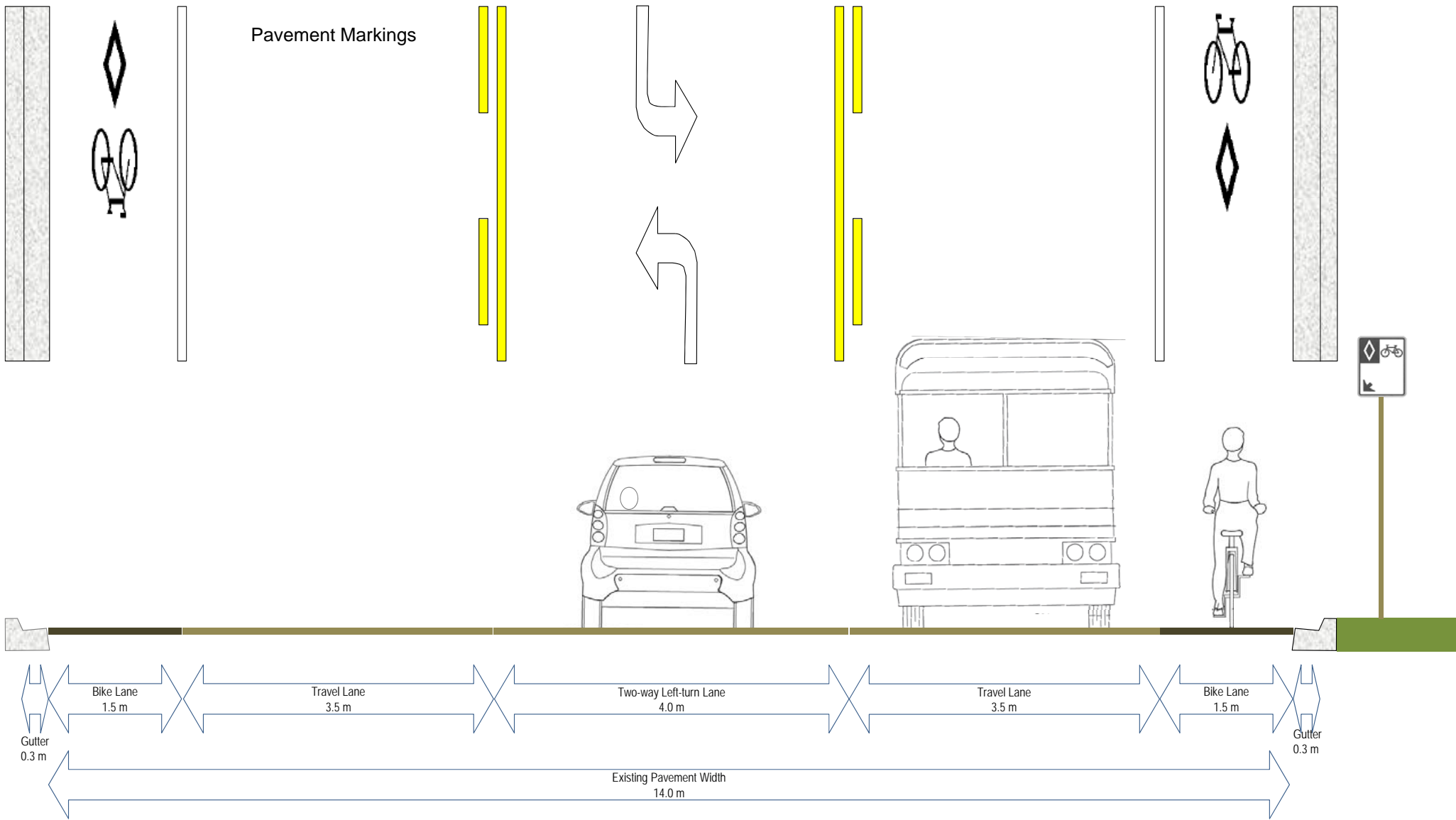
Re-stripe Existing Road with Two Travel Lanes, Centre Two-way Left-turn Lane and Two Bicycle Lanes. No Parking allowed



Example: Second Street, East of Marlborough

Existing four-lane roadway, 14 m wide pavement, no parking on either side

Re-stripe Existing Road with Two Travel Lanes, Centre Two-way Left-turn Lane and Two Bicycle Lanes

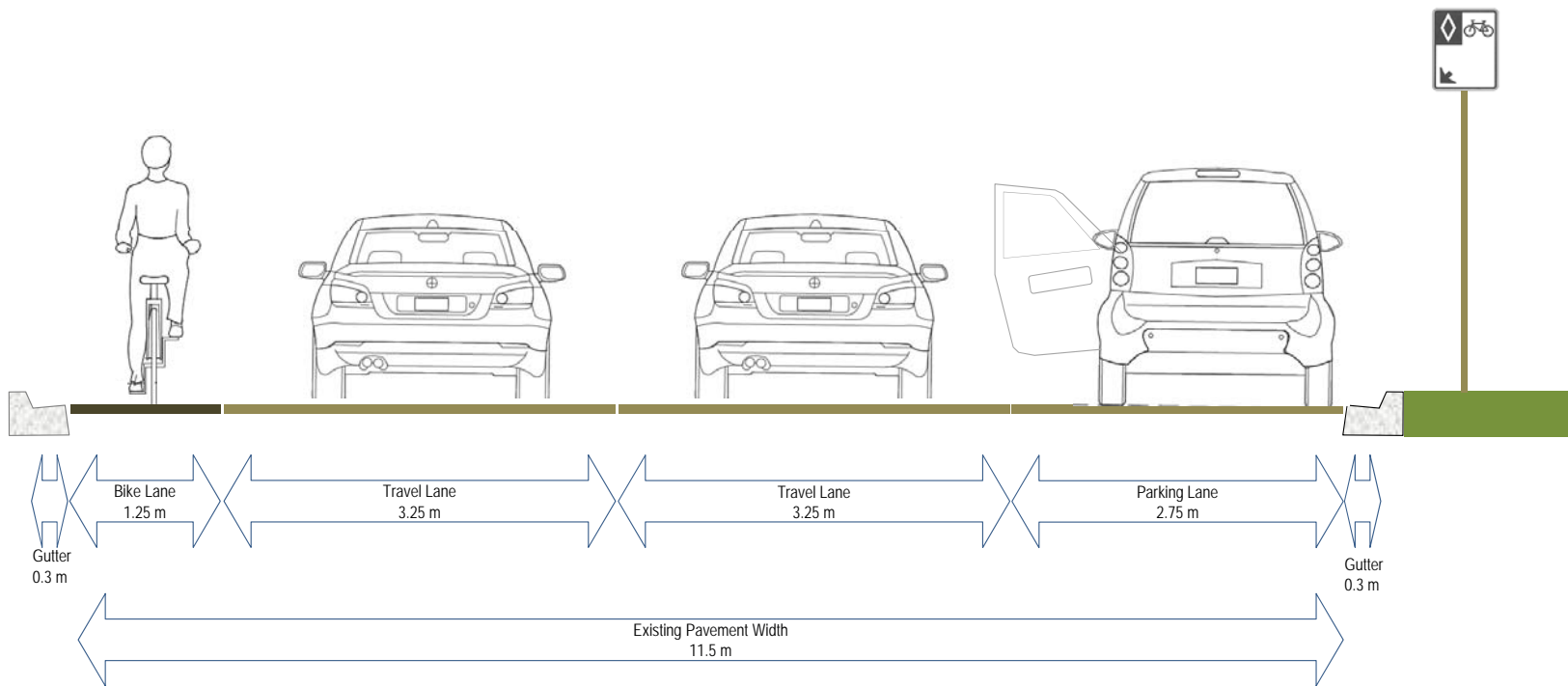
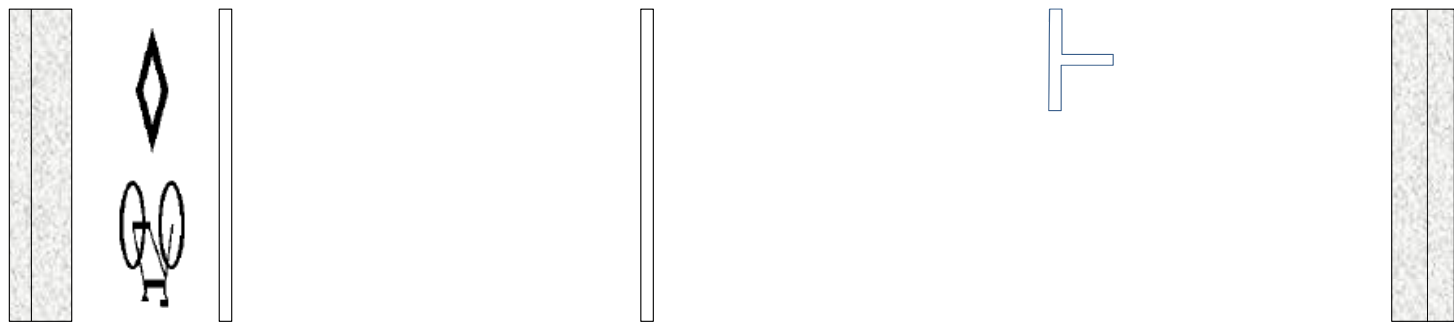


Example: Fifth Street, Amelia Street to Sydney Street

Existing three-lane roadway (one way), parking permitted one side, 10.5 m wide pavement

Re-stripe Existing Road with Two Travel Lanes, Parking Lane One Side and Bicycle Lane One Side

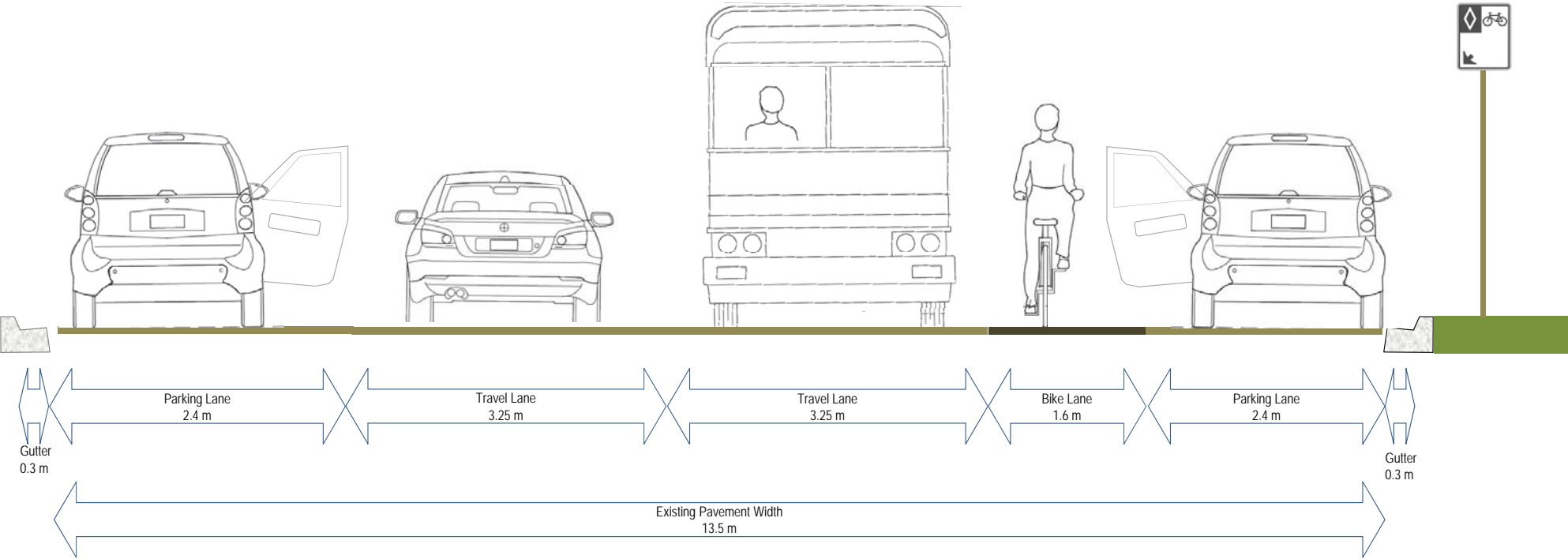
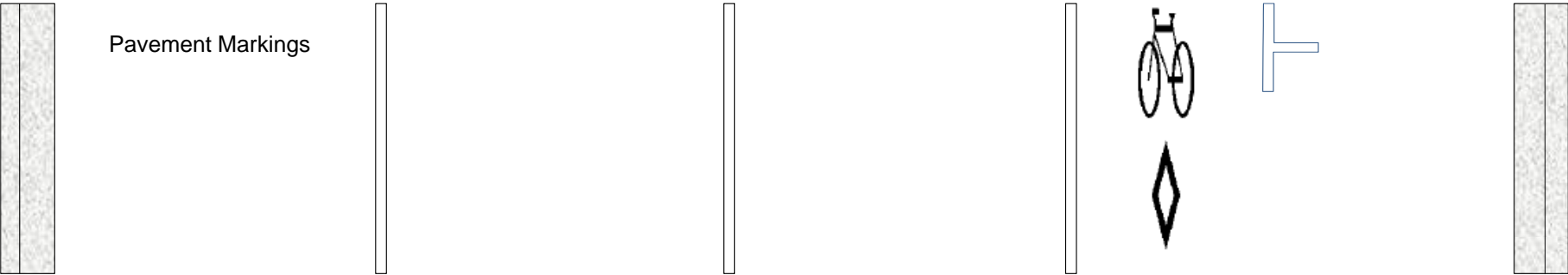
Pavement Markings



Example: Pitt Street, Ninth Street to Fifth Street

Existing four-lane roadway (one way), parking permitted both sides, 13.5 m wide pavement

Re-stripe Existing Road with Two Travel Lanes, Parking Lane Both Sides and One Bicycle Lane

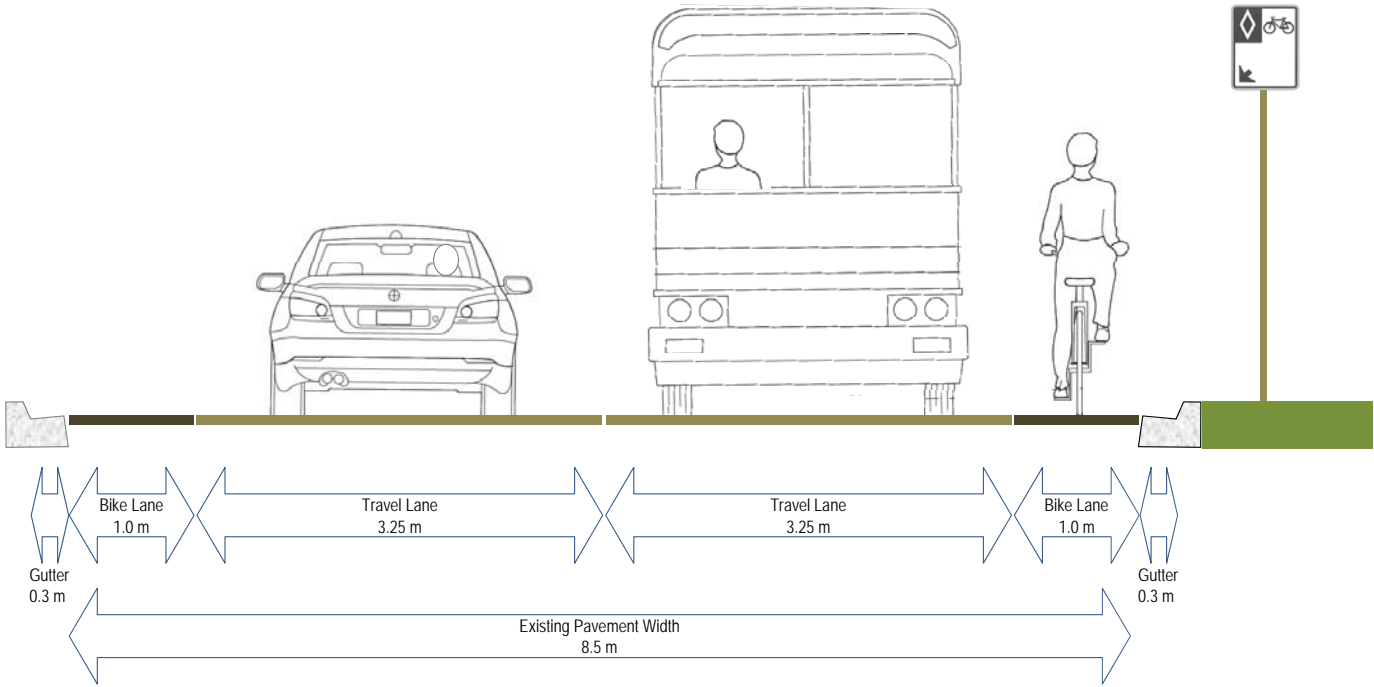
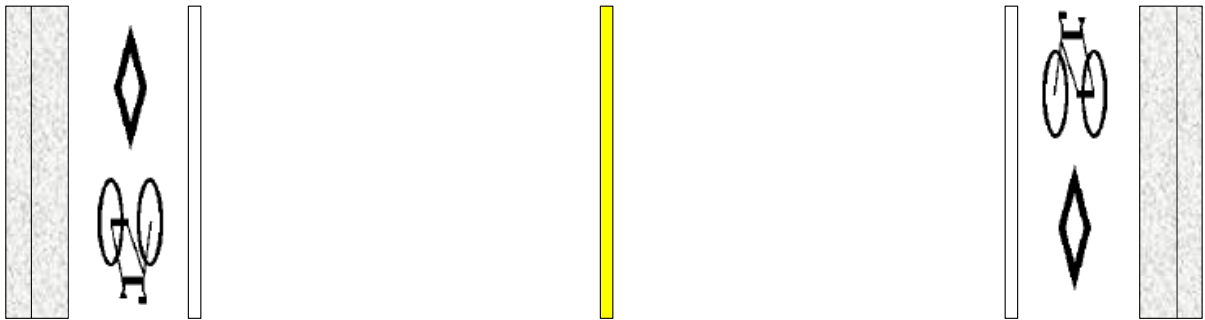


Example: Eleventh Street

Existing two-lane roadway, no parking, 8.5 m wide pavement

Stripe Existing Road with Two Bicycle Lanes

Pavement Markings



APPENDIX B

PROPOSED POLICY CHANGES FOR CORNWALL

AT Policy Objective	Relevant Cornwall Policy	Proposed Cornwall Policy Changes
Make Cornwall a Pedestrian and Bicycle-Friendly Community	Official Plan	<p>2.3 Planning Principles and 2.4 Goals</p> <ul style="list-style-type: none"> Update principles to reflect that the Official Plan supports active transportation, creating pedestrian and cycle-friendly development and that active transportation opportunities and utilitarian travel needs are identified alongside recreational and motorized traffic needs.
		<p>3.0 Growth</p> <ul style="list-style-type: none"> Update growth policies to indicate that planning for more compact and infill development supports greater walking and cycling.
		<p>4.0 Land Use</p> <ul style="list-style-type: none"> Ensure land use planning particularly for Urban Residential, Commercial, Business District, General Commercial, Major Institutional and Industrial areas plan for cyclists alongside pedestrians. Ensure that pedestrian and cycling circulation, access and facilities are adequately planned for across all land uses. Developers could become responsible for providing adequate bike parking and ensuring that impacts on cyclists and pedestrians are addressed and minimized. Consider permitting greater mixed uses and reducing parking requirements across land uses.
		<p>4.10 Open Space and 6.0 Parks and Recreation</p> <ul style="list-style-type: none"> Ensure open space, ad parks and recreation planning supports utilitarian travel as well as recreation needs. Integrate and coordinate trails development with the Pedestrian and Cycling Master Plan, and connect with walkway and bikeway systems. Include bike parking in open space and parks and recreation planning.
		<p>7.0 Waterfront Planning</p> <ul style="list-style-type: none"> Consider active transportation as a resource similar to tourism. Ensure that the Waterfront links to pedestrian and bikeway systems and plans for utilitarian travel as well as recreational needs.
		<p>8.0. Tourism Development</p> <ul style="list-style-type: none"> Promote greater cycling-based tourism by supporting the Pedestrian and Cycling Master Plan. Market cycling for tourism as facilities develop and ensure their maintenance.

AT Policy Objective	Relevant Cornwall Policy	Proposed Cornwall Policy Changes
Make Cornwall a Pedestrian and Bicycle-Friendly Community	Official Plan	<p data-bbox="662 275 1062 306">Visual Environment and Urban Design</p> <ul data-bbox="711 312 1435 642" style="list-style-type: none"> <li data-bbox="711 312 1435 375">• Include the provision of pedestrian amenities e.g., street furniture and wayfinding. <li data-bbox="711 390 1435 453">• Design for cyclists, bikeway access as well as for walking and pedestrian circulation. <li data-bbox="711 468 1435 531">• Consider developing a consistent signage strategy beneficial to pedestrians and cyclists. <li data-bbox="711 546 1435 642">• Consider street designs more favourable for connecting people using active modes of transportation rather than cul de sacs e.g., grid system with shorter blocks. <p data-bbox="662 663 867 695">12.0 Transportation</p> <ul data-bbox="711 701 1435 1877" style="list-style-type: none"> <li data-bbox="711 701 1435 795">• 12.2.11 Implement pedestrian and cycling facilities at time of road reconstruction, redesign and resurfacing to reduce costs <li data-bbox="711 810 1435 873">• 12.3.1 f) Promote walking and cycling as viable modes of transportation. <li data-bbox="711 888 1435 951">• Add Policy 12.3 Encourage greater use of active modes of transportation by: <li data-bbox="711 966 1435 1029">• Adopting and implementing the Pedestrian and Cycling Master Plan <li data-bbox="711 1043 1435 1106">• Installing bike parking at key destinations and public transit facilities <li data-bbox="711 1121 1435 1184">• Considering AT as part of transit spectrum and transit as part of AT spectrum <li data-bbox="711 1199 1435 1230">• Increasing mixed use and compact forms of development <li data-bbox="711 1245 1435 1308">• Considering implementing TDM measures e.g., reducing parking ratios and employer incentive programs <li data-bbox="711 1323 1435 1386">• Considering developing bike parking guidelines that include ratios for bike parking provision <li data-bbox="711 1400 1435 1558">• Applying urban design principles that factor pedestrian and cyclist needs and comforts e.g., consider sun and wind impacts, height setbacks on tall buildings, landscaping and beautification, street furniture including seating and a coherent visual aesthetic <li data-bbox="711 1572 1435 1635">• Installing pedestrian and bicycle priority signals at intersections <li data-bbox="711 1650 1435 1713">• Ensuring wayfinding, signage and pavement markings are clearly visible to pedestrians, cyclists and motorists <li data-bbox="711 1728 1435 1759">• Protecting pedestrian and cyclist amenities and facilities <li data-bbox="711 1774 1435 1877">• Broadening scope of traffic impact assessments to include consideration of impacts on pedestrians and cyclists

AT Policy Objective	Relevant Cornwall Policy	Proposed Cornwall Policy Changes
Make Cornwall a Pedestrian and Bicycle-Friendly Community	Official Plan	<p>13.0 Energy Conservation</p> <ul style="list-style-type: none"> 13.1.1 Change the term “transportation” to “motorized vehicle” and identify a key goal is to strengthen the use of active modes of transportation
	Accessibility Plan	<p>Traffic Division</p> <ul style="list-style-type: none"> 8. Consider increasing the duration of pedestrian countdown signals as part of the audible signals strategy
	Site Plan Process	<p>Design guidelines: Planning and building requirements</p> <p>Buildings</p> <ul style="list-style-type: none"> Ensure that building access, heights, setbacks and vehicular entrances have considered the impact on pedestrians and cyclists e.g., shade, wind, visibility, curb depressions, etc. Parking Areas Increase bike parking at store fronts and consider reducing automobile parking Consider developing bike parking ratios Consider facilitating pedestrian and cyclist crossing priority with appropriate signage and pavement marking <p>Signage</p> <ul style="list-style-type: none"> Consider requiring route and crossing signage for pedestrians and cyclists as part of site design for large shopping/commercial and major institutional sites Infrastructure and Municipal Works Department Ensure that catch basins, positions, grate elevations and manhole positions are cycle-friendly
Implement the Pedestrian and Cycling Networks	Official Plan	<p>12.0 Transportation</p> <ul style="list-style-type: none"> Plan and implement the pedestrian and bikeway network Build active transportation networks within capital plans and budgets for roadwork Pave 1.2m shoulders on rural and secondary roads to safely accommodate cyclists, reduce motorist-cyclist conflicts and reduce road maintenance costs Develop and support an active transportation advisory committee Develop a Sidewalk Prioritization Program to address requests for sidewalks on local streets Create a program and design guide to provide bicycle end of trip facilities, and pedestrian amenities, i.e. bike parking, seating, showers, change rooms, etc., at existing public and private developments

AT Policy Objective	Relevant Cornwall Policy	Proposed Cornwall Policy Changes
Implement the Pedestrian and Cycling Networks	Recreation Master Plan	<p>General</p> <ul style="list-style-type: none"> Identify recreational facilities and parks as destinations Bikeways, Pathways and Trails Strategic Actions Consider developing and coordinating a trails signage strategy supporting walking and cycling route wayfinding
	Streets By-Law	<p>Definitions</p> <ul style="list-style-type: none"> Consider revising the definition of “play vehicle” to reflect “self-propelled vehicle” and non-motorized modes of transportation for utilitarian purposes Consider revising the definition of “shoulder” to reflect concrete and asphalt paving (not gravel) and as a bicycle and pedestrian travel lane <p>Other</p> <ul style="list-style-type: none"> Add auditing of existing streets and the AT network in the by-law and identify and implement a process for continual improvement
Make the City’s practices supportive of walking and cycling	Official Plan	<p>4.0 Land Use</p> <ul style="list-style-type: none"> Ensure land use planning routinely considers cyclists needs alongside pedestrians. Ensure that pedestrian and cycling circulation, access and facilities are routinely planned for across all land uses. <p>12.0 Transportation</p> <ul style="list-style-type: none"> Regularly collect data on walking and cycling to understand, plan for and protect vulnerable road users <p>14.0 Implementation</p> <ul style="list-style-type: none"> 14.1 Consider including monitoring and performance measures as an implementation tool. This could include developing an AT monitoring checklist and establishing an AT Advisory Committee that reports on progress made. Create a reporting system for cyclists and pedestrians to use to report poor roadway / bikeway / trail / sidewalk conditions Provide training on how to better accommodate pedestrians and cyclists in the City’s decisions and responsibilities
	Recreation Master Plan	<p>Trail Maintenance</p> <ul style="list-style-type: none"> Consider winter maintenance of trails frequently used for utilitarian travel to better support year round active transportation

AT Policy Objective	Relevant Cornwall Policy	Proposed Cornwall Policy Changes
Make the City's practices supportive of walking and cycling	Streets By-Law	<p>13.0 Ice and Snow</p> <ul style="list-style-type: none"> • Add cyclists as a road user like pedestrians • Consider changes winter maintenance of sidewalks and bikeways to better support year round active transportation particularly in transit and other high-use corridors
	Accessibility Plan	<p>Accessibility Issue #10 (Identified Barriers)</p> <ul style="list-style-type: none"> • Address Issue #10 on snow clearing practices of sidewalks (for pedestrians) that may also impact cyclists (where snow is pushed)
	Site Plan Process	<p>Traffic</p> <ul style="list-style-type: none"> • Broaden traffic impact assessments to include examining impacts on cyclists and pedestrians • Consider requiring entrance designs shown in plan and section to include provisions for pedestrian and cyclist entrances and crossings • Consider expanding restrictions for additional entrances if they would impact on the movement of people and not only on traffic flow
Expand and create programs that shift behaviours to encourage more people to walk and cycle	Official Plan	<p>12.0 Transportation</p> <ul style="list-style-type: none"> • Support a pedestrian and cycling coordinator to oversee the implementation of the plan • Have the Coordinator collaborate with the health unit on Safe Routes to School programs, active living and physical activity programming and communications/social marketing campaigns and events
	Recreation Master Plan	<p>Recreation Programs</p> <ul style="list-style-type: none"> • Tailor existing programs to better support cycling and walking • Provide new programs to deal with gaps in the stages of changing behaviour e.g., learn-to-bike and CanBike programs for all ages • Coordinate with the AT Coordinator, the AT Advisory Committee and public health to develop new and regular AT events e.g., Bike Sundays, walk for health fundraisers, etc.