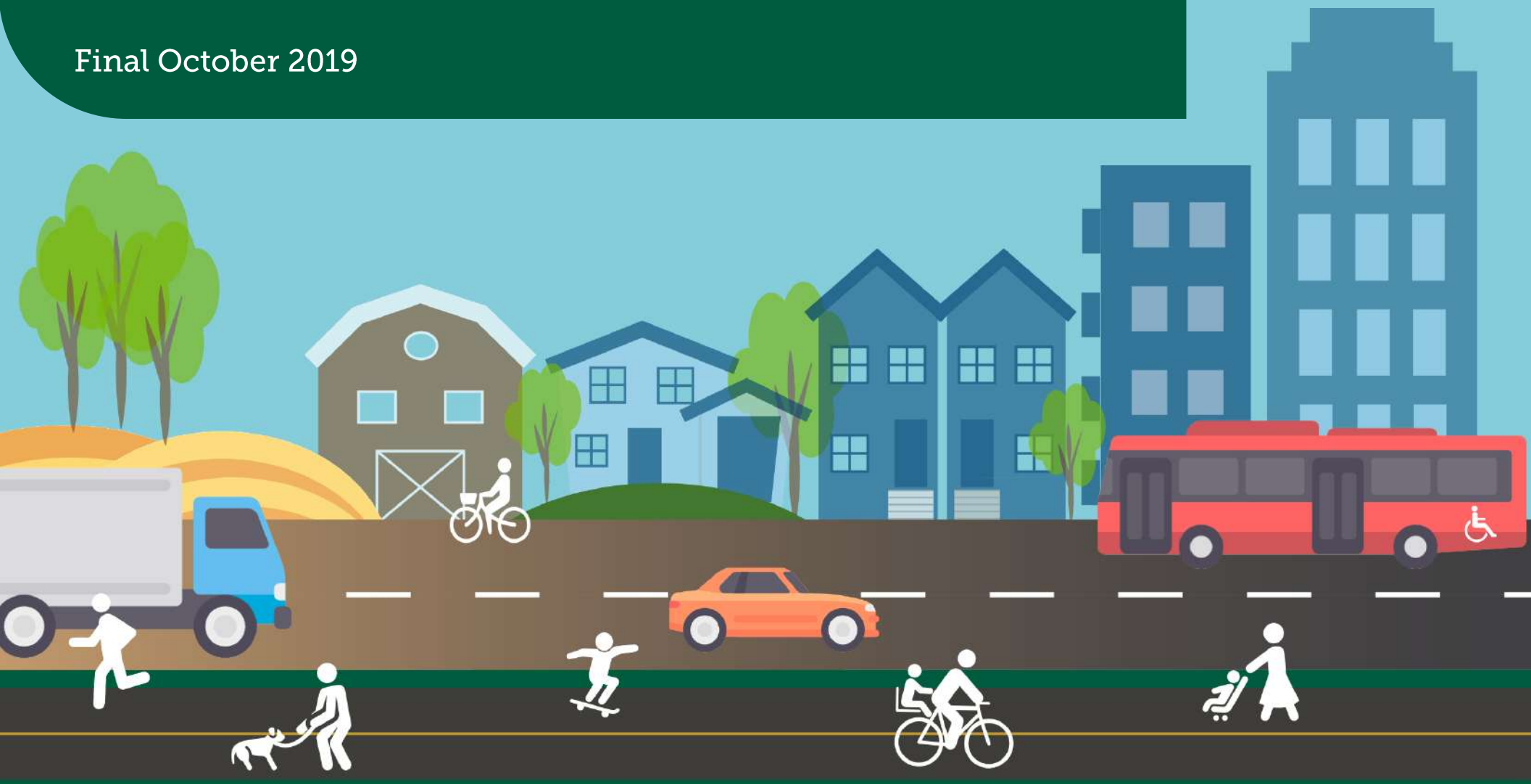
Town of Lincoln
Transportation Master Plan

Final October 2019



Make Moving Make Sense as We Grow!

Town of Lincoln

wsp


WELCOME TO
The Town of
Lincoln
POPULATION 23,787
Niagara Region

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Greenbelt
Walks
BRUCE TRAIL
NIAGARA TO TOBERMORY
GREEN BELT
Close to nature.
Close to home.

EXECUTIVE SUMMARY

INTRODUCTION

The Town of Lincoln's first Transportation Master Plan (TMP) has been designed as a long-range, integrated transportation guide and blueprint which provides flexible tools and strategies to support transportation decision making over the next 20 years and beyond. A TMP establishes the vision for transportation services by first assessing the existing transportation system performance, forecasting future travel demand and then defining actions and policies to address Town needs with respect to active transportation, transit and road infrastructure and services.

The purpose of the TMP is to help Lincoln address population growth, align with Provincial and Regional government policies, enhance community benefits and proactively respond to new transportation trends. The TMP has been prepared under the Municipal Class Environmental Assessment (MCEA) process for master plans and addresses both Phase 1 (opportunity statement) and Phase 2 (assessment of alternatives). Through two engagement rounds that involved technical committee workshops, public information centres, online surveys, and Council presentations, the Town of Lincoln adopted public consultation and engagement as a core component while developing this TMP. The Town used an audience-focussed consultation approach applying qualitative and quantitative data collection methods to maximize the impact of stakeholders' feedback.

The TMP develops transportation policies, plans, and strategies geared towards moving Lincoln residents around town in a safe, comfortable, enjoyable and efficient way. It addresses the primary modes of transportation including walking and cycling, transit, goods movement and roads in a manner that aligns with the Town's Vision, Mission, and Values.

EXISTING CONDITIONS

It is important to understand where Lincoln is today to set a vision for where the Town wants to be in the future. Existing conditions were examined under two key lenses: the socio-demographic make-up of the community and travel patterns, and the existing transportation infrastructure. The Town's population is expected to grow steadily at an annual growth rate of one percent from approximately 23,000 residents in 2016 to nearly 32,000 by 2041. Similarly, employment within the Town is also expected to grow at the same rate to approximately 14,700 jobs in 2041.

One of the key aspects of a TMP is to understand travel patterns and behaviour of people to and from, and within the Town to ensure that adequate transportation networks are provided to meet demand. Currently, the most utilized mode of transportation for trips entering and exiting Lincoln during the morning and afternoon peak periods is single-occupant vehicle or auto-driver at 90% and 95% for outbound and inbound trips, respectively. Considering the high auto driver mode share, a review of auto ownership data determined the Town currently has a car ownership rate of 2.1 vehicles per household,

higher than the 1.7 vehicles per household rate for the entire Niagara Region. Today, approximately 35% of the outbound trips remain in Lincoln, which is higher than trips to any one of the surrounding municipalities. This indicates a strong potential for the use of alternative modes of transportation beyond the single occupancy vehicle for trips starting and ending in Lincoln.

TMP PRINCIPLES

There are 10 main objectives for the Town's TMP, including:

- An assessment of the current state of the Town's transportation network, including recommendations for network optimization and improvements to address growth and travel demand based on a horizon year of 2041.
- Traffic assessment of intersections within regional corridors, signal warrants and road rationalization review.
- Access major goods movement facilities with high volumes of trucks and escarpment crossing for potential operational and safety issues and provide policy and planning implications and recommendations.
- Develop an Active Transportation Masterplan that provides a high-quality connected network (pedestrian, cycling and trails) based on a set of priorities and coordination with the Town's Parks Master Plan.
- A Traffic Calming policy to aid in decision-making about traffic calming on local roadways.
- An assessment of current on-street parking policy and by-law.
- A complete Streets policy to balance the needs of all transportation modes while improving the attractiveness of the Town's streetscapes.
- A feasibility analysis of promoting transit service to and within the Town, to reduce car dependent travels.
- A consultation process to coordinate and establish partnerships with community and agency stakeholders, engaging a wide variety of local interests and soliciting opinion to inform the recommendations of the TMP.
- TMP to comply with the requirements of the current Municipal Class Environmental Assessment document.

Understanding the objectives of the study, existing conditions of the transportation networks, and existing Town, Regional and Provincial policies helped inform the development of the Town's Opportunity Statement, which reads:

The opportunity presented through the Town's first TMP is to enhance the integrated transportation network for the benefit of current and future generations, and to support the urban form advanced by the Growth Plan for the Greater Golden Horseshoe.

The TMP will help the Town leverage resources to provide increased transportation options for the community. It will also provide a strong voice to influence decisions on public transit, enhanced GO Transit service, and transportation infrastructure investments that will continue to make Lincoln an attractive place to locate well planned residential neighbourhoods.

Multiple public consultation and engagement opportunities were offered throughout the duration of the study. These were published through the project website, social media, and newspaper notices, and consisted of two Council workshops, two technical stakeholder workshops, four public information sessions or events, two rounds of online surveys, two Town Committee working sessions and one presentation to Council. All the comments, input, and feedback from stakeholders and the public were grouped, mapped, and assessed to help inform the recommendations in the TMP.

FUTURE CONDITIONS

A holistic approach to transportation planning that considers all transportation users and all modes of travel when planning, designing and implementing transportation routes, facilities and improvements was utilized to develop the Town's first TMP. All input received from the various consultation events were considered and combined with technical analyses, staff knowledge, and best practices to create tailor-made solutions for the Town of Lincoln. An overview of the approach used to assess and evaluate potential improvements for each mode of transportation is provided below with a summary of recommendations provided in the next chapter.

Active Transportation

Through discussions with Town Council, staff, stakeholders, and the public, it was clear that there was significant interest in implementing a set of active transportation (AT) routes which create a continuous and connected system as opposed to implementing AT routes as roadways come up for redesign or budget becomes available. Building upon the existing active transportation routes, facilities and programs that have already been implemented by the Town and its partners, the Town embarked on a network development process to identify a connected and continuous network of on- and off-road active transportation routes, facilities and amenities. Five priority loops were identified consisting of a combination of facility types including cycle tracks, in-boulevard trails, buffered paved shoulders and bike lanes, regular paved shoulders and bike lanes, signed routes, off-road trails and walking trails. An active transportation strategy (ATS) focusing specifically on the design and implementation of active transportation routes and facilities was undertaken alongside the TMP. For additional details about the AT portion of Lincoln's transportation system, please refer to the ATS.

Transit

The approach to transit is to encourage future coordination between Niagara Region and GO Transit to achieve a cohesive and comprehensive transit network within Lincoln, with viable connections to the surrounding municipalities. The process used to address transit in Lincoln was designed to address expanding local service (uLinc), welcoming regional service (Niagara Region Transit) and planning for inter-regional service (GO Transit). With the recent addition of a Transit Coordinator, the Town is in a better position to facilitate efforts to implement local transit initiatives and assist the Region and GO Transit in their own transit pursuits impacting Lincoln.

Goods Movement

An important component of this TMP is to identify viable solutions that will help protect and preserve the quality of life in urban areas and provide for efficient goods movement. Input and feedback generated over the course of developing the TMP included a significant focus on the challenge trucks pose to the quality of life, specifically in downtown Beamsville. To address goods movement within the Town, a two-step approach was used including a review of previous studies followed by an assessment of future traffic volumes and its impact on goods movement. The challenges regarding goods movement are multi-faceted and the solutions will require cooperation between multiple municipalities and different levels of government. New truck by-pass routes for Beamsville were identified as the interim solution, with an ultimate solution involving Niagara Region and other municipalities.

Road Network

In compliance with Phase 2 (alternatives assessment) of the MCEA process, five future alternatives for Lincoln's road network were studied using Niagara Region's transportation model and transportation principles considering multi-modal mobility and congestion. The alternatives used in the modelling analysis built upon the existing conditions to the planning horizon year of 2041 using the approved Niagara Region population and employment forecasts. A five-step approach was used to review, assess and identify improvements to the road network including establishing an evaluation criteria and framework, determining the road network alternatives, evaluation of the alternatives to select the preferred road network, and the provision of localized recommendations for intersections to enhance safety and optimize performance.

SUPPORTING POLICIES

Lincoln's TMP also provides a toolkit of five policies to support infrastructure investment and help achieve an inclusive, safe, and innovative transportation network. The Complete Streets policy will work as a manual to designing more attractive streets that are accessible for users of all ages and abilities. As part of the TMP, a tailored traffic calming policy has been prepared to outline a transparent, objective, and data-driven approach to address traffic calming requests. The policy is focused on addressing the negative impacts of high motor-vehicle speeds and traffic volumes in residential local and collector streets.

On-street parking tends to be the most desirable public parking facility for sharing since it is highly visible and convenient. The Lincoln context for on-street parking is focused primarily in new urban residential areas and revolves around the need to provide adequate on-street parking to accommodate residential demand. This concern is more prominent during the winter months, especially during snow events. A series of recommendations have been made to improve parking management. Key recommendations include conducting a zoning by-law review to determine appropriate residential and visitor parking requirements, as well as establishing a strategy to evaluate the need for overnight parking restrictions in residential areas if problems persist. Doing so will help to ensure effective usage of on-street parking supplies in Lincoln.

A policy to improving multi-modal operations seeks to reduce car-dependency and congestion while providing alternative travel mode options. The transportation demand management (TDM) policy intends to develop a balanced transportation system that provides a full range of travel choices through infrastructure, programming, education, and marketing of alternative modes of transportation. Through a Vision Zero policy, road safety is emphasized and proposes guidelines to develop a strategy with the goal of eliminating road traffic deaths and serious injuries within the Town. A policy to help prepare for new mobility technologies is also recommended with the development of ride-sharing apps, electric vehicles, and autonomous vehicles. These policies will assist the Town in becoming more resilient to change.

IMPLEMENTATION

With the preferred recommended active transportation, transit, goods movement and road network improvements, the project timeframes were divided into short (generally within five years), medium (six years to 2031), and long term (2032 to 2041 and beyond). Estimated costs for the active transportation, transit, goods movement and road network have been developed to guide and inform future decision making. Opportunities for funding have also been noted. Finally, an integrated monitoring strategy with a comprehensive data-collection framework was developed to ensure that infrastructure investments translate into desired benefits and that the Town can continue to assess the impact of public policy on key mobility trends and indicators.

SUMMARY OF RECOMMENDATIONS

Lincoln's first TMP provides recommendations that include physical infrastructure projects, policies, and additional studies to strengthen the Town's multi-modal transportation network and make the Town "future ready". The recommendations for active transportation, transit, goods movement and the road network are summarized in **Table ES-1**; the policy recommendations are provided in **Table ES-2**.

The active transportation priority loops, goods movement improvements and road network recommendations are illustrated in **Figure ES-1**, **Figure ES-2** and **Figure ES-3**, respectively.

Table ES-1 | Recommended Transportation Improvements by Phase

MODE	SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
AT	- Local Connecting Primary Loop - Local Spine Link	- Inter-Municipal Primary Link - Local Connecting Secondary Loop - Inter-Community Secondary Loop	- Inter-Municipal Secondary Link - Tertiary Loop
Transit	- Ensure uLinc schedules are coordinated with the GO Transit schedule - Continue monitoring ridership and implement customer satisfaction surveys - Consider integrating ride-sharing - Consider adding an additional bus to the transit fleet if additional resources are needed	- Provide appropriate support and efforts for Regional initiatives	- Refine uLinc routes and scheduling to coordinate with Beamsville GO train

MODE	SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
Goods Movement	- Create a truck route network that bypasses the Beamsville core - Restrict through trucks on Ontario and King within Beamsville core - Support any remaining studies, implementation and construction of the Park Road to Bartlett Avenue connection to the QEW - Work with the Region to develop and implement traffic safety improvement measures - Work with the MTO, Niagara Regional Police, and the Region initiate frequent truck safety inspection/ enforcement blitzes - Develop enforcement strategies with MTO and the Region for truck traffic bypassing of the QEW inspection station	- Continue working with the Region to develop and implement traffic safety improvement measures - Continue working with the MTO, NRP, and the Region to initiate frequent truck safety inspection/enforcement blitzes	- After the Park / Bartlett, Grimsby connection is open, transfer Mountain Road from Fly Road to King Street from Region to Town - Prohibit trucks on this section of Mountain Road
Roads	- King / Nineteenth / Main intersection improvements and signalization, as part of the Jordan Village EA - Bartlett roadway modifications from King to South Service Road - Durham roadway modifications from King to South Service Road - Greenlane roadway modifications from Durham to Lincoln - King / Stadelbauer / West intersection signalization - King / Mountain intersection improvements - Victoria / South Service Road intersection improvements	- Widen Ontario Street from Greenlane to south of Union while continuing to work with the region to improve safety in the interim - Greenlane roadway modifications from Lincoln to Bartlett - Lincoln roadway modifications from King to South Service Road - Identify a new east-west collector road to replace lake front roads (Lakeside Drive and Lakeshore Road)	- Greenlane roadway improvements from Bartlett to Victoria

Table ES-2 | Identified Policy Recommendations

POLICY	LIST OF RECOMMENDATIONS
Complete Streets	- Appoint a committee to monitor and evaluate the execution of the Policy. - Define measurable outcomes and establish a baseline of indicators to monitor success. - Regular review of potential candidate projects. - The Committee will advise the relevant Implementation Partners to follow the best design guidelines according to the nature of each project and ensure that coordinated efforts are adopted between departments/agencies during the implementation to optimize fiscal resources. - Provide regular training and education on Complete Streets policies and best design practices through workshops, seminars, conferences or other events. - The Town will prioritize and approve current and future sources of funding, based on the expected impact and scope of Complete Streets candidate projects. - Education and promotion of active transportation to improve road-use behaviour. - Incorporation of Complete Streets principles into all existing plans, manuals, regulations and programs, as appropriate to ensure consistent application.
Traffic Calming	- Adopt and begin implementing the Traffic Calming Warrant and Policy developed as part of this TMP.

POLICY	LIST OF RECOMMENDATIONS

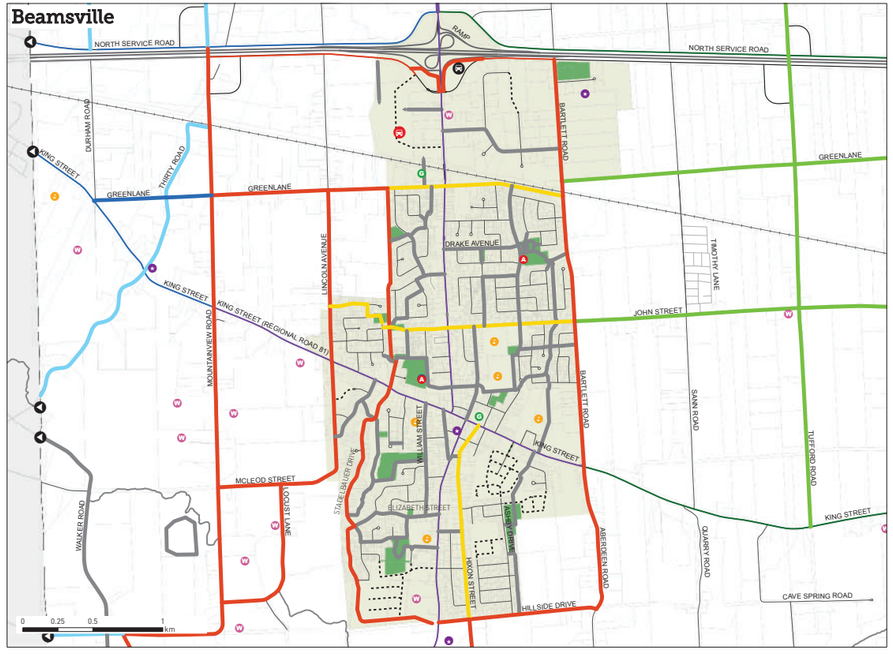
On-Street Parking	- Conduct a zoning by-law review to determine appropriate residential and visitor parking requirements
	- Consider establishing appropriate time limits of up to three hours in locations where on-street parking is in high demand
	- Consider the following improvements and uses of municipal parking lots:
	  o Designate carpool parking spaces in highly desirable lots to promote carpooling over single-occupant vehicle travel
	  o Provide secure bicycle parking in highly desirable lots to promote cycling over driving
	  o Provide overflow parking for nearby land use, special events, and snow events when on-street parking is discouraged
	  o Consider alternative uses for underutilized municipal parking lots
	- Initiate an education campaign to clearly communicate on-street parking restrictions to the public
	- Launch a “Clear Your Garage” campaign
	- Establish a strategy to evaluate the need for overnight parking restrictions in residential areas, if problems persist. Consider seasonal restrictions (winter) as part of this strategy.
	- Include shared parking in the next zoning by-law review;
	- Permit shared parking in mixed-use developments provided that a satisfactory parking justification report is submitted
	- Promote shared parking through the provision of public (municipal) parking within the intensification areas
	- The Town of Lincoln should consider future ready parking improvements which could include but are not limited to:
	  o Designate off-street pick-up and drop-off facilities
	  o Continue to consider on-street accessible parking space applications, upon request
	  o Implement a paid On-Street Permit Pilot Program for residents requiring on-street parking
	  o Monthly permit parking in a municipal parking lot in substitution for on-street parking permits
	  o Implement car share spaces in high density areas

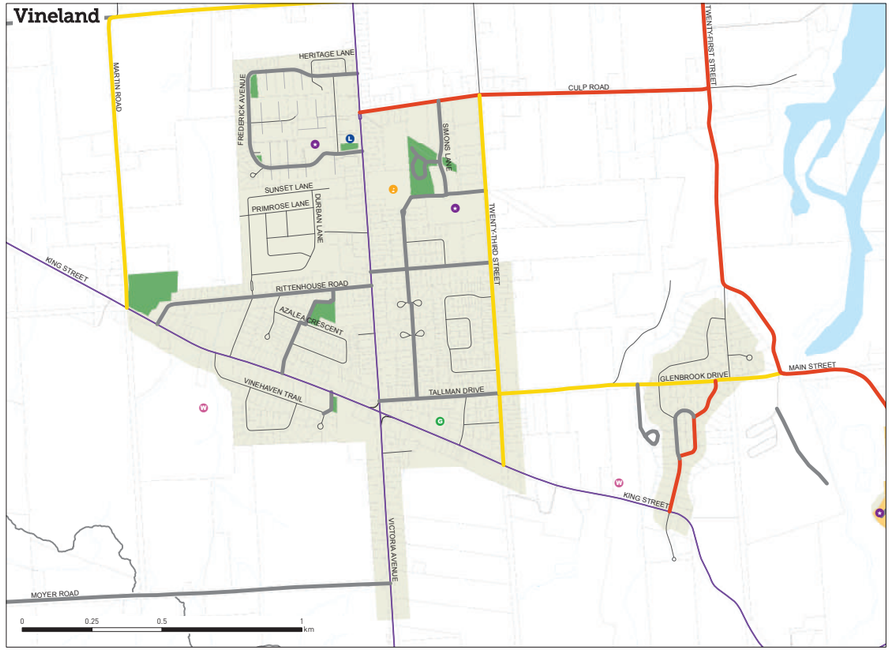
POLICY	LIST OF RECOMMENDATIONS
TDM	- Appoint a Sustainable Mobility Coordinator to administer and monitor the program. - Develop and promote a TDM page within the Town's official website. - Collaborate with the Region and Town's departments to gain larger support. - Create a working group that consists of local cycling and pedestrian groups, car sharing services, school boards and community groups. - Review and partake in Niagara Region's TDM initiatives. - Engage with all relevant stakeholders and if possible hold public consultation or social marketing events. - Support and prioritize land use policies which leverage TDM initiatives. - Engage with local employers to promote workplace programs that support the needs of commuters, including those at remote locations and employed as shift-workers. - Develop personalized travel planning programs that provide information of multi-modal transportation options to meet the needs of individuals and households. - Consider introducing car share and bikeshare programs through public-private partnerships. - Conduct small scale, neighborhood pilot projects. - Design an incentives program with the support of local businesses and public agencies. - Expand the scope of transportation planning projects to include consideration of all modes. - Consider the role of developing a multi-modal search engine that provides navigation information and the ability to find commute partners for walking, cycling, carpooling, and riding transit. - Develop measurable and attainable goals such as a volume reduction %.
Future Ready	- Develop a Road Safety Action Plan specifically tailored for Lincoln in coordination with the Region. This plan should be evidence-based, include ambitious road safety goals and directives for the preferred countermeasures, community initiatives, pilot studies, education programs, and developed in collaboration with internal and external stakeholders. - Continue to monitor emerging technologies and their impact on travel behaviour.

Figure ES-1

Proposed Active Transportation Priority Loops

Town of Lincoln TMP | Draft August 2019





Legend

Priority Routes

Municipal	Region / Provincial / Other[1]
	Local Connecting Loop - Primary
	Local Connecting Loop - Secondary
	Inter-Municipal Link - Primary
	Inter-Municipal Link - Secondary
	Inter-Community - Primary
	Inter-Community - Secondary
	Local Spine Link
	Tertiary

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Connection to Surrounding Municipality

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note:

1. Includes routes located on roads and lands owned and / or managed by Niagara Region, the Ministry of Transportation Ontario and the Bruce Trail Conservancy.

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Figure ES-2

Recommended Goods Movement Improvements

Town of Lincoln TMP | Draft August 2019

N

BARTLETT AVENUE
PARK ROAD SOUTH
BLEZARD DRIVE
THIRTY ROAD NORTH
ACRES TRACE
LISTER ROAD
RAMP
QUEEN ELIZABETH WAY
NORTH SERVICE ROAD
SOUTH SERVICE ROAD
SOUTH SERVICE ROAD (REGIONAL ROAD 40)
DRIVE
HINAN DRIVE
DURHAM ROAD
CHRISTIE
UNION ROAD
GREENLANE
THIRTY ROAD
CEDARBROOK LANE
HOMESTEAD DRIVE
DRAKE AVENUE
CAMERON AVENUE
ALLAN COURT
DENNIS AVENUE
JOHN STREET
LINCOLN AVENUE
ONTARIO STREET
CENTRAL AVENUE
AREJAY AVENUE
KING STREET (REGIONAL ROAD 81)
KING STREET
HILLVIEW DRIVE
BARTLETT ROAD
MOUNTAINVIEW ROAD
MCLEOD STREET
WILLIAM STREET
STADELBAUER DRIVE
ELIZABETH STREET
LOCUST LANE
ASHBY DRIVE
BARRY DRIVE
HIXON STREET
MOUNTAIN STREET
HILLSIDE DRIVE
ABERDEEN ROAD
KONKLE ROAD
EDELHEIM ROAD
WALKER ROAD
ZIMMERMAN ROAD
MOUNTAIN ROAD
KINSMEN ROAD
FROST ROAD
PHILP ROAD
FAIRBROTHER ROAD

0 0.5 1 2 Kilometers

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Legend

Interim

- Proposed Through Truck Route
- Proposed Through Truck Prohibition

Ultimate Solution

- Park Rd - Bartlett Ave - QEW

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Railway

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Lincoln *Make Moving Make Sense as Lincoln Grows!*

Figure ES-3

Recommended Road Network Improvements

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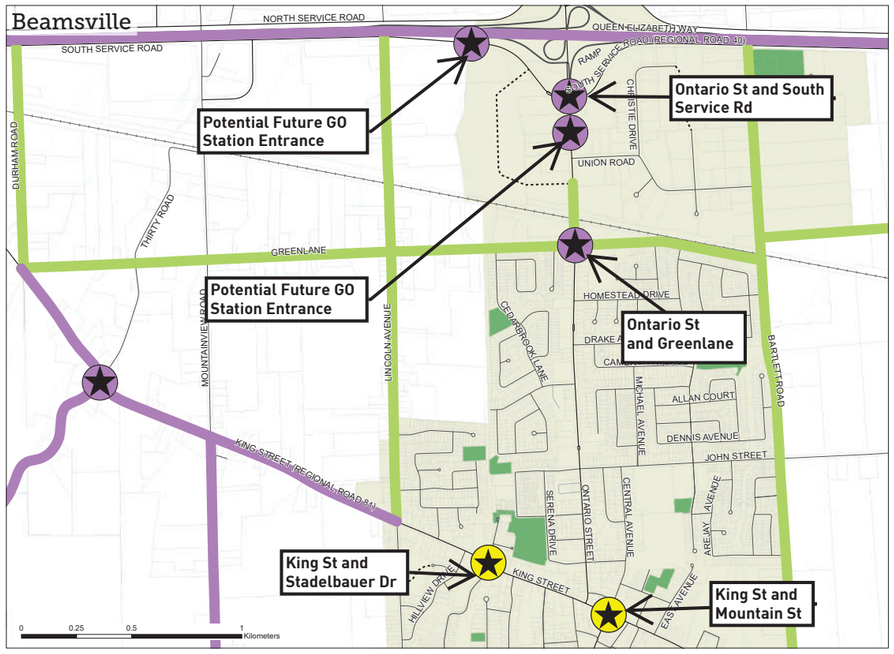

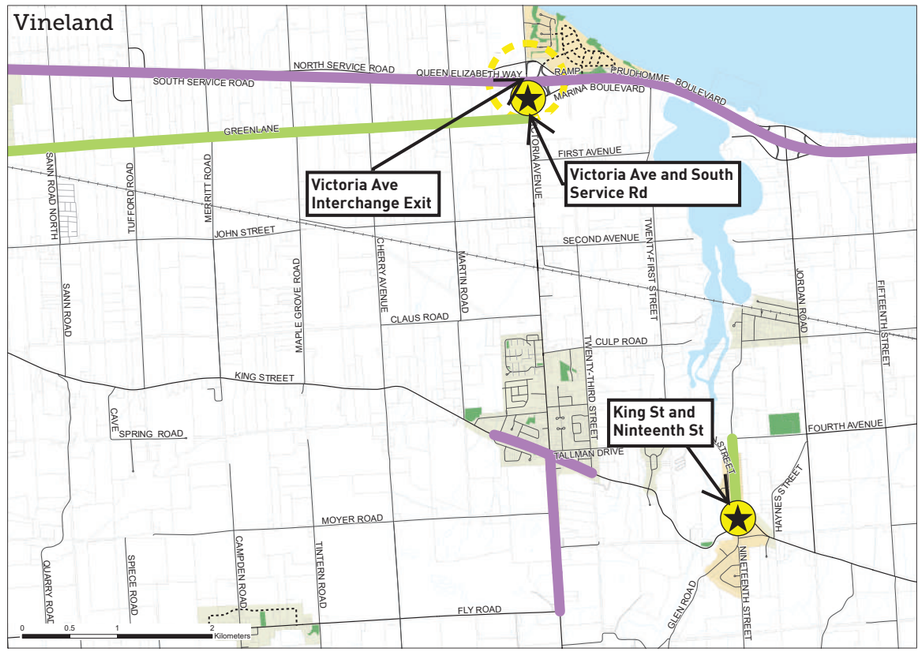

Legend

Town Led Road Improvements

- Intersection Improvement
- Road Improvement
- Potential Future East-west Collector Study

Improvements Led by Others

- Intersection Improvement
- Road Improvement
- Interchange Improvement

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Potential Transit Station

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Town of Lincoln — *Make Moving Make Sense as Lincoln Grows!*

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CHAPTER 1.0 | INTRODUCTION

The Town of Lincoln's first Transportation Master Plan (TMP) has been designed as a long-range, integrated transportation guide and blueprint which provides flexible tools and strategies to support transportation decision making over the next 20 years and beyond. Lincoln is located between the southern shore of Lake Ontario and the Niagara Escarpment, within Niagara Region. Lincoln is comprised of eight communities, Beamsville, Campden, Jordan, Jordan Station, Rockway, Tintern, Vineland and Vineland Station.

Lincoln's three largest communities include Beamsville, which is also the administrative and commercial centre, Jordan and Vineland. Lincoln is well known for its orchards, vineyards, wineries and restaurants, resulting in significant tourist activity during the summer months. According to the Census Canada data, Lincoln had a population of approximately 23,800 people in 2016, which was almost a six percent increase since 2011. Detailed population and employment statistics and future projections will be discussed in **Chapter 2**.

The overall intent of this document is to develop transportation policies, plans, and strategies geared towards moving Lincoln residents around town in a safe, comfortable, enjoyable and efficient way.

1.1 CONTEXT

The following sections provide an overview of what, why and how the TMP was developed to create a greater understanding of the foundation and assumptions upon which it was developed.

1.1.1 What: A Transportation Master Plan

A TMP establishes the vision for transportation services by first assessing the existing transportation system performance, forecasting future travel demand and then defining actions and policies to address Town needs with respect to active transportation, transit and road infrastructure and services. A TMP is intended to be the foundation on which transportation decision-making will be based for the next 10+ years. It is also intended to be a flexible tool used for different purposes by different staff, stakeholders and decision makers, as described in **Table 1**.

A TMP is typically updated every five to 10 years to address changing social and economic dynamics and addresses these changes in a community-specific and proactive manner. A strong and reliable TMP is intended to align with a community's strategic plan and other planning initiatives to achieve its goals. Therefore, this document will be revised and enhanced within the coming years, as Lincoln continues to change.

Table 1 | Transportation Master Plan Purpose Overview

Community building asset	A guide to improve community services and infrastructure.
Communication tool	A tool to help better communicate with various audiences and groups about key issues.
Support for partnerships	A support for coordination and collaboration with existing and future partners to support implementation.
Community vision	A cohesive and aspirational vision for the future of transportation within Lincoln that is also realistic for the community.
Implementation guide	A next guide to support the short, medium and long-term next steps and processes to facilitate implementation.
Decision making tool	A tool to support those involved in implementation with future decision making.
Integrated multi-modal plan	A strategy which addresses and integrates all modes of transportation in a cohesive manner.

1.1.2 Why: Study Purpose

It is important to clearly define why a Transportation Master Plan is being developed. The Lincoln TMP was developed for four primary reasons which are outlined below.

#1: Address our growth...

Lincoln is expected to experience growth within Beamsville, Jordan and Vineland, in terms of local employment and population. Considering the space limitations due to the proximity to the Niagara Escarpment, Lincoln needs to adapt its transportation infrastructure and policies to meet the current and future needs of transit users, pedestrians, cyclists and drivers in a variety of urban and rural settings. This will involve a mix of short, intermediate and long-term initiatives.

#2: Align with existing policies...

Recent policy directives from the provincial government, Niagara Region, and the Town have all refocused the vision for urban development in Lincoln and throughout southern Ontario. The vision is to better utilize infrastructure investment by optimizing the land uses in developed areas and creating hubs that include all modes of transportation. As a result, Lincoln intends to develop its TMP to align with these existing government policies, which are reviewed in **Chapter 3**, and its Vision, Mission and Values in a manner that addresses the needs of its own growing population and changing community dynamic.

#3: Enhance community benefits...

The Town recognizes the benefits of a long-range planning approach to define, prioritize, and build transportation infrastructure over an extended period to bring about a gradual change in the transportation system. This approach will be taken in the preparation of the TMP, allowing the Town to proactively address transportation issues and make informed decisions about capital investments in infrastructure.

#4: Address new transportation trends...

The Lincoln TMP explores the greater opportunities for connectivity, for all "sustainable transportation" measures, including walking, cycling, transit and transportation demand management. It also recognizes that the nature of transportation is changing. Mobile technology and new ways of providing mobility services are giving people more travel options. The intent of the document is to identify ways that these new transportation opportunities can be integrated into day-to-day life. Lincoln's TMP explores specific opportunities surrounding the future Lincoln GO station in Beamsville, to connect more of the Town's population to nearby employment areas and markets in Niagara Region, Hamilton and further afield.

The TMP also aims to identify enhanced active transportation options, transportation demand management strategies, transportation policies and parking management initiatives to improve the efficiency and effectiveness of Lincoln's transportation network. Developing a TMP enhances Lincoln's existing transportation facilities in the short-term and sets a course towards a more sustainable, integrated, and multi-modal transportation system in the future.

1.1.3 How: Environmental Assessment Process

Lincoln's TMP was developed as a collaboration between the Town and WSP (the leading consultant team), and included significant input and engagement with community residents, local stakeholders and interest groups, Lincoln Town Council, as well as the surrounding jurisdictions and governmental agencies. The TMP was developed in accordance to the Municipal Class Environmental Assessment Process for master plans, which requires the following key steps and stages:

- Development of an opportunity statement, objectives and an overall TMP vision (Phase 1);
- Alternative scenarios development and evaluation, leading to a preferred alternative (Phase 2); and
- Engaging public representatives and stakeholders at least twice over the course of the study.

The Municipal Class Environmental Assessment process (October 2000, amended in 2007 and 2011), sets out a methodology in accordance with the Environmental Assessment (EA) Act for municipal infrastructure projects. Master Plans are required to complete Phases 1 and 2 of the five-phased Municipal Class EA process, which are:

- Phase 1 - Identify the problem (deficiency) or opportunity; and
- Phase 2 - Identify alternative solutions to address the problem or opportunity by considering the existing environment and establishing the preferred solution.

Completion of Phases 1 and 2 allows the Town to move on to implementation of any Schedule A, A+ or B projects and allows the Town to continue to Phase 3 (Assessment of Design Alternatives) for the recommended projects that fall under Schedule 'C' of the Class EA Document. Further consultation will be required for any Schedule 'C' projects.

1.2 CONTENT

The TMP, with collaboration and comprehensive consultation, tells the story on how Lincoln will move towards a more integrated and sustainable multi-modal transportation system. Over the course of the TMP preparation, two rounds of engagement were undertaken with the goal of integrating and understanding the opinions, interests and priorities of various stakeholders including but not limited to technical agencies, Council members, staff, residents and interest groups. The TMP was launched in September 2017 to address the following four key transportation topics:

WALKING & CYCLING

- Document existing and proposed routes
- Identify improvements and enhancements
- Identify priorities and strategies

GOODS MOVEMENT

- Review and understand past studies
- Investigate existing goods movement patterns
- Develop policies

TRANSIT

- Review existing plans and assess demographics
- Identify potential transit connections
- Develop recommendations

ROADS

- Understand the current roadway conditions
- Assess the needs and intersections
- Identify and evaluate potential improvements

The TMP report shall first assess the current transportation conditions and context of the community, with the goal of determining gaps and opportunities for future improvements. Existing planning policies and input during the consultation process shall be reviewed to provide strategic support for the TMP. The Lincoln TMP shall then identify and develop supporting policies intended to guide the implementation of the TMP, including providing a conclusion and summary of key priorities and recommendations.


MAXIMUM
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tonnes
ON BRIDGE

CHAPTER 2.0 | EXISTING CONDITIONS

For the Lincoln TMP to identify improvements, recommendations and strategies to the Town's transportation network, it is important to identify and understand the current context. The existing conditions addressed in this chapter includes an overview of the local population, demographics, and economic status, as well as existing travel patterns and transportation conditions at key locations within the Town. The chapter also includes current transportation conditions identified including the various mode components of the network including active transportation, transit and road networks and services.

2.1 LINCOLN'S PROFILE

The TMP is shaped by three key conditions:

- The people. Those who live, work and play within the town who utilize the transportation system and travel within, between and to surrounding municipalities.
- The community. The land-use and development trends which are being experienced due to the growth that Lincoln is experiencing.
- The transportation system. The system that allows people to move to and from key destinations throughout the town, to surrounding areas and to regional destinations.

2.1.1 The People

The Town has a population of approximately 23,000 residents, as per the 2016 Census of Canada.

Lincoln's population is forecast to steadily grow at an annual growth rate of one percent to approximately 32,000 residents by 2041, as illustrated in **Figure 1**.

Similarly, the employment within the Town is also expected to grow at a steady annual rate of one percent to approximately 14,700 jobs in 2041.

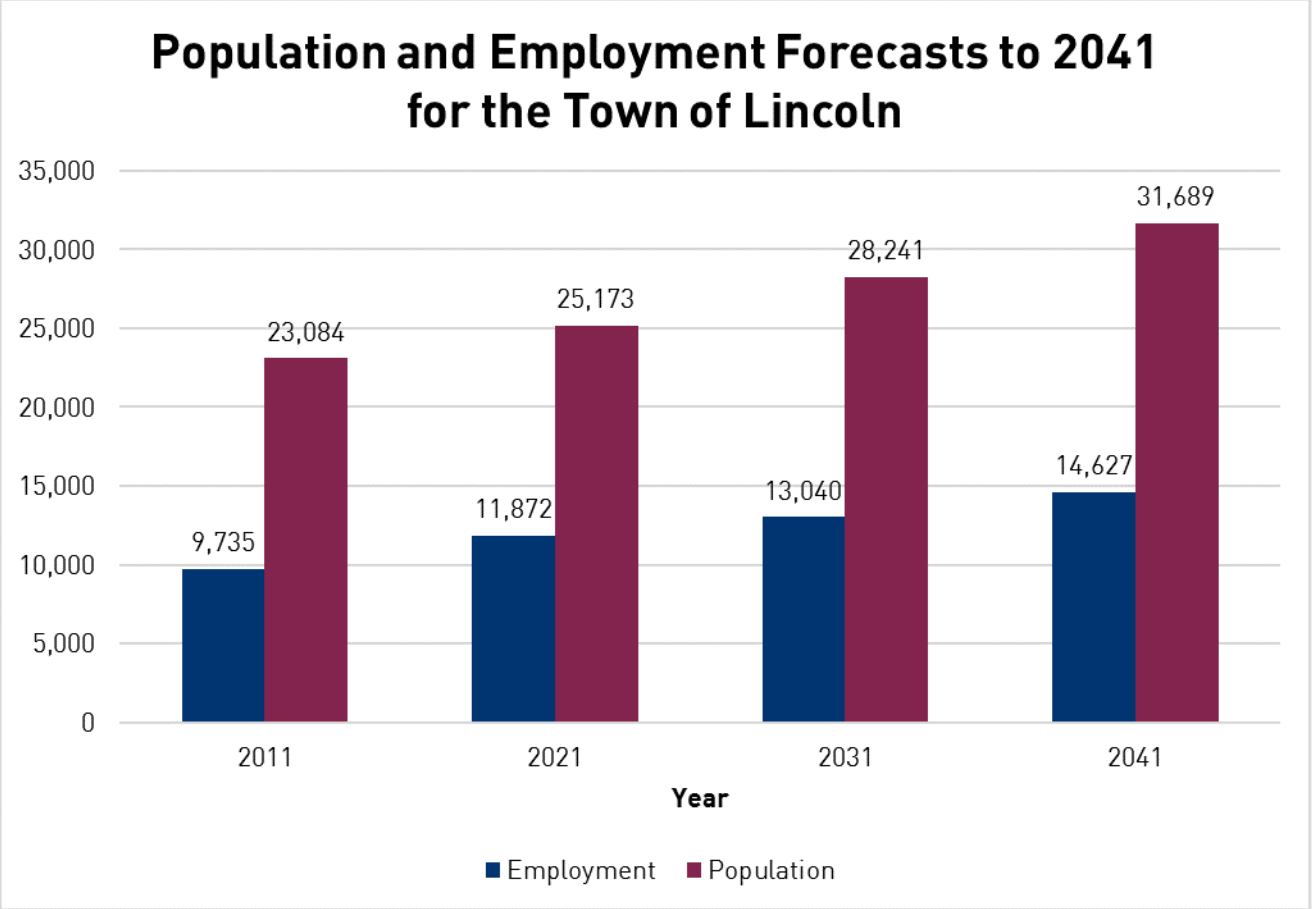


Figure 1 | Lincoln Population & Employment Forecasts to 2041
Source: Niagara Region EMME Model

2.1.2 The Community

Lincoln lies within Niagara Region and is comprised of multiple communities, including Beamsville, Vineland, Jordan, Jordan Station, Prudhommes, Campden, Rockway and Tintern. Combined, these urban and rural areas cover an area of approximately 160 km^2. The main industry which supports the local economy in Lincoln are wineries as Lincoln is located within the heart of the province's world-renowned wine country.

The Town's orchards and vineyards, in addition to the wineries creates a local tourism industry for Lincoln during the summer season. In addition, various aggregate sites for mining and construction currently operate within the community, the major one being the Lincoln Quarry site located in Beamsville.

2.1.3 The Transportation

One of the key aspects of a TMP is to understand travel patterns and behaviour of people to and from, and within the Town to ensure that adequate transportation networks are provided to meet demand. Travel patterns and behaviour are captured in the Transportation Tomorrow Survey (TTS), which is a comprehensive travel survey conducted in the Greater Golden Horseshoe every five years since 1986. The data collected during the survey is maintained in a database and utilized to make transportation planning and investment decisions within local, regional, provincial and transit agencies, among others.

The travel characteristic analyses discussed below are informed by the 2016 TTS data, firstly to obtain an understanding of where people are currently travelling from or to Lincoln. The subsequent discussion will look at how people travel to understand the current transportation mindset within Lincoln, to better approach the challenge of shifting the mindset to more sustainable modes of transportation.

TRIP DISTRIBUTION

To determine where people are going, origin-destination surveys from the 2016 TTS were utilized to assess the morning peak period travel behaviour; the morning peak period typically represents commuter trips travelling from home to work. Often, commuters taking one mode of transportation in the morning peak period will take the same mode of transportation for the return trip in the afternoon peak period. The distribution of the morning peak period outbound trips originating from Lincoln is illustrated in **Figure 2.** It should be noted that these trips include all forms of travel such as auto, transit, walking, cycling and school buses.

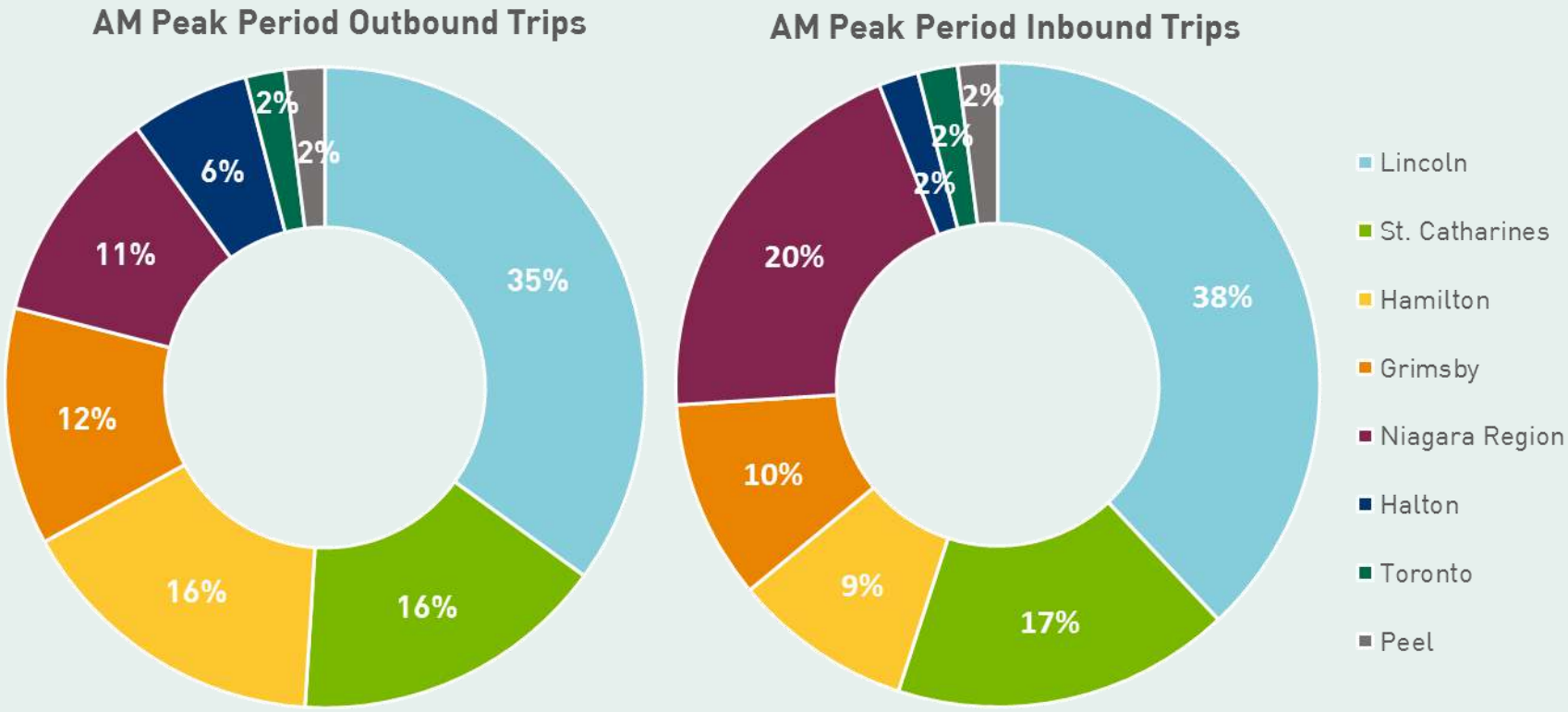


Figure 2 | 2016 AM Peak Period Trip Distribution
Source: 2016 Transportation Tomorrow Survey

As shown in the figure above, approximately 35% of the outbound trips remain in Lincoln, which is considerably higher than trips to any one of the surrounding municipalities. This signifies that a considerable number of trips starting in Lincoln also end in Lincoln which indicates a strong potential for the use of alternative modes of transportation beyond the single occupancy vehicle. Few communities within the greater Toronto and Hamilton Area can boast these types of trends. Leveraging this trip type is a significant opportunity for the Town moving forward.

TRAVEL MODES

As established in the discussion above, most morning trips are internal Lincoln trips, which impact the travel demand on the Town's transportation networks. A review of the mode share was also undertaken to establish travel behaviour in Lincoln and identify potential gaps. The mode split for trips entering and exiting Lincoln during the morning peak period is illustrated in **Figure 3**.

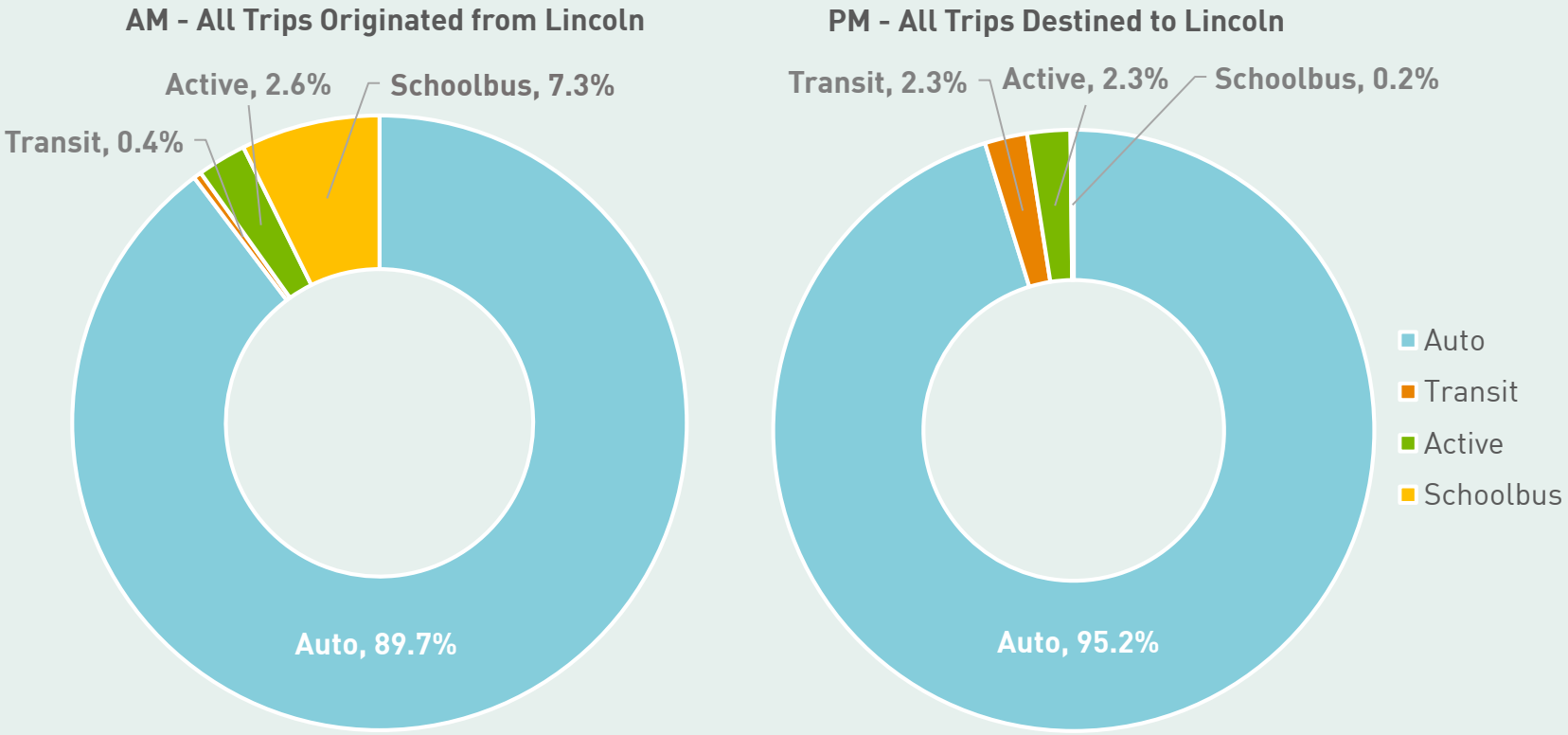


Figure 3 | 2016 AM Peak Period Modal Split
Source: 2016 Transportation Tomorrow Survey

Based on the 2016 TTS data, the most utilized mode of transportation to enter and exit Lincoln is single-occupant vehicle or auto-driver at 90% and 97% for outbound and inbound trips, respectively. As illustrated above, very few trips are made using a more sustainable mode of transportation, with Active Transportation (walking, cycling and other self-propelled forms of transportation) usage at approximately three percent and minimal transit trips.

The change in travel behaviour was also assessed with the review of TTS data from the 2006 and 2011 surveys. The most significant change in travel behaviour in Lincoln was the increase of auto mode share from 69% to 84% from 2006 to 2016. While the Town is working towards improving its transportation infrastructure, the travel patterns assessed still demonstrate a heavy reliance on personal automobiles for the daily trips.

Considering the high auto driver mode share, a review of auto ownership data within the TTS database for Lincoln determined the Town currently has a higher rate of car ownership than Niagara Region. The 2016 TTS data shows auto ownership numbers of 2.1 vehicles per household in Lincoln, compared to the 1.7 vehicles per household for the entire Niagara Region.

2.2 TRANSPORTATION CONDITIONS

Lincoln supports an interconnected network of various transportation modes and services that are planned, operated and maintained by the Town and its partners. Each piece of this system plays a unique role for various trip types and purposes.

One of the primary intents of developing a transportation master plan for the Town is to establish a strategy / approach to create a more multi-modal network of transportation options and alternatives. The TMP was not developed to "reinvent" the Town's transportation network but to built on what is already in place to address existing and future trends.

The following is an overview of the four key transportation systems that make up the Town's existing transportation network. This is comprised of active transportation, transit, goods movement and roads. These networks provide the foundation for the development of the Lincoln TMP network and proposed improvements.

2.2.1 Active Transportation

Active transportation refers to any form of human-powered transportation such as walking, cycling, in-line skating, rollerblading and using a wheelchair. Active transportation plays an increasingly greater role in any transportation network providing opportunities for active first and last mile component of a user's trip as well as more sustainable and environmentally friendly alternatives to the single occupancy vehicle.

There is a total of 148 kilometres of existing active transportation routes and facilities found in the Town of Lincoln. A summary of facility types that make up the existing active transportation network is provided in **Table 2**. The routes are illustrated in **Figure 4a** and **Figure 4b**.

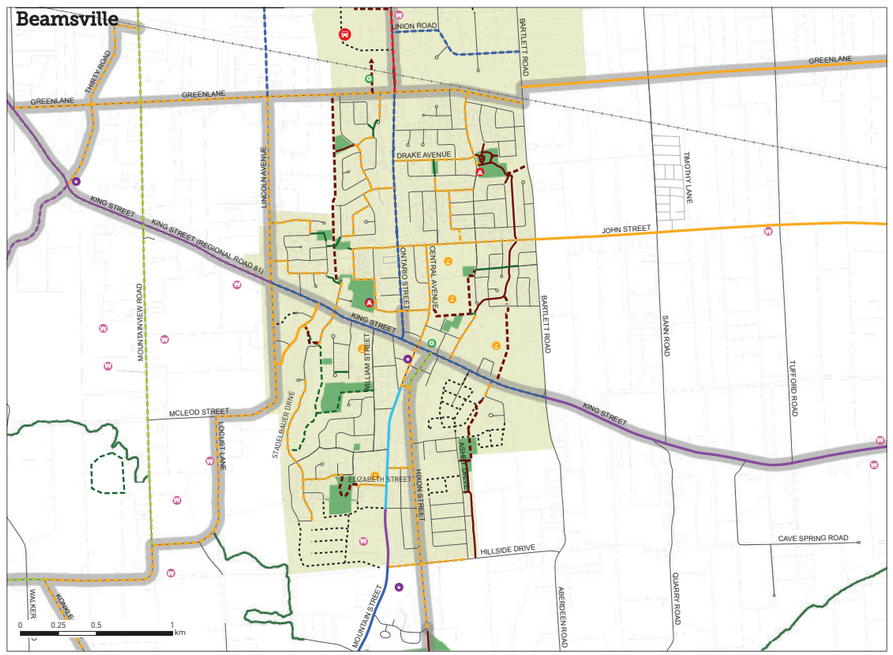
Table 2 | Existing Active Transportation Routes / Facilities

FACILITY	TOWN (KM)	REGION (KM)	OTHER (KM)	TOTAL (KM)
Bike Lane	0	4.6	0	4.6
Paved Shoulder	0.8	51.0	0	51.8
Signed Route	37.8	1.2	0	39.0
Off-road Trail	4.4	0	0	4.4
Walking Trail	2.2	0	46.1	48.3
TOTAL	**45.2**	**56.8**	**46.1**	**148.1**

Figure 4a

Existing & Previously Proposed Active Transportation Conditions

Town of Lincoln TMP | Draft August 2019



Legend

Existing Active Transportation Facility Types

- Bike Lane
- Paved Shoulder
- Signed Route
- Urban Shoulder
- Multi-use Trail
- Walking Trail

Previously Proposed Active Transportation Facility Types

- In-Boulevard Pathway
- Bike Lane
- Paved Shoulder
- Signed Route
- Future Cycling Facility[2]
- Multi-use Trail
- Walking Trail

Regionally Significant Routes and Trails

- Waterfront Trail / Province-wide Cycling Network
- Bruce Trail
- Region of Niagara Cycling Network

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Connection to Surrounding Municipality

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Notes:

1. Information based on the Town of Lincoln Official Plan (2010) - Schedule 'D2' Trail and Bikeway Plan, Beamsville GO Transit Secondary Plan (2018), Town of Lincoln Ontario Street Vision Presentation (2018) and the Niagara Region Transportation Master Plan - Strategic Cycling Network Development Technical Paper (2017).

2. Future Cycling Facility identified in the Niagara Region Transportation Master Plan - Strategic Cycling Network Development Technical Paper (2017). Additional details on specific facility type / design not provided.

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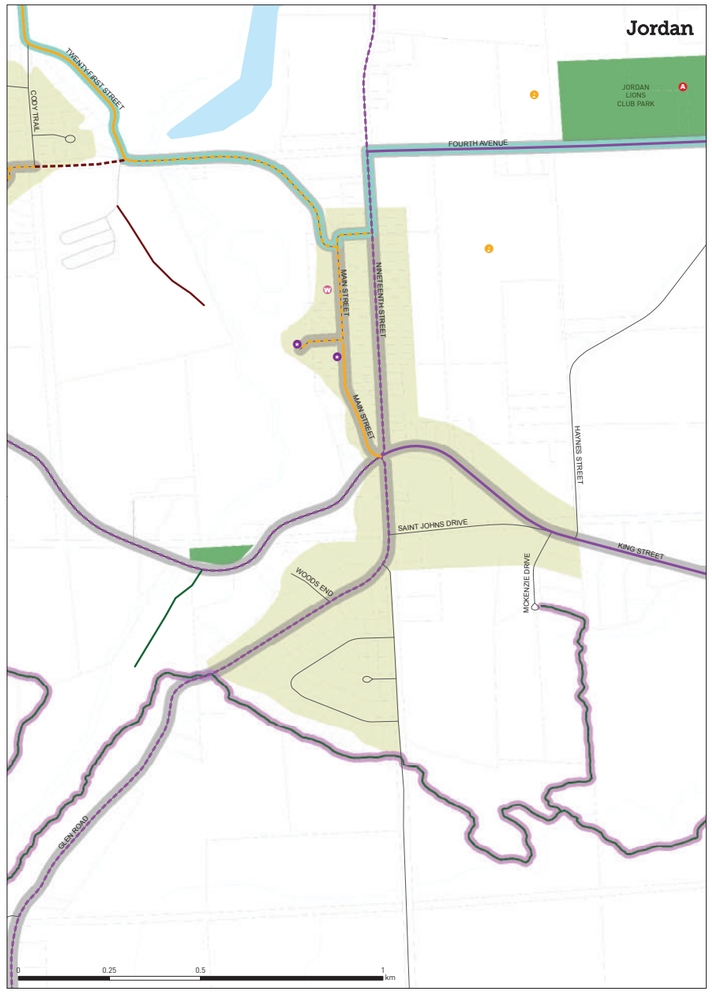
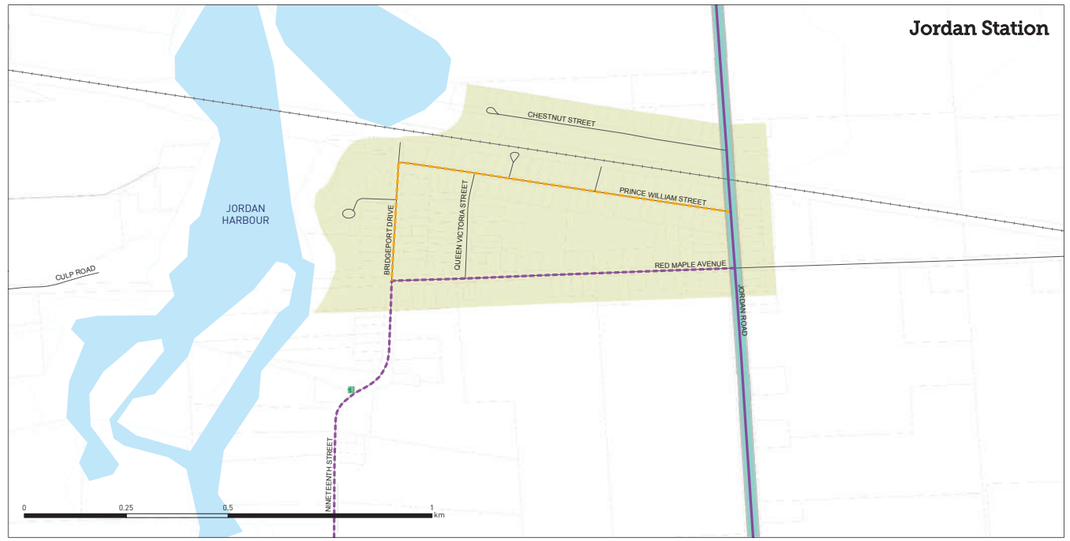
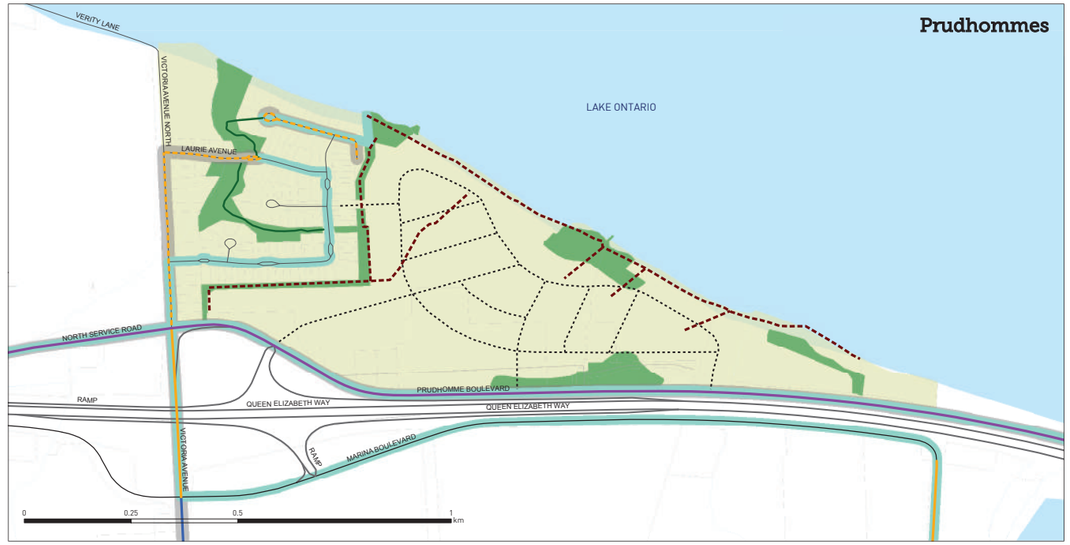
Figure 4b

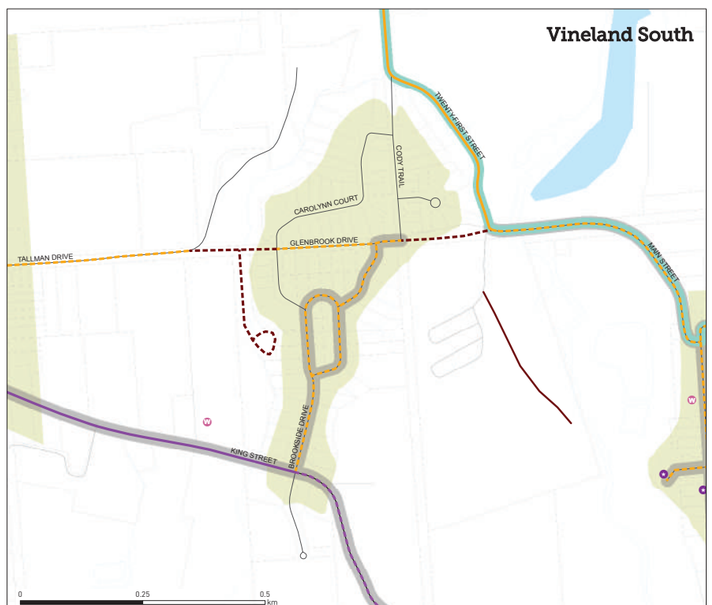
Existing & Previously Proposed Active Transportation Conditions

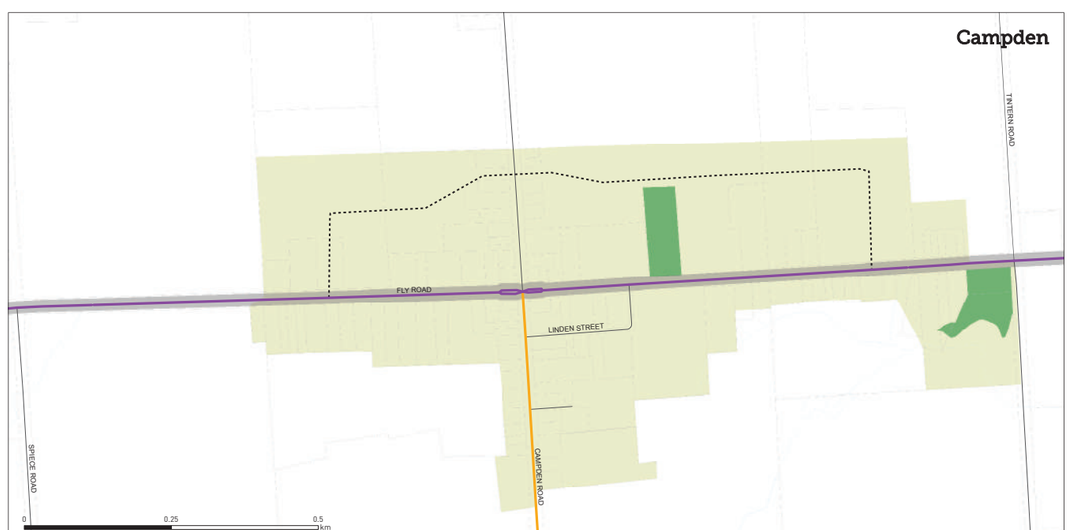
Town of Lincoln TMP | Draft August 2019











Legend

Existing Active Transportation Facility Types

- Bike Lane
- Paved Shoulder
- Signed Route
- Urban Shoulder
- Multi-use Trail
- Walking Trail

Previously Proposed Active Transportation Facility Types [1]

- In-Boulevard Pathway
- Bike Lane
- Paved Shoulder
- Signed Route
- Future Cycling Facility [2]
- Multi-use Trail
- Walking Trail

Regionally Significant Routes and Trails

- Waterfront Trail / Province-wide Cycling Network
- Bruce Trail
- Region of Niagara Cycling Network

Key Destinations

- Arena
- Grocery Store
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Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Notes:

1. Information based on the Town of Lincoln Official Plan (2010) - Schedule 'D2' Trail and Bikeway Plan, Beamsville GO Transit Secondary Plan (2018), Town of Lincoln Ontario Street Vision Presentation (2018) and the Niagara Region Transportation Master Plan - Strategic Cycling Network Development Technical Paper (2017).

2. Future Cycling Facility identified in the Niagara Region Transportation Master Plan - Strategic Cycling Network Development Technical Paper (2017). Additional details on specific facility type / design not provided.

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There are several key components of the existing active transportation network which play a unique role in the overall transportation system. They include:

Waterfront Trail

The Waterfront Trail is primarily an on-road route. The route is aligned along North Service Road and connects to the Town of Grimsby and the City of St. Catharines. Along the same alignment as the waterfront trails is the Province-wide Cycling Network which was identified in May 2018 by MTO. The province-wide cycling network is intended to be a spine system of cycling routes linking various destinations throughout the Province of Ontario with a focus on tourism and cultural destinations.

The Bruce Trail

The Bruce Trail is an 800+ kilometre hiking trail that spans from Niagara Region to Bruce Peninsula. The trail follows the Niagara Escarpment and is located on lands owned by the Province of Ontario, local municipalities, Conservation Authorities, private landowners and the Bruce Trail Conservancy. The Bruce Trail supports local tourism initiatives as it connects hikers to key destinations and local businesses such as wineries in Lincoln. The trail also provides off-road connections to local parks (Kinsmen Park) and communities such as Beamsville and Jordan within the Town.

Niagara Region Bikeway Network

The Region's bikeway network consists of existing and planned routes identified in the Niagara Region Transportation Master Plan (2017) and the Niagara Region Bikeways Master Plan (2003). The intent is to facilitate inter-regional connectivity and to form a spine system of routes linking municipalities. The bikeway network consists mainly of on-road routes.

Connection to Surrounding Municipalities

Connections to the surrounding municipalities can help facilitate regional and inter-municipal travel. When reviewing the Town's existing active transportation network, current plans and policies from surrounding municipalities and the Region were assessed to identify points of access along the boundary of the Town.

Community Destinations

Community destinations include Conservation Areas, schools, parks, community centres, recreation centres and major community destinations such as the built-up areas of Beamsville, Jordan, etc. These destinations generate active trips and can be more conducive to walking and cycling.

It is important to note that at the same time the transportation master plan was completed, an active transportation strategy (ATS) focusing specifically on the design and implementation of active transportation routes and facilities was also being undertaken. The strategy is a separately bound document which includes specific details about the existing active transportation system and future proposed improvements. For additional details about the AT portion of Lincoln's transportation system please refer to the ATS.

2.2.2 Transit

Lincoln launched its first intra-municipal transit service in November 2017 in the form of a pilot project called uLinc. The project was intended to introduce local transit to residents and gauge user needs, desire and readiness for local transit. uLinc was initiated as a free service for the period of one year, with the following objectives:

- Providing mobility to members of the community;
- Facilitating economic development and support labour workforce development/accessibility;
- Supporting future plans for sustainable development and intensification, as outlined in the Town's Official Plan;
- Contributing to a higher quality of life, including improved health and community participation rates; and
- Supporting the introduction of the future GO train service in Lincoln.

uLinc was transitioned into a permanent service in January 2019 with quarterly assessments of routes, stops, and frequencies to determine if adjustments are required to meet the needs of the community. Since then, the schedule has been updated periodically with the latest update of Saturday service implemented for July and August. Descriptions of the transit routes are provided below, and the system map is provided in **Figure 5**.

- Route 931 – Beamsville South (formerly 'Hixon'): Operates south of the Fleming Centre, servicing the Edelheim/ Albright Centre, Beamsville Medical Centre, the No Frills Plaza, Calvary Gospel Church, and the Lincoln Community Centre.
- Route 932 – Beamsville North (formerly 'Ontario Bartlett'): Operates north of the Fleming Centre, servicing the Lincoln Medical Centre, Sobeys Plaza, GO Bus, Industrial Centre, the Golden Horseshoe Estate, Hilary Bald Park, and operates as a "Flag Stop" along John Street. That is, riders can board the bus by waving to the driver as the bus approaches.
- Route 933 – Vineland/Jordan (formerly 'King'): Operates east of the Fleming Centre, servicing the Queen Manor, Vinland and Jordan. Multiple segments on this route have been designated as "Flag Stop".

uLinc connects residents of Beamsville, Vineland and Jordan with medical clinics, shopping centres, and community services. The bus is fully accessible and accommodates two wheelchairs, two bicycles on the font of the vehicle, and storage space for walkers or portable grocery carts. As of April 1, 2019, the fare to use the uLinc services is $1.00 per ride with an option to purchase a Transit Pass at a cost of $10 for 11 rides.

For residents who are seeking to travel outside of the town via GO Transit, uLinc connects to the GO Route 12 bus service at the Ontario Street / QEW stop in Beamsville. The GO Route 12 bus service runs between the Burlington GO Park'n'Ride and the Niagara Falls bus terminal, seven days a week, and are timed to meet with GO train service at Burlington GO Station.

This GO bus service helps Lincoln residents move around the Region, specifically to Brock University and Niagara College, and provides connection to Hamilton and the Greater Golden Horseshoe. The bus route map is illustrated in **Figure 6**.

During weekdays, one westbound bus (towards Toronto Union Station) leaves from Beamsville Park and Ride every 30 to 60 minutes from 5:29am to 10:07pm. Eastbound service (towards Niagara Falls) at this stop operates from 7:31am to midnight. Weekend service with one-hour frequency for the westbound direction operates from 6:07am to 10:07pm, and for the eastbound direction operates from 8:35am to midnight.

Figure 5 | Town of Lincoln Existing Summer 2019 Transit Routes
Source: Town of Lincoln

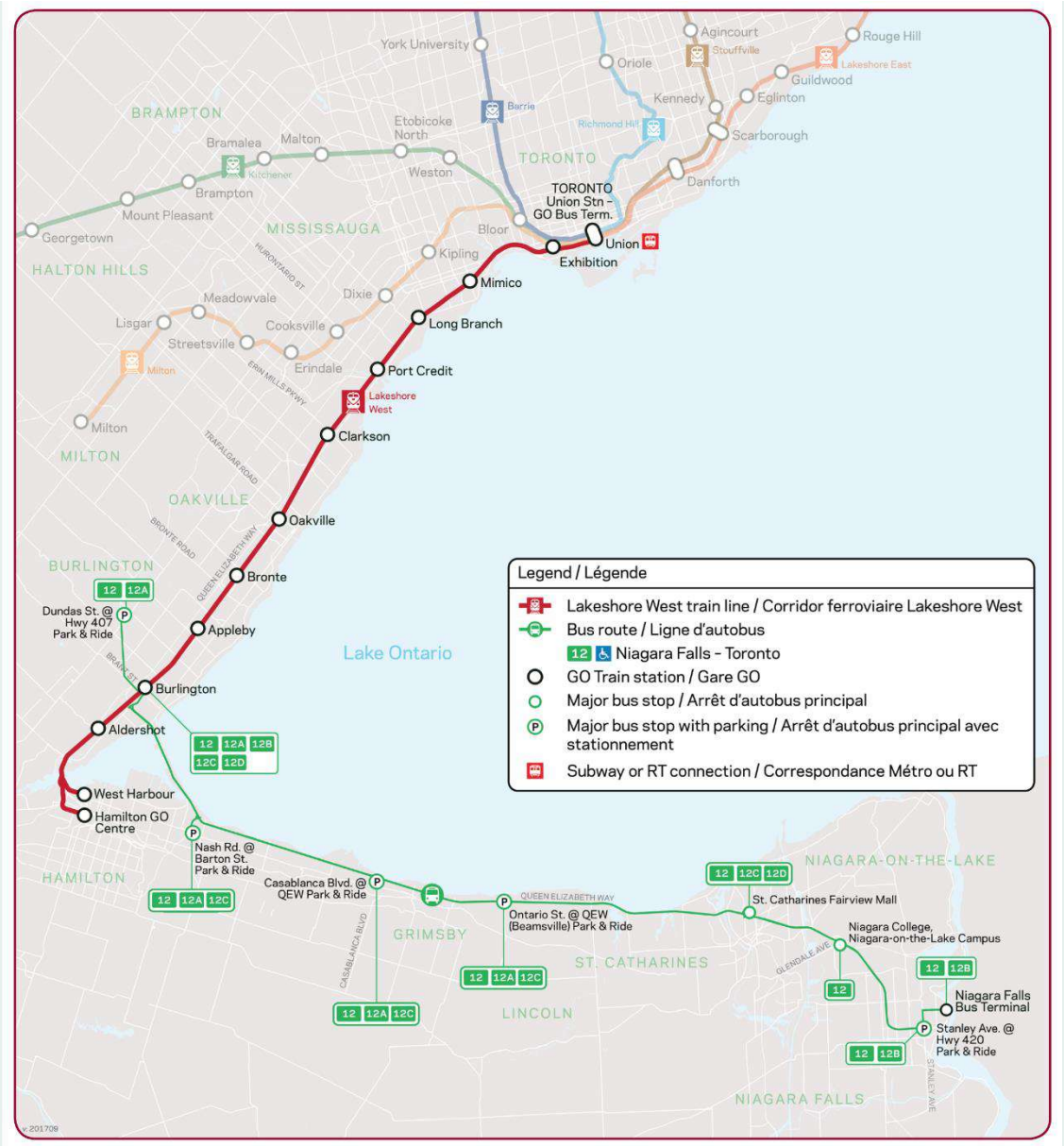

Figure 6 | GO Transit Route Number 12 – Niagara Fall to Toronto

2.2.3 Goods Movement

Goods movement is an essential part of the Town's economy, providing jobs to many and a valuable service to core employment industries such as agriculture and aggregate extraction. Additionally, trucks deliver the goods people need to the retail stores and businesses throughout the Town. The existing goods movement routes within the Town of Lincoln are illustrated in **Figure 7**.

The main challenge identified for goods movement in Lincoln is to alleviate through truck movements at the Ontario Street at King Street intersection and in the Beamsville downtown centred on this intersection. At present, through trucks typically travel north on Mountain Street to cross the Escarpment, then west on King Street for a very brief stretch and finally north on Ontario Street on their way to the QEW. The turning movements at the Mountain Street and Ontario Street intersections on King Street add to traffic congestion in the downtown.

Through trucks from other origins and destinations also use King Street and Ontario Street to access the QEW. While King Street and Ontario Street are Regional roads and typically would be used as goods movement routes, these streets are also the main commercial streets in Beamsville and are accessed by businesses and residential properties alike. The Town wishes to reclaim the downtown for people and de-emphasize truck traffic.


Spring Creek Rd

Figure 7

Existing Goods Movement Routes

Town of Lincoln TMP | Draft August 2019

Legend

Truck Route Recommmendations

- Existing truck route
- Prohibited truck route[1]

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Connection to Surrounding Municipality

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note:

1. Refer to By-law No. 2017-08 for a detailed description and provisions of heavy vehicles in the Town of Lincoln.

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2.2.4 Roads

The existing Lincoln road network includes a hierarchy of roadways classified as Provincial Highways, Arterials, Collectors and Local Roads. Three tiers of government have jurisdictions within the Town boundary; the provincial highway is under the jurisdiction of the Ministry of Transportation (MTO), the arterial roadways are under the jurisdiction of Niagara Region (with some minor arterials governed by the Town), and the collector and local roads are governed by the Town. A description of the roadway classifications with Lincoln is provided below.

Provincial Freeways (or Highways)

Fall under the jurisdiction of the MTO and include the Queen Elizabeth Way (QEW). Freeways are limited-access high-capacity roads where traffic movement is the primary function.

Arterial Roadways

Primarily traffic-carrying facilities, providing through routes across and within the Town. Arterials serve mainly inter-regional and regional travel demands, accommodate truck traffic, transit services; some arterial roadways may have some access restrictions.

Collector Roadways

Serves local travel demands by connecting neighborhoods and distributing traffic to and from arterials. They may also be used to service adjacent properties as moving traffic and serving properties are equally important under this classification.

Local Roadways

Connects individual properties to collectors and arterials and are designed to restrict major volumes of through traffic.

The Public Works department within the Town is responsible for the operation and maintenance of the Lincoln road network. Currently Public Works oversees approximately 300 kilometres of roadway including 49 bridges and 130 culverts. Key activities include:

- Road signage inventory, inspections, maintenance and repairs;
- Road surface repairs (potholes, hot asphalt);
- Sidewalk inspections and maintenance;
- Winter maintenance; and
- By-law enforcement.

The analysis of existing roadway and intersection operations are discussed in detail below.

TRAVEL DEMAND MODEL

The Region's travel demand model that was prepared as part of the Region's 2017 TMP was utilized to evaluate existing roadway traffic conditions specific to Lincoln. The model is primarily a tool to measure capacity and any deficiencies on a north-south or east-west basis. The assessment of the road network is based on a volume to capacity (v/c) calculation, where the assumed capacity of the travel lanes is compared to the volume of vehicles using the travel lanes. The existing conditions model specific to Lincoln was validated using statistical methods. Details of the validation of the existing model is provided in **Appendix A**.

Figure 8 and **Figure 9** depict the road links in the model for Lincoln and shows the current v/c ratios of the roadway segments during the AM and PM peak hours, respectively. A v/c ratio above 0.90 indicates links that are approaching capacity, and links with a v/c ratio above 1.0 indicates links that are over capacity. It is understood that v/c ratio of 0.90 and higher indicate a poor level of service.

The travel demand model illustrates minimal congestion on all roadway links during the AM peak hour with all links operating with v/c ratios of less than 0.60. On the other hand, during the PM peak hour, the road links with moderate congestion include sections of the Queen Elizabeth Way (QEW) and some stretches on King St and Ontario St within Beamsville.

Figure 8 | Volume-to-Capacity Model Output (AM Peak Hour)

Figure 9 | Volume-to-Capacity Model Output (PM Peak Hour)

INTERSECTION CAPACITY ANALYSIS

Several intersections with existing perceived traffic operational challenges were selected for a detailed study as part of the TMP, with a goal of identifying quick wins that could help improve traffic flow and safety. This section gives an overview of the existing levels of service of the 15 identified critical intersections within the communities of Beamsville, Vineland / Campden, and Jordan / East Lincoln, which are listed in **Table 3**. Existing turning movement counts were obtained from the Town and Region; signal timing plans were collected from Niagara Region for all studied signalized intersections. The turning movement counts and signal timing plan data are provided in **Appendix B**.

Table 3 | Assessed Intersections within the Town of Lincoln

BEAMSVILLE	VINELAND / CAMPDEN	JORDAN / EAST LINCOLN
- Ontario Street at South Service Road - Ontario Street at Greenlane - Ontario Street at Friesen Boulevard - King Street at Lincoln Avenue - King Street at Stadelbauer Drive - King Street at Ontario Street - King Street at Bartlett Road - King Street at Quarry Road	- Victoria Avenue at South Service Road - Menno Street at Victoria Avenue - Victoria Avenue at King Street - Twenty-Third Street at Tallman Drive - Campden Road at Fly Road	- Nineteenth Street at Glen Road - King Street at Ninth Street

An intersection capacity analysis provides an indication of existing traffic operations based on calculations of v/c ratios and delays for individual movements at a specific intersection. The Level of Service (LOS) represents the traffic operations delay and is denoted by letters as detailed in **Table 4** below, based on the intersection control type.

The intersection capacity assessment for the above-mentioned intersections were completed for the weekday AM and PM peak hours using the Highway Capacity Manual (HCM) 2000 methodology within the Synchro 10 software adhering to the Niagara Region Guidelines for Transportation Impact Studies. The operations of each sub-area are summarized below, with detailed Synchro tables and output sheets provided in **Appendix B**.

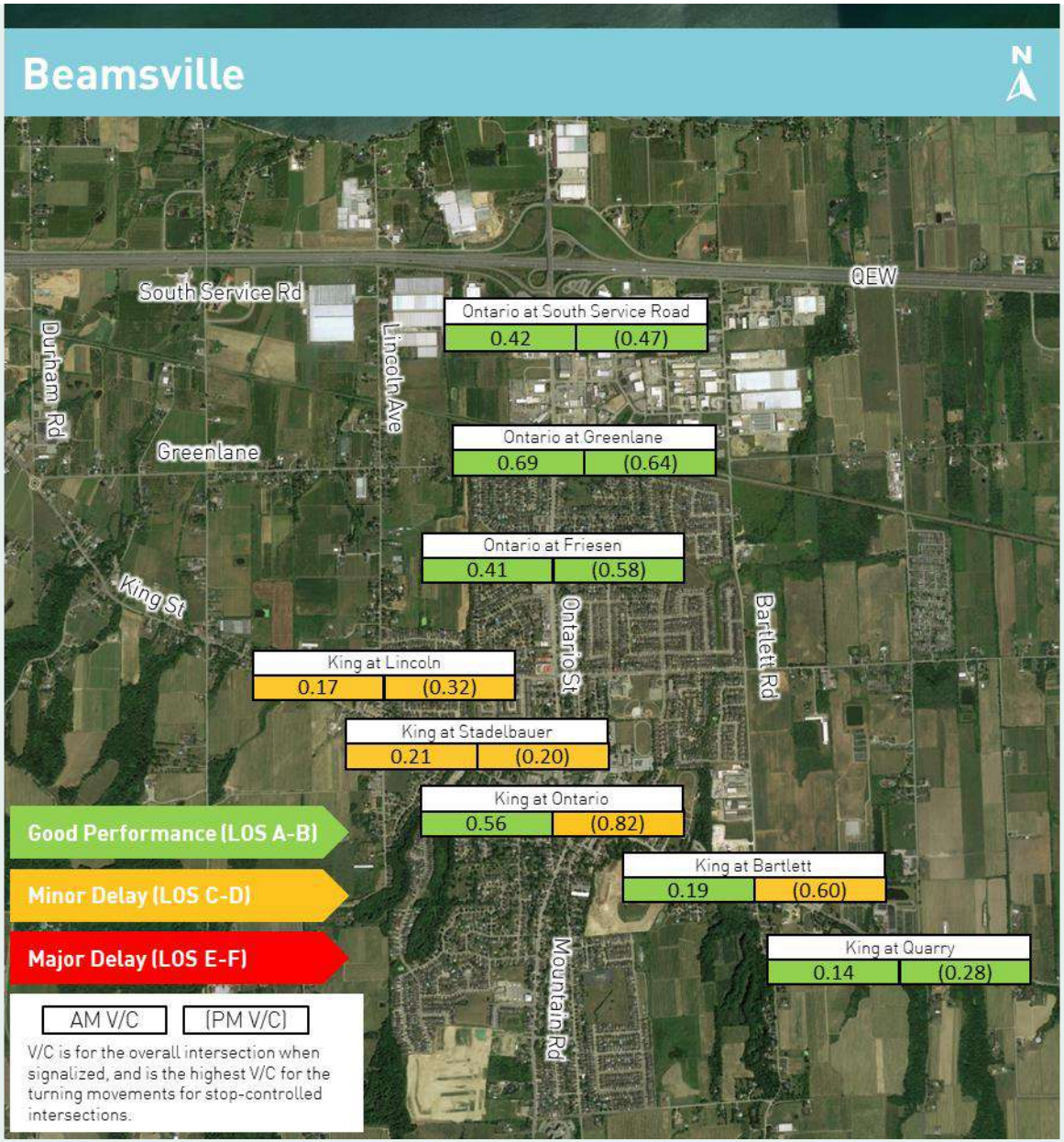
Table 4 | Level of Service (LOS) Definitions

LEVEL OF SERVICE	AVERAGE DELAY PER VEHICLE (SECONDS / VEHICLE)		EXPECTED DELAY TO MINOR STREET TRAFFIC FROM MAJOR STREET
	Signalized	Unsignalized	
A	10	0 – 10	Little or no delay
B	10.1-20.0	10 – 15	Short traffic delay
C	20.1 – 35.0	15 – 25	Average traffic delay
D	35.1 – 55.0	25 – 35	Long traffic delay
E	55.1 – 80.0	35 – 50	Very Long traffic delay
F	80	50	Extreme delay encountered with queuing, which may cause severe congestion affecting other traffic movements in the intersection

Beamsville

Study intersections assessed within the Beamsville area included four signalized and four unsignalized intersections. The intersection of Ontario Street at Friesen Boulevard was assessed as both signalized and stop-controlled due to the pedestrian signal head governing traffic flow along Ontario Street when called by pedestrian demand. The results of the assessment are illustrated in **Figure 10**.

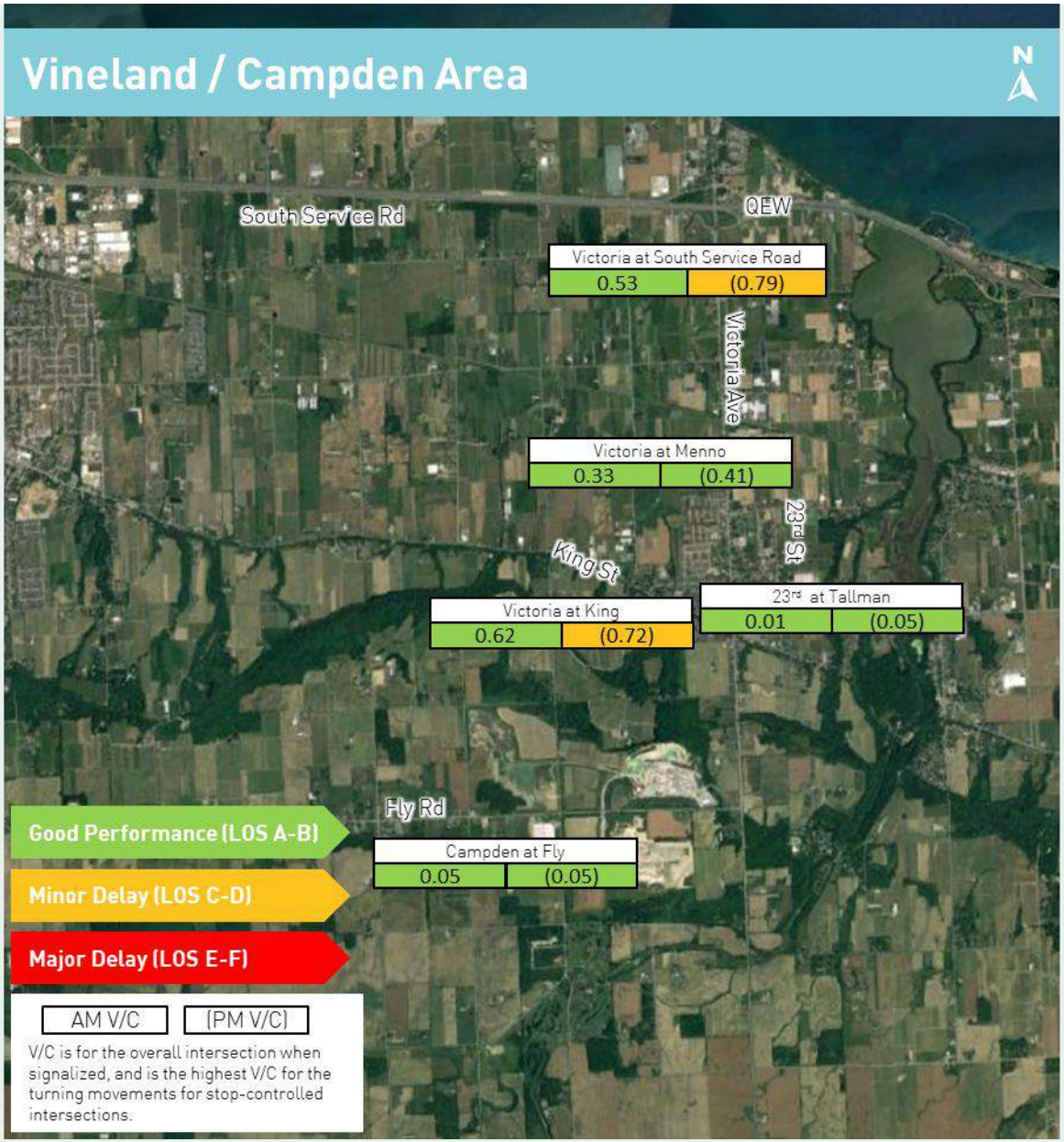
Under existing conditions, all studied signalized intersections located within Beamsville operate with an overall LOS C or better, and all turning movements at the studied unsignalized intersections operate with
LOS D or better during both the weekday AM and PM peak hours. The overall v/c ratios for the signalized intersections and the maximum v/c ratio for the unsignalized intersections are well below the critical operating point of 0.85, as per the Region guidelines, demonstrating residual capacity for future growth. Under existing traffic conditions, the overall delay at each intersection does not exceed 35 seconds for the signalized intersections, and no turning movement operates with a delay greater than 35 seconds for the unsignalized intersections.



Vineland / Campden

Study intersections assessed within the Vineland/Campden area included two signalized and three unsignalized intersections. The results of the assessment are illustrated in **Figure 11**.

Under existing conditions, all studied signalized intersections located within Vineland/Campden operate with an overall LOS C or better, and all turning movements at the studied unsignalized intersections operate with LOS B or better during both the weekday AM and PM peak hours. The v/c ratios for the overall signalized and the maximum v/c ratio for the unsignalized intersections are well below the critical operating point of 0.85, as per the Region guidelines, demonstrating residual capacity for future growth. Under existing traffic conditions, the overall delay at each intersection does not exceed 35 seconds for the signalized intersections, and no turning movement operates with a delay greater than 15 seconds for the unsignalized intersections.



Jordan / East Lincoln

Study intersections assessed within the Jordan / East Lincoln area included two unsignalized intersections; the results of the assessment are illustrated in **Figure 12.** These intersections currently operate with an overall
LOS B or better during the weekday AM and PM peak hours, with residual capacity at each intersection. Under existing traffic conditions, the overall delay at each intersection does not exceed 15 seconds.

Although public perception may be that intersections are congested in Lincoln, or that they are more congested than they were in previous years, the data analysis suggests that the level of congestion typically experienced is acceptable for urban conditions.

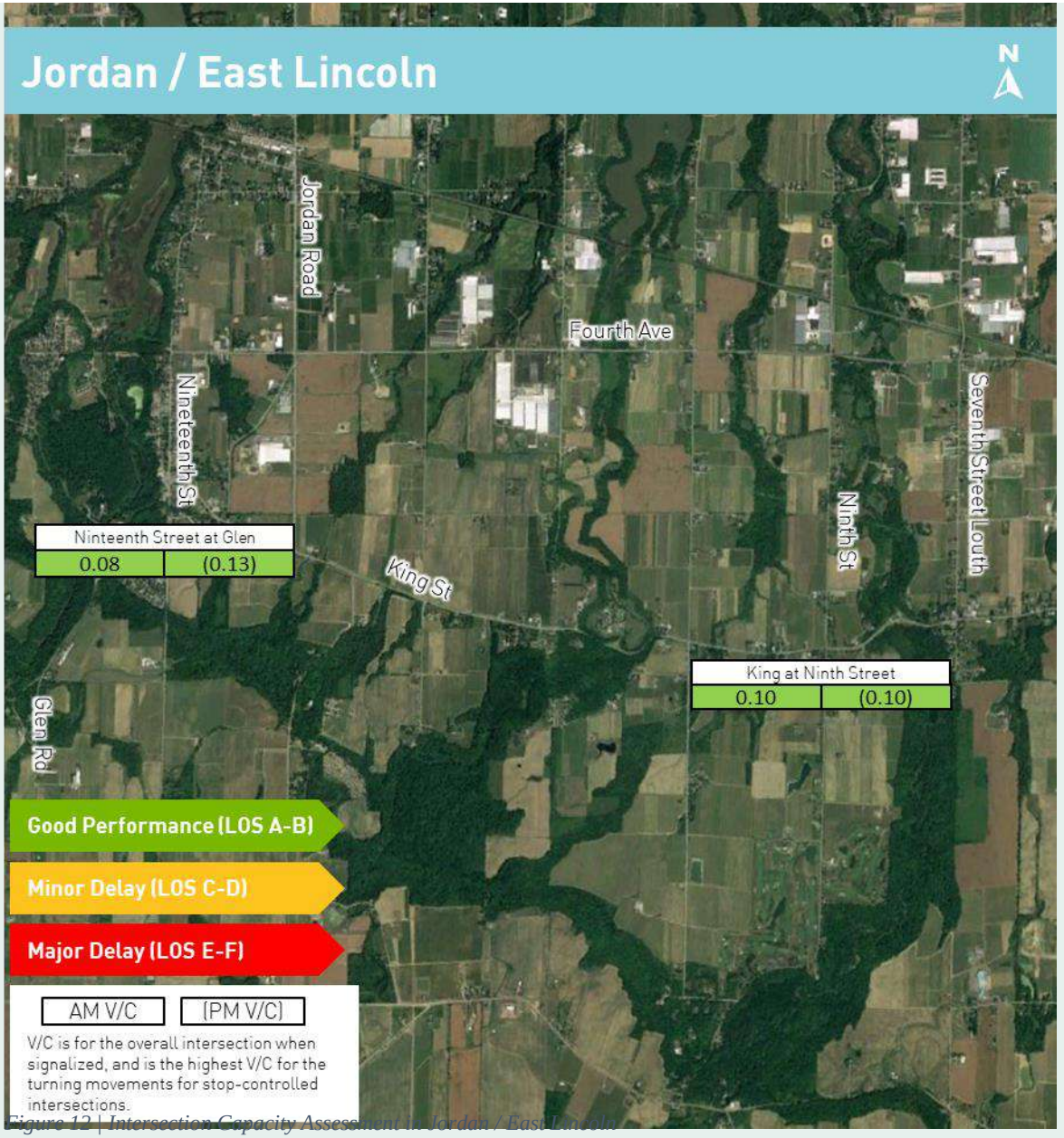


Figure 12 | Intersection Capacity Assessment in Jordan / East Lincoln

INTERSECTION GEOMETRIC DESIGN

As part of existing conditions of traffic operations, a site visit was completed to understand the current geometric layout at select intersections and to identify any improvements that could be made to the design to improve safety and efficiency of operations. The intersections reviewed were determined based on conversations with Town staff and a review of the available collision data. The list of intersections reviewed is provided in **Table 5**.

Table 5 | Geometric Design Review – Intersections within the Town of Lincoln

BEAMSVILLE	VINELAND / CAMPDEN	JORDAN / EAST LINCOLN
- Ontario Street at South Service Road	- Victoria Avenue at South Service Road	- Nineteenth Street at Glen Road
- Ontario Street at Greenlane	- Victoria Avenue at Culp Road	- King Street at Ninth Street
- Ontario Street at Friesen Boulevard	- Victoria Avenue at Second Avenue	- King Street at Nineteenth Street
- King Street at Lincoln Avenue		- St John Drive at Nineteenth Street
- King Street at Stadelbauer Drive		
- King Street at Thirty Road		
- King Street at Bartlett Road		
- King Street at Quarry Road		
- King Street at Moutainview Road		
- John Street at Sann Road		
- Drake Street at Ontario Street		
- Greenlane at Bartlett Road		

Based on the site visit, most of the observed intersections were designed and constructed acceptably with some sightline constraints due to either steep slopes at the intersection approaches, overgrown shrubbery or objects located within the daylight triangles. For most of the reviewed intersections, additional lighting would improve visibility of the implemented signage. However, based on field observations there seem to be some safety concerns at the King / Stadelbauer, King / Nineteenth and Victoria / South Service Road intersections. Geometric recommendations for intersections are discussed in **Chapter 4.4**. Detailed site visit notes for the remaining intersections are provided in **Appendix C**.

CHAPTER 3.0 | TMP PRINCIPLES

The intent of the Lincoln TMP is to build upon the transportation system that currently services the Town while providing a proactive and context specific approach to future planning, design and implementation.

To achieve this, a Town-wide transportation master plan should be shaped by community planning principles, best practices and stakeholder / public input. If effectively integrated and considered, a transportation master plan will include realistic and implementable recommendations and strategies to achieve the Town's short and long-term objectives.

There are four key principles / elements that were used to shape the content of Lincoln's transportation master plan including the project objectives, and supportive policies and plans. As well as input which was gathered from the robust consultation and engagement program used to inform the development of the TMP and lastly the opportunities which were identified through comprehensive field investigations and analysis.

This chapter outlines the foundations that were used to inform the development of the TMP and provide details on what was considered and how they were used over the course of the project.

3.1 PROJECT OBJECTIVES

The TMP objectives are the foundation from which the master plan process, principles and recommendations are developed from.

The project objectives were identified based on input from Town staff and members of Council and then further articulated based on input received through consultation and engagement. They were articulated to the project team early in the project process and used to shape the work completed. The Lincoln TMP objectives are presented on the right-hand side of the page.

Overall, the Town desires to provide mobility to all members of the community, to support future plans for sustainable development and intensification, and to contribute to a higher quality of life.

- An assessment of the current state of the Town's transportation network, including recommendations for network optimization and improvements to address growth and travel demand based on a horizon year of 2041.
- Traffic assessment of intersections within regional corridors, signal warrants and road rationalization review.
- Access major goods movement facilities with high volumes of trucks as well as escarpment crossing for potential operational and safety issues. Provide policy and planning implications and recommendations.
- Develop an Active Transportation Masterplan that provides a high-quality connected network (pedestrian, cycling and trails) based on a set of priorities and coordination with the Town's Parks Master Plan.
- A Traffic Calming policy to aid in decision-making about traffic calming on local roadways.
- An assessment of current on-street parking policy and by-law.
- A complete Streets policy to balance the needs of all transportation modes while improving the attractiveness of the Town's streetscapes.
- A feasibility analysis of promoting transit service to and within the Town, to reduce car dependent travels.
- A consultation process to coordinate and establish partnerships with community and agency stakeholders, engaging a wide variety of local interests and soliciting opinion to inform the recommendations of the TMP.
- TMP to comply with the requirements of the current Municipal Class Environmental Assessment document.

3.2 SUPPORTIVE POLICIES

Policies provide the basis for future development and growth, as well as change in the community. The Lincoln TMP builds upon, responds too and is supported by policies at the federal, provincial, regional and local levels. The policies encourage and, in some cases, require more wide-spread policy change to support less dependence on driving as the main mode of commuting, with a movement towards a balanced use of many transportation options available. The policy framework is briefly described below, as are the ways in which existing policy has influenced and supported the TMP.

3.2.1 Federal & Provincial Policies

Typically, Federal and provincial policies provide very high-level guidance on the planning of various geographic areas. More recently there has been a stronger strategic focus towards progressive and emerging planning topics such as climate change and sustainability. As a result, several provincial policies now provide guidance and direction to regional and local governments on how to address, integrate and manage these trends. The following are the applicable policies which influenced the development of the Lincoln TMP.

National Vision for Urban Transit to 2020 (2001).

Developed for Transport Canada in 2001, this policy document outlines a vision for new urban transit policies in Canadian communities, featuring a reduced level of motorized travel per person; less dependence on the private automobile; and more accessible transit service as widely available as possible.

Federal Sustainable Development Act (2008).

The FSDA grants the Government of Canada the authority to develop strategies related to sustainable development and reduced environmental impact. It sets a policy precedent at the federal level, asking other orders of government to take sustainability seriously, both in their own actions and the types of economic and development-related decisions they make within their jurisdictions.

Provincial Policy Statement (2014).

The Provincial Policy Statement provides guiding principles and policy directions for transportation development in the Greater Golden Horseshoe. The PPS also promotes land use patterns that support "a mix of ⋯ transportation choices that increase the use of active transportation and transit before other modes of travel."

Municipal Act (2001).

The Municipal Act provides municipalities the flexibility to deal with local circumstances and recognizes municipalities as accountable governments with respects to matters in their jurisdictions. The Act provides direction for the municipality regarding future transportation alternatives and improvements for the existing network.

Greenbelt Plan (2005).

This policy applies to the entire Greater Golden Horseshoe, including Niagara Region. It is designed to protect agricultural land base, and a range of ecological and recreational features in the region. It does not specifically preclude new transportation infrastructure in protected areas but defines the conditions under which new development in the Greenbelt can occur.

Niagara Escarpment Plan (2015 Consolidation).

This plan protects the Niagara Escarpment, by limiting where development can occur. It also identifies potential locations where cycling and pedestrian trails can improve access to the area covered by the plan. Similar to the Greenbelt Plan, the document does not preclude new transportation infrastructure, but defines the conditions under which development in the area can occur.

Growth Plan for the Greater Golden Horseshoe - Places to Grow (2017).

This policy forms the backbone of the Province's growth management structure, acting as land use plans to which all local policy must conform, designating specific lands as unsuitable for development and directing intensification of residential and employment land uses. These plans direct future growth to traditional downtown communities where it argues that the potential for intensification is highest. This means that the Town must develop a strategy to achieve a minimum intensification target and prioritize planning, infrastructure investment and public service facilities to support that intensification.

CycleON: Ministry of Transportation Cycling Strategy (2013).

The goal of this provincial initiative is to empower everyone from occasional cyclists to daily commuters to feel safe when they get on a bicycle in Ontario, thereby promoting cycling as a viable mode of transportation across the province over the next 20 years

3.2.2 Regional Policies

The Niagara Regional government provides several policy documents that set out goals, objectives, and policies that are intended to help manage growth and direct physical change throughout the Region, taking into consideration the effects on the social, economic and natural environment.

Niagara Region Transportation Master Plan (2017).

This comprehensive strategic planning document defines policies and infrastructure improvements required to address transportation and growth needs from today to the year 2041. The plan recognizes new regional population and employment goals of 610,000 and 265,000, respectively, for the year 2041. The Region also recognizes that transportation is a catalyst for change, and investments in transportation systems and infrastructure can support the Region's substantial growth over the next 25 years.

Regional Official Plan (2013).

The Regional Official Plan guides the Niagara Region's physical, economic, and social development under the Provincial Planning Act. It includes the protection of lands identified for:

- The Niagara-to-GTA East Area Corridor and the Highway 20 Smithville by-pass; and
- Upgraded or new VIA Rail and/or GO Stations in Grimsby, Beamsville, St. Catharines, and Niagara Falls.

3.2.3 Local Policies

The Town of Lincoln, being a lower-tier municipality, is bound by the policy directives of Niagara Region. In addition to the Regional plans noted in section 3.2.2, Lincoln has supporting policy documents that outline the goals, initiatives, objectives, and opportunities intended to manage and direct growth, future land uses, and physical development within the municipality. The TMP draws guidance and inspiration from these existing plans and policies and provides important local context regarding specific network and facility improvements. The TMP seeks to embrace the Town's community vision as a place to grow, a place to prosper and a place to belong.

Lincoln Official Plan (2016).

The Official Plan contains the goals, objectives and policies which set out the long-term vision for the future. With regards to transportation in the Official Plan, the Town intends to ensure that major goods movement facilities are protected for the long term to provide a safe system for the movement of people and goods throughout the Town, including active transportation. This system includes public road network, rail system, and passenger services.

GO Hub & Station Study (2016).

In 2016, the Province announced that GO train service will be extended to Niagara Region. Four communities will have future two-way GO Transit stations, including Beamsville in Lincoln. The purpose of the study is to guide the development of the four stations and create transit supportive environments efficiently out of the regional and local resources.

3.3 COMMUNITY INPUT

Consultation and engagement are core components of any master plan. It is also a requirement for plans that are completed consistent with the Municipal Class Environmental Assessment (MCEA) Process. A comprehensive consultation and engagement program was designed, developed and implemented to inform key stages in the Lincoln TMP process. A detailed summary of the consultation process and a high-level overview of the input received through the various engagement and consultation tactics is provided in the following sections.

3.3.1 Engagement Process

The consultation and engagement program used to inform the development of the Lincoln TMP was woven into the overall work plan including key technical tasks and outcomes. The intent was to use the input that was generated through the process to inform the completion of the tasks and the development of the TMP including the recommendations.

The intent was to use a range of consultation and engagement tactics and techniques to gather input from six key audiences including residents, technical agencies, local stakeholders, Town committee members, as well as Town Council and staff. By identifying methods of engagement for each of these audiences, the result is a master plan that is reflective and representative of the interests, ideas and preferences of those who live, work and play within the Town of Lincoln.

A two-phase consultation and engagement program provided engagement opportunities that were selected and undertaken to form a "Made in Lincoln" approach designed specifically based on target audiences, their communication and consultation preferences and the overall objectives for each of the study.
Table 6 summarizes the consultation and engagement process and milestones which were used to inform the development of the TMP.

Table 6 | Engagement Timeline Overview

PHASE / TIMELINE	AUDIENCE	TACTICS
Phase 1 Opportunities & Challenges January / February 2018	**Council**	Council Workshop
	Stakeholders	Stakeholder Workshop Interactive Online Survey
	Public	Public Open House General & AT Surveys
	Committee	Working Session
Phase 2 Shaping the Recommendations March / April 2019	**Council**	Council Workshop
	Stakeholders	Stakeholder Workshop Interactive Online Survey
	Public	Public Events / Pop-ups March Break Camp Senior Centre Outreach Interactive Online Survey
	Committee	Presentations

3.3.2 Input Themes

A comprehensive summary of input received is provided in **Appendix D** of the master plan report. While unique input was provided within both phases of the engagement process; there were some key themes that emerged through the various consultation and engagement opportunities, which are summarized in **Table 7**.

Table 7 | Summary of Input Themes from Round 1 and 2 Engagement

PHASE 1 | OPPORTUNITIES & CHALLENGES		PHASE 2 | SHAPING THE RECOMMENDATIONS	
Objective: to inform audiences of the intents and purposes of the project and to gather preliminary input on the transportation trends, preferences, opportunities and challenges found within the Town of Lincoln.		**Objective:** to report back on the input received through Phase 1 and to demonstrate its use and to gather input on the proposed recommendations and prioritize recommendations based on implementation timelines.	
Active Transportation	Providing safe and comfortable facilities for pedestrian and cyclists.	**Active Transportation**	Pedestrian and cyclist safety/visibility concerns particularly around school zones.
Transit	Improving connections to surrounding municipalities, uLinc coordination with GO schedules, and increase frequencies.	**Transit**	Expand intermunicipal transit to the Town, including refinements to the uLinc routes and timing to coordinate with GO transit.
Traffic Calming	Improving traffic calming initiatives to reduce speeding and increase compliance.	**Traffic Calming**	Implement traffic calming measures based on a more data-driven process, with frequent monitoring to measure success.
Goods Movement	Enforcing heavy truck traffic prohibitions and limiting access through the Beamsville core.	**Goods Movement**	Identify bypass networks for increased separation between active transportation routes.
Complete Streets	Maintaining roadways and improving cycling and sidewalk facilities, transit stops and shelters and on-street parking.	**Complete Streets**	Evaluate road projects for implementation of Complete Streets roadway design.

3.4 LINCOLN'S OPPORTUNITY

The existing policies and directives provide a foundation on which to plan for a more balanced, multi-modal transportation system in Lincoln. With the supportive help of these various visions, Lincoln's TMP advances a more sustainable distribution of modes, emphasizing active transportation and transit while continuing to provide facilities for efficient car travel and goods movement.

To meet Phase 1 of the MCEA process, a master plan needs to include a problem or opportunity statement. For the Town of Lincoln, an opportunity statement has been identified which, along with the study purpose and objectives, these statements provide the foundation for the transportation policies, recommendations and strategies found within this document.

The TMP Opportunity...

The opportunity presented through the Town's first TMP is to enhance the integrated transportation network for the benefit of current and future generations, and to support the urban form advanced by the Growth Plan for the Greater Golden Horseshoe.

The TMP will help the Town leverage resources to provide increased transportation options for the community. It will also provide a strong voice to influence decisions on public transit, enhanced GO Transit service, and transportation infrastructure investments that will continue to make Lincoln an attractive place to locate well planned residential neighbourhoods.

The benefits of producing a TMP that conforms to these policy directions lie in the support the Town is likely to receive from partners at other levels of government. Working in parallel with the planning and transportation initiatives undertaken by Niagara Region and the Province of Ontario provides opportunities related to funding support, service improvements, and other complementary future projects from higher orders of government. The TMP also creates the basis of supportive and positive relationships among various levels of government, with the aim to work towards common goals in improving mobility and growth management.

CHAPTER 4.0 | FUTURE CONDITIONS

The TMP has been prepared using a holistic approach to transportation planning that considers all transportation users and all modes of travel when planning, designing and implementing transportation routes, facilities and improvements.

The TMP carefully considered all the input received and combines this input with technical analyses, staff knowledge, and best practices to create tailor-made solutions for the Town of Lincoln.

Chapter 4 provides an overview of the future conditions analysis coupled with key technical considerations and assumptions. These set the basis for the proposed mode specific transportation recommendations which have specifically been identified to address the objectives of the overall TMP as well as individual goals for each of the mode focus areas addressed through this TMP.

The Chapter includes sections which speak to specific modes and includes an overview of the approach used to assess and evaluate potential improvements as well as the proposed recommendations which have been identified and confirmed by staff and members of Council. The recommendations found within this chapter are intended to be the foundation for implementation and ultimately provide guidance to staff and its partners on how to address transportation in the short and long-term following the adoption of the TMP.

4.1 ACTIVE TRANSPORTATION

4.1.1 Approach

As noted in **Chapter 2**, at the same time as the TMP was being developed a comprehensive active transportation strategy (ATS) was also being prepared. The intent of the ATS is to provide the Town of Lincoln with an additional, focused set of policies, programs and tools to help facilitate a shift from the single occupancy vehicle to more active forms of transportation and to accommodate a wider number of residents including people of all ages and abilities.

Building upon the existing active transportation routes, facilities and programs that have already been implemented by the Town and its partners, the Town embarked on a seven-step network development process to identify a connected and continuous network of on and off-road active transportation routes, facilities and amenities. The steps are presented in **Table 8**.

Table 8 | Summary of AT Network Development Process

Step 1: Existing Conditions	Consolidation and mapping of existing and previously proposed routes and facilities found within Lincoln.
Step 2: Selection Criteria	Identification of route selection criteria consistent with strategy and network objectives.
Step 3: Candidate Routes	Identification of potential on and off-road walking and cycling routes within urban and rural areas.
Step 4: Route Investigation	Investigation of candidate routes and the documentation of context specific conditions along the proposed routes.
Step 5: Routes & Facilities	Selection of preferred active transportation routes based on investigation and the selection of recommended facility types.
Step 6: Network Priorities	Identification of route network priorities in the form of loop routes connecting major communities and tourism destinations.
Step 7: Network Costing	Identification of preliminary cost for each of the proposed routes.

4.1.2 Outcomes

There are three key outcomes that were generated as part of the ATS development which have an impact on the overall TMP. These include:

- The draft active transportation network;
- A set of priority loop and routes which are designed to guide implementation; and
- Recommended programs and initiatives to support active transportation education, encouragement, evaluation and enforcement.

These three outcomes are supported by a set of recommendations, policy considerations and an implementation plan to help guide short and long-term implementation of the ATS and integration with the TMP. The following sections provide highlights of these outcomes.

PROPOSED ACTIVE TRANSPORTATION NETWORK

The proposed active transportation network is intended to be used as the blueprint for the expansion and future build-out of the active transportation system. The facility types that have been identified for each of the proposed routes reflects the current conditions of the roadway based on available information, the field investigation as well as input from staff, decision makers and stakeholders.

Table 9 provides a summary of the proposed facility types which make up Lincoln's Active Transportation Network. They are presented in **Figure 13a** and **Figure 13b**. Also included in the table is a break-down of route / facility type lengths by jurisdiction to help better understand the overall impact of responsibility.

Table 9 | Overview of Proposed Active Transportation Facility Types

	TOWN	REGION	TOTAL KM
Cycle Track	0.8	0	**0.8**
In-Boulevard Trail	0	1.3	**1.3**
Buffered Paved Shoulder	4.5	20.5	**25**
Buffered Bike Lane	0	2.5	**2.5**
Bike Lane	1.3	2.7	**4**
Paved Shoulder	5.6	2.3	**7.9**
Signed Route	94.6	1.4	**96**
Off-road Trail	7.6	0	**7.6**
Walking Trail	2.2	0	**2.2**

It is important to note that what has been identified for each of the proposed facilities is considered a "minimum". This means that the Town should not pursue the implementation of a facility with less separation without appropriate documentation and rationale.

PRIORITY LOOPS & ROUTES

While the implementation of the ATS is intended to be integrated with the Transportation Master Plan, the approach that is being used to "phase in" the AT improvements uses a unique, loop / route focus.

Through discussions with staff and stakeholders / the public it was clear that there was significant interest in implementing a set of routes which create a continuous and connected system as opposed to implementing AT routes as roadways come up for redesign or budget becomes available. Five priority loops have been identified throughout the Town of Lincoln. They are presented in **Figure 14a** and **Figure 14b**. A brief description of each is provided below:

- Local Spine: Direct north-south and east-west connections within the major built-up areas of the Town.
- Local Connecting Loop: Local routes that provide connections to the spine system and provide access to major community destinations.
- Inter-Municipal Link: Routes that provide connections to the surrounding municipalities in Lincoln.
- Inter-Community Link: Routes that provide connections between the major built-up areas in the Town.
- Tertiary: all other connections identified as part of the Town's active transportation network.

Within the first three categories there are both primary and secondary loops which indicates the level of "importance" and priority of implementation. Additional details are provided in section 2.3 of the ATS.

RECOMMENDED PROGRAMS & INITIATIVES

In addition to the proposed network and priority loops, a successful active transportation strategy must also include considerations for and recommendations regarding the encouragement, education, evaluation and enforcement of safe, enjoyable and frequent active transportation and recreation use.

In **Chapter 3** of the ATS there are several recommended programs and initiatives which are to be considered by Town staff for implementation in partnership with local stakeholders, agencies and interest groups.

4.1.3 Phasing & Implementation

The AT network is proposed to be implemented over a 10+ year timeline. The primary, secondary and tertiary loop routes identified in **Section 4.1.2** have been organized into three phases and integrated into the overall implementation schedule and timeline of the TMP. The implementation of the active transportation network is meant to be flexible and should be used as a guide to inform future planning and decision making on an annual basis.

Since municipal planning documents are typically updated every five years, it is recognized that the secondary and tertiary routes in the medium and long-term horizons may change over time and that the implementation of the loop routes may be adapted based on available budget on an annual basis. **Table 10** provides a summary of the proposed active transportation projects by phase. Please refer to **Figure 13a** and **Figure 13b** for the proposed facility types, and **Figure 14a** and **Figure 14b** for additional details on the alignment of the loop routes.

Table 10 | Summary of Active Transportation Phasing

SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
– Local Connecting Primary Loop – Local Spine Link	– Inter-Municipal Primary Link – Local Connecting Secondary Loop – Inter-Community Secondary Loop	– Inter-Municipal Secondary Link – Tertiary Loop

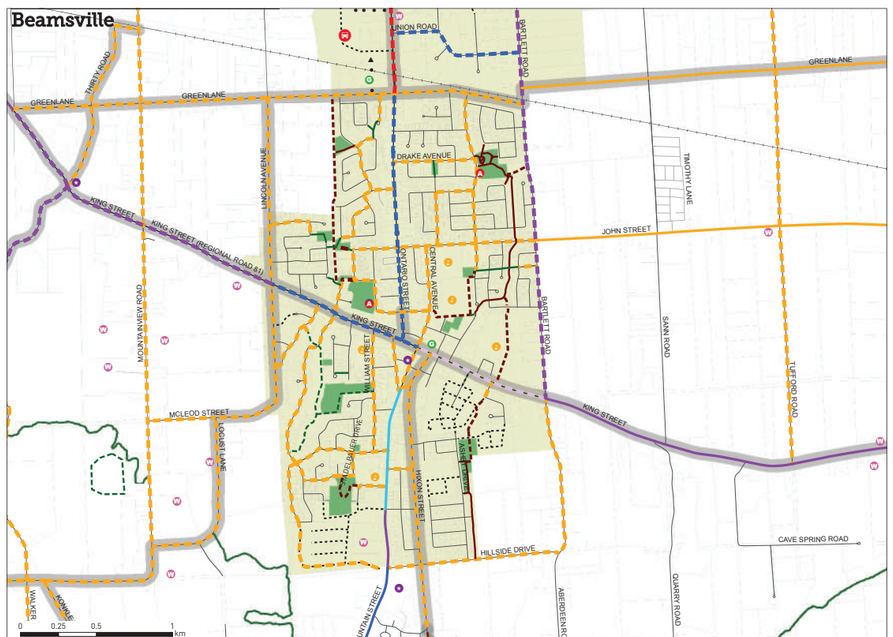
*** Primary Inter-community links are not included in this table as there are no proposed routes identified that make up this part of the system.*

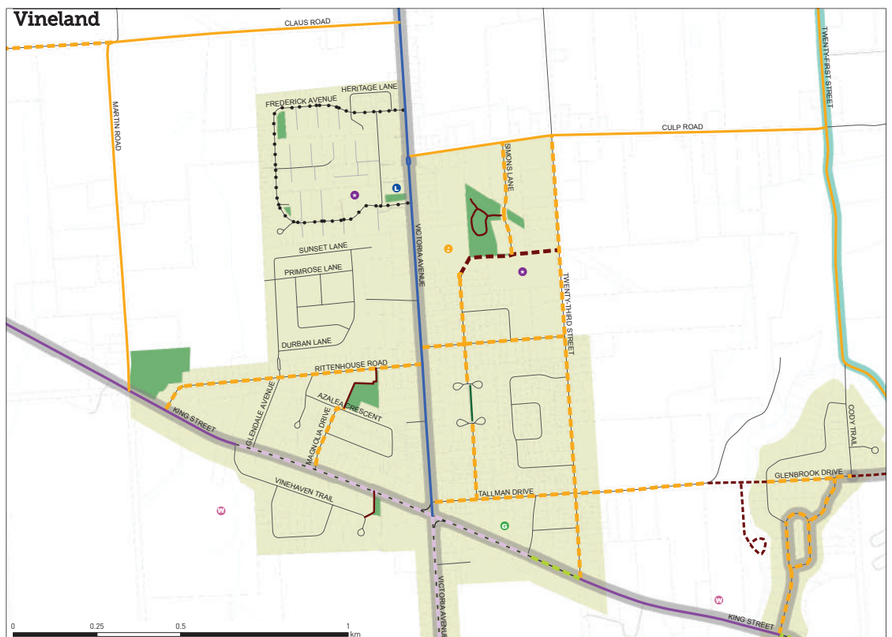

BRUCE TRAIL
CROSSING AHEAD

Figure 13a

Draft Active Transportation Network by Facility Type

Town of Lincoln TMP | Draft August 2019





Legend

Existing Active Transportation Facility Types

- Bike Lane
- Paved Shoulder
- Signed Route
- Urban Shoulder
- Multi-use Trail
- Walking Trail

Proposed Active Transportation Facility Types

- Cycle Track
- In-Boulevard Pathway
- Buffered Paved Shoulder
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Signed Route
- Multi-use Trail
- Walking Trail
- Desired Connection

Regionally Significant Routes and Trails

- Waterfront Trail / Province-wide Cycling Network
- Bruce Trail
- Region of Niagara Cycling Network

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Connection to Surrounding Municipality

Land Use Features

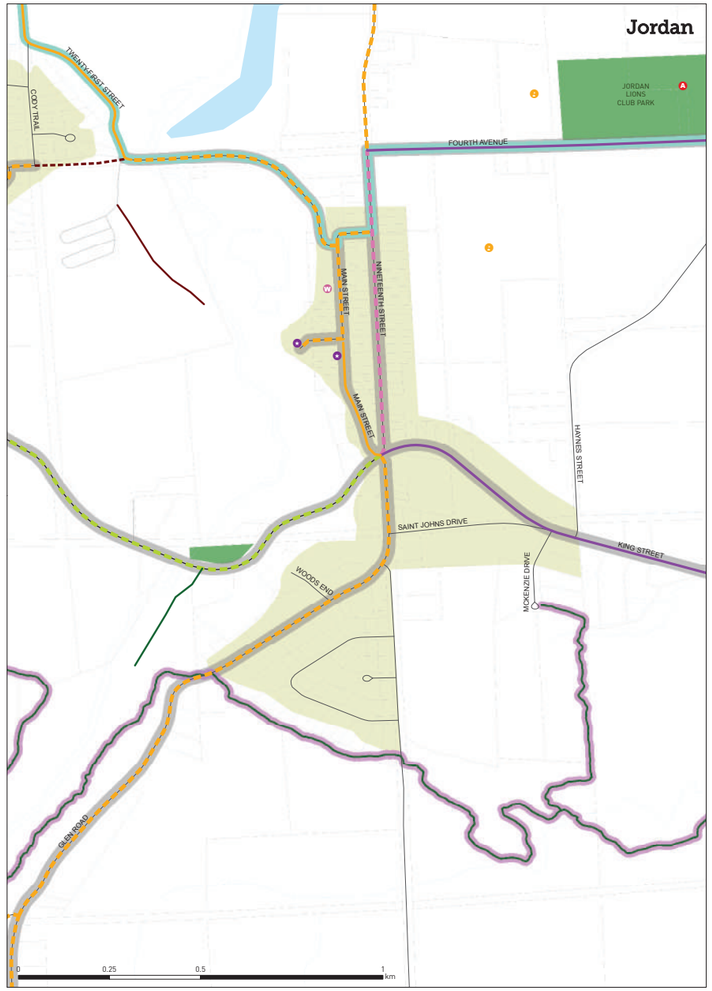
- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

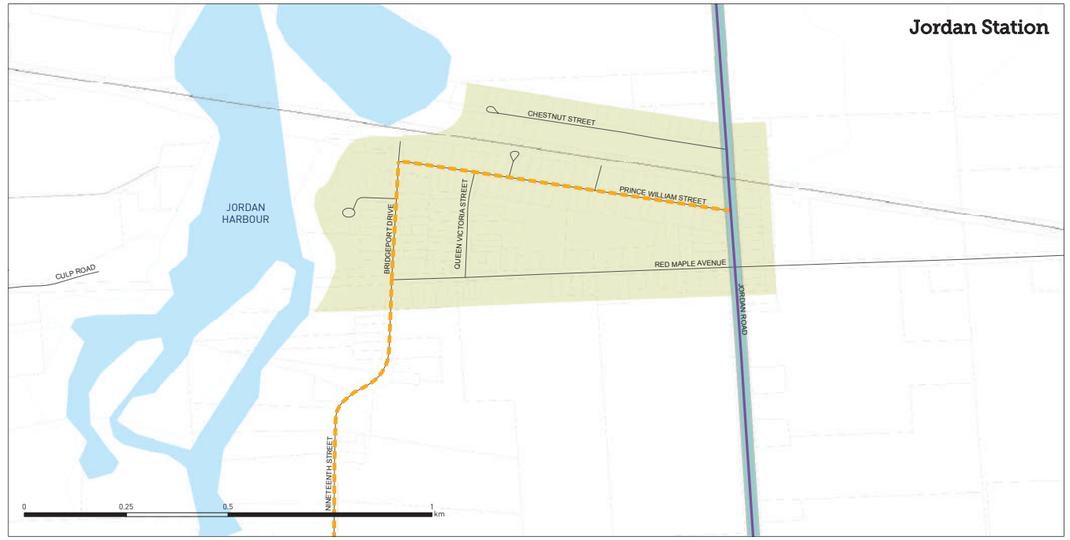
Town of Lincoln — *Make Moving Make Sense as Lincoln Grows!*

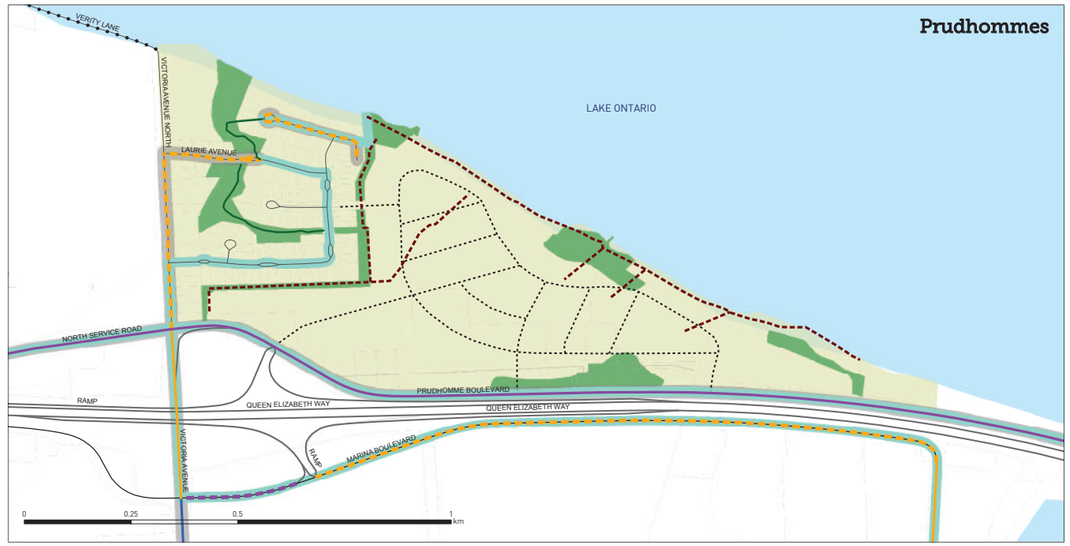
Figure 13b

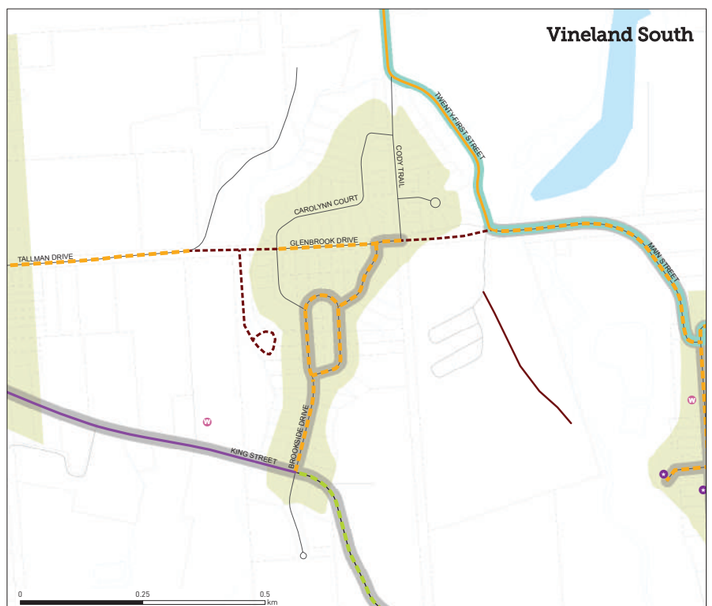
Draft Active Transportation Network by Facility Type

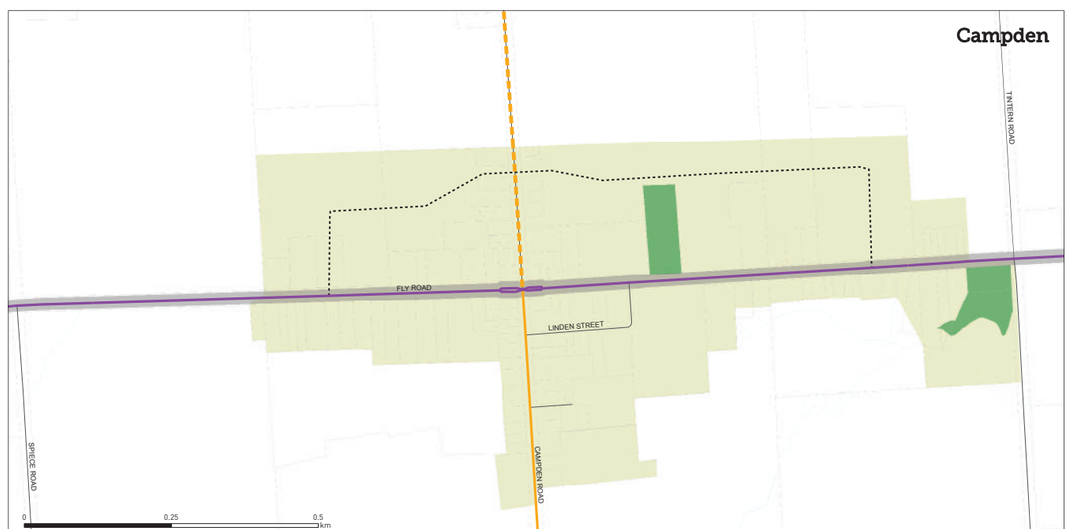
Town of Lincoln TMP | Draft August 2019











Legend

Existing Active Transportation Facility Types

- Bike Lane
- Paved Shoulder
- Signed Route
- Urban Shoulder
- Multi-use Trail
- Walking Trail

Proposed Active Transportation Facility Types

- Cycle Track
- In-Boulevard Pathway
- Buffered Paved Shoulder
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Signed Route
- Multi-use Trail
- Walking Trail
- Desired Connection

Regionally Significant Routes and Trails

- Waterfront Trail / Province-wide Cycling Network
- Bruce Trail
- Region of Niagara Cycling Network

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station

Land Use Features

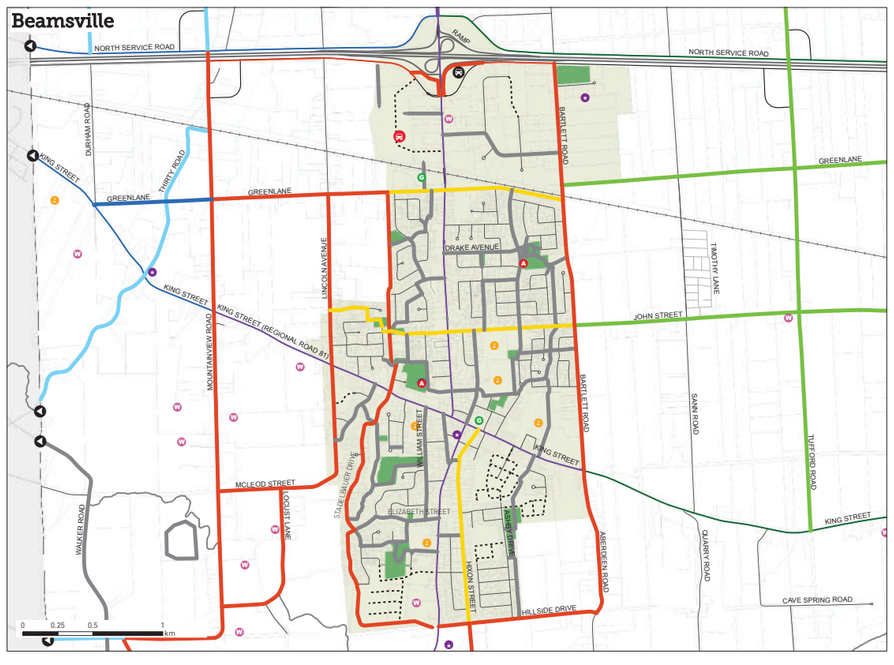
- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

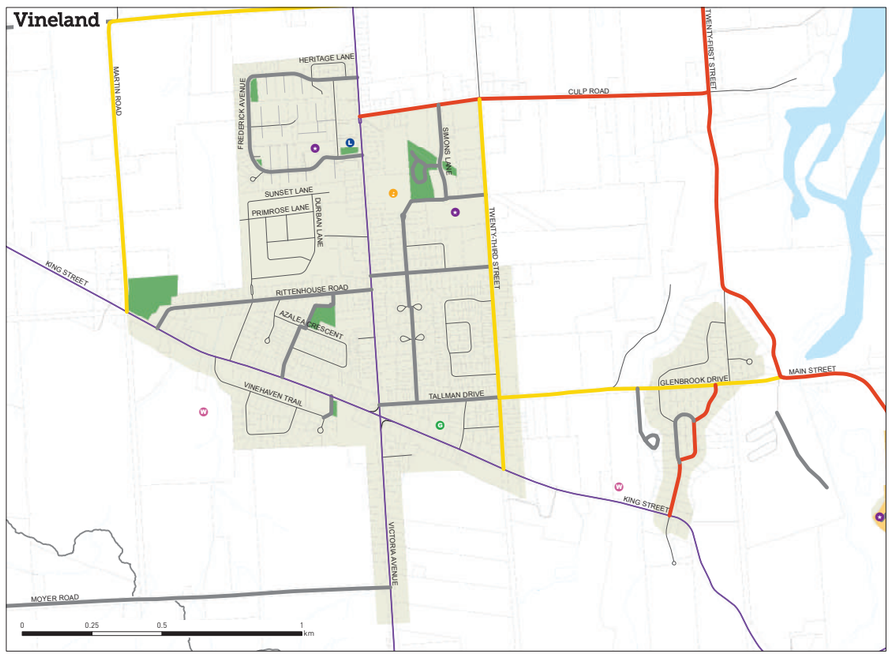
Lincoln — *Make Moving Make Sense as Lincoln Grows!*

Figure 14a

Proposed Active Transportation Priority Loops

Town of Lincoln TMP | Draft August 2019





Legend

Priority Routes

Municipal	Region / Provincial / Other[1]
	Local Connecting Loop - Primary
	Local Connecting Loop - Secondary
	Inter-Municipal Link - Primary
	Inter-Municipal Link - Secondary
	Inter-Community - Primary
	Inter-Community - Secondary
	Local Spine Link
	Tertiary

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Connection to Surrounding Municipality

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note:

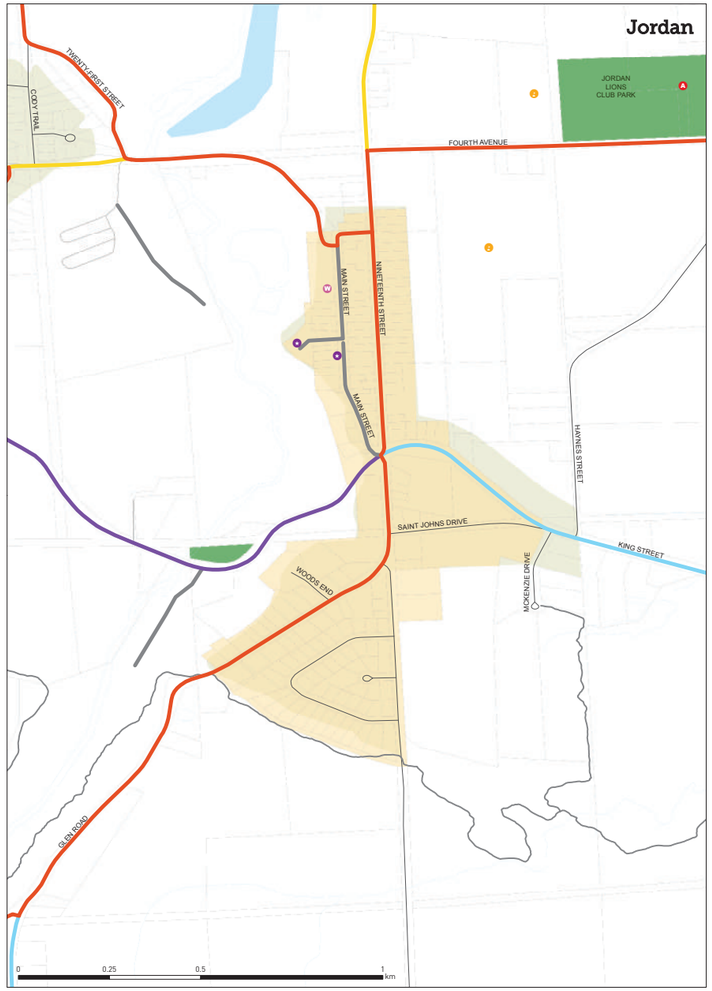
1. Includes routes located on roads and lands owned and / or managed by Niagara Region, the Ministry of Transportation Ontario and the Bruce Trail Conservancy.

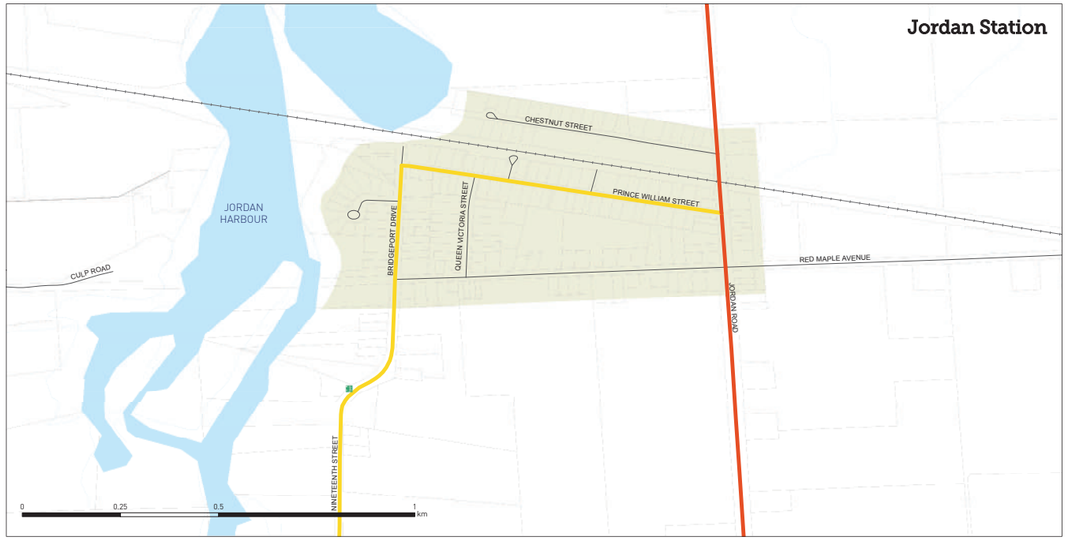
Lincoln *Make Moving Make Sense as Lincoln Grows!*

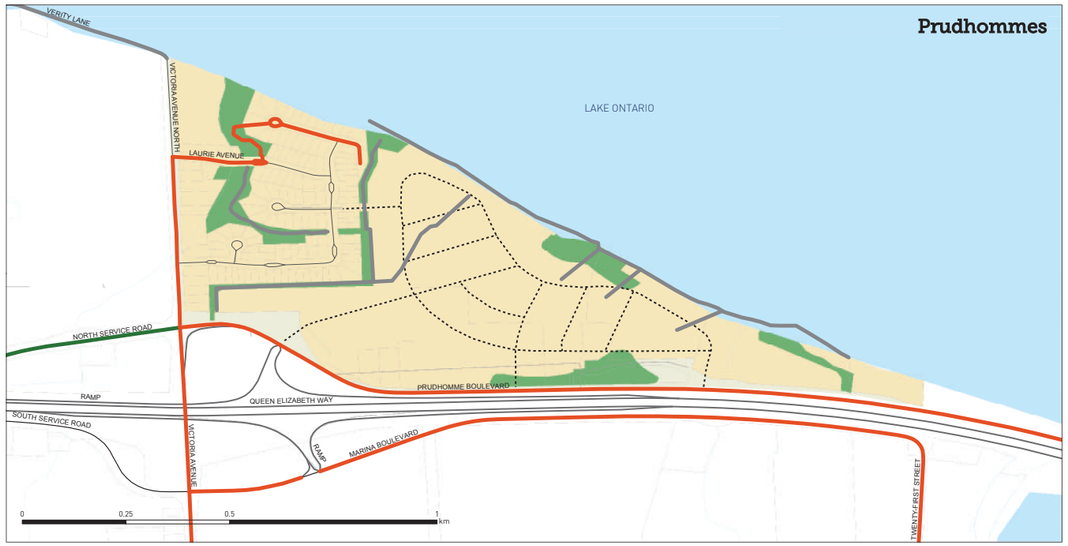
Figure 14b

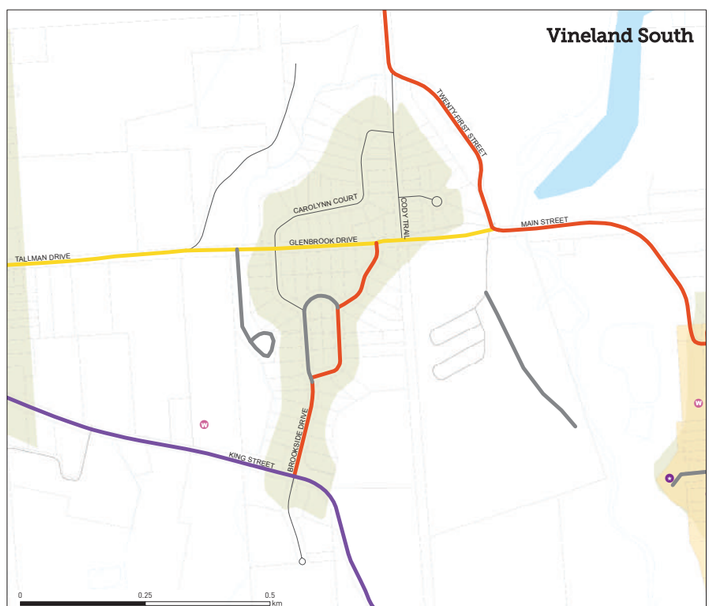
Proposed Active Transportation Priority Loops

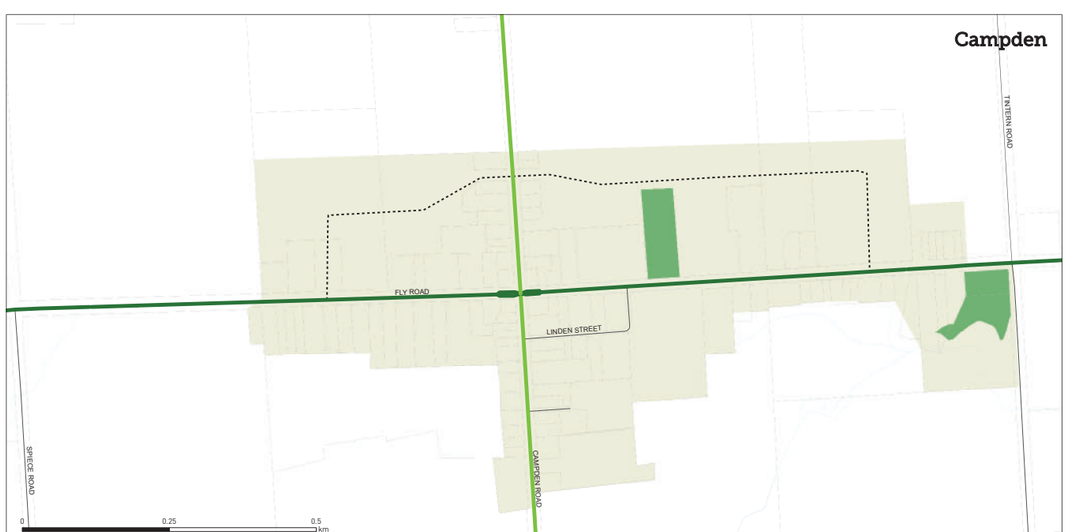
Town of Lincoln TMP | Draft August 2019











Legend

Priority Routes

Municipal	Region / Provincial / Other[1]
	Local Connecting Loop - Primary
	Local Connecting Loop - Secondary
	Inter-Municipal Link - Primary
	Inter-Municipal Link - Secondary
	Inter-Community - Primary
	Inter-Community - Secondary
	Local Spine Link
	Tertiary

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note:

1. Includes routes located on roads and lands owned and / or managed by Niagara Region, the Ministry of Transportation Ontario and the Bruce Trail Conservancy.

Town of Lincoln *Make Moving Make Sense as Lincoln Grows!*

4.2 TRANSIT

4.2.1 Approach

The intent of the transit approach is to encourage future coordination between Niagara Region and GO Transit to achieve a cohesive and comprehensive transit network within Lincoln, with viable connections to the surrounding municipalities.

With the recent addition of a Transit Coordinator, the Town is in a better position to facilitate efforts to implement local transit initiatives and assist the Region and GO Transit in their own transit pursuits impacting Lincoln.

The process used to address transit in Lincoln was designed to address three primary transit challenges including:

Expanding local service

The uLinc network currently uses a single bus to service three communities, Beamsville, Vineland and Jordan, via three bus loops, of which two serve Beamsville and the other connects all three communities. Due to the distance between the three communities, only the Beamsville loops run in the morning and afternoon peak periods, and all three loops run during the midday period. The operation of all three loops with one bus results in increased travel times and low frequencies.

Welcoming Regional service

Regionally, while Lincoln provides transit within the Town, for those wanting to travel to destinations in the surrounding municipalities such as St. Catharines or Grimsby, there presently are no Niagara Region Transit connections.

Planning for inter-regional service

Inter-regionally, there is one GO Transit bus stop in Lincoln. The Town should continue to provide local transit access to this bus stop but also strongly advocate for a GO train station. Regional and Town transit services should then be connected to this station.

4.2.2 Outcomes

The approach used to address transit in the Town of Lincoln created recommendations for local transit, regional transit and inter-regional transit. The following is a summary of the recommendations within each of these categories.

LOCAL TRANSIT

The conversion of the uLinc pilot project to a permanent transit service in January 2019 was an important step towards achieving a more sustainable and connected community. However, Lincoln residents are still heavily dependent on personal transportation for daily trips. The following aspects of the transit system can be improved to provide a more viable alternative for residents on a regular basis:

1. Increase frequencies and coverage

Currently, Lincoln has one bus operating the entire transit system. The Beamsville loops run once during the morning period, and twice during the midday and afternoon periods. Whereas the loop that connects Beamsville, Vineland and Jordan (Vineland / Jordan) runs three times but only during the midday period. Due to the distance between the three communities, the Vineland / Jordan loop is the longest of the three.

Adding an additional bus to the fleet would allow the two Beamsville loops and the Vineland / Jordan loop to be operated by different buses. This would result in increased number of runs per loop per period due to the splitting of travel times. Additionally, the Vineland / Jordan route could be enhanced to either connect to the GO bus stop or the other communities within Lincoln, increasing coverage. The Town should consider adding an additional bus to the uLinc transit fleet.

2. Improve scheduling

The increased frequencies because of adding a second bus to the fleet will enable the improvement of route schedules. The key change should be a stronger focus on uLinc buses meeting the GO Transit buses to ensure transit is a viable option for getting to and from the GO bus stop.

Additional transit hubs, other than the Fleming Centre, can be established in each community in preparation for the Regional and Provincial transit initiatives discussed below.

The Town should ensure uLinc schedules are coordinated with the GO Transit schedule.

3. Monitoring

uLinc ridership data is analyzed on a quarterly basis to assess the impact of the pilot project. With the transition to a permanent service, ridership monitoring should be maintained along with the initiation of regular customer satisfaction surveys. It is important to monitor both on a regular basis as each provide different sets of information. While ridership data provides a snapshot of existing demand, customer satisfaction surveys can be tailored to ascertain potential demand.

The Town should continue monitoring ridership data on a quarterly basis and implement regular customer satisfaction surveys.

4. Integration of ride-sharing

The current transit service connects the three communities of Beamsville, Vineland and Jordan. However, other communities of Jordan Station, Prudhommes, Campden, Rockway and Tintern are currently not served by uLinc.

Instead of implementing a fixed route to connect these communities, it may be more efficient to utilize a local taxi company or ride-sharing service to connect users from these communities to major stops along the bus route. Other municipalities such as Milton have successfully integrated ride-sharing into their transit system to ensure areas of low demand have equal access to transit services without a significant financial impact.

The Town should consider integrating ride-sharing to enhance the coverage and access of uLinc services.

REGIONAL TRANSIT

The Niagara Region TMP provides short-, medium-, and long-term transit network strategies with a view of strengthening core services and providing connections to all its local municipalities. The Region's TMP recommends expanding and improving its transit system. The following are some of the strategies currently being considered by the Region:

1. Regional transit service

New service between Grimsby and St. Catharines, operating on Regional Road 81 (King Street) and connecting St. Catharines, Jordan, Vineland, Beamsville, and Grimsby. The proposed time frame for this service is by 2021.

2. On-demand transit

Initiate and fund a transit demand-responsive model/pilot to investigate the financial and operational viability of providing demand-responsive transit service in low-density areas using ride-hailing technology to expand access to Niagara Region Transit service.

3. Rapid transit considerations

Future transit demand may warrant consideration for higher-order transit services such as rapid transit, high-frequency buses in either dedicated lanes or high-occupancy vehicle lanes, or additional rail services.

The Town should provide appropriate support and efforts to ensure Lincoln is represented in the above-mentioned initiatives and provide the necessary connectivity between the proposed Regional transit initiatives and uLinc services.

INTER-REGIONAL TRANSIT

The Niagara GO Hub and Transit Stations Environmental Assessment Study recommended a future new transit station in Beamsville, at the QEW and Ontario Street Interchange, east of Ontario Street and south of South Service Road. The study area and potential location of the new station are illustrated in **Figure 15**.

Future plans to expand GO Train service from Hamilton to Grimsby by 2021 and to Niagara Falls by 2023, as well as the new Grimsby - St. Catharines bus service will enable Lincoln residents to have more travel options within and outside of the region.

The Town should refine the uLinc routes and scheduling to ensure appropriate access to and coordination with the future GO train station in Beamsville. The GO station could become an additional transit hub following intensification of the area.

Figure 15 | Niagara Go Hub and Transit Stations Environmental Assessment Beamsville Study Area | Niagara Region Website

4.2.3 Phasing & Implementation

The transit recommendations have been summarized in short-, medium- and long-term categories in **Table 11**.

Table 11 | Summary of Transit Phasing

SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
– The Town should ensure uLinc schedules are coordinated with the GO Transit schedule. – The Town should continue monitoring ridership and implement customer satisfaction surveys on a regular basis. – The Town should consider integrating ride-sharing to enhance the coverage and access of uLinc services, as well as to potentially increase service hours. – The Town should consider adding an additional bus to the uLinc transit fleet if additional resources are needed to expand and improve service.	– The Town should provide appropriate support and efforts to ensure Lincoln is represented in Regional initiatives and provide the necessary connectivity between the proposed Regional transit initiatives and uLinc services.	– The Town should refine the uLinc routes and scheduling to ensure appropriate access to, and coordination with the future GO train station in Beamsville. The GO station could become an additional transit hub following intensification of the area.

4.3 GOODS MOVEMENT

4.3.1 Approach

Input and feedback generated over the course of developing the TMP included a significant focus on the challenge trucks pose to the quality of life, specifically in downtown Beamsville. Consultation also has revealed that the trucking industry is committed to maintaining a strong working relationship with the Town and other partners and is willing to re-route trucks if there are appropriate alternate routes. An important component of this TMP is to identify viable solutions that will help protect and preserve the quality of life in urban areas and provide for efficient goods movement. To address goods movement within the Town of Lincoln, a two steps approach was used including a review of previous studies followed by an assessment of future traffic volumes and its impact on goods movement. These steps are described in more detail below.

PREVIOUS STUDIES

Much work already has been completed to consider how to manage goods movement in this area. The Niagara Escarpment, one of the Town's greatest assets, is also one of its greatest constraints as vehicle crossing locations are limited and not all are appropriate for truck traffic. The Town and Region have undertaken goods movement studies previously. Most relevant to this discussion is the Region's Niagara Escarpment Crossing Study (2016), which shows a Park Road to Bartlett Avenue, Grimsby, connection as the preferred route to accommodate truck movements in this part of Niagara Region, illustrated in **Figure 16**. This connection would be expected to service not only Grimsby but Lincoln and other parts of the Region.

FUTURE TRAFFIC VOLUMES AND THE IMPLICATIONS FOR GOODS MOVEMENT

General traffic analysis has been conducted as part of the TMP which includes all vehicles, not only trucks. Using the Region's travel demand model and considering forecasted growth in Lincoln, the analysis indicated that existing congestion on Ontario Street would be likely to increase to the point that mitigation measures would be necessitated. The distribution of traffic volumes between the three parallel roadways (Lincoln Avenue, Ontario Street and Bartlett Road from west to east) under future 2041 "Do Nothing" scenario illustrates the available capacity on Bartlett and Lincoln, shown in **Figure 17**.

Ontario Street already has a four-lane cross section and widening it further is undesirable. Bartlett Road was identified as a suitable parallel route that could act as a relief valve for some of the vehicular traffic forecast to be using Ontario Street. The TMP recommends improvements to Bartlett Road.

The Bartlett Road improvements can be leveraged by designating this street as part of the through truck route network to reduce truck traffic in the downtown of Beamsville.

Niagara Escarpment Crossing Study Area
Proposed Improvements

Legend

– Road Transfer - Regional to Municipal

– Region to investigate Bartlett/Park connection and Park Rd transfer to Region

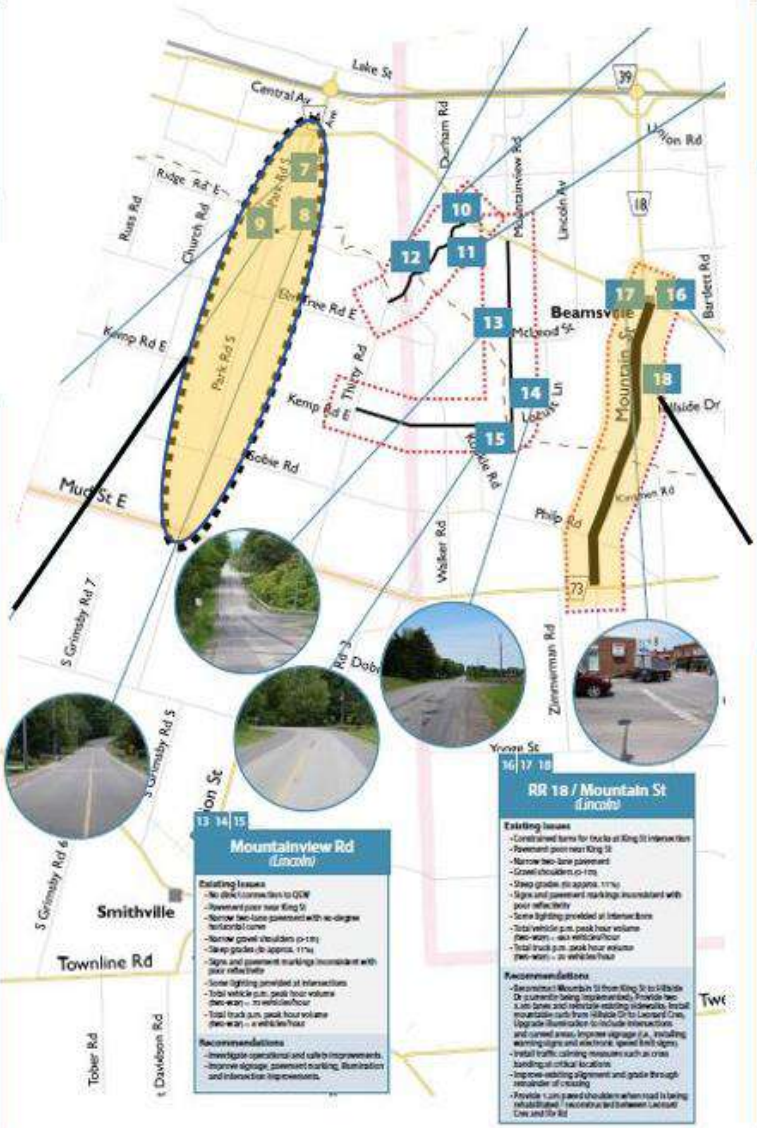
Park Rd *(Grimsby)*

Existing Issues

- Indirect connection to QEW via Bartlett Ave
- Pavement in poor condition
- Narrow two-lane pavement with sharp horizontal curves throughout length
- Narrow two-lane pavement with sharp horizontal curves north of Ridge Road and south of Bell Ave
- Steep grades (to approx. 16%)
- Visibility restricted at Ridge Rd west approach
- Some lighting provided
- Total vehicle p.m. peak hour volume (two-way) = 355 vehicles/hour
- Total truck p.m. peak hour volume (two-way) = 13 vehicles/hour

Recommendations

- Investigate operational and safety improvements.
- Improve signage, pavement marking, illumination and intersection improvements.



RR 18 / Mountain St *(Lincoln)*

Existing Issues

- Constrained turns for trucks at King St intersection
- Pavement poor near King St
- Narrow two-lane pavement
- Gravel shoulders (0-1m)
- Steep grades (to approx. 11%)
- Signs and pavement markings inconsistent with poor reflectivity
- Some lighting provided at intersections
- Total vehicle p.m. peak hour volume (two-way) = 465 vehicles/hour
- Total truck p.m. peak hour volume (two-way) = 20 vehicles/hour

Recommendations

- Reconstruct Mountain St from King St to Hillside Dr (currently being implemented); Provide two 3.5m lanes and reinstate existing sidewalks; Install mountable curb from Hillside Dr to Leonard Cres; Upgrade illumination to include intersections and curved areas; Improve signage (i.e., installing warning signs and electronic speed limit signs)
- Install traffic calming measures such as cross banding at critical locations
- Improve existing alignment and grade through remainder of crossing
- Provide 1.2m paved shoulders when road is being rehabilitated / reconstructed between Leonard Cres and Fly Rd

Figure 16 | Niagara Escarpment Crossing Study Proposed Improvements - Mountain Street and Park Road

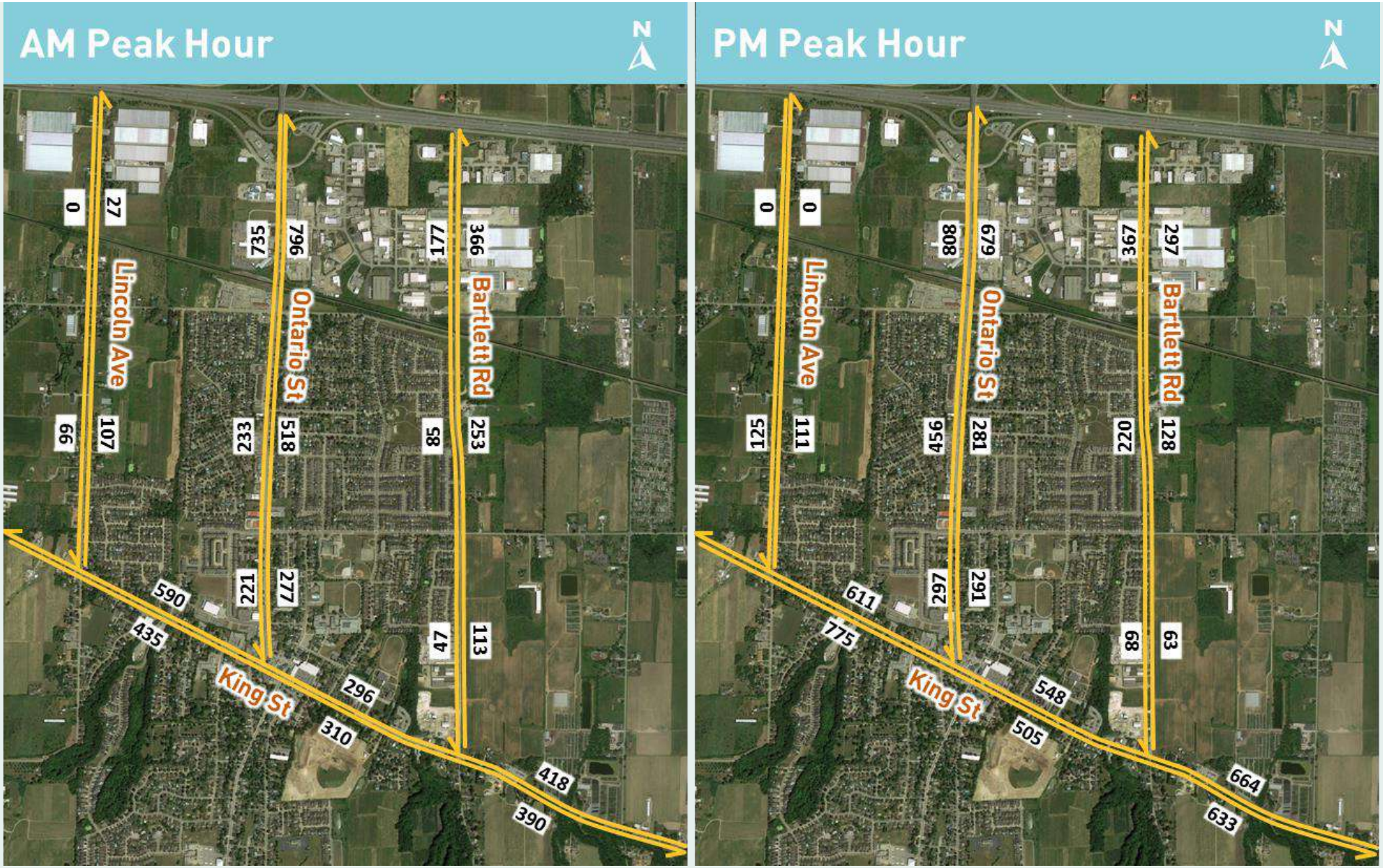


Figure 17 | North-South Road Volumes in 2041 (Do Nothing) Scenario

4.3.2 Outcomes

The challenges regarding goods movement are multi-faceted and the solutions will require cooperation between multiple municipalities and different levels of government. The process to implement the ultimate solution requires some short term, interim solutions before a longer term, ultimate solution can be constructed. The following is a summary of those solutions which were a result of the approach described above.

SHORT TERM

Residents of Beamsville cannot wait for major infrastructure projects to be designed and constructed before action is taken regarding trucks in the downtown. The short-term solution is to find viable alternative routes for trucks to bypass the downtown. In line with the TMP analysis to improve Bartlett Road, this road should become an integral part of the goods movement network.

Through trucks traveling north on Mountain Road should be directed to turn east on King Street and then north on Bartlett Road on their way to the QEW. They should travel Bartlett Road until they reach South Service Road and then travel west to the Ontario Street at QEW interchange. This bypass route is illustrated by the yellow line in **Figure 18**. In addition to improving Bartlett Road, the intersection of Mountain Road at King Street also would need to be improved to facilitate northbound right turns of trucks from Mountain Road onto King Street.

Trucks traveling east on King Street should be directed to turn north onto Durham Road and then east on South Service Road. They then could access the QEW or continue South Service Road to Bartlett Road and eventually back to King Street to head further east. Trucks exiting the QEW at Ontario Street should be directed to South Service Road and use Bartlett Road or Durham Road to access King Street. This route is illustrated by the blue line in **Figure 18**.

To enact this will require consultation and cooperation with Niagara Region to agree to the through truck restrictions, as both King and Ontario Streets are Regional roads.

MEDIUM-TERM

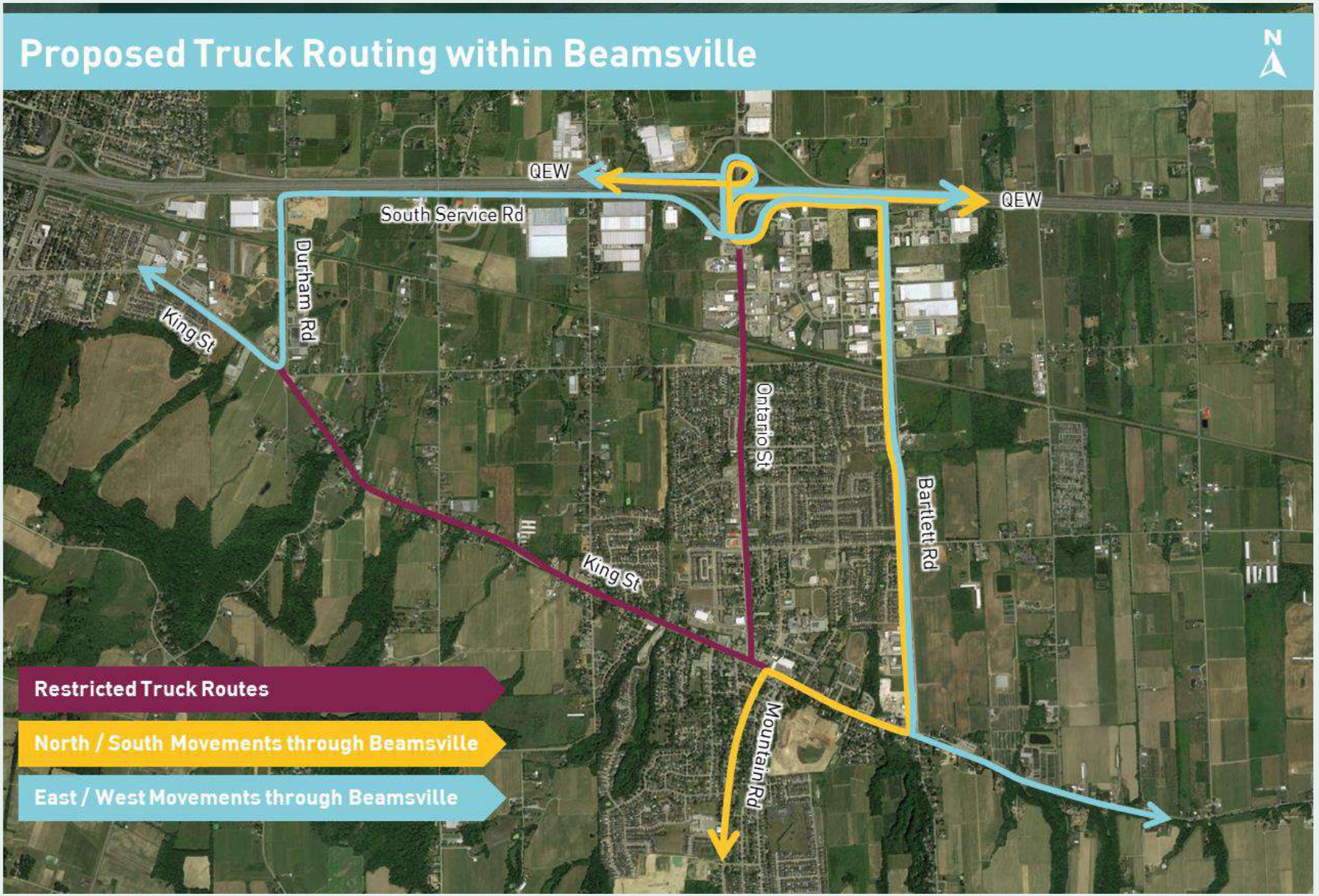
To ensure the safety and efficiency of goods movement in Lincoln, the Town should work collaboratively with the Region on developing and implementing traffic safety improvement measures until the Park Road to Bartlett Avenue connection in Grimsby is in place. Furthermore, the Town should continue to work closely with the Region, Niagara Regional Police (NRP), and MTO to initiate frequent truck safety inspection/enforcement blitzes and develop enforcement strategies for truck traffic bypassing the QEW inspection station.

LONG-TERM

The long-term solution to improve goods movement in this part of Niagara Region identified in previous studies and generally acknowledged by municipalities and the public is the Park Road to Bartlett Avenue connection in Grimsby. Bartlett Avenue in Grimsby includes an interchange on the QEW and could serve as the truck access to the highway.

By constructing this improvement to the goods movement network, the Town would be able to make further changes to goods movement within its boundaries, particularly in Beamsville. Mountain Road could be taken off the truck route network by transferring ownership from the Region to the Town of the stretch between Fly Road and King Street. The Town could then prohibit through truck traffic on this route. Trucks would be directed to bypass Beamsville completely and use the Park Road - Bartlett Avenue connection to access the QEW.

Figure 18 | Proposed Truck Routing within Beamsville



4.3.3 Phasing & Implementation

The goods movement phasing strategy has been summarized in **Table 12** and illustrated in **Figure 19**.

Table 12 | Summary of Goods Movement Phasing

SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
– Create a truck route network for Lincoln that bypasses the downtown of Beamsville. – Through trucks should be required to use Bartlett Road, South Service Road, and Durham Road to bypass the downtown. Through trucks should be restricted on Ontario Street between the South Service Road and King Street and on King Street between Greenlane in the west and Mountain Road in the east. – Through trucks traveling north on Mountain Road would be required to turn east on King Street, north on Bartlett Road and west on South Service Road to access the QEW at the Ontario Street interchange. – Through trucks traveling east on King Street would be required to turn north onto Durham Road and then east on South Service Road to either access the QEW or continue further east on South Service Road to Bartlett Road and eventually back to King Street. – Support any remaining studies, implementation and construction of the Park Road to Bartlett Avenue connection to the QEW in Grimsby as the preferred Niagara Escarpment truck crossing accessing the QEW in this part of Niagara Region. – Work with the Region to develop and implement traffic safety improvement measures – Work with the MTO, NRP, and the Region initiate frequent truck safety inspection/enforcement blitzes – Develop enforcement strategies with MTO and the Region for truck traffic bypassing of the QEW inspection station	– Continue working with the Region to develop and implement traffic safety improvement measures – Continue working with the MTO, NRP, and the Region to initiate frequent truck safety inspection/enforcement blitzes	– Once the Park Road to Bartlett Avenue, Grimsby connection is constructed, transfer Mountain Road from Fly Road to King Street from the Region to the Town's control. – Prohibit through truck movements on this section of Mountain Road.


INNOVATION
60

Figure 19

Recommended Goods Movement Improvements

Town of Lincoln TMP | Draft August 2019

Legend

Interim

- Proposed Through Truck Route
- Proposed Through Truck Prohibition

Ultimate Solution

- Park Rd - Bartlett Ave - QEW

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Railway

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Town of Lincoln — *Make Moving Make Sense as Lincoln Grows!*

J:\01 PROJECTS\2017 Jobs\Town of Lincoln TMP\Mapping\b. Maps\a. Roads\Map X - Goods Movement Routes.mxd

4.4 ROAD NETWORK

4.4.1 Approach

In compliance with Phase 2 (alternatives assessment) of the MCEA process, five future alternatives for Lincoln's road network were studied using Niagara Region's transportation model and transportation principles considering a multiple account evaluation framework.

The alternatives used in the modelling analysis build upon the existing conditions to the planning horizon of the year 2041 using the approved Niagara Region population and employment forecasts.

The approach used to review, assess and identify improvements to the road network is presented in **Table 13**.

Table 13 | Road Network Assessment Approach

STEP 1	Develop assessment criteria and a framework to evaluate the proposed transportation network alternatives. The criteria should improve mobility and reduce congestion.
STEP 2	Identify a list of projects that have the potential to improve travel through the Town.
STEP 3	Test the proposed improvements (from Step 2) using Niagara Region's Travel Demand Forecasting Model. Quantify and assess the impacts of the improvements based on criteria developed in Step 1. Based on the assessment results choose a list of projects to be implemented.
STEP 4	Identify geometric design improvements for specific intersections found throughout the Town based on assessment and input received.
STEP 5	Identify potential phasing for proposed roadway and intersection improvements

The following sections provide an overview of the specific details of each of these steps as well as the outcomes of the process.

4.4.2 Outcomes

STEP 1: EVALUATION CRITERIA & FRAMEWORK

Mobility, such as ease of connectivity, and congestion relief were the two main themes of the assessment criteria used to evaluate the proposed transportation network alternatives. Each theme was used to serve as an evaluation framework for testing the performance of proposed network alternatives.

Table 14 provides an overview of the two themes which were used to form the evaluation framework for the Lincoln roads network.

Table 14 | Overview of Evaluation Framework Themes

THEME 1: MOBILITY
The measure of how easy it is to reach a preferred destination point. If certain links are not provided, or over-congested, it forces people to divert from their direct path, and requires them to travel longer distances to get to their destination, which is undesirable.
Key Performance Measures: - Vehicle Kilometres Travelled (VKT) - % of total VKT on congested links - Vehicle lane-kilometres
THEME 2: CONGESTION
The amount of time an individual spends in traffic. By upgrading certain roadways and/or providing new links, roadway users spend less time idle in traffic and less time looking for alternate routes. This gets people to their destinations faster and decreases environmental impact.
Key Performance Measures: - Vehicle Hours Travelled (VHT) - % of total VHT on congested links - Travel Time Index

STEP 2: ROAD NETWORK ALTERNATIVES

The first step in the network development process is to determine if the existing transportation network can accommodate the future traffic volume forecasts, the "Base Case" scenario. This establishes a baseline to identify future challenges and determine appropriate solutions. The "Base Case" scenario includes all committed projects planned for construction by the Town, Region and Province.

The analysis of the "Base Case" scenario with forecasted 2041 future traffic reveals that the roadways within the Town of Lincoln are projected to experience very localized and limited congestion. Small sections of congestion are projected to occur on Ontario Street during the AM peak hour and on King Street through Beamsville during the PM peak hour. A select link analysis indicates that majority of the vehicles travelling eastbound along King Street through Beamsville are destined for downtown Beamsville. Alleviating this congestion would require localized roadway widenings of King Street, as these vehicles cannot be diverted to other routes.

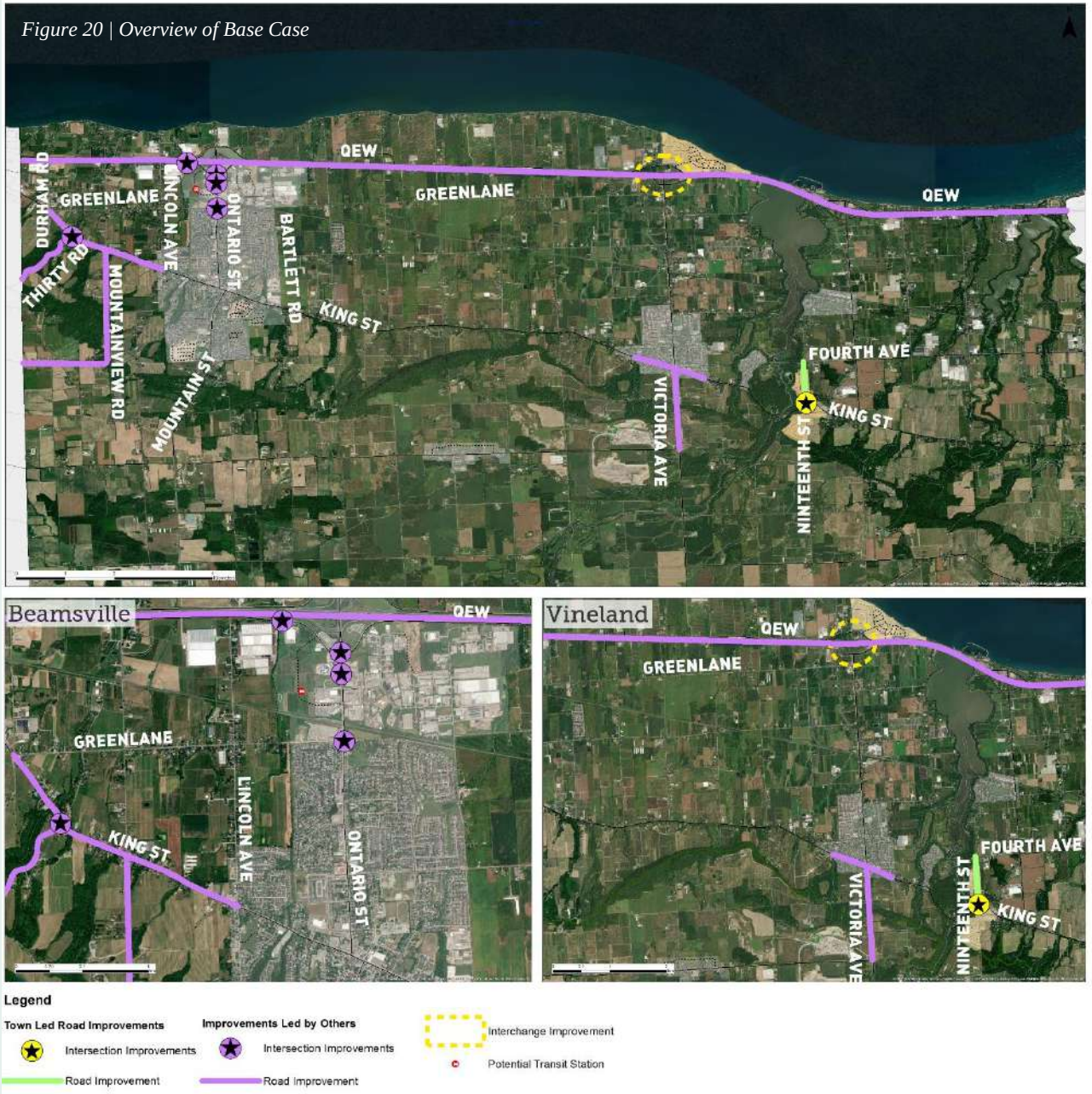
Based on the results of the "Base Case" scenario and discussions with Town staff, five additional network scenarios were developed and tested for the 2041 horizon year to determine if any additional improvements beyond the Base Case would be needed to accommodate future growth. The road network scenarios with specific project details are on the following pages including a map of the proposed routes and a written description of each. Scenarios 1 through to 5 include the improvements listed under the "Base Case" scenario.

Due to the limited vehicle congestion forecast in the Town, all the proposed improvements, aside from the widening of Ontario Street in Scenario 1, were designed to improve multi-modal travel.

Base Case:

- Mountainview Road – intersection and roadway improvements (signage, pavement marking, and illumination)
- Victoria Avenue – roadway improvements (wider travel lanes and centre turn lane)
- Greenlane / Ontario Street – intersection improvement
- South Service Road / Ontario Street – intersection improvement
- South Service Road access to potential GO Train Station
- Ontario Street access to potential GO Train Station
- QEW – widening and rehabilitation between McLeod Street and Mountain Street
- QEW – improvements to Victoria Avenue interchange
- King Street / Nineteenth Street – intersection reconfiguration and signalization
- King Street – centre turn lane between Durham Road and Lincoln Avenue, plus bike lanes
- King Street / Thirty Road – channelized southbound right-turn
- King Street- reconstruct to two lanes between Vinehaven Trail and 23rd Street, with on-road bike lanes

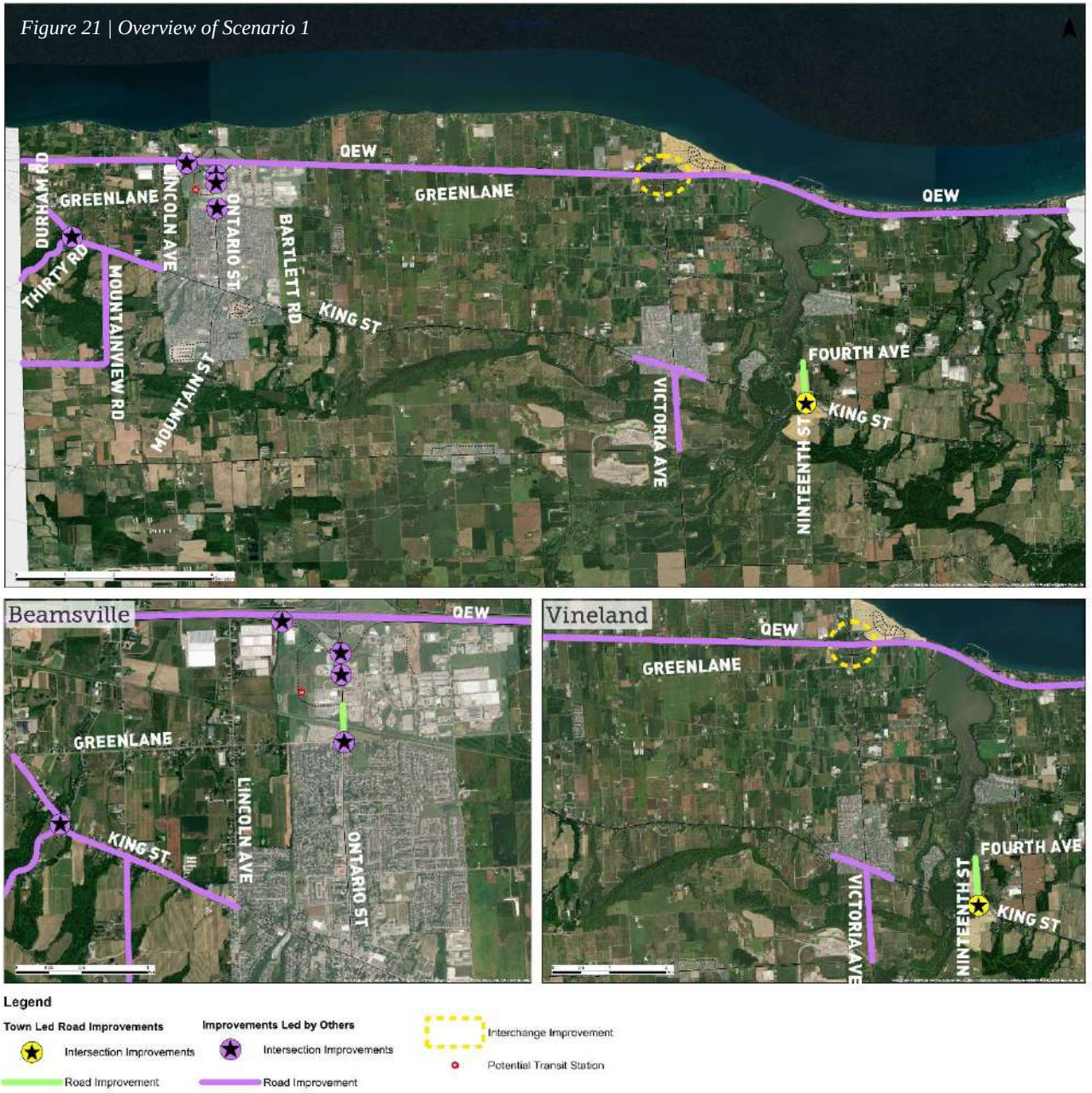
Figure 20 | Overview of Base Case



Scenario 1:

- Ontario Street - widen northbound approach from south of Union to Greenlane

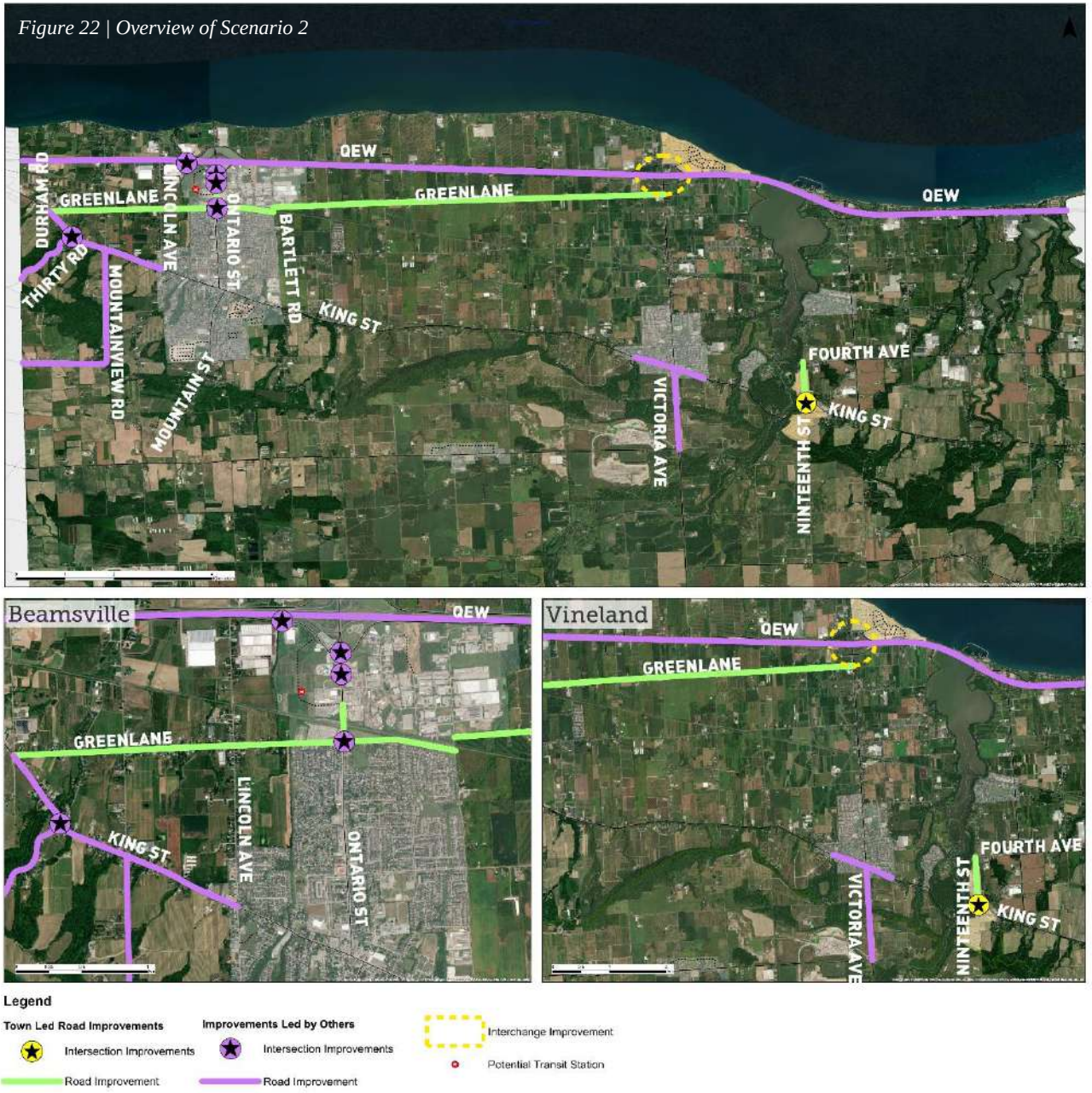
Figure 21 | Overview of Scenario 1



Scenario 2:

- Scenario 1 improvements
- Greenlane - roadway modification from King Street to Victoria Avenue (widen travel lanes and convert all-way stop to two-way stop-control)

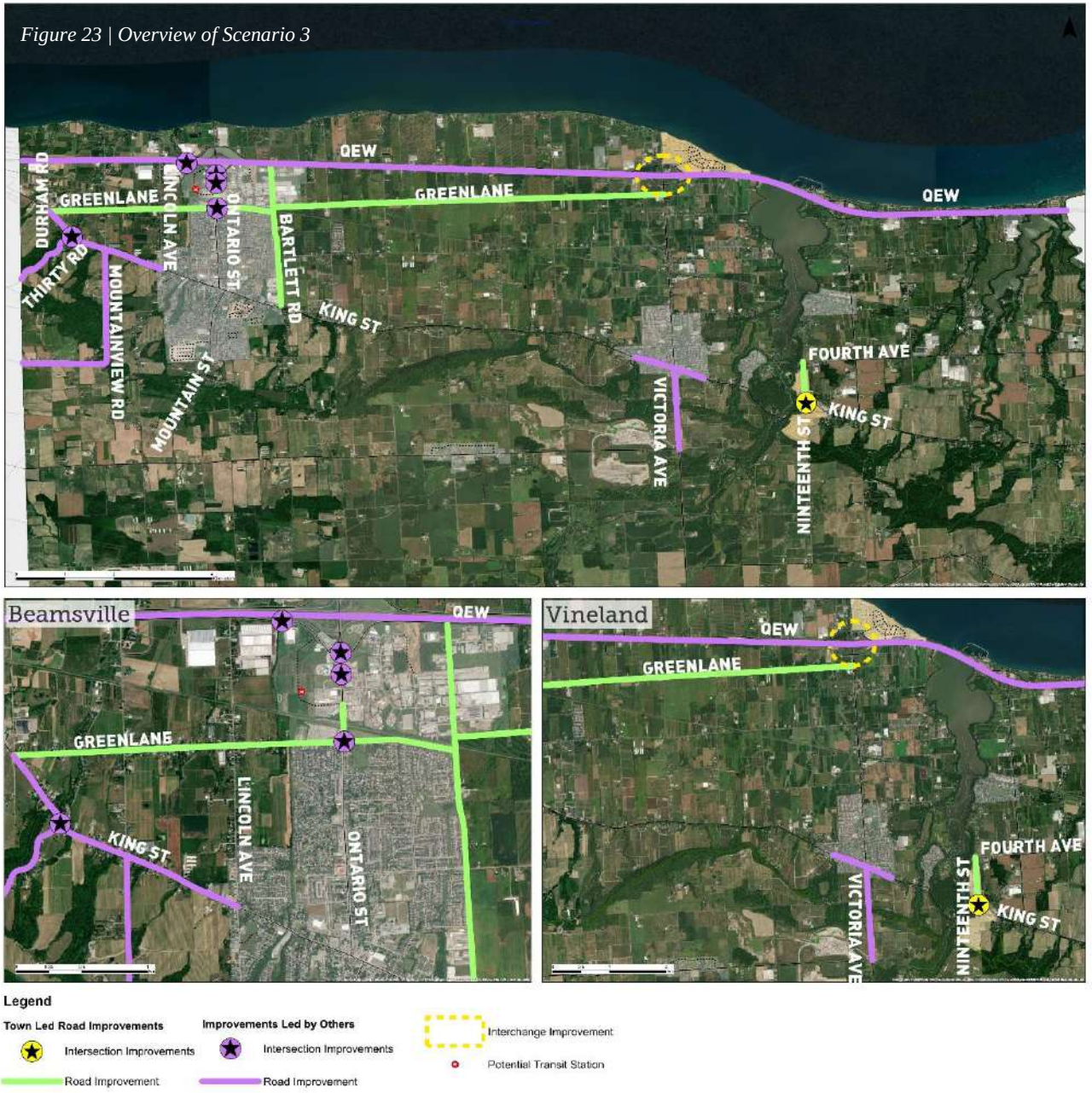
Figure 22 | Overview of Scenario 2



Scenario 3:

- Scenario 2 improvements
- Bartlett Road - roadway modifications from King Street to South Service Road (widen travel lanes and convert all-way stop to two-way stop-control)

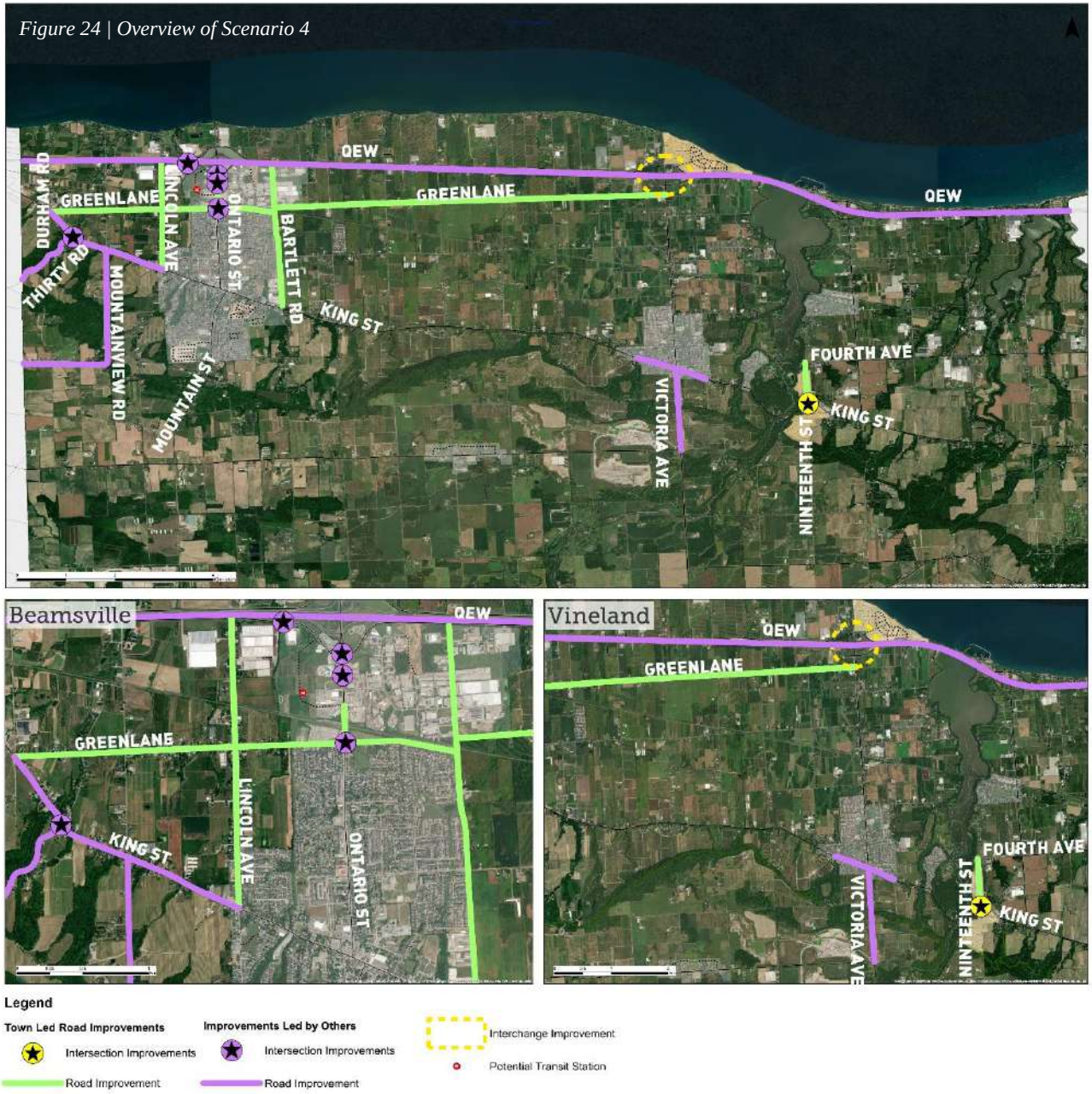
Figure 23 | Overview of Scenario 3



Scenario 4:

- Scenario 3 improvements
- Lincoln Avenue - roadway modifications from King Street to South Service Road (convert all-way stop to two-way stop-control)

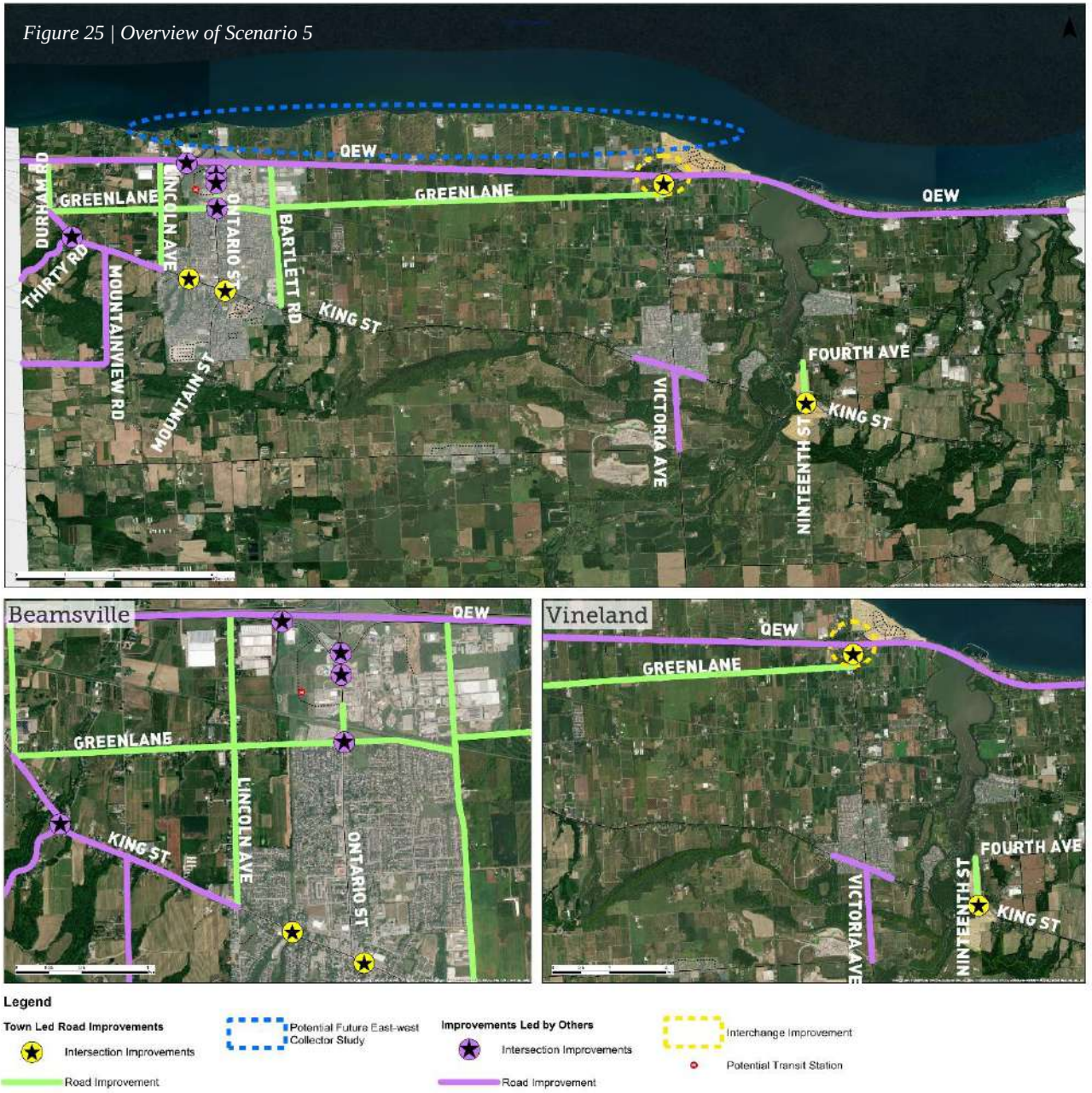
Figure 24 | Overview of Scenario 4



Scenario 5:

- Scenario 4 improvements
- Durham Road – roadway modifications from King Street to South Service Road
- King Street and Stadelbauer Drive – intersection improvement
- King Street and Mountain Street – intersection improvement
- South Service Road and Victoria Avenue – intersection improvement
- East-west collector road to replace lake front roads (Lakeside Drive and Lakeshore Road)

Figure 25 | Overview of Scenario 5



STEP 3: RESULTS OF EVALUATION

A summary of the evaluation of the six road network scenarios is provided in **Table 15**. The scenarios are compared for system-wide network performance for the 2041 horizon year on all roadway links within the Town of Lincoln. The QEW has been excluded from this analysis to focus on local performance of the road network in Lincoln. Additional detail on the network analyses, including figures showing vehicle congestion on roadways in Lincoln, can be found in **Appendix A**.

Table 15 | Overview of Roadway Alternative Evaluation Results

Peak Periods	Themes	System Metrics	Existing Conditions (Excluding QEW)	2041 All Roads Within Lincoln (Excluding QEW)					
				Base Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
AM	Mobility	VKT	28, 903	46,037	46,010	46,074	45,724	46,032	45,724
		VKT on links with v/c > 0.8 (%)	0.00%	0.60%	0.40%	0.40%	0.40%	0.40%	0.40%
	Congestion	VHT	29,678	49,746	49,592	49,510	48,906	49,468	48,898
		VHT on links with v/c > 0.8 (%)	0.00%	2.00%	1.40%	1.30%	1.20%	1.30%	1.20%
PM	Mobility	VKT	46,486	73,320	73,425	73,606	73,620	73,507	73,572
		VKT on links with v/c > 0.8 (%)	0.00%	2.80%	2.90%	3.00%	2.80%	2.70%	2.80%
	Congestion	VHT	47,732	78,980	79,131	79,037	78,769	78,870	78,700
		VHT on links with v/c > 0.8 (%)	0.00%	4.70%	4.70%	5.10%	4.50%	4.30%	4.50%

Most of the roadways within the Town of Lincoln operate at an acceptable level of service with minimal delay. Widening Ontario Street northbound to two lanes between Greenlane and Union Road (Scenario 1) reduced the congestion levels through this short area during the AM peak hour.

The proposed improvements, Scenarios 2-5 were intended to allow vehicles to use some combination of Greenlane, Lincoln Avenue and/or Bartlett Road to bypass Beamsville and remove some of traffic from King Street. There is minimal improvement in mobility and congestion between these scenarios and Scenario 1. This was to be expected given the high levels of service and low levels of congestion on most of the links in the Town of Lincoln.

The improvements not only serve vehicles but also can serve other modes, such as active transportation. The ATS outlines a comprehensive network that could benefit from road improvements, even if additional vehicle capacity is not required.

There are several proposed developments along Greenlane, including the Beamsville GO Station just north of Greenlane, therefore improving Greenlane was suggested to facilitate the growth of this area and provide for active transportation facilities to access the GO Station. Bartlett Road was selected as the potential truck route, while Lincoln Avenue was selected to have a signed bike route. Upgrades to Bartlett Road and Lincoln Avenue were suggested to facilitate the multi-modal movement.

After considering the impacts of the proposed truck routes and active transportation routes in the analysis, it was determined that Scenario 5 is the preferred option. A map of recommended roadway improvements is provided in **Figure 26**. This map also identifies improvements planned prior to the TMP, including several Regional improvements and a Town improvement at King Street and Nineteenth Street in Jordan.

Erosion along the Lake Ontario shoreline is causing the need for continued costly repairs and reinforcement of Lakeside Drive and other lakefront roads such as Lakeshore Road to keep these roads from completely collapsing into Lake Ontario. To provide more reliable access to these properties and to better respond to climate change, the Town should identify a new east-west corridor for a roadway further south of the shoreline that would provide access to shoreline properties and one day replace the shoreline roads. This recommendation is illustrated in **Figure 26**.

Once the new road is constructed, what is remaining of the existing shoreline roads could be converted to purely active transportation uses, provided that these roads have not deteriorated to the point that they are unsafe to travel.

Select intersections also have been identified for improvement through the TMP. The analysis regarding these is described in the next section.


18 Ontario St.
PRESENTATION CENTRE

Figure 26

Recommended Road Network Improvements

Town of Lincoln TMP | Draft August 2019

N

LAKE ONTARIO

LAKESIDE DRIVE
LAKESHORE ROAD
BLEZARD DRIVE
LISTER ROAD
NORTH SERVICE ROAD
SOUTH SERVICE ROAD
RAMP
PRUDHOMME BOULEVARD
MARINA BOULEVARD
QUEEN ELIZABETH WAY
DURHAM ROAD
THIRTY ROAD
UNION ROAD
GREENLANE
LINCOLN AVENUE
SANN ROAD
TUFFORD ROAD
MERRITT ROAD
MARTIN ROAD
FIRST AVENUE
JOHN STREET
SECOND AVENUE
TWENTY-FIRST STREET
HONSBERGER AVENUE / FAIRLANE ROAD
THIRTEENTH STREET
MAPLE GROVE ROAD
BARTLETT ROAD
ABERDEEN ROAD
MOUNTAINVIEW ROAD
MCLEOD STREET
CLAUS ROAD
CULP ROAD
RED MAPLE AVENUE
GLASS AVENUE
LOCUST LANE
MOUNTAIN STREET
NIXON STREET
KING STREET
CAVE
SPRING ROAD
TWENTY-THIRD STREET
JORDAN ROAD
FIFTEENTH STREET
NINTH STREET
JORDAN LIONS CLUB PARK
TALLMAN DRIVE
MAIN STREET
FOURTH AVENUE
HILLSIDE DRIVE
QUARRY ROAD
KOMOKLE ROAD
PHILP ROAD
KINSMEN ROAD
MOYER ROAD
HORTON AVENUE
WALKER ROAD
FLY ROAD
SIXTH AVENUE
GLEN ROAD
NINETEENTH STREET
CAMPDEN ROAD
ZIMMERMAN ROAD
MOUNTAIN ROAD
FROST ROAD
COOSBY ROAD
DUTCH LANE
SPECE ROAD
TINTERN ROAD
BETHESDA ROAD
SEVENTH AVENUE
SEVENTEENTH STREET
ELEVENTH STREET
CHERRY AVENUE
HIGH ROAD
VICTORIA AVENUE
STAFF AVENUE
EIGHTH AVENUE
MARTINDALE ROAD
PELHAM ROAD
YONGE STREET
0 1 2 4 Kilometers

Beamsville

NORTH SERVICE ROAD
SOUTH SERVICE ROAD
QUEEN ELIZABETH WAY
RAMP
SOUTH SERVICE ROAD / REGIONAL ROAD 81
CHRISTIE DRIVE
UNION ROAD
DURHAM ROAD
THIRTY ROAD
GREENLANE
MOUNTAINVIEW ROAD
LINCOLN AVENUE
HOMESTEAD DRIVE
DRAKE
CAMPBELL
BARTLETT ROAD
CHERRYBROOK LANE
MICHAEL AVENUE
ALLAN COURT
DENNIS AVENUE
JOHN STREET
KING STREET / REGIONAL ROAD 81
SERENA DRIVE
ONTARIO STREET
GENTRAL AVENUE
ALBERT AVENUE
JILLVIEW DRIVE
KING STREET
EXS AVENUE
0 0.25 0.5 1 Kilometers

Potential Future GO Station Entrance
Ontario St and South Service Rd
Potential Future GO Station Entrance
Ontario St and Greenlane
King St and Stadelbauer Dr
King St and Mountain St

Vineland

NORTH SERVICE ROAD
QUEEN ELIZABETH WAY
RAMP
PRUDHOMME BOULEVARD
SOUTH SERVICE ROAD
MARINA BOULEVARD
GREENLANE
SANN ROAD NORTH
TUFFORD ROAD
MERRITT ROAD
VICTORIA AVENUE
FIRST AVENUE
JOHN STREET
SECOND AVENUE
CHERRY AVENUE
MARTIN ROAD
TWENTY-FIRST STREET
SANN ROAD
MAPLE GROVE ROAD
CLAUS ROAD
JORDAN ROAD
FIFTEENTH STREET
CULP ROAD
KING STREET
TWENTY-THIRD STREET
CAVE
SPRING ROAD
TALLMAN DRIVE
FOURTH AVENUE
STREET 3
HAYNES STREET
MOYER ROAD
QUARRY ROAD
SPECE ROAD
CAMPDEN ROAD
TINTERN ROAD
NINETEENTH STREET
GLEN ROAD
FLY ROAD
0 0.5 1 2 Kilometers

Victoria Ave Interchange Exit
Victoria Ave and South Service Rd
King St and Ninteenth St

J:\01 PROJECTS\2017 Jobs\Town of Lincoln TMP\Mapping\b. Maps\a. Roads\Map X - Roadway, Intersection, Traffic Calming Improvements_v3.mxd

Legend

Town Led Road Improvements

- Intersection Improvement
- Road Improvement
- Potential Future East-west Collector Study

Improvements Led by Others

- Intersection Improvement
- Road Improvement
- Interchange Improvement

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Potential Transit Station

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Town of Lincoln — Make Moving Make Sense as Lincoln Grows!

STEP 4: INTERSECTION GEOMETRIC DESIGN

This section builds upon the review of intersection geometric design under existing conditions, as examined in **Chapter 2.2.4**, to provide recommendations to optimize the performance at the intersections with identified safety and operational concerns.

This section will focus on improvements to the following intersections:

- King / Stadelbauer / West;
- King / Mountain;
- King / Nineteenth / Main; and
- Victoria / South Service Road.

For each of the intersections there is an overview of some of the current limitations / challenges as well as a summary of potential improvements which are proposed for consideration by the Town of Lincoln.

King / Stadelbauer / West

The intersection is currently two-way-stop-controlled with Stadelbauer and West stopping for vehicular traffic on King. There is a single lane on each approach. The Fleming Centre is located to the northwest of this intersection, with a connecting entrance via Park Avenue, off West Avenue, as illustrated in **Figure 27**. South of King, there are residential neighbourhoods between Lincoln Avenue and Ontario Street.

There are several operational and safety factors noted under existing conditions, which will be exacerbated by further residential development located approximately 1.5 km south of King along Stadelbauer, and future opening of the Park Avenue access to Fleming Centre.

Residents have long been requesting a signalization of this intersection to assist multi-modal travel through this intersection. An analysis of existing traffic volumes as well as forecast traffic volumes once further residential development is constructed indicates that a traffic signal is not, and likely will not, be warranted, strictly based on vehicle traffic volumes.

There are compelling reasons to consider signalization of the intersection outside of vehicle traffic volumes. These include limited active transportation connections to a major trip generator (the Fleming Centre) and sightline concerns.

Figure 27 | King / Stadelbauer / West Intersection

Existing Intersection Issues

Limited Active Transportation Connections between the Residential Neighbourhoods and Community Centre

Currently, there is only one signalized intersection along this stretch of King Street, at Ontario Street, and one pedestrian crosswalk located at William Street, which is approximately 300 metres east of the King / Stadelbauer intersection, as illustrated in the figure above. Stadelbauer is lined with homes, with more residential development planned. Stadelbauer to West to Park is the major desire line for active transportation from these residences to the Fleming Centre. The Fleming Centre is the main community centre in Beamsville and is a focal point for sports and other community activities. There is no convenient, controlled crossing for pedestrians or cyclists to cross from these neighbourhoods to the Fleming Centre and other parts of downtown Beamsville on the north side of King Street.

Additionally, the Losani residential development is expected to bring more families to the Stadelbauer corridor and increase the number of pedestrians and cyclists wishing to cross at Stadelbauer and King. The improvements recommended in the Losani Traffic Impact Study include a westbound left-turn lane and eastbound right-turn lane on King Street at this intersection. This will increase the crossing distance for pedestrians, increasing their exposure.

Existing Sightline Concerns

Based on field observations, there are horizontal and vertical sightline concerns at this intersection. Horizontally, the bends along King Street east and west of Stadelbauer makes it difficult for Stadelbauer traffic to see oncoming traffic on King. These concerns are exacerbated by vertical sightline issues, as this stretch of King Street is undulating with peaks and valleys at the curves to the east and west, respectively. The horizontal and vertical sightline issues affect the ability of vehicle drivers, pedestrians and cyclists to detect oncoming traffic and determine if there is a safe gap to enter King Street or cross to the other side of King Street.

Recommended Improvements

A pedestrian signal was contemplated for this intersection to assist active transportation to and from the Fleming Centre and other points north of King. However, based on the horizontal and vertical sightline concerns that affect pedestrians, cyclists and vehicle drivers, it is recommended that this intersection be signalized. The existing concerns of residents have been well documented. These are only going to become more acute as future development occurs along Stadelbauer. For the safety of all modes of travel utilizing this intersection, all-way signalization is recommended.

King / Mountain

As part of the goods movement recommendations, the truck route network is recommended to be revised to instruct trucks traveling north on Mountain to the intersection of King Street to turn right and travel east on King Street to Bartlett Road, as illustrated in **Figure 28**. Currently, trucks typically turn left here to travel west to Ontario Street. Geometric improvements to King / Mountain will be required to facilitate northbound right turning truck movements. Detailed engineering design to accommodate a truck's swept path movement should be undertaken and physical improvements to the intersection constructed to enable trucks to make this turn.

Figure 28 | King / Mountain Northbound Right-Turn Movement

King / Nineteenth / Main

The intersection of King / Nineteenth is currently a five-legged intersection with three approaches being stop-controlled, as illustrated in **Figure 29**. Based on field observations, the substantial bend along King Street just west of the intersection and the vertical incline makes this intersection very challenging to maneuver. This intersection was studied by the Town as part of the Jordan Village Improvements EA prior to the TMP and is slated for the following improvements:

- Closure of the southern terminus of Main Street to vehicular traffic and convert it into a pedestrian friendly urban square;
- Eastbound and westbound left turn lanes on King Street;
- Signalization with priority given to approaches with reduced sightlines and pedestrian crossings; and
- Pedestrian crossings provided at all four legs.

The planned improvements have been incorporated into the TMP.

Figure 29 | King / Nineteenth / Main

Victoria / South Service Road

Vehicles currently making a westbound left-turn movement at the intersection often encroach onto the oncoming lane on the south approach, as illustrated in **Figure 30**. This was evident during our site visit when we drove through the intersection making the westbound left turn. Considering this is a truck route and a connection to the QEW, this is a difficult movement for truck traffic. A solution would be to shift the south approach stop bar further south to allow more space for left-turning vehicles. The Town should conduct an AutoTURN analysis to confirm the extent of the problem and determine how far south the stop bar should be placed on the south approach; the Town should also ensure sufficient all-red clearance time for vehicles to clear the north-south approach after shifting the stop bar.

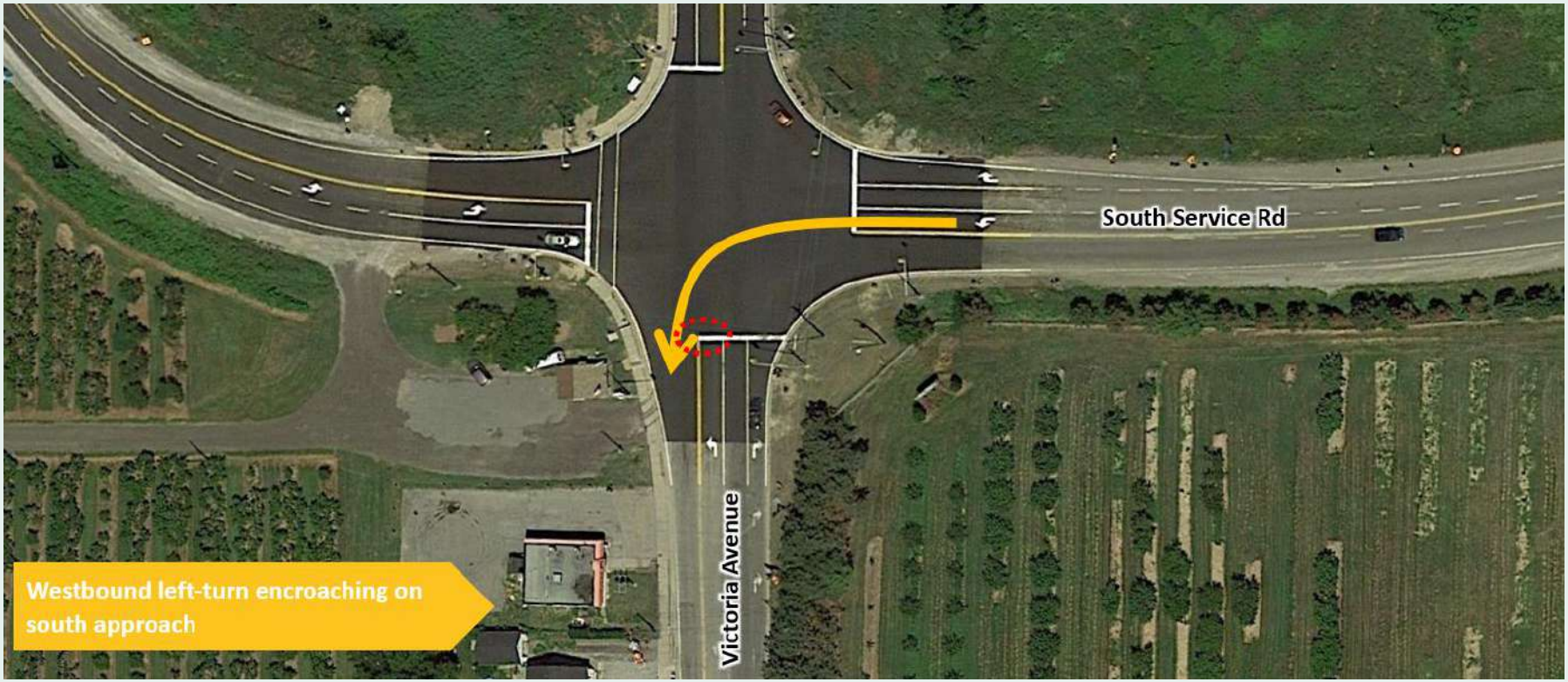


Figure 30 | Victoria / South Service Road Westbound Left-Turn Movement

4.4.3 Phasing & Implementation

The recommended road network and intersection improvements throughout this section have been phased depending on the urgency of the improvement and in coordination with the other modes including active transportation and goods movement. **Table 16** summarizes the phasing of the recommendations, with detailed costing provided in **Chapter 6**.

Table 16 | Summary of Road Network Phasing

SHORT TERM (next five years)	MEDIUM TERM (year six to 2031)	LONG TERM (2032 to 2041 and beyond)
– King / Nineteenth / Main intersection improvements and signalization, as part of the Jordan Village EA. – Bartlett roadway modifications from King to South Service Road. – Durham roadway modifications from King to South Service Road. – Greenlane roadway modifications from Durham to Lincoln. – King / Stadelbauer / West intersection signalization. – King / Mountain intersection improvements. – Victoria / South Service Road intersection improvements.	– Widen Ontario Street from Greenlane to south of Union, while continuing to work with the region to improve safety in the interim. – Greenlane roadway modifications from Lincoln to Bartlett. – Lincoln roadway modifications from King to South Service Road. – Identify a new east-west corridor for a roadway further south of the shoreline that would provide access to shoreline properties and one day replace the Lakeside Drive and Lakeshore Road.	– Greenlane roadway improvements from Bartlett to Victoria.


Waterfront
Trail
ONTARIO
TRAIL OF
DISTINCTION

CHAPTER 5.0 | SUPPORTING POLICIES

Policies are the "legs" on which the "table top" of the transportation network stands. The policies in this chapter are necessary to help implement the active transportation, transit, goods movement and road network recommendations made in **Chapter 4**. The supporting policies have been highlighted in this chapter. Each policy is elaborated upon in a separate technical appendix. The technical appendices are intended to support and provide additional details to the TMP report.

5.1 COMPLETE STREETS

Complete Streets is the concepts of designing the transportation network for all modes of transportation and all transportation system users. It is an umbrella policy that guides the remaining policies as well as the planning of the physical transportation network.

The Complete Streets concept refers to the transportation network as a system - not every street is designed for every mode, for instance, a local road typically does not have a dedicated cycling facility and is not used as a truck route. The network must be complete in providing alternatives or parallel facilities that are "complete". Complete Streets for Canada defines the following 10 "action elements" to serve as a model of best practices in the development of a comprehensive Complete Streets Policy. These 10 action elements are listed in **Table 17**.

Table 17 | Complete Street Action Elements

Embodies Community Vision	Adopted by All Agencies
States Lincoln's community vision and intent of how and why Complete Streets elements will be implemented	Conveys an approach that can be adoptable and understood by all Town departments and/or agencies that may be involved in the process
Defines All Users and Modes	**Utilizes Latest Design Guidelines**
Gives equal consideration to different users regardless of age or ability, especially those who walk, cycle and ride transit	Draws from the use of the latest and best design criteria and guidelines to stimulate interaction between users of different modes and the built or natural environment
Applies to All New & Retrofit Projects	**Acknowledges Context Sensitive Solutions**
Recognizes opportunities of application to new and retrofit transportation projects as well as existing maintenance operations	Concedes that solutions will be context-sensitive to Lincoln's different urban, suburban and rural environments
Identifies Exceptions	**Defines Performance Standards**
Accounts for any appropriate exemptions due to legislative, topographical, technical, cost-benefit limitations or others	Establishes qualitative or quantitative performance indicators to evaluate and monitor policy impacts over time
Encourages Connectivity & Integration	**Proposes Specific Implementation Steps**
Promotes continuous integration, and connectivity throughout Lincoln's street network and between modes	Lists specific steps for an implementation strategy according to a set time scope

Complete Street Recommendations

The Complete Streets Policy addresses these 10 action elements by providing the recommendations listed in the below. The complete streets policy work in its entirety is provided in **Appendix E**. The following is a summary of the complete street recommendations that are proposed for adoption by the Town of Lincoln to guide next steps.

Recommendation #1

Appoint a committee to monitor and evaluate the execution of the Policy.

Recommendation #2

Define measurable outcomes and establish a baseline of indicators to monitor success.

Recommendation #3

Regular review of potential candidate projects.

Recommendation #4

The Committee will advise the relevant Implementation Partners to follow the best design guidelines according to the nature of each project and ensure that coordinated efforts are adopted between departments/agencies during the implementation to optimize fiscal resources.

Recommendation #5

Provide regular training and education on Complete Streets policies and best design practices through workshops, seminars, conferences or other events.

Recommendation #6

The Town will prioritize and approve current and future sources of funding, based on the expected impact and scope of Complete Streets candidate projects.

Recommendation #7

Education and promotion of active transportation to improve road-use behaviour.

Recommendation #8

Incorporation of Complete Streets principles into all existing plans, manuals, regulations and programs, as appropriate to ensure consistent application.

5.2 TRAFFIC CALMING

Traffic calming is a common and consistent request heard by Town staff in their daily work. In the context of Lincoln, traffic calming is typically referring to resident complaints of vehicles speeding within the residential neighbourhoods.

As part of the TMP, a tailored traffic calming policy has been prepared to outline a transparent, objective, and data-driven approach to address traffic calming requests.

The policy is focused on addressing the negative impacts of high motor-vehicle speeds and traffic volumes in residential local and collector streets; it aims to address a series of challenges that are depicted in **Figure 31** | Traffic Calming Objectives

Figure 32.

The traffic calming process consists of procedures for eligibility, review, and implementation of a traffic calming measure. The steps are intended to provide a consistent, transparent process and highlight the initial criteria needed to consider a location for traffic calming.

Traffic calming measures include physical vertical or horizontal deflections, obstructions, and signage; some examples of traffic calming measures are provided in **Table 18**.

Figure 31 | Traffic Calming Objectives

Figure 32 | Traffic Calming Objectives

Table 18 | Summary of Traffic Calming Measures

Speed Hump	Raised Median Island
- Usually designed to encourage speeds of 30 - 40 km/h - Best suited for local and minor collector roadways	- Installed in the centre of roadway to reduce lane widths without affecting road capacity - Effective when combined with curb extensions and/or textured crosswalks - Best suited for local and collector roadways
Speed Cushion	**Traffic Calmed Neighbourhood**
- Similar to speed humps but smaller design - Does not slow down emergency or transit vehicles - Generally laid out in sets of two or three cushions - Best suited for local and collector roadways	- Increase awareness regarding entering a traffic-calmed zone - Complementary when other measures have been installed like chicanes, curb extensions, or speed humps - Best suited for local and collector roadways
Chicanes	**Enforcement**
- Alternating curb extensions that narrow a two-lane to a one-lane road - Suitable for mid-block locations only on one or two-way streets - Not suitable on roads with transit or emergency routes - Best suited for local and minor collector roadways	- Police presence monitoring speeds and issuing tickets for violations - Effective in meeting drivers' attention - Effective in reducing travel speeds if enforcement is consistent - No impact to emergency vehicles - Immediate implementation
Speed Radar Sign	**Right-in / Right-out Island**
- Raises speed awareness of oncoming drivers - More effective in reducing speed than just a posted speed limit sign - Best suited for local and collector roadways	- Raised triangular islands at an intersection to restrict left-turn movements. - Best suited for locations where local residential streets intersect any other road class

Traffic Calming Recommendations

Complete Streets also play a role in reducing motor vehicle speed and enhancing safety and attractiveness of the public realm as complete streets provide a natural traffic calming effect. Although some measures may take longer to implement due to an increased scope and cost, they may be as effective as traditional traffic calming measures. Some recommended Complete Streets supportive measures include implementing and/or extending cycling lanes (applicable mainly to roadways identified as proposed cycling routes), sidewalks, or on-street parking. The implementation of these measures generally implies reducing roadway lane widths, thereby discouraging speeding.

The single traffic calming recommendation is provided below, with the policy work in its entirety provided in **Appendix F**.

Recommendation #1

Adopt and begin implementing the Traffic Calming Warrant and Policy developed as part of this TMP.

5.3 ON-STREET PARKING

The Lincoln context for on-street parking is focused primarily in new urban residential areas and revolves around the need to provide adequate on-street parking to accommodate residential demand. This concern is more prominent during the winter months, especially during snow events. The following comments regarding parking were received during the pubic consultation process:

- Insufficient on-street parking supply year-round
- Issues during winter maintenance events with on-street parking
- Parking needs to be investigated in Jordan Station
- Parking issues in the Ontario Street / King Street area
- Lack of communications regarding parking locations and availability
- Insufficient shoulder widths if on-street parking is expected

Currently, the available on-street parking spaces within residential neighbourhoods are frequently being occupied by residents themselves, resulting in a shortage of visitor parking. Use of on-street parking in residential neighbourhoods should be prioritized for visitors, as residents are provided two spaces per unit, with one in the garage and one in the driveway. The TMP approach has been to recommend improvements to the management and efficient usage of existing facilities to avoid additional Town expenditures to provide more parking.

Currently, the Town does not have any on-street parking restrictions; the Town has a "Keep It Clear" program that requests residents' assistance toward the Town's snow removal operations but does not impose parking restrictions that are enforceable.

A review of similar municipalities' approaches to parking management was undertaken to identify benchmark strategies which could be tailored to address the Town's parking issues. Several municipalities, some surrounding the Town and others with similar characteristics, were selected to conduct a review of the applicable on-street parking management, which include the Town of Grimsby, Town of Milton, City of Thorold and the City of St. Catharines.

All the municipalities listed above have time limits for on-street parking ranging from five to 16 hours, and majority have parking restrictions during snow events. Some of the studied municipalities also have overnight parking restrictions and on-street parking permit programs.

In addition to on-street parking management, a review of the residential parking requirements was conducted based on zoning by-law requirements and approved development applications. The parking requirements for single/semi-detached and townhouse units range between 1.0 to 2.0 spaces per unit, and the requirement for apartments ranges between 1.25 to 1.75 spaces per unit, including visitor requirements. The Town's parking requirements of 2.0 and 1.25 spaces per unit for singles / townhouses and apartments, respectively, falls within the observed ranges in similar and surrounding municipalities.

On-Street Parking Recommendations

On-street parking tends to be the most desirable public parking facility for sharing since it is highly visible and convenient. It is helpful to manage on-street parking for maximum use, particularly for visitors in residential neighbourhoods. When the road right-of-way can accommodate both traffic flow and parking, it is very cost-effective to utilize on-street parking. Additionally, on-street parking uses less land per space than off-street since it does not require access lanes.

On-street parking also creates a buffer between street traffic and pedestrians and assists with traffic calming by reducing vehicle travel speeds. It is widely acknowledged that streets with on-street parking tend to have lower travel speeds and that on-street parking is generally an effective tool in helping to create places that are safer, more walkable, require less parking, and have more vitality.

The following strategies are proposed to ensure effective usage of on-street parking supplies, along with some future-ready measures for consideration. The on-street parking policy work in its entirety is provided in **Appendix G**.

Recommendation #1

Conduct a zoning by-law review to determine appropriate residential and visitor parking requirements

Recommendation #2

Consider establishing appropriate time limits of up to three hours in locations where on-street parking is in high demand

Recommendation #3

Consider the following improvements and uses of municipal parking lots:

- Designate carpool parking spaces in highly desirable lots to promote carpooling over single-occupant vehicle travel
- Provide secure bicycle parking in highly desirable lots to promote cycling over driving
- Provide overflow parking for nearby land use, special events, and snow events when on-street parking is discouraged
- Consider alternative uses for underutilized municipal parking lots

Recommendation #4

Initiate an education campaign to clearly communicate on-street parking restrictions to the public

Recommendation #5

Launch a “Clear Your Garage” campaign

Recommendation #6

Establish a strategy to evaluate the need for overnight parking restrictions in residential areas, if problems persist. Consider seasonal restrictions (winter) as part of this strategy.

Recommendation #7

Include shared parking in the next zoning by-law review;

Recommendation #8

Permit shared parking in mixed-use developments provided that a satisfactory parking justification report is submitted

Recommendation #9

Promote shared parking through the provision of public (municipal) parking within the intensification areas

Recommendation #10

The Town of Lincoln should consider future ready parking improvements which could include but are not limited to:

- Designate off-street pick-up and drop-off facilities
- Continue to consider on-street accessible parking space applications, upon request
- Implement a paid On-Street Permit Pilot Program for residents requiring on-street parking
- Monthly permit parking in a municipal parking lot in substitution for on-street parking permits
- Implement car share spaces in high density areas

5.4 TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) is one implementation tool in the TMP. TDM integrates multiple strategies to encourage travel by means other than the single occupant vehicle in the peak travel hours. The strategies create a cohesive approach to managing demand on the transportation network that help to alleviate traffic congestion, lower carbon emissions, decrease health-related problems due to sedentary lifestyles and offer an overall improvement to the quality of life.

This chapter provides strategic guidelines for a future TDM Plan specific for Lincoln. The components of the plan are recommended to be developed in a standalone document to deliver specific short, medium, and long-term actions that meet the community's needs. This will permit the Town of Lincoln to establish a comprehensive program tailored to the community's travel patterns and future mobility goals. A context-sensitive TDM Plan for Lincoln should:

- Consider the following key elements that have characterized other successful strategies, including: Integrate policies that are aligned with the Town's Official Plan, Transportation Master Plan (TMP), public health initiatives, transit service strategies, and active transportation plans (part of the TMP).
- Identify partnerships with stakeholders, including sustainable transportation advocates, transit services, public health, businesses, school boards that can support the communication campaign as well as provide incentives to sway user transportation preferences.
- Determine existing travel conditions and transportation preferences to set a baseline of the demand and the population segments that the TDM Plan should focus on.
- Consider launching a survey of public perception to identify main barriers and challenges dissuading people from using more sustainable modes of transportation.
- Set clear goals and objectives, as well as modal share goals for short, medium, and long-term horizons.
- Explore all the possible TDM opportunities based on best practices that account for different soft and hard measures including: Education, Promotion, Community Outreach, Incentives (monetary or non-monetary), land use, urban design, and transit services.
- Consider piloting the program in one community and launching a survey to collect most recent travel patterns.
- Consider establishing a Commute Ambassador program, where leaders of the community are the active voices of their neighborhoods and help to act as "commute role models".
- Develop an action plan with clear actions, possible resources and partners, and preferably measurable outcomes.
- Design a detailed monitoring plan with a data collection framework to quantify outcomes and evaluate impact of the TDM program.
- Draft an implementation plan.
- Anticipate staffing recommendations.

The summary below provides a list of recommended items for the development of a TDM Plan. The TDM policy work in its entirety is provided in **Appendix H**.

TDM Recommendations

Recommendation #1

Appoint a Sustainable Mobility Coordinator to administer and monitor the program.

Recommendation #2

Develop and promote a TDM page within the Town's official website.

Recommendation #3

Collaborate with the Region and Town's departments to gain larger support.

Recommendation #4

Create a working group that consists of local cycling and pedestrian groups, car sharing services, school boards and community groups.

Recommendation #5

Review and partake in Niagara Region's TDM initiatives.

Recommendation #6

Engage with all relevant stakeholders and if possible hold public consultation or social marketing events.

Recommendation #7

Support and prioritize land use policies which leverage TDM initiatives.

Recommendation #8

Engage with local employers to promote workplace programs that support the needs of commuters, including those at remote locations and employed as shift-workers.

Recommendation #9

Develop personalized travel planning programs that provide information of multi-modal transportation options to meet the needs of individuals and households.

Recommendation #10

Consider introducing car share and bikeshare programs through public-private partnerships.

Recommendation #11

Conduct small scale, neighborhood pilot projects.

Recommendation #12

Design an incentives program with the support of local businesses and public agencies.

Recommendation #13

Expand the scope of transportation planning projects to include consideration of all modes.

Recommendation #14

Consider the role of developing a multi-modal search engine that provides navigation information and the ability to find commute partners for walking, cycling, carpooling, and riding transit.

Recommendation #15

Develop measurable and attainable goals such as a volume reduction %.

5.5 FUTURE READY

For Lincoln, Future Ready is about unlocking future opportunities by actively identifying and monitoring key trends in the present. A focus on Future Ready now can help Lincoln become more resilient to change in the coming decades and be better positioned to achieve its vision. This section looks at some of the current and emerging trends at the intersection of technology, mobility, and society to help the Town best identify the pulse of the sector and better align its resources for the future.

5.5.1 Vision Zero

To best ensure a safer and healthier future for Lincoln's mobility systems, the Town should look to supplement the existing Regional and Town road safety programs with the emerging Vision Zero approach. Vision Zero is a long-term, evidence-based road safety strategy that seeks to significantly reduce fatalities and serious injuries in the transportation network through the collaborative efforts of road users and system designers - from transportation planners, traffic engineers, land-use planners, to policymakers, law enforcement, and emergency response teams. Instead of demanding road users to adapt perfectly to their dynamic surroundings, Vision Zero recognizes that human errors are unavoidable and works to advance road safety through intentional design.

As Lincoln grows, the Town should work closely with the Region in developing a comprehensive Vision Zero Road Safety Action Plan that will guide Lincoln's interim road safety goals and mitigation measures. The goals of the plan should be ambitious, yet achievable, tailored specifically to Lincoln's needs for the short, medium, and long-term timeframes. It should also include a monitoring and evaluation framework that allows for the ongoing update of the plan as conditions evolve. The timeline and monitoring program could be rolled into the overall TMP implementation efforts described in **Chapter 6**.

To strengthen the Road Safety Action Plan's resiliency, it should be developed collaboratively across disciplines and contextually to the unique conditions of Lincoln's transportation framework.

The success of Lincoln's future Vision Zero adoption will rely heavily on the public, internal and external road-safety stakeholders, the continued collaboration between the Town and the Region.

Recommendation #1

Develop a Road Safety Action Plan specifically tailored for Lincoln in coordination with the Region. This plan should be evidence-based, include ambitious road safety goals and directives for the preferred countermeasures, community initiatives, pilot studies, education programs, and developed in collaboration with internal and external stakeholders.

5.5.2 New Mobility Technologies

For the past decade, the introduction of emerging mobility technologies has gradually expanded travel options and is now poised to one day transform transportation. These technologies include ride-sharing platforms, electric vehicles, and in the coming decades, autonomous vehicles. Collectively, these new mobility technologies create a new mobility landscape that will continue to evolve over the planning horizon of the TMP.

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

Electric vehicles (EVs) are motor vehicles with electric engines instead of traditional combustion engines. These vehicles do not generate point source carbon emissions and have a huge potential in help reduce the transportation-sector's overall emissions. EVs, however, require charging infrastructure. To accelerate EV adoption, the Town should review opportunities and business cases to implement electric charging infrastructure at public parking lots /garages. The provision would encourage more motorists to consider switching to electric and help build a cleaner, healthier and low-carbon future for Lincoln.

Autonomous vehicles (AVs) use advanced sensors and artificial intelligence to perform all driving-related tasks. While this technology is in relatively advanced stages of development, it is still unclear on when it will be widely deployed. With estimates ranging from the early 2020's to the 2030's or beyond, AV should be on every municipality's radar. When they are introduced on a wide-scale, it is expected that AVs will improve road safety, reduce the cost of ride-sharing and enable more flexible use of commute time for drivers. For towns like Lincoln, AV's potential to reduce vehicle ownership, parking demand and increase opportunities for shared parking are perhaps among foremost implications of this technology. To further investigate the role AVs will play within Lincoln's transportation system, the Town is encouraged to provide as much separated cycling infrastructure on major streets as possible to mitigate future conflict between cyclists and AVs.

Moving forward, the Town should work with the Region to establish a regional working group dedicated for new mobility technologies to best monitor new mobility trends and provide appropriate policy responses. Members of this working group should include representatives from the Region, the local municipalities, Metrolinx, educational institutions, citizen representatives and other relevant industry stakeholders.

Recommendation #1

Continue to monitor emerging technologies and their impact on travel behaviour.

CHAPTER 6.0 | IMPLEMENTATION

A plan is only as good as its implementation. This chapter addresses the phasing of the multi-modal recommendations, provides a high-level estimate for the costs, identifies available funding sources and recommends ways to monitoring implementation progress through data collection and staff review.

6.1 PHASING

Not all the projects recommended can be implemented at one time. Based on population and employment forecasts and to establish a feasible timeline that can be achieved, projects have been grouped into short (generally the next five years), medium (to the year 2031) and long term (2032 to the year 2041 or beyond). Multi-modal projects have been shown in each horizon year to optimize construction and leverage resources.

A road that is scheduled for road and active transportation improvements should have all improvements constructed at one time - this would be more cost effective than to build an active transportation improvement only to have to go back later and construct a road improvement.

The recommended projects by phase and mode are summarized in **Table 19**.

Table 19 | Recommended Transportation Improvements by Phase

MODE	SHORT TERM (next five years)	MEDIUM TERM (six years to 2031)	LONG TERM (2032 to 2041 and beyond)
AT	- Local Connecting Primary Loop - Local Spine Link	- Inter-Municipal Primary Link - Local Connecting Secondary Loop - Inter-Community Secondary Loop	- Inter-Municipal Secondary Link - Tertiary Loop
Transit	- Ensure uLinc schedules are coordinated with the GO Transit schedule - Continue monitoring ridership and implement customer satisfaction surveys - Consider integrating ride-sharing - Consider adding an additional bus to the transit fleet if additional resources are needed	- Provide appropriate support and efforts for Regional initiatives	- Refine uLinc routes and scheduling to coordinate with Beamsville GO train
Goods Movement	- Create a truck route network that bypasses the Beamsville core - Restrict through trucks on Ontario and King within Beamsville core - Support any remaining studies, implementation and construction of the Park Road to Bartlett Avenue connection to the QEW - Work with the Region to develop and implement traffic safety improvement measures - Work with the MTO, NRP, and the Region initiate frequent truck safety inspection/ enforcement blitzes - Develop enforcement strategies with MTO and the Region for truck traffic bypassing of the QEW inspection station	- Continue working with the Region to develop and implement traffic safety improvement measures - Continue working with the MTO, NRP, and the Region to initiate frequent truck safety inspection/enforcement blitzes	- After the Park / Bartlett, Grimsby connection is open, transfer Mountain Road from Fly Road to King Street from Region to Town - Prohibit trucks on this section of Mountain Road

MODE	SHORT TERM (next five years)	MEDIUM TERM (six years to 2031)	LONG TERM (2032 to 2041 and beyond)
Roads	- King / Nineteenth / Main intersection improvements and signalization, as part of the Jordan Village EA - Bartlett roadway modifications from King to South Service Road - Durham roadway modifications from King to South Service Road - Greenlane roadway modifications from Durham to Lincoln - King / Stadelbauer / West intersection signalization - King / Mountain intersection improvements - Victoria / South Service Road intersection improvements	- Widen Ontario Street from Greenlane to south of Union while continuing to work with the region to improve safety in the interim - Greenlane roadway modifications from Lincoln to Bartlett - Lincoln roadway modifications from King to South Service Road - Identify a new east-west collector road to replace lake front roads (Lakeside Drive and Lakeshore Road)	- Greenlane roadway improvements from Bartlett to Victoria

6.2 COSTING

6.2.1 Overview of Costs

Financial resources need to be allocated to the specific improvements in the TMP for them to be implemented. A high-level cost estimate broken down by each phase and each mode / group is summarized in **Table 20**; a detailed overview of the indicative capital costs of the TMP projects is provided in **Appendix I**. These costs should be confirmed in the detailed design stage for construction projects. The costs have been based on values derived from municipal construction projects throughout southern Ontario.

Table 20 | Costs of Recommended Improvements by Phase

CATEGORY	SHORT TERM	MEDIUM TERM	LONG TERM	TOTAL
AT	$1,689,000	$933,000	$2,996,000	$5,618,000
ROADS	$9,949,000	$5,507,000	$3,533,000	$18,989,000
TOTAL	**$11,638,000**	**$6,440,000**	**$6,529,000**	**$24,607,000**

6.2.2 Funding Alternatives

Implementation of the recommendations included within the TMP will require significant ongoing investments from the Town. These investments should be prioritized alongside other requirements of the transportation program such as asset renewal and rehabilitation, the assumption of local roadways through subdivision agreements, as well as other corporate program areas. For additional funding opportunities beyond the annual capital budget process, the Town should closely monitor opportunities at the Federal, Provincial and Regional levels for any new or incremental funding sources to support future projects. When the opportunity arises, the Town should aim to build a business case for each specific project and go through an application process with the respective funding source stream that is most relevant to the nature of the project.

The following are several funding options and alternatives that could be available to the Town of Lincoln to facilitate future funding and implementation of recommended transportation projects.

Federal Funding

Investing in Canada Plan: Starting in 2016, the federal government has committed to a comprehensive, long-term plan that focuses on providing predictable and sustainable funding for projects that will build modern, resilient, and green communities in Canada. The Investing in Canada Plan will be directly responsible for over $95.6 billion in new federal funding that will flow to provincial, territorial, and municipal partners through bilateral agreements, targeted funding programs, and innovative initiatives. Investments under the Investing in Canada Plan will be made in five identified priority streams - public transit, green infrastructure, social infrastructure, rural and northern communities, and transportation infrastructure. As a part of the Investing in Canada Plan is also $92.2 billion in funding that was committed prior to 2016, including:

- The Gas Tax Fund (GTF)
- New Building Canada Fund – Provincial-Territorial Infrastructure Component – National and Regional Projects (PTIC-NRP)

Federal Gas Tax Fund: The Gas Tax Fund provides municipalities with a predictable and long-term funding for the construction and rehabilitation of core public infrastructure such as roads, bridges, public transit and recreational facilities. Under the program, municipalities can pool, bank and borrow against this funding to provide further financial flexibility.

New Building Canada Fund – Provincial-Territorial Infrastructure Component – National and Regional Projects (PTIC-NRP): This program provides $9 billion in funding to support infrastructure projects of national and regional significance that contribute to economic growth, a clean environment, and stronger communities. Eligible projects to be funded through this program include the construction, rehabilitation and enhancement of highways and roads, public transit infrastructure, culture, recreation and tourism.

Investing in Canada Infrastructure Program: Public Transit Stream: The Investing in Canada Infrastructure Program is a cost-shared infrastructure funding program between the federal government, provinces and territories, and municipalities and other recipients. It provides up to $30 billion in combined funding to support the construction, expansion and improvement of public transit systems and networks across Ontario. The application for potential projects is currently closed, however, it is recommended that the Town seek additional opportunities to apply for funding should it become available in the future.

Municipalities for Climate Innovation Program (MCIP): The MCIP is a five-year, $75 million program designed to encourage Canadian municipalities to better prepare for and adapt to the new realities of climate change. The program supports a variety of projects that seek to help municipalities to reduce greenhouse gas emissions by encouraging cycling, walking and transit.

Municipal Asset Management Program (MAMP): The MAMP is a $60 million program being delivered over the next five years to ensure municipalities across Canada can continue to make the best decision regarding the maintenance, replacement and rehabilitation of vital municipal infrastructure. To best achieve this goal, the program had identified four key areas of focus - good asset management practices, community training and workshops, sound data collection and analysis, and knowledge sharing across municipalities.

Provincial Funding

Infrastructure Ontario (IO): Infrastructure Ontario's Loan Program provides long-term financing to public sector clients to help renew infrastructure. IO loans have been used by several Ontario municipalities to revitalize roads and bridges, build recreational facilities, and improve the overall mobility of municipal residents. The Loan Programs provide various benefits to public sector clients such as:

- Affordable interest rates.
- Flexible terms of up to 30 years, designed to match the life of the asset.
- Access to dedicated and experienced staff throughout the loan process.
- Instant access to capital markets with no extra fees or commissions.
- No need to refinance over the life of the loan.

Provincial Gas Tax Program: The program provides long-term funding to reduce congestion, support economic growth and improve the overall quality of life of municipal residents. As part of the program, Ontario currently provides two cents to municipalities for every litre of gasoline sold to help fund local public transit improvements.

Community Transportation Grant Program - Municipal Stream: The Community Transportation Grant Program is a $30 million program dedicated to the development of community transportation solutions to address local transportation needs, including ways to better utilize existing transportation resources. It provides an opportunity for municipalities to improve mobility options and remove transportation barriers in their communities, particularly for older adults, people with disabilities, youth, and persons living on low income. The application for potential projects is currently closed, however, it is recommended that the Town seek additional opportunities to apply for funding should it become available in the future.

Ontario Sport and Recreation Communities Fund (OSRCF): The OSRCF is a grant program intended to support active lifestyles for Ontarians through community sport, recreation and physical activity. In the past, it has funded projects such as bike and hike workshops, CAN-Bike certified lessons and the installation of bike repair stations. The application for potential projects is currently closed, however, it is recommended that the Town seek additional opportunities to apply for funding should it become available in the future.

Tourism Development Fund: The program provides project-based funding to not-for-profit organizations, national and/or provincial industry sector associations, municipalities, and businesses in areas such as tourism investment, tourism product development and industry capacity building. Under the Tourism Development Fund, the Town's cycling network and cycling tourism effort could be eligible for funding. Applications for the fund are accepted on an ongoing basis and should be submitted a minimum of four months prior to the start of the project.

Ontario Trillium Foundation (OTF): The OTF is an agency of the Government of Ontario that seeks to build healthy and vibrant communities across Ontario through investments in community-based initiatives. One key action area identified by the OTF is Active People - Fostering more active lifestyles, where funding of up to $150,000 is provided to support the repair, renovation or construction of infrastructure for unstructured and structured physical activities.

Regional Funding

Proposed infrastructure improvements located on roads and lands under the jurisdiction of Niagara Region should be funded through the Region's capital budget and other available funding sources such as the Waterfront Investment Program.

Waterfront Investment Program: The program is an initiative by the Region to promotes partnerships, private sector investment and public access to waterfronts in the Niagara region. In the past, the program has provided funding of up to $800,000 for projects such as multi-use trail construction and improvements, pedestrian terraces, and staircase reconstructions.

Development Charges

Funding for roadway and active transportation infrastructure projects has been identified in the Town's 2018 Development Charge Study. To ensure proper accommodation for the Town's future growth, the Town should consider using development charges to its fullest extent under provincial legislation to recover any eligible capital cost expenditures necessary to service the new developments.

Town Funding

Capital projects are identified on an annual basis which includes the construction and rehabilitation of roadway and active transportation projects. Specifically, active transportation improvements can be identified as part of the overall cost of roadway projects to achieve efficiencies in project delivery and ultimately cost savings.

6.3 MONITORING

To help ensure the success of the recommendations outlined in the TMP and to help Lincoln achieve its collective vision for the future of its transportation network, the Town should actively track progress both in terms of key performance indicators as well as project implementation.

Together, this would allow the Town to better allocate its valuable resources as well as help identify where modifications or updates to the TMP recommendations might be needed.

6.3.1 Framework & Indicators

To help monitor progress toward achieving the transportation vision set forth in the TMP, the following data collection framework and key performance indicators listed in **Table 21** were developed as a blueprint. Further to these, historic baselines should be established in conjunction with existing indicators to provide a holistic overview of the TMP's progress.

This information can then be summarized and published through the Town's open data portal to empower both stakeholders and the public to be more conscious of the benefits of multi-modal travel and contribute more proactively towards future updates.

Table 21 | Data Collection Framework and Key Performance Indicators

MODE	INDICATOR	DATA SOURCE	FREQUENCY
ROAD NETWORK	Total lane kilometres of new roads	Town of Lincoln/Niagara Region	Every Two Years
	Daily Vehicle Kilometres Travelled (VKT)	Town of Lincoln	Every Five Years
	Screenline analysis (volume/capacity)	Town of Lincoln/Niagara Region	
	Private vehicle ownership per 1000 inhabitants	Government of Ontario	
	Motorist collisions/accidents	Niagara Regional Police Service	Every Year
TRANSIT	Modal share of transit trips during peak periods	Transportation Tomorrow Survey (TTS)	Every Five Years
	Transit ridership	uLinc	Every Quarter
	Cost recovery ratio		
	Total kilometres transit routes (Transit coverage)		
	Customer satisfaction with service frequency		
ACTIVE TRANSPORTATION (AT)	Total kilometres of on/off road cycling facilities	Town of Lincoln/Niagara Region	Every Two Years
	Total kilometres of new sidewalks	Town of Lincoln	
	Number of crosswalks or intersection improvements		
	Modal share of walking and cycling during peak periods	Transportation Tomorrow Survey (TTS)	Every Five Years
	Pedestrian or cyclist collisions/ accidents	Niagara Regional Police Service	Every Year
GOODS MOVEMENT	Goods movement related complains	Town of Lincoln	Every Year
	Total kilometres of designated truck routes		Every Two Years
	Truck Route violations	Niagara Regional Police Service	Every Year
	Goods movement vehicle related collisions/ accidents		

The collection and analysis of relevant data is at the core of measuring the TMP's performance. For the Greater Toronto Area, the Transportation Tomorrow Survey (TTS) is the most comprehensive travel survey available and is currently used widely in the industry. The survey is conducted every five years with an additional year or two required for data processing before release. The most recent survey was conducted in 2016, and data were released in 2018.

Besides the TTS data, the Town should consider utilizing the Automatic Traffic Recording (ATR) counts regularly conducted by Niagara Region to further monitor the vehicular traffic for Regional roads within Lincoln. For local roads that are not accounted for by the Regional count, the Town could establish its own annual traffic counting program to help monitor road network congestion at key locations. When monitoring road network congestion, the Town should take into consideration that a certain level of roadway congestion should be acceptable, since the one of the goals of the TMP is to ensure multi-modal mobility by managing vehicular volumes, and not to overbuild roads at the expense of other funding priorities.

For transit performances, as uLinc transition from a pilot project to a permanent service, ridership monitoring should be maintained on a quarterly basis along with the initiation of regular customer satisfaction surveys. While ridership data provides a snapshot of existing demand, customer satisfaction surveys can be tailored to ascertain potential demand. Therefore, both sets of information should be monitored closely and be reviewed to observe any trends in increasing ridership, while taking into consideration Lincoln's growing population and employment forecast.

As active transportation grows and becomes a more popular mode of transportation, the Town should monitor closely the impact of active transportation investments have on public participation through both the TTS data and consider initiating its own traffic information collection program and household survey. Such programs would help to address the lag in the reporting time with the TTS data and provide more data for walking and cycling within Lincoln. Data from the survey and cycling counts on select routes could be used to create an AT database to help quantify usage of facilities, and to gauge the change in public's attitude towards AT. Potential resources for the Town to initiate such a program could be either through Town's own resources or by enlisting the support of community active transportation advocacy groups and the public.

To best suit Lincoln's evolving needs, the truck route recommendations should be routinely monitored to ensure proper adaptation to any future context shifts such as changing land uses in the community. Key performance indicators of the monitoring program should include any trends in the safety, enforcement, or community impacts that emerge due to the implementation of the new truck routes. Close monitoring of these trends would provide the Town the opportunity to address any adverse impacts early on through channels such as enhanced signing, enforcement, or community outreach. By regularly reviewing the impacts of the truck routes, the Town can best ensure that truck traffic remains well managed and goods move safely and efficiently through the community.

6.3.2 Monitoring Checklist

The second part of the monitoring program is to establish monitoring checklist to track the progress of project implementation under the TMP. The checklist can be prepared with links to related documents or files, and elements including but not limited to the monitoring plan report, timing, and staffing.

As shown in **Table 22**, different monitoring frequencies have been recommended for projects under each implementation horizon. The closer the expected project implementation window, the more frequent the recommended routine monitoring. To further improve the monitoring program's reliability and convenience, the Town is also encouraged to set-up an automated system, such as an e-mail notification system to routinely remind the assigned project managers to update the project monitoring plan.

Table 22 | Summary of Transit Phasing

PROJECT IMPLEMENTATION DATE	FREQUENCY OF MONITORING
Within the next two years	Quarterly
Greater than two years but less than five years	Bi-annually
Five years or greater	Annually

To ensure the timely implementation of the recommended projects, the Town should assign an implementation coordinator to oversee the routine completion of the progress reports and regularly liaise with the assigned project managers to understand the project status.

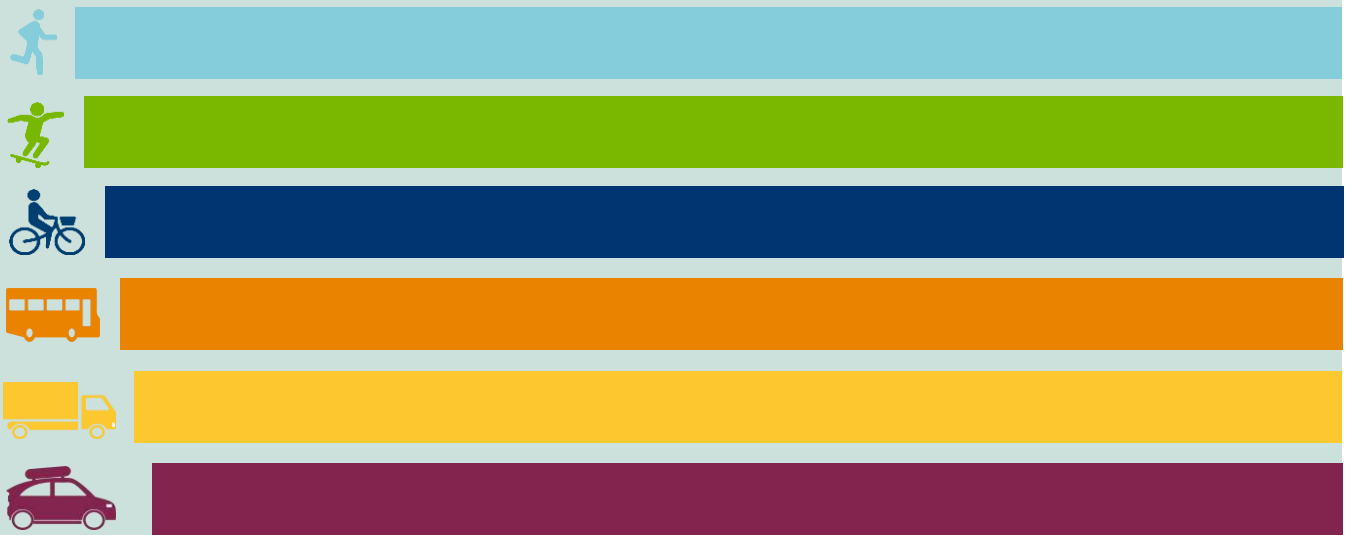
A sample monitoring plan checklist for road projects as well as other types of transportation improvements, such as the construction of new active transportation facilities is shown in **Table 23**. The main types of information that would provide value to the plan are also outlined in the table.

Table 23 | Sample Monitoring Plan Checklist

PROJECT NAME			
Description	A brief description of each project should be provided	Project ID	XXXXX
		Implementation Year	XXXXX
		Budget	- Initial budget from the latest DC - More detailed budget closer to implementation date including funding sources and their statuses - Monitoring the project budget would involve checking budget demands and draws to determine how much of the budget has been spent.
		Status	- Detailed and varied list such as: On Schedule, Delayed, Postponed, Terminated or Complete - Consistent usage is highly recommended
		Department Lead	
		Staff Lead	
Issue	Most important aspect of the plan. Defines what may hinder implementation. This requires an action plan for resolution and assigned personnel	By Whom	
Resolution		Completion Date	

APPENDIX

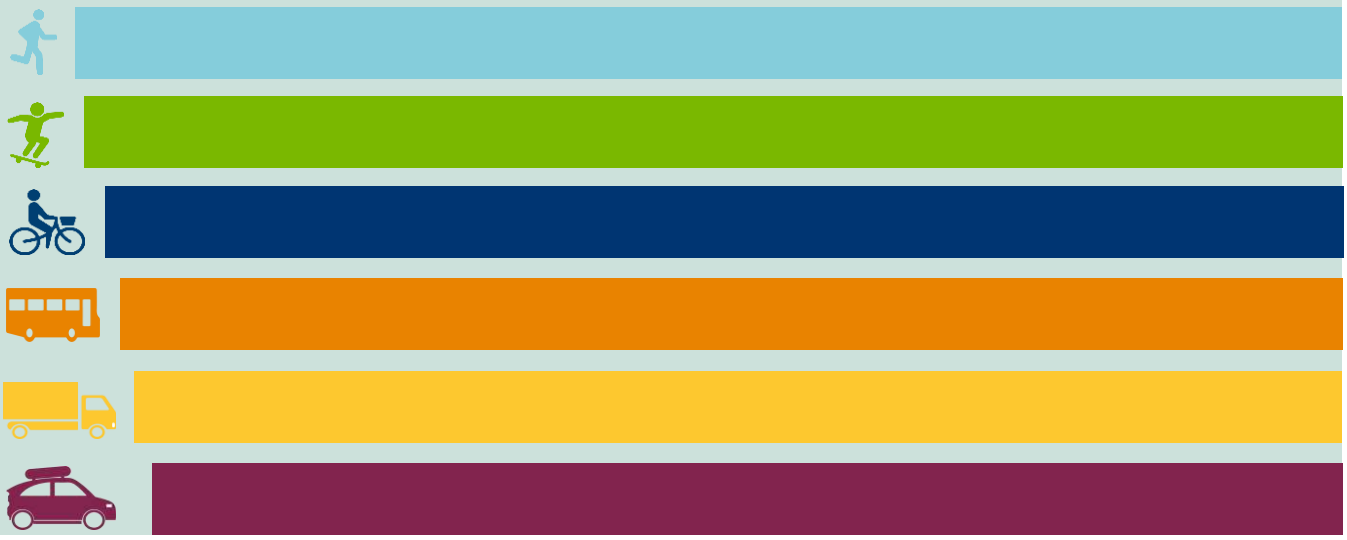
A Travel Demand Model



Make moving make sense as we grow!

APPENDIX

A-1 Existing Model Performance



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Existing Model Performance

The purpose of this section is to review the forecasting tool provided for the use in this study, and detail any implemented changes.

It was decided that a subarea of the Niagara Regional Model, would be used for forecasting purposes and determining the impacts of the proposed improvements. The Niagara Regional Model is a four-step travel demand model built in EMME, and last updated in 2016 based on the 2011 Transportation Tomorrow Survey (TTS) data. An AM and PM peak hour subareas were defined and extracted from the Regional model for the existing horizon. The subareas contained the roadway networks as well as the auto demand matrices.

The roadway network was reviewed and updated to match the 2011 conditions. New roadway links were added to the network to increase the roadway granularity within the Town of Lincoln. Shapes of the links were updated to better reflect the curvature and length of the various roadways. Finally, the properties (speed, lanes, capacity) of the existing links were reviewed and updated wherever necessary. After the changes were implemented, the updated AM and PM peak hour auto matrices were re-assigned and the model was then validated with the existing traffic counts.

EMME's demand adjustment tool was used to get a better fit between the model volumes and observed volumes. The demand adjustment tool uses an iterative process of adjusting the origin-destination (O-D) demand matrices, reassigning the demand, and comparing the assigned volumes to the observed volumes. The objective function of the tool is to minimize the difference between the observed and assigned volumes as well as the difference between the adjusted matrix and the original matrix. The final output is a new demand matrix.

Usually the deltas between the adjusted and original existing demand matrices are applied directly to the future matrices, however this creates issues when forecasting in the medium- and long-term as the absolute adjustments cannot reflect the potential population and employment changes. As an example, a zone with no existing population and employment would not have any adjustments made to its existing demand matrix. However, if that zone becomes a major employment area in the future, there still would be no adjustments applied to that zone (because the existing demand matrices would be applied to the future matrices).

In order to get around this issue, regression analysis was used to correlate the deltas in the demand adjustment to the population and/or employment of the zones. The regression allows us to scale the changes in demand based on the future population and employment of the zones, irrespective of their present demographics. Based on the regression equations, new trip production and attraction values were obtained for each zone, and a seed matrix was utilized to distribute the traffic and create an updated demand matrix.

With the updated demand and roadway network, the next step was to develop a level of comfort that the model was representing existing conditions reasonably accurately. A popular validation technique used to determine how well the modelled volumes portray the observed volumes is using the maximum desirable error (MDE) method. A percent difference between modelled

volumes and counts was calculated for all the count stations. The percent difference was then plotted against their corresponding count volumes. There are both upper and lower limits to model error, which were defined in the National Corporative Highway Research Program Report 765. The philosophy of the max desirable percent error (MDE) curve is that errors falling between the curves are unlikely to affect a decision as to the number of lanes on a roadway. For a valid model we expect majority of the points to fall between the max desirable percent error curves. **Figure 1** and **Figure 2** illustrates the AM and PM peak hour MDE graphs, respectively.

Figure 1: SOLA AM Peak Hour - Auto

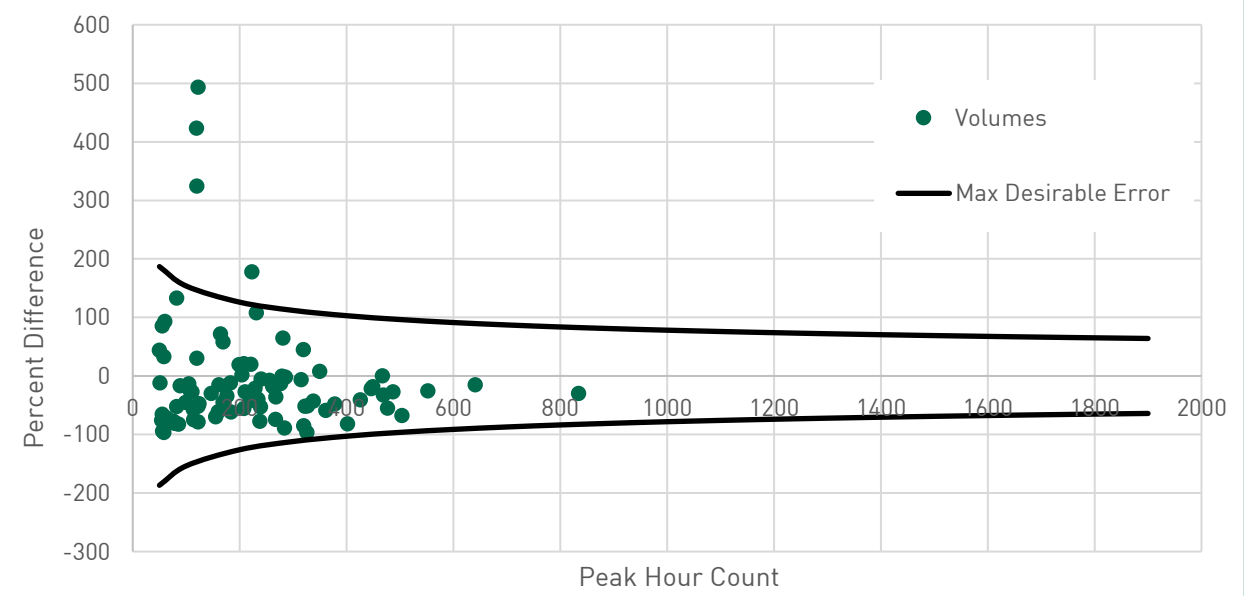
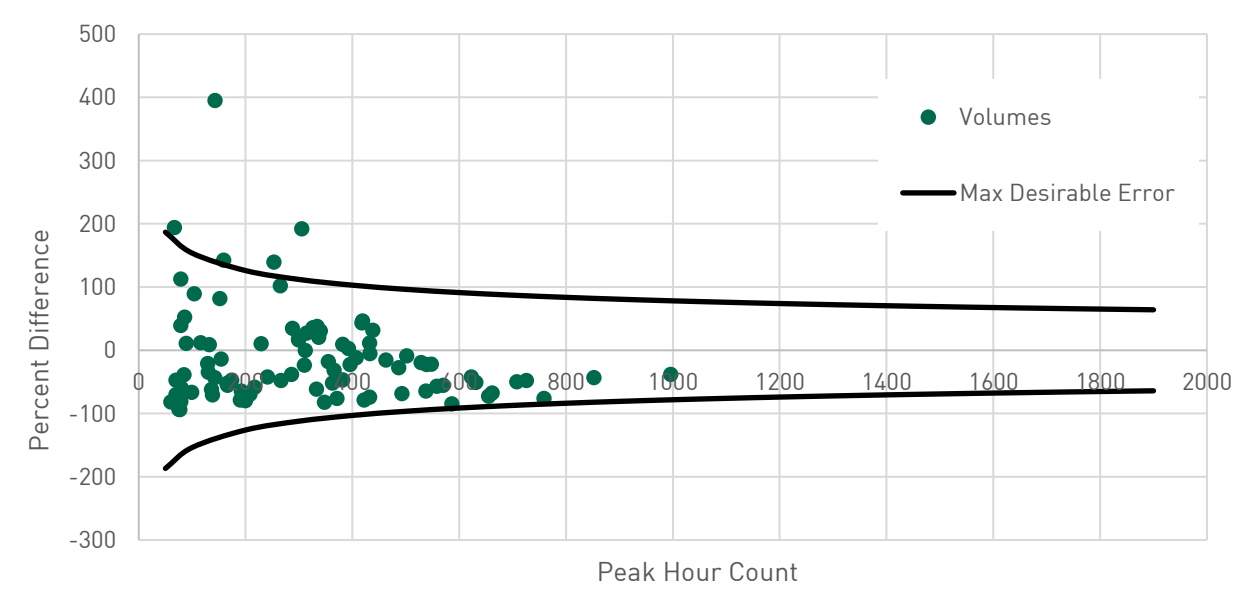


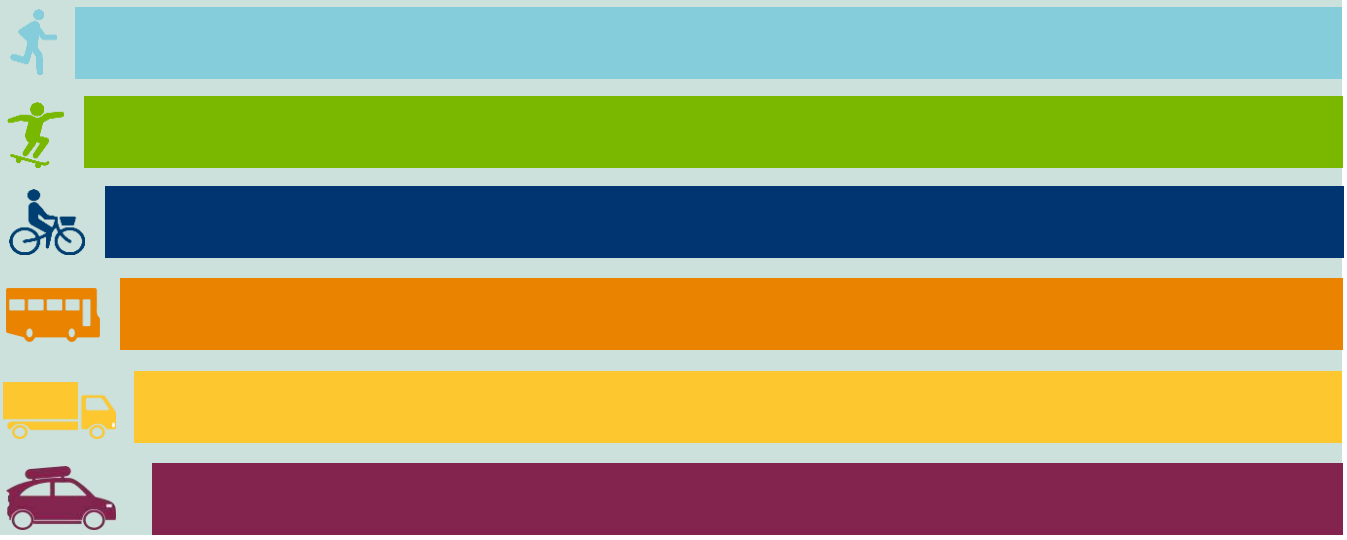
Figure 2: SOLA PM Peak Hour - Auto



Based on the figures, it is noticeable that the model tends to under-predict the volumes. However, the majority of the points (94%) fall between the max desirable percent error curves. Given the scope and purpose of this study, the model provides reasonable results.

APPENDIX

A-2 Existing Volume-to-Capacity Maps



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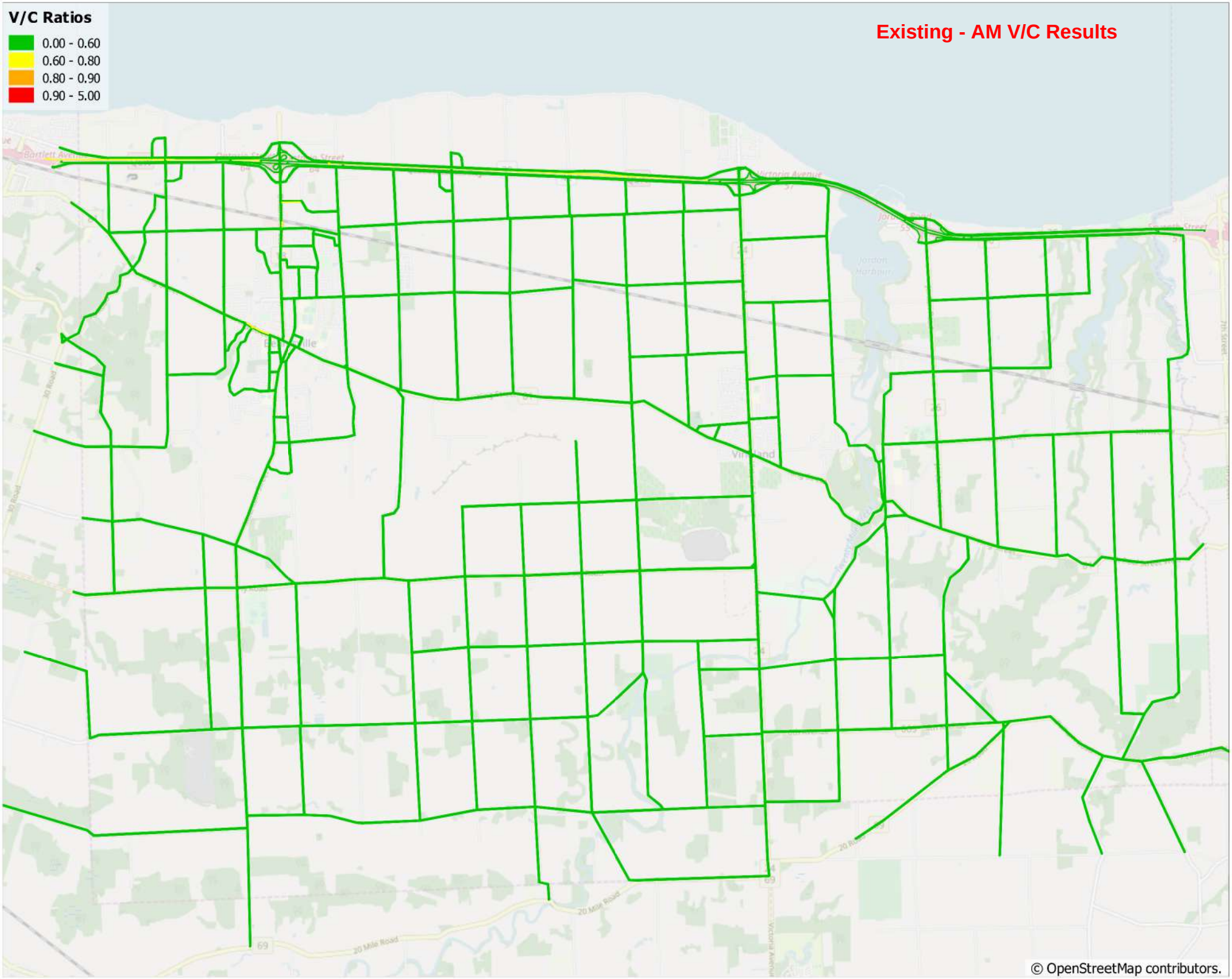
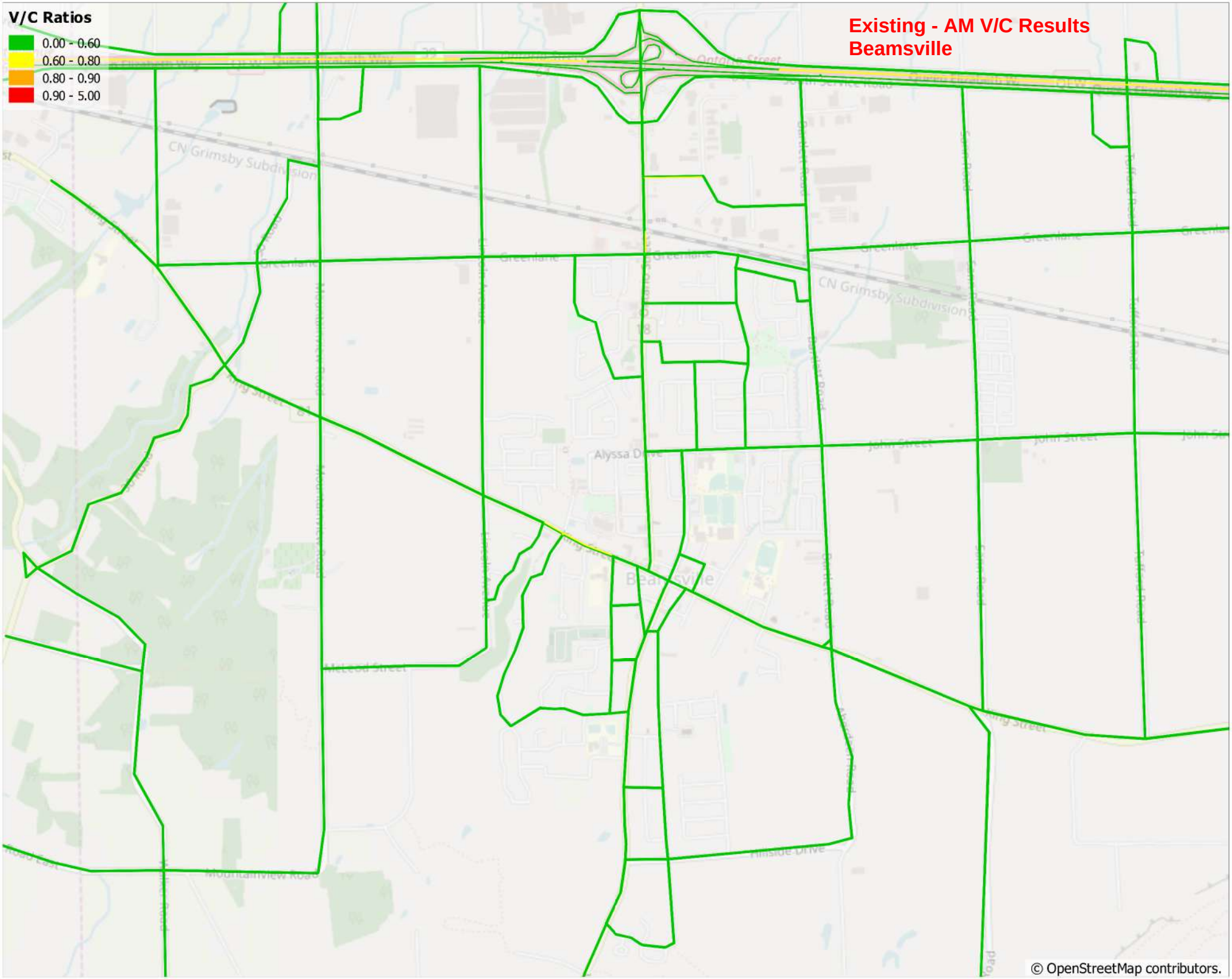
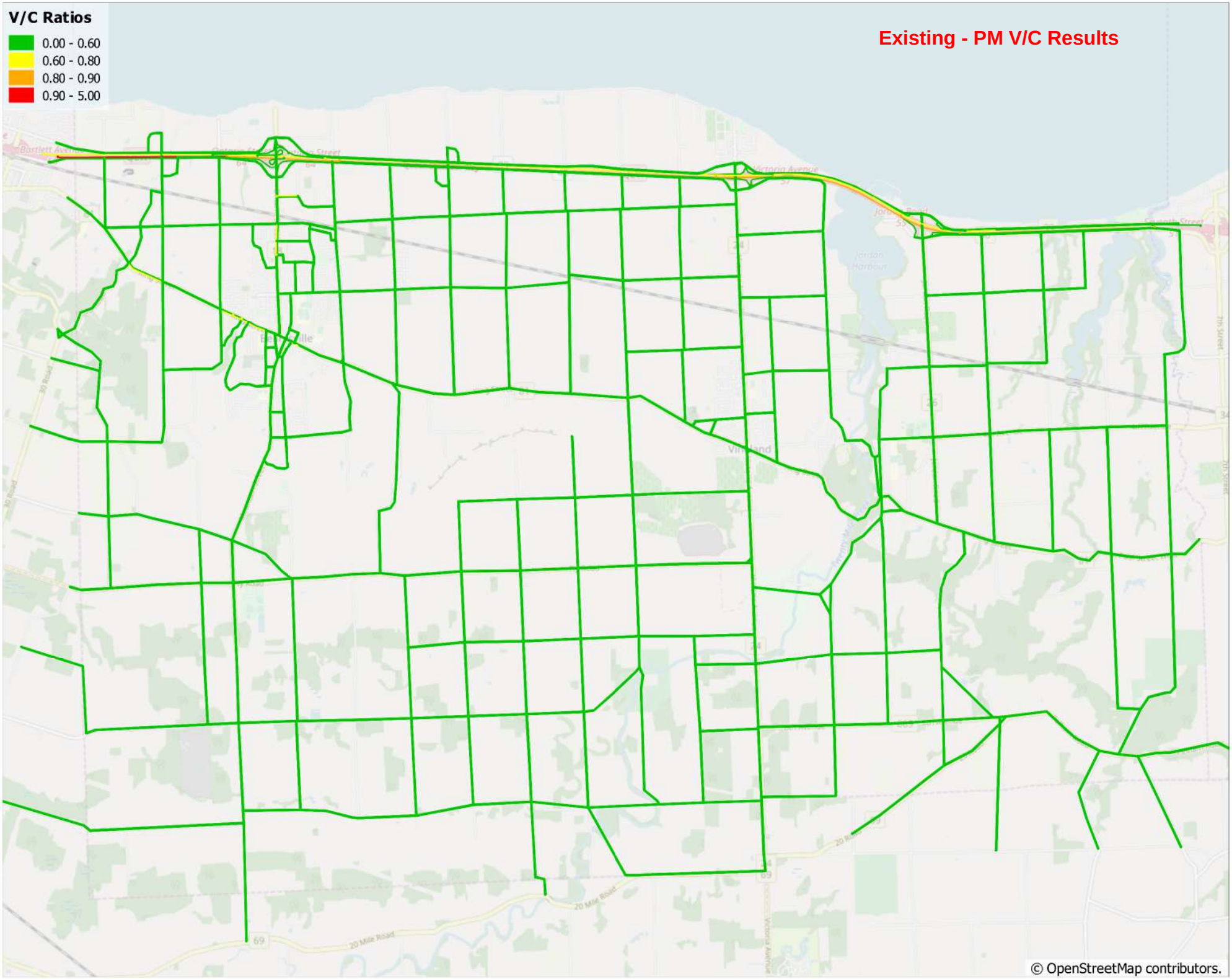

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 5.00
Existing - AM V/C Results
20 Mile Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 5.00
Existing - AM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.


V/C Ratios
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0.80 - 0.90
0.90 - 5.00
Existing - PM V/C Results
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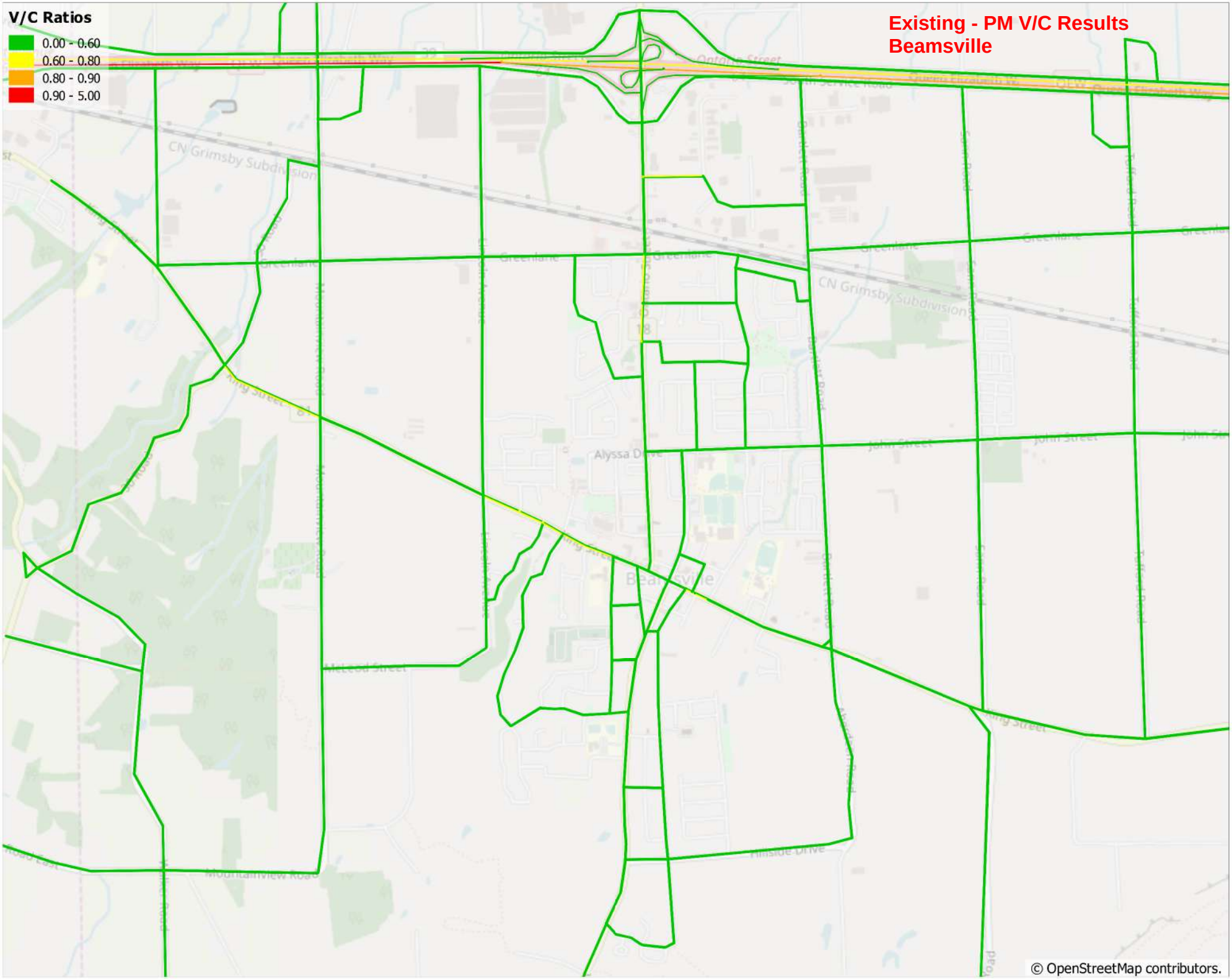
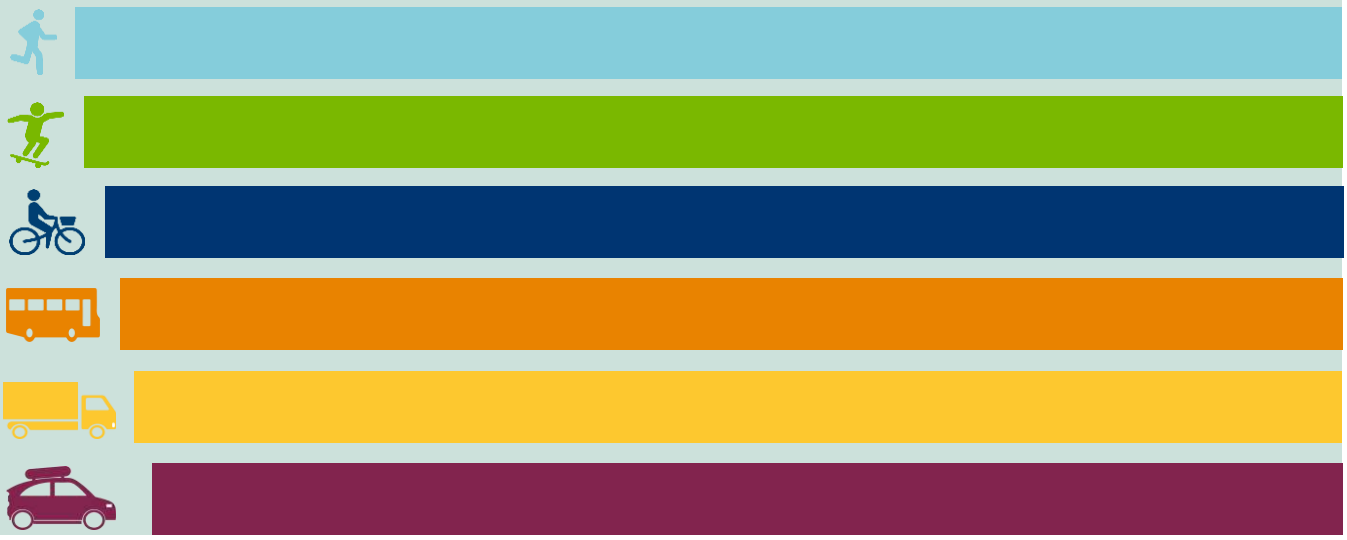
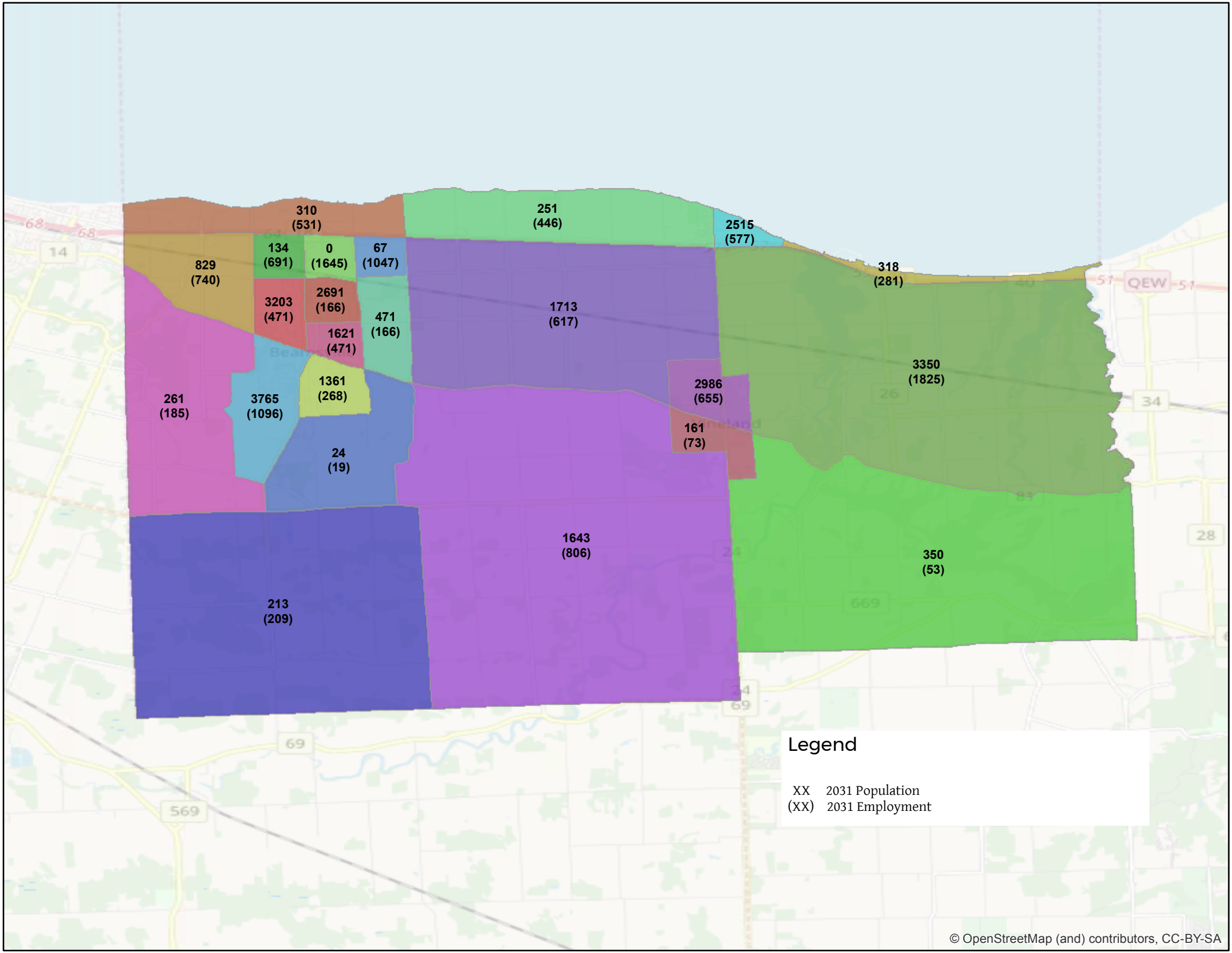

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 5.00
Existing - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Hillside Drive
© OpenStreetMap contributors.

APPENDIX

A-3 Population and Employment Forecasts



Make moving make sense as we grow!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(806)
350
(53)
213
(209)
Legend
XX 2031 Population
(XX) 2031 Employment
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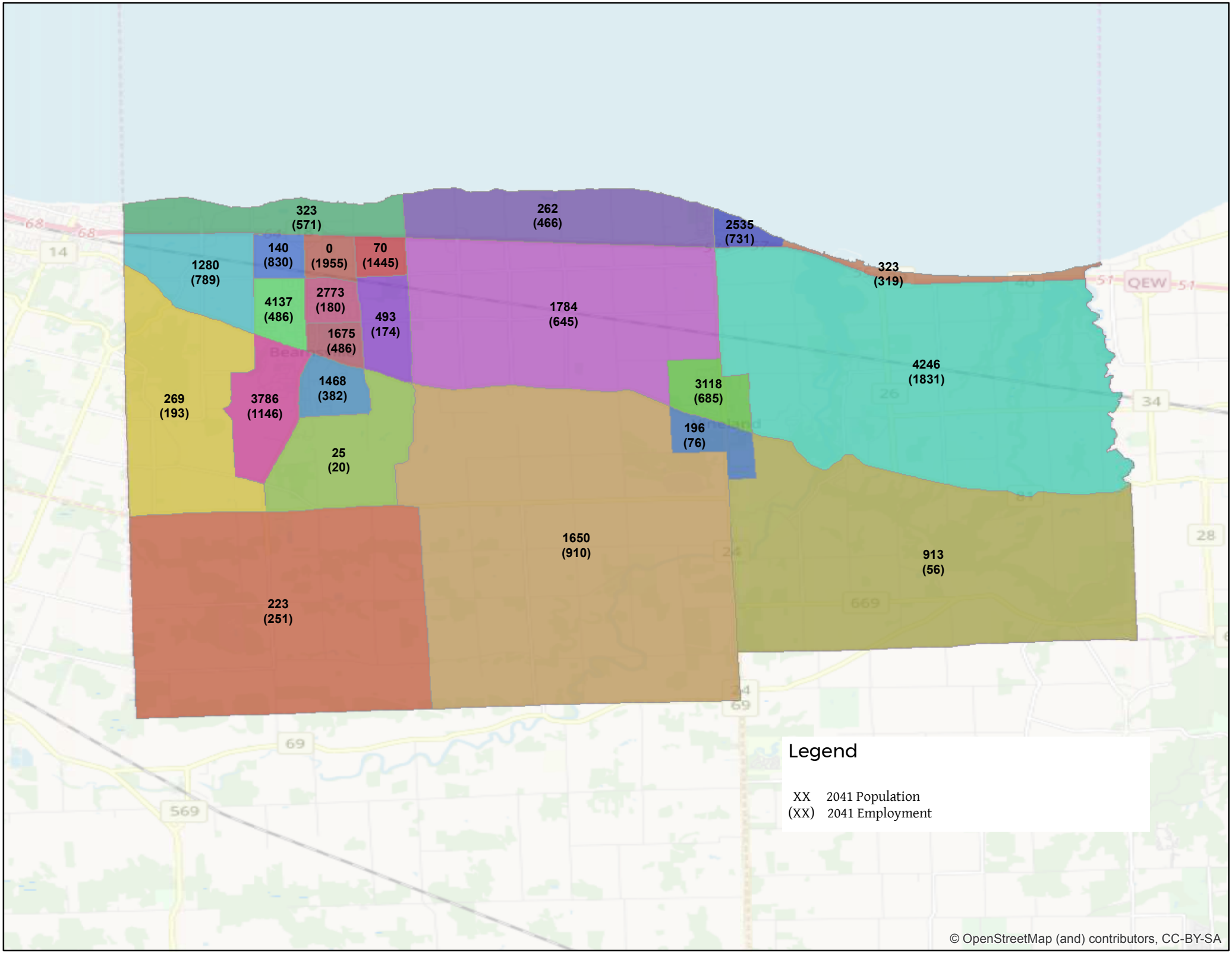
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(571)
262
(466)
2535
(731)
140
(830)
0
(1955)
70
(1445)
1280
(789)
323
(319)
4137
(486)
2773
(180)
493
(174)
1784
(645)
1675
(486)
4246
(1831)
1468
(382)
3118
(685)
269
(193)
3786
(1146)
196
(76)
25
(20)
1650
(910)
913
(56)
223
(251)
Legend
XX 2041 Population
(XX) 2041 Employment
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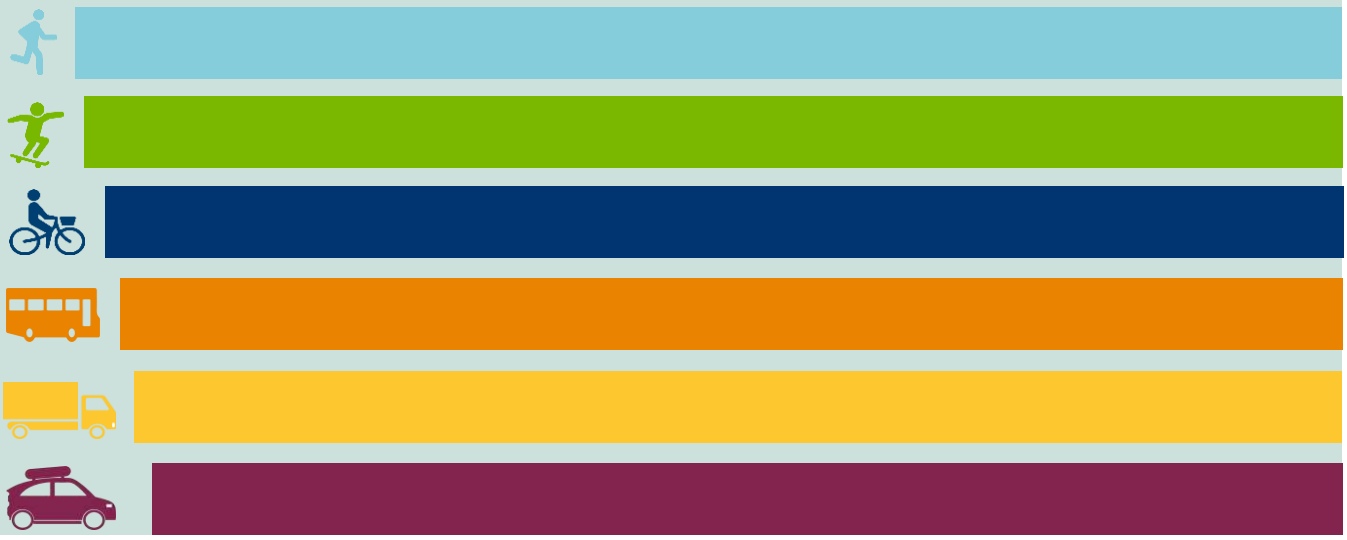
APPENDIX

A-4 Future System Metric Results



Make moving make sense as we grow!

Future System Metric Results

Table 1 – All Roads within Lincoln – Future Base Case System Metric Results

Peak Periods	Themes	System Metrics	2031 Base Case (with QEW)	2031 Base Case (w/o QEW)	2041 Base Case (with QEW)	2041 Base Case (w/o QEW)
AM	Mobility	VKT	151,389	41,061	158,724	46,037
		VKT on links with v/c → 0.8 (%)	0.20%	0.60%	0.20%	0.60%
		Lane Km	750.70	641.4	750.70	641.4
	Congestion	VHT	114,860	43,867	122,725	49,746
		VHT on links with v/c → 0.8 (%)	0.60%	1.50%	0.80%	2.00%
		Travel Time Index (TTI)	1.00	1.00	1.01	1.00
PM	Mobility	VKT	220,281	66,378	229,929	73,320
		VKT on links with v/c → 0.8 (%)	65.60%	3.00%	63.90%	2.80%
		Lane Km	750.70	641.4	750.70	641.4
	Congestion	VHT	203,467	70,415	218,200	78,980
		VHT on links with v/c → 0.8 (%)	62.70%	4.70%	61.30%	4.70%
		Travel Time Index (TTI)	1.02	1.01	1.02	1.01

Table 2 – 2031 All Roads within Lincoln – System Metric Results

Peak Periods	Themes	System Metrics	2031 All Roads Within Lincoln (Including QEW)					
			Base Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
AM	Mobility	VKT	151,389	151,366	151,316	151,509	151,309	151,465
		VKT on links with v/c → 0.8 (%)	0.20%	0.10%	0.10%	0.10%	0.10%	0.10%
		Lane Km	750.70	750.83	750.83	750.83	750.83	750.83
	Congestion	VHT	114,860	114,799	114,576	114,731	114,719	114,693
		VHT on links with v/c → 0.8 (%)	0.60%	0.40%	0.40%	0.40%	0.40%	0.40%
		Travel Time Index (TTI)	1.00	1.00	1.00	1.00	1.00	1.00
PM	Mobility	VKT	220,281	220,210	220,025	220,216	220,062	220,065
		VKT on links with v/c → 0.8 (%)	65.60%	65.60%	65.60%	65.60%	65.60%	65.60%
		Lane Km	750.70	750.83	750.83	750.83	750.83	750.83
	Congestion	VHT	203,467	203,247	202,621	203,032	203,032	202,646
		VHT on links with v/c → 0.8 (%)	62.70%	62.70%	62.60%	62.70%	62.70%	62.70%
		Travel Time Index (TTI)	1.02	1.02	1.02	1.02	1.02	1.02

Table 3 – 2041 All Roads within Lincoln – System Metric Results

Peak Periods	Themes	System Metrics	2041 All Roads Within Lincoln (Including QEW)					
			Base Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
AM	Mobility	VKT	158,724	158,754	158,654	158,851	158,623	158,852
		VKT on links with v/c → 0.8 (%)	0.20%	0.10%	0.10%	0.10%	0.10%	0.10%
		Lane Km	750.70	750.83	750.83	750.83	750.83	750.83
	Congestion	VHT	122,725	122,635	122,384	122,290	122,352	122,282
		VHT on links with v/c → 0.8 (%)	0.80%	0.60%	0.50%	0.50%	0.50%	0.50%
		Travel Time Index (TTI)	1.01	1.01	1.01	1.01	1.01	1.01
PM	Mobility	VKT	229,929	229,885	229,722	229,705	229,587	229,665
		VKT on links with v/c → 0.8 (%)	63.90%	63.80%	63.80%	63.70%	63.70%	63.70%
		Lane Km	750.70	750.83	750.83	750.83	750.83	750.83
	Congestion	VHT	218,200	217,924	216,986	216,666	216,788	216,647
		VHT on links with v/c → 0.8 (%)	61.30%	61.20%	61.20%	61.10%	61.00%	61.10%
		Travel Time Index (TTI)	1.02	1.02	1.02	1.02	1.02	1.02

Table 4- 2031 All roads within Lincoln excluding highways – System Metric Results

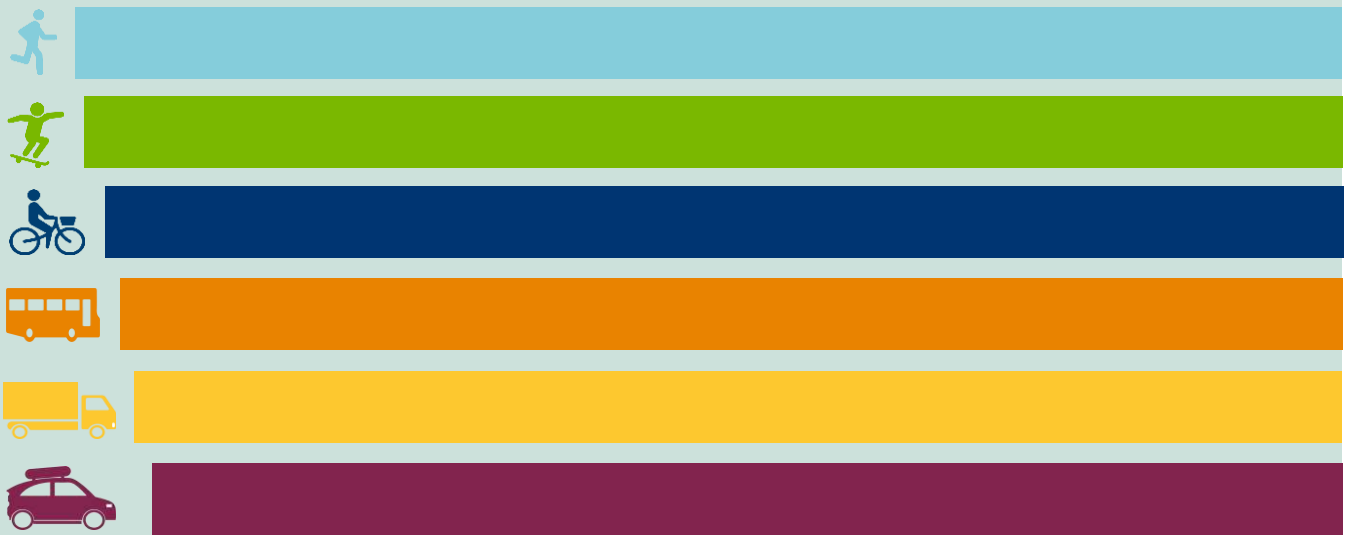
Peak Periods	Themes	System Metrics	2031 All Roads Within Lincoln (Excluding QEW)					
			Base Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
AM	Mobility	VKT	41,061	44,105	41,086	40,893	41,035	40,831
		VKT on links with v/c → 0.8 (%)	0.60%	0.30%	0.40%	0.40%	0.40%	0.40%
		Lane Km	641.4	641.5	641.5	641.5	641.5	641.5
	Congestion	VHT	43,867	46,610	43,672	43,465	43,784	43,404
		VHT on links with v/c → 0.8 (%)	1.50%	0.90%	1.00%	0.90%	1.00%	1.00%
		Travel Time Index (TTI)	1.00	1.0	1.00	1.0	1.0	1.0
PM	Mobility	VKT	66,378	66,415	66,470	66,464	66,340	66,426
		VKT on links with v/c → 0.8 (%)	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
		Lane Km	641.4	641.5	641.5	641.5	641.5	641.5
	Congestion	VHT	70,415	70,438	70,356	70,302	70,375	70,173
		VHT on links with v/c → 0.8 (%)	4.70%	4.70%	4.60%	4.70%	4.60%	4.60%
		Travel Time Index (TTI)	1.01	1.01	1.01	1.01	1.01	1.01

Table 5- 2041 All roads within Lincoln excluding highways – System Metric Results

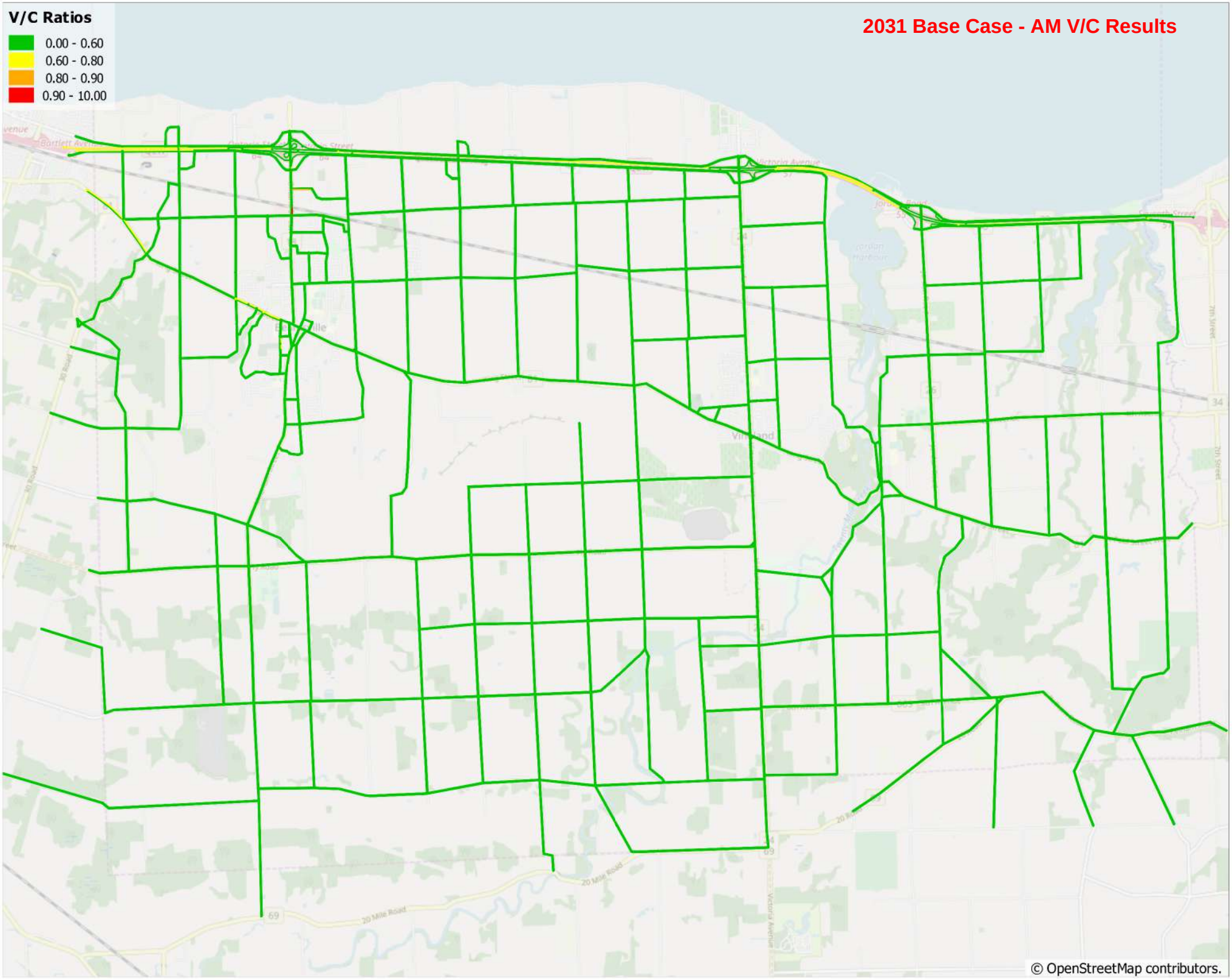
Peak Periods	Themes	System Metrics	2041 All Roads Within Lincoln (Excluding QEW)					
			Base Case	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
AM	Mobility	VKT	46,037	46,010	46,074	45,724	46,032	45,724
		VKT on links with v/c → 0.8 (%)	0.60%	0.40%	0.40%	0.40%	0.40%	0.40%
		Lane Km	641.4	641.5	641.5	641.5	641.5	641.5
	Congestion	VHT	49,746	49,592	49,510	48,906	49,468	48,898
		VHT on links with v/c → 0.8 (%)	2.00%	1.40%	1.30%	1.20%	1.30%	1.20%
		Travel Time Index (TTI)	1.00	1.0	1.00	1.0	1.0	1.0
PM	Mobility	VKT	73,320	73,425	73,606	73,620	73,507	73,572
		VKT on links with v/c → 0.8 (%)	2.80%	2.90%	3.00%	2.80%	2.70%	2.80%
		Lane Km	641.4	641.5	641.5	641.5	641.5	641.5
	Congestion	VHT	78,980	79,131	79,037	78,769	78,870	78,700
		VHT on links with v/c → 0.8 (%)	4.70%	4.70%	5.10%	4.50%	4.30%	4.50%
		Travel Time Index (TTI)	1.01	1.01	1.01	1.01	1.01	1.01

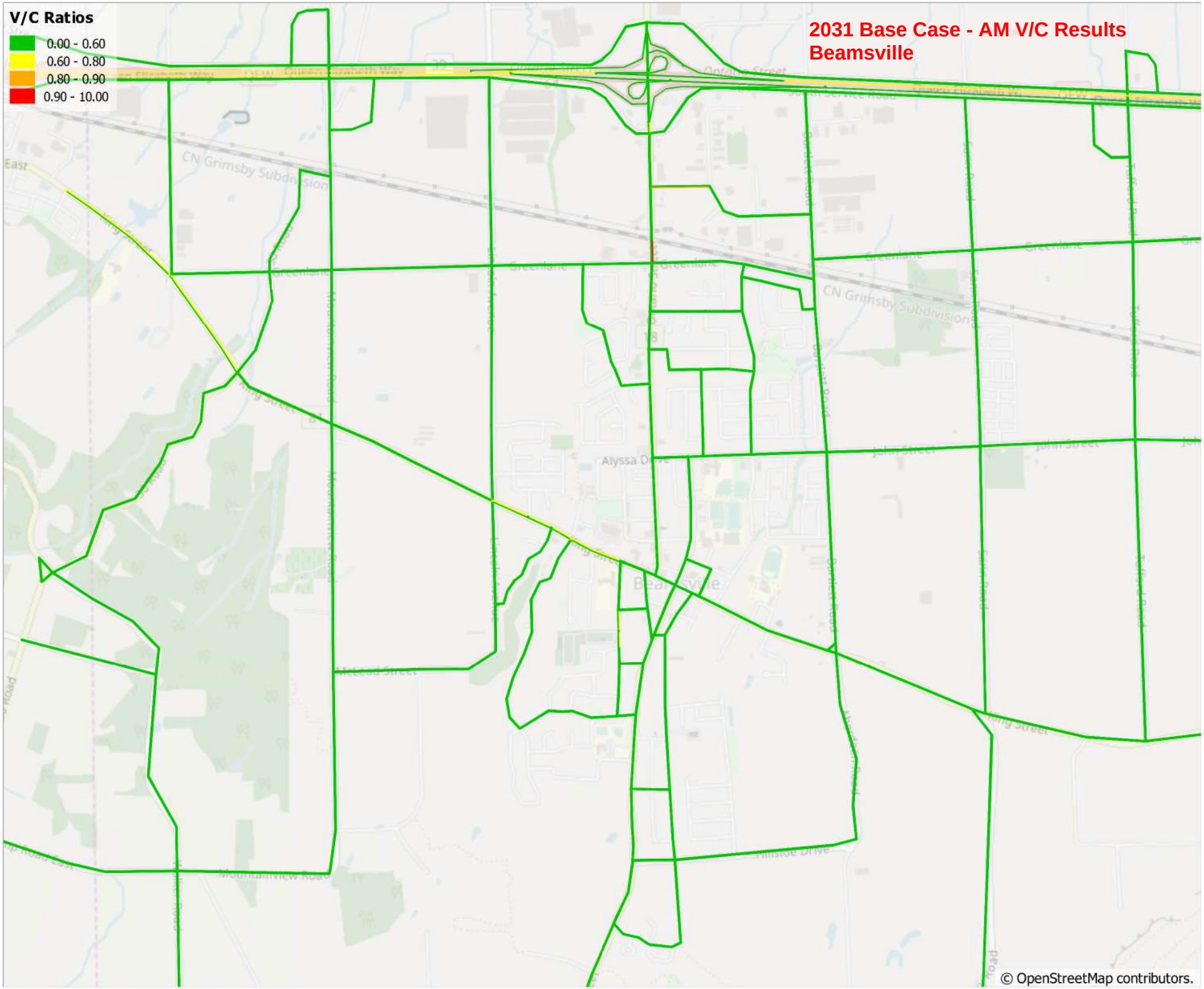
APPENDIX

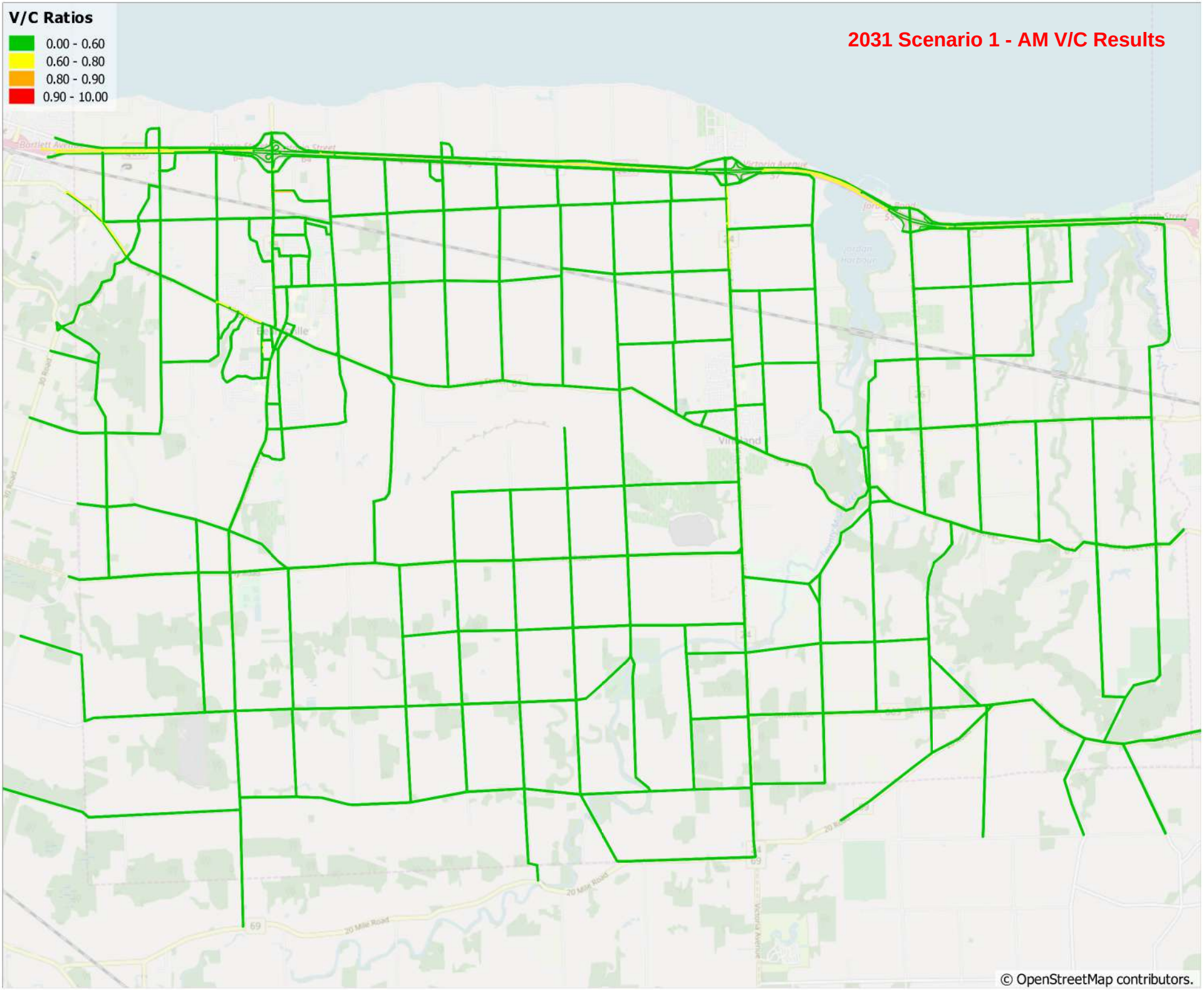
A-5 2031 Volume-to-Capacity Maps

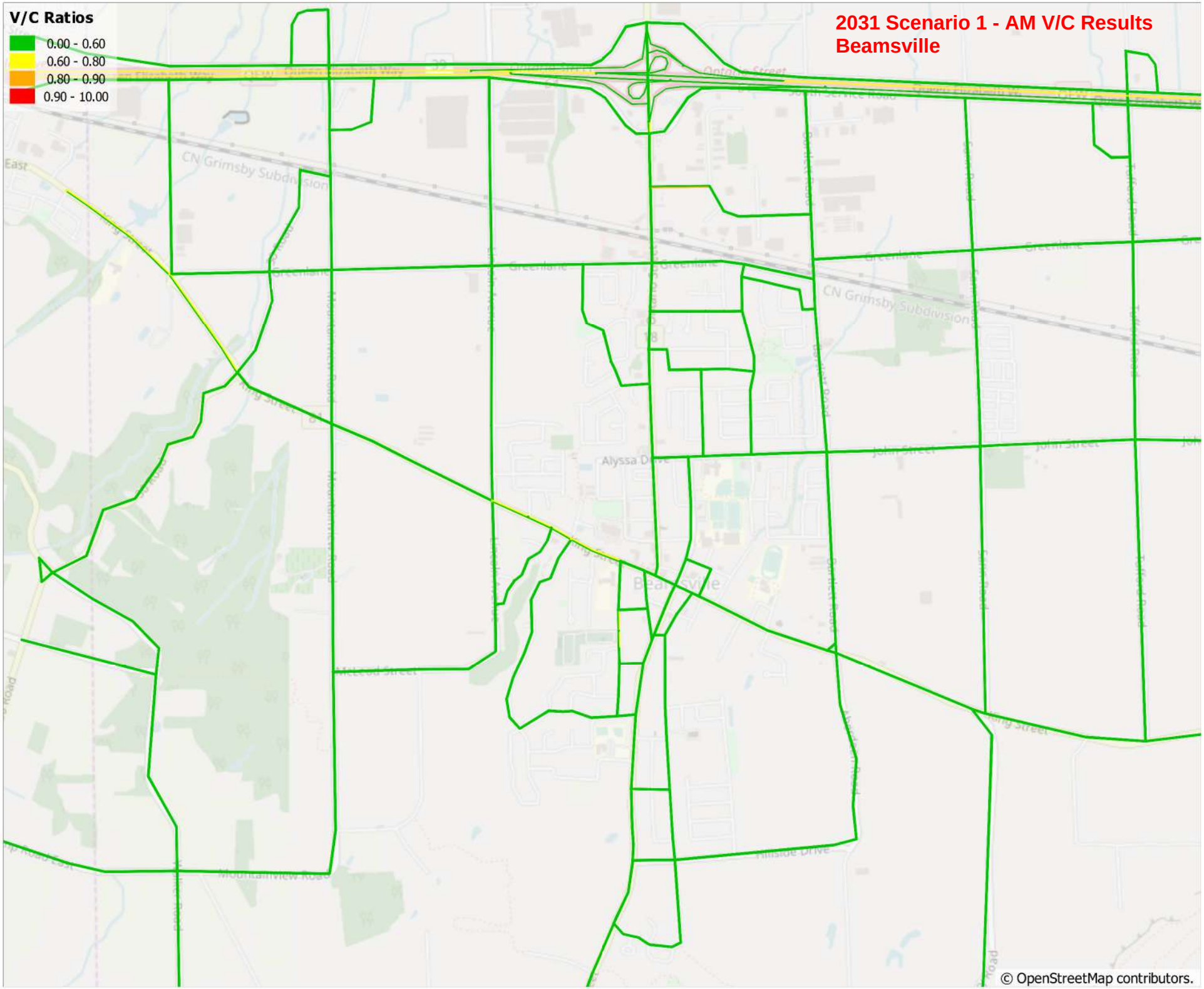


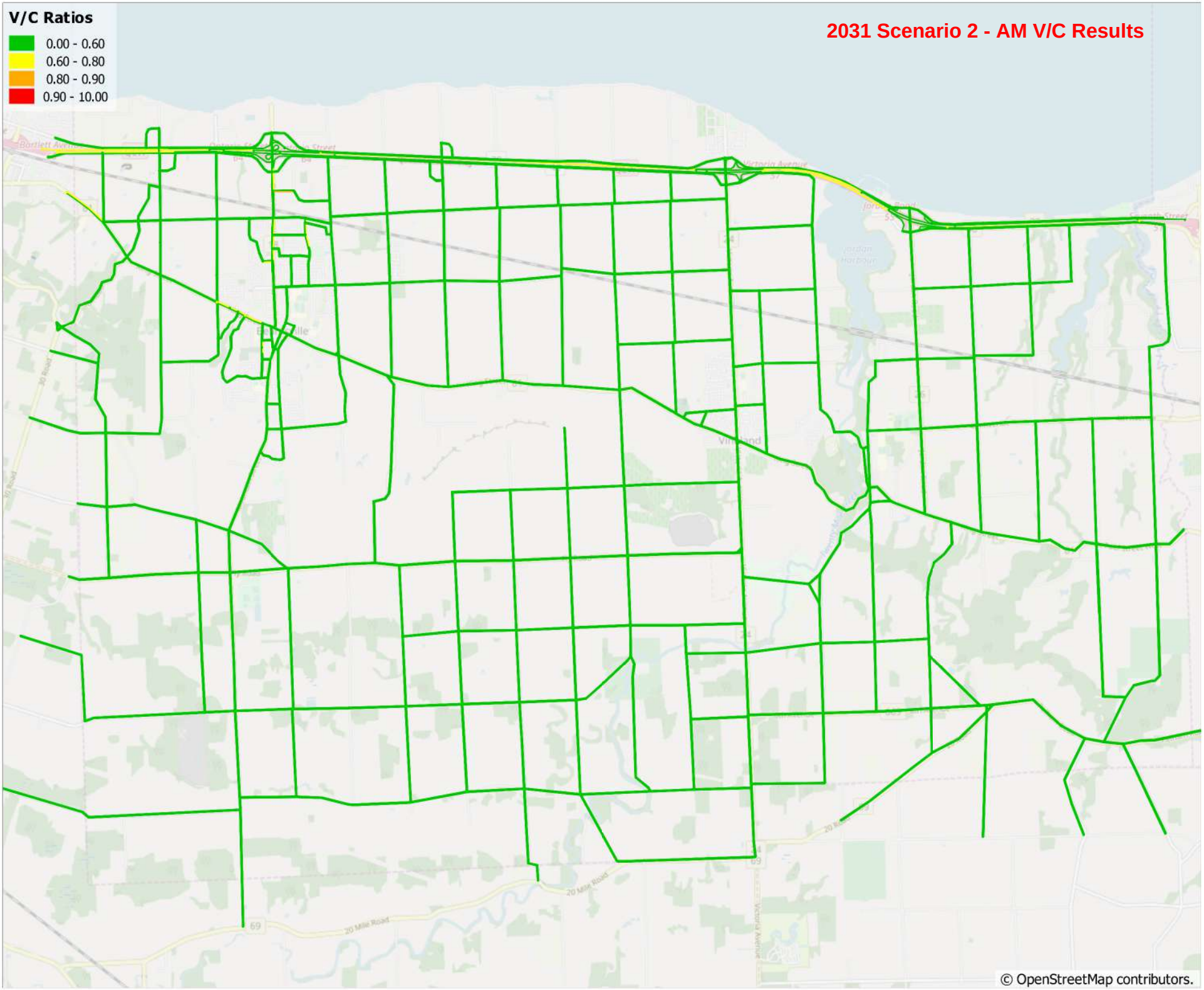
Make moving make sense as we grow!

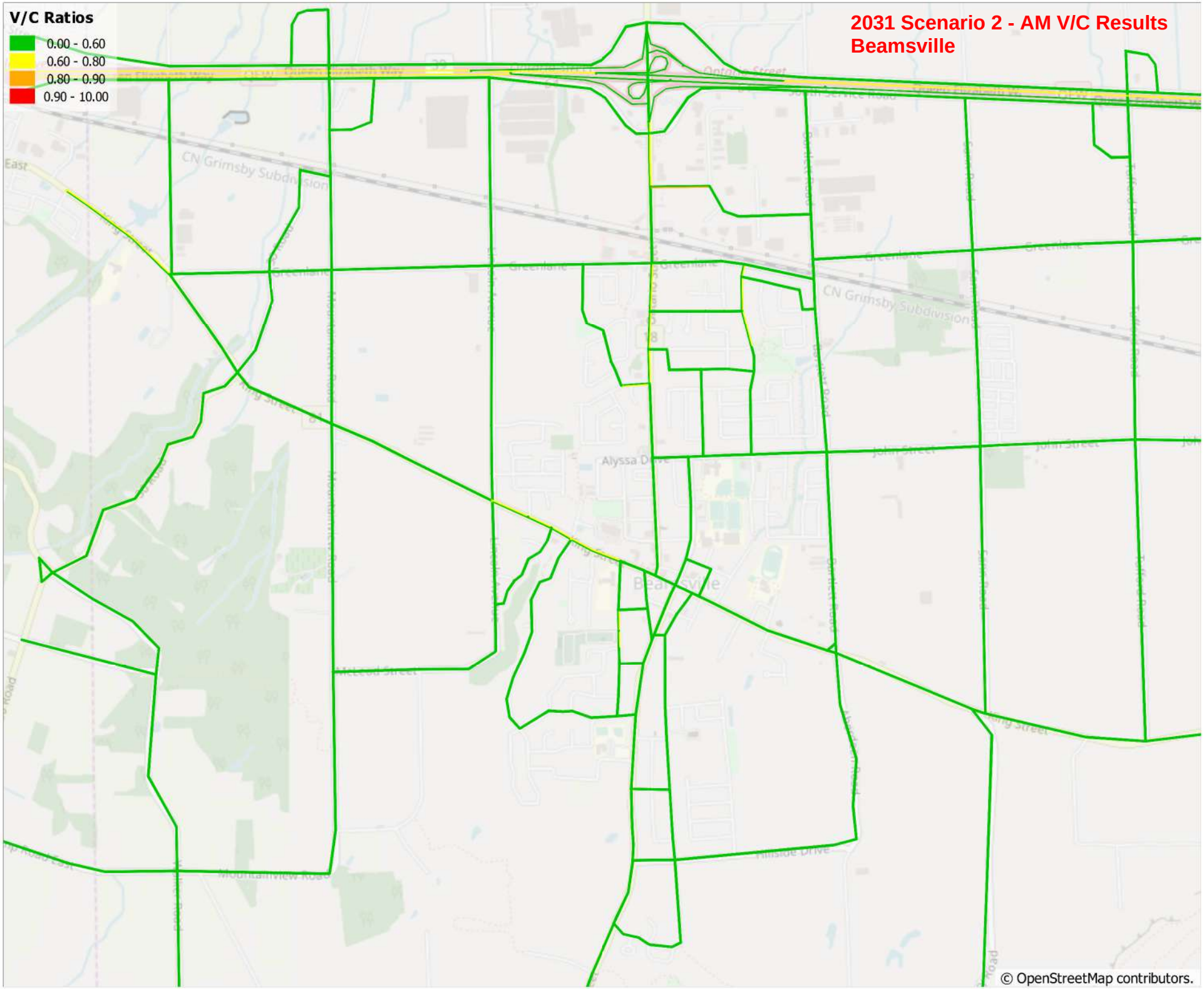

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Base Case - AM V/C Results
© OpenStreetMap contributors.

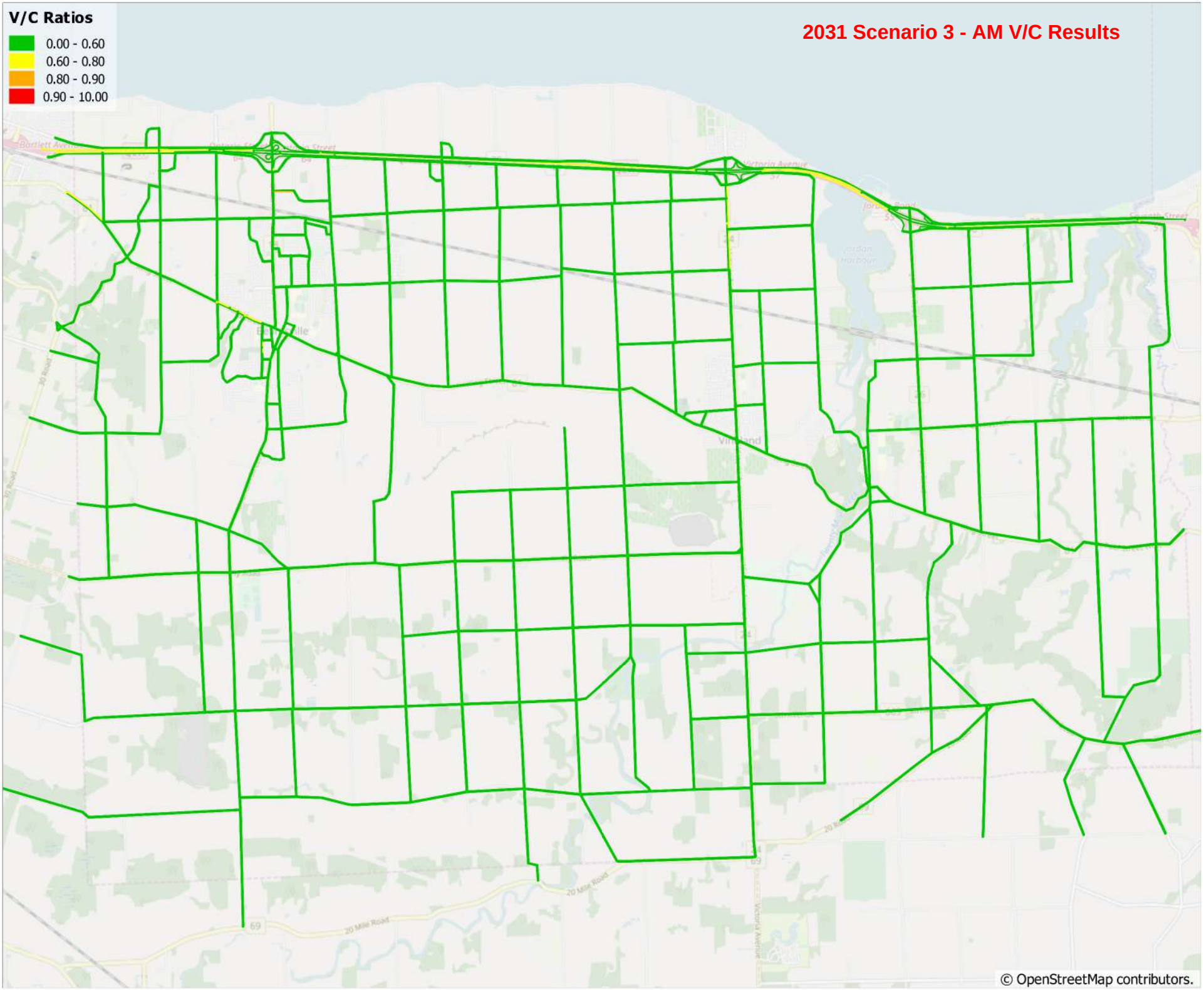

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Base Case - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Hillside Drive
© OpenStreetMap contributors.

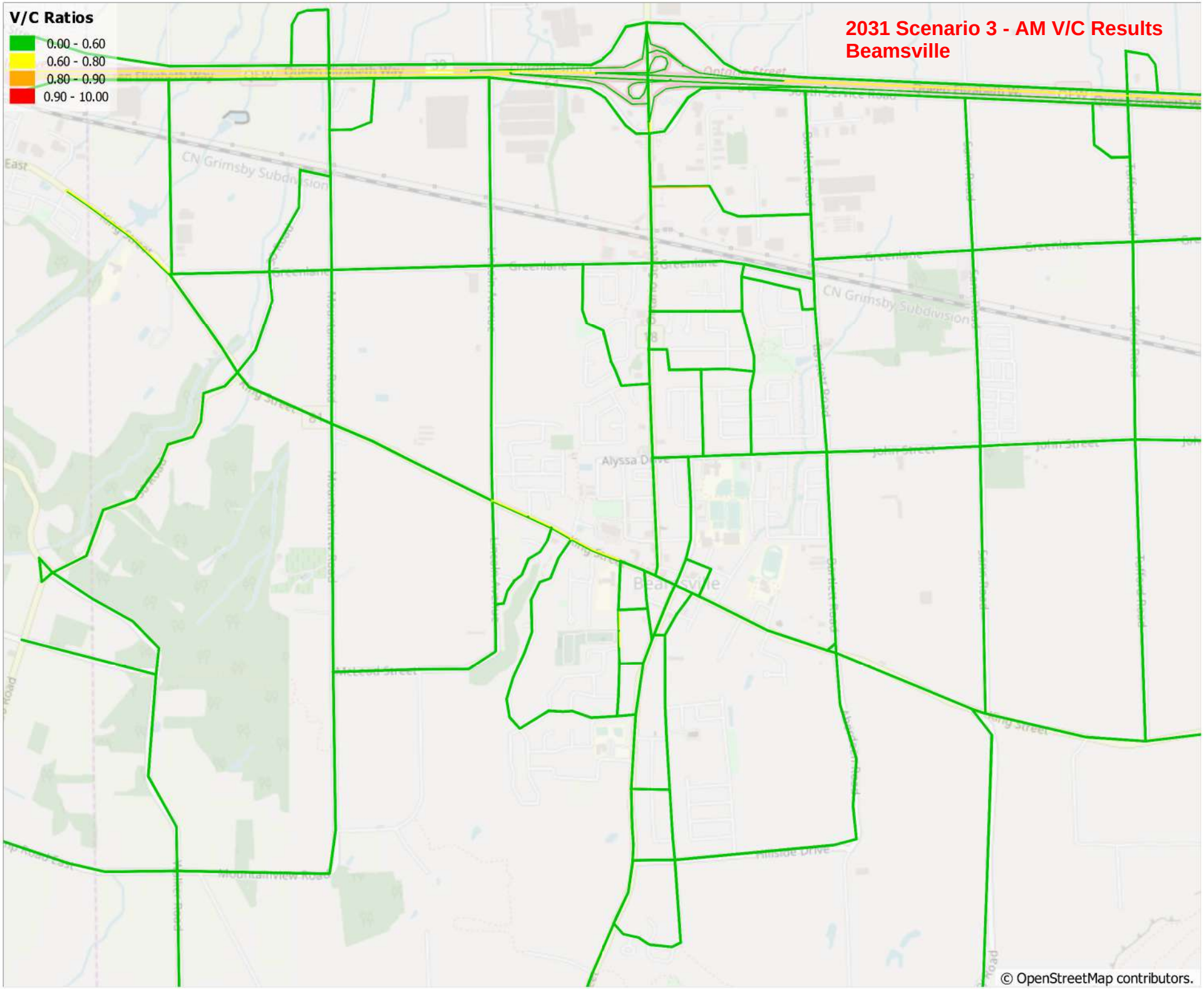

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 1 - AM V/C Results
20 Mile Road
69
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 1 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
Greenlane
John Street
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 2 - AM V/C Results
20 Mile Road
69
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 2 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
Greenlane
John Street
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 3 - AM V/C Results
20 Mile Road
69
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 3 - AM V/C Results
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CN Grimsby Subdivision
Ontario Street
Greenlane
John Street
Alyssa Drive
Hillside Drive
Mountainview Road
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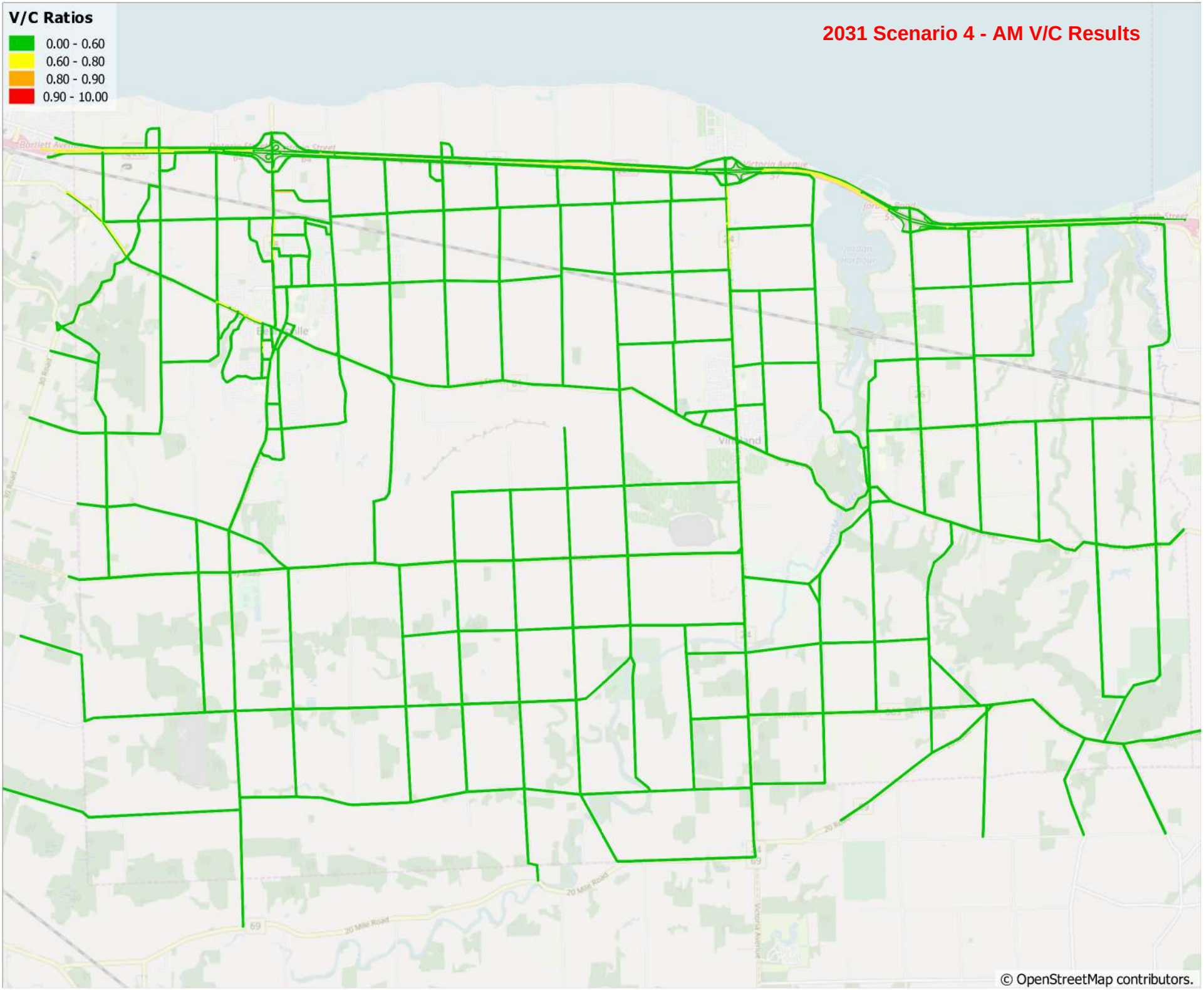
V/C Ratios
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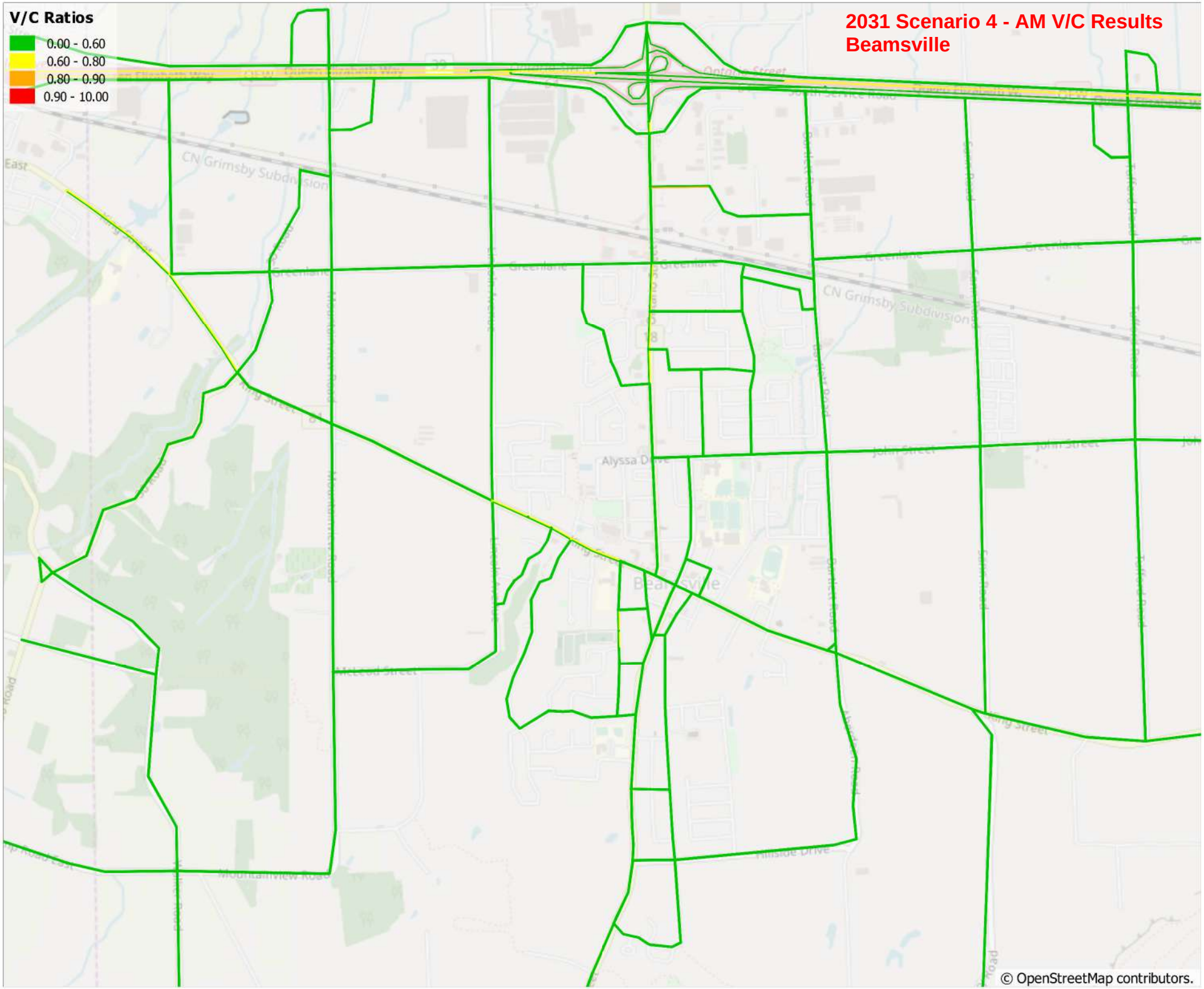
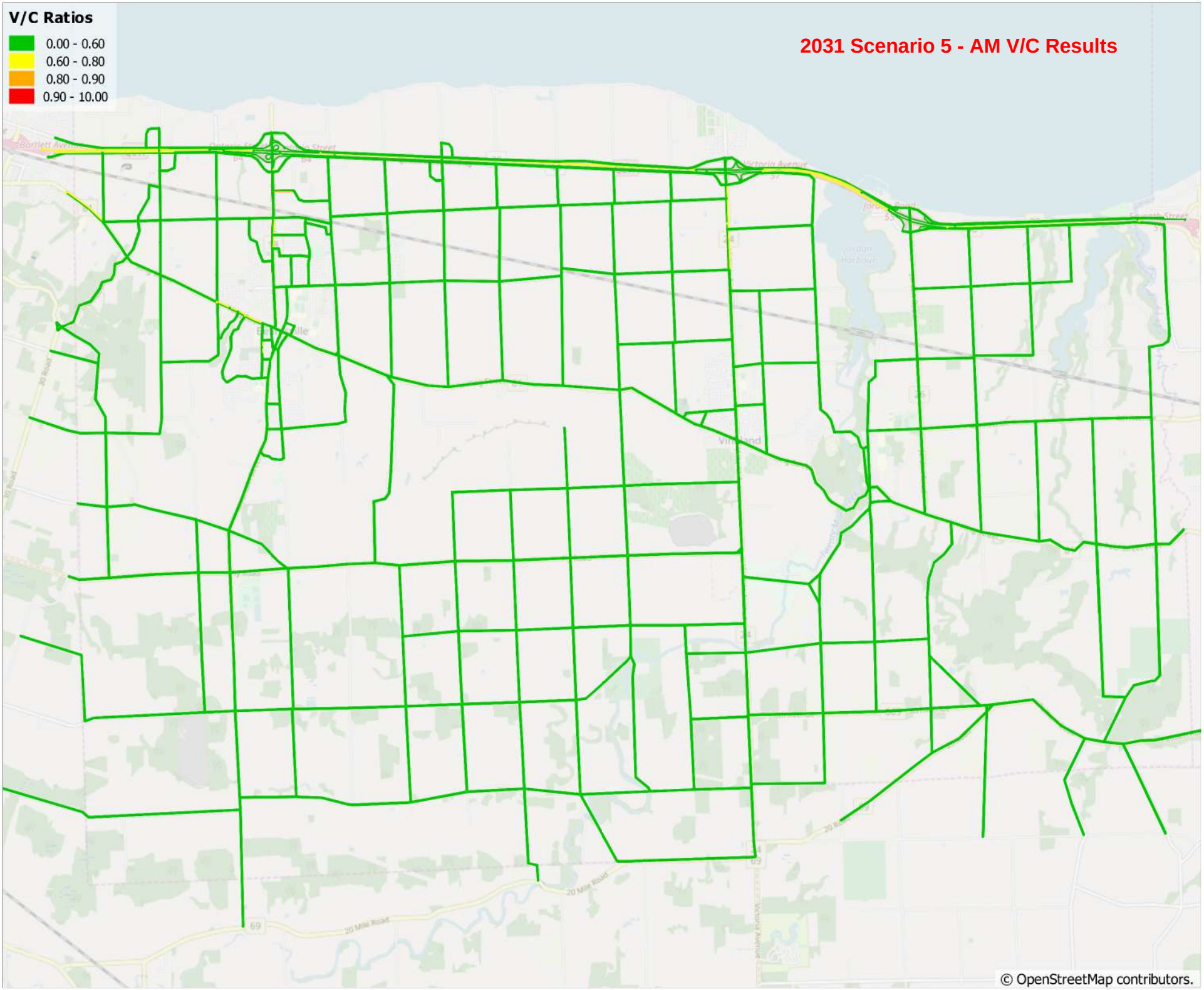
0.80 - 0.90
0.90 - 10.00
2031 Scenario 4 - AM V/C Results
20 Mile Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 4 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
Greenlane
John Street
Alyssa Drive
Hillside Drive
Mountainview Road
King Street
East
© OpenStreetMap contributors.


V/C Ratios
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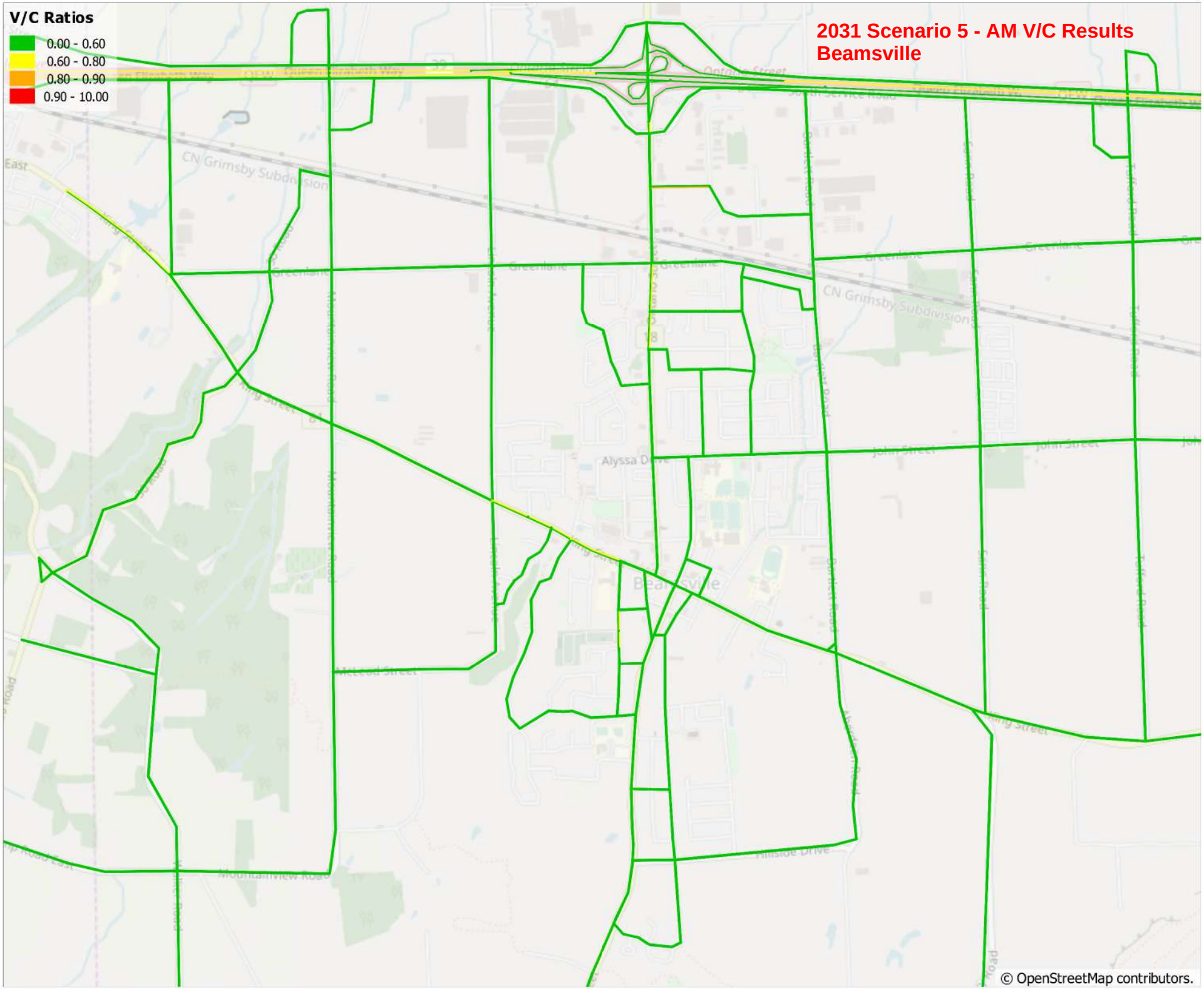
0.80 - 0.90
0.90 - 10.00
2031 Scenario 5 - AM V/C Results
20 Mile Road
© OpenStreetMap contributors.


V/C Ratios
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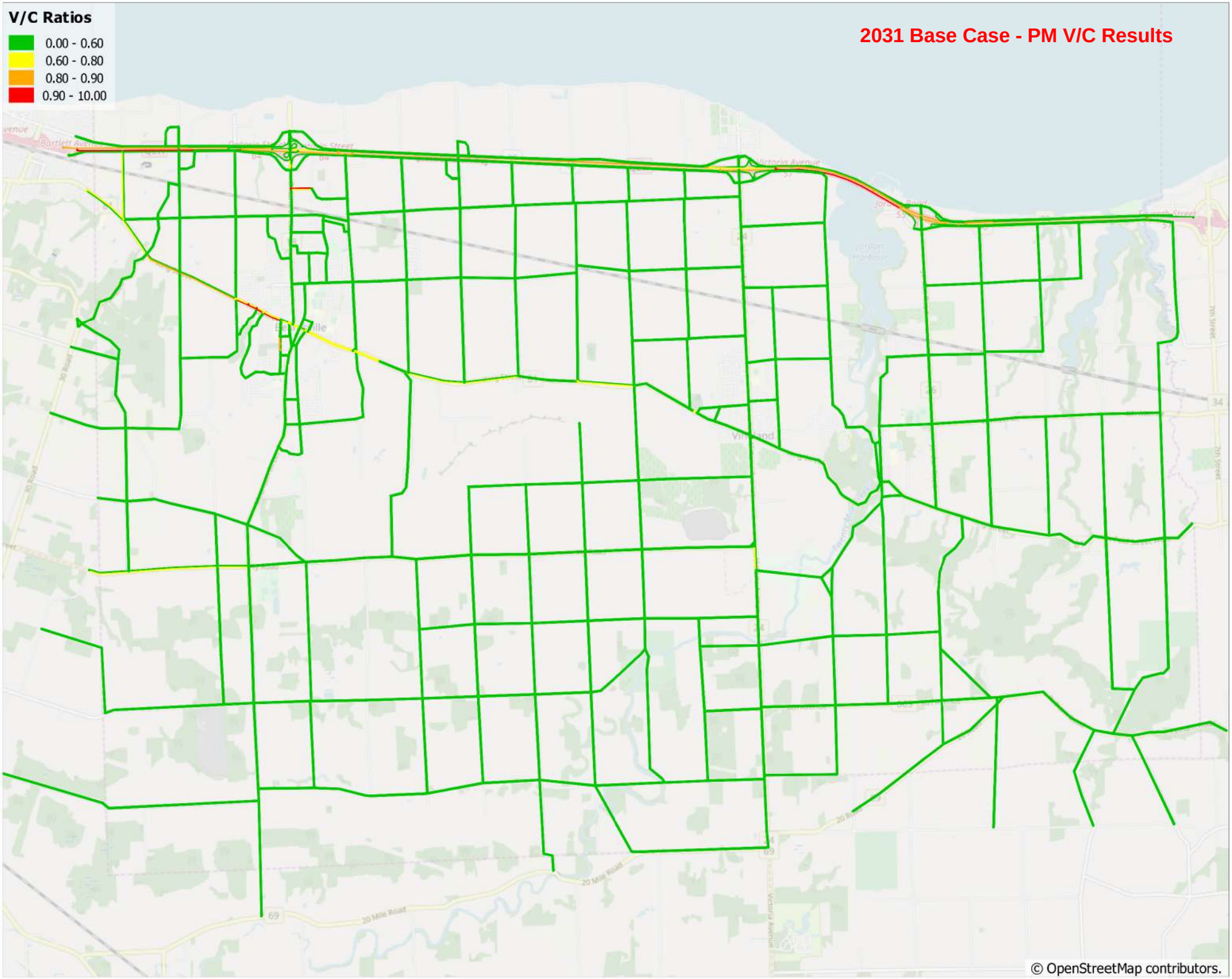
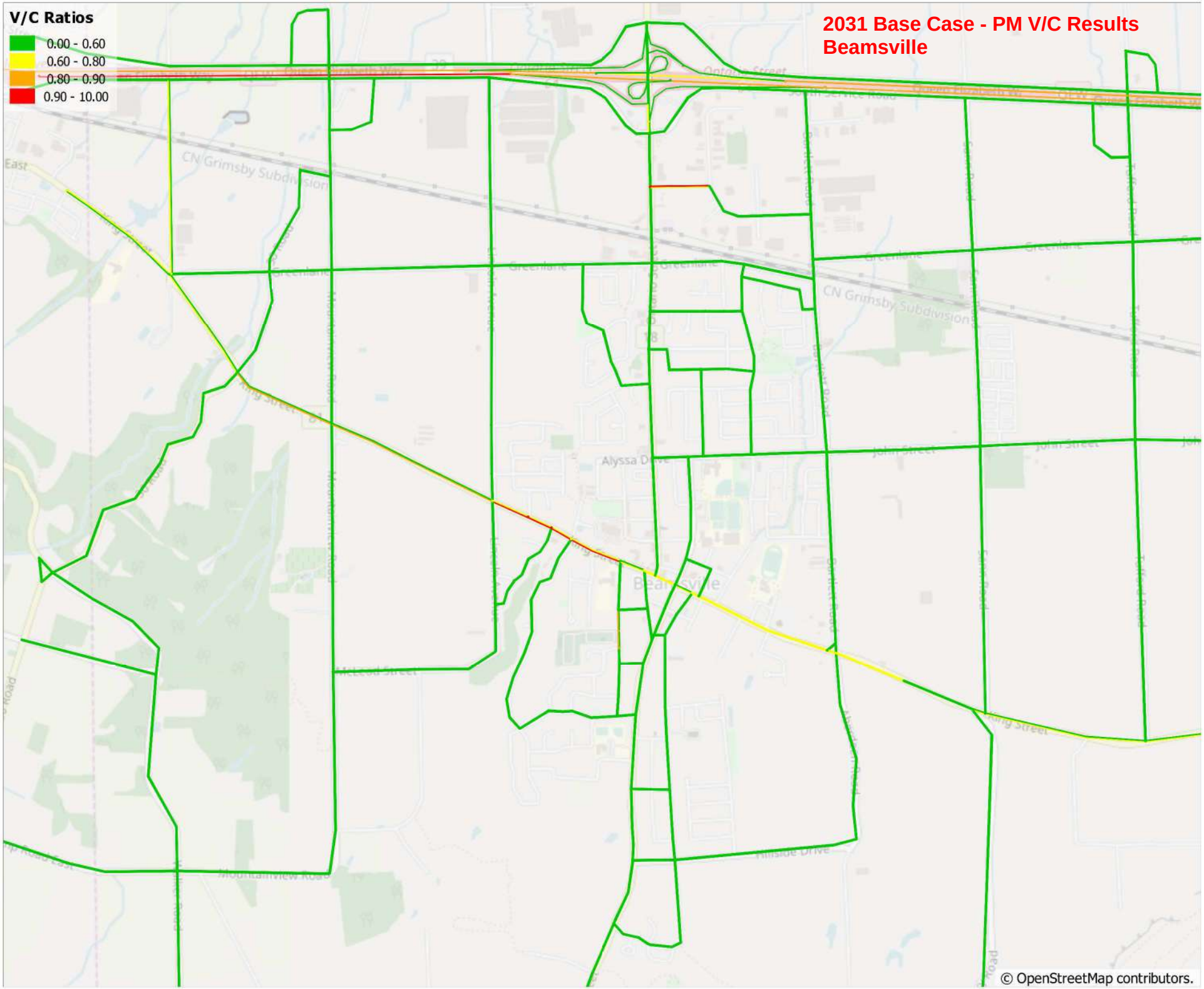
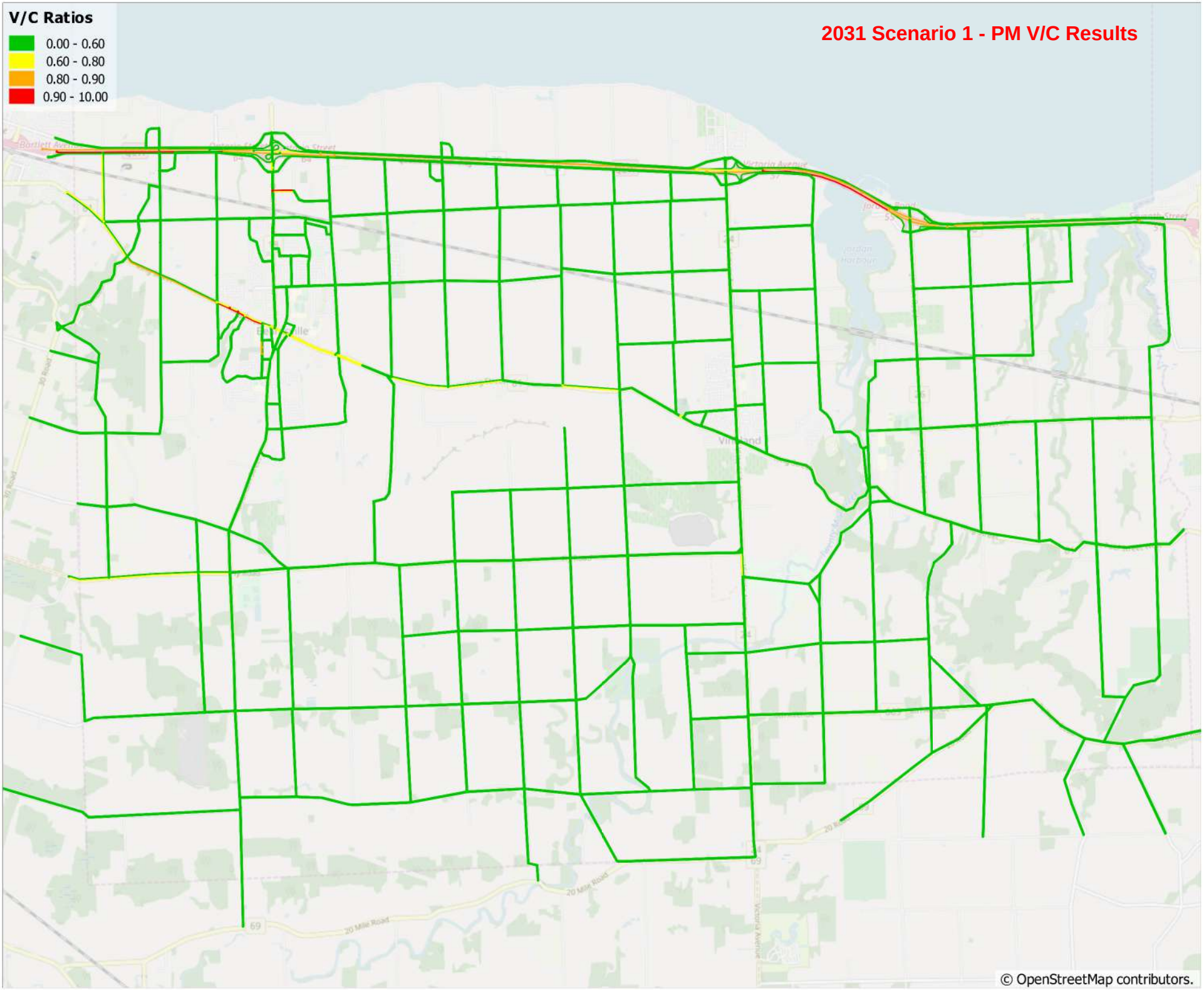
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 5 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
Greenlane
John Street
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Base Case - PM V/C Results
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Base Case - PM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
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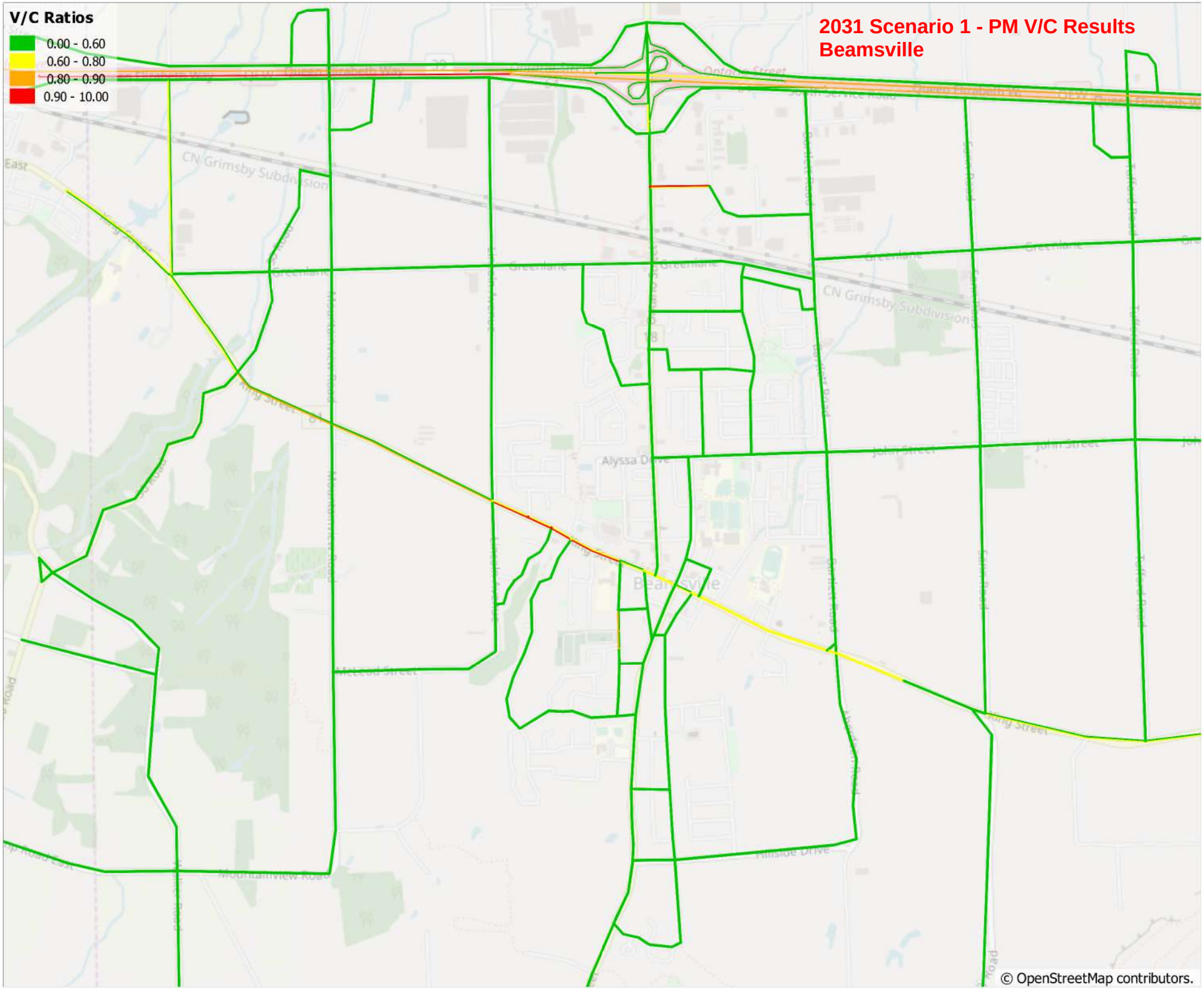
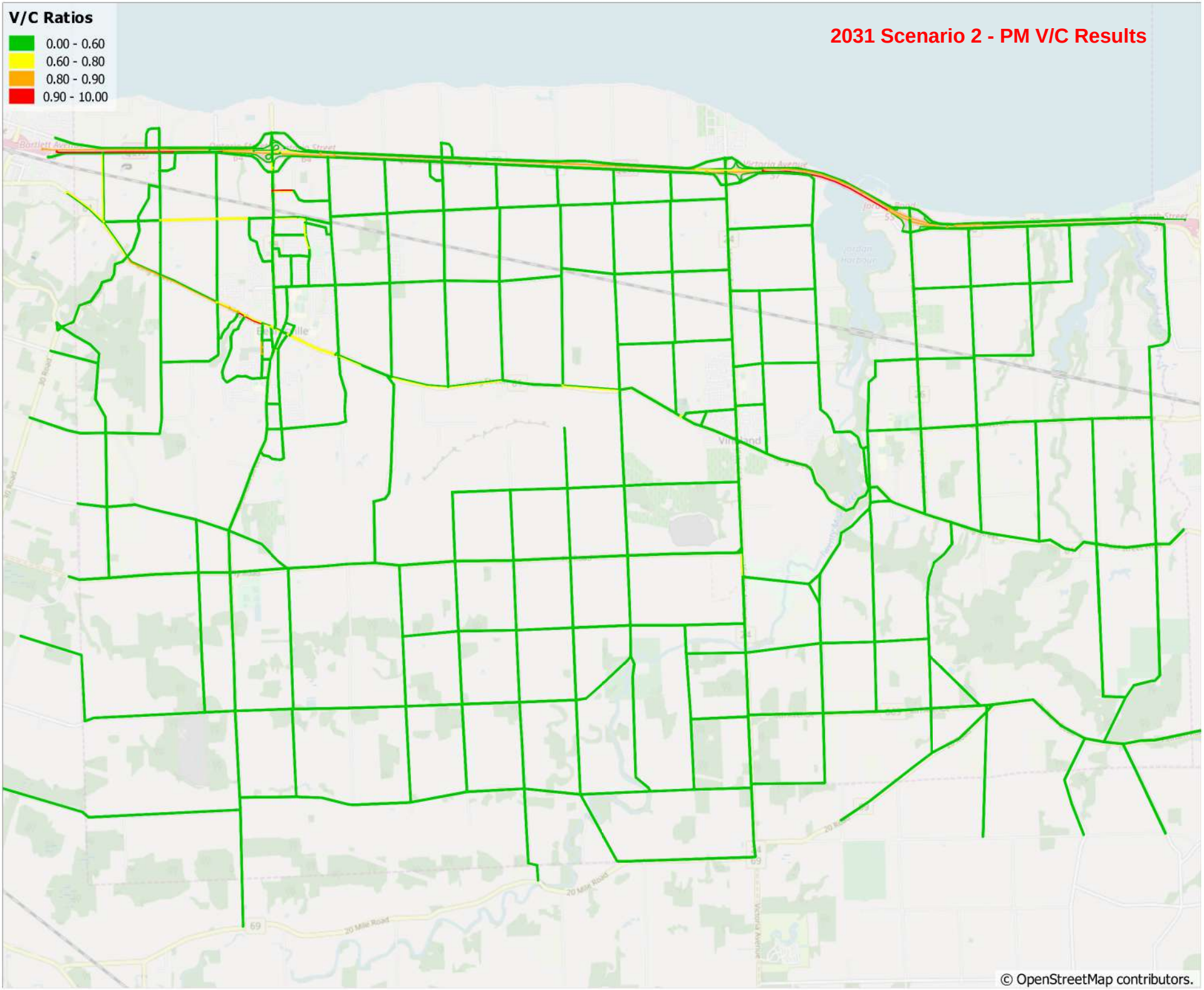
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 1 - PM V/C Results
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 1 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
King Street
Greenlane
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
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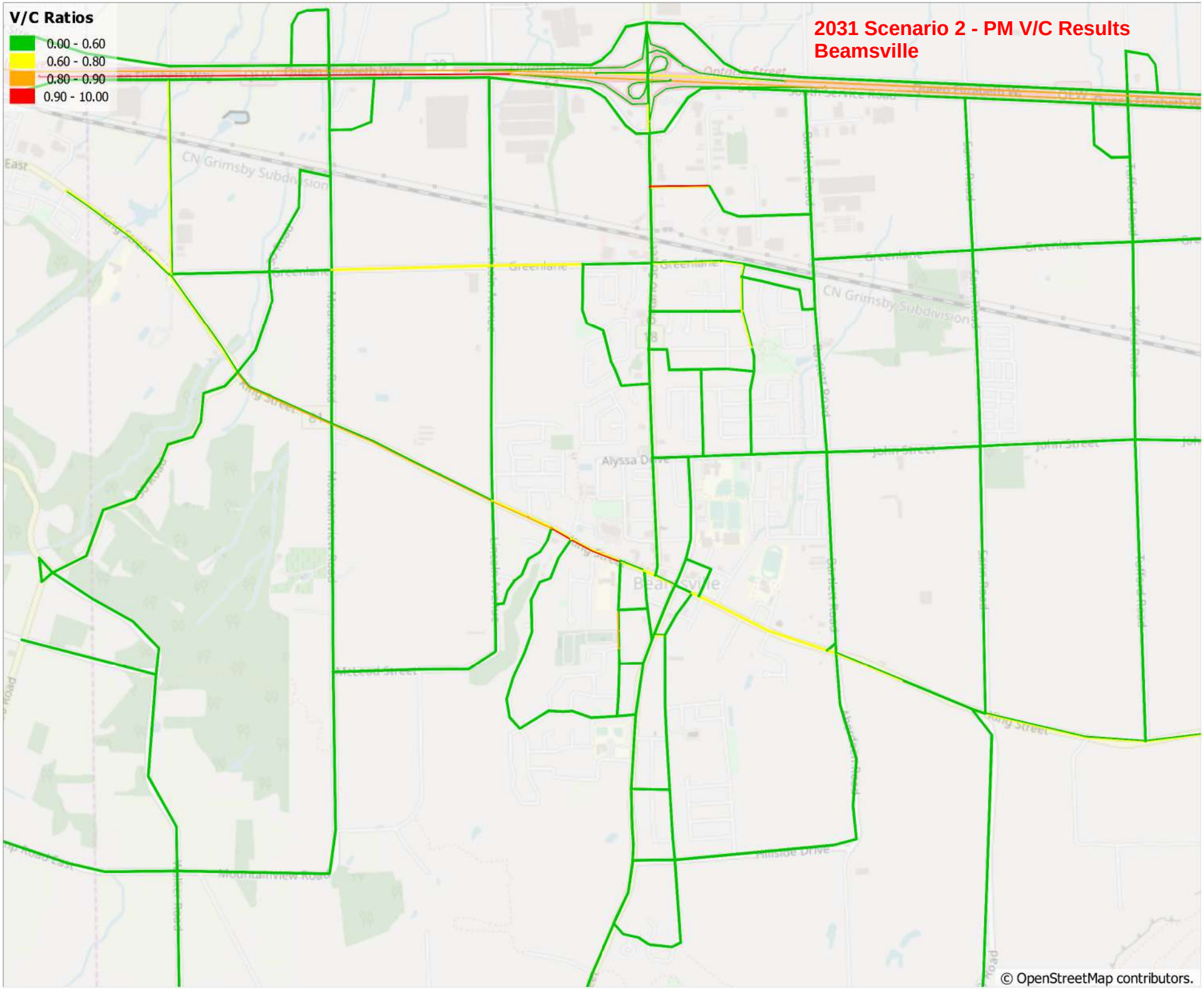
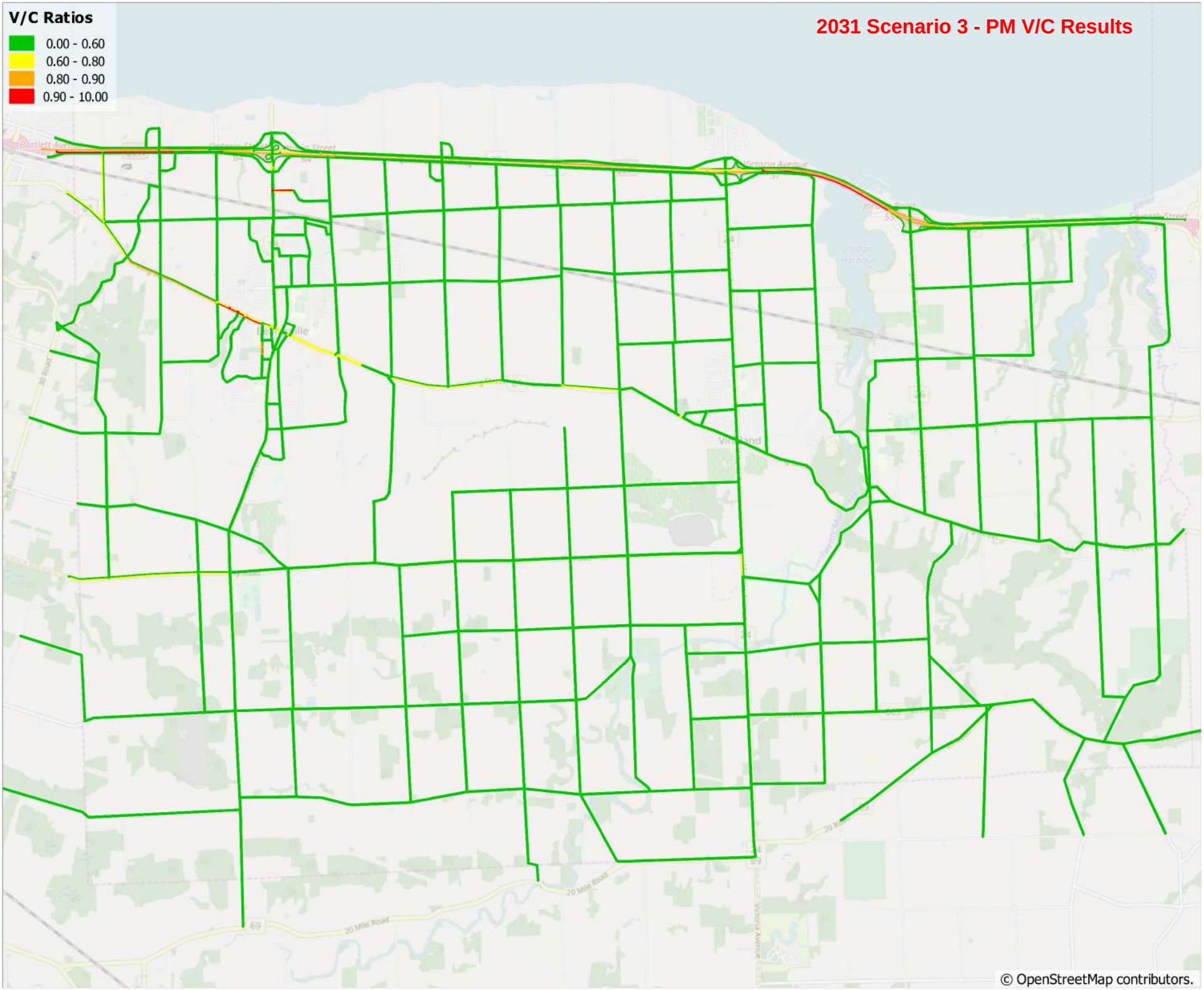
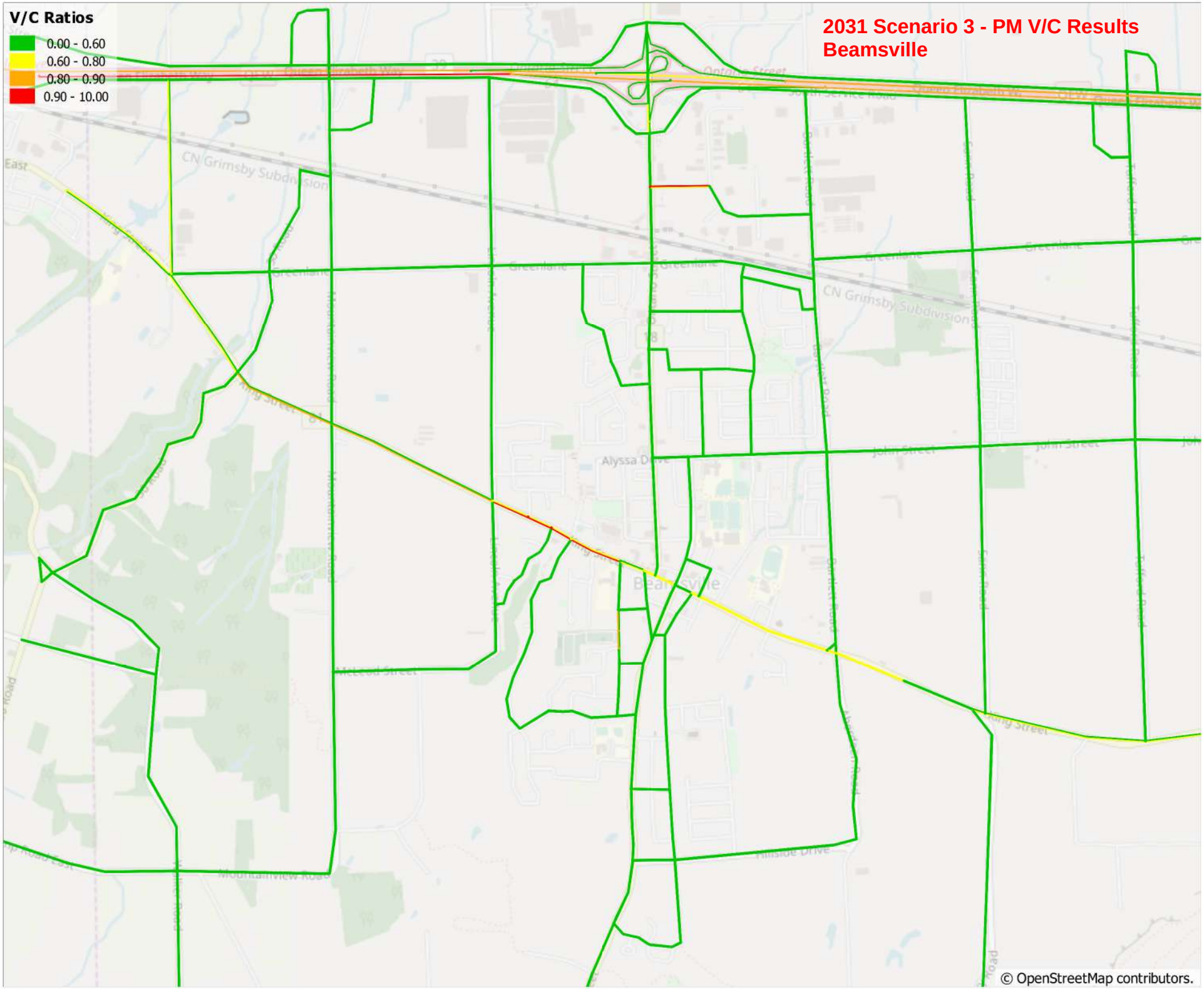
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 2 - PM V/C Results
20 Mile Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 2 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 3 - PM V/C Results
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 3 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Ontario Street
King Street
Greenlane
Alyssa Drive
Hillside Drive
Mountainview Road
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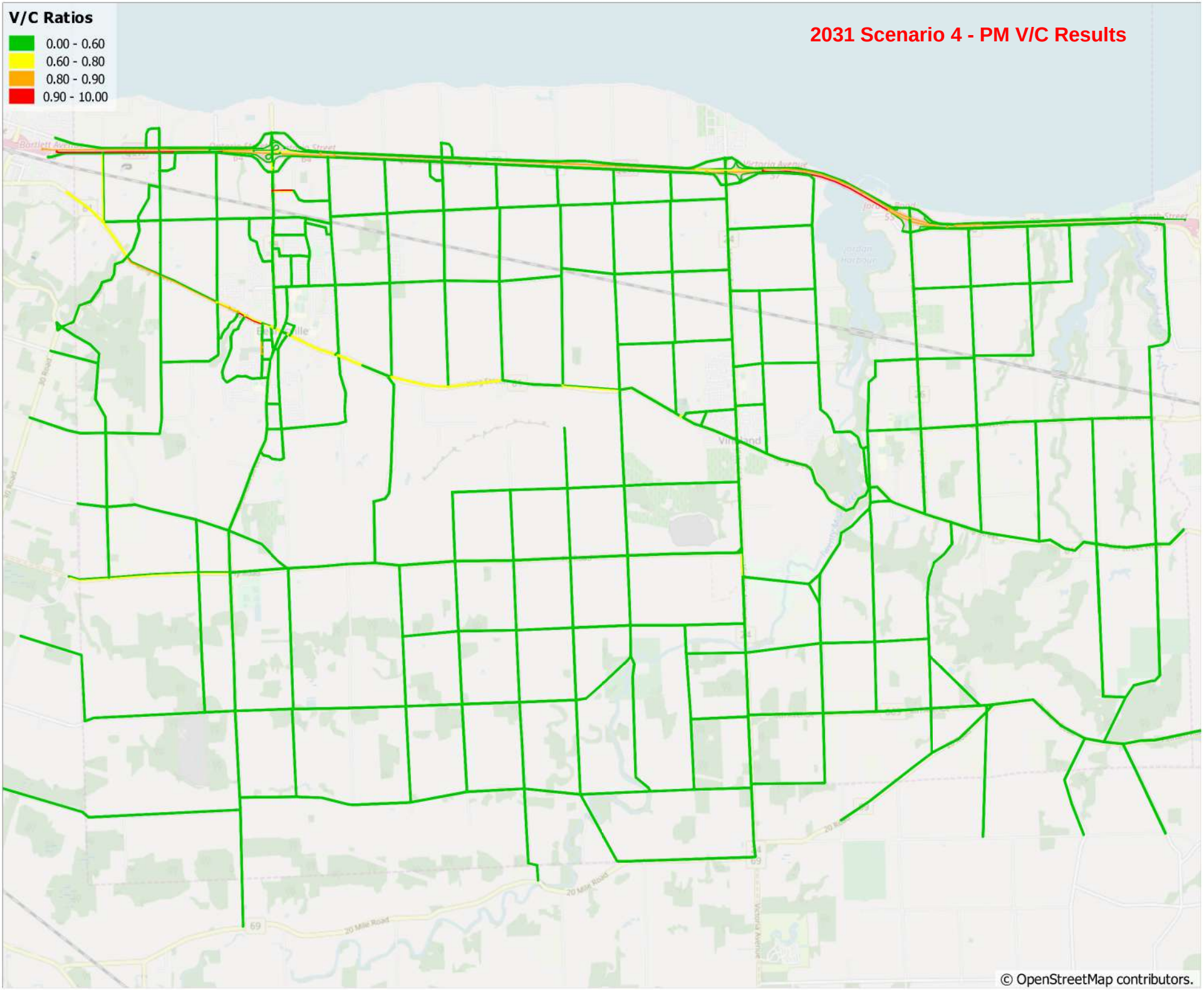
V/C Ratios
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0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 4 - PM V/C Results
20 Mile Road
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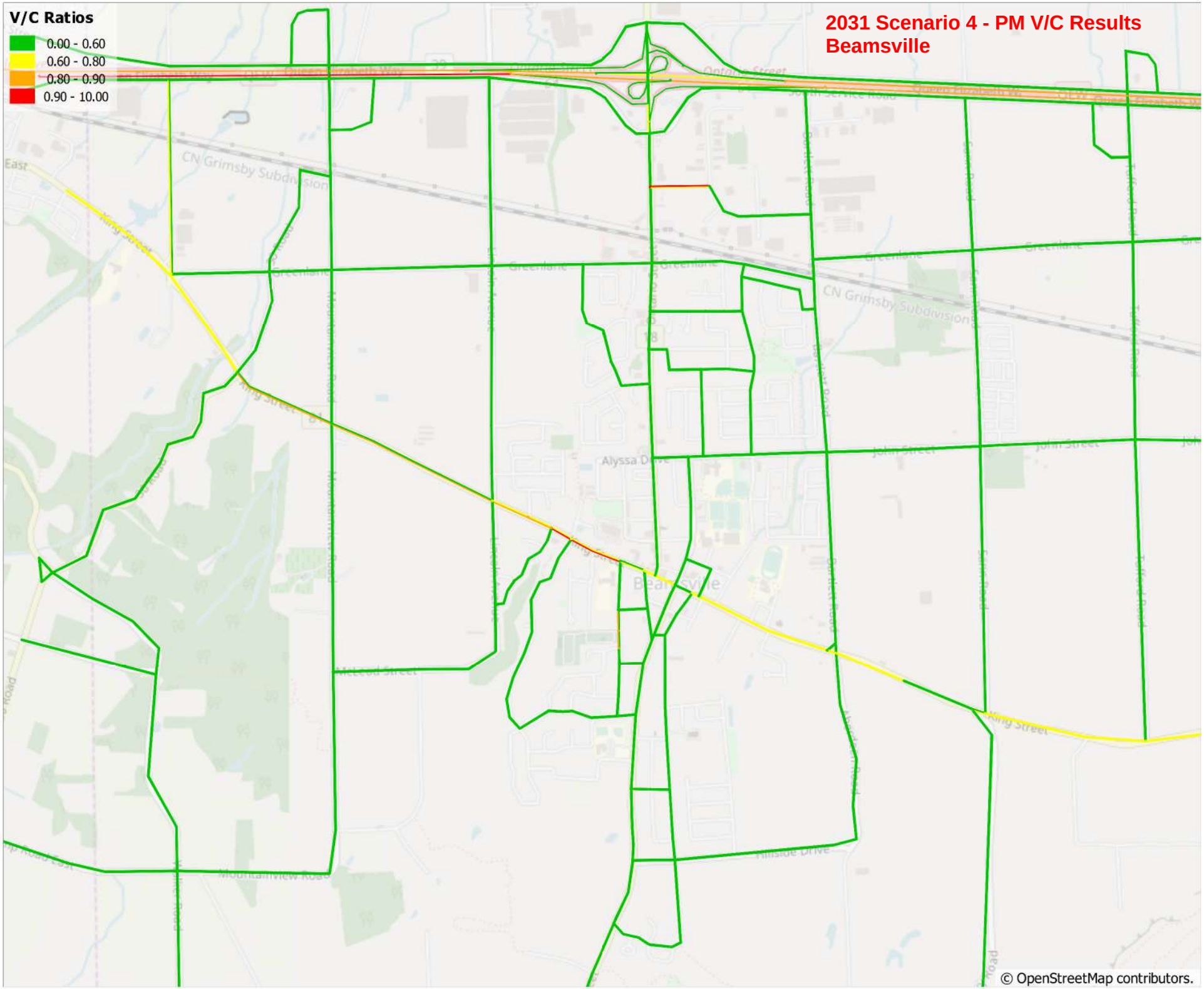
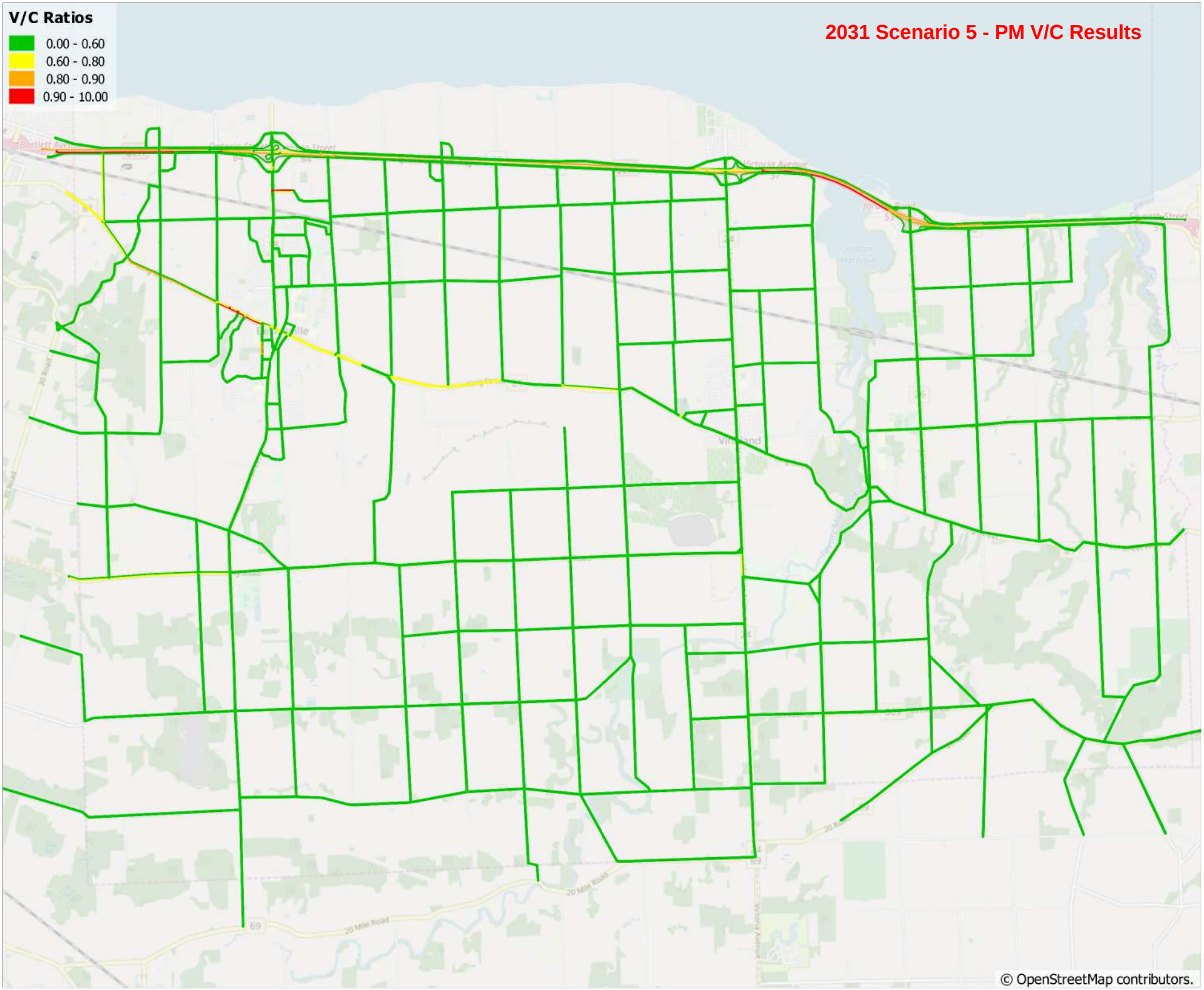
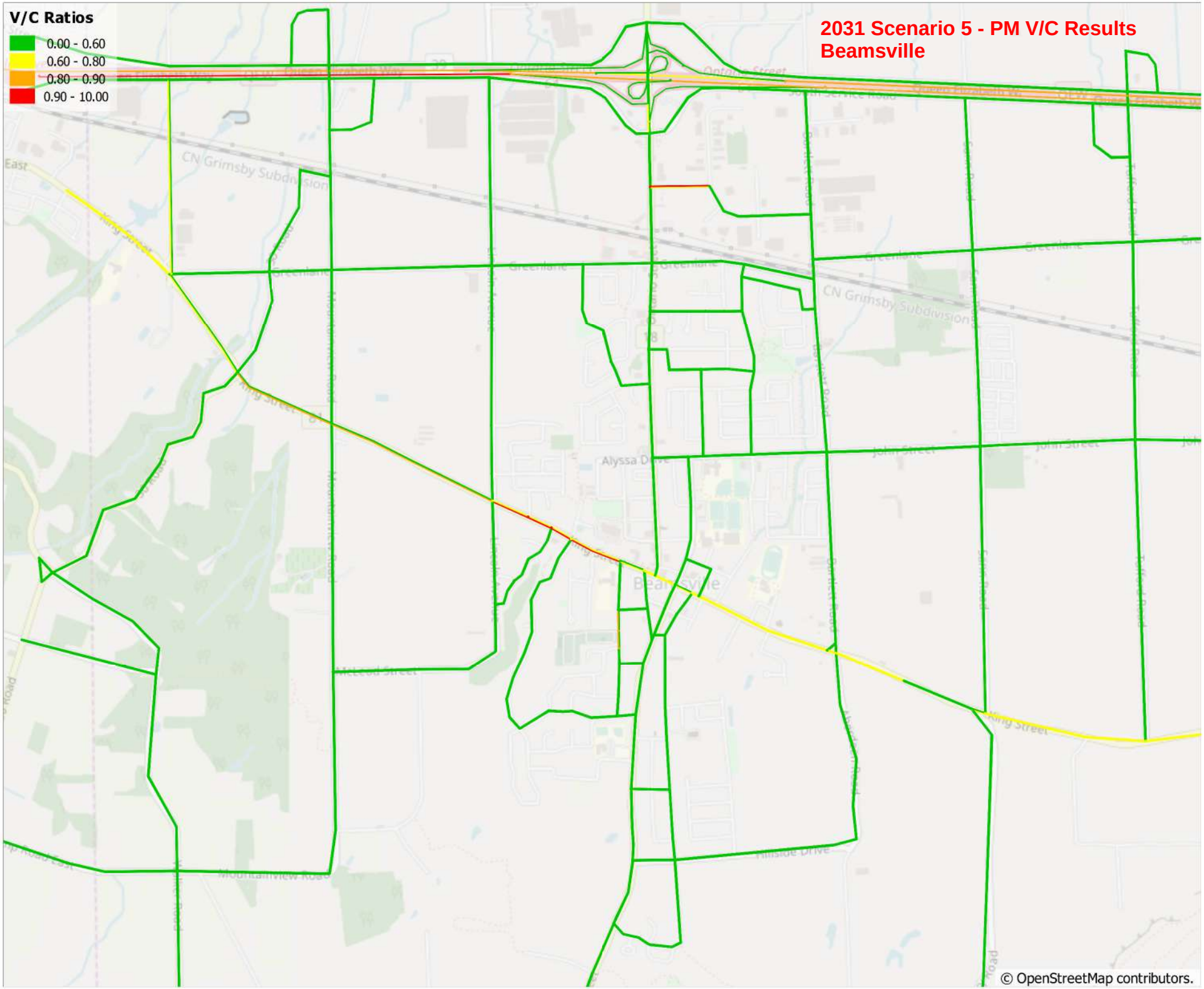
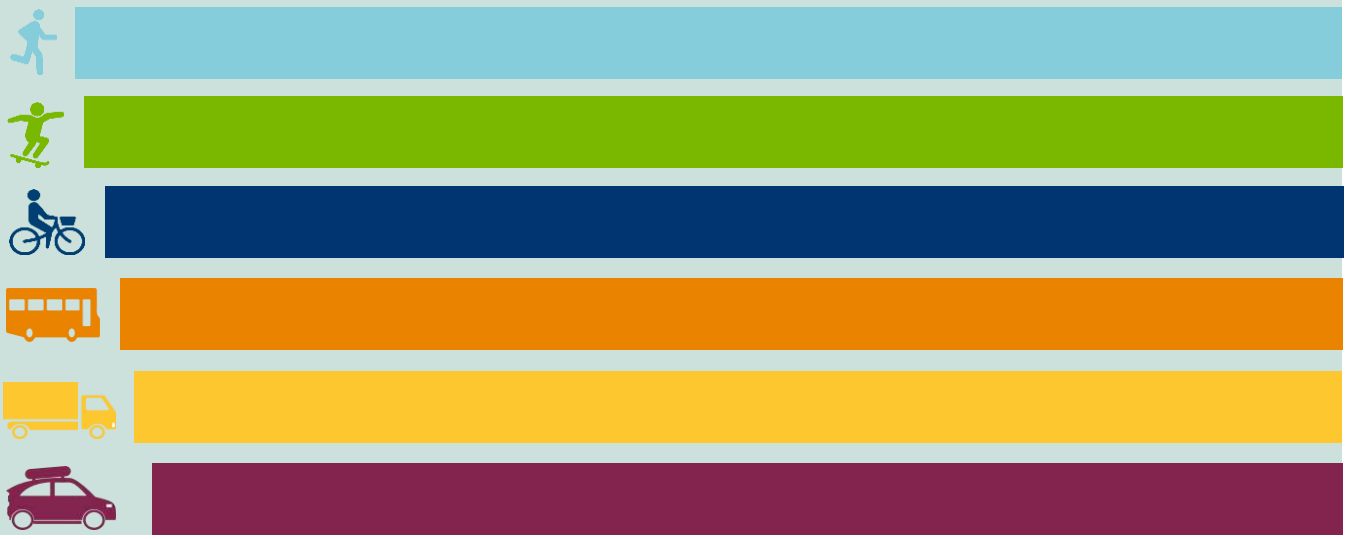

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 4 - PM V/C Results
Beamsville
CN Grimsby Subdivision
King Street
Ontario Street
Greenlane
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.


V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 5 - PM V/C Results
20 Mile Road
© OpenStreetMap contributors.

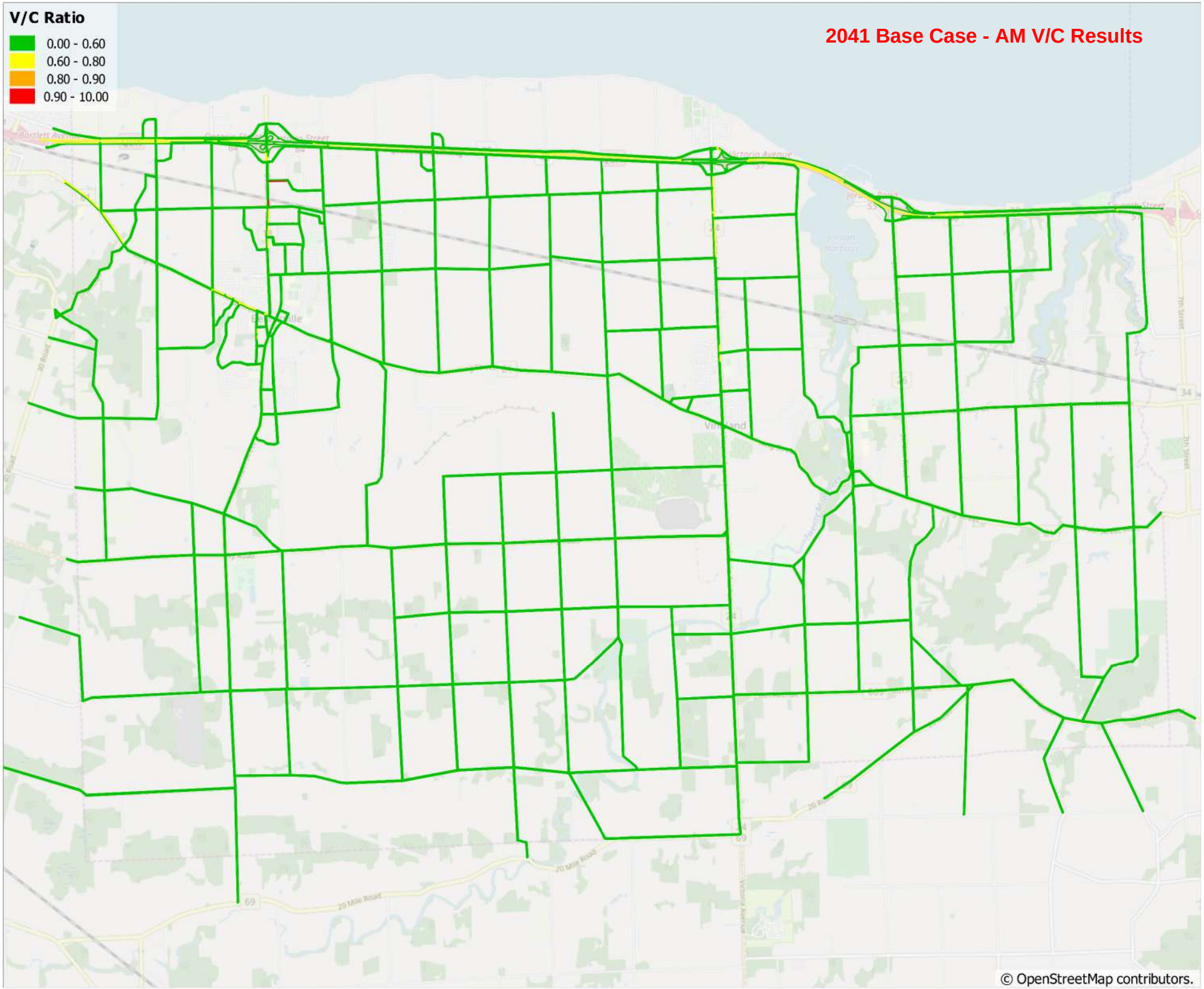

V/C Ratios
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2031 Scenario 5 - PM V/C Results
Beamsville
CN Grimsby Subdivision
King Street
Greenlane
Ontario Street
Alyssa Drive
Hillside Drive
Mountainview Road
© OpenStreetMap contributors.

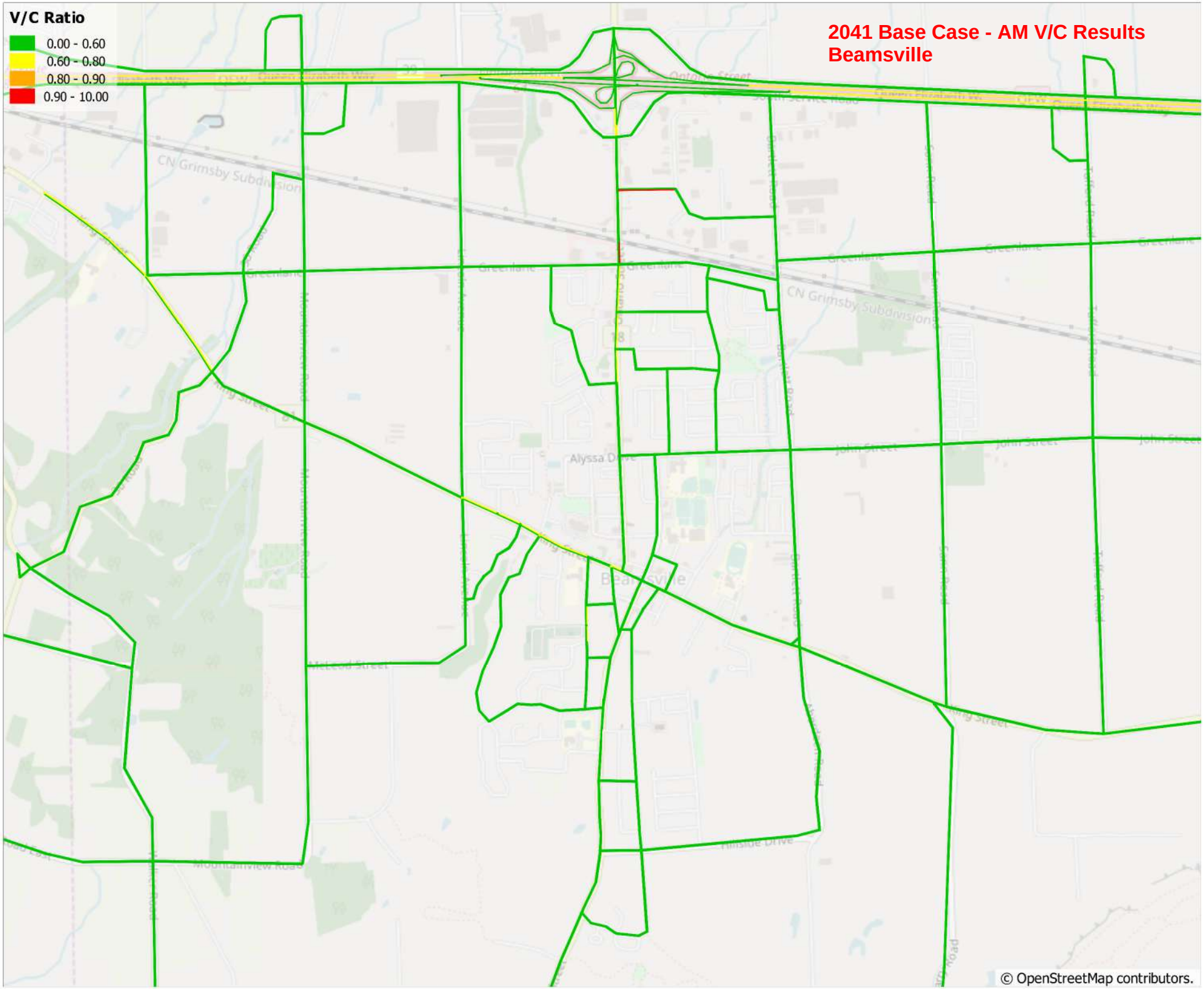
APPENDIX

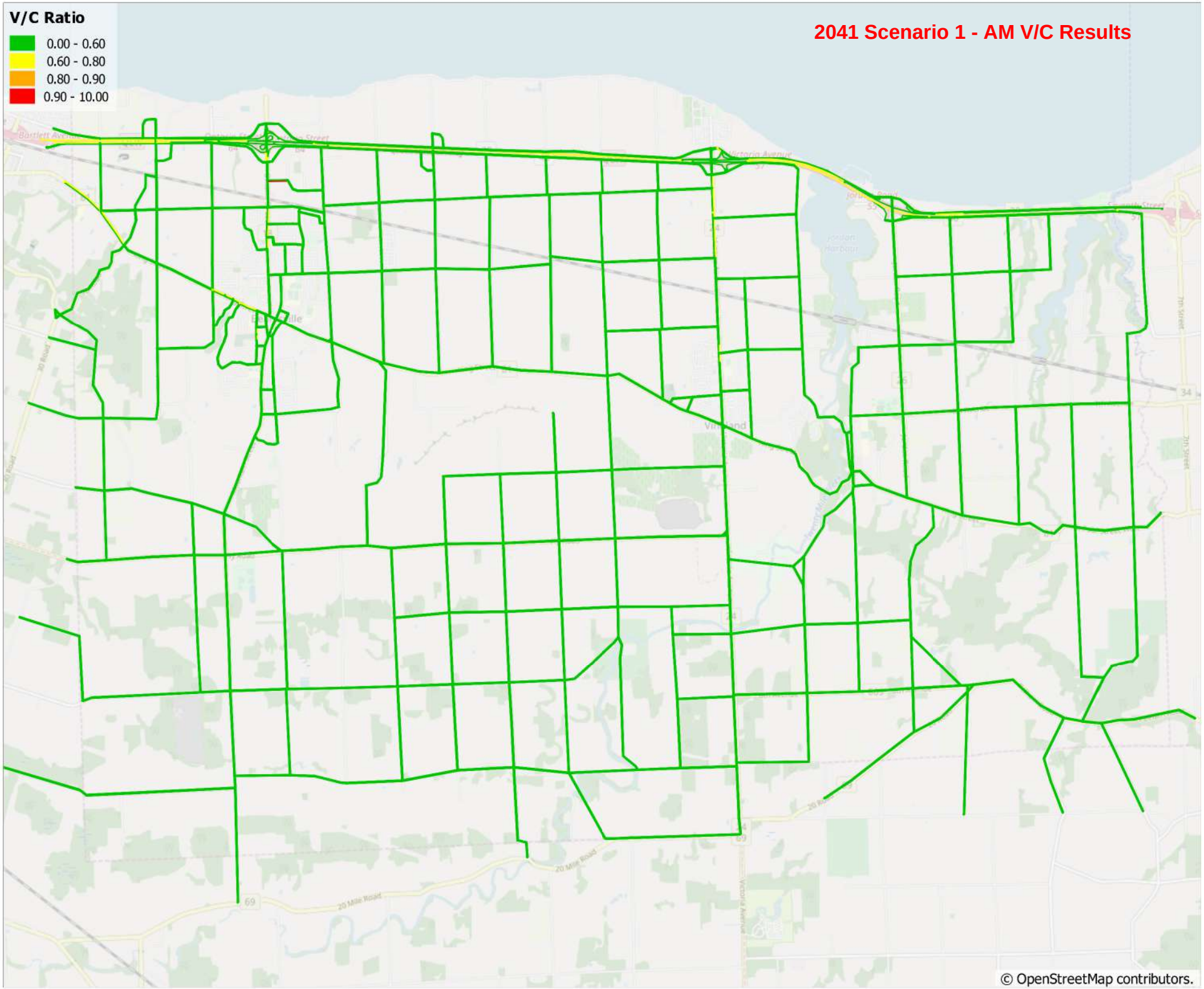
A-6 2041 Volume-to-Capacity Maps

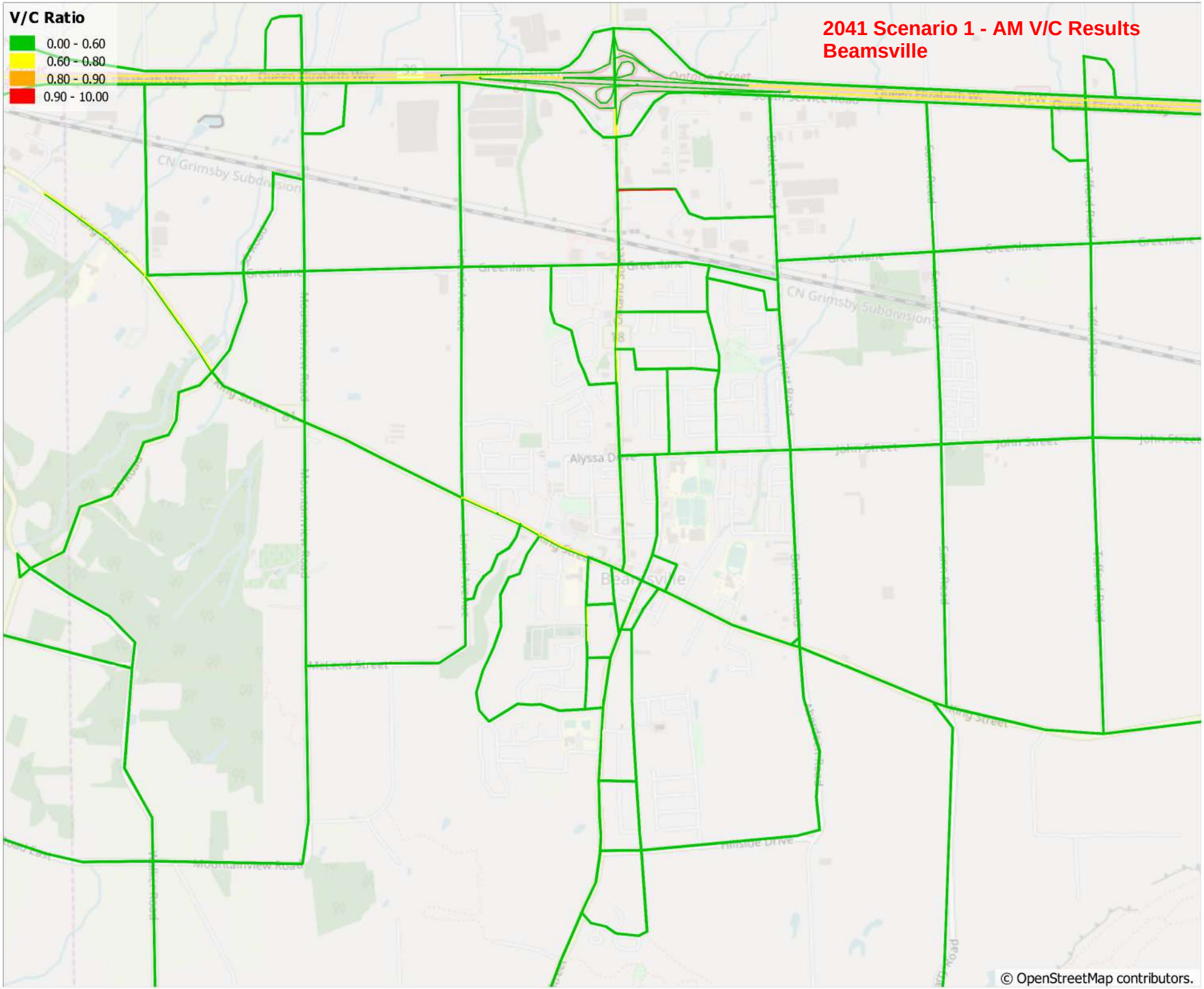


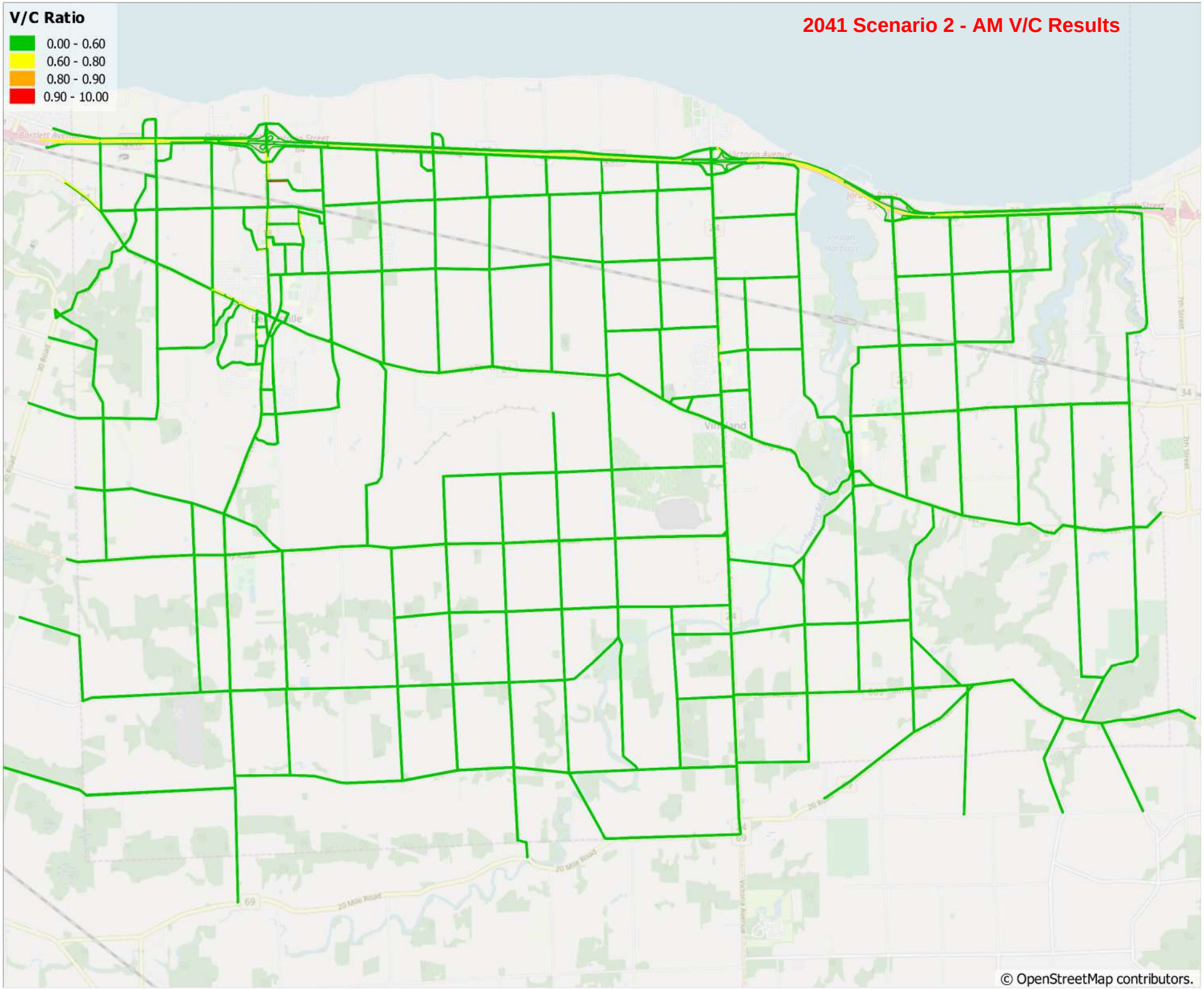
Make moving make sense as we grow!

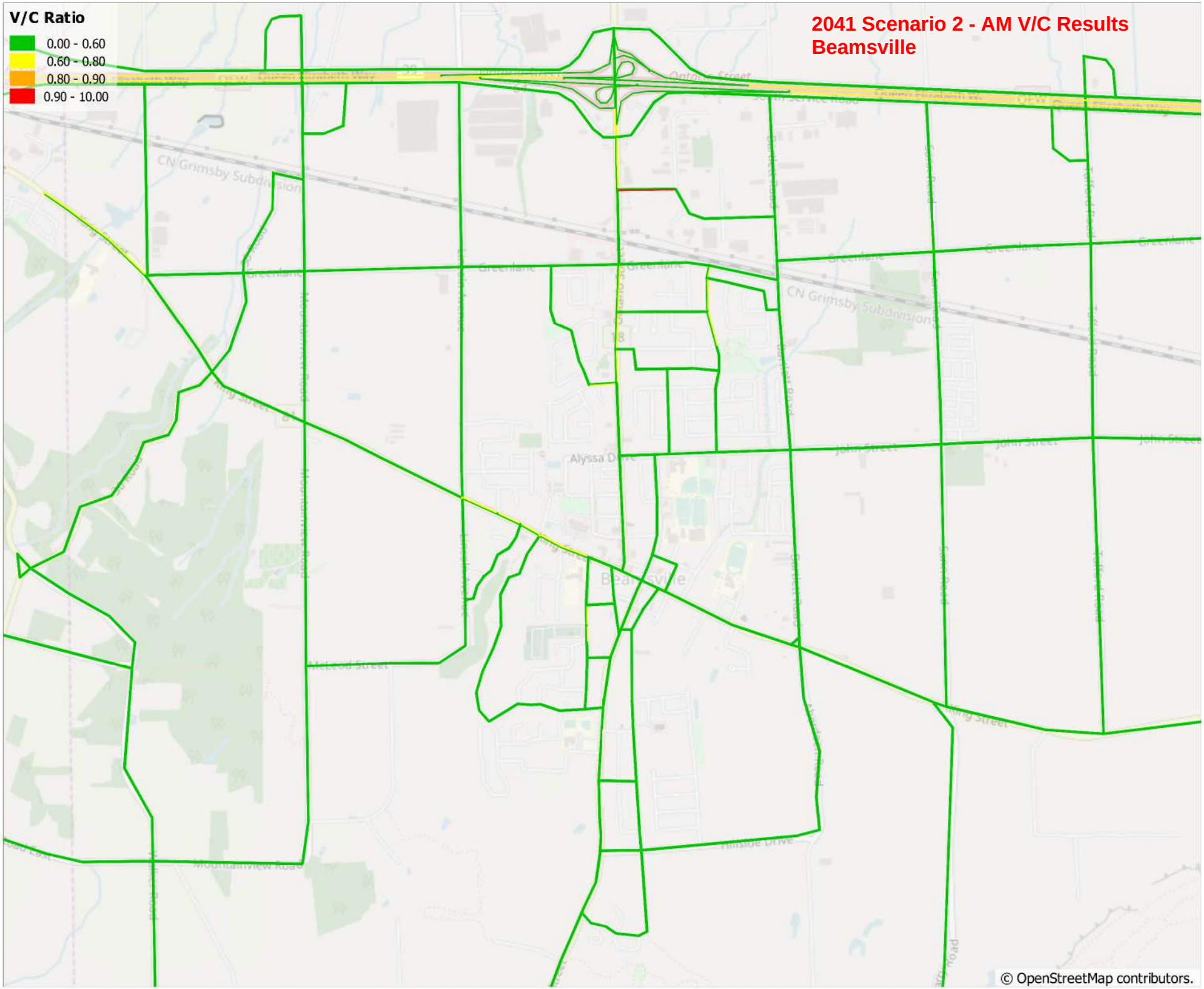

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Base Case - AM V/C Results
© OpenStreetMap contributors.

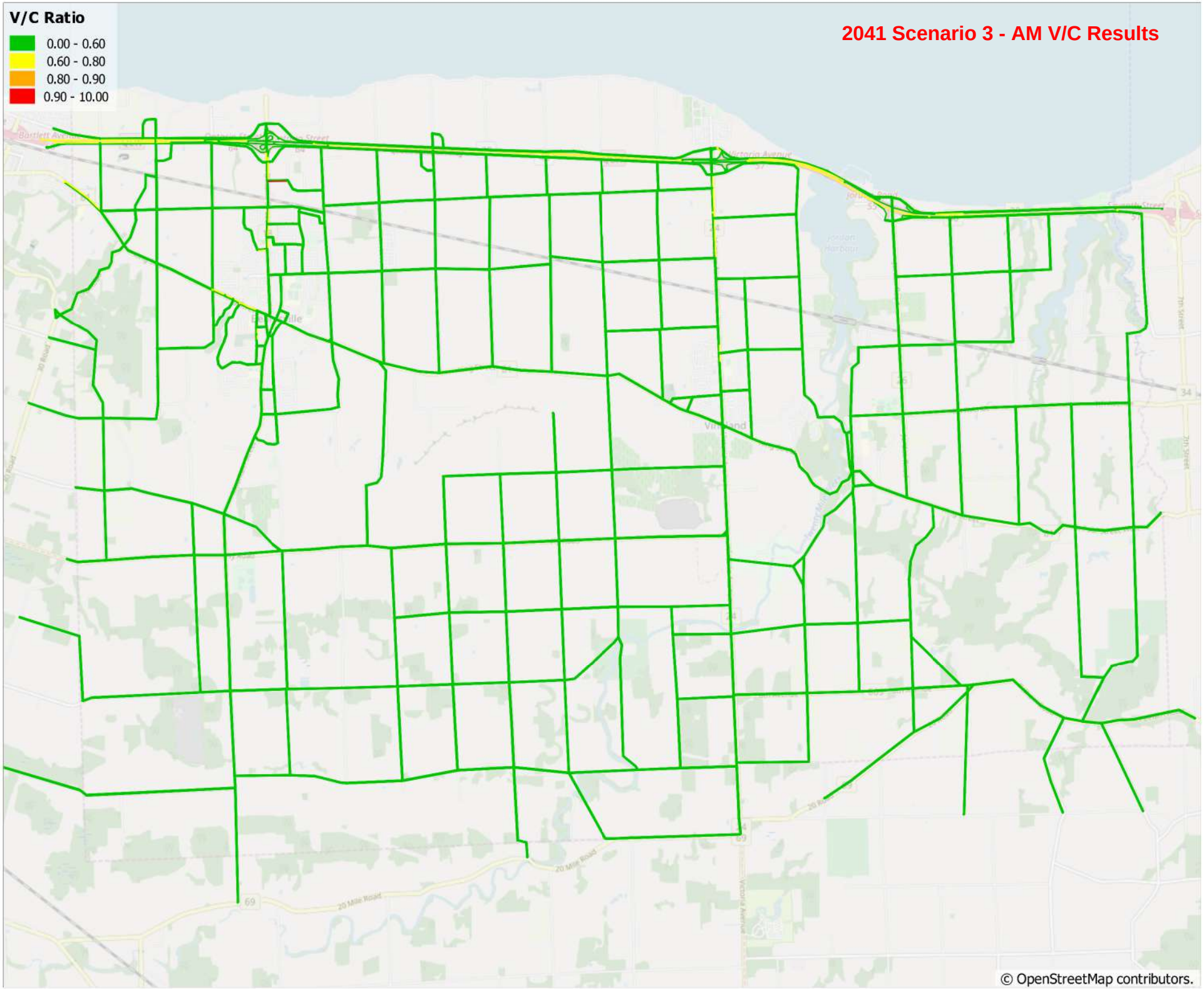

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Base Case - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Greenlane
John Street
King Street
Mountainview Road
Hillside Drive
© OpenStreetMap contributors.

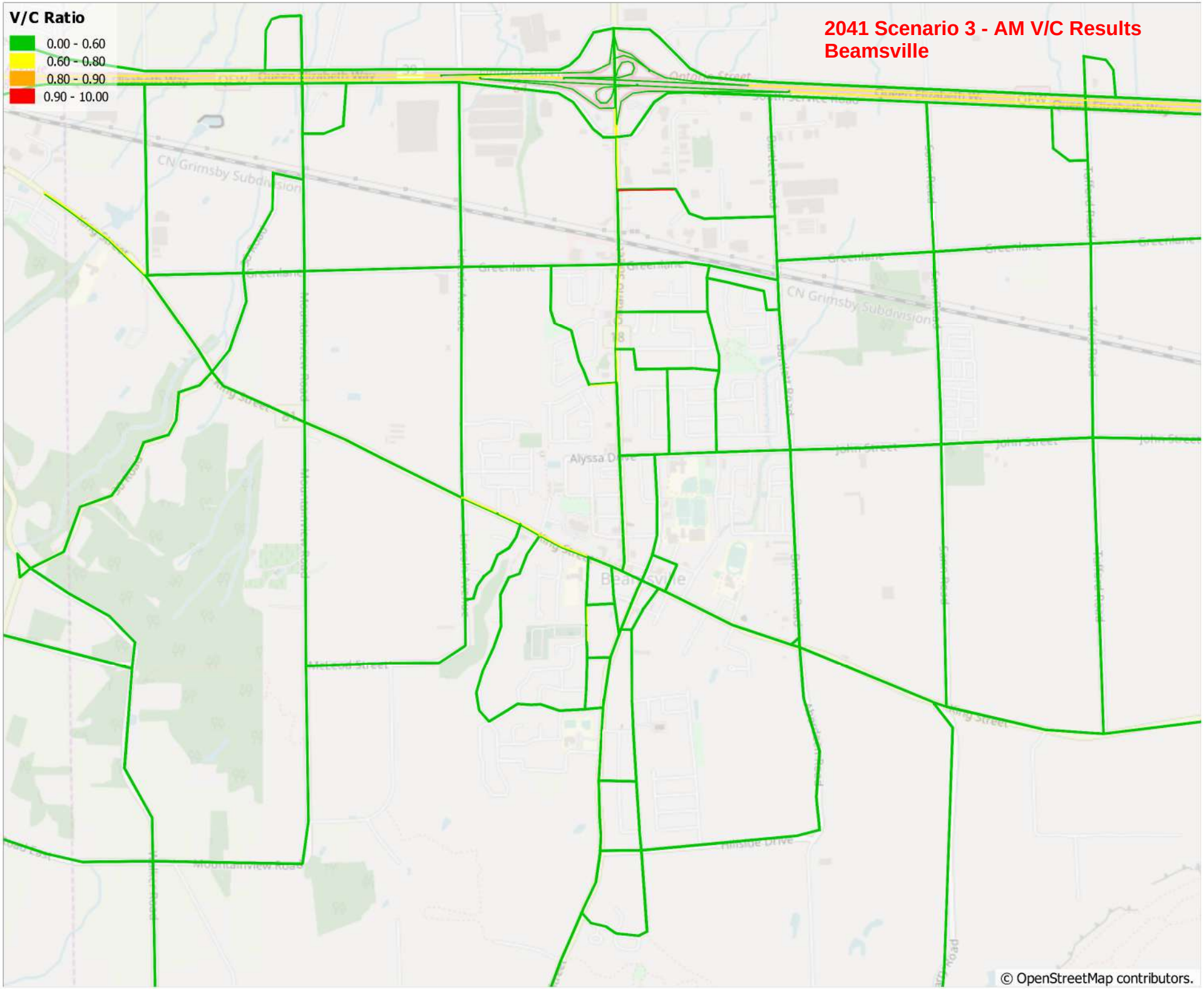

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 1 - AM V/C Results
© OpenStreetMap contributors.

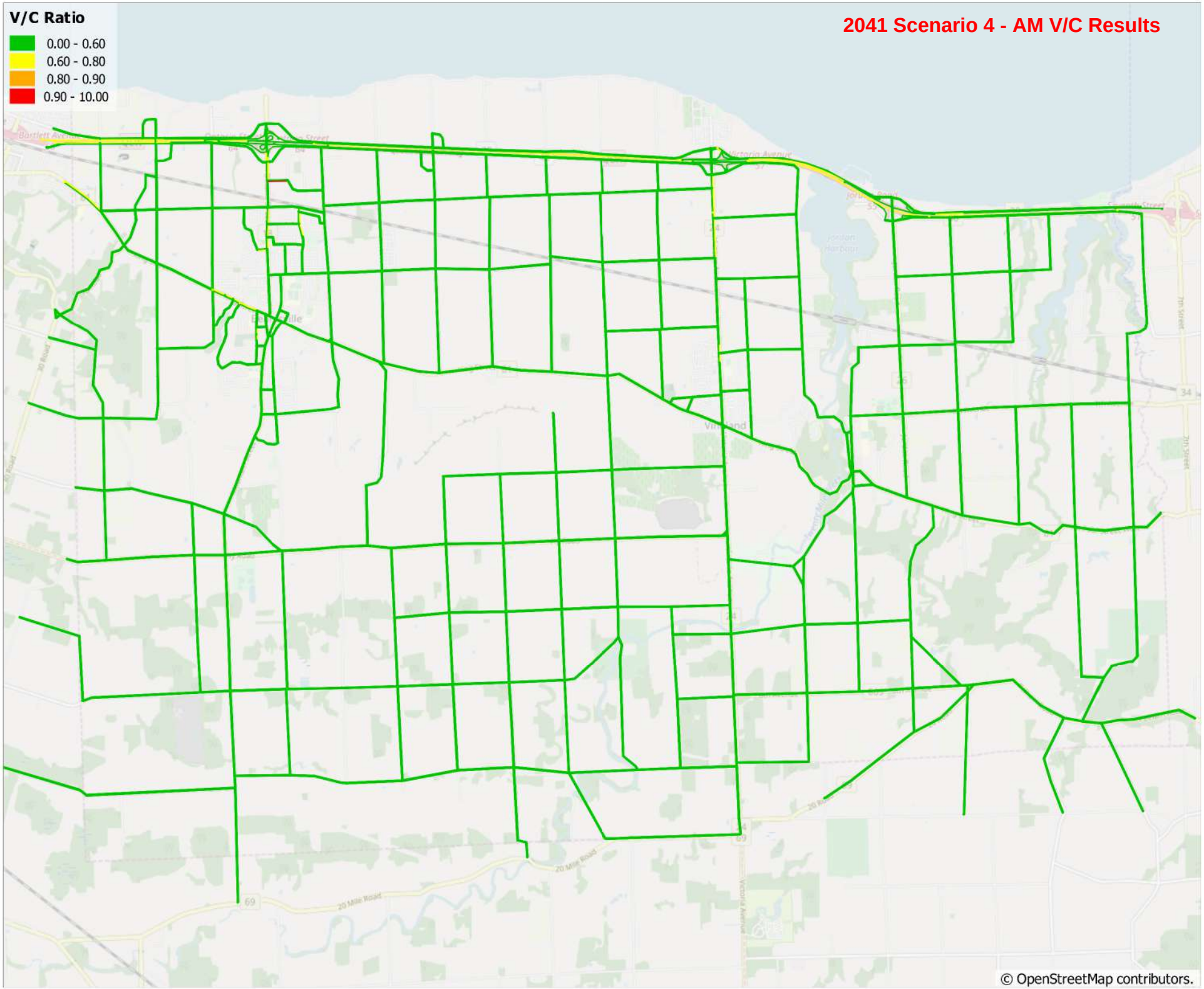

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 1 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

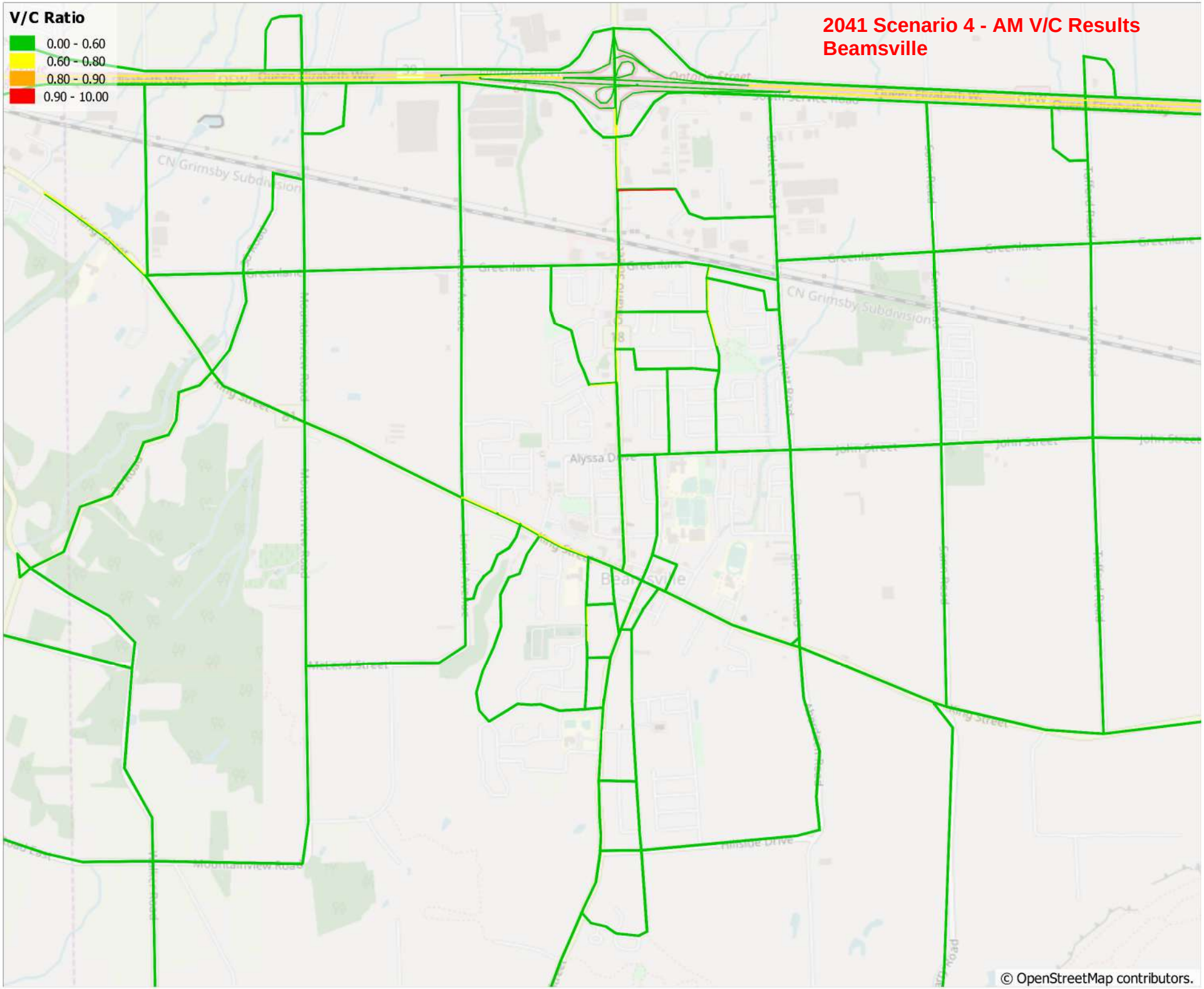

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 2 - AM V/C Results
© OpenStreetMap contributors.

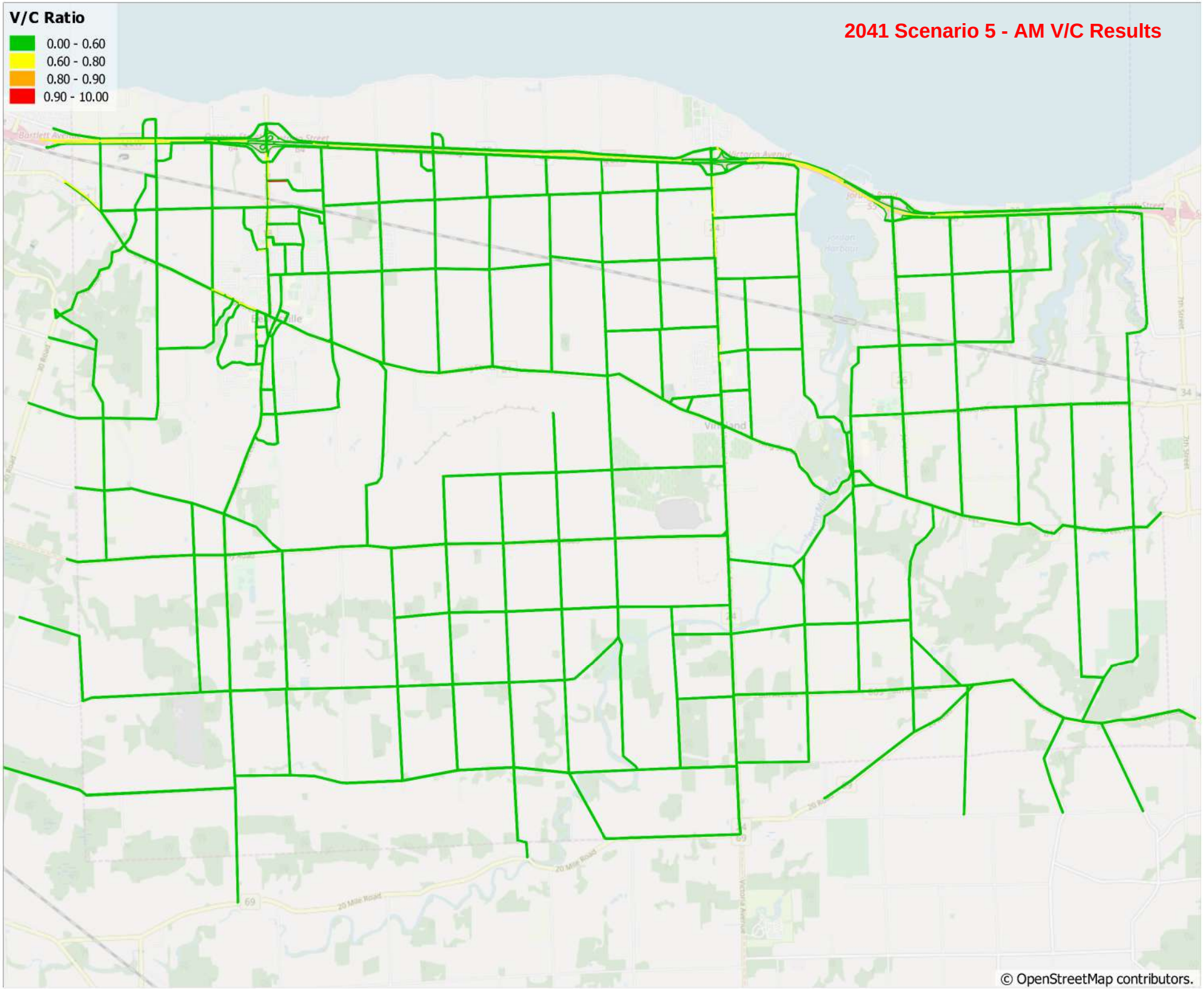

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 2 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

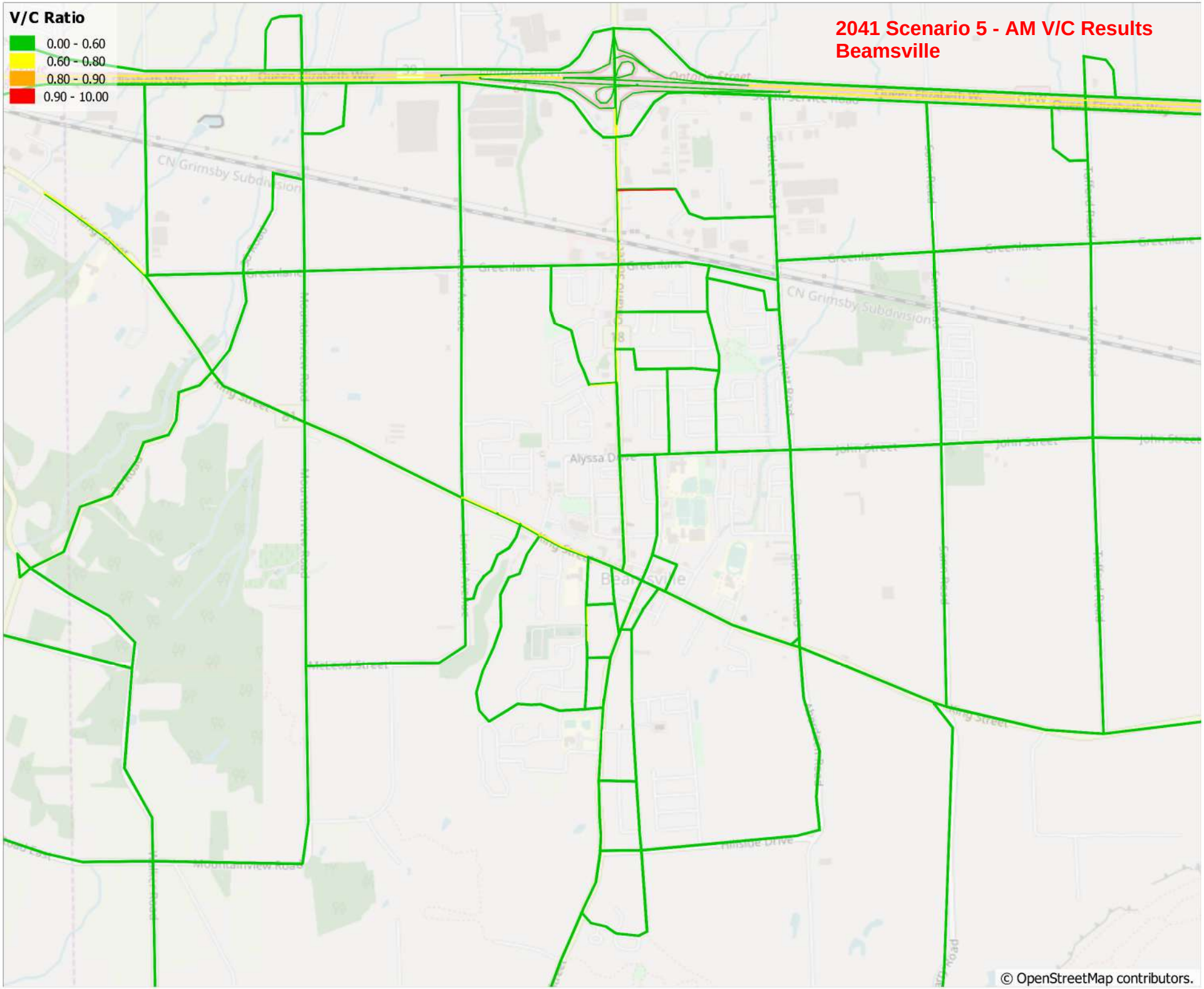

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 3 - AM V/C Results
© OpenStreetMap contributors.

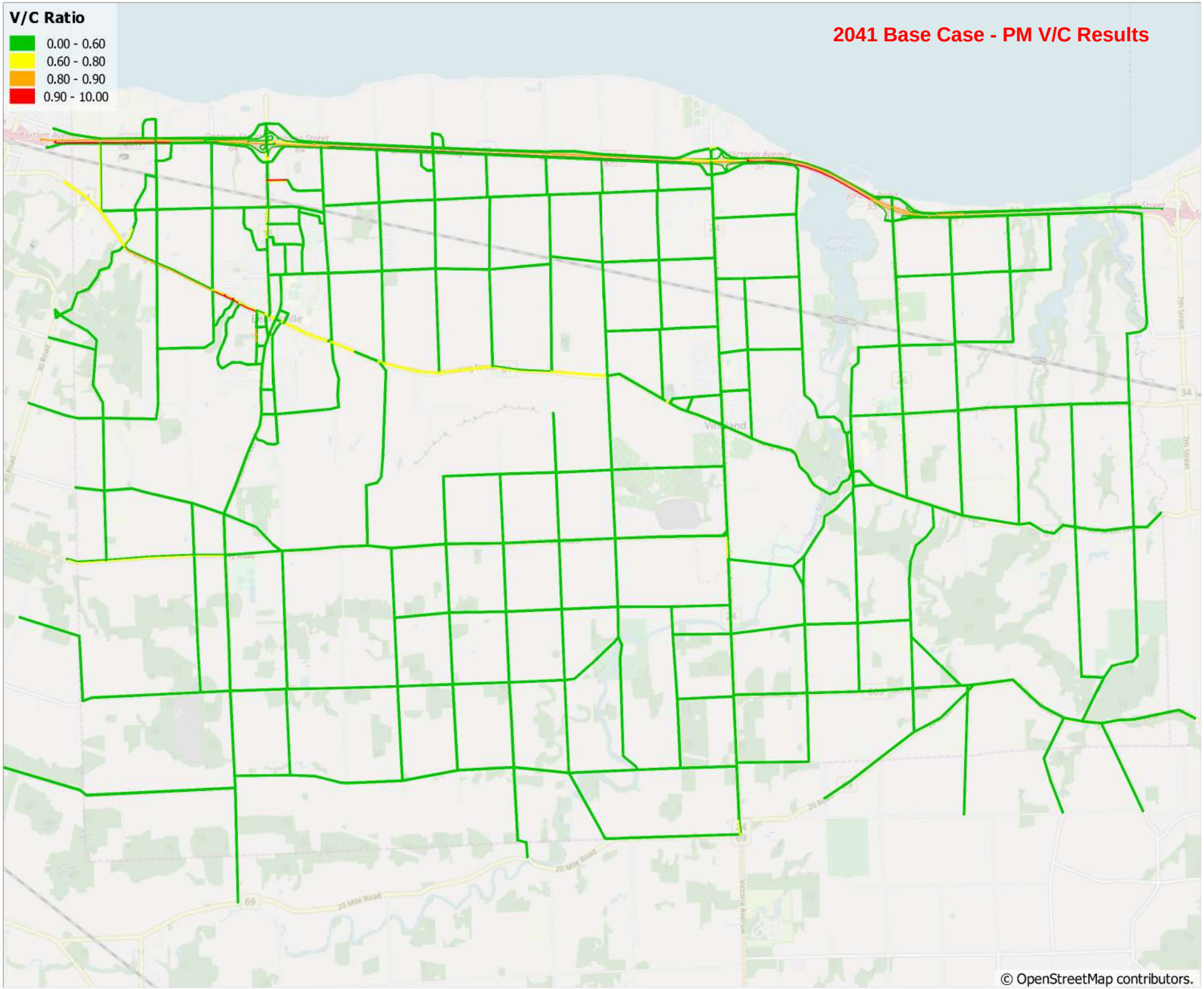

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 3 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Greenlane
John Street
Ontario Street
Hillside Drive
© OpenStreetMap contributors.

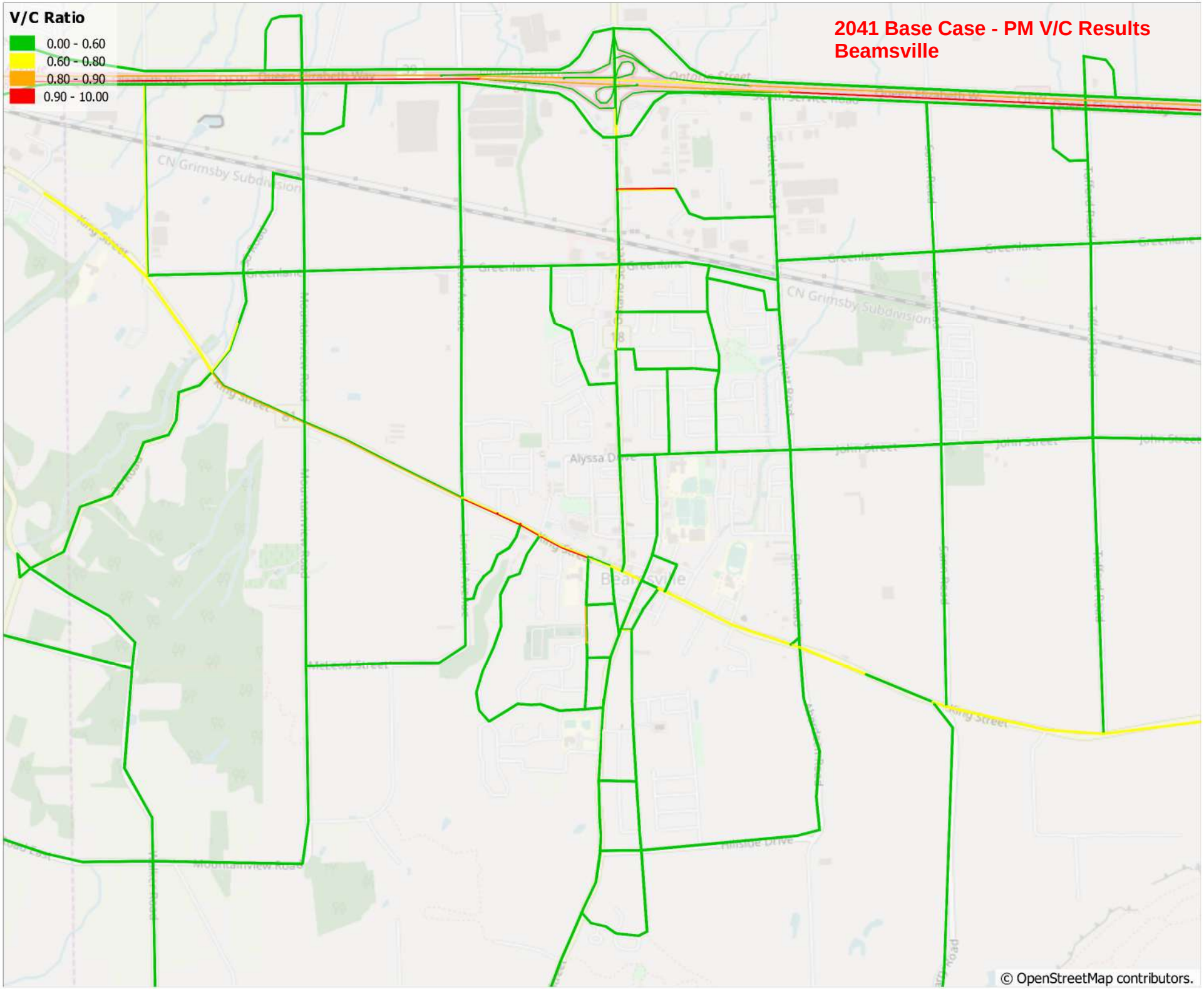

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 4 - AM V/C Results
© OpenStreetMap contributors.

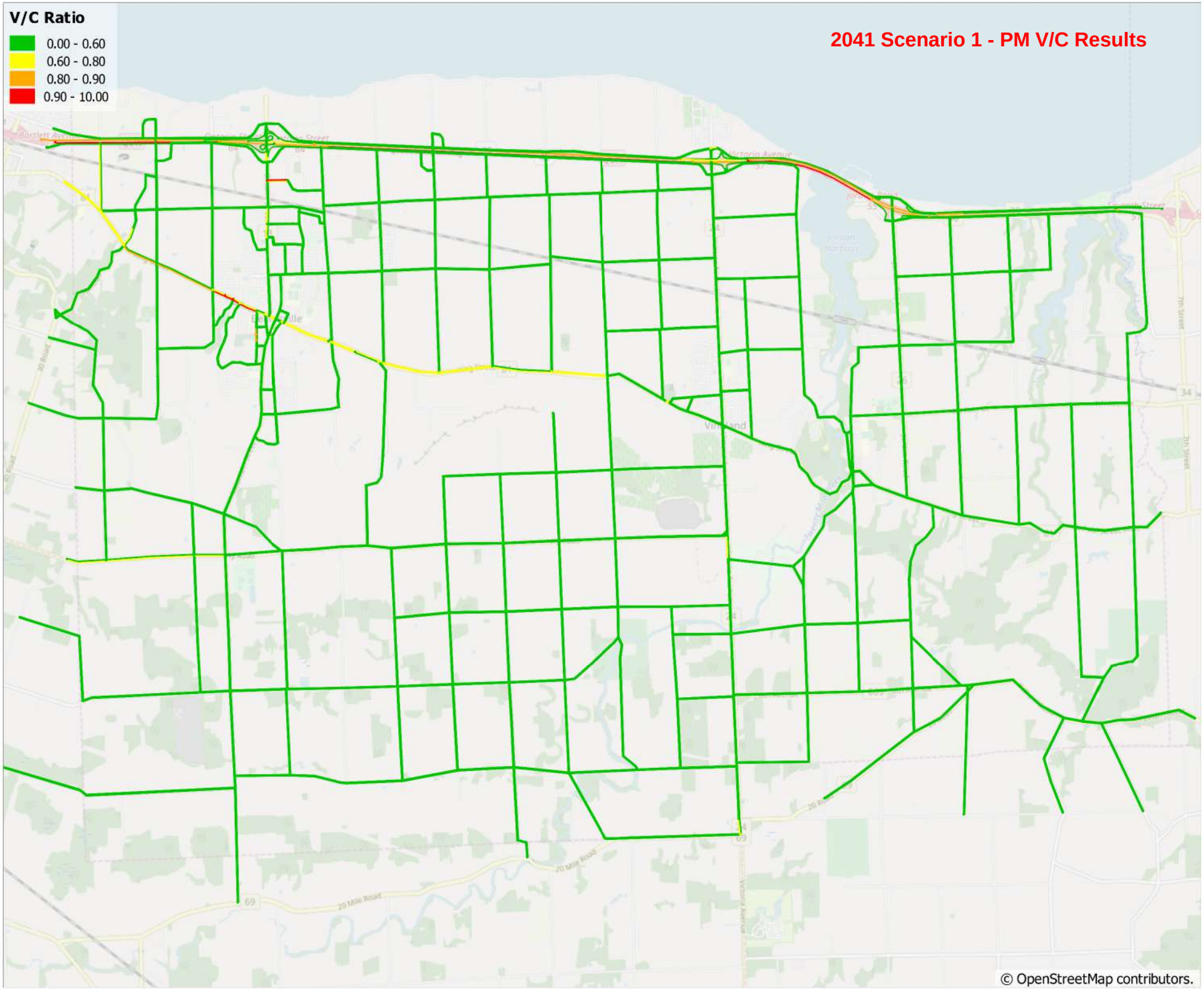

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 4 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
© OpenStreetMap contributors.

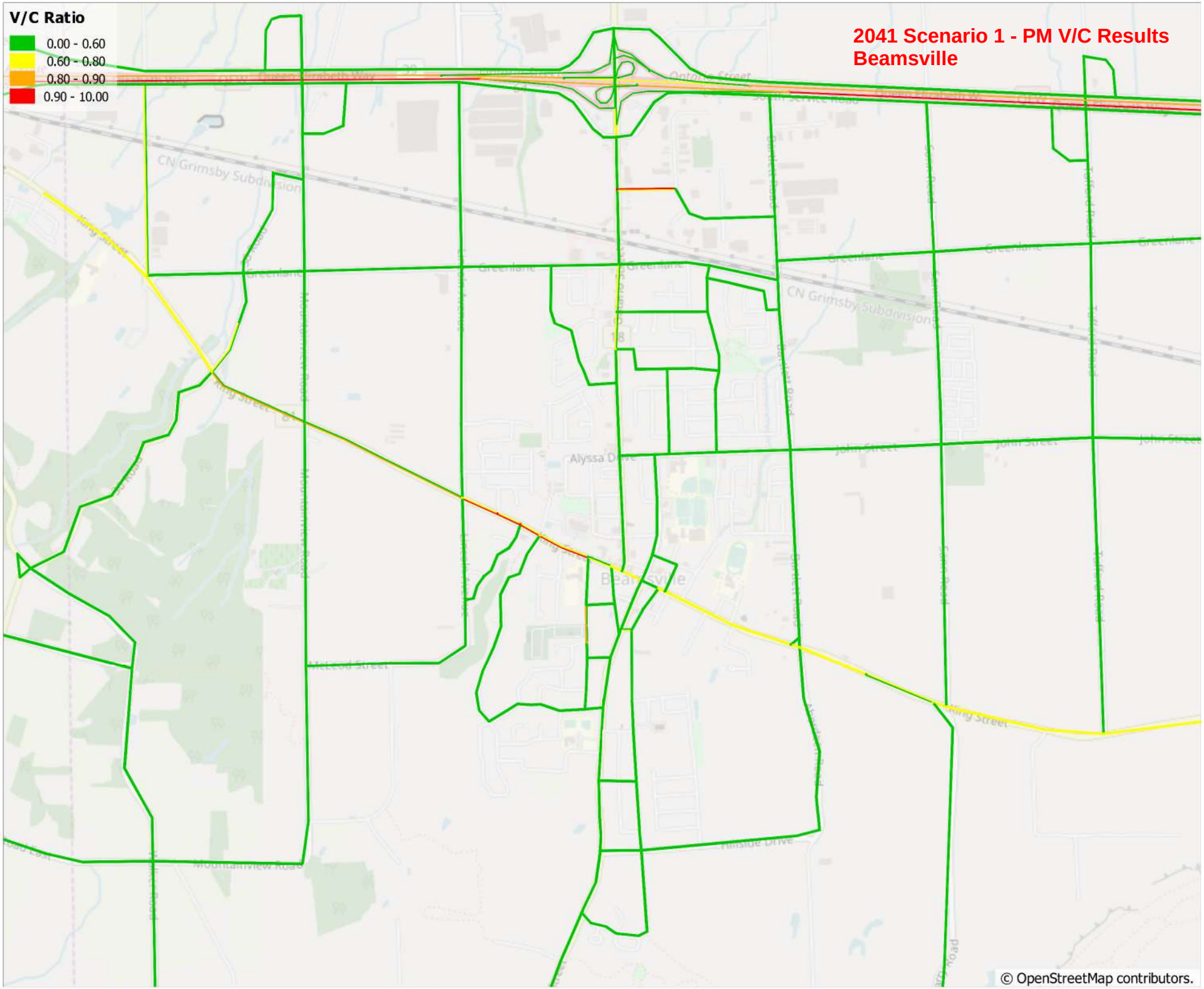

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 5 - AM V/C Results
© OpenStreetMap contributors.

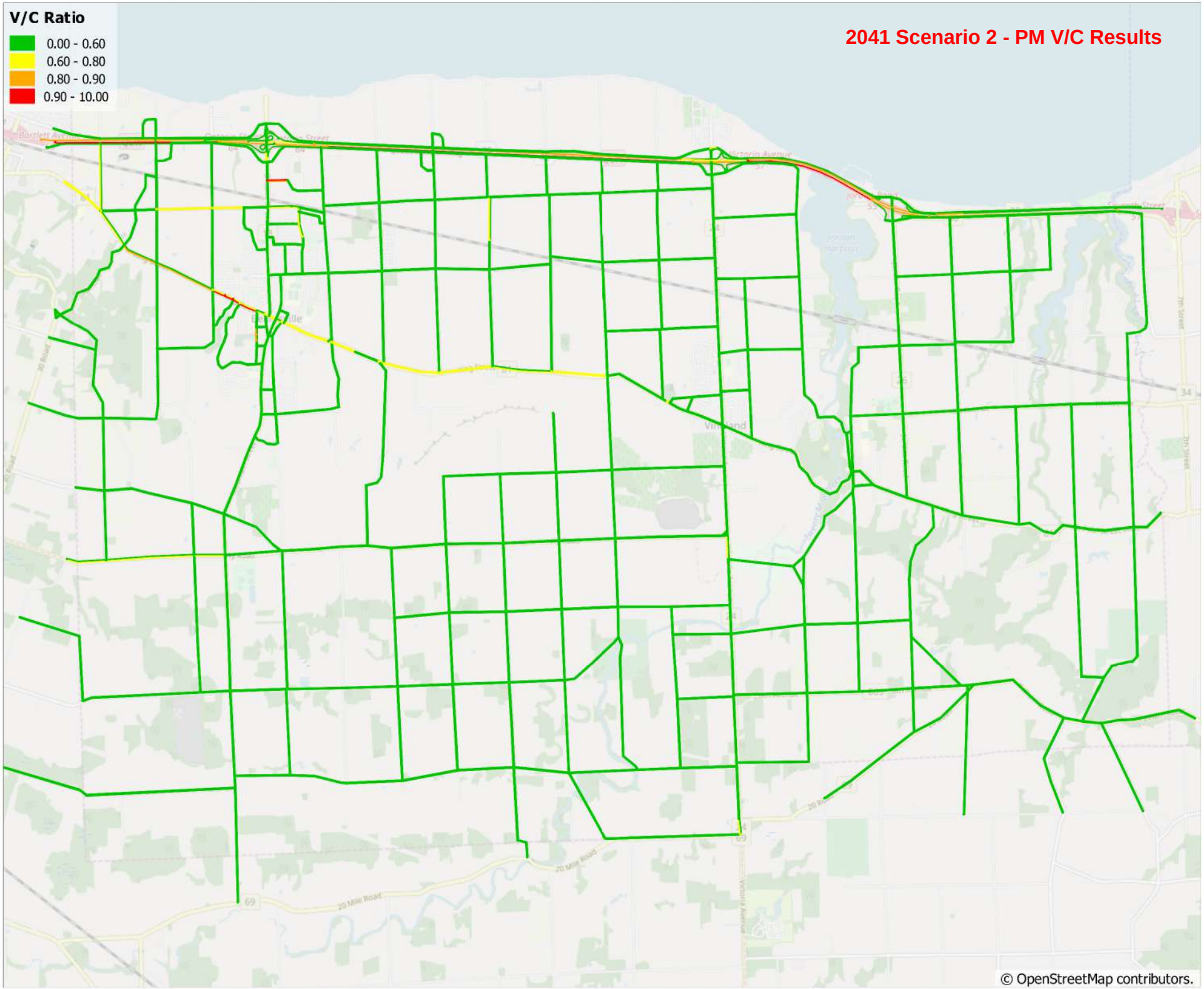

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 5 - AM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Hillside Drive
© OpenStreetMap contributors.

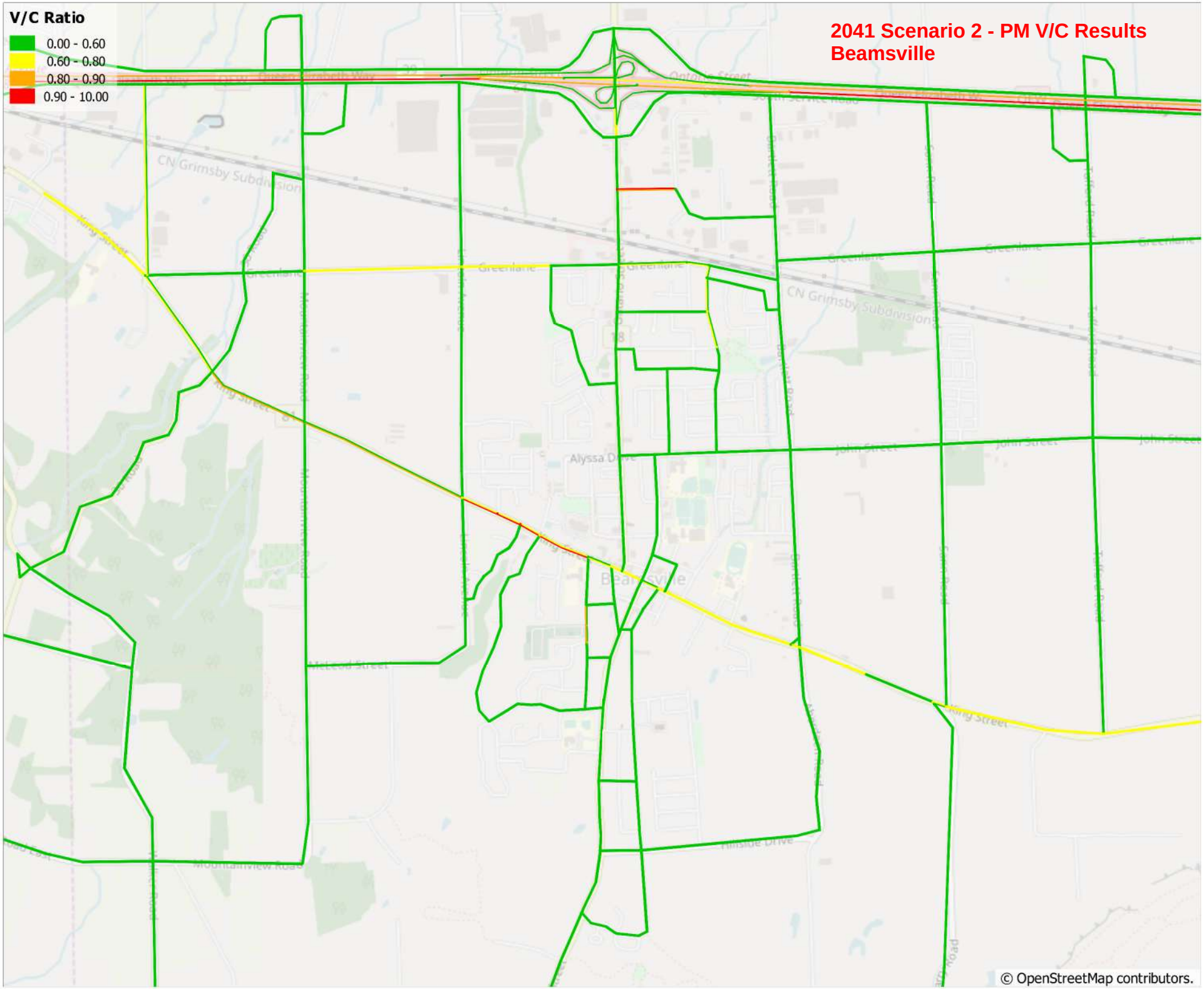

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Base Case - PM V/C Results
© OpenStreetMap contributors.

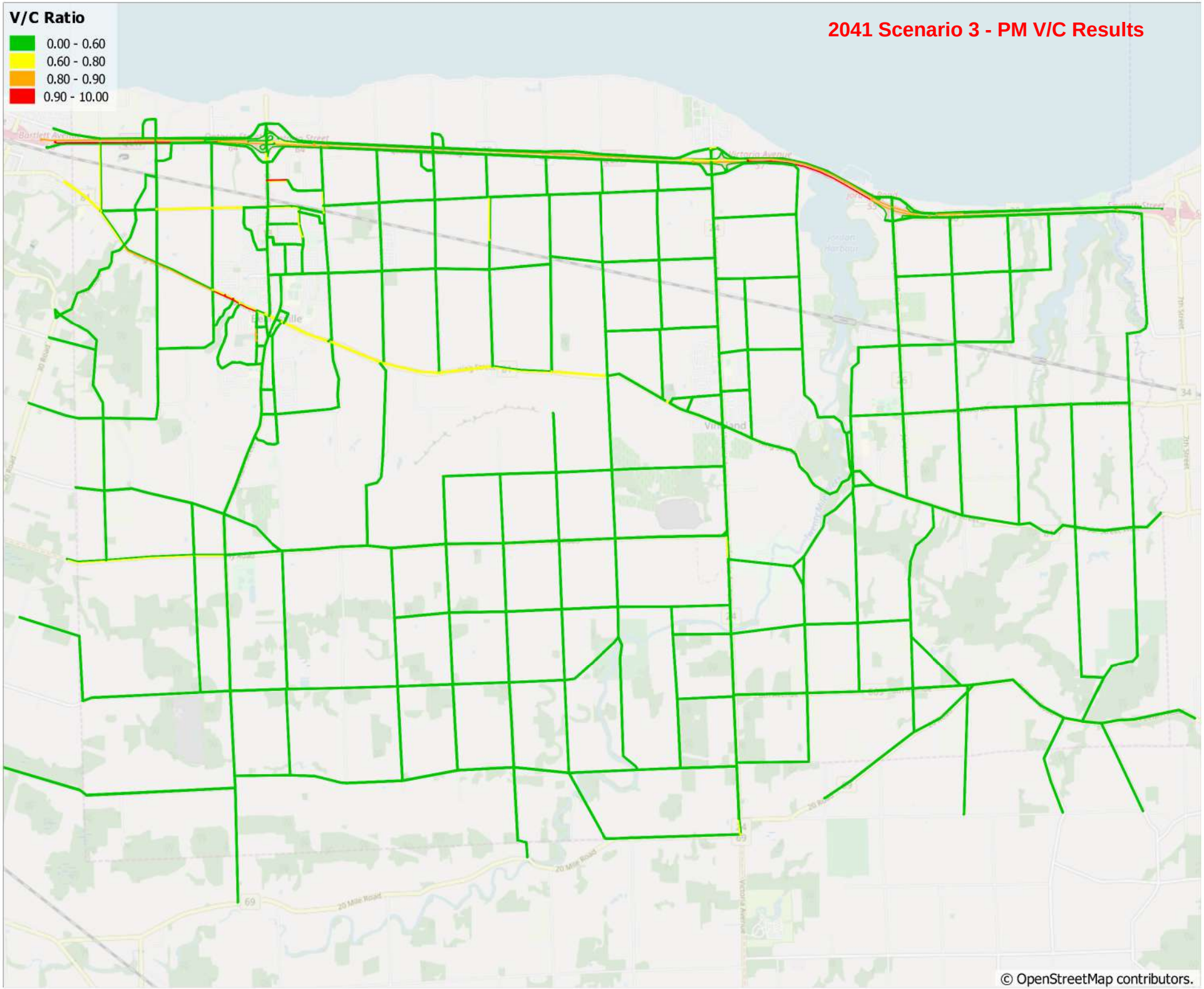

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Base Case - PM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

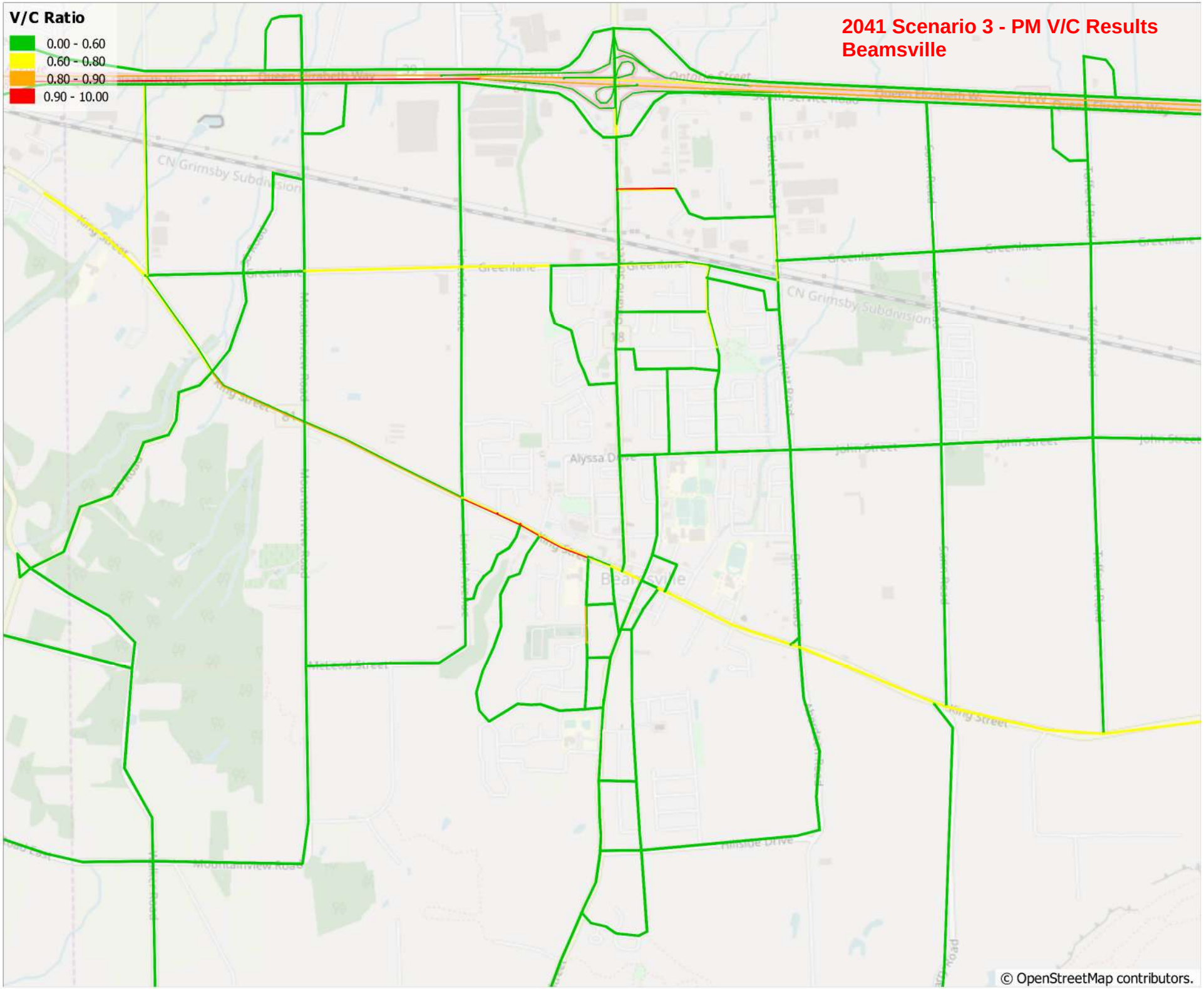

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 1 - PM V/C Results
© OpenStreetMap contributors.

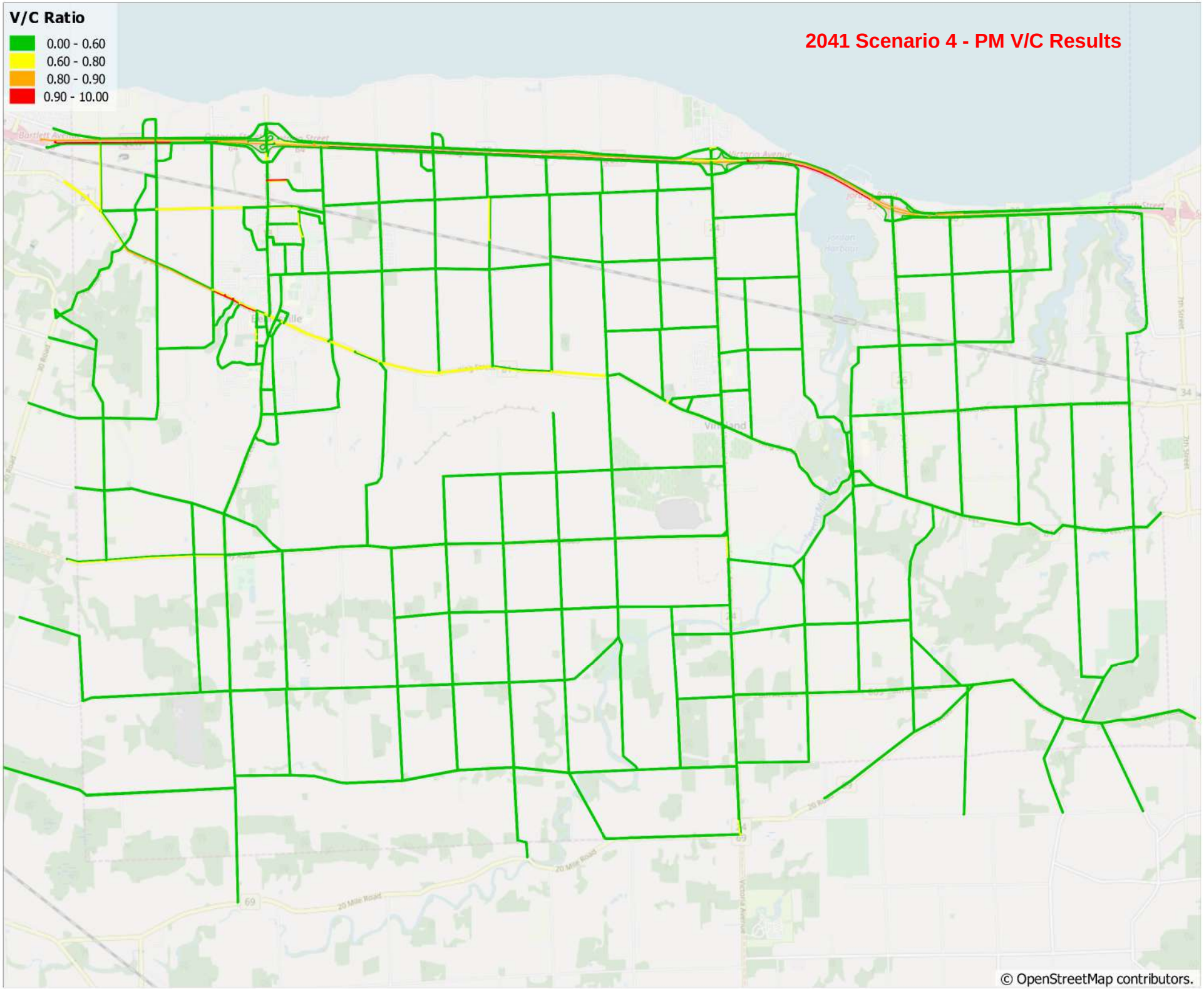

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 1 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

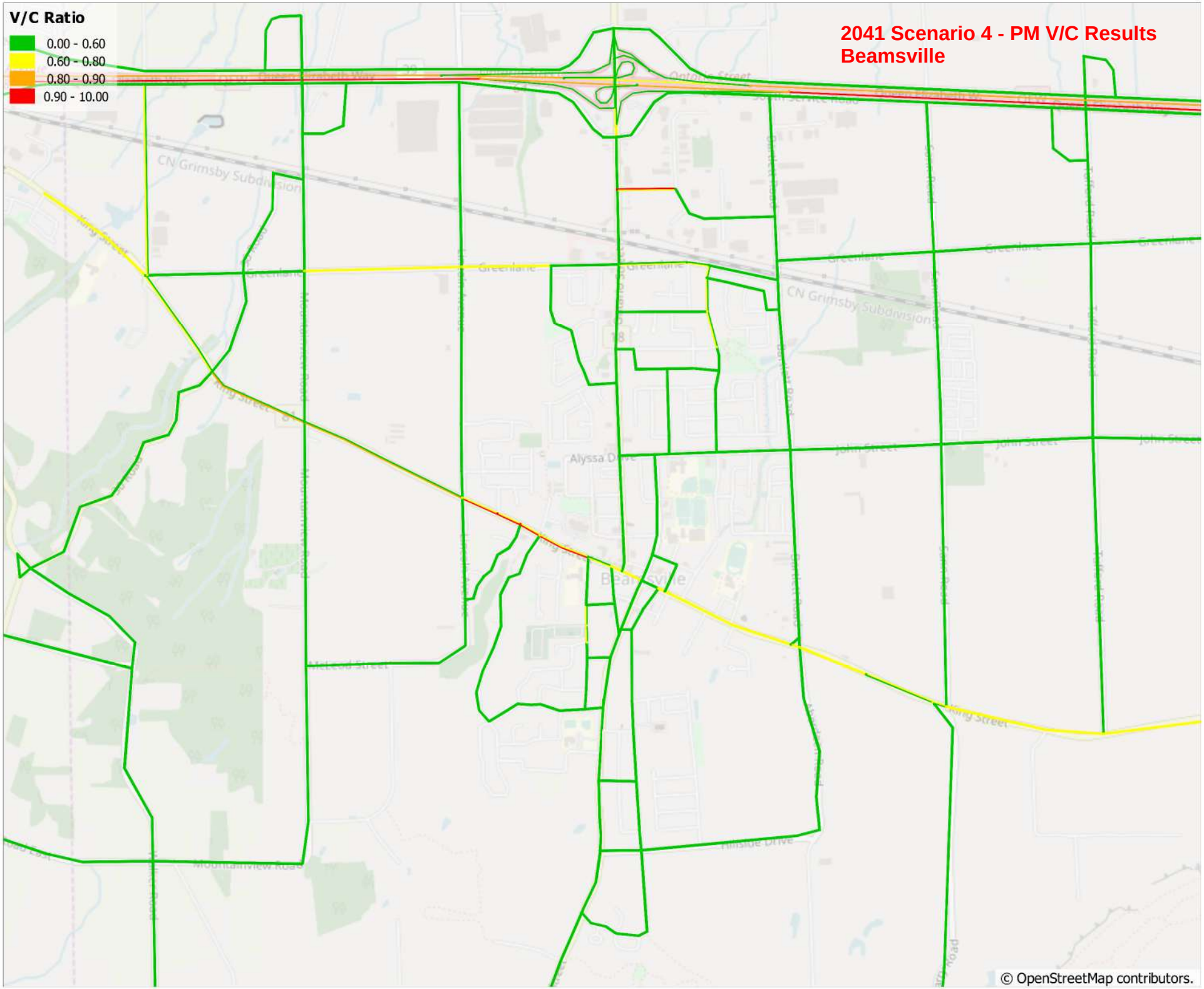

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 2 - PM V/C Results
© OpenStreetMap contributors.

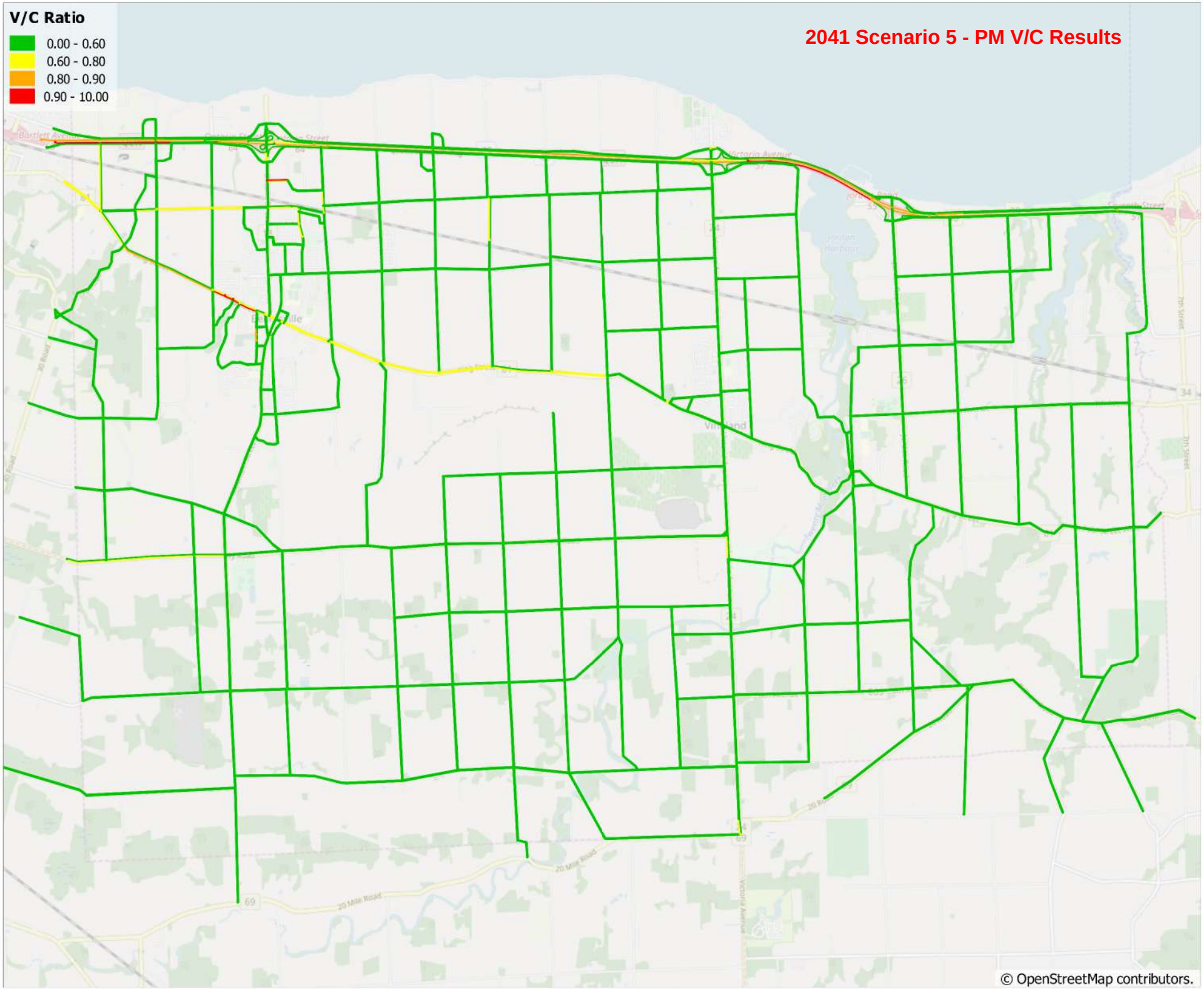

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 2 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

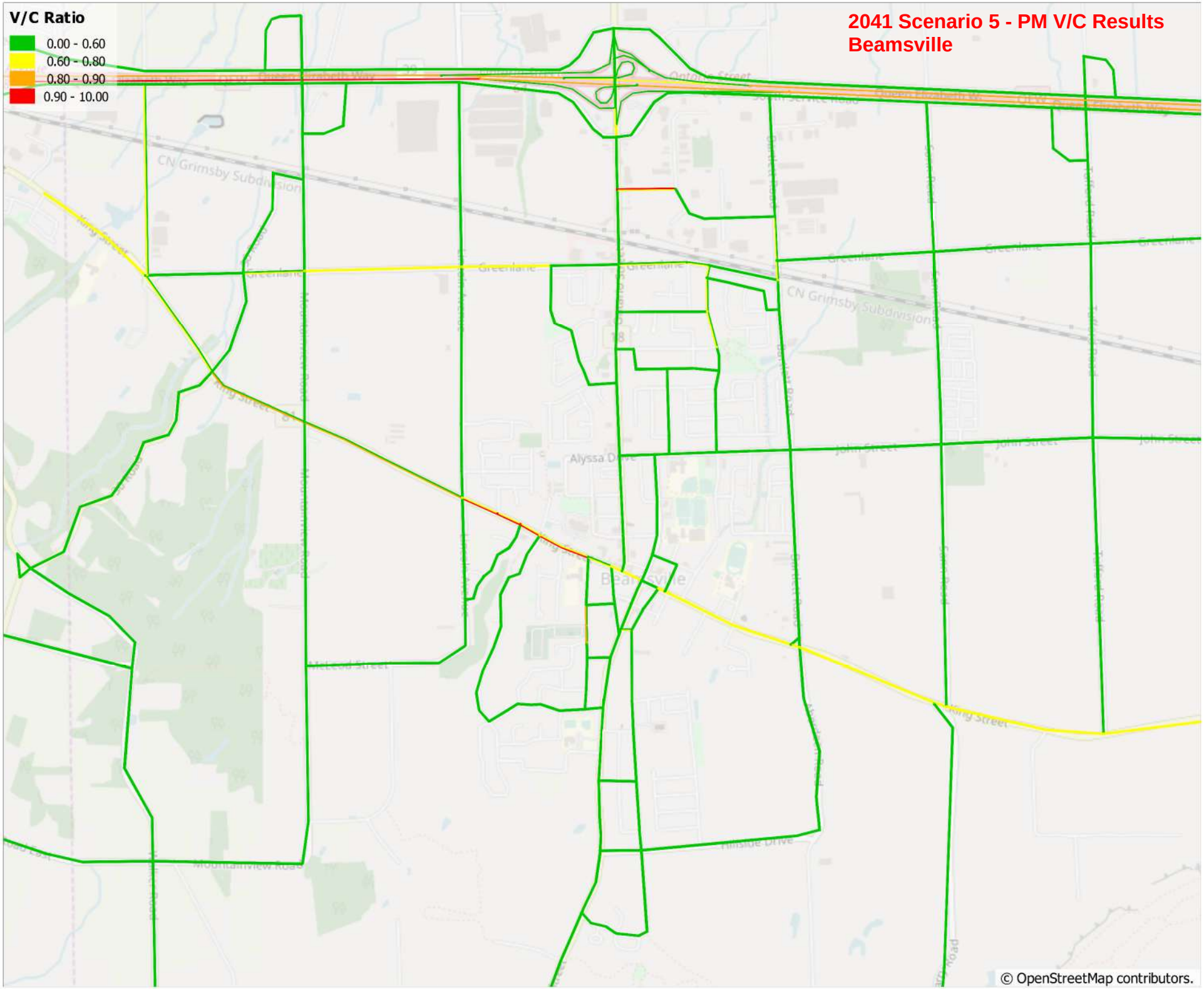

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 3 - PM V/C Results
© OpenStreetMap contributors.


V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 3 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Beamsville
Mountainview Road
Hillside Drive
© OpenStreetMap contributors.


V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 4 - PM V/C Results
© OpenStreetMap contributors.

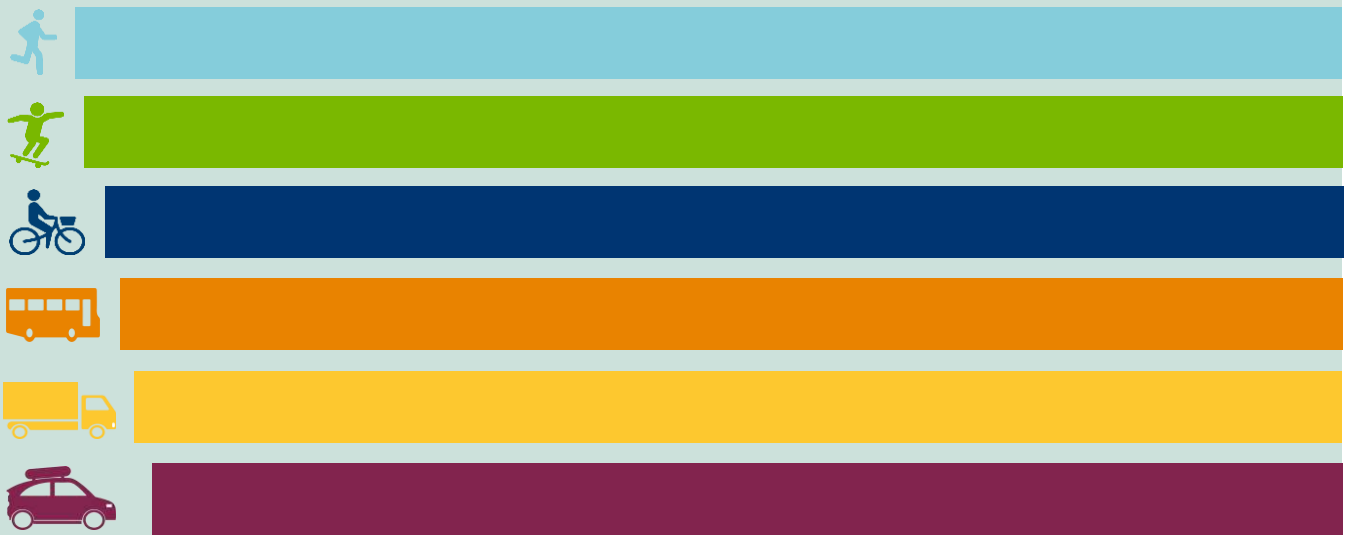

V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 4 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.


V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 5 - PM V/C Results
© OpenStreetMap contributors.


V/C Ratio
0.00 - 0.60
0.60 - 0.80
0.80 - 0.90
0.90 - 10.00
2041 Scenario 5 - PM V/C Results
Beamsville
CN Grimsby Subdivision
Greenlane
Alyssa Drive
Beamsville
Hillside Drive
© OpenStreetMap contributors.

APPENDIX

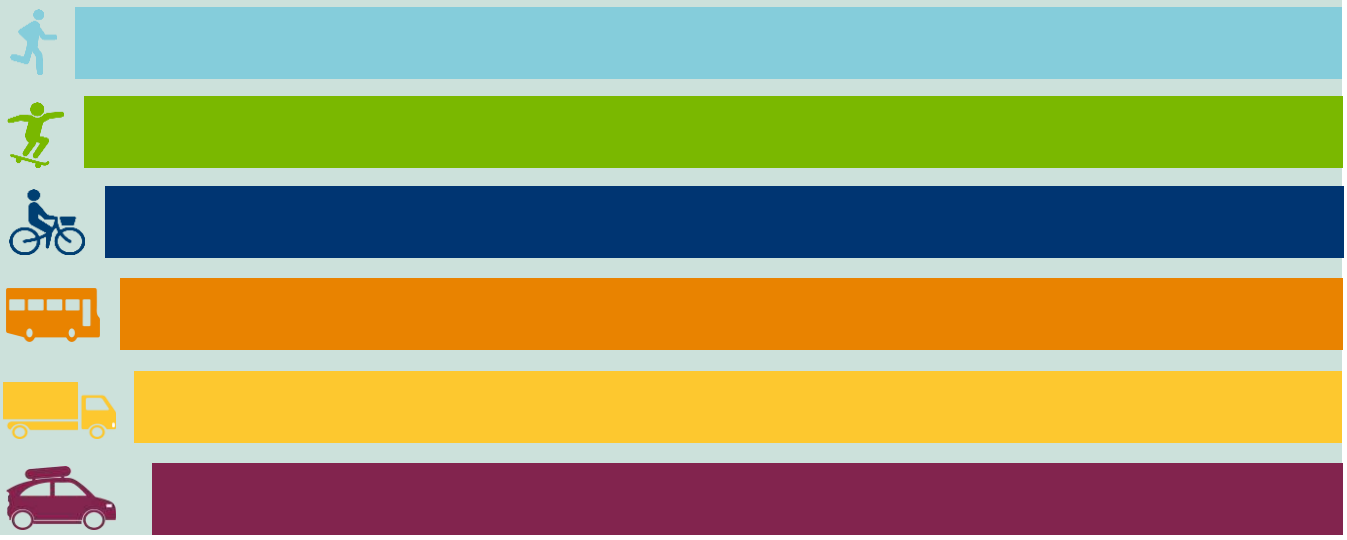
B Intersection Capacity Analyses



Make moving make sense as we grow!

APPENDIX

B-1 Existing Turning Movement Counts

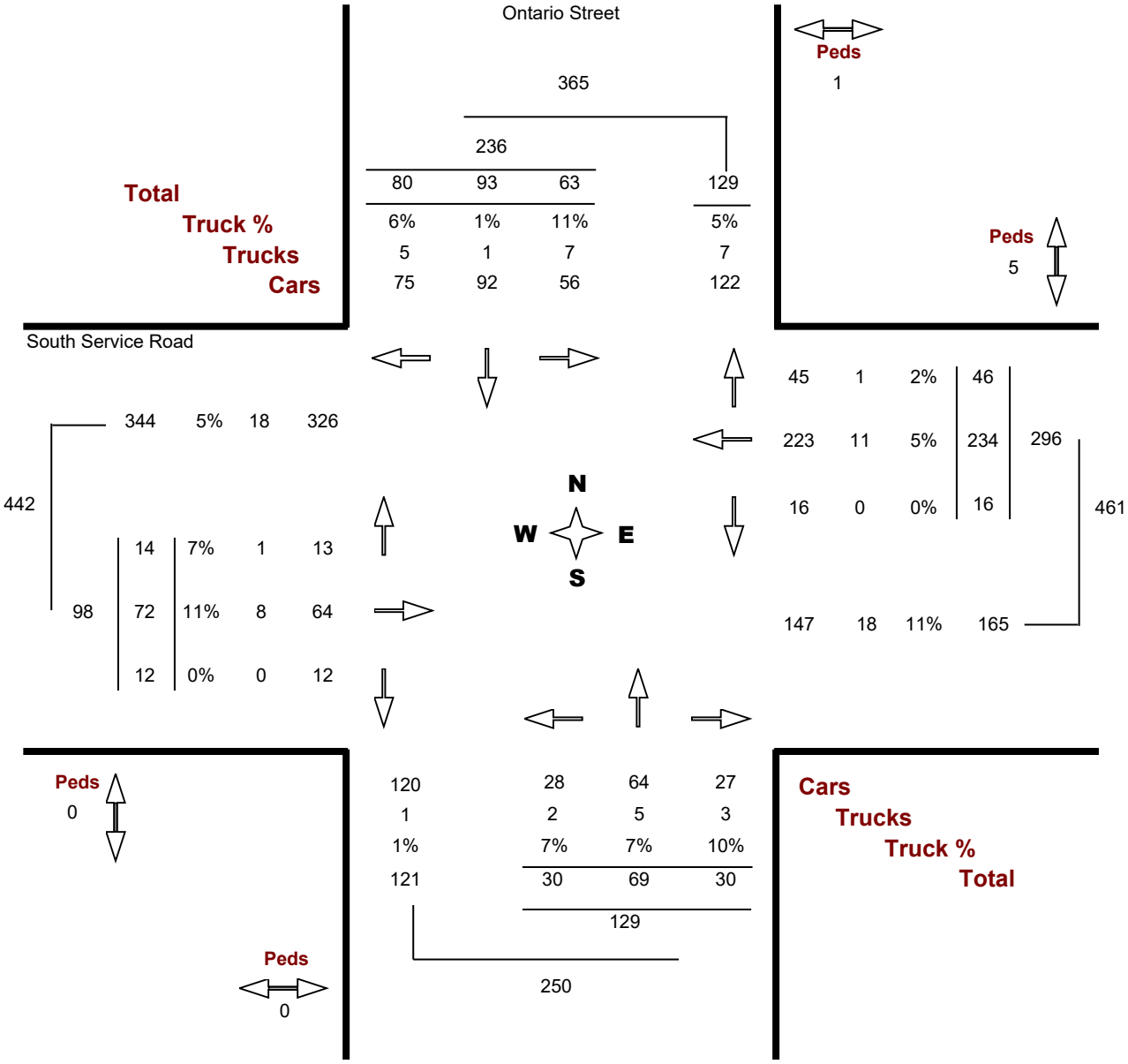


Make moving make sense as we grow!

Turning Movements Report - AM Period

Location..... Ontario Street @ South Service Road
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

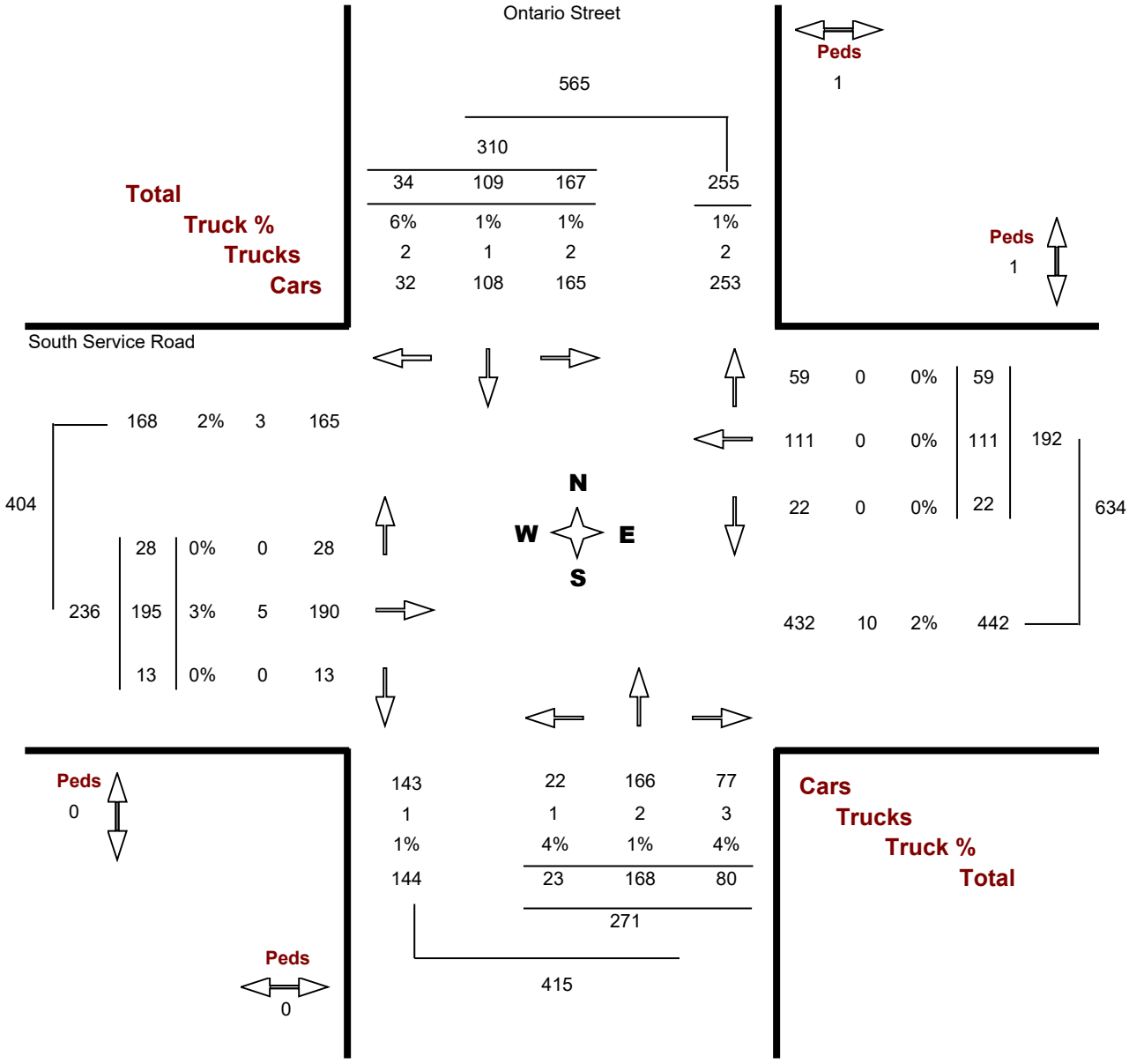
GeoID..... 01317
Count Date. Thursday, 10 December, 2015
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... Ontario Street @ South Service Road
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

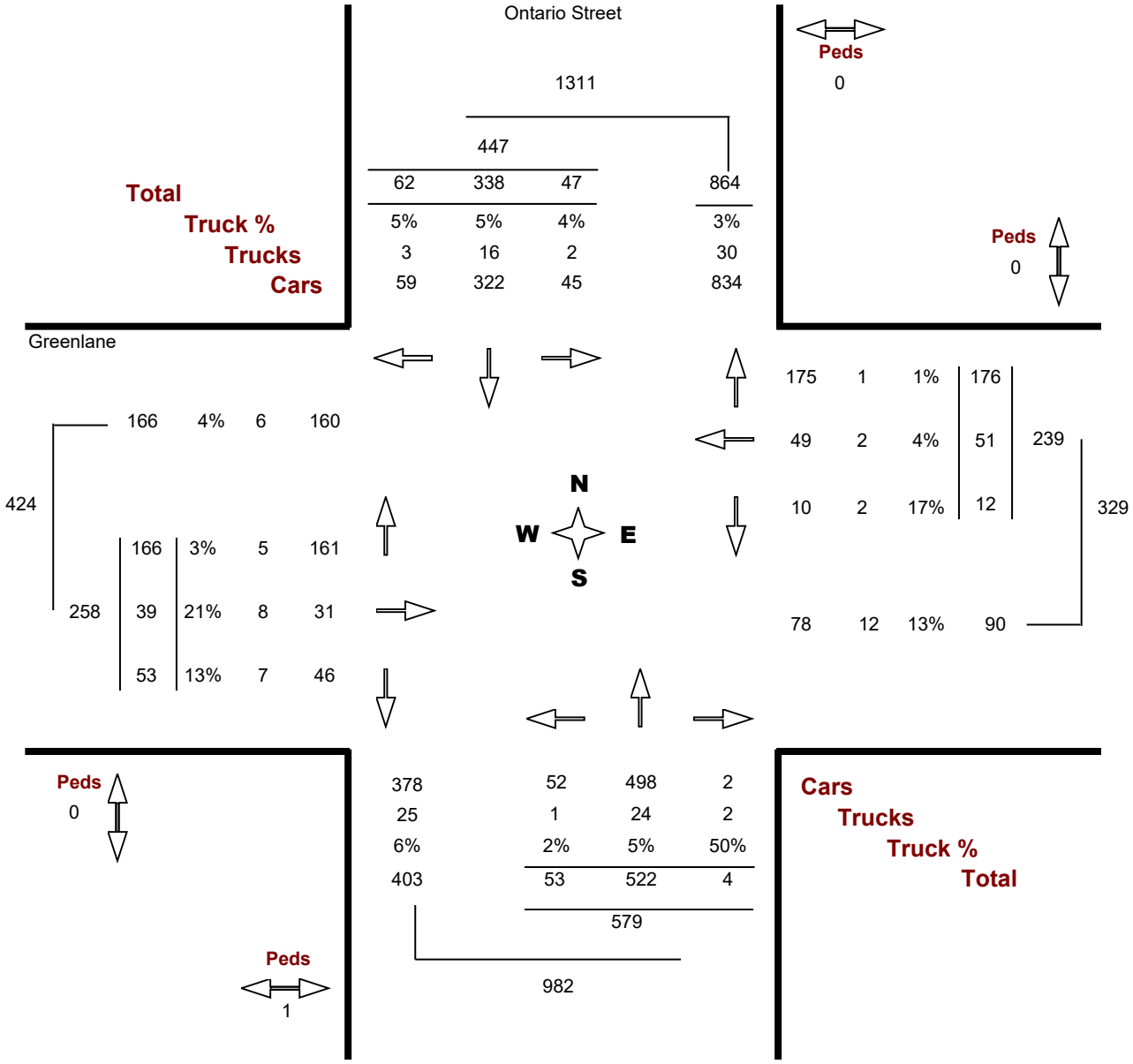
GeoID..... 01317
Count Date. Thursday, 10 December, 2015
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:15 PM — 05:15 PM



Turning Movements Report - AM Period

Location..... Greenlane @ Ontario Street
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

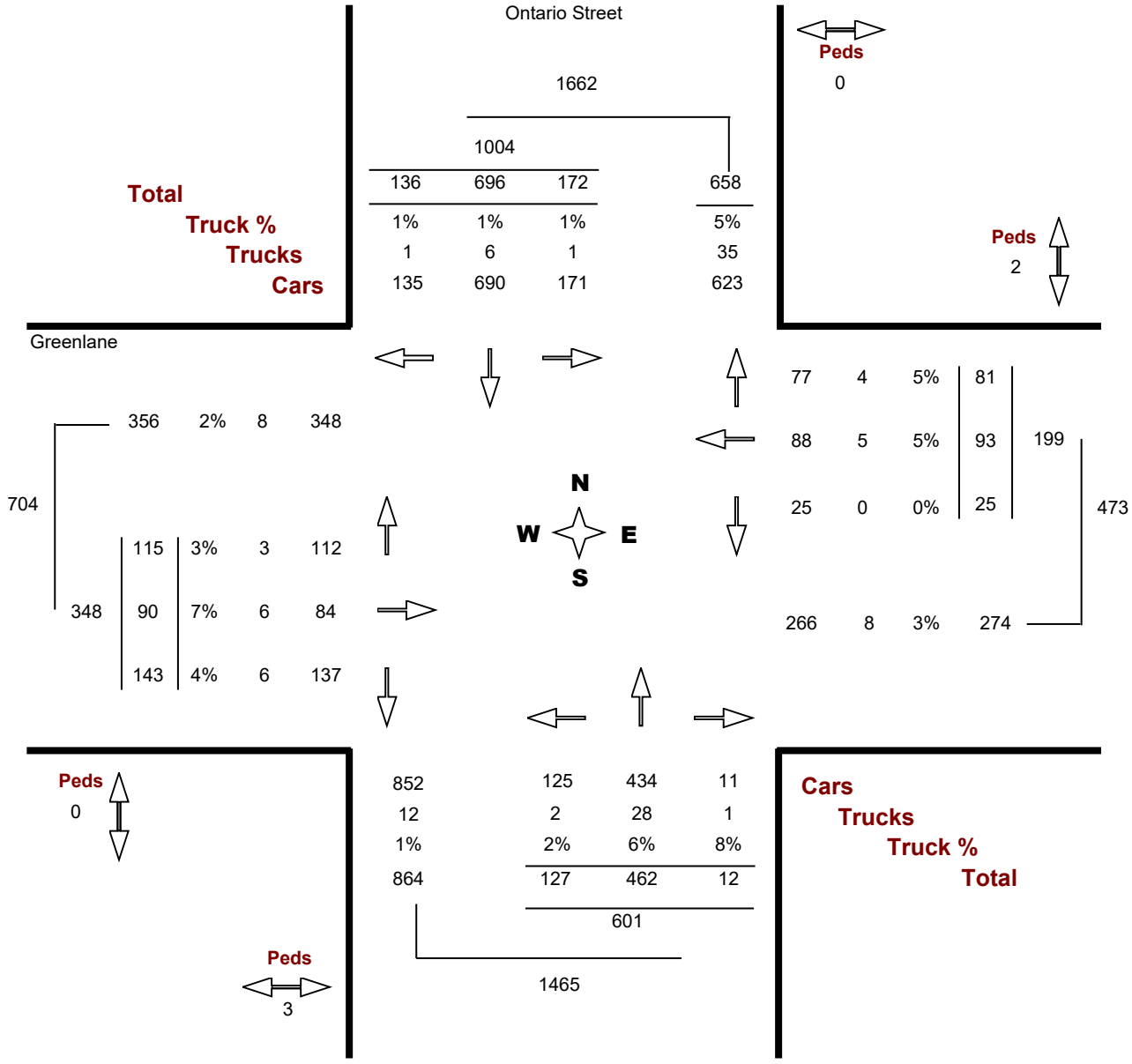
GeoID..... 01200
Count Date. Wednesday, 07 June, 2017
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... Greenlane @ Ontario Street
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 01200
Count Date. Wednesday, 07 June, 2017
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:30 PM — 05:30 PM



Ontario St @ Friesen Blvd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

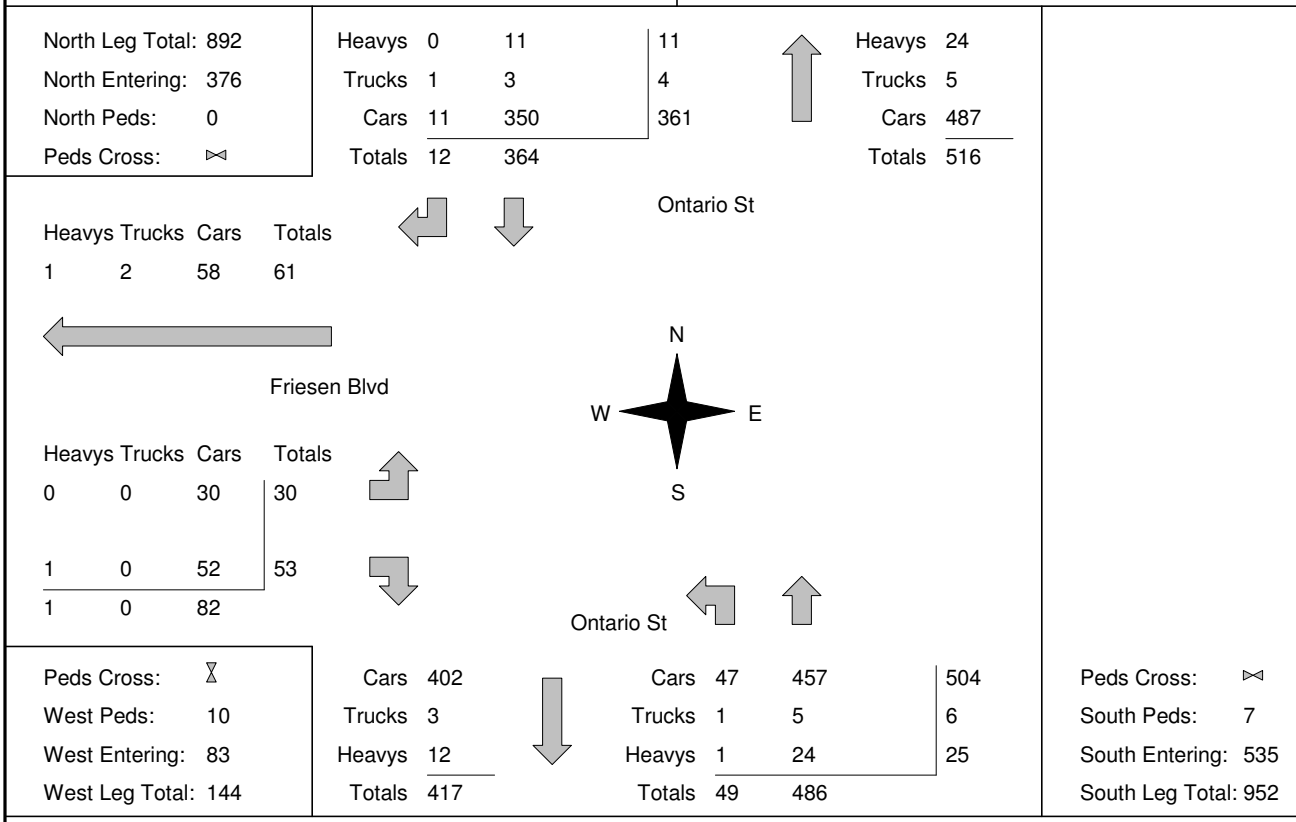
Municipality: Lincoln
Site #: 0000000002
Intersection: Ontario St & Friesen Blvd
TFR File #: 2
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ontario St runs N/S



Comments

Ontario St @ Friesen Blvd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

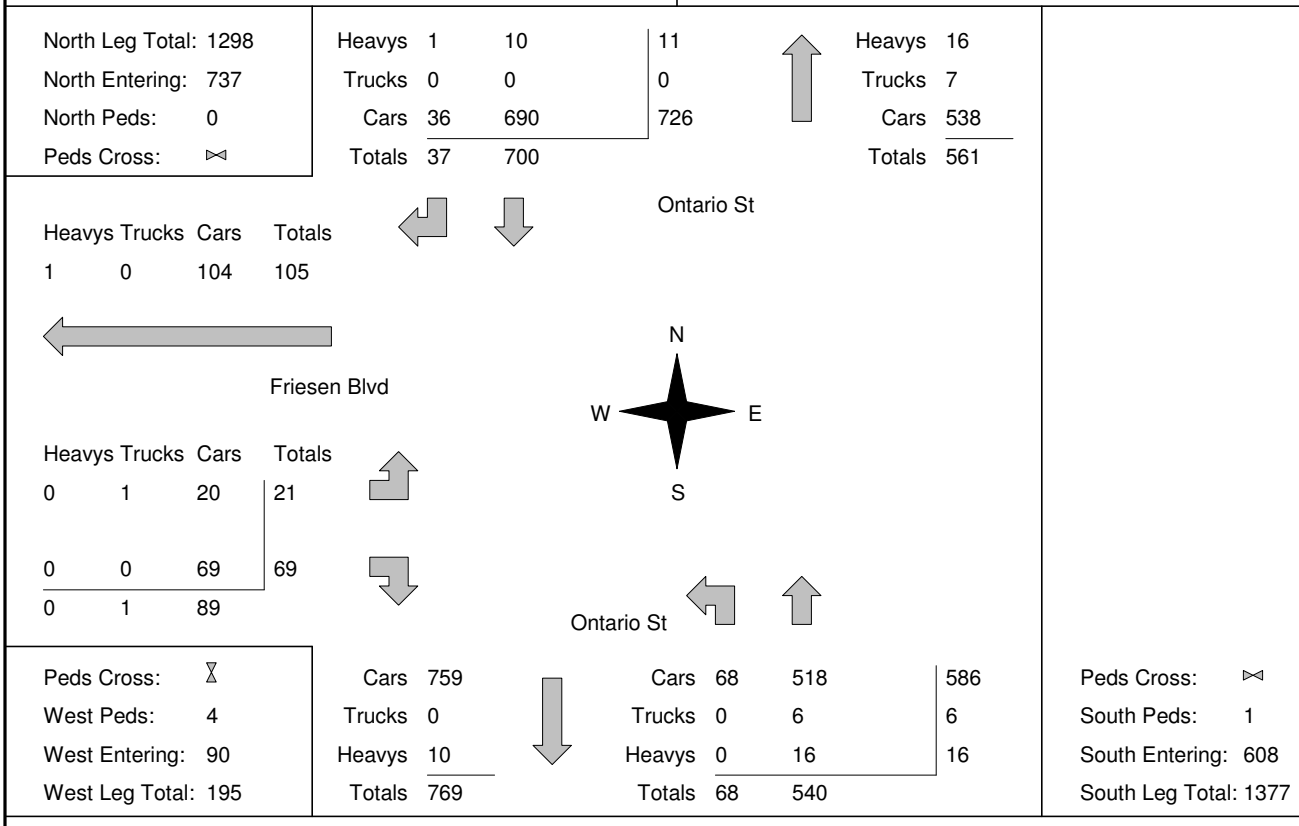
Municipality: Lincoln
Site #: 0000000002
Intersection: Ontario St & Friesen Blvd
TFR File #: 2
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ontario St runs N/S

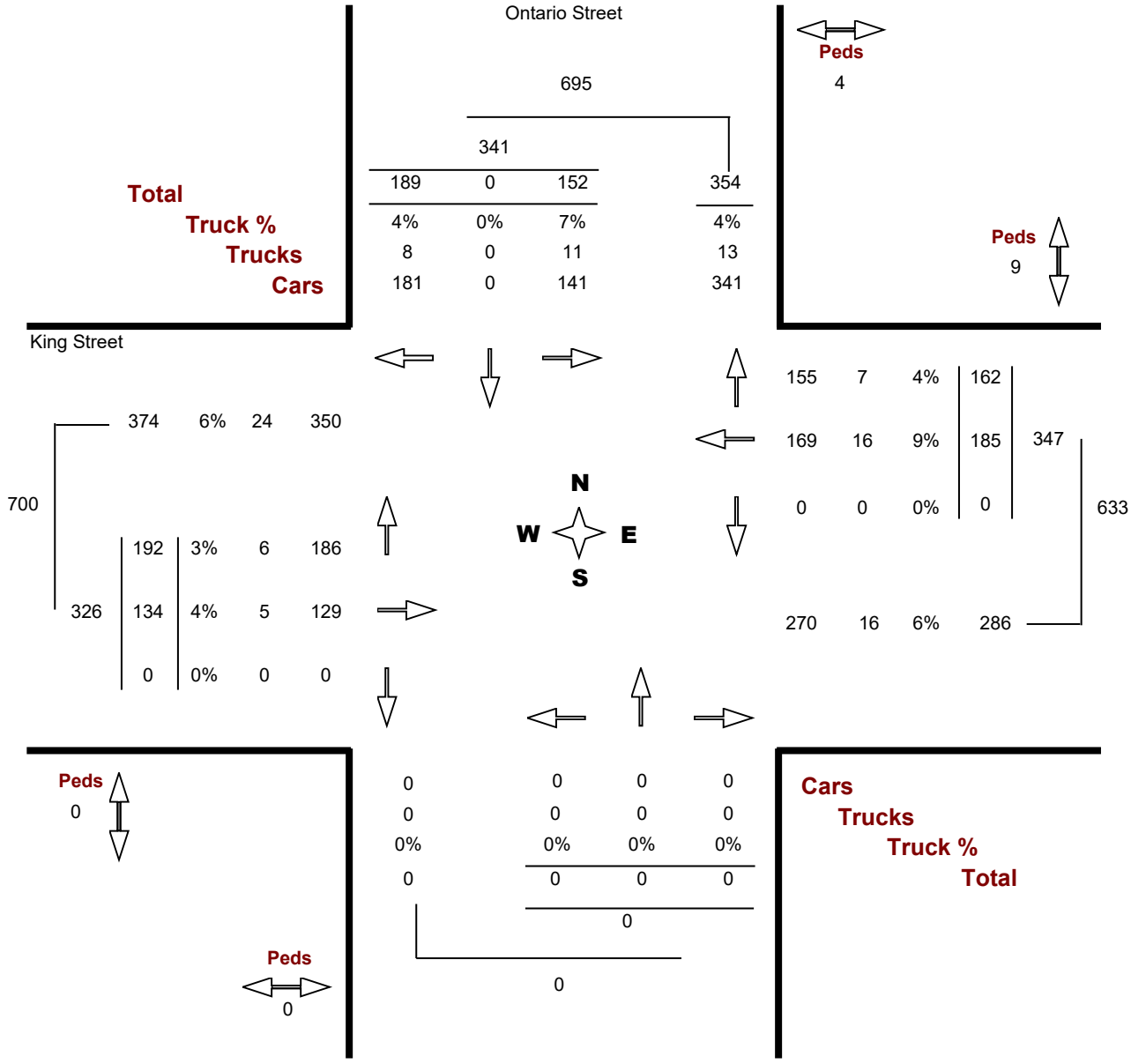


Comments

Turning Movements Report - AM Period

Location..... King Street @ Ontario Street
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

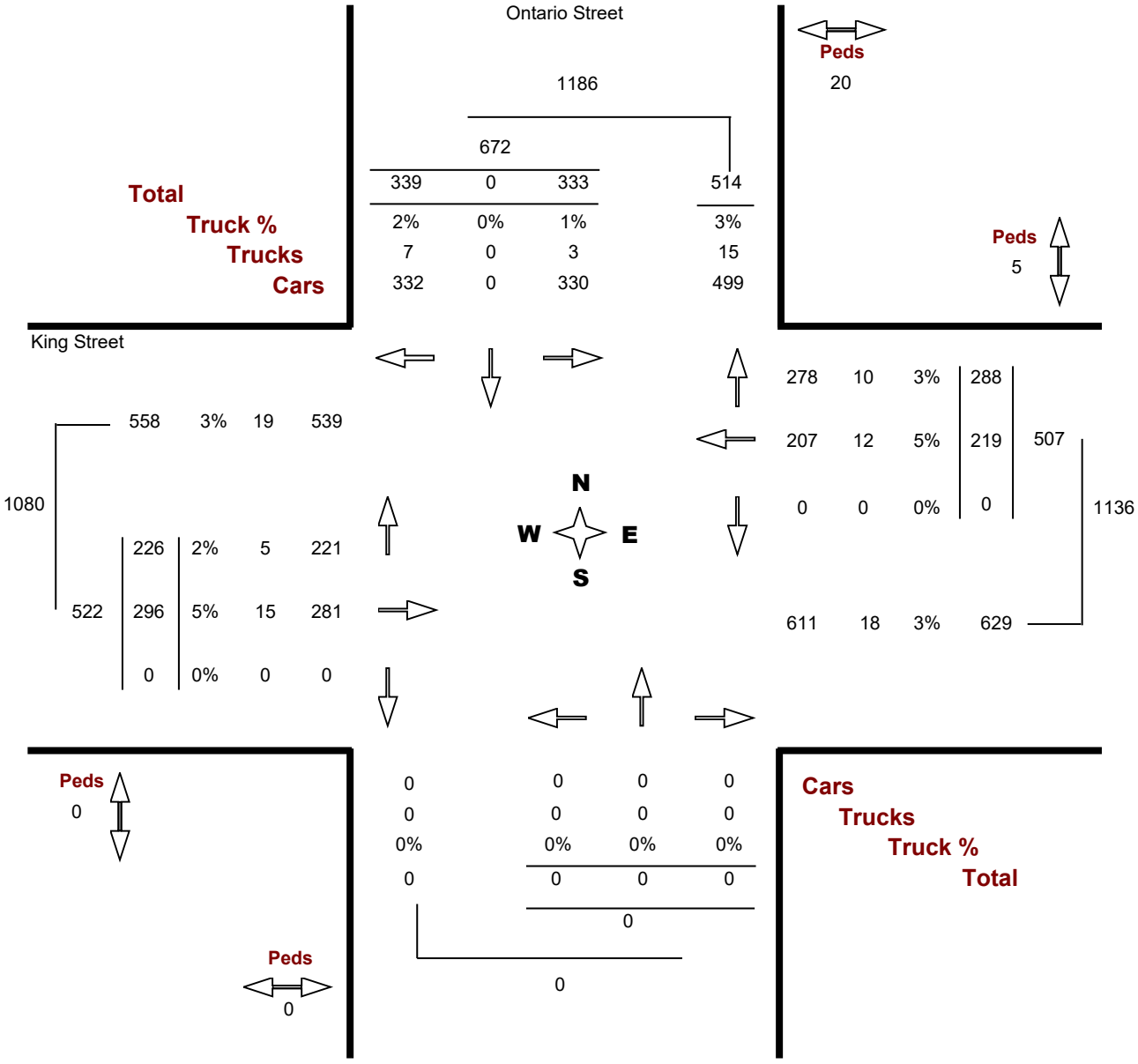
GeoID..... 00009
Count Date. Thursday, 13 October, 2016
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... King Street @ Ontario Street
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 00009
Count Date. Thursday, 13 October, 2016
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:30 PM — 05:30 PM



King St @ Lincoln Ave

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

Municipality: Lincoln
Site #: 0000000004
Intersection: King St & Lincoln Ave
TFR File #: 4
Count date: 26-Sep-2016

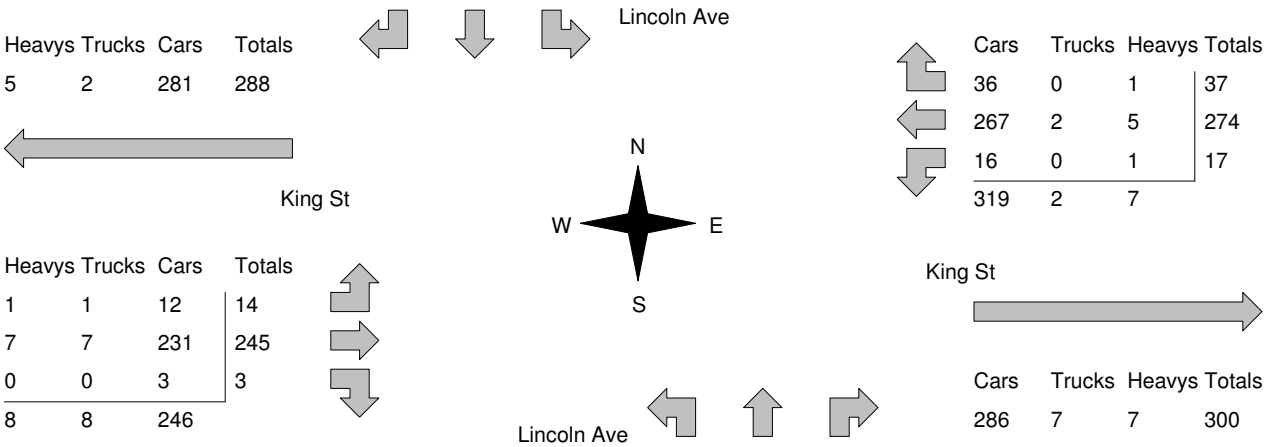
Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E

North Leg Total:	119			
North Entering:	60			
North Peds:	2			
Peds Cross:	⋈			
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	12	14	34	60
Totals	12	14	34	
Heavys	3			
Trucks	1			
Cars	55			
Totals	59			
East Leg Total:	628			
East Entering:	328			
East Peds:	0			
Peds Cross:	⧖			



Peds Cross:	⧖			
West Peds:	0			
West Entering:	262			
West Leg Total:	550			
Cars	33			
Trucks	0			
Heavys	1			
Totals	34			
Cars	2	7	21	30
Trucks	0	0	0	0
Heavys	0	1	0	1
Totals	2	8	21	
Peds Cross:	⋈			
South Peds:	1			
South Entering:	31			
South Leg Total:	65			

Comments

King St @ Lincoln Ave

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

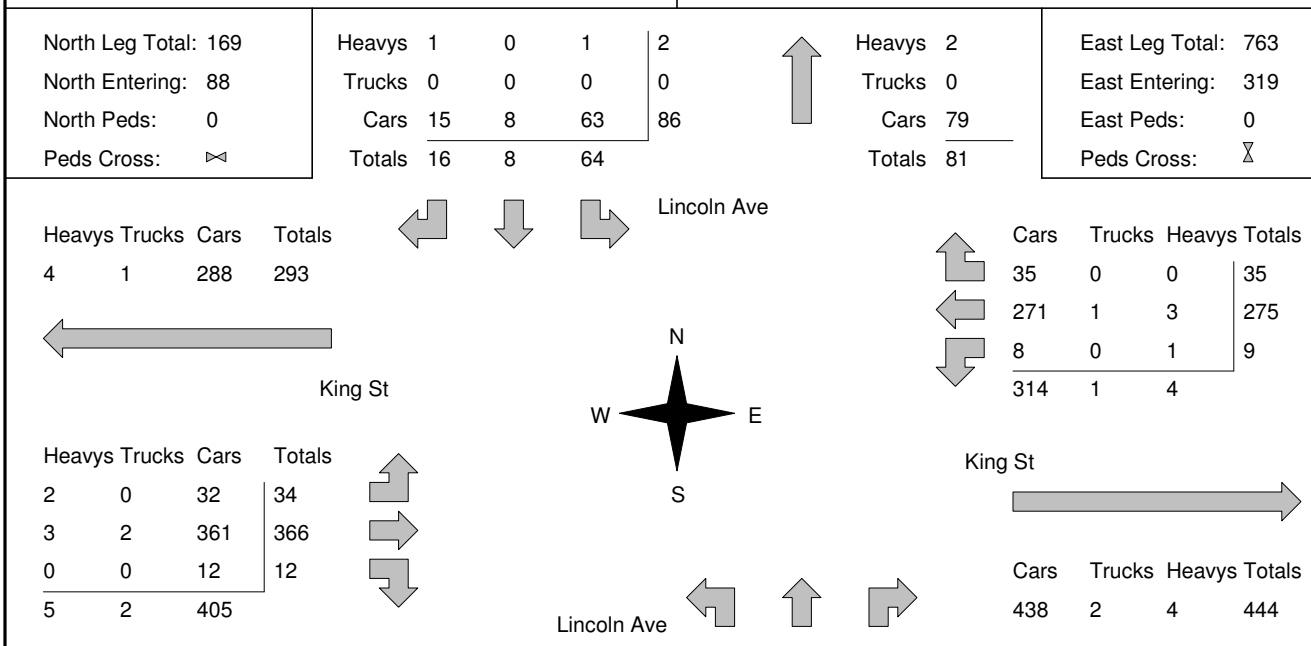
Municipality: Lincoln
Site #: 0000000004
Intersection: King St & Lincoln Ave
TFR File #: 4
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E



Comments

King St @ Stadelbauer Dr

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

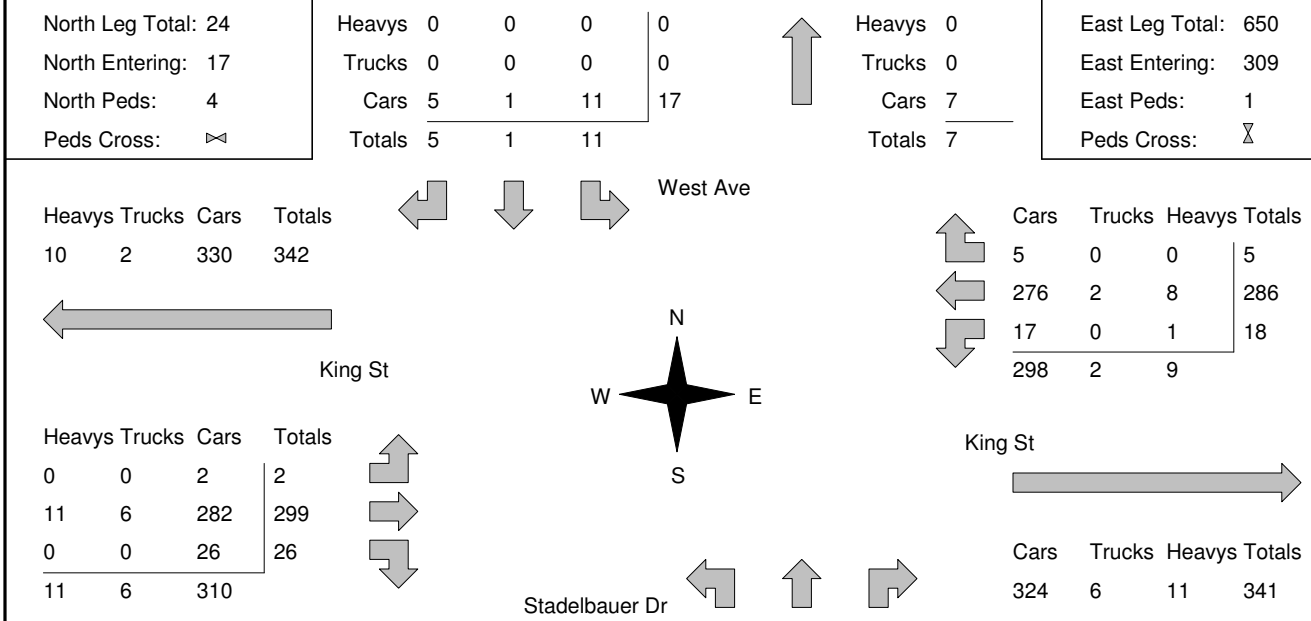
Municipality: Lincoln
Site #: 0000000003
Intersection: King St & Stadelbauer Dr
TFR File #: 3
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E



Comments

King St @ Stadelbauer Dr

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Lincoln
Site #: 0000000003
Intersection: King St & Stadelbauer Dr
TFR File #: 3
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E

North Leg Total:	18			
North Entering:	5			
North Peds:	3			
Peds Cross:	⋈			

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	1	0	4	5
Totals	1	0	4	

Heavys	0
Trucks	0
Cars	13
Totals	13

East Leg Total:	895
East Entering:	374
East Peds:	1
Peds Cross:	⧖

West Ave

Heavys	Trucks	Cars	Totals
4	0	353	357

Cars	Trucks	Heavys	Totals
6	0	0	6
326	0	4	330
38	0	0	38
370	0	4	

King St

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	7	7
3	1	483	487
0	0	63	63
3	1	553	

King St

Cars	Trucks	Heavys	Totals
517	1	3	521

Stadelbauer Dr

Peds Cross:	⧖			
West Peds:	0			
West Entering:	557			
West Leg Total:	914			

Cars	101			
Trucks	0			
Heavys	0			
Totals	101			

Cars	26	0	30	56
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	26	0	30	

Peds Cross:	⋈
South Peds:	4
South Entering:	56
South Leg Total:	157

Comments

King St @ Bartlett Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

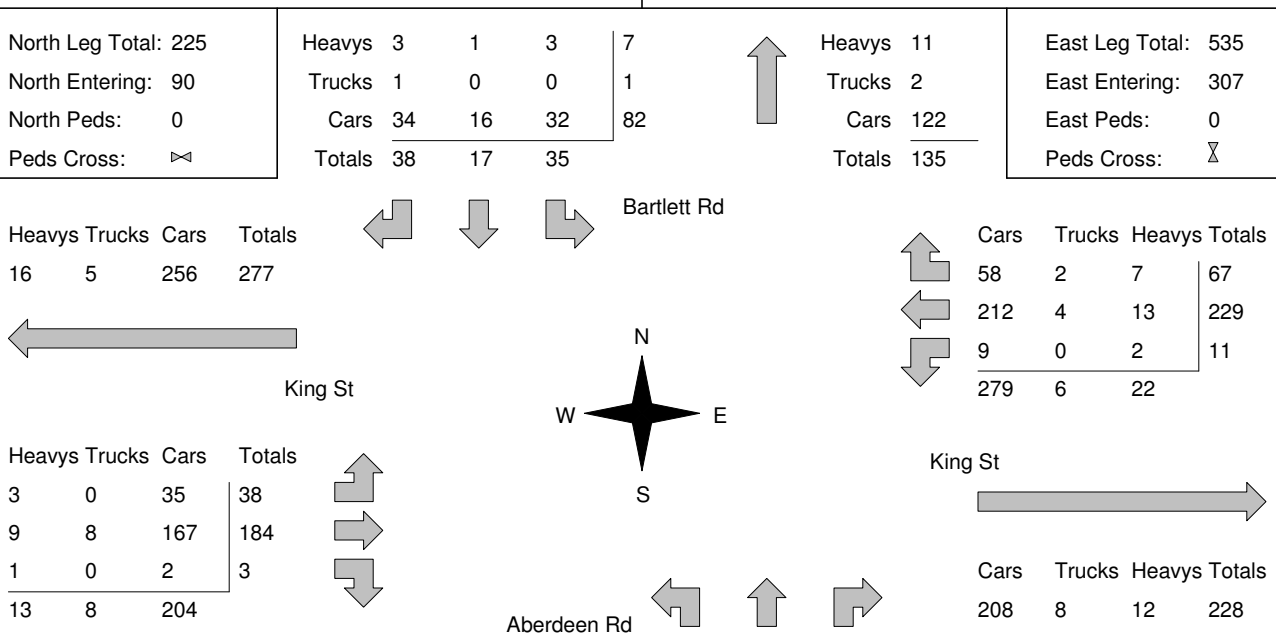
Municipality: Lincoln
Site #: 0000000008
Intersection: King St & Bartlett Rd
TFR File #: 8
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E



Comments

King St @ Bartlett Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

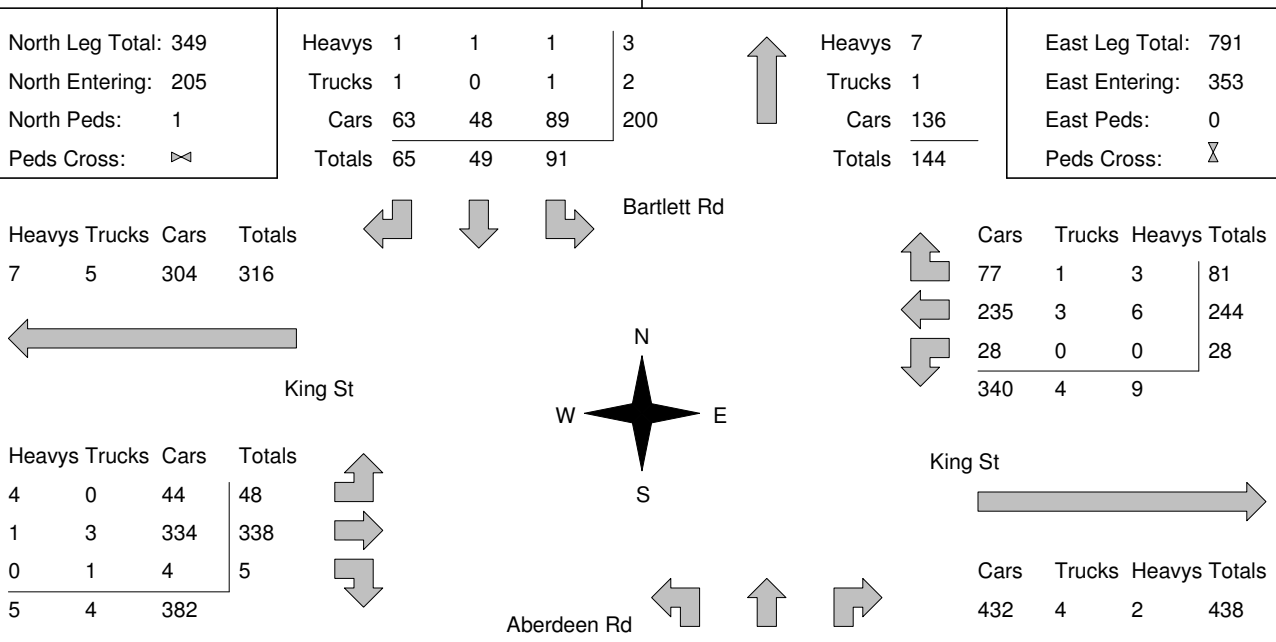
Municipality: Lincoln
Site #: 0000000008
Intersection: King St & Bartlett Rd
TFR File #: 8
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E



Comments

King St @ Quarry Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: Lincoln
Site #: 0000000007
Intersection: King St & Quarry Rd
TFR File #: 7
Count date: 26-Sep-2016

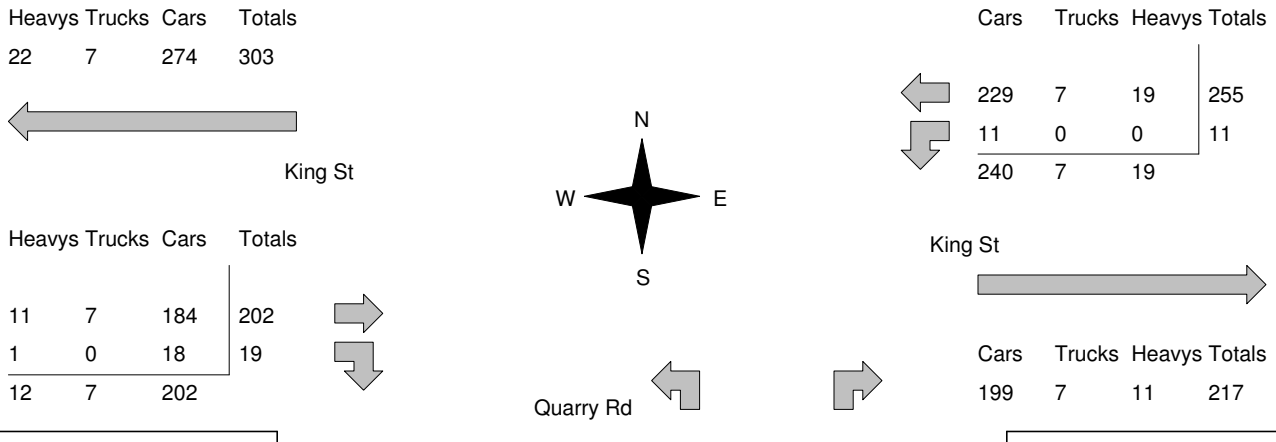
Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E

East Leg Total: 483
East Entering: 266
East Peds: 0
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 221
West Leg Total: 524

Cars 29
Trucks 0
Heavys 1
Totals 30

Cars 45 15 60
Trucks 0 0 0
Heavys 3 0 3
Totals 48 15

Peds Cross:
South Peds: 0
South Entering: 63
South Leg Total: 93

Comments

King St @ Quarry Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Lincoln
Site #: 0000000007
Intersection: King St & Quarry Rd
TFR File #: 7
Count date: 26-Sep-2016

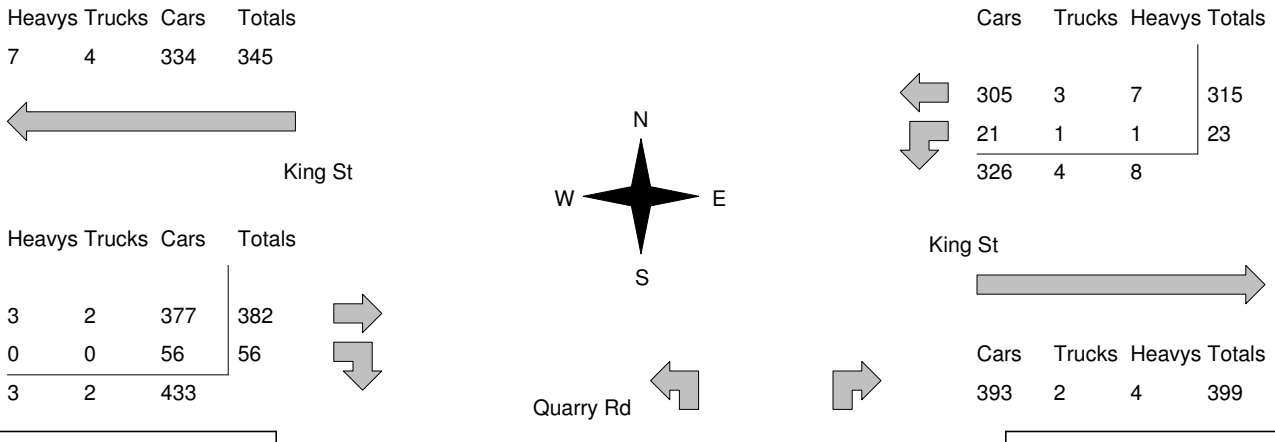
Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E

East Leg Total: 737
East Entering: 338
East Peds: 0
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 438
West Leg Total: 783

Cars 77
Trucks 1
Heavys 1
Totals 79

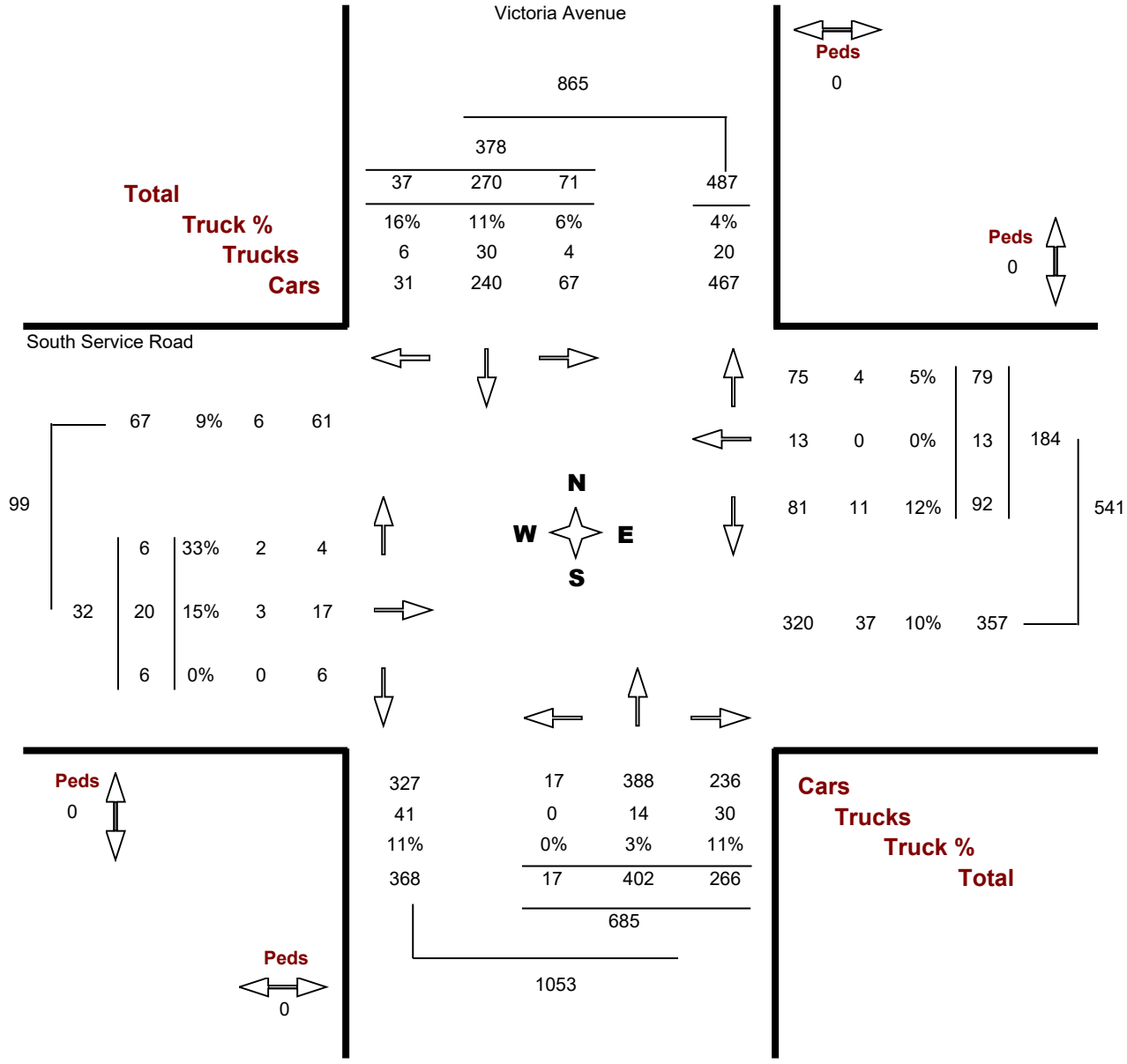
Cars 29 16 45
Trucks 1 0 1
Heavys 0 1 1
Totals 30 17

Peds Cross:
South Peds: 0
South Entering: 47
South Leg Total: 126

Comments

Turning Movements Report - AM Period

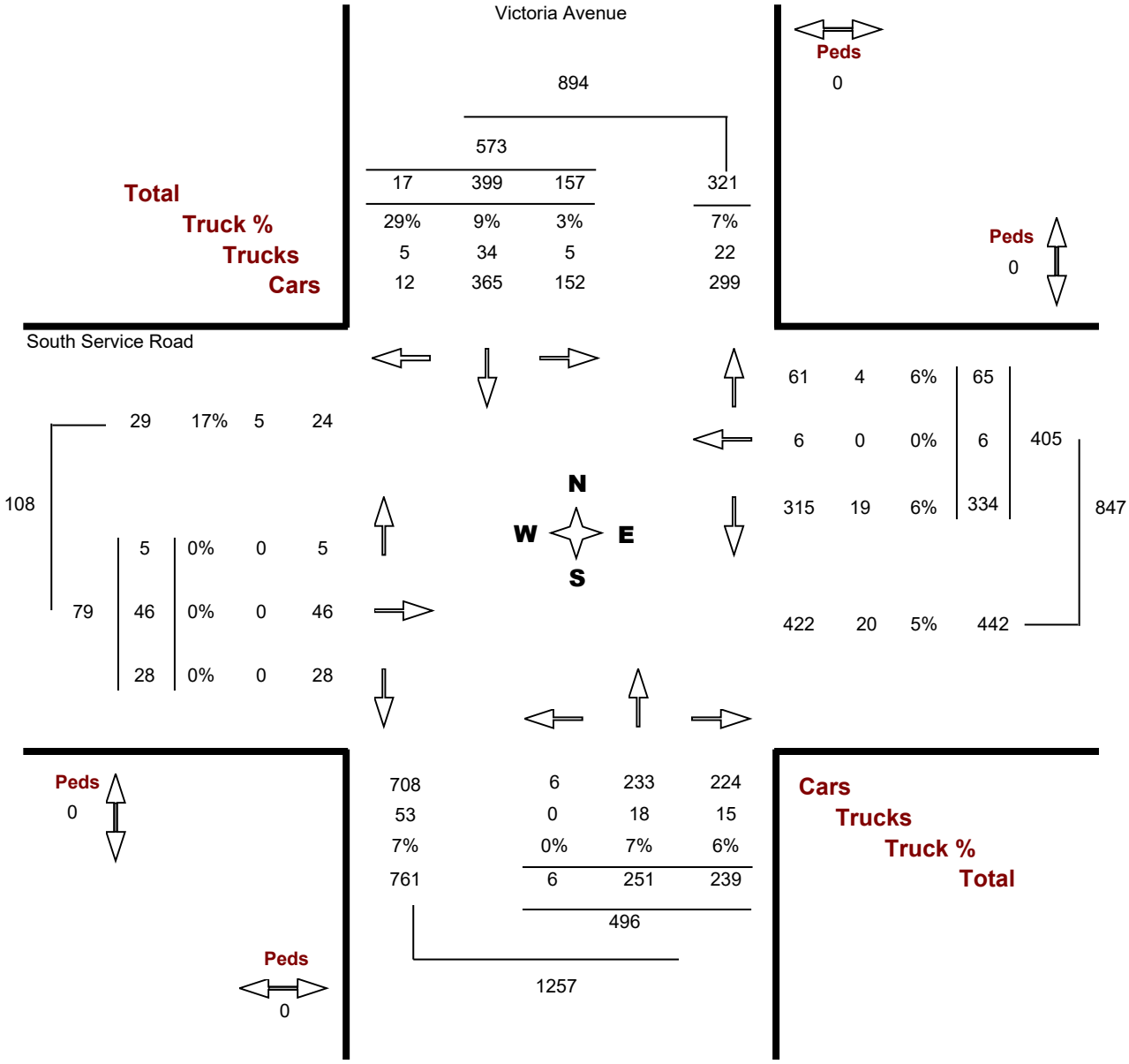
Location..... South Service Road @ Victoria Avenue
GeoID..... 01330
Municipality. LINCOLN
Count Date. Wednesday, 07 June, 2017
Traffic Cont. Traffic signal
Count Time. 07:00 AM — 09:00 AM
Major Dir..... None
Peak Hour.. 07:30 AM — 08:30 AM



Turning Movements Report - PM Period

Location..... South Service Road @ Victoria Avenue
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 01330
Count Date. Wednesday, 07 June, 2017
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:30 PM — 05:30 PM



Victoria Ave @ Menno St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Lincoln
Site #: 0000000005
Intersection: Victoria Ave & Menno St
TFR File #: 5
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

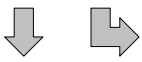
Major Road: Victoria Ave runs N/S

North Leg Total: 844
North Entering: 322
North Peds: 0
Peds Cross: ⋈

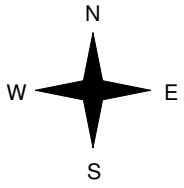
Heavys	44	1	45
Trucks	10	0	10
Cars	255	12	267
Totals	309	13	

Heavys	35
Trucks	10
Cars	477
Totals	522

East Leg Total: 81
East Entering: 46
East Peds: 8
Peds Cross: ⋈



	Cars	Trucks	Heavys	Totals
	29	1	2	32
	13	0	1	14
	42	1	3	



Menno St

Cars	Trucks	Heavys	Totals
33	0	2	35

Victoria Ave

Cars	268
Trucks	10
Heavys	45
Totals	323

Cars	448	21	469
Trucks	9	0	9
Heavys	33	1	34
Totals	490	22	

Peds Cross: ⋈
South Peds: 5
South Entering: 512
South Leg Total: 835

Comments

Victoria Ave @ Menno St

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

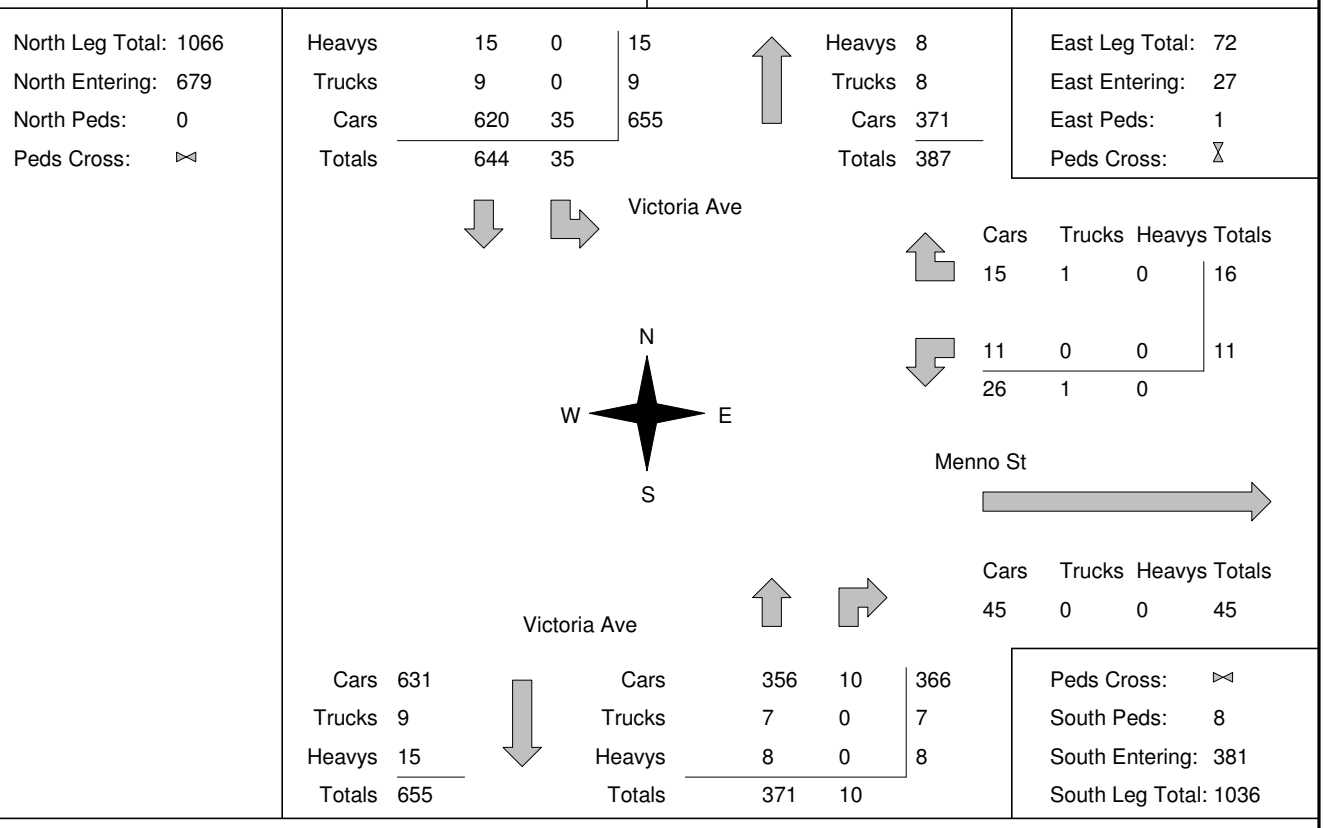
Municipality: Lincoln
Site #: 0000000005
Intersection: Victoria Ave & Menno St
TFR File #: 5
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Victoria Ave runs N/S

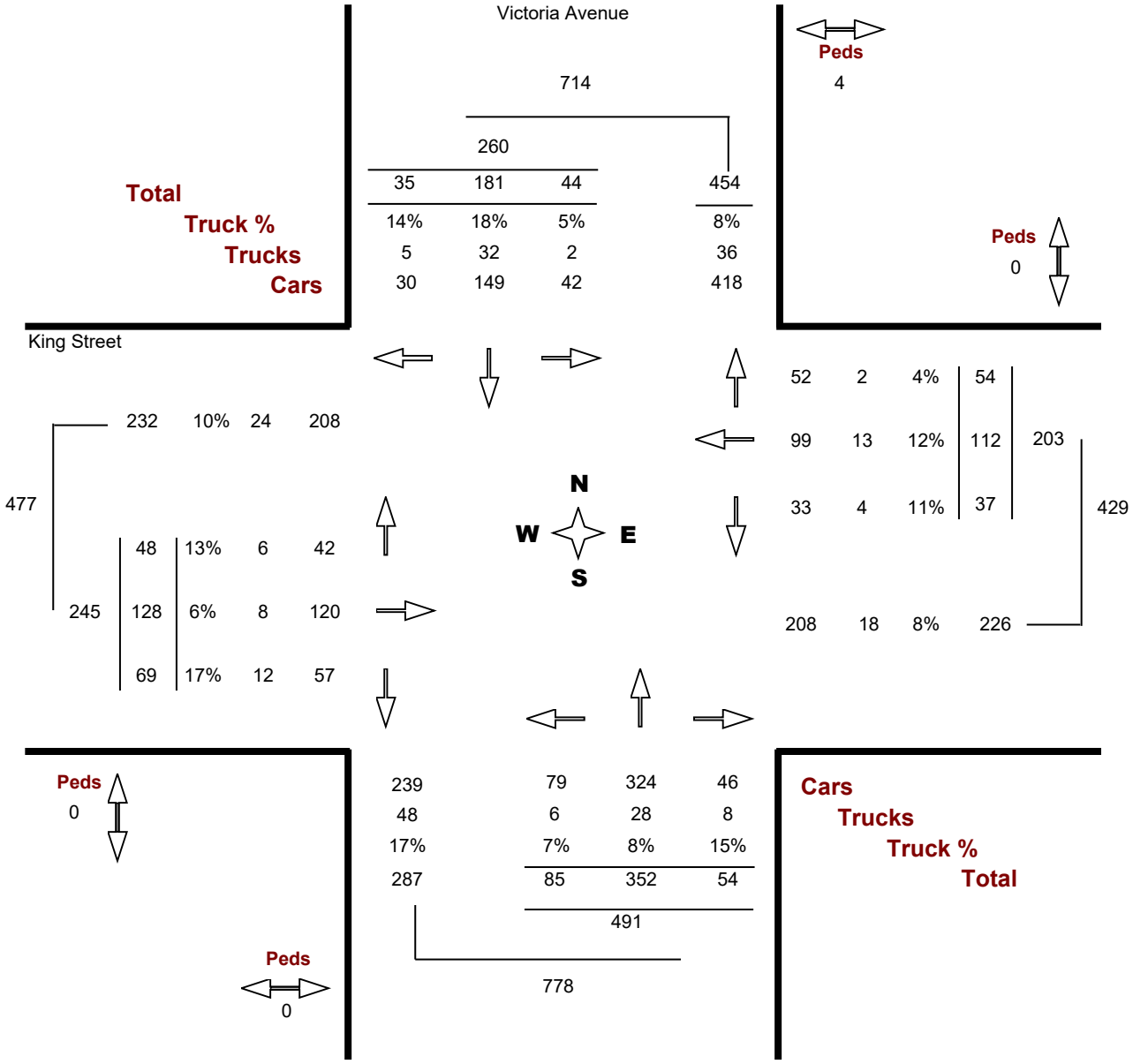


Comments

Turning Movements Report - AM Period

Location..... King Street @ Victoria Avenue
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

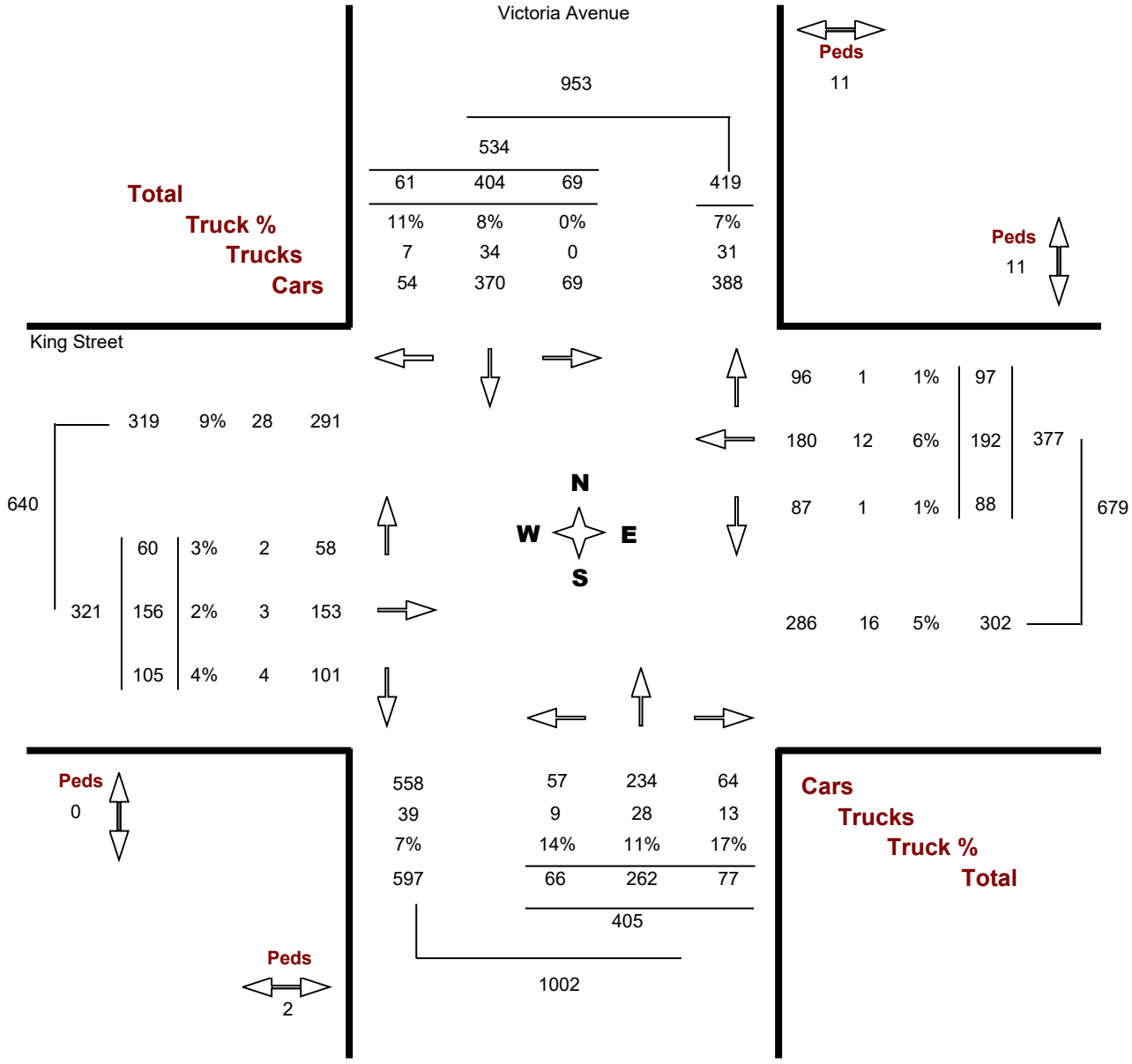
GeoID..... 00185
Count Date. Wednesday, 07 June, 2017
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 07:45 AM — 08:45 AM



Turning Movements Report - PM Period

Location..... King Street @ Victoria Avenue
Municipality. LINCOLN
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 00185
Count Date. Wednesday, 07 June, 2017
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:15 PM — 05:15 PM



23rd St @ Tallman Dr

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

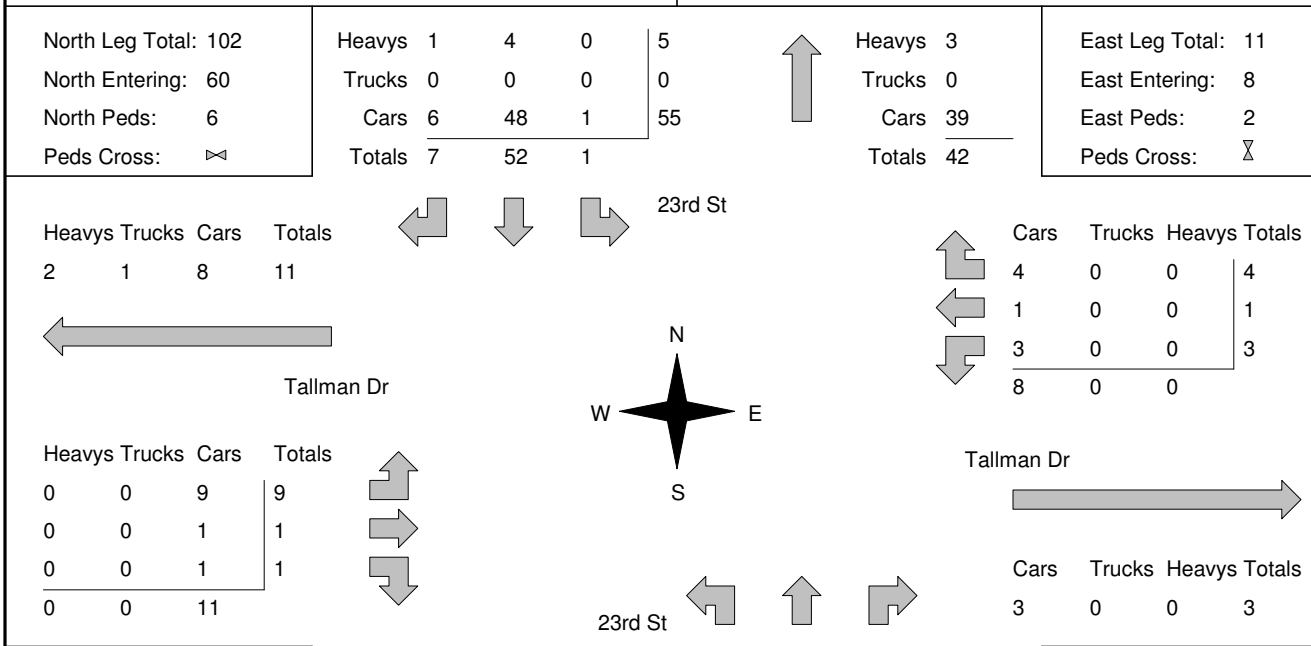
Municipality: Lincoln
Site #: 0000000011
Intersection: 23rd St & Tallman Dr
TFR File #: 11
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: 23rd St runs N/S



Comments

23rd St @ Tallman Dr

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

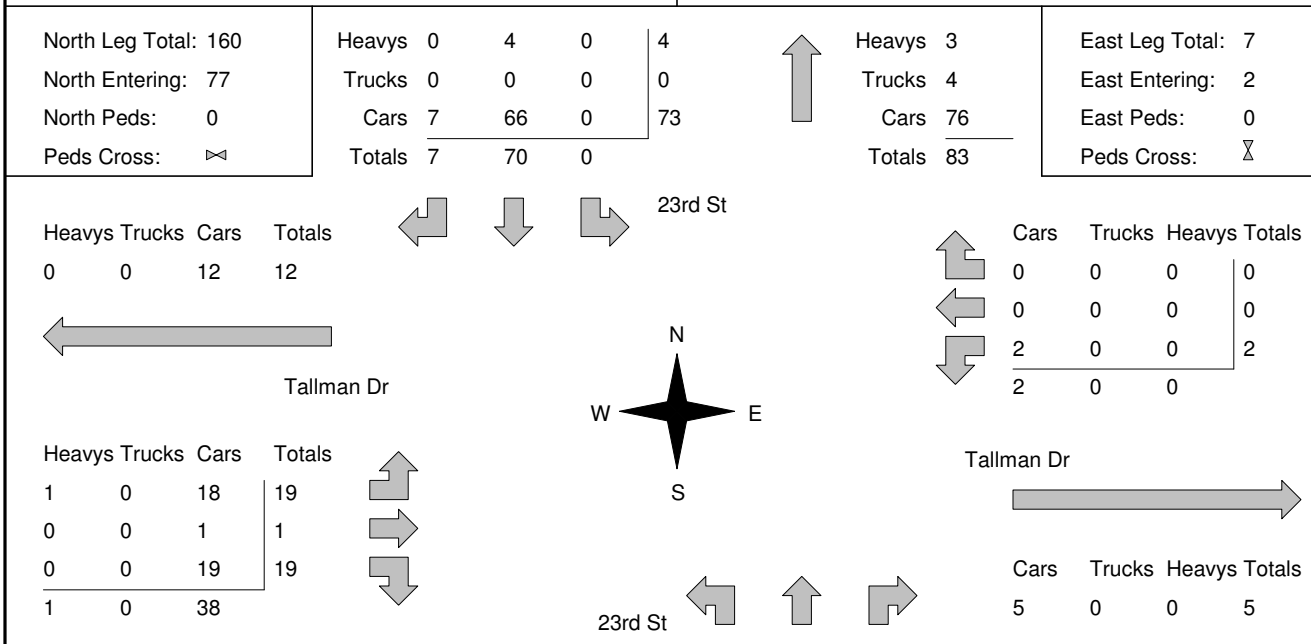
Municipality: Lincoln
Site #: 0000000011
Intersection: 23rd St & Tallman Dr
TFR File #: 11
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: 23rd St runs N/S



Comments

Fly Rd @ Campden Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

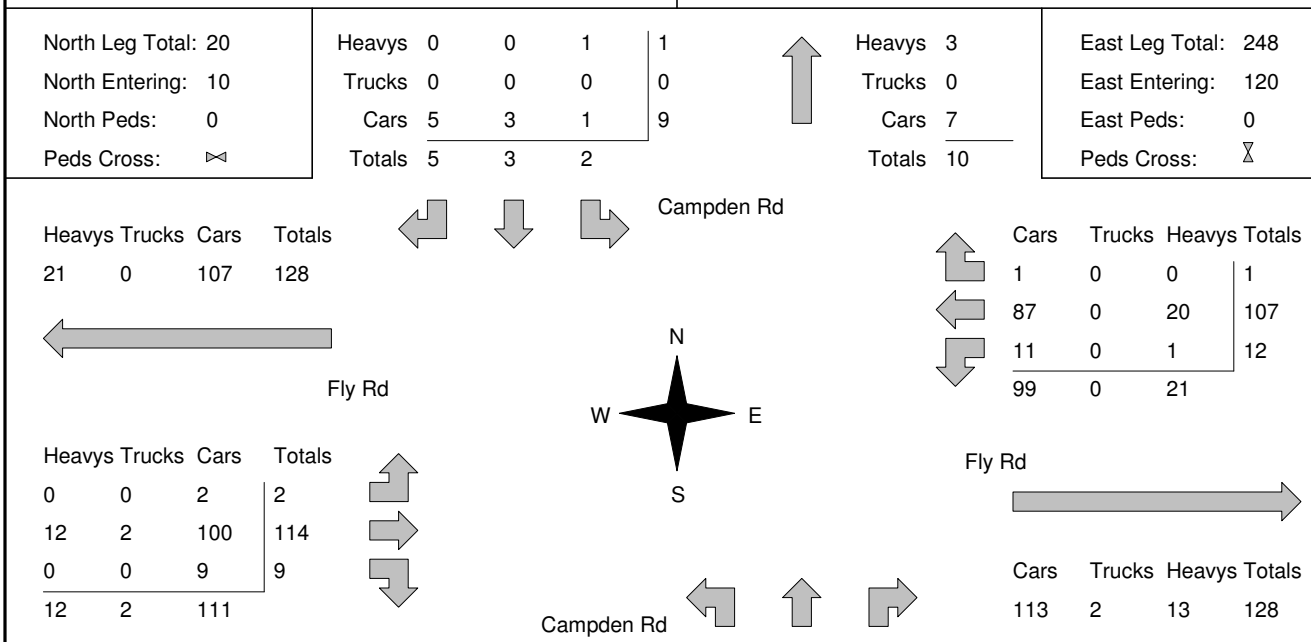
Municipality: Lincoln
Site #: 0000000006
Intersection: Fly Rd & Campden Rd
TFR File #: 6
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Fly Rd runs W/E



Comments

Fly Rd @ Campden Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:45:00
To: 16:45:00

Municipality: Lincoln
Site #: 0000000006
Intersection: Fly Rd & Campden Rd
TFR File #: 6
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Fly Rd runs W/E

North Leg Total:	26			
North Entering:	11			
North Peds:	0			
Peds Cross:	⋈			
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	7	2	2	11
Totals	7	2	2	
Heavys	0			
Trucks	2			
Cars	13			
Totals	15			
East Leg Total:	326			
East Entering:	152			
East Peds:	0			
Peds Cross:	⧖			

Campden Rd

Heavys	Trucks	Cars	Totals
16	4	132	152

Cars	Trucks	Heavys	Totals
4	0	0	4
114	4	16	134
11	0	3	14
129	4	19	

Fly Rd

N
W E
S

Heavys	Trucks	Cars	Totals
0	2	3	5
15	5	140	160
1	1	16	18
16	8	159	

Fly Rd

Cars	Trucks	Heavys	Totals
152	5	17	174

Campden Rd

Peds Cross:	⧖			
West Peds:	4			
West Entering:	183			
West Leg Total:	335			
Cars	29			
Trucks	1			
Heavys	4			
Totals	34			
Cars	11	6	10	27
Trucks	0	0	0	0
Heavys	0	0	2	2
Totals	11	6	12	
Peds Cross:	⋈			
South Peds:	0			
South Entering:	29			
South Leg Total:	63			

Comments

Nineteenth St @ Glen Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

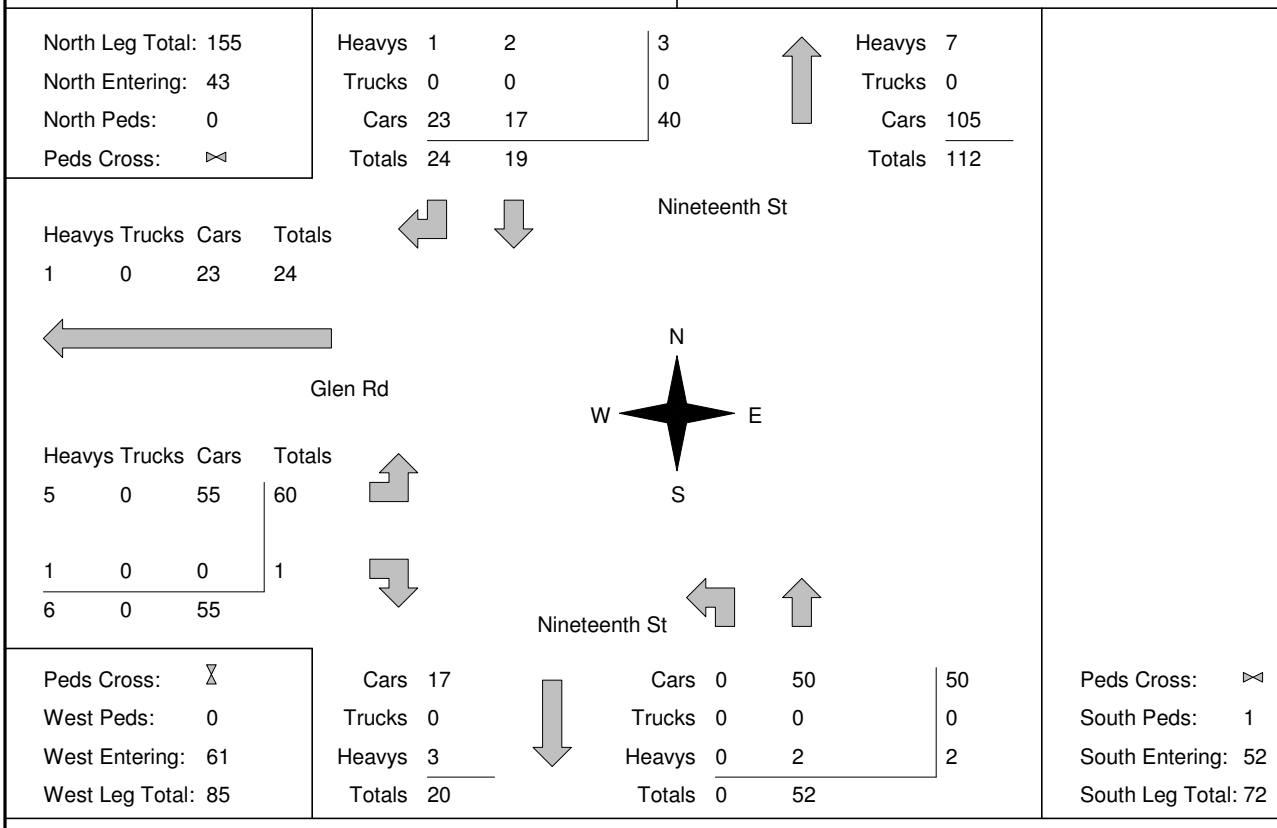
Municipality: Lincoln
Site #: 0000000009
Intersection: Nineteenth St & Glen Rd
TFR File #: 9
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Nineteenth St runs N/S



Comments

Nineteenth St @ Glen Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

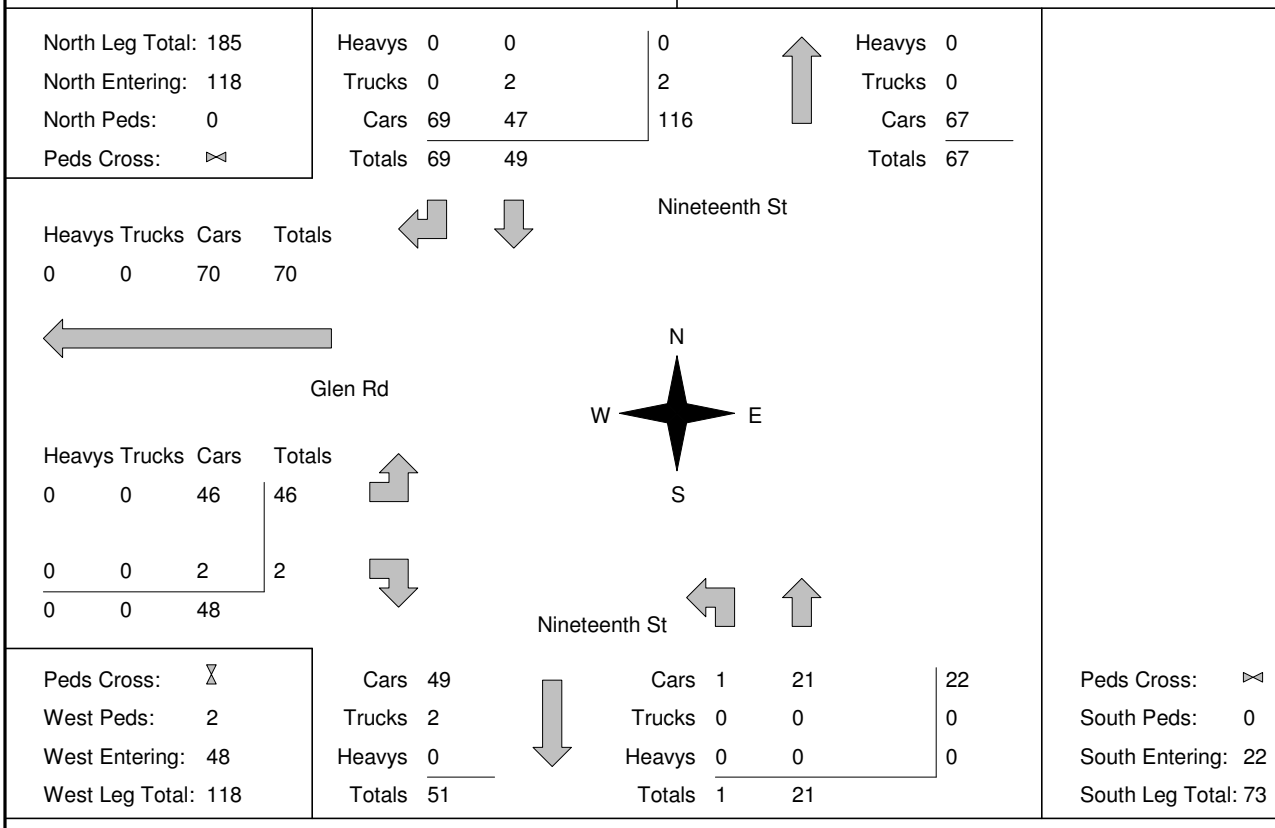
Municipality: Lincoln
Site #: 0000000009
Intersection: Nineteenth St & Glen Rd
TFR File #: 9
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Nineteenth St runs N/S



Comments

King St @ Ninth St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

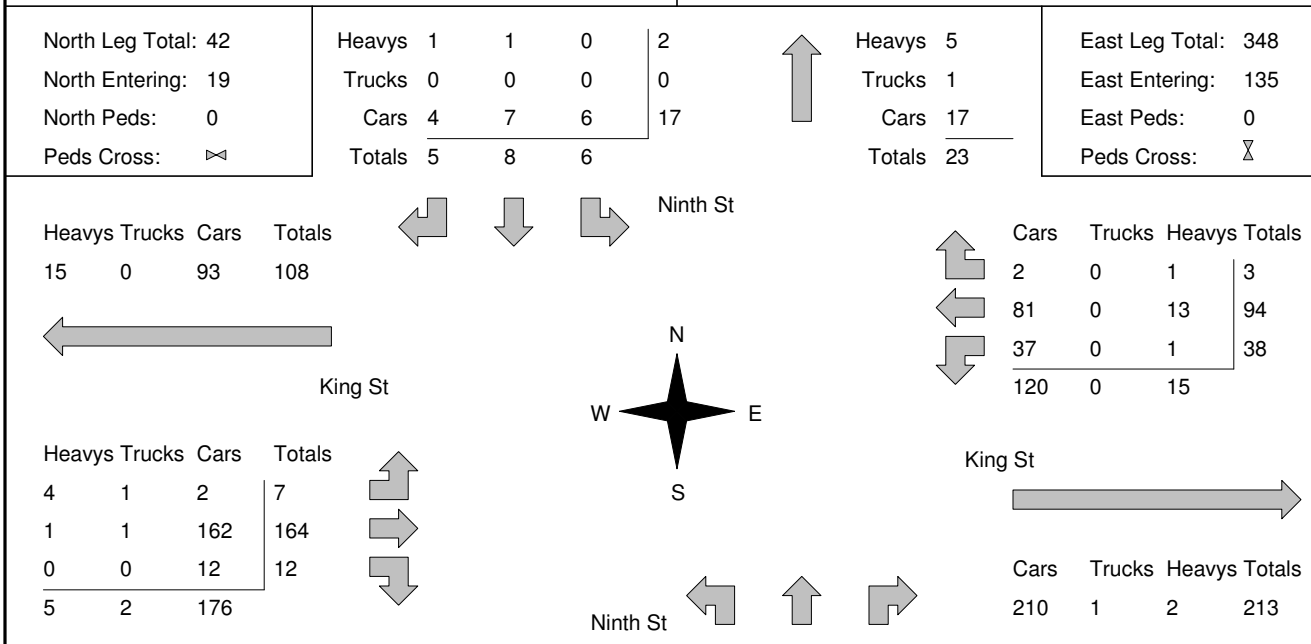
Municipality: Lincoln
Site #: 0000000010
Intersection: King St & Ninth St
TFR File #: 10
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: King St runs W/E



Comments

King St @ Ninth St

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

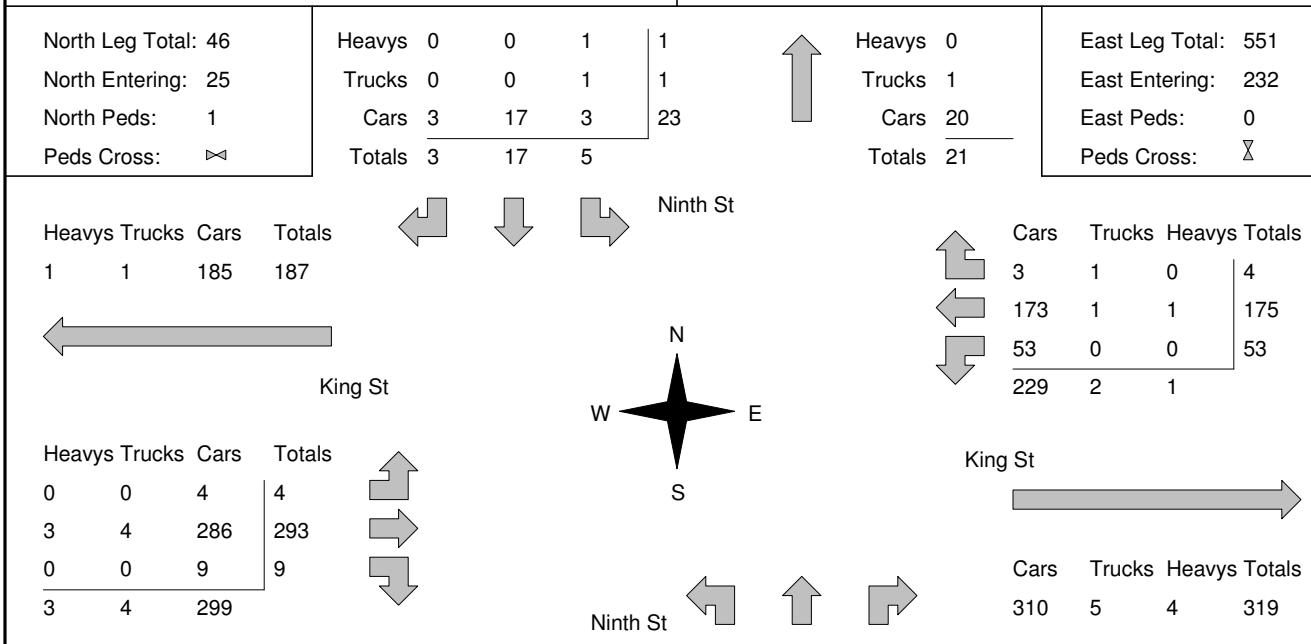
Municipality: Lincoln
Site #: 0000000010
Intersection: King St & Ninth St
TFR File #: 10
Count date: 26-Sep-2016

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

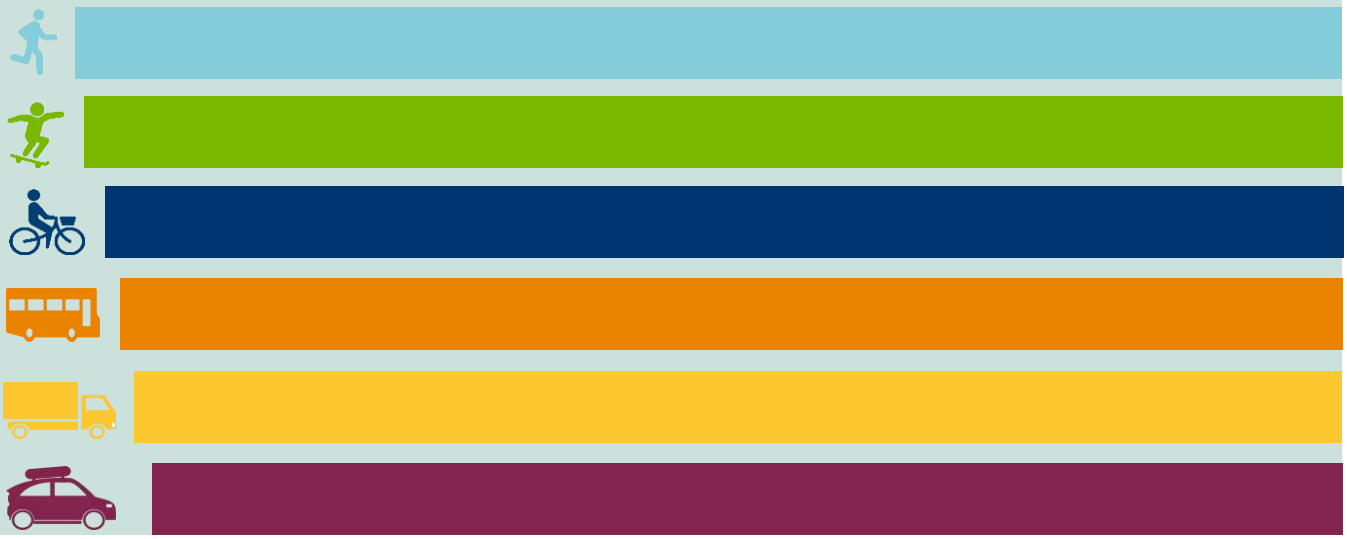
Major Road: King St runs W/E



Comments

APPENDIX

B-2 Signal Timing Plans



Make moving make sense as we grow!

Signal Code: 018040
Intersection: RR18(ONTARIO ST.) & RR40(SOUTH SERVICE RD.)
Municipality: lincoln
Owner: region
Last Modified: 3/8/2018 8:54:58 AM

Timing Parameters	NBD & SBD ADVANCE ONTARIO ST.	NBD & SBD THRU ONTARIO ST.	EBD ADVANCE SOUTH SERVICE RD	EBD & WBD THRU SOUTH SERVICE RD	n/a	n/a
Min Green	6	10	6	8	0	0
Walk	0	12	0	12	0	0
Ped Clearance	0	21	0	21	0	0
Vehicle Ext.	2.6	2.3	2.6	2.3	0	0
Max Green	15	45	15	30	0	0
Yellow	3	4.1	3	4.1	0	0
All Red	0	2.8	0	3.3	0	0

		Offset
Minimum Cycle	32.3	0
Pedestrian Cycle	80.3	
Maximum Cycle	125.3	0
Operation	FA	

Installed On:
3/2/2010
Count Date:
4/30/2015

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portrait to Landscape**

Signal Code: 018GRN						
Intersection: RR18 (ONTARIO ST.) & GREENLANE						
Municipality: lincoln						
Owner: Region						
Last Modified: 12/8/2014 9:48:44 AM						
Timing Parameters	**NBD & SBD ADVANCE ONTARIO ST.**	**NBD & SBD THRU ONTARIO ST.**	**EBD & WBD THRU GREENLANE**	**n/a**	**n/a**	**n/a**
Min Green	**6**	**10**	**8**	**0**	**0**	**0**
Walk	**0**	**12**	**11**	**0**	**0**	**0**
Ped Clearance	**0**	**20**	**18**	**0**	**0**	**0**
Vehicle Ext.	**2.5**	**2.5**	**2.5**	**0**	**0**	**0**
Max Green	**10**	**45**	**30**	**0**	**0**	**0**
Yellow	**0**	**4.1**	**4.1**	**0**	**0**	**0**
All Red	**3**	**2.8**	**2.8**	**0**	**0**	**0**

		Offset
Minimum Cycle	**31.8**	**0**
Pedestrian Cycle	**74.8**	
Maximum Cycle	**101.8**	**0**
Operation	**FA**	

Installed On:
12/3/2014
Count Date:
11/6/2014

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

***Note: you need to change the paper orientation from Portrait to Landscape**

Signal Code: 018FRS
Intersection: RR18 (ONTARIO ST.) & FRIESEN BLVD.
Municipality: lincoln
Owner: region
Last Modified: 3/8/2018 10:29:13 AM

Timing Parameters	NBD & SBD ONTARIO ST.	EBD & WBD PEDESTRIAN PHASE	n/a	n/a	n/a	n/a
Min Green	35	21	0	0	0	0
Walk	30	9	0	0	0	0
Ped Clearance	5	12	0	0	0	0
Vehicle Ext.	0	0	0	0	0	0
Max Green	35	21	0	0	0	0
Yellow	4.1	3	0	0	0	0
All Red	3	2	0	0	0	0

		Offset
Minimum Cycle	68.1	0
Pedestrian Cycle	68.1	
Maximum Cycle	68.1	0
Operation	SA	

Installed On:
8/8/2005
Count Date:
--/--/----

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portrait to Landscape**

Signal Code: 018081						
Intersection: RR18 (ONTARIO ST.) & RR81 (KING ST.)						
Municipality: lincoln						
Owner: Region						
Last Modified: 7/15/2009 12:10:12 PM						
Timing Parameters	**EBD KING ADV.**	**EBD & WBD KING**	**NBD ONTARIO**	**n/a**	**n/a**	**n/a**
Min Green	**5**	**8**	**8**	**0**	**0**	**0**
Walk	**0**	**10**	**8**	**0**	**0**	**0**
Ped Clearance	**0**	**16**	**12**	**0**	**0**	**0**
Vehicle Ext.	**2.5**	**2.8**	**2.5**	**0**	**0**	**0**
Max Green	**15**	**35**	**25**	**0**	**0**	**0**
Yellow	**3**	**3.2**	**3.2**	**0**	**0**	**0**
All Red	**0**	**2**	**2**	**0**	**0**	**0**

		Offset
Minimum Cycle	**26.4**	**0**
Pedestrian Cycle	**56.4**	
Maximum Cycle	**88.4**	**0**
Operation	**FA**	

Installed On:
--/--/----
Count Date:
--/--/----

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

***Note: you need to change the paper orientation from Portrait to Landscape**

Signal Code: 024040						
Intersection: RR24 (VICTORIA AVE.) & RR40 (SOUTH SERV. RD)						
Municipality: operation						
Owner: operation						
Last Modified: 1/9/2017 10:52:44 AM						
Timing Parameters	**WBD ADVANCE SOUTH SERVICE RD.**	**EBD & WBD THRU SOUTH SERVICE RD.**	**SBD ADVANCE VICTORIA AVE.**	**NBD & SBD THRU VICTORIA AVE.**	**n/a**	**n/a**
Min Green	**6**	**10**	**6**	**20**	**0**	**0**
Walk	**0**	**0**	**0**	**7**	**0**	**0**
Ped Clearance	**0**	**7**	**0**	**13**	**0**	**0**
Vehicle Ext.	**2**	**3**	**2**	**3**	**0**	**0**
Max Green	**20**	**25**	**13**	**35**	**0**	**0**
Yellow	**3**	**4.1**	**3**	**4.1**	**0**	**0**
All Red	**0**	**2**	**0**	**2**	**0**	**0**

		Offset
Minimum Cycle	**42.2**	**0**
Pedestrian Cycle	**26.1**	
Maximum Cycle	**111.2**	**0**
Operation	**SA**	

Installed On:
7/26/2010
Count Date:
10/24/2014

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

***Note: you need to change the paper orientation from Portrait to Landscape**

Signal Code: 024081
Intersection: RR24 (VICTORIA AVE.) & RR81 (KING ST)
Municipality: lincoln
Owner: Region
Last Modified: 3/8/2018 8:57:29 AM

Timing Parameters	EBD & WBD KING ST	NBD ADV. VICTORIA	NBD & SBD THRU VICTORIA	n/a	n/a	n/a
Min Green	8	6	8	0	0	0
Walk	12	0	9	0	0	0
Ped Clearance	15	0	15	0	0	0
Vehicle Ext.	2.9	2.6	3.5	0	0	0
Max Green	33	12	30	0	0	0
Yellow	4.1	3	5	0	0	0
All Red	2	0	3	0	0	0

		Offset
Minimum Cycle	30.1	0
Pedestrian Cycle	65.1	
Maximum Cycle	92.1	0
Operation	FA	

Installed On:
--/--/----
Count Date:
--/--/----

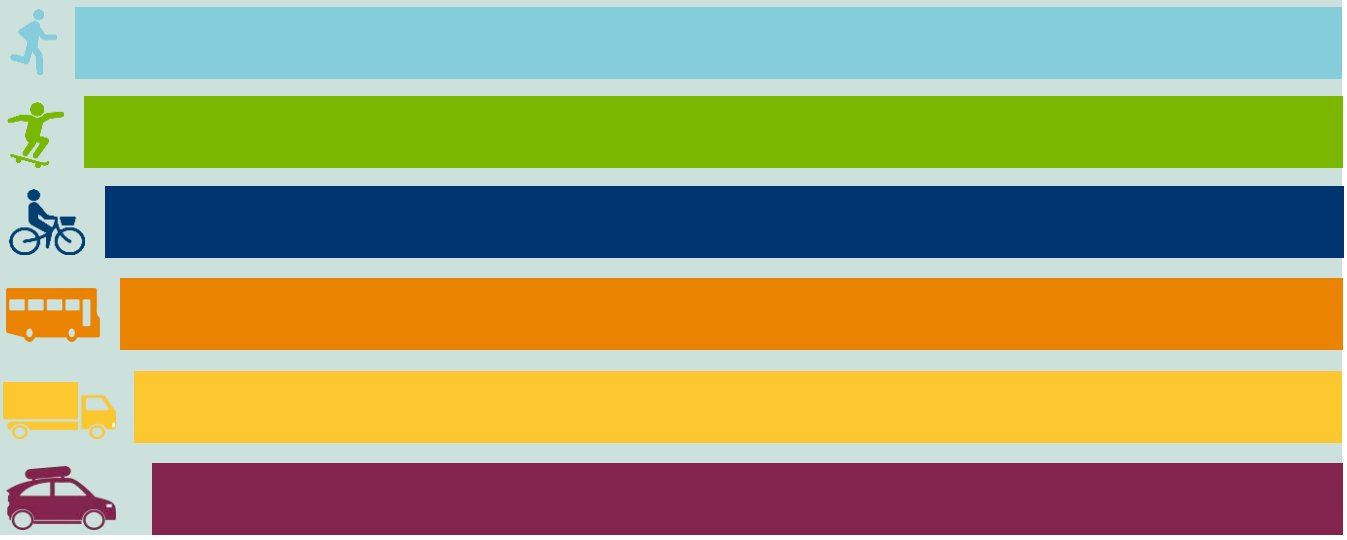
FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portrait to Landscape**

APPENDIX

B-3 Synchro Output Sheets - Beamsville

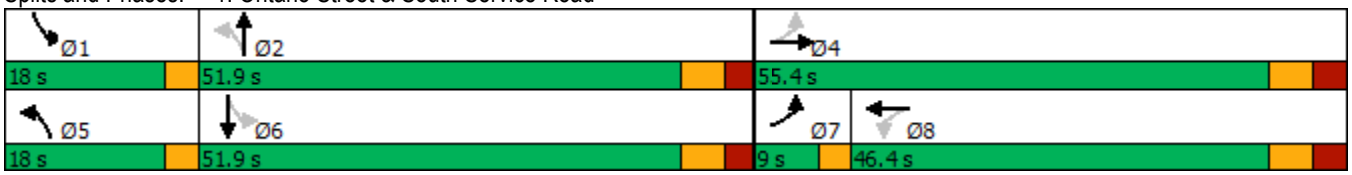


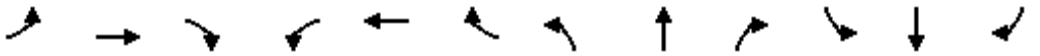
Make moving make sense as we grow!

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	14	72	16	234	30	69	63	93
Future Volume (vph)	14	72	16	234	30	69	63	93
Lane Group Flow (vph)	15	91	17	304	33	108	68	188
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	8.0	8.0	8.0	6.0	10.0	6.0	10.0
Minimum Split (s)	9.0	40.4	40.4	40.4	9.0	39.9	9.0	39.9
Total Split (s)	9.0	55.4	46.4	46.4	18.0	51.9	18.0	51.9
Total Split (%)	7.2%	44.2%	37.0%	37.0%	14.4%	41.4%	14.4%	41.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	0.0	3.3	3.3	3.3	0.0	2.8	0.0	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.4	7.4	7.4	3.0	6.9	3.0	6.9
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.03	0.17	0.05	0.60	0.07	0.16	0.15	0.21
Control Delay	9.1	11.9	14.8	21.0	10.9	16.6	11.1	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	11.9	14.8	21.0	10.9	16.6	11.1	11.7
Queue Length 50th (m)	0.8	5.3	1.0	21.9	1.3	2.7	2.8	2.6
Queue Length 95th (m)	3.4	13.5	5.4	54.7	7.5	11.2	12.8	14.1
Internal Link Dist (m)		189.5		203.5		653.3		90.1
Turn Bay Length (m)	150.0		35.0		80.0		40.0	
Base Capacity (vph)	431	1396	927	1310	591	2513	553	2584
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.02	0.23	0.06	0.04	0.12	0.07

Intersection Summary
Cycle Length: 125.3
Actuated Cycle Length: 48.7
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Ontario Street & South Service Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	72	12	16	234	46	30	69	30	63	93	80
Future Volume (vph)	14	72	12	16	234	46	30	69	30	63	93	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	3.0	7.4		7.4	7.4		3.0	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1522	1536		1552	1609		1450	2868		1383	2933	
Flt Permitted	0.48	1.00		0.70	1.00		0.63	1.00		0.57	1.00	
Satd. Flow (perm)	763	1536		1140	1609		967	2868		833	2933	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	78	13	17	254	50	33	75	33	68	101	87
RTOR Reduction (vph)	0	5	0	0	6	0	0	26	0	0	65	0
Lane Group Flow (vph)	15	86	0	17	298	0	33	82	0	68	124	0
Confl. Peds. (#/hr)	1					1			5	5		
Heavy Vehicles (%)	8%	12%	0%	0%	5%	3%	7%	8%	10%	12%	2%	7%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0	19.0		15.2	15.2		13.7	11.3		18.1	13.5	
Effective Green, g (s)	19.0	19.0		15.2	15.2		13.7	11.3		18.1	13.5	
Actuated g/C Ratio	0.36	0.36		0.29	0.29		0.26	0.22		0.35	0.26	
Clearance Time (s)	3.0	7.4		7.4	7.4		3.0	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	289	559		331	468		275	620		337	758	
v/s Ratio Prot	0.00	c0.06			c0.19		0.01	0.03		c0.02	0.04	
v/s Ratio Perm	0.02			0.01			0.03			c0.05		
v/c Ratio	0.05	0.15		0.05	0.64		0.12	0.13		0.20	0.16	
Uniform Delay, d1	10.8	11.2		13.3	16.1		14.5	16.5		11.8	15.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.1	2.8		0.2	0.1		0.3	0.1	
Delay (s)	10.8	11.3		13.4	18.9		14.7	16.6		12.1	15.1	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		11.2			18.7			16.2			14.3	
Approach LOS		B			B			B			B	

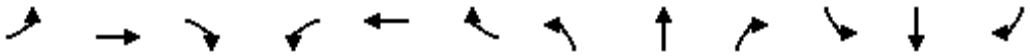
Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	20.3
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	39	12	51	53	522	47	338
Future Volume (vph)	166	39	12	51	53	522	47	338
Lane Group Flow (vph)	180	100	13	246	58	571	51	434
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	10.0	6.0	10.0
Minimum Split (s)	35.9	35.9	35.9	35.9	9.0	38.9	9.0	38.9
Total Split (s)	36.9	36.9	36.9	36.9	13.0	51.9	13.0	51.9
Total Split (%)	36.2%	36.2%	36.2%	36.2%	12.8%	51.0%	12.8%	51.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	2.8	2.8	2.8	2.8	0.0	2.8	0.0	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9	3.0	6.9	3.0	6.9
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.64	0.22	0.04	0.42	0.12	0.78	0.16	0.32
Control Delay	38.5	13.6	24.2	10.9	8.7	28.7	9.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	13.6	24.2	10.9	8.7	28.7	9.2	15.2
Queue Length 50th (m)	23.3	4.6	1.4	7.9	3.4	72.6	3.0	21.1
Queue Length 95th (m)	54.2	18.0	6.2	30.1	9.3	129.7	8.4	36.5
Internal Link Dist (m)		308.8		217.6		607.9		653.3
Turn Bay Length (m)	45.0		25.0		70.0		30.0	
Base Capacity (vph)	439	683	473	829	547	1143	390	2139
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.15	0.03	0.30	0.11	0.50	0.13	0.20

Intersection Summary

Cycle Length: 101.8
Actuated Cycle Length: 73.7
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Ontario Street & Green Lane



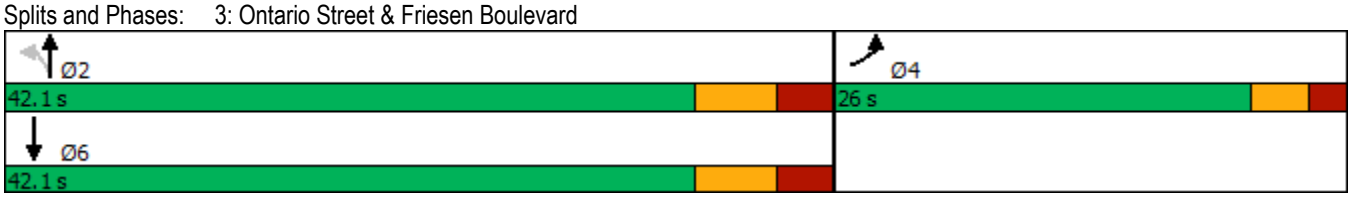
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	39	53	12	51	176	53	522	4	47	338	62
Future Volume (vph)	166	39	53	12	51	176	53	522	4	47	338	62
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	4.0	4.0	3.5	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Total Lost time (s)	6.9	6.9		6.9	6.9		3.0	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.88		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1581	1409		1404	1588		1521	1734		1478	3231	
Flt Permitted	0.57	1.00		0.69	1.00		0.50	1.00		0.27	1.00	
Satd. Flow (perm)	950	1409		1023	1588		798	1734		414	3231	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	180	42	58	13	55	191	58	567	4	51	367	67
RTOR Reduction (vph)	0	41	0	0	122	0	0	0	0	0	15	0
Lane Group Flow (vph)	180	59	0	13	124	0	58	571	0	51	419	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	4%	21%	14%	17%	4%	1%	2%	5%	50%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	21.8		21.8	21.8		34.9	31.1		34.7	31.0	
Effective Green, g (s)	21.8	21.8		21.8	21.8		34.9	31.1		34.7	31.0	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.48	0.42		0.47	0.42	
Clearance Time (s)	6.9	6.9		6.9	6.9		3.0	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	418		303	471		416	734		249	1364	
v/s Ratio Prot		0.04			0.08		0.01	c0.33		c0.01	0.13	
v/s Ratio Perm	c0.19			0.01			0.06			0.09		
v/c Ratio	0.64	0.14		0.04	0.26		0.14	0.78		0.20	0.31	
Uniform Delay, d1	22.4	18.9		18.4	19.7		10.5	18.2		11.7	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.7	0.2		0.1	0.3		0.2	5.2		0.4	0.1	
Delay (s)	27.1	19.1		18.4	20.0		10.7	23.4		12.2	14.2	
Level of Service	C	B		B	B		B	C		B	B	
Approach Delay (s)		24.2			19.9			22.2			14.0	
Approach LOS		C			B			C			B	

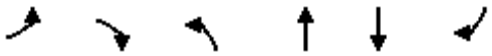
Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	49	486	364
Future Volume (vph)	30	49	486	364
Lane Group Flow (vph)	91	53	528	409
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	21.0	35.0	35.0	35.0
Minimum Split (s)	26.0	42.1	42.1	42.1
Total Split (s)	26.0	42.1	42.1	42.1
Total Split (%)	38.2%	61.8%	61.8%	61.8%
Yellow Time (s)	3.0	4.1	4.1	4.1
All-Red Time (s)	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.1	7.1	7.1
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Min	Min	Min
v/c Ratio	0.16	0.10	0.50	0.38
Control Delay	9.1	9.3	12.6	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.1	9.3	12.6	10.8
Queue Length 50th (m)	2.9	3.3	43.6	30.3
Queue Length 95th (m)	12.0	8.5	71.4	50.1
Internal Link Dist (m)	237.8		980.4	607.9
Turn Bay Length (m)		30.0		
Base Capacity (vph)	568	512	1064	1079
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.10	0.50	0.38

Intersection Summary
Cycle Length: 68.1
Actuated Cycle Length: 66.8
Natural Cycle: 70
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Ontario Street & Friesen Boulevard





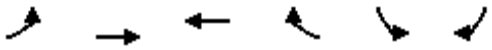
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	30	53	49	486	364	12
Future Volume (vph)	30	53	49	486	364	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	4.5	4.5	3.5	4.0	4.0	3.5
Total Lost time (s)	5.0		7.1	7.1	7.1	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.91		1.00	1.00	1.00	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1672		1557	1724	1746	
Flt Permitted	0.98		0.51	1.00	1.00	
Satd. Flow (perm)	1672		830	1724	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	58	53	528	396	13
RTOR Reduction (vph)	44	0	0	0	2	0
Lane Group Flow (vph)	47	0	53	528	407	0
Confl. Peds. (#/hr)		7	10			10
Heavy Vehicles (%)	0%	2%	5%	6%	4%	9%
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	16.2		39.6	39.6	39.6	
Effective Green, g (s)	16.2		39.6	39.6	39.6	
Actuated g/C Ratio	0.24		0.58	0.58	0.58	
Clearance Time (s)	5.0		7.1	7.1	7.1	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	398		484	1005	1018	
v/s Ratio Prot	c0.03			c0.31	0.23	
v/s Ratio Perm			0.06			
v/c Ratio	0.12		0.11	0.53	0.40	
Uniform Delay, d1	20.3		6.3	8.5	7.7	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		0.1	0.5	0.3	
Delay (s)	20.4		6.4	9.0	8.0	
Level of Service	C		A	A	A	
Approach Delay (s)	20.4			8.8	8.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	12.1
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	192	134	185	152	189
Future Volume (vph)	192	134	185	152	189
Lane Group Flow (vph)	209	146	377	165	205
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	31.2	31.2	25.2	25.2
Total Split (s)	18.0	58.2	40.2	30.2	30.2
Total Split (%)	20.4%	65.8%	45.5%	34.2%	34.2%
Yellow Time (s)	3.0	3.2	3.2	3.2	3.2
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	5.2
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	None	Min	Min	None	None
v/c Ratio	0.39	0.15	0.74	0.52	0.44
Control Delay	7.2	6.0	24.9	29.0	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	6.0	24.9	29.0	7.3
Queue Length 50th (m)	7.1	5.5	28.3	15.0	0.0
Queue Length 95th (m)	20.4	15.6	65.1	39.0	15.2
Internal Link Dist (m)		454.3	1002.2	980.4	
Turn Bay Length (m)	20.0			90.0	
Base Capacity (vph)	599	1472	996	670	762
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.10	0.38	0.25	0.27

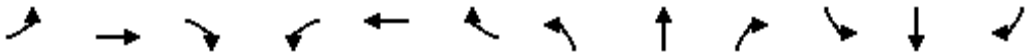
Intersection Summary
Cycle Length: 88.4
Actuated Cycle Length: 57.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: King Street & Ontario Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	192	134	185	162	152	189
Future Volume (vph)	192	134	185	162	152	189
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.5	3.0	3.5
Total Lost time (s)	3.0	5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1491	1664	1496		1437	1401
Flt Permitted	0.34	1.00	1.00		0.95	1.00
Satd. Flow (perm)	527	1664	1496		1437	1401
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	146	201	176	165	205
RTOR Reduction (vph)	0	0	40	0	0	159
Lane Group Flow (vph)	209	146	337	0	165	46
Confl. Peds. (#/hr)	4			4	9	
Heavy Vehicles (%)	4%	4%	9%	5%	8%	5%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	33.6	33.6	18.2		12.6	12.6
Effective Green, g (s)	33.6	33.6	18.2		12.6	12.6
Actuated g/C Ratio	0.59	0.59	0.32		0.22	0.22
Clearance Time (s)	3.0	5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	524	987	481		319	311
v/s Ratio Prot	c0.09	0.09	c0.23		c0.11	
v/s Ratio Perm	0.15					0.03
v/c Ratio	0.40	0.15	0.70		0.52	0.15
Uniform Delay, d1	6.2	5.1	16.8		19.3	17.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.1	4.6		1.4	0.2
Delay (s)	6.7	5.2	21.4		20.7	17.9
Level of Service	A	A	C		C	B
Approach Delay (s)		6.1	21.4		19.2	
Approach LOS		A	C		B	

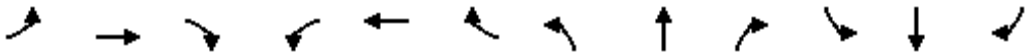
Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	13.4
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	245	3	17	274	37	2	8	21	34	14	12
Future Volume (Veh/h)	14	245	3	17	274	37	2	8	21	34	14	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	266	3	18	298	40	2	9	23	37	15	13
Pedestrians								1			2	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	340			270			673	674	268	681	656	320
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340			270			673	674	268	681	656	320
tC, single (s)	4.2			4.2			7.1	6.6	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.1	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	97	97	89	96	98
cM capacity (veh/h)	1148			1270			346	351	774	341	376	724

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	284	356	34	65
Volume Left	15	18	2	37
Volume Right	3	40	23	13
cSH	1148	1270	556	391
Volume to Capacity	0.01	0.01	0.06	0.17
Queue Length 95th (m)	0.3	0.3	1.5	4.5
Control Delay (s)	0.6	0.5	11.9	16.0
Lane LOS	A	A	B	C
Approach Delay (s)	0.6	0.5	11.9	16.0
Approach LOS			B	C

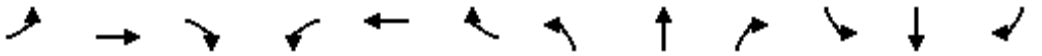
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	299	26	18	286	5	51	0	31	11	1	5
Future Volume (Veh/h)	2	299	26	18	286	5	51	0	31	11	1	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	325	28	20	311	5	55	0	34	12	1	5
Pedestrians					1			3			4	
Lane Width (m)					4.5			4.5			4.5	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	320			356			705	706	343	736	718	318
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			356			705	706	343	736	718	318
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			84	100	95	96	100	99
cM capacity (veh/h)	1245			1177			337	351	701	313	348	724

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	355	336	89	18
Volume Left	2	20	55	12
Volume Right	28	5	34	5
cSH	1245	1177	421	374
Volume to Capacity	0.00	0.02	0.21	0.05
Queue Length 95th (m)	0.0	0.4	6.0	1.1
Control Delay (s)	0.1	0.6	15.8	15.1
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.6	15.8	15.1
Approach LOS			C	C

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	43.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	184	3	11	229	67	10	30	9	35	17	38
Future Volume (Veh/h)	38	184	3	11	229	67	10	30	9	35	17	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	200	3	12	249	73	11	33	10	38	18	41
Pedestrians		1										
Lane Width (m)		3.5										
Walking Speed (m/s)		1.1										
Percent Blockage		0										
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	322			203			566	630	202	618	594	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	322			203			566	630	202	618	594	286
tC, single (s)	4.2			4.3			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.4			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	97			99			97	91	99	89	95	94
cM capacity (veh/h)	1205			1274			385	379	844	350	395	731

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	41	203	12	322	54	97
Volume Left	41	0	12	0	11	38
Volume Right	0	3	0	73	10	41
cSH	1205	1700	1274	1700	424	631
Volume to Capacity	0.03	0.12	0.01	0.19	0.13	0.15
Queue Length 95th (m)	0.8	0.0	0.2	0.0	3.3	4.1
Control Delay (s)	8.1	0.0	7.9	0.0	14.7	13.9
Lane LOS	A		A		B	B
Approach Delay (s)	1.4		0.3		14.7	13.9
Approach LOS					B	B

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	40.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	202	19	11	255	48	15
Future Volume (Veh/h)	202	19	11	255	48	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	220	21	12	277	52	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			241		532	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			241		532	230
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			99		90	98
cM capacity (veh/h)			1337		495	814

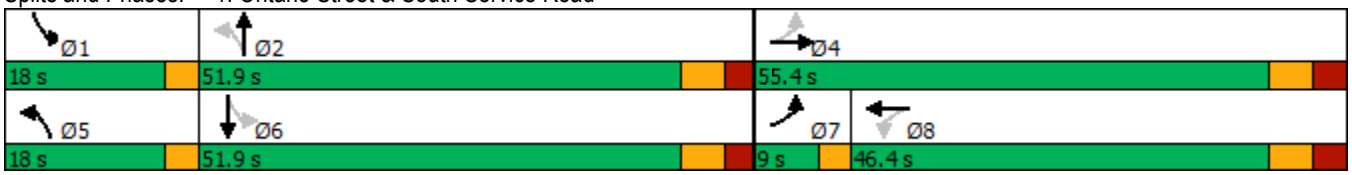
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	241	289	68
Volume Left	0	12	52
Volume Right	21	0	16
cSH	1700	1337	546
Volume to Capacity	0.14	0.01	0.12
Queue Length 95th (m)	0.0	0.2	3.2
Control Delay (s)	0.0	0.4	12.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	12.5
Approach LOS			B

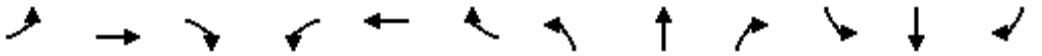
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	195	22	111	23	168	167	109
Future Volume (vph)	28	195	22	111	23	168	167	109
Lane Group Flow (vph)	30	226	24	185	25	270	182	155
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	8.0	8.0	8.0	6.0	10.0	6.0	10.0
Minimum Split (s)	9.0	40.4	40.4	40.4	9.0	39.9	9.0	39.9
Total Split (s)	9.0	55.4	46.4	46.4	18.0	51.9	18.0	51.9
Total Split (%)	7.2%	44.2%	37.0%	37.0%	14.4%	41.4%	14.4%	41.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	0.0	3.3	3.3	3.3	0.0	2.8	0.0	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.4	7.4	7.4	3.0	6.9	3.0	6.9
Lead/Lag	Lead		Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.07	0.48	0.11	0.48	0.05	0.40	0.34	0.13
Control Delay	11.8	19.8	21.0	22.6	9.4	17.7	10.6	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	19.8	21.0	22.6	9.4	17.7	10.6	12.2
Queue Length 50th (m)	1.8	17.1	1.6	12.1	0.9	8.0	7.3	2.7
Queue Length 95th (m)	6.6	37.8	8.1	35.9	5.1	22.4	24.3	12.4
Internal Link Dist (m)		189.5		203.5		653.3		90.1
Turn Bay Length (m)	150.0		35.0		80.0		40.0	
Base Capacity (vph)	409	1471	750	1221	655	2578	615	2635
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.15	0.03	0.15	0.04	0.10	0.30	0.06

Intersection Summary
Cycle Length: 125.3
Actuated Cycle Length: 54.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Ontario Street & South Service Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	195	13	22	111	59	23	168	80	167	109	34
Future Volume (vph)	28	195	13	22	111	59	23	168	80	167	109	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	3.0	7.4		7.4	7.4		3.0	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	1668		1552	1634		1478	3028		1521	3102	
Flt Permitted	0.51	1.00		0.62	1.00		0.65	1.00		0.48	1.00	
Satd. Flow (perm)	890	1668		1008	1634		1017	3028		764	3102	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	212	14	24	121	64	25	183	87	182	118	37
RTOR Reduction (vph)	0	2	0	0	17	0	0	55	0	0	24	0
Lane Group Flow (vph)	30	224	0	24	168	0	25	215	0	182	131	0
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	0%	3%	0%	0%	0%	0%	5%	2%	4%	2%	1%	6%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.2	17.2		12.2	12.2		15.5	13.2		26.4	21.1	
Effective Green, g (s)	17.2	17.2		12.2	12.2		15.5	13.2		26.4	21.1	
Actuated g/C Ratio	0.30	0.30		0.21	0.21		0.27	0.23		0.46	0.36	
Clearance Time (s)	3.0	7.4		7.4	7.4		3.0	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	495		212	344		290	690		481	1130	
v/s Ratio Prot	0.00	c0.13			0.10		0.00	0.07		c0.07	0.04	
v/s Ratio Perm	0.03			0.02			0.02			c0.11		
v/c Ratio	0.10	0.45		0.11	0.49		0.09	0.31		0.38	0.12	
Uniform Delay, d1	14.7	16.5		18.5	20.1		15.8	18.6		9.8	12.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7		0.2	1.1		0.1	0.3		0.5	0.0	
Delay (s)	14.8	17.2		18.7	21.2		15.9	18.8		10.3	12.3	
Level of Service	B	B		B	C		B	B		B	B	
Approach Delay (s)		16.9			20.9			18.6			11.2	
Approach LOS		B			C			B			B	

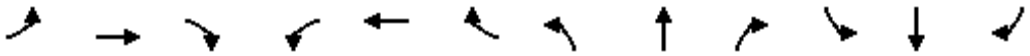
Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	57.9	Sum of lost time (s)	20.3
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	115	90	25	93	127	462	172	696
Future Volume (vph)	115	90	25	93	127	462	172	696
Lane Group Flow (vph)	125	253	27	189	138	515	187	905
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	10.0	6.0	10.0
Minimum Split (s)	35.9	35.9	35.9	35.9	9.0	38.9	9.0	38.9
Total Split (s)	36.9	36.9	36.9	36.9	13.0	51.9	13.0	51.9
Total Split (%)	36.2%	36.2%	36.2%	36.2%	12.8%	51.0%	12.8%	51.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	2.8	2.8	2.8	2.8	0.0	2.8	0.0	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9	3.0	6.9	3.0	6.9
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	Min	None	Min
v/c Ratio	0.50	0.61	0.13	0.46	0.37	0.78	0.46	0.62
Control Delay	33.7	24.4	25.9	23.5	9.8	29.2	10.8	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	24.4	25.9	23.5	9.8	29.2	10.8	19.0
Queue Length 50th (m)	14.0	19.5	2.8	15.8	6.3	55.8	8.9	47.0
Queue Length 95th (m)	36.5	51.5	10.5	41.2	19.2	116.3	25.5	87.2
Internal Link Dist (m)		308.8		217.6		607.9		653.3
Turn Bay Length (m)	45.0		25.0		70.0		30.0	
Base Capacity (vph)	489	746	416	757	411	1162	437	2299
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.34	0.06	0.25	0.34	0.44	0.43	0.39

Intersection Summary

Cycle Length: 101.8
Actuated Cycle Length: 71
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Ontario Street & Green Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	90	143	25	93	81	127	462	12	172	696	136
Future Volume (vph)	115	90	143	25	93	81	127	462	12	172	696	136
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	4.0	4.0	3.5	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Total Lost time (s)	6.9	6.9		6.9	6.9		3.0	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.93		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1596	1547		1640	1611		1521	1700		1536	3354	
Flt Permitted	0.64	1.00		0.53	1.00		0.25	1.00		0.29	1.00	
Satd. Flow (perm)	1073	1547		915	1611		408	1700		462	3354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	98	155	27	101	88	138	502	13	187	757	148
RTOR Reduction (vph)	0	61	0	0	34	0	0	1	0	0	16	0
Lane Group Flow (vph)	125	192	0	27	155	0	138	514	0	187	889	0
Confl. Peds. (#/hr)			3	3					2	2		
Heavy Vehicles (%)	3%	7%	5%	0%	6%	5%	2%	7%	9%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.4	16.4		16.4	16.4		35.3	28.4		39.5	30.5	
Effective Green, g (s)	16.4	16.4		16.4	16.4		35.3	28.4		39.5	30.5	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.50	0.40		0.56	0.43	
Clearance Time (s)	6.9	6.9		6.9	6.9		3.0	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	359		212	374		312	683		395	1448	
v/s Ratio Prot		c0.12			0.10		0.04	c0.30		c0.06	0.26	
v/s Ratio Perm	0.12			0.03			0.18			0.20		
v/c Ratio	0.50	0.54		0.13	0.42		0.44	0.75		0.47	0.61	
Uniform Delay, d1	23.6	23.8		21.4	23.0		10.0	18.1		9.2	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.5		0.3	0.7		1.0	4.7		0.9	0.8	
Delay (s)	25.1	25.3		21.7	23.8		11.0	22.8		10.1	16.3	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		25.2			23.5			20.3			15.2	
Approach LOS		C			C			C			B	

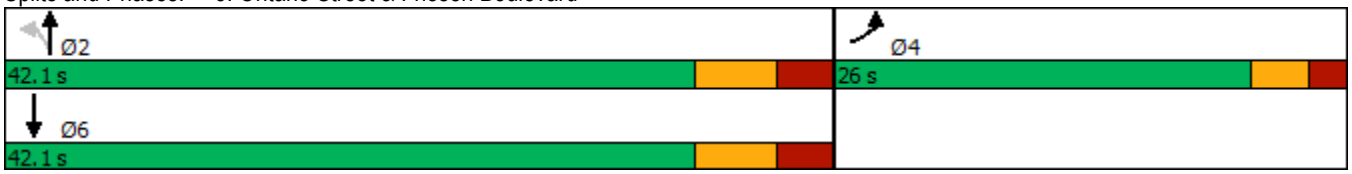
Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	16.8
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

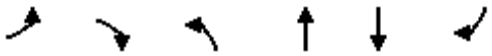
Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	21	68	540	700
Future Volume (vph)	21	68	540	700
Lane Group Flow (vph)	98	74	587	801
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		2		
Detector Phase	4	2	2	6
Switch Phase				
Minimum Initial (s)	21.0	35.0	35.0	35.0
Minimum Split (s)	26.0	42.1	42.1	42.1
Total Split (s)	26.0	42.1	42.1	42.1
Total Split (%)	38.2%	61.8%	61.8%	61.8%
Yellow Time (s)	3.0	4.1	4.1	4.1
All-Red Time (s)	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.1	7.1	7.1
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Min	Min	Min
v/c Ratio	0.17	0.32	0.55	0.73
Control Delay	7.7	15.4	13.6	19.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.7	15.4	13.6	19.3
Queue Length 50th (m)	2.0	5.3	50.8	82.7
Queue Length 95th (m)	11.1	15.8	82.7	#154.4
Internal Link Dist (m)	237.8		980.4	607.9
Turn Bay Length (m)		30.0		
Base Capacity (vph)	580	229	1066	1090
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.32	0.55	0.73

Intersection Summary
Cycle Length: 68.1
Actuated Cycle Length: 66.1
Natural Cycle: 70
Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Ontario Street & Friesen Boulevard





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	69	68	540	700	37
Future Volume (vph)	21	69	68	540	700	37
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	4.5	4.5	3.5	4.0	4.0	3.5
Total Lost time (s)	5.0		7.1	7.1	7.1	
Lane Util. Factor	1.00		1.00	1.00	1.00	
Frpb, ped/bikes	0.98		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.90		1.00	1.00	0.99	
Flt Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1658		1642	1741	1777	
Flt Permitted	0.99		0.22	1.00	1.00	
Satd. Flow (perm)	1658		375	1741	1777	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	75	74	587	761	40
RTOR Reduction (vph)	57	0	0	0	3	0
Lane Group Flow (vph)	41	0	74	587	798	0
Confl. Peds. (#/hr)		1	4			4
Heavy Vehicles (%)	5%	0%	0%	5%	2%	3%
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	16.2		38.8	38.8	38.8	
Effective Green, g (s)	16.2		38.8	38.8	38.8	
Actuated g/C Ratio	0.24		0.58	0.58	0.58	
Clearance Time (s)	5.0		7.1	7.1	7.1	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	400		216	1006	1027	
v/s Ratio Prot	c0.02			0.34	c0.45	
v/s Ratio Perm			0.20			
v/c Ratio	0.10		0.34	0.58	0.78	
Uniform Delay, d1	19.8		7.4	9.0	10.8	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1		1.0	0.9	3.8	
Delay (s)	19.9		8.4	9.9	14.6	
Level of Service	B		A	A	B	
Approach Delay (s)	19.9			9.7	14.6	
Approach LOS	B			A	B	

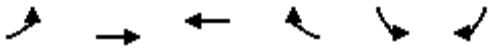
Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	12.1
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	226	296	219	333	339
Future Volume (vph)	226	296	219	333	339
Lane Group Flow (vph)	246	322	551	362	368
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	31.2	31.2	25.2	25.2
Total Split (s)	18.0	58.2	40.2	30.2	30.2
Total Split (%)	20.4%	65.8%	45.5%	34.2%	34.2%
Yellow Time (s)	3.0	3.2	3.2	3.2	3.2
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.2	5.2	5.2	5.2
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?					
Recall Mode	None	Min	Min	None	None
v/c Ratio	0.63	0.34	0.91	0.86	0.56
Control Delay	17.1	9.7	41.0	49.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	9.7	41.0	49.4	6.6
Queue Length 50th (m)	16.9	24.9	71.9	57.4	0.0
Queue Length 95th (m)	37.1	39.7	#132.4	#103.0	20.0
Internal Link Dist (m)		454.3	1002.2	980.4	
Turn Bay Length (m)	20.0			90.0	
Base Capacity (vph)	417	1129	723	501	713
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.29	0.76	0.72	0.52

Intersection Summary

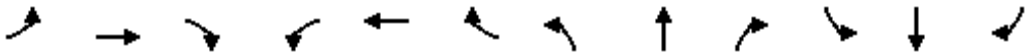
Cycle Length: 88.4
Actuated Cycle Length: 79.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: King Street & Ontario Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	226	296	219	288	333	339
Future Volume (vph)	226	296	219	288	333	339
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	3.0	3.5	3.5	3.5	3.0	3.5
Total Lost time (s)	3.0	5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.92		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1505	1633	1481		1536	1428
Flt Permitted	0.18	1.00	1.00		0.95	1.00
Satd. Flow (perm)	293	1633	1481		1536	1428
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	246	322	238	313	362	368
RTOR Reduction (vph)	0	0	55	0	0	266
Lane Group Flow (vph)	246	322	496	0	362	102
Confl. Peds. (#/hr)	20			20	5	
Heavy Vehicles (%)	3%	6%	6%	4%	1%	3%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	46.6	46.6	29.7		21.9	21.9
Effective Green, g (s)	46.6	46.6	29.7		21.9	21.9
Actuated g/C Ratio	0.59	0.59	0.38		0.28	0.28
Clearance Time (s)	3.0	5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	386	964	557		426	396
v/s Ratio Prot	c0.11	0.20	c0.33		c0.24	
v/s Ratio Perm	0.26					0.07
v/c Ratio	0.64	0.33	0.89		0.85	0.26
Uniform Delay, d1	11.6	8.2	23.1		26.9	22.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	0.2	15.9		14.6	0.3
Delay (s)	15.0	8.4	39.0		41.6	22.5
Level of Service	B	A	D		D	C
Approach Delay (s)		11.3	39.0		32.0	
Approach LOS		B	D		C	

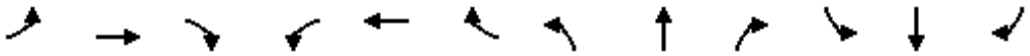
Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	13.4
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	366	12	9	275	35	2	12	14	64	8	16
Future Volume (Veh/h)	34	366	12	9	275	35	2	12	14	64	8	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	398	13	10	299	38	2	13	15	70	9	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	337			411			838	836	404	838	823	318
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337			411			838	836	404	838	823	318
tC, single (s)	4.2			4.2			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	97			99			99	96	98	73	97	98
cM capacity (veh/h)	1200			1096			266	294	651	262	298	711

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	448	347	30	96
Volume Left	37	10	2	70
Volume Right	13	38	15	17
cSH	1200	1096	401	298
Volume to Capacity	0.03	0.01	0.07	0.32
Queue Length 95th (m)	0.7	0.2	1.8	10.3
Control Delay (s)	1.0	0.3	14.7	22.7
Lane LOS	A	A	B	C
Approach Delay (s)	1.0	0.3	14.7	22.7
Approach LOS			B	C

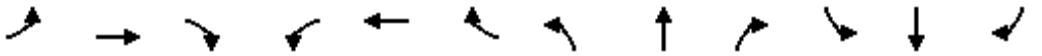
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	57.7%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	487	63	38	330	6	26	0	30	4	0	1
Future Volume (Veh/h)	7	487	63	38	330	6	26	0	30	4	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	529	68	41	359	7	28	0	33	4	0	1
Pedestrians					1			4			3	
Lane Width (m)					4.5			4.5			4.5	
Walking Speed (m/s)					1.1			1.1			1.1	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			601			1028	1034	568	1060	1064	366
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			601			1028	1034	568	1060	1064	366
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			86	100	94	98	100	100
cM capacity (veh/h)	1196			981			204	219	523	182	210	682

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	605	407	61	5
Volume Left	8	41	28	4
Volume Right	68	7	33	1
cSH	1196	981	304	213
Volume to Capacity	0.01	0.04	0.20	0.02
Queue Length 95th (m)	0.2	1.0	5.6	0.5
Control Delay (s)	0.2	1.3	19.8	22.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	1.3	19.8	22.3
Approach LOS			C	C

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	55.5%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	338	5	28	244	81	7	15	9	91	49	65
Future Volume (Veh/h)	48	338	5	28	244	81	7	15	9	91	49	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	367	5	30	265	88	8	16	10	99	53	71
Pedestrians								3			1	
Lane Width (m)								3.5			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	354			375			828	890	372	859	849	310
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			375			828	890	372	859	849	310
tC, single (s)	4.2			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			96	94	99	59	81	90
cM capacity (veh/h)	1166			1191			200	263	676	244	275	725

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	52	372	30	353	34	223
Volume Left	52	0	30	0	8	99
Volume Right	0	5	0	88	10	71
cSH	1166	1700	1191	1700	294	374
Volume to Capacity	0.04	0.22	0.03	0.21	0.12	0.60
Queue Length 95th (m)	1.1	0.0	0.6	0.0	2.9	28.1
Control Delay (s)	8.2	0.0	8.1	0.0	18.8	29.2
Lane LOS	A		A		C	D
Approach Delay (s)	1.0		0.6		18.8	29.2
Approach LOS					C	D

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	47.9%	ICU Level of Service		A
Analysis Period (min)	15			

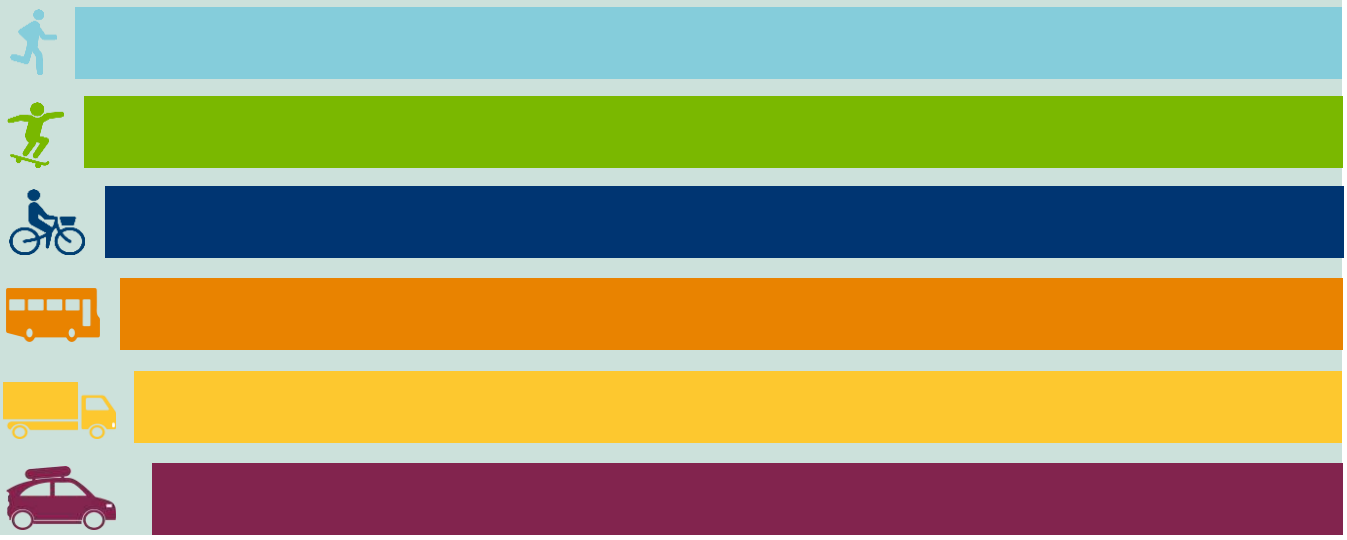
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	382	56	23	315	30	17
Future Volume (Veh/h)	382	56	23	315	30	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	415	61	25	342	33	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			476		838	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476		838	446
tC, single (s)			4.2		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.4
p0 queue free %			98		90	97
cM capacity (veh/h)			1051		326	604

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	476	367	51
Volume Left	0	25	33
Volume Right	61	0	18
cSH	1700	1051	389
Volume to Capacity	0.28	0.02	0.13
Queue Length 95th (m)	0.0	0.6	3.4
Control Delay (s)	0.0	0.8	15.6
Lane LOS		A	C
Approach Delay (s)	0.0	0.8	15.6
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX

B-4 Synchro Output Sheets – Vineland / Campden

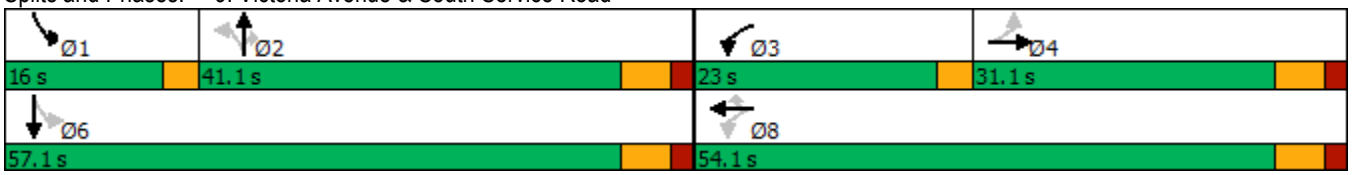


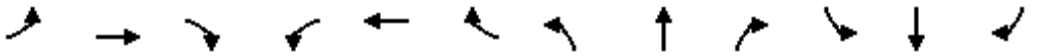
Make moving make sense as we grow!

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	6	20	92	13	79	17	402	266	71	270
Future Volume (vph)	6	20	92	13	79	17	402	266	71	270
Lane Group Flow (vph)	7	29	100	14	86	18	437	289	77	333
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases		4	3	8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	3	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	20.0	20.0	20.0	6.0	20.0
Minimum Split (s)	16.1	16.1	9.0	16.1	16.1	26.1	26.1	26.1	9.0	26.1
Total Split (s)	31.1	31.1	23.0	54.1	54.1	41.1	41.1	41.1	16.0	57.1
Total Split (%)	28.0%	28.0%	20.7%	48.7%	48.7%	37.0%	37.0%	37.0%	14.4%	51.3%
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1
Lead/Lag	Lag	Lag	Lead			Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio	0.04	0.12	0.31	0.03	0.20	0.04	0.51	0.39	0.15	0.37
Control Delay	32.5	27.8	21.2	19.9	6.6	15.2	19.9	11.0	7.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	27.8	21.2	19.9	6.6	15.2	19.9	11.0	7.9	11.0
Queue Length 50th (m)	0.8	2.6	9.0	1.3	0.0	1.5	47.9	14.2	4.3	25.1
Queue Length 95th (m)	4.9	10.8	22.8	5.7	9.7	5.7	87.2	37.8	10.7	48.2
Internal Link Dist (m)		640.3		697.3			3229.5			285.6
Turn Bay Length (m)	40.0		50.0		30.0	80.0		25.0	200.0	
Base Capacity (vph)	425	620	495	1309	1071	587	1008	848	604	1128
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.05	0.20	0.01	0.08	0.03	0.43	0.34	0.13	0.30

Intersection Summary
Cycle Length: 111.2
Actuated Cycle Length: 65.5
Natural Cycle: 65
Control Type: Semi Act-Uncoord

Splits and Phases: 9: Victoria Avenue & South Service Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	20	6	92	13	79	17	402	266	71	270	37
Future Volume (vph)	6	20	6	92	13	79	17	402	266	71	270	37
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1227	1497		1385	1731	1388	1644	1664	1313	1551	1424	
Flt Permitted	0.80	1.00		0.50	1.00	1.00	0.56	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1033	1497		729	1731	1388	969	1664	1313	618	1424	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	22	7	100	14	86	18	437	289	77	293	40
RTOR Reduction (vph)	0	6	0	0	0	65	0	0	72	0	3	0
Lane Group Flow (vph)	7	23	0	100	14	21	18	437	217	77	330	0
Heavy Vehicles (%)	34%	15%	0%	12%	0%	6%	0%	4%	12%	6%	12%	17%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	5.0	5.0		16.9	16.9	16.9	31.9	31.9	31.9	40.4	40.4	
Effective Green, g (s)	5.0	5.0		16.9	16.9	16.9	31.9	31.9	31.9	40.4	40.4	
Actuated g/C Ratio	0.07	0.07		0.24	0.24	0.24	0.46	0.46	0.46	0.58	0.58	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	74	107		261	420	337	444	763	602	433	827	
v/s Ratio Prot		0.02		c0.05	0.01			c0.26		0.01	c0.23	
v/s Ratio Perm	0.01			c0.04		0.02	0.02		0.16	0.09		
v/c Ratio	0.09	0.21		0.38	0.03	0.06	0.04	0.57	0.36	0.18	0.40	
Uniform Delay, d1	30.1	30.4		21.5	20.1	20.2	10.4	13.8	12.2	7.0	7.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	1.0		0.9	0.0	0.1	0.0	1.0	0.4	0.2	0.3	
Delay (s)	30.7	31.4		22.5	20.1	20.3	10.4	14.8	12.6	7.2	8.2	
Level of Service	C	C		C	C	C	B	B	B	A	A	
Approach Delay (s)		31.2			21.4			13.8			8.1	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	18.2
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	32	490	22	13	309
Future Volume (Veh/h)	14	32	490	22	13	309
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	35	533	24	14	336
Pedestrians	8		5			
Lane Width (m)	3.5		3.5			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	1		0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	922	553			565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922	553			565	
tC, single (s)	6.5	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	95	93			99	
cM capacity (veh/h)	285	514			970	

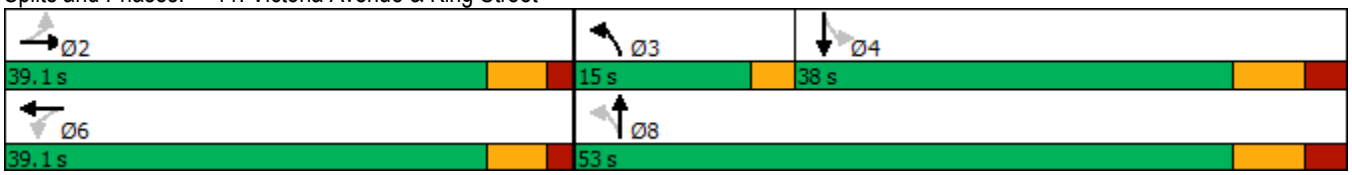
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	50	557	14	336
Volume Left	15	0	14	0
Volume Right	35	24	0	0
cSH	414	1700	970	1700
Volume to Capacity	0.12	0.33	0.01	0.20
Queue Length 95th (m)	3.1	0.0	0.3	0.0
Control Delay (s)	14.9	0.0	8.8	0.0
Lane LOS	B		A	
Approach Delay (s)	14.9	0.0	0.4	
Approach LOS	B			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	48	128	37	112	85	352	44	181
Future Volume (vph)	48	128	37	112	85	352	44	181
Lane Group Flow (vph)	52	214	40	181	92	442	48	235
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		2		6	3	8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	3	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0	8.0	8.0
Minimum Split (s)	33.1	33.1	33.1	33.1	9.0	32.0	32.0	32.0
Total Split (s)	39.1	39.1	39.1	39.1	15.0	53.0	38.0	38.0
Total Split (%)	42.5%	42.5%	42.5%	42.5%	16.3%	57.5%	41.3%	41.3%
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	3.0	8.0	8.0	8.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.21	0.54	0.16	0.46	0.17	0.63	0.20	0.56
Control Delay	19.1	20.6	18.4	18.9	6.5	15.0	17.9	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	20.6	18.4	18.9	6.5	15.0	17.9	21.7
Queue Length 50th (m)	3.6	13.5	2.7	11.1	3.1	25.1	3.2	16.7
Queue Length 95th (m)	12.7	36.2	10.3	30.7	10.3	60.1	11.6	41.7
Internal Link Dist (m)		528.7		470.9		468.8		475.9
Turn Bay Length (m)	15.0		45.0				60.0	
Base Capacity (vph)	690	1050	685	1058	631	1372	537	927
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.20	0.06	0.17	0.15	0.32	0.09	0.25

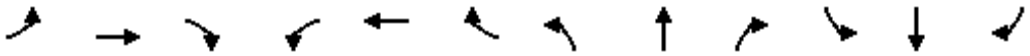
Intersection Summary
Cycle Length: 92.1
Actuated Cycle Length: 49.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 11: Victoria Avenue & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	128	69	37	112	54	85	352	54	44	181	35
Future Volume (vph)	48	128	69	37	112	54	85	352	54	44	181	35
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.1	6.1		6.1	6.1		3.0	8.0		8.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1451	1479		1481	1493		1522	1557		1566	1437	
Flt Permitted	0.64	1.00		0.62	1.00		0.51	1.00		0.51	1.00	
Satd. Flow (perm)	982	1479		973	1493		811	1557		835	1437	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	139	75	40	122	59	92	383	59	48	197	38
RTOR Reduction (vph)	0	25	0	0	22	0	0	6	0	0	8	0
Lane Group Flow (vph)	52	189	0	40	159	0	92	436	0	48	227	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	13%	7%	18%	11%	12%	4%	8%	8%	15%	5%	18%	15%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	12.5	12.5		12.5	12.5		22.8	22.8		14.3	14.3	
Effective Green, g (s)	12.5	12.5		12.5	12.5		22.8	22.8		14.3	14.3	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.46	0.46		0.29	0.29	
Clearance Time (s)	6.1	6.1		6.1	6.1		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	374		246	377		453	718		241	415	
v/s Ratio Prot		c0.13			0.11		0.02	c0.28			0.16	
v/s Ratio Perm	0.05			0.04			0.07			0.06		
v/c Ratio	0.21	0.51		0.16	0.42		0.20	0.61		0.20	0.55	
Uniform Delay, d1	14.6	15.8		14.4	15.4		7.7	9.9		13.2	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1		0.3	0.8		0.2	1.5		0.4	1.5	
Delay (s)	15.0	16.9		14.7	16.2		7.9	11.4		13.6	16.3	
Level of Service	B	B		B	B		A	B		B	B	
Approach Delay (s)		16.5			15.9			10.8			15.8	
Approach LOS		B			B			B			B	

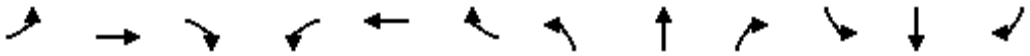
Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.4	Sum of lost time (s)	17.1
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	1	3	1	4	3	29	1	1	52	7
Future Volume (Veh/h)	9	1	1	3	1	4	3	29	1	1	52	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	1	1	3	1	4	3	32	1	1	57	8
Pedestrians		9			9			7			6	
Lane Width (m)		3.5			3.0			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	121	120	77	119	124	48	74			42		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	121	120	77	119	124	48	74			42		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.8			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.8			2.2		
p0 queue free %	99	100	100	100	100	100	100			100		
cM capacity (veh/h)	831	760	975	836	756	1014	1188			1569		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	8	36	66
Volume Left	10	3	3	1
Volume Right	1	4	1	8
cSH	835	903	1188	1569
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (m)	0.3	0.2	0.1	0.0
Control Delay (s)	9.4	9.0	0.7	0.1
Lane LOS	A	A	A	A
Approach Delay (s)	9.4	9.0	0.7	0.1
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	16.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	114	9	12	107	1	16	7	12	2	3	5
Future Volume (Veh/h)	2	114	9	12	107	1	16	7	12	2	3	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	124	10	13	116	1	17	8	13	2	3	5
Pedestrians		1										
Lane Width (m)		3.5										
Walking Speed (m/s)		1.1										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	117			134			283	276	129	292	280	118
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			134			283	276	129	292	280	118
tC, single (s)	4.1			4.2			7.2	6.9	6.2	7.6	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.6	4.4	3.3	4.0	4.0	3.3
p0 queue free %	100			99			97	99	99	100	100	99
cM capacity (veh/h)	1484			1408			648	562	926	556	625	939

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	136	130	38	10
Volume Left	2	13	17	2
Volume Right	10	1	13	5
cSH	1484	1408	697	729
Volume to Capacity	0.00	0.01	0.05	0.01
Queue Length 95th (m)	0.0	0.2	1.3	0.3
Control Delay (s)	0.1	0.8	10.5	10.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.8	10.5	10.0
Approach LOS			B	B

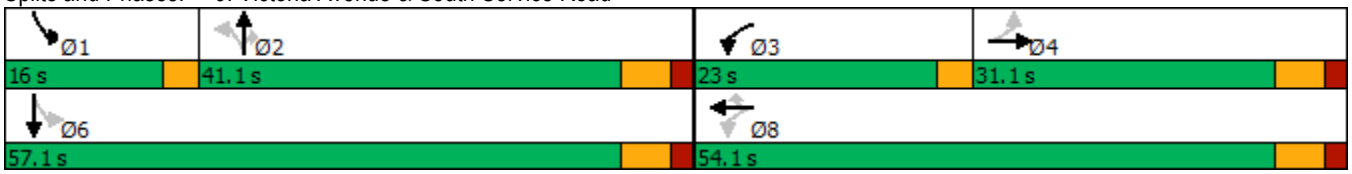
Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	24.8%	ICU Level of Service	A	
Analysis Period (min)	15			

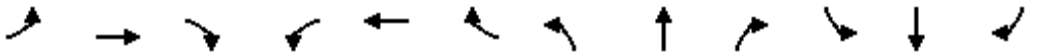
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	5	46	334	6	65	6	251	239	157	399
Future Volume (vph)	5	46	334	6	65	6	251	239	157	399
Lane Group Flow (vph)	5	80	363	7	71	7	273	260	171	452
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases		4	3	8			2		1	6
Permitted Phases	4		8		8	2		2	6	
Detector Phase	4	4	3	8	8	2	2	2	1	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	20.0	20.0	20.0	6.0	20.0
Minimum Split (s)	16.1	16.1	9.0	16.1	16.1	26.1	26.1	26.1	9.0	26.1
Total Split (s)	31.1	31.1	23.0	54.1	54.1	41.1	41.1	41.1	16.0	57.1
Total Split (%)	28.0%	28.0%	20.7%	48.7%	48.7%	37.0%	37.0%	37.0%	14.4%	51.3%
Yellow Time (s)	4.1	4.1	3.0	4.1	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1
Lead/Lag	Lag	Lag	Lead			Lag	Lag	Lag	Lead	
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Min	Min	Min	None	Min
v/c Ratio	0.03	0.31	0.76	0.01	0.13	0.03	0.57	0.48	0.35	0.64
Control Delay	34.0	28.8	30.6	16.5	5.4	22.5	30.5	10.8	14.0	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	28.8	30.6	16.5	5.4	22.5	30.5	10.8	14.0	22.0
Queue Length 50th (m)	0.7	7.5	37.5	0.6	0.0	0.8	36.3	7.8	14.4	53.0
Queue Length 95th (m)	4.0	22.2	#85.4	3.4	8.0	3.9	64.5	28.8	27.2	89.4
Internal Link Dist (m)		640.3		697.3			3229.5			285.6
Turn Bay Length (m)	40.0		50.0		30.0	80.0		25.0	200.0	
Base Capacity (vph)	447	577	522	1140	930	417	769	760	530	1035
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.14	0.70	0.01	0.08	0.02	0.36	0.34	0.32	0.44

Intersection Summary

Cycle Length: 111.2
Actuated Cycle Length: 75.8
Natural Cycle: 65
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Victoria Avenue & South Service Road





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	46	28	334	6	65	6	251	239	157	399	17
Future Volume (vph)	5	46	28	334	6	65	6	251	239	157	399	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1644	1633		1464	1731	1375	1644	1602	1375	1581	1478	
Flt Permitted	0.75	1.00		0.51	1.00	1.00	0.50	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1303	1633		787	1731	1375	869	1602	1375	734	1478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	50	30	363	7	71	7	273	260	171	434	18
RTOR Reduction (vph)	0	22	0	0	0	44	0	0	136	0	1	0
Lane Group Flow (vph)	5	58	0	363	7	27	7	273	124	171	451	0
Heavy Vehicles (%)	0%	0%	0%	6%	0%	7%	0%	8%	7%	4%	9%	30%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	7.9	7.9		28.8	28.8	28.8	22.9	22.9	22.9	36.0	36.0	
Effective Green, g (s)	7.9	7.9		28.8	28.8	28.8	22.9	22.9	22.9	36.0	36.0	
Actuated g/C Ratio	0.10	0.10		0.37	0.37	0.37	0.30	0.30	0.30	0.47	0.47	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.1	6.1	6.1	3.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	133	167		451	647	514	258	476	408	454	691	
v/s Ratio Prot		0.04		c0.19	0.00			0.17		0.05	c0.31	
v/s Ratio Perm	0.00			c0.11		0.02	0.01		0.09	0.13		
v/c Ratio	0.04	0.34		0.80	0.01	0.05	0.03	0.57	0.30	0.38	0.65	
Uniform Delay, d1	31.1	32.1		20.1	15.1	15.4	19.2	22.9	20.9	12.6	15.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.2		10.0	0.0	0.0	0.0	1.7	0.4	0.5	2.2	
Delay (s)	31.2	33.4		30.2	15.2	15.4	19.2	24.6	21.3	13.1	17.9	
Level of Service	C	C		C	B	B	B	C	C	B	B	
Approach Delay (s)		33.3			27.6			22.9			16.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.2
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	16	371	10	35	644
Future Volume (Veh/h)	11	16	371	10	35	644
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	17	403	11	38	700
Pedestrians	1		8			
Lane Width (m)	3.5		3.5			
Walking Speed (m/s)	1.1		1.1			
Percent Blockage	0		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1194	410			415	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1194	410			415	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	94	97			97	
cM capacity (veh/h)	200	631			1154	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	29	414	38	700
Volume Left	12	0	38	0
Volume Right	17	11	0	0
cSH	333	1700	1154	1700
Volume to Capacity	0.09	0.24	0.03	0.41
Queue Length 95th (m)	2.2	0.0	0.8	0.0
Control Delay (s)	16.8	0.0	8.2	0.0
Lane LOS	C		A	
Approach Delay (s)	16.8	0.0	0.4	
Approach LOS	C			

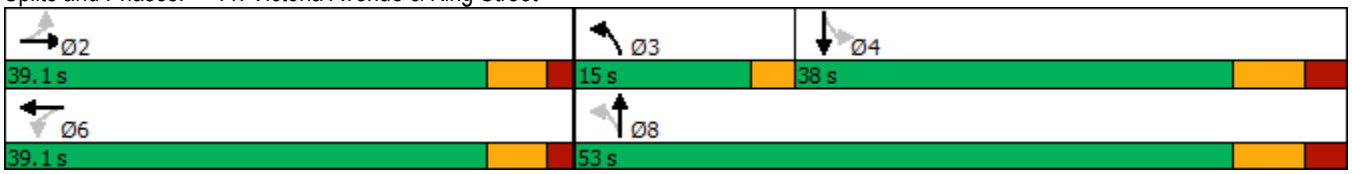
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

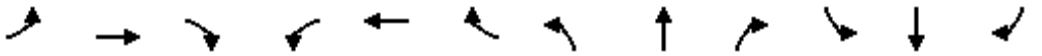
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	60	156	88	192	66	262	69	404
Future Volume (vph)	60	156	88	192	66	262	69	404
Lane Group Flow (vph)	65	284	96	314	72	369	75	505
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		2		6	3	8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	3	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0	8.0	8.0
Minimum Split (s)	33.1	33.1	33.1	33.1	9.0	32.0	32.0	32.0
Total Split (s)	39.1	39.1	39.1	39.1	15.0	53.0	38.0	38.0
Total Split (%)	42.5%	42.5%	42.5%	42.5%	16.3%	57.5%	41.3%	41.3%
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	3.0	8.0	8.0	8.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.36	0.64	0.45	0.73	0.19	0.47	0.19	0.77
Control Delay	27.9	27.1	30.2	32.4	8.6	13.2	18.6	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	27.1	30.2	32.4	8.6	13.2	18.6	30.9
Queue Length 50th (m)	7.3	29.5	11.1	35.6	3.5	25.6	6.3	56.5
Queue Length 95th (m)	18.2	54.2	24.9	63.2	11.2	60.1	19.1	#138.5
Internal Link Dist (m)		528.7		470.9		468.8		475.9
Turn Bay Length (m)	15.0		45.0				60.0	
Base Capacity (vph)	332	778	384	759	456	977	406	685
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.37	0.25	0.41	0.16	0.38	0.18	0.74

Intersection Summary

Cycle Length: 92.1
Actuated Cycle Length: 70.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

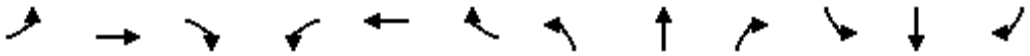
Splits and Phases: 11: Victoria Avenue & King Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	156	105	88	192	97	66	262	77	69	404	61
Future Volume (vph)	60	156	105	88	192	97	66	262	77	69	404	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.1	6.1		6.1	6.1		3.0	8.0		8.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.94		1.00	0.95		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1567	1568		1609	1543		1442	1475		1628	1551	
Flt Permitted	0.42	1.00		0.47	1.00		0.31	1.00		0.54	1.00	
Satd. Flow (perm)	692	1568		797	1543		477	1475		928	1551	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	170	114	96	209	105	72	285	84	75	439	66
RTOR Reduction (vph)	0	30	0	0	23	0	0	11	0	0	5	0
Lane Group Flow (vph)	65	254	0	96	291	0	72	358	0	75	500	0
Confl. Peds. (#/hr)	11		2	2		11			11	11		
Heavy Vehicles (%)	4%	2%	4%	2%	7%	2%	14%	11%	17%	0%	9%	12%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	18.8	18.8		18.8	18.8		38.2	38.2		29.6	29.6	
Effective Green, g (s)	18.8	18.8		18.8	18.8		38.2	38.2		29.6	29.6	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.54	0.54		0.42	0.42	
Clearance Time (s)	6.1	6.1		6.1	6.1		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	182	414		210	407		332	792		386	645	
v/s Ratio Prot		0.16			c0.19		0.02	c0.24			c0.32	
v/s Ratio Perm	0.09			0.12			0.10			0.08		
v/c Ratio	0.36	0.61		0.46	0.72		0.22	0.45		0.19	0.77	
Uniform Delay, d1	21.2	23.0		21.9	23.7		9.0	10.1		13.2	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.7		1.6	5.9		0.3	0.4		0.2	5.8	
Delay (s)	22.4	25.6		23.5	29.6		9.3	10.5		13.4	23.7	
Level of Service	C	C		C	C		A	B		B	C	
Approach Delay (s)		25.0			28.2			10.3			22.3	
Approach LOS		C			C			B			C	

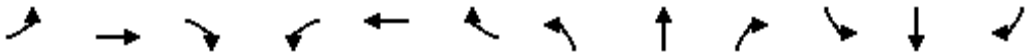
Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.1	Sum of lost time (s)	17.1
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	1	19	2	0	0	5	64	4	0	70	7
Future Volume (Veh/h)	19	1	19	2	0	0	5	64	4	0	70	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	1	21	2	0	0	5	70	4	0	76	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	162	164	80	184	166	72	84			74		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162	164	80	184	166	72	84			74		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	98	100	100	100	100			100		
cM capacity (veh/h)	792	730	986	763	724	990	1526			1526		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	43	2	79	84
Volume Left	21	2	5	0
Volume Right	21	0	4	8
cSH	874	763	1526	1526
Volume to Capacity	0.05	0.00	0.00	0.00
Queue Length 95th (m)	1.2	0.1	0.1	0.0
Control Delay (s)	9.3	9.7	0.5	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.3	9.7	0.5	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	18.4%	ICU Level of Service	A	
Analysis Period (min)	15			



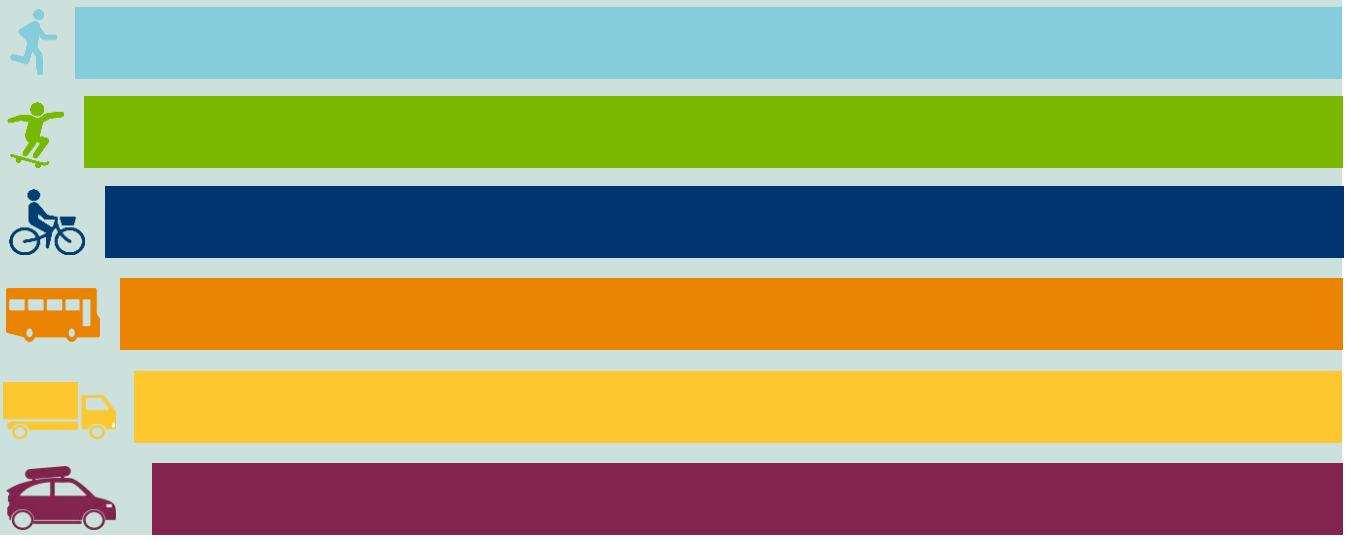
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	160	18	14	134	4	11	6	12	2	2	7
Future Volume (Veh/h)	5	160	18	14	134	4	11	6	12	2	2	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	174	20	15	146	4	12	7	13	2	2	8
Pedestrians		4										
Lane Width (m)		3.5										
Walking Speed (m/s)		1.1										
Percent Blockage		0										
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	150			194			385	374	184	388	382	152
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	150			194			385	374	184	388	382	152
tC, single (s)	4.5			4.3			7.1	6.5	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.6			2.4			3.5	4.0	3.5	3.5	4.0	3.3
p0 queue free %	100			99			98	99	98	100	100	99
cM capacity (veh/h)	1229			1268			561	551	821	553	545	896

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	199	165	32	12
Volume Left	5	15	12	2
Volume Right	20	4	13	8
cSH	1229	1268	641	740
Volume to Capacity	0.00	0.01	0.05	0.02
Queue Length 95th (m)	0.1	0.3	1.2	0.4
Control Delay (s)	0.2	0.8	10.9	9.9
Lane LOS	A	A	B	A
Approach Delay (s)	0.2	0.8	10.9	9.9
Approach LOS			B	A

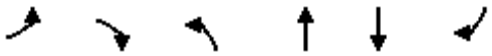
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	26.4%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX

B-5 Synchro Output Sheets – Jordan / East Lincoln



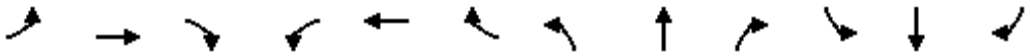
Make moving make sense as we grow!



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	60	1	0	52	19	24
Future Volume (vph)	60	1	0	52	19	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	1	0	57	21	26

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	66	57	47
Volume Left (vph)	65	0	0
Volume Right (vph)	1	0	26
Hadj (s)	0.36	0.07	-0.20
Departure Headway (s)	4.5	4.2	3.9
Degree Utilization, x	0.08	0.07	0.05
Capacity (veh/h)	781	837	898
Control Delay (s)	7.9	7.5	7.1
Approach Delay (s)	7.9	7.5	7.1
Approach LOS	A	A	A

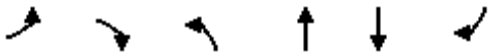
Intersection Summary			
Delay		7.5	
Level of Service		A	
Intersection Capacity Utilization		14.0%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	164	12	38	94	3	9	13	43	6	8	5
Future Volume (Veh/h)	7	164	12	38	94	3	9	13	43	6	8	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	178	13	41	102	3	10	14	47	7	9	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	105			191			396	388	184	440	392	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105			191			396	388	184	440	392	104
tC, single (s)	4.8			4.1			7.2	6.5	6.2	7.1	6.6	6.4
tC, 2 stage (s)												
tF (s)	2.8			2.2			3.6	4.0	3.3	3.5	4.1	3.5
p0 queue free %	99			97			98	97	95	99	98	99
cM capacity (veh/h)	1145			1377			521	530	855	478	508	904

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	199	146	71	21
Volume Left	8	41	10	7
Volume Right	13	3	47	5
cSH	1145	1377	706	554
Volume to Capacity	0.01	0.03	0.10	0.04
Queue Length 95th (m)	0.2	0.7	2.5	0.9
Control Delay (s)	0.4	2.3	10.7	11.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	2.3	10.7	11.8
Approach LOS			B	B

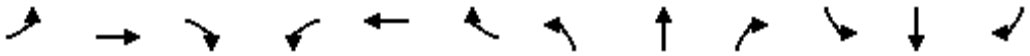
Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	33.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	46	2	1	21	49	67
Future Volume (vph)	46	2	1	21	49	67
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	2	1	23	53	73

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	52	24	126
Volume Left (vph)	50	1	0
Volume Right (vph)	2	0	73
Hadj (s)	0.17	0.01	-0.31
Departure Headway (s)	4.4	4.1	3.7
Degree Utilization, x	0.06	0.03	0.13
Capacity (veh/h)	794	842	946
Control Delay (s)	7.7	7.3	7.3
Approach Delay (s)	7.7	7.3	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		



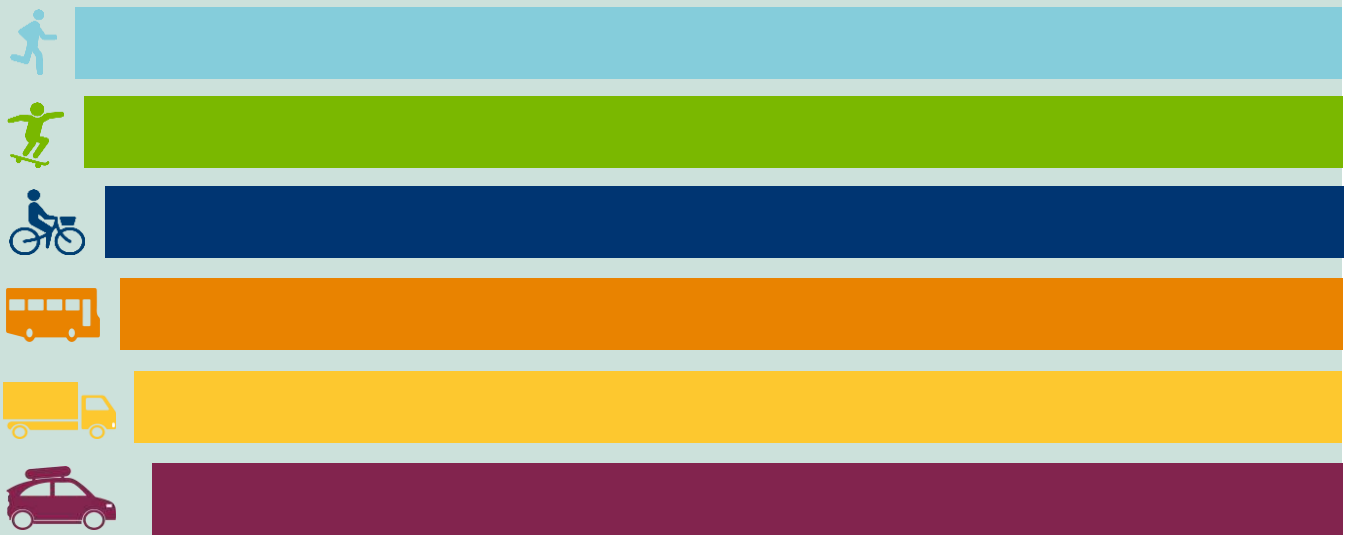
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	293	9	53	175	4	9	13	21	5	17	3
Future Volume (Veh/h)	4	293	9	53	175	4	9	13	21	5	17	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	318	10	58	190	4	10	14	23	5	18	3
Pedestrians								2			1	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	195			330			653	644	325	670	647	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195			330			653	644	325	670	647	193
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.5	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.9	4.0	3.3
p0 queue free %	100			95			97	96	97	98	95	100
cM capacity (veh/h)	1389			1239			353	373	719	292	372	853

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	332	252	47	26
Volume Left	4	58	10	5
Volume Right	10	4	23	3
cSH	1389	1239	480	377
Volume to Capacity	0.00	0.05	0.10	0.07
Queue Length 95th (m)	0.1	1.1	2.5	1.7
Control Delay (s)	0.1	2.2	13.3	15.3
Lane LOS	A	A	B	C
Approach Delay (s)	0.1	2.2	13.3	15.3
Approach LOS			B	C

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	44.7%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX

C Intersection Geometric Design Review



Make moving make sense as we grow!

Town of Lincoln's Transportation Master Plan

Intersection Geometric Design Review

As part of existing conditions of traffic operations, a site visit was completed to understand the current geometric layout at select intersections and to identify any improvements that could be made to the design to improve safety and efficiency of operations. The intersections reviewed were determined based on conversations with Town staff and a review of the available collision data. A summary of the observations for each intersection reviewed are provided below:

1. King Street at Thirty Road
   - Steep slope approaching the intersection on northbound approach plus horizontal curvature along King Street. Speed limit on King Street is 70km/h, coupled with the curvature of the road results in potential sightline issues.
   - There is currently a "Stop Ahead" sign in place, however flashing beacons can be installed to improve visibility during night-time conditions.
2. King Street at Mountainview Road
   - Steep slope approaching the intersection on northbound approach plus some overgrown shrubbery could cause horizontal sightline issues.
   - There is currently a "Stop Ahead" sign in place, however flashing beacons can be installed to improve visibility during night-time conditions.
3. King Street at Lincoln Avenue
   - Potential horizontal sightline issues at stop bar for the northbound approach due to the angle of the intersection and some overgrown shrubbery. The sightline issue for the southbound is likely due to the house located close to the pavement edge, within the daylight triangles.
4. King Street at Stadelbauer Drive
   - Potential vertical sightline issues for the eastbound left-turn movement, which would increase delays due to the single lane per direction. Similarly, the southbound right-turn and northbound left-turn movements experience the same vertical sightline issues.
   - Potential horizontal sightline issues for the northbound and southbound approaches due to the curvature of King Street coupled with overgrown shrubbery within the daylight triangles.
5. Ontario Street at Friesen Boulevard
   - Eastbound right-turn vehicles were seen by-passing intersection via the bakery parking lot if vehicles are waiting to make the eastbound left-turn movement.
6. Ontario Street at Greenlane
   - One through lane along Ontario heading northbound, no sightline issues observed at the intersection.

7. Ontario Street and South Service Road
   - Trucks making the eastbound right-turn movement may experience some difficulty.
8. John Street at Sann Road
   - Potential horizontal sightline issues for the northbound approach due to overgrown shrubbery.
9. King Street at Quarry Road
   - Enough signage heading southbound along Quarry Road with 50 km/h sign and northbound towards King Street with 30 km/h signage. Considering this road is surrounded by forestry and limited lighting, it would be beneficial to implement enhanced lighting to improve night-time conditions.
10. King Street at Bartlett Street/Aberdeen Road
    - Potential horizontal sightline issues for the northbound and southbound approaches due to overgrown shrubbery.
    - Potential vertical sightline issues heading northbound towards King Street; currently signage in place, which could be enhanced with additional lighting.
11. Drake Street and Ontario Street
    - No sightline issues were observed.
12. Greenlane at Bartlett Street
    - No sightline issues were observed.
    - Future realignment of Greenlane would investigate any sightline issues.
13. King Street at Ninth Street
    - Northbound approach – potential vertical sightline issue looking east and horizontal sightline issue looking west (overgrown shrubbery).
14. King Street at Nineteenth Street
    - Technically five-legged intersection coupled with potential vertical and horizontal sightline issues along King Street makes this intersection challenging to maneuver. A signal would be beneficial to improve safety and visibility.
15. Nineteenth Street and Glen Road
    - No sightline issues were observed.
16. St. John Drive at Nineteenth Street
    - Vertical sightline issue on St. John Drive looking north along King Street.

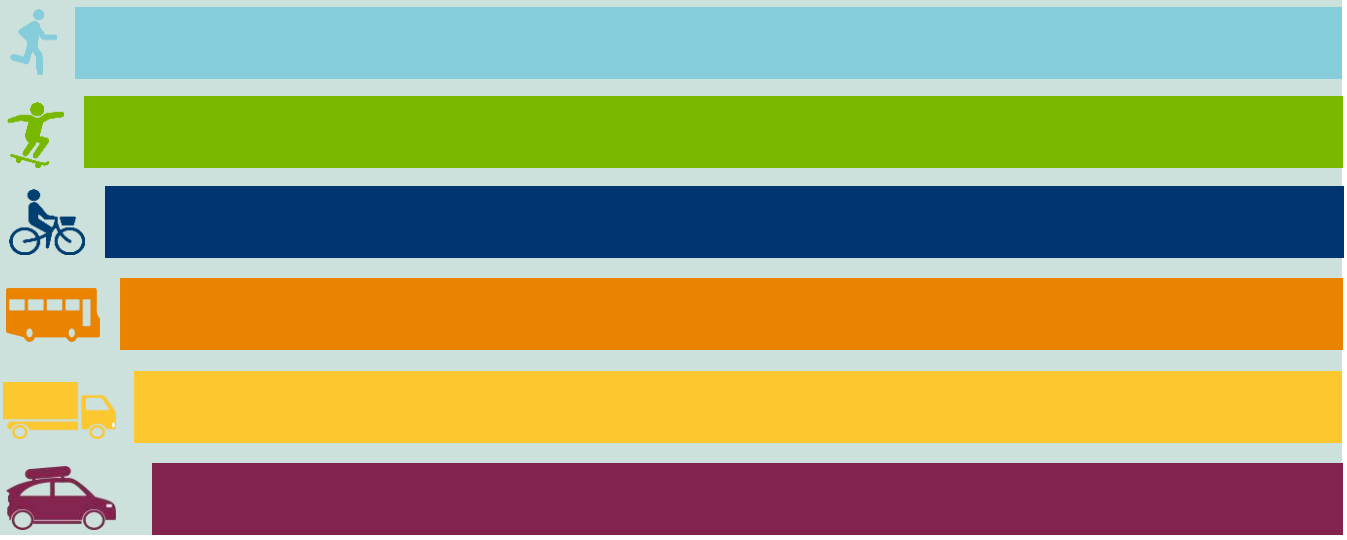
17. Victoria Avenue at Culp Road
    - No sightline issues were observed.
18. Victoria Avenue at Second Avenue
    - Some vertical sightline issues on Second Avenue looking south on Victoria Avenue.
19. Victoria Avenue at South Service Road
    - Vehicles (especially trucks) making the westbound left-turn movement encroach on the northbound left-turn lane.

Based on the site visit, most of the observed intersections were designed and constructed acceptably with some potential sightline constraints due to either steep slopes at the intersection approaches, overgrown shrubbery or objects located within the daylight triangles. However, based on field observations there seem to be some safety concerns particularly at the King / Stadelbauer, King / Nineteenth and Victoria / South Service Road intersections.

For majority of the reviewed intersections, additional lighting would improve visibility of the implemented signage. The Town and the Region should jointly review the potential issues identified in the site visit to determine if any remedial measures are required.

APPENDIX

D Consultation Summary



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Town of Lincoln

Town of Lincoln's Transportation Master Plan

Consultation Summary

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1.0 INTRODUCTION

1.1 ENGAGEMENT APPROACH

The Town of Lincoln Transportation Master Plan (TMP) has been developed to serve as a blueprint that will guide decision-making to improve the transportation operations and conditions in the Town. The Master Plan has been developed to be consistent with the Master Plan Approach 1 of the Municipal Class Environmental Assessment (MCEA) Process, which requires a minimum of two points of contact for public engagement. **Table 1** outlines the project milestones where engagement and consultation are required through the MCEA process. Consultation was a key component, with several opportunities provided for the engagement, consultation and communication with a wide range of audiences.

Table 1 - Engagement and Consultation Milestones

1	**Identify program or opportunity**	Provide opportunities to gather input on existing conditions including opportunities, constraints and areas of improvement
2	**Identify alternative solutions**	Gather input on potential infrastructure alternatives and improvements to help select preferred options and gather input on priorities

To develop the Lincoln TMP, the study team aimed to go beyond the MCEA requirements and engage with six key audience groups including residents, technical agencies, local stakeholders, committee members, Town Council and Town staff. Each group offered unique ideas, preferences, values and interests. The result was the development of strategies and recommendations that are representative of the interests, ideas and preferences of Lincoln residents, decision makers, staff and agencies. The consultation and engagement opportunities were selected and undertaken as part of the Lincoln TMP to reflect a “Made in Lincoln” approach that was designed specifically based on these audiences, their communication and consultation preferences and the overall objectives for each of the study phases.

1.2 ENGAGEMENT PRINCIPLES

The consultation and engagement program for the Lincoln TMP was developed based on the process and principles of the International Association of Public Participation (IAP2). The IAP2 process identifies five (5) potential levels of engagement: inform, consult, involve, collaborate and empower. **Table 2** illustrates the levels of engagement and the commitments that are provided to the audiences.

Table 2 - Overview of IAP2 Engagement Levels

Inform

Residents and stakeholders are kept appraised of the ongoing project including work undertaken, outcomes, recommendations and the preferred outcomes.

Consult

Key audiences are consulted for feedback at key project milestones to assist in the shaping of the outcome.

Involve

Technical agencies, stakeholders and decision makers' concerns and interests directly influence the outputs of the project.

Collaborate

Staff and Council advice and innovation is requested and incorporated into the selection of recommendations, policies and strategies to shape the TMP

Empower

Decisions made by staff and other decision makers are implemented.

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A typical transportation master plan achieves the first two levels of the IAP2 approach described above. However, for the Lincoln TMP, the project team aimed to provide a range of consultation and engagement commitments to various audiences from involvement to collaboration. In doing so, this TMP will establish a long-term blueprint reflecting community priorities and principles.

The consultation and engagement program was developed, designed and implemented based on a set of seven (7) key principles, outlined in **Table 3**, which reflected the priorities, preferences and objectives of the project team.

Table 3 - Consultation and Engagement Principles

1	**Accessible**	Provide information that is not only accessible from a technical understanding standpoint but also venues which can be accessed by people of all ages and abilities.
2	**Creative**	Plan engagement activities that are considered creative and innovative but are also based on best practices and tailored to the various audiences.
3	**Proven**	Build on past consultation efforts and best practices for consultation in the Town of Milton and surrounding communities of similar scale and scope.
4	**Adaptive**	Be adaptive, open, and flexible to additional consultation events and / or methods of promotion and / or education.
5	**Meaningful**	Establish opportunities for meaningful exchange of information, dialogue and input gathering.
6	**Equitable**	Provide a range of opportunities that target all potential audiences resulting in an equitable engagement process.
7	**Complementary**	Establish a consultation approach that is complementary to ongoing planning initiatives being undertaken by the Town and its partners.

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1.3 WHO WAS ENGAGED

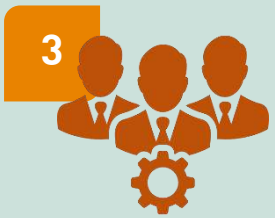
Three (3) groups were consulted as part of the development of the Lincoln TMP – members of the public, stakeholders / technical agency representatives and Town council / committee / senior management. Each audience was identified and defined prior to the commencement of the project to ensure that the appropriate consultation, engagement and communication tactics and tools were utilized. The audiences are described in **Figure 1**.

Public

This audience represents the individuals who live, work and play within the Town of Lincoln. They have a strong interest in the outcomes of the study, as these outcomes will have a direct impact on their day-to-day activities, taxes, property values and quality of life. This group's opinions and interests vary depending on factors such as geographic location, proximity to various modes of transportation, and socio-demographic backgrounds.

Stakeholders

This group included representatives of local interest groups, service clubs, and neighbourhood associations as well as technical agencies. They have a vested interest in the outcomes of the TMP with some of the stakeholders holding a role in components of the plan's implementation – specifically infrastructure improvements while other have a role supporting the Town with programs and initiatives and provide perspective on their community's values and interests.



Town Staff & Councilors

This group is involved in the day-to-day planning, implementation, decision-making, operation and management of the TMP. They understand the internal politics, technical issues and opportunities, budget expectations, and strategic directions in which the Town wishes to go and ultimately decide what is selected and recommended through the TMP as well as the approval and adoption of the document.

Figure 1 - Overview of Engagement Audiences

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2.0 WHAT WE HEARD

Documenting the input, comments and ideas throughout the consultation and engagement process provided valuable support for Lincoln's TMP and allowed the consultant team to collaborate with key partners and develop recommendations that reflect community values and interests. The input gathered at each stage / milestone of consultation and engagement was documented. In addition to the consultation and engagement tactics, there were also several promotion and communication tools used to increase awareness, interest and involvement. The following sections provide an overview of:

- Communication and outreach tactics that were undertaken to help promote the study to various audiences;
- Round 1 consultation and engagement activities to inform phase 2 of the work plan; and
- Round 2 consultation and engagement activities to inform phases 3 and 4 of the work plan.

Photo taken at Lincoln TMP Public Information Centre (PIC) #1 – March 27, 2018

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2.1 COMMUNICATION AND PROMOTION

Communication is a core component to any master plan development process. Providing clear, consistent and interesting information was a priority for the project team when addressing any communication tool or tactic. Prior to project commencement, a *"project specific look and feel"* was developed and used to generate several promotion and communication tools utilized to encourage and enhance involvement. The look and feel was developed based on corporate communication standards and used on all communication tactics and documentations for consistency. In addition to traditional notifications and outreach, illustrated and described in **Figure 2**, the promotional material was also distributed throughout the Town at key community destinations.

Project website

The Town of Lincoln developed a website (lincolntmp.com) dedicated to providing audiences with updates and information, and to promote project events and input opportunities.

Project email

An email account was set up and managed for the duration of the project as a forum for ongoing dialogue between the study team and key contacts.

Social media

The Town of Lincoln's existing social media presence was used to promote the project's intents and values as well as to promote events and other opportunities for input.

Promotional materials

Newspaper ads, newsletters, and project posters project's *look and feel* to promote public meetings and the online tool.

Figure 2 – Overview of types of communication used for the Lincoln TMP

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2.2 ROUND 1 CONSULTATION

During the Fall of 2017 and Winter of 2018, stakeholders and members of the public were asked to participate in the first round of engagement with a focus on gathering input on current transportation trends and habits, preferences and areas of improvement. This round of engagement was designed to achieve the first three levels of commitment identified in the IAP2 process. The consultation and engagement tools and tactics selected for the first round of engagement meet the following commitments to the key audiences:

1. To **inform** the different audiences of the intents and purposes of the project, the desired outcomes and foundational principles.
2. To **consult** with audiences to gather input regarding various transportation habits, values and interests including opportunities and challenges related to improvements.
3. To **involve** key audiences to gather input on the vision and objectives of the study.

The consultation and engagement tactics provided significant context on the study prior to asking detailed questions and gathering input. The following subsections provide a summary of the approach used to engage the various audiences and the input received.

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1
2
3
4
5
6

2.2.1 Public Engagement

Three (3) methods were used to engage and consult with members of the public during the first round of engagement, including an online survey administered through the project website, an information center integrated into the Town's Homecoming Festival and a public open house. A summary of the input received through these three consultation tools is provided below. Detailed responses are provided in **Appendix D-1**.

Homecoming Festival

Public consultation was initiated at the Town's annual Homecoming Festival held on the September 29, 2017 weekend. Members of the project team attended the event and had a booth to promote the study. Vouchers were distributed at the Homecoming Festival that contained a link to the project website. The voucher could also be used as a ticket for a free skate at any Town arena.

Online Survey #1 – A Bit About You

An online survey was developed at the beginning of the study to gather input on the current transportation usage, habits and preference of Lincoln residents. The survey had a total of eight (8) questions and was hosted on the project website.

The survey covered a general range of topics to gather a high-level overview of the current transportation related issues and concerns experienced by Lincoln residents and visitors. The following are some of the themes which have emerged based on the responses provided to date.

Objective: to provide online opportunities to gather input on transportation habits, values, interests, opportunities and challenges.

Participants: Total of 24 responses, of which 23 were Lincoln residents.

Timeline: The survey was hosted on the Project Website between November 2017 and May 2018.

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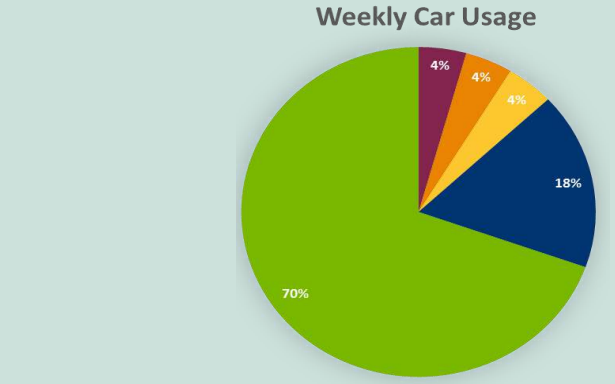
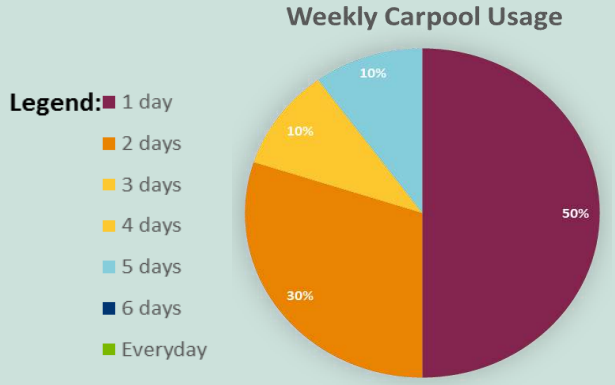
Weekly Transportation Usage

This activity asked respondents to estimate how many days in a typical week they drive a car, carpool, take transit, walk, cycle or engage in other modes of transportation.

Approximately 90% of respondents drive at least six (6) days in a week. 16 respondents also indicated that they carpool as a mode of transportation. 80% of these respondents indicated that they carpool once or twice a week.

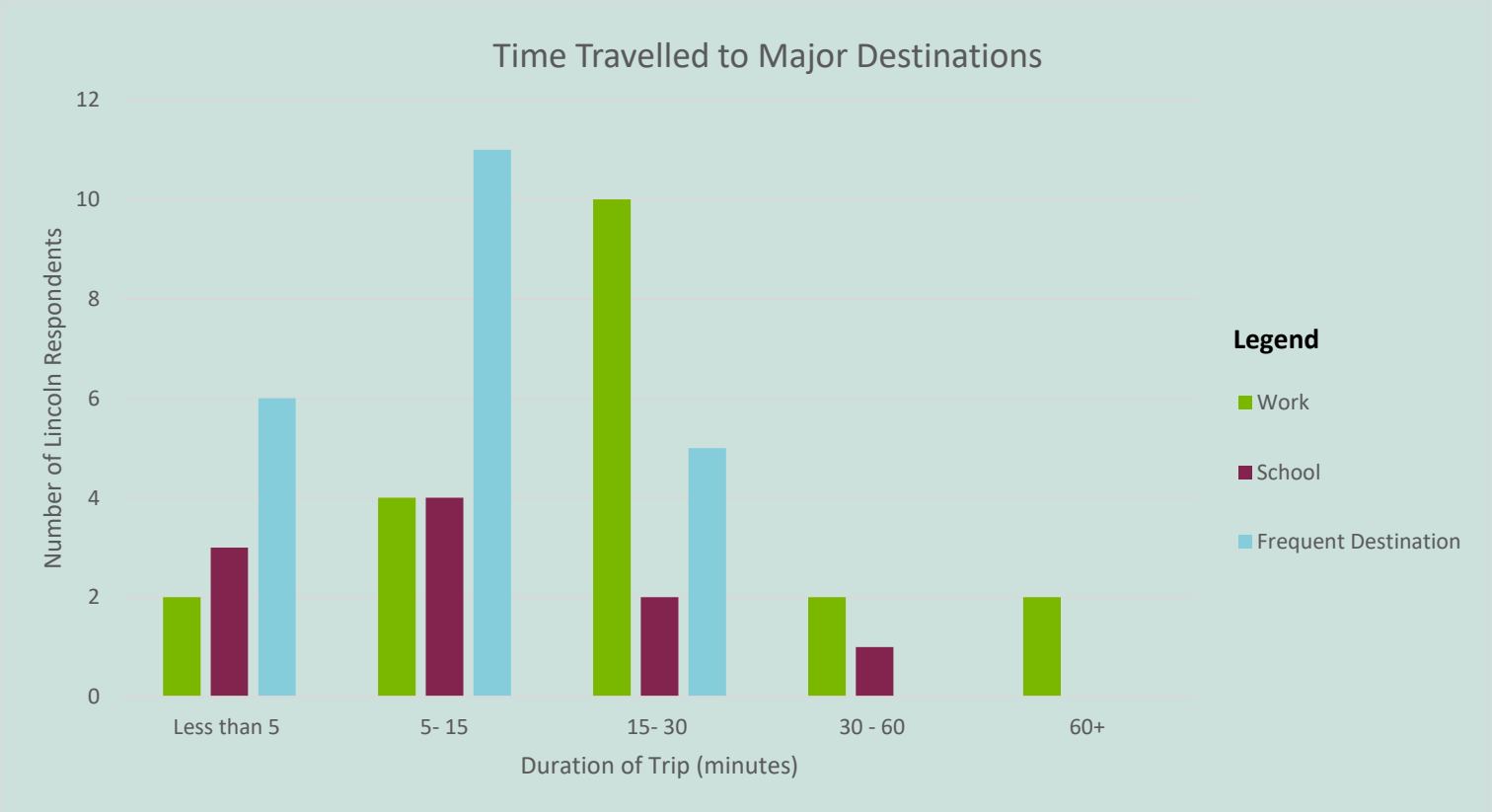
Followed by most respondents who drive at least six times a week, walking was indicated as the most frequent use of transportation by respondents. When developing the Lincoln TMP, it is important to understand the opportunities and challenges that existing in the Town as well as attributes such as distance to major destinations, transit availability and reliability, and active transportation infrastructure that could impact transportation decisions for residents and visitors.





Distance to Major Destinations

The survey asked respondents to estimate how long it takes them to travel from their home to major destinations such as their place of work, school and other frequent destinations including grocery stores, shopping centres, other entertainment, etc. Based on the survey results, a majority of the respondents travel approximately 15 to 30 minutes for work, less than 15 minutes to school and at most 30 minutes to reach a frequent destination. To provide some context, the City of St. Catharines and the City of Hamilton are approximately 30 minutes east and west from the center of Beamsville, respectively.



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Transit Priorities

Respondents were asked to provide their opinion on transit priorities within and surrounding the Town. As noted above, most residents live within 30 minutes of work, school and entertainment / service activities. Therefore, it is important to understand what it will take for auto-dependent residents to consider using other modes of transportation such as transit. The following transit priorities were ranked based on the responses collected from the survey.

1. Connections to Major Centers within Niagara Region
2. Regional Service with Connections to the Greater Toronto and Hamilton Area
3. Implemented within the Town's urban centers
4. Focus should be on non-transit-related issues
5. Provide transit in rural areas on an as-needed basis

Transportation Improvement Priorities

Respondents were also asked to provide their opinion on the importance of the Town's transportation improvement priorities, with the key categories described and illustrated below. The majority of respondents rated accessibility, connectivity and convenience to be the top three category of transportation improvements necessary to improve the community.

ACCESSIBILITY

Connect seniors and vulnerable persons to necessary services.

CONVENIENCE

Provide easier and more equitable transportation connections into the Town.

CONNECTIVITY

Improve connections to surrounding municipalities and Toronto.

HEALTH

Provide viable active transportation options.

COMMUNITY

Complete, attractive and connected communities.

Respondents emphasized the need to improve active transportation facilities to increase the safety and usability by senior residents and vulnerable persons within the community. A sample of the suggested improvements include:

- Providing sidewalks along local and main roads especially along roads that connect to schools
- Maintaining roadways including roads with lower vehicular traffic
- Enforcing speed limits
- Providing well-lit roadways
- Separating heavy truck traffic from pedestrians and cyclists
- Providing equitable choices for non-motorized forms of transportation

Online Survey #2 – Active Transportation

A second online survey was prepared and contained questions to collect input and feedback to improve active transportation conditions in Lincoln.

The survey had a total of 10 questions and was aimed at gathering resident opinions on the existing active transportation infrastructure in Lincoln, their level of comfort and the frequency using the Town's existing facilities. The two (2) key themes that were derived from the survey results are discussed below.

Objective: Provide online opportunities to gather opinions on existing Active Transportation infrastructure in Lincoln and how it can be improved.

Participants: The survey had a total of 17 responses, of which 15 were Lincoln residents.

Timeline: The survey was hosted between November 2017 and May 2018.

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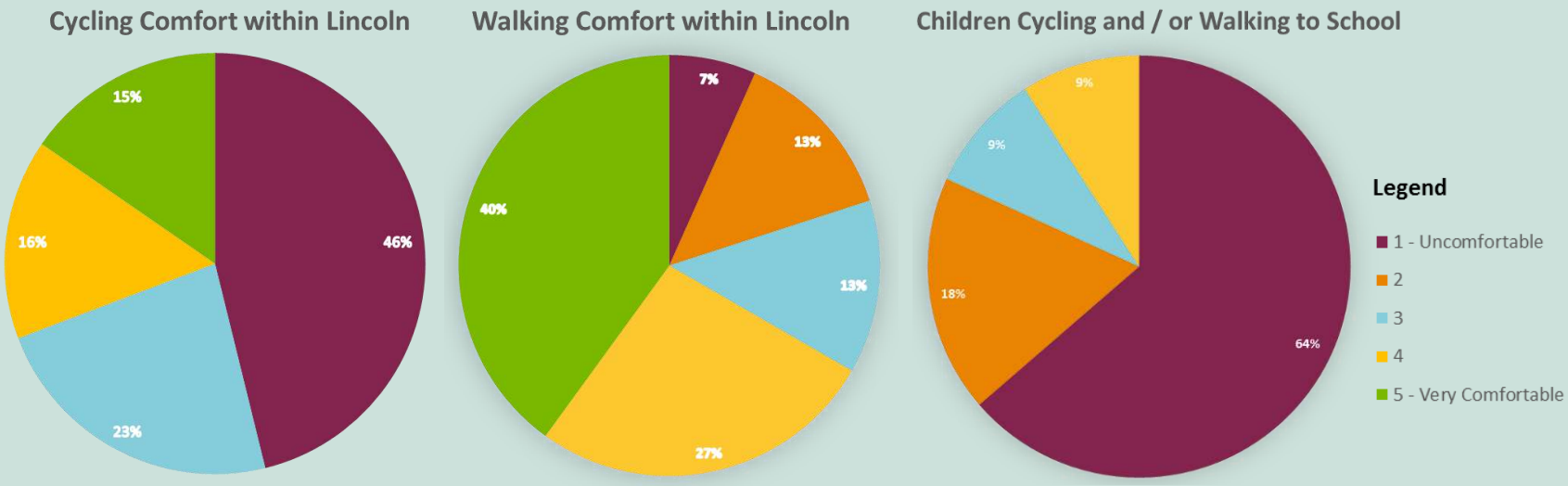
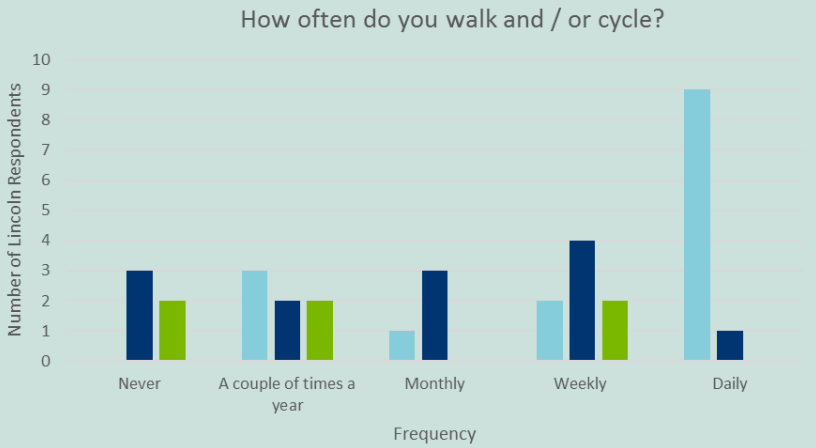
Comfort Using Lincoln Active Transportation Facilities

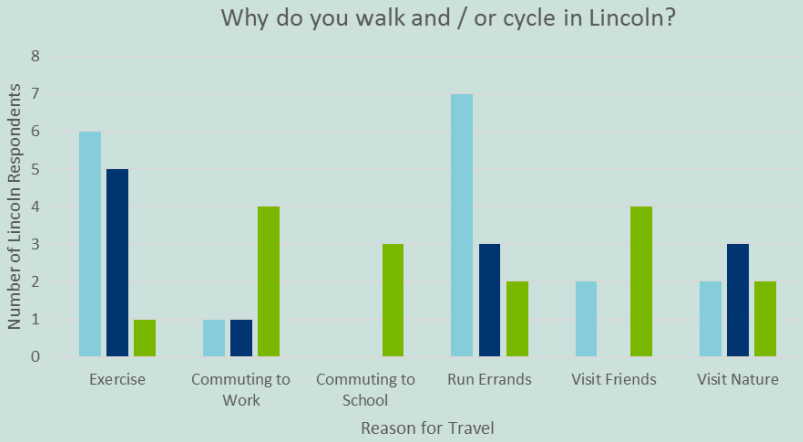
Respondents were asked how comfortable they feel using the existing active transportation facilities to cycle and walk within the Town. Based on the results, respondents indicated that they feel more comfortable walking as compared to cycling. 54% of respondents feel comfortable cycling whereas 80% of respondents feel comfortable walking (based on a rating of "3" or higher). The results also indicate that 18% of respondents feel comfortable allowing their children to walk and / or cycle to school using the existing infrastructure.



Existing Usage of Lincoln Active Transportation Facilities

The perception of safety plays a vital role in the usage of active transportation facilities. Residents are more likely to engage in active forms of travel if they feel safe and comfortable when walking and cycling. With the low comfort levels associated with cycling as compare to walking, discussed and illustrated in the section above, we see a large gap between the frequencies of walking and cycling, illustrated below.





As illustrated in the graphs above, the most common form of active transportation is walking and the most common reason for it is to exercise. While exercising is a favorable use of active transportation facilities, it is usually done during off-peak periods when there is less vehicular traffic on the road. It is also important to ensure appropriate facilities are implemented that make residents feel safe enough to utilize during the peak traffic periods such as the weekday morning and afternoon commuting hours. As illustrated in the graph on the right, a low percentage of respondents commute to work and / or school using active transportation.

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Public Information Centres

The first Public Information Centre was held on March 27, 2018 in the Fleming Centre at 5020 Serena Drive, Beamsville from 6:00 to 8:00 p.m. and again on March 28, 2018 at the Jordan Fire Station on 19th Street from 6:00 to 8:00 p.m. The public sessions were formatted as a drop-in open house session with a mix of information and interactive boards.

The displays and information provided at the public sessions provided attendees with introductory information on the study and key project considerations. Project team members were available to answer any questions and collect input, in addition to the interactive maps and boards. Comment forms were also distributed to gather any additional input from the attendees.

Objective: Inform attendees of the intents and purposes of the project; shape the Active Transportation (AT) vision and objectives and identify opportunities and challenges.

Participants: 50 – 55 attendees participated at the open house.

Timeline: March 27 and 28, 2018 6:00 – 8:00 p.m.

Photo taken at Lincoln TMP PIC #1 – March 27, 2018

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A total of six (6) interactive display boards were developed and used to gather input from attendees on existing transportation and transit networks, existing traffic conditions, goods movement routes and roadway designs. An image of the marked-up display board following the open house and a summary of the input received is documented below.

MAP 1 – TRANSIT NETWORK

- Connection to Grimsby and St. Catharines
- Increase local transit within Vineland
- Collaboration between uLinc and GO bus schedules
- Callerbus for rural uses
- On-demand bus service for major areas
- Uber style transit as a pilot project

MAP 2 – EXISTING ACTIVE TRANSPORTATION

- More off-road trails
- More paved shoulders or bike paths on major and rural roadways
- Pedestrian and bicycle accesses for GO stations
- Bike trail from Beamsville to Vineland
- Bike lanes on John Street and King Street
- More frequent maintenance
- Limit trail access on agriculture lands

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MAP 3 – TRAFFIC ASSESSMENT

- Redesign the Ontario Street at South Service Road intersection
- Ontario Street railway crossing to be grade separated
- Signal coordination along King Street
- Review for sight distances:
  - Victoria Avenue and Second Avenue
  - Victoria Avenue and King Street
- Better pedestrian infrastructure within Beamsville
- Traffic calming measures on Ashby Drive
- Signalize King Street at Stadelbauer Drive

FUTURE ROADWAY DESIGN – COMPLETE STREETS

Ranking of roadway design features:

1. Cycling Facilities
2. Sidewalks
3. Transit Stops and Shelters
4. Parking & Landscaping
5. Street Furniture

MAP 4 – PARKING LOCATIONS

- Prudhommes - recreation / visitor parking lot near Lake Ontario
- Jordan Station - parking needs to be investigated
- Parking issues in the Ontario Street / King Street area
- Increase communications of parking locations and availability
- Increase shoulder widths if on-street parking is expected

MAP 5 – EXISTING GOODS MOVEMENT

- Heavy vehicles travel east on King Street beyond Bartlett Road, which is prohibited
- Too many heavy trucks travelling through central Beamsville
- Remove heavy truck traffic running through the center of Vineland
- Remove heavy trucks travelling through Jordan on King Street
- Truck routes should support local farmers
- Move trucks off King Street and Mountain Street
- Prohibited routes should be enforced

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Overall, the public open houses were well attended and a significant amount of valuable feedback was received from the attendees. The following is a summary of key themes that emerged from input collected at the public open houses:

- Transit connections to surrounding municipalities and through the Region;
- Providing options for active transportation and recreation;
- Widening of main arterial roadways to accommodate increased heavy truck and regular vehicular traffic;
- Addressing / limiting access of off-road trials through agriculture lands; and
- Enforce heavy truck traffic prohibitions.

2.2.2 Stakeholder Engagement

In addition to engaging the public through the open houses and online surveys, several sessions including a Council Presentation, Council workshop, Active Transportation Committee meeting and a Technical Advisory Committee meeting were conducted to engage and consult with stakeholders, Town staff and other decision-makers. A summary of the input received through the four (4) events is provided below.

Council Presentation

The first stakeholder engagement session was held for the Town of Lincoln Committee of the Whole on September 20, 2017 at 7:00 p.m. in the Council Chambers to introduce the study and inform council members of the Lincoln TMP objectives, scope, themes and public consultation plans.

Active Transportation Committee Meeting

A meeting was held with the Town of Lincoln Active Transportation Committee on October 26, 2017 at 7:00 p.m. at the Town Hall in the Beamsville Room to engage with committee members, present the study scope, objectives and work completed to date. It was also used as an opportunity to present the proposed plan to address active transportation elements of the study and gather feedback.

In this first working group session, the project team introduced the active transportation approach illustrated in **Figure 3** below. Following the presentation, the project team engaged in a roundtable discussion to establish the committee's goals and aspirations for active transportation in the Town. The study team presented a variety of active transportation facilities that will be considered through the development of the TMP including: shared facilities such as a signed bicycle route typically for roads with lower vehicular volumes and speeds; designated facilities such as bike lanes or paved shoulders; and separated and off-road facilities such as in-boulevard multi-use trails, cycle tracks, buffered bike lane/shoulder and off-road trails for roads with high traffic and speeds.

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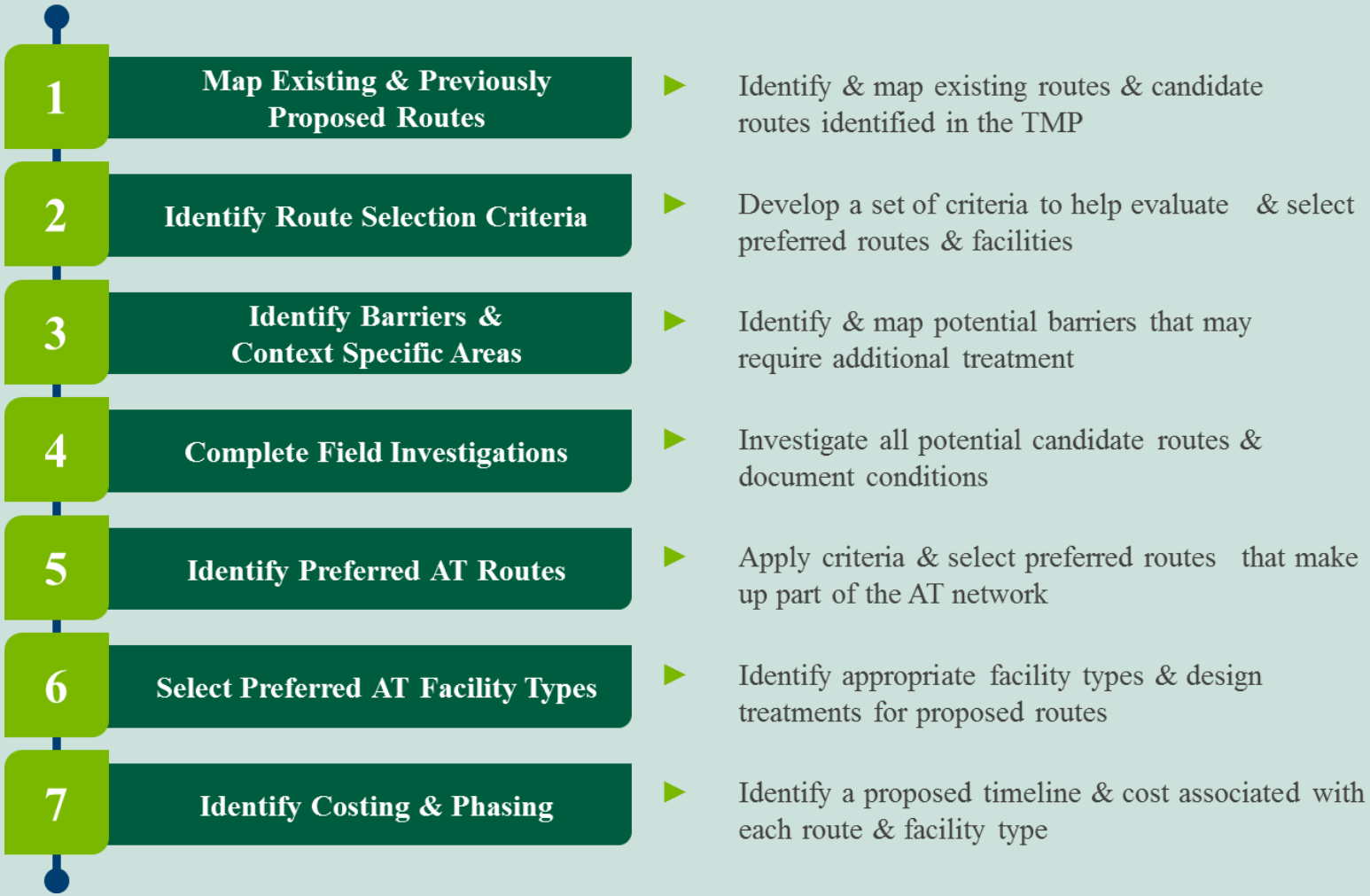

Figure 3 – Lincoln TMP Proposed Active Transportation Approach

Following the meeting, members of the Active Transportation Committee provided their input on the existing routes and facility types within the Town of Lincoln and potential new route connections that should be explored through the development of an active transportation network.

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Council Workshop

A Council Workshop was held on April 5, 2018 at 6:00 p.m. in the Council Chambers. Attendees who participated in the workshop included seven Council members, the Fire Chief and three Town staff members. The workshop was conducted in three separate sessions, starting with an introductory presentation followed by a workshop activity where the attendees could walk around and provide input at the following four (4) stations:

1. Transit and Parking;
2. Active Transportation;
3. Trucks and Goods Movement; and
4. Traffic Assessment and Traffic Calming.

This was followed by a roundtable discussion to collect input from all attendees and provide an opportunity for final comments and discussion. The following input was received from attendees of this workshop:

Transit and Parking	• There are no transit connections to surrounding municipalities; • Low transit frequencies present challenges for residents to use; • High-frequency transit routes should have smaller loops; • Dial-a-Ride could be a viable transit option; • Transit infrastructure at bus stops / stations should be maintained; • Transit should be promoted; • Should study the Innisfil Uber/Transit pilot project; • Maximize on-street parking supply year-round; and • Issues during winter maintenance events with on-street parking.
Active Transportation	• Sidewalks are a necessity followed by cycling facilities; • Proposed trails are causing trespassing, littering, property damage and theft concerns; • Not enough separation / buffer for bicycle routes in Town; • Grading on Mountain Road is unsafe for cyclists; • Lack of crosswalks at King Street and Stadelbauer Drive / West Avenue intersection; • Road type classifications will help determine the required active transportation facilities; and • Landscaping and street furniture are less of a priority in rural/suburban context, more suited for downtown roads.

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Trucks and Goods Movement	• Heavy truck routes currently run through town centers; • 19th Street in Jordan is not suitable for heavy truck traffic; • Ontario Street right-of-way (ROW) no longer suitable for heave vehicles, especially intersection with King Street; • King Street ROW within Beamsville intensification corridor not suitable for heavy vehicle movements; • Heavy truck prohibitions should be enforced; • Gravel trucks travel at high speed along Mountain Road; • Farm equipment slowing down traffic; and • Region must be involved in route planning.
Traffic Assessment and Traffic Calming	• Congestion at King & Ontario Street, and King & Mountain Road intersections; • Traffic back-up due to morning cargo trains on Ontario Street; • Difficulty making left turns onto King Street from Ontario Street; • Insufficient warning for northbound traffic approaching the Victoria Avenue / 2nd Avenue and Victoria Avenue / Culp Road intersections; • Speeding and related noise issues on Aberdeen Road; • Sightline issues for traffic accessing King Street from Stadelbauer Drive / West Avenue; several concerns of overgrown bushes blocking sightline/traffic signage at the 19th Street and St. John's Drive intersection; • Sightline, queuing and/or safety concerns at these intersections should be reviewed: Victoria Street and King Street; King Street and Bartlett Road/Aberdeen Road; and Ontario Street and Greenlane. • Closure of bridge is causing traffic to divert and use a private bridge to cross Spring Creek; • Durham Road and Service Road intersection requires improvements; • Traffic calming should be a focus to target speeding; and • Road diets of downtown roadways could be a viable solution to speeding and truck traffic.

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Advisory Committee Meeting #1

A Technical Advisory Committee (TAC) meeting was held on March 23, 2018 from 10:00 a.m. to 12:00 p.m. at Town Hall in the Beamsville Room. TAC members who participated in the meeting included representatives from the Region of Niagara, surrounding municipalities, the Ministry of Transportation and others. The meeting began with introductory remarks delivered by members of the project team, followed by a presentation on the TMP, highlighting information related to the study process, key themes, engagement strategy and intended outcomes. A brief overview of the online survey results was also presented along with an update on the study progress.

The first activity of the workshop aimed to determine the role and responsibility of attendees as it relates to transportation in Lincoln. Attendees were asked to introduce themselves and provide a brief description of ongoing work within their community / agency that could impact the development and outcomes of the TMP, their organization's priorities and how the TMP could impact their work. The following is a summary of responses received:

Niagara Escarpment Commission	• Provide linkages to the Bruce Trail • Increase opportunities for cycle tourism • Improve access to the escarpment
Niagara Region	• The Region is developing new complete street guidelines • Regional roads that are being improved will go through a "checklist" • Provide flexible transit options
St. Catharines	• Provide continuous AT connections to Lincoln • Build upon what is being done by the Region • Investigate GO connections
Grimsby	• Town is expected to complete a TMP in 2019 / 2020 • No development lands east of Christie • Next elected Council to investigate transit • Long term escarpment crossing, find short term solution
Ministry of Tourism, Culture and Sport	• Priorities include active transportation, complete streets and improve mobility • Leverage available programs and grants to achieve these priorities
Ministry of Transportation	• MTO to scope cycling into future rehabilitation projects • Dedicated cycling facilities on MTO structures should be consistent with MTO guidelines

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The second workshop activity was designed to identify and discuss opportunities and challenges related to Lincoln's transportation system. Attendees were provided with maps that illustrated the existing conditions as it relates to transit, active transportation, trucks / goods movement, and traffic operation in Lincoln. Attendees were asked to provide their input on:

- Physical barriers / challenges in Lincoln that impact their work;
- Non-physical barriers / planning challenges in Lincoln that impact their work; and
- Opportunities / initiatives within their agency that should be incorporated into the Town's TMP.

A summary of input collected is provided below:

- Address constrained rights-of-way in Prudhommes
- Work with MTO to address opportunities for AT crossing at QEW
- Improve transit and active transportation connections to St. Catharines
- Work with Region, Grimsby and MTO to address truck concerns and trucking routes
- Engage with quarries to identify solutions for movement of goods / truck routes
- Increase cycle tourism and leverage existing wineries to increase economic benefit
- The town should work with MTSC and local businesses to integrate bike friendly amenities at wineries along cycling routes

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2.3 ROUND 2 CONSULTATION

A second round of engagement occurred between March and April of 2018. Stakeholders and members of the public were asked to provide input on the proposed transportation improvements and recommendations, as well as potential implementation priorities and budgeting considerations. The second round was designed to achieve the first three levels of public participation identified in the IAP2 process including the following commitments:

1. To **inform** the different audiences of the work that has been completed to date, the input that has been received and how it has been used.
2. To **consult** with audiences to gather input on the proposed transportation improvements including revisions and additions to the various recommendations.
3. To **involve** key audiences in the process of identifying suggested implementation timelines and priorities.

The following subsections provide a summary of the approach used to engage the various audiences and the input received.

2.3.1 Public Engagement

The second round of engagement included four (4) targeted public engagement and consultation sessions including two free skate open house sessions, outreach at local March break camps, an Online Engagement Tool which was available on the project website and promoted at the local events. In addition to the formal public engagement activities; the Town also worked on a comprehensive promotion and outreach campaign including transit ads, elevator ads, social media outreach, posters and other online and in-person outreach tactics. Detailed responses are provided in **Appendix D-2**.

Free Skate Open House Sessions

A free skate open house was held in Jordan on March 11th, and again in Beamsville on March 23rd, 2019 where attendees were asked to provide input on the proposed transportation recommendations and identify budgetary and design priorities. The sessions were drop-in format which allowed attendees to interact with members of the team, answer questions, provide input using interactive activities and enjoy a free skate and some complementary food.

Objective: to gather input on the proposed transportation improvements / recommendations, identify implementation priorities and preferred costing impacts for future budget allocation.

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The interactive activities that were prepared and hosted at the public open house were consistent with the online engagement tool which was prepared and hosted on the project website. There were a total of three activities which used different methods of gathering input to engage attendees. More specifically, they included a mark-up map to use pins to indicate priorities; a dotmocracy to gather input on potential transportation improvements / recommendations and a budget allocation activity using "tokens" and jars for the various budget categories.

iPad and laptops were available at the public open house sessions to provide attendees with the option to provide responses online as opposed to using the in-person activities.

The following is a summary of the input which was received through each of the activities. They are a consolidation of the input received at both of the public skate events.

Time and Location:
#1: Jordan on March 11th, 2019 from 11:30 am-1:00 pm
#2: Beamsville on March 23rd, 2019 from 5:00-7:00pm

Over 60 attendees

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Activity #1: Map Comments - Proposed Routes

Comments collected focused on road improvements, trucking routes, and active transportation. Comments were provided by marking up hard copy maps that were provided at the public open house sessions. The comments received can be organized into the following themes:

Key comment highlights
Concern for speeding and safety around school zones
Notes regarding the need for maintenance of infrastructure
The integration of community and urban design
Visibility concerns for pedestrians and cyclists
Addressing the QEW and other transportation barriers
The application and consistency of signage throughout the community

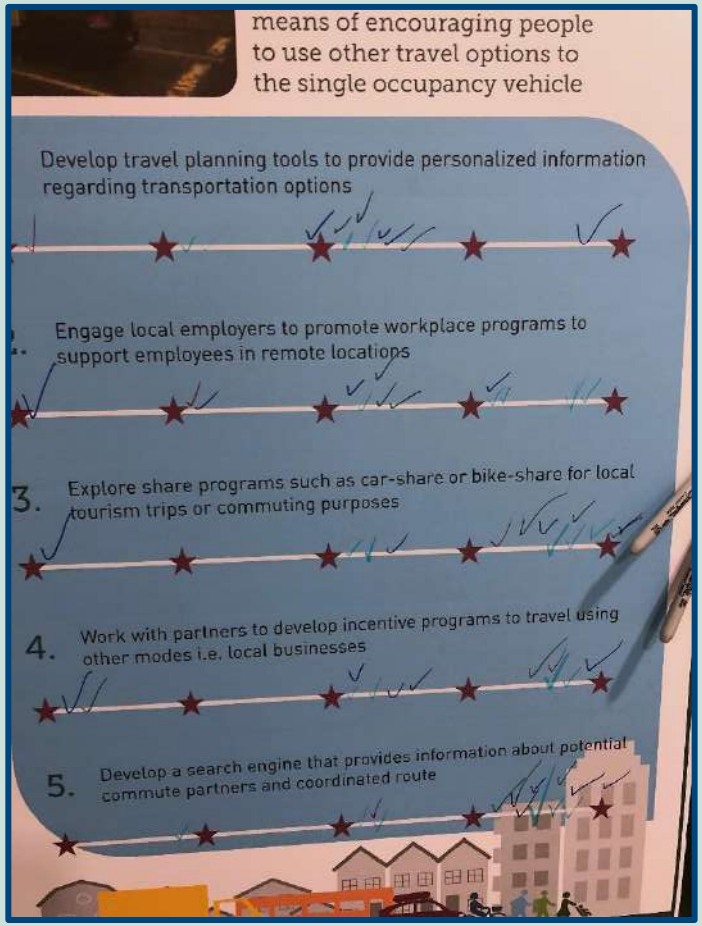
Activity #2: Dotmocracy – Proposed Recommendations

Before receiving a ticket for free skating, participants were asked to complete a dotmocracy exercise to identify their preferred transportation related recommendations. Recommendations were identified in the following transportation categories: Complete Streets, Transportation Demand Management, Traffic Calming, Transit, and Truck Movement. A set of five recommendations were identified within each of these categories. For each recommendation, respondents were asked to identify their level of support from 1 to 5 stars where 1 star indicated no support and 5 stars indicated a high level of support.

Responses from this activity indicated a greater level of support for the recommendations related to **Complete Streets**, **Traffic Calming**, and **Trucks Movement**. The following is a summary of the responses received through this activity.

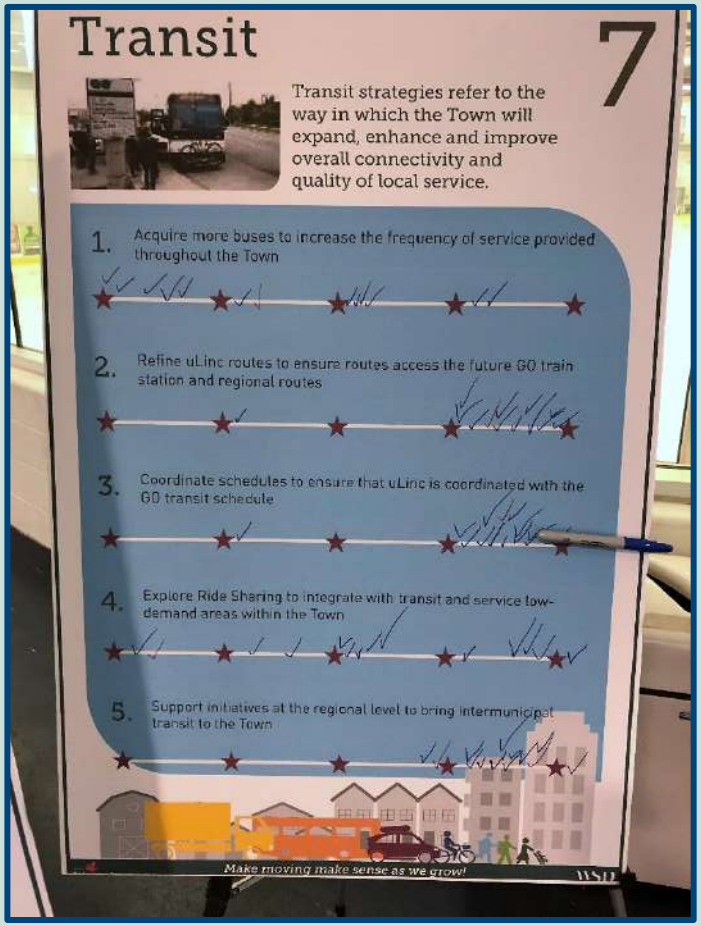
Transportation demand management

Respondents typically ranked the transportation demand management recommendations three to five range indicating a moderate to high level of support. Of greatest interest was the development of a search engine to coordinate ride sharing as well as car-share and bike share.



Transit

Transit recommendations received a typically high level of support specifically identifying refinements to the U Link routes to provide access to the GO station, coordinating schedules to make using uLinc and GO transit more coordinated and the expansion of intermunicipal transit to the Town.



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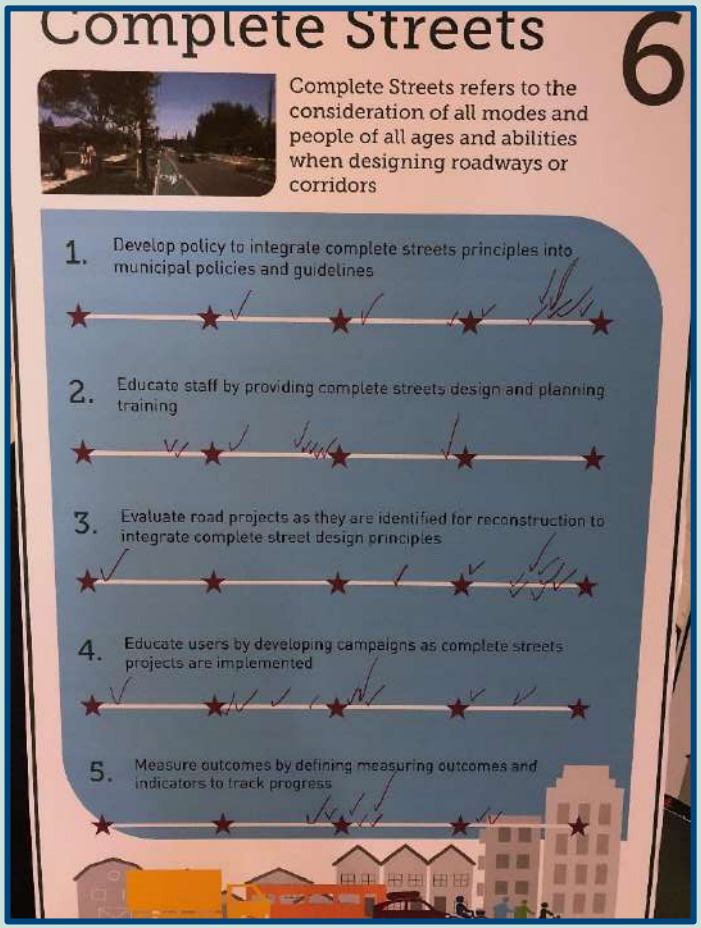
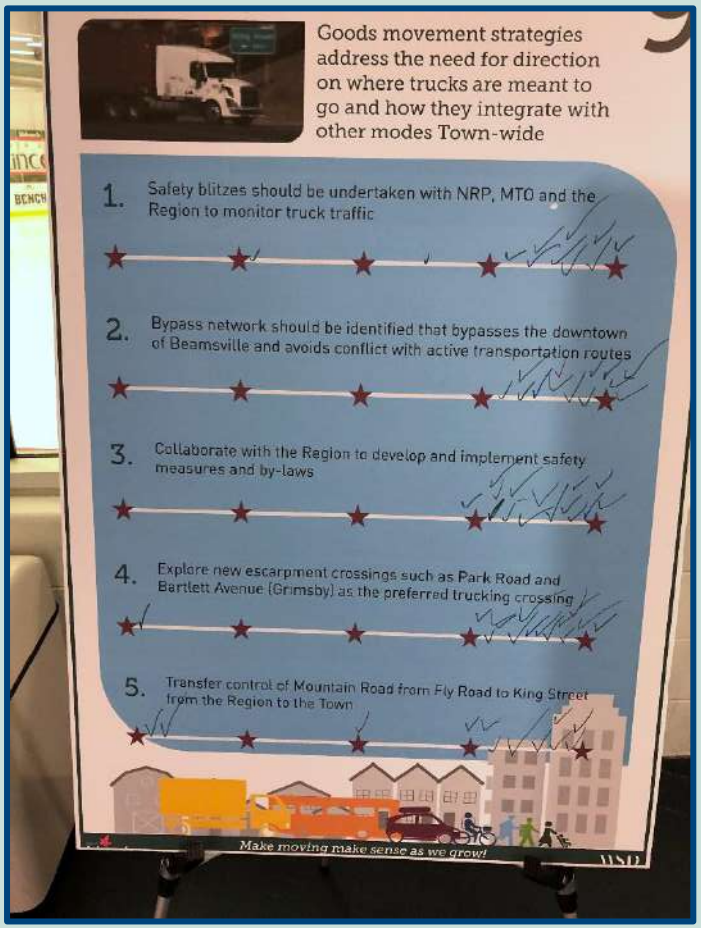
Complete Streets

Compared to some of the other categories, complete streets received the lowest number of responses. Of the responses provided people indicated a range of support from low to high. Of the high ranked recommendations respondents indicated a support for integrating design guidelines and evaluating road projects to integrate complete streets.



Truck Movement

A high number of responses were provided regarding goods movement / trucking. For each recommendation respondents indicated an extremely high level of support indicating a strong need for a greater strategic focus on trucking management and communication.



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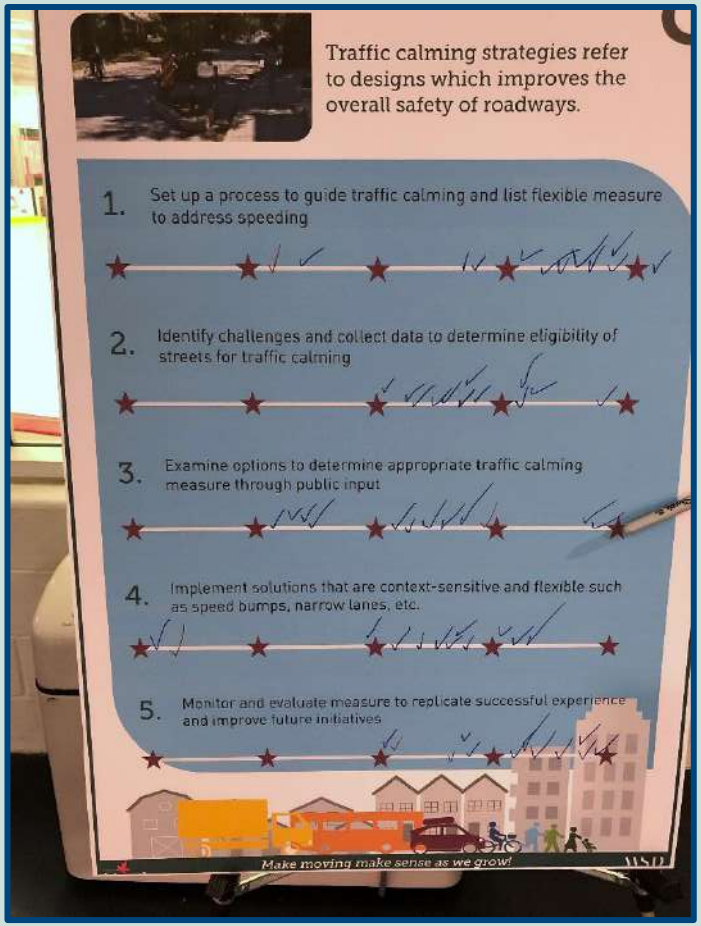
Traffic Calming

Responses provided at the public open house indicated a range of support for traffic calming recommendations. Some recommendations received a high level of support where other indicated moderate support. Of greatest interest to the community is the traffic calming guide to address speeding.



1

5/5
5-star Votes for
Transit

2

5/5
5-star Votes for
Truck Movement

3

4/5
5-star Votes for
Complete Streets

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Activity #3: Allocation of Municipal Budget

Attendees were asked to provide their input on transportation specific investments which the Town could consider as they move forward with the implementation of the TMP. Eight categories of transportation improvements were identified and attendees were asked to use 10 tokens to "vote" for their preferred topics. In exchange for their participation they received a free piece of pizza or hot chocolate. The following is a summary of the responses received.

103 tickets

1

Road Improvements

89 tickets

2

Walking Improvements

66 tickets

3

Improved Road maintenance

64 tickets

4

Traffic Calming/Safety

56 tickets

5

Cycling Improvements

51 tickets

6

Transit improvements

40 tickets

7

Goods movement routes

30 tickets

8

Education and Promotion

These results indicate a greater level of support for **Road Improvements**, **Walking Improvements** and **Improved Road Maintenance**.

Online Engagement

An interactive online engagement survey / activity was developed using a tool called MetroQuest. The intent of developing an online engagement tool was to provide individuals who could not attend the in-person engagement activities with an alternative means of providing input in a convenient and accessible manner. The tool was developed and hosted on the project website and was the basis for the activities / questions which were posed as part of the in-person engagement activities i.e. the public open houses.

The online engagement tool was hosted for a span approximately a month and a half and a total of 69 responses were provided to the online survey during that timeline. The following is a summary of the responses received.

Objective:
Provide an accessible and easy to use platform that participants and the public could use and contribute to the development of the Lincoln Transportation System

Time:
The MetroQuest engagement tool was active for a month and a half starting on February 28th, 2019

Activity #1: Map Marking and Comments

The first activity was an interactive map which allowed respondents to "drop pins" to indicate their comments on the proposed active transportation network and road improvements. There were four options provided including a "yes" to indicate support for a proposed route, a "no" to indicate disagreement, a priority for consideration by the Town and a general comment.

A total of 115 markers were placed on the map which provided a range of insights and comments. To the right are some high level "responses" that were received using this tool. Responses indicated general agreement with the proposed AT routes and road improvements with some suggestions on facility enhancements.

115
Markers placed

33% of respondents placed a **'yes'**
10% of respondents placed a **'no'**
18% of respondents placed a **'priority'**
40% of respondents included a **comment**

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Activity #2: Transportation Recommendations

As noted through the public open house sessions, respondents were asked to provide their feedback on the top five recommendations identified for transit, traffic calming, truck movement, complete streets and transportation demand management. There was a total of 882 rating submitted to the question and another 110 comments. Out of the twenty-five recommendations identified for consideration and evaluation the following were the top recommendations identified based on rank provided:

1. **New escarpment crossing** including Park Road to Bartlett Avenue as the preferred truck crossing
2. **Bypass Network** that bypasses the downtown of Beamsville and avoids conflict with AT routes
3. **Coordinate Schedules** to ensure that uLinc is coordinated with the GO Transit Schedule
4. **Support Initiatives** at the regional level to bring inter-municipal transit to the Town
5. **Refine uLinc routes** to ensure routes access the future GO train station and regional routes

Where there is a high-ranking preference for investment in truck movement and transit, there are many other significant recommendations within the other categories. The following is the order from least the greatest support for each of the recommendations identified within the five transportation categories.

Transit	Traffic Calming	Truck Movement	Complete Streets	Demand Management
1. Coordinate schedules	1. Implement solutions	1. Bypass network	1. Evaluate road projects	1. Engage local employers
2. Support initiatives	2. Examine options	2. New escarpment crossings	2. Measure outcomes	2. Explore Share programs
3. Refine uLinc routes	3. Identify challenges	3. Safety blitzes	3. Educate users	3. Develop Travel planning
4. Explore rideshare	4. Monitor and evaluate	4. Collaborate with Region	4. Develop policy	4. Work with partners
5. Acquire more buses	5. Set up a process	5. Transfer control	5. Educate staff	5. Develop a search engine

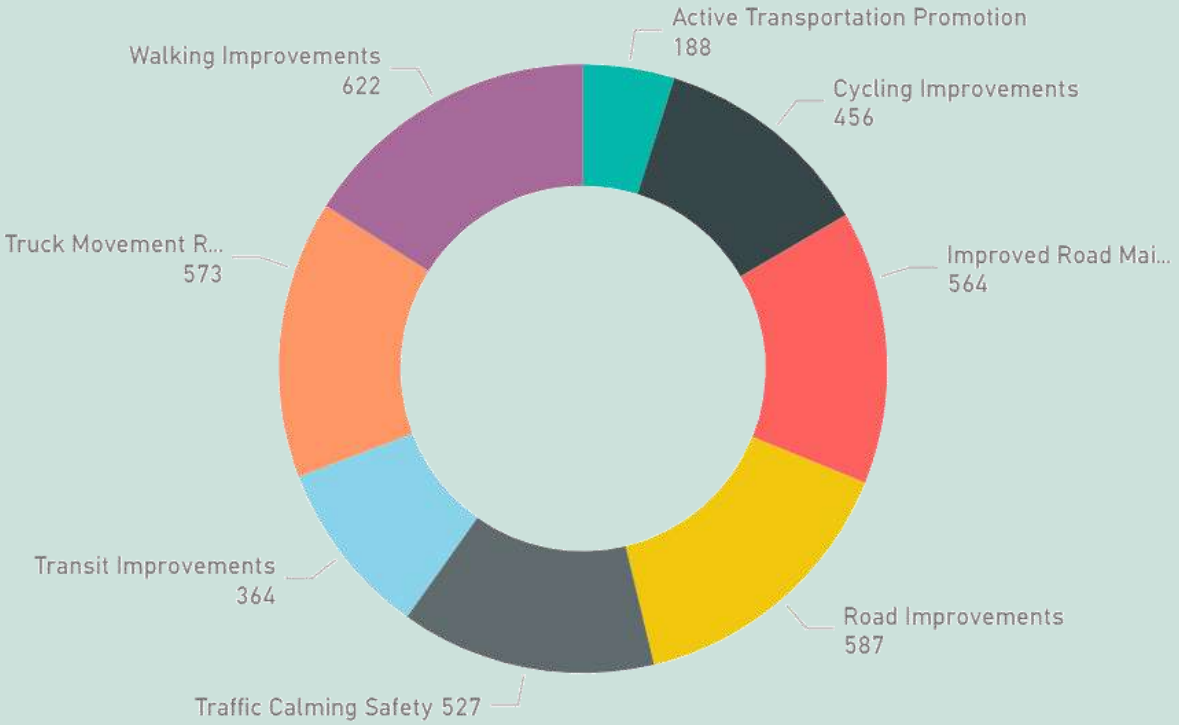
Activity #3: Allocation of Municipal Budget

Budget allocation was also used through the online engagement tool. A total of 384 "coins" were placed within the various transportation improvement categories identified through this activity. The following figure illustrates the allocation of coins based on the topics.

As illustrates in the figure the top five highly "ranked" categories included:

1. Walking Improvements
2. Road Improvements
3. Truck Movement Routes
4. Improve Road Maintenance
5. Traffic Calming Safety

Unlike the in-person engagement, the online engagement responses indicate a greater need for truck movement improvements in addition to the walking and road improvements. Interestingly, walking improvements received the greatest amount of support compared to other topics indicating a strong interest in and support for active transportation improvements.



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March Break Camps

A goal of the second round of engagement was to target and gather input from a more varied set of respondents. To do this, the team identified opportunities at the Town's March Break camps and developed simplified and "fun" comments forms / activities for the campers to complete with support from the camp counselors. In addition to the hard copy surveys older campers were encouraged to complete the MetroQuest online engagement tool.

Objective:
Engage a variety of audiences and gain a well-rounded perspective of resident feedback

Time:
The march Break camps ran from March 11 to March 15, 2019

Responses provided through the online engagement tool were captured in the summary provided above. The following is a comment form specific summary based on the 30 or so responses that were received following the completion of the camp.

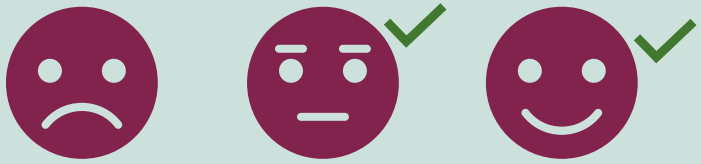
Question #1: How do you travel to the places you typically go?

The comment form identified a range of different types of travel modes which could be used by respondents. It also identified options for different destinations. Based on the responses received, most respondents indicated that they Walk, Scooter, Take a Bus, or Use a Car to travel to places they typically go.

Most of the respondents indicated the use of a vehicle to get to school while more active modes were used to get to other recreational destinations such as parks or playgrounds.

Question #2: How do you feel when you think about getting around your town?

Based on the responses received, all respondents of the survey indicated that the current transportation within Lincoln made them feel either somewhat happy or very happy

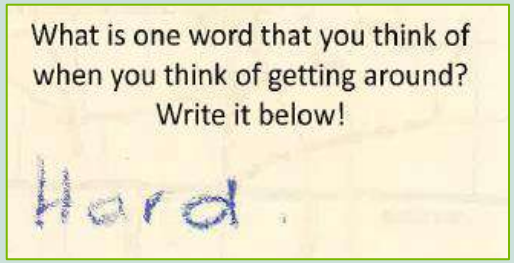


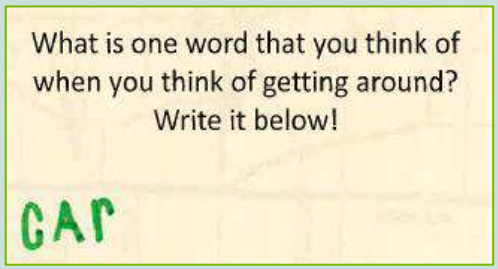
Not happy | Somewhat happy | Very happy

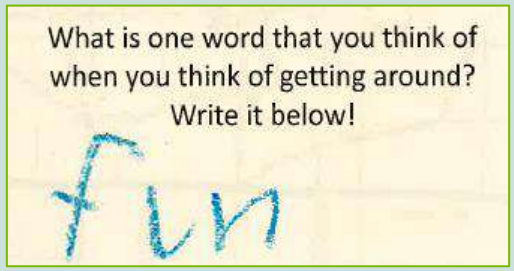
Question #3: What is one word you think of when you think about getting around?

Respondents were asked to write the first word that they thought of when thinking about getting around the town of Lincoln. The following are some of the common responses which we received.

1. Car / Driving
2. Hard
3. Fun
4. Easy
5. Traffic
6. Fast
7. Safety
8. Happy







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Pop-Ups in Community Locations and Social Media Outreach

As noted above, in addition to the formal in-person and online engagement tactics which were used to engage various audiences and gather input to inform the final phase of the project there were some additional outreach and promotion tactics which were coordinated by Town staff to increase interest and involvement. Town staff coordinated with local venues to host "pop-ups" as well as ongoing social media blasts.

The following is a summary of the approach to those tactics.

Pop-Ups

Pop-Ups were set up in community locations like the Lincoln Spark Incubator. The transportation plan and related consultation initiatives were promoted in public areas to be seen by the people coming through the area. A display of the Online engagement tool included a stand-up panel and a guide for filling out the survey questions. Also included in these tactics was a transit ad as well as banners and promotion in elevators within municipal buildings.

Social Media Outreach

Using Town social media and the Town website, the online engagement tool as well as the in-person engagement activities were promoted. To the right is a sample of the types of messages which were "blasted" to the public leading up to the open house sessions and following their completion.

The pop-ups and media outreach resulted in an increased use and awareness of the engagement tools available to the Residents of Lincoln.

Objective:
Communicate knowledge of the plan and the engagement initiatives to as wide a range of people as possible

Time:
Spark incubator: 2-3 weeks during round 2 of engagement
Social Media: Ongoing over the course of round 2 engagement

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2.3.2 Council Workshop

A second Council presentation was coordinated and hosted to gather input from members of Council on the draft transportation recommendations identified for consideration as part of the TMP. The Council workshop started with an overview presentation which was provided to give Council members some additional context regarding the work completed to date, input received thus far and approach and rationale for the proposed recommendations within each of the transportation categories. The presentation was followed by an interactive station-based facilitated workshop where small groups could work with members of the project team to review and comment on the recommended transportation improvements. The following is a summary of the input received by mode.

Objective:
Report on project process and proposed recommendations, and receive input on the AT network and other key recommendations.

Time:
April 3rd, 2019 | 4:00-5:30 pm

Trucking	-Ongoing bylaw enforcement and other safety efforts should be undertaken to monitor truck traffic -Bypass network should be identified • Fly Rd. to Victoria St. is an interim solution but it already had a truck problem • Ontario St. truck restriction is supported -Collaborate with the Region, the Region could do more (especially at Mountain Rd. in Grimsby) -Support escarpment crossing at Park Rd. and Bartlett Ave. ASAP -Transfer control of Mountain St. from Fly Rd. to King St. to the Town ASAP
Complete Streets	-Short term: make complete streets a part of municipal policy, especially for sidewalks and new development -Short to Medium term: provide complete streets and planning training for staff -Short term or immediate: Integrate complete streets into reconstruction road projects • Apply to rural and urban roads in large full connection sections -Short to Long term: educate users with complete street campaigns (there is not much demand for this) -Long term: Define indicators and measure outcomes to track progress

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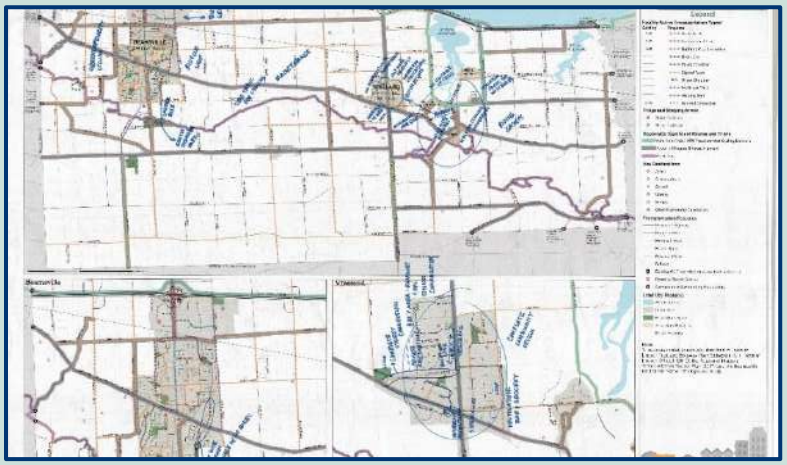
Transit	-Short to medium term: Acquire more buses to increase frequency of service • Consider possibility of ride-shares • Consider contract and cost -Long term: Refine ULinc routes to access future GO station and regional routes -Short term: Coordinate ULinc schedules with GO transit schedules -Short term: Explore integrating ride-share with transit to service low-demand areas -Short term: Support regional level initiatives to bring intermunicipal transit to Town • Expand bus routes to Jordan (3 more locations) • Consider many routes and transit types
Traffic Calming	Very few comments and feedback on traffic calming -Data collection strongly supports determining the eligibility of streets for traffic calming
Transportation Demand Management	-Short term: Develop travel planning tools to provide personalized transportation options -Short term: Engage employers to promote programs to support employees in remote locations -Short term: Explore car-share or bike-share for tourism trips or commuting purposes -Medium term: Develop incentive programs to travel using other modes • Work with partners i.e. local businesses -Medium term: Develop a search engine that provides information on potential commute partners and coordinated routes



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2.3.3 Stakeholder Consultation

Objective:
Consult with key representatives who have significant knowledge regarding the results of the plan, receive feedback related to logistics and discus results.

Time:
April 30th, 2019 | 1:00 - 3:00 pm

A second stakeholder workshop was coordinated and facilitated following the council workshop and public events. The workshop was used to present the recommendations to various agencies and stakeholders who will ultimately be involved in the implementation of some elements of select recommendations. Stakeholders in attendance included but were not limited to the Region of Niagara, Niagara Public Health, local aggregate operators, MTO, the Conservation Authority, etc.

The stakeholder workshop started with a presentation summarizing the work completed to date, the input received through the second round of engagement and the high-level recommendations being considered by the Town as part of the TMP. The group focused on reviewing and discussing the draft active transportation network and goods movement / trucking routes. A high-level summary of key input received is provided to the right. Detailed comments from Niagara Region and other Stakeholders are provided in **Appendix D-3** and **Appendix D-4**, respectively. Responses to each comment is also included in the appendices.

Active transportation route comments
Educate all groups targeted
Wayfinding signage strategy
Bike lanes vs Multi-Use Trail on major roads
Separated around schools
Multi-Use Trail along truck route
Transportation route comments
Winery bicycle tourism enforcement
Coordination of events and location of signage
Signage and Awareness around tourism uses
Proposed through truck route comments
Pedestrian safety and improvements
Improve truck movements at the intersection of King St. and Mountain St.
New through at Queen St.?
Other route considerations? -New through route at Hillside Dr. and Bartlett Rd.

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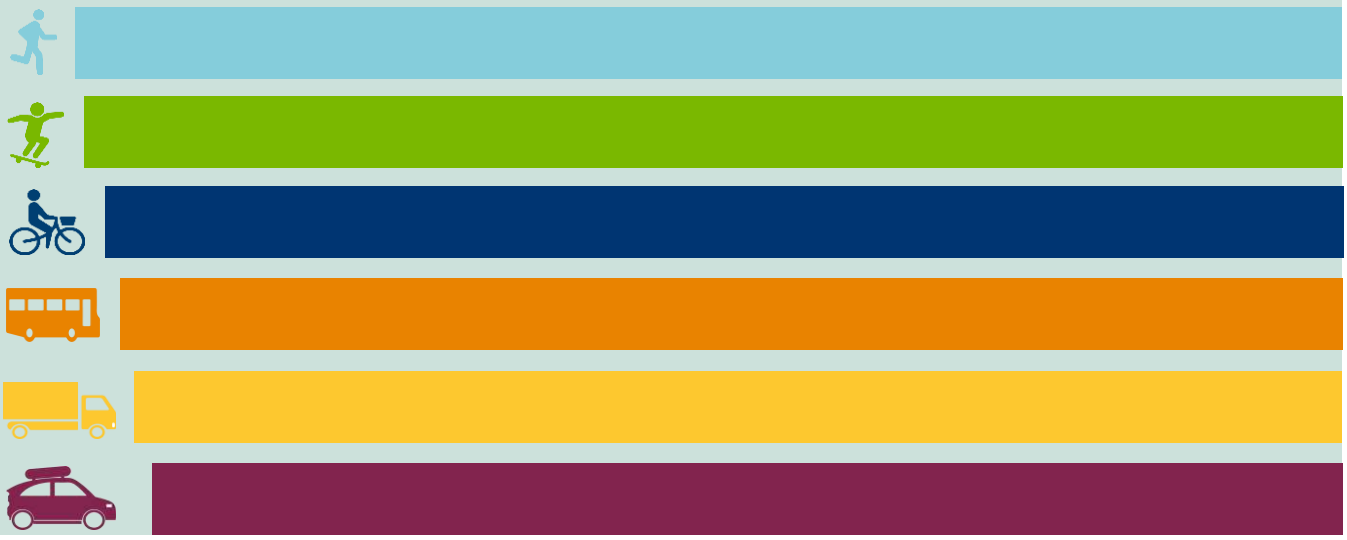
APPENDIX

D-1 Round 1 Public Information Centre Responses



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Town of Lincoln Transportation Master Plan
Public Information Centre #1

[redacted]

	Name	Organization	Email
1	[redacted]	[redacted]	[redacted]
2	[redacted]	[redacted]	[redacted]
3	[redacted]	[redacted]	[redacted]
4	[redacted]	[redacted]	[redacted]
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12	[redacted]	[redacted]	[redacted]
13	[redacted]	[redacted]	[redacted]
14	[redacted]	[redacted]	[redacted]

Sign-in Sheet
March 27 & 28, 2018 | 6:00 p.m. – 8:00 p.m.

Town of Lincoln Transportation Master Plan
Public Information Centre #1

	Name	Organization	Email
15	[redacted]	[redacted]	[redacted]
16	[redacted]	[redacted]	[redacted]
17	[redacted]	[redacted]	[redacted]
18	[redacted]	[redacted]	[redacted]
19	[redacted]	[redacted]	[redacted]
20	[redacted]	[redacted]	[redacted]
21	[redacted]	[redacted]	[redacted]
22	[redacted]	[redacted]	[redacted]
23	[redacted]	[redacted]	[redacted]
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25	[redacted]	[redacted]	[redacted]
26	[redacted]	[redacted]	[redacted]
27	[redacted]	[redacted]	[redacted]
28	[redacted]	[redacted]	[redacted]

Sign-in Sheet
March 27 & 28, 2018 | 6:00 p.m. – 8:00 p.m.

Town of Lincoln Transportation Master Plan
Public Information Centre #1

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33	[redacted]	[redacted]	[redacted]
34	[redacted]	[redacted]	[redacted]

Sign-in Sheet
March 27 & 28, 2018 | 6:00 p.m. – 8:00 p.m.

Town of Lincoln Transportation Master Plan
Public Information Centre #1

	Name	Organization	Email
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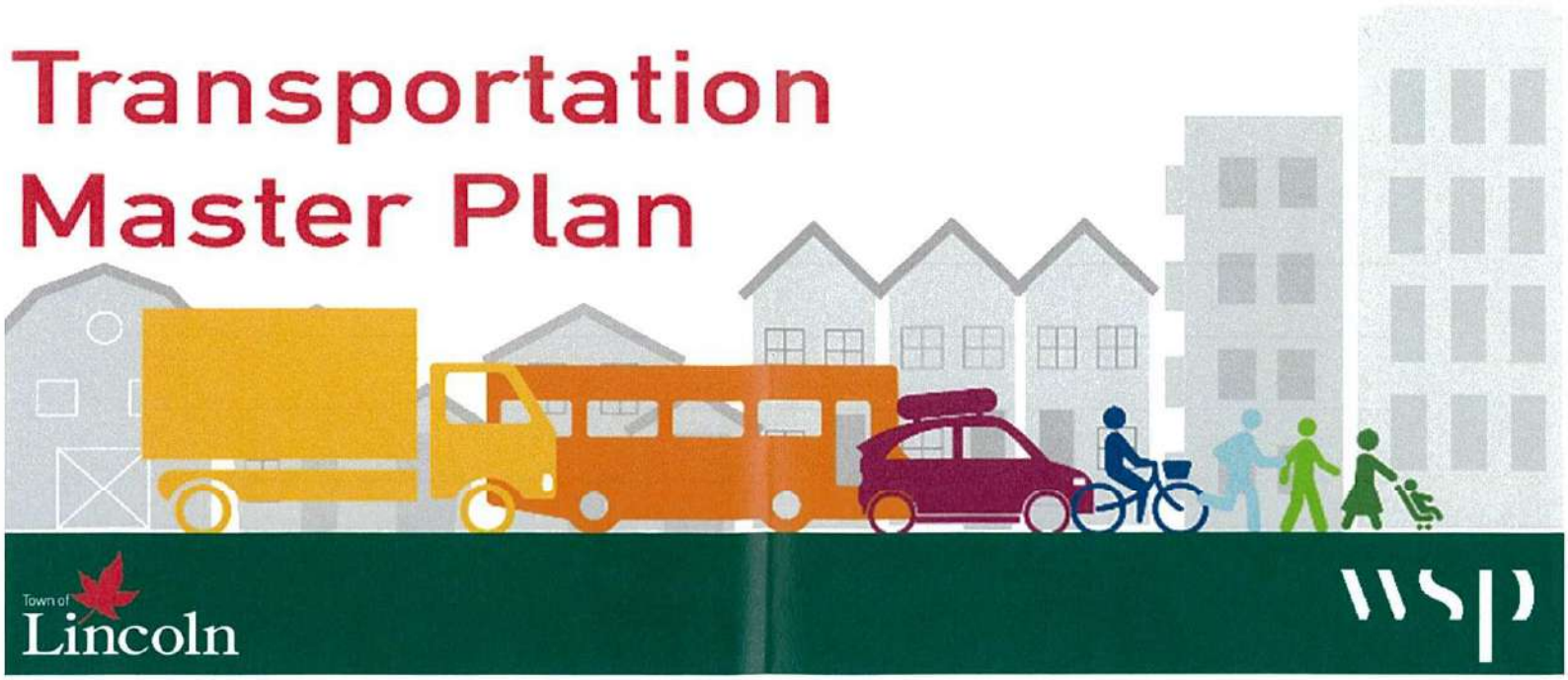
37	[redacted]	[redacted]	[redacted]
38	[redacted]	[redacted]	[redacted]
39	[redacted]	[redacted]	[redacted]
40	[redacted]	[redacted]	[redacted]
41	[redacted]	[redacted]	[redacted]

Sign-in Sheet
March 27 & 28, 2018 | 6:00 p.m. – 8:00 p.m.

Transportation Master Plan



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Town of Lincoln
905-563-8205 x 278
wneubauer@lincoln.ca

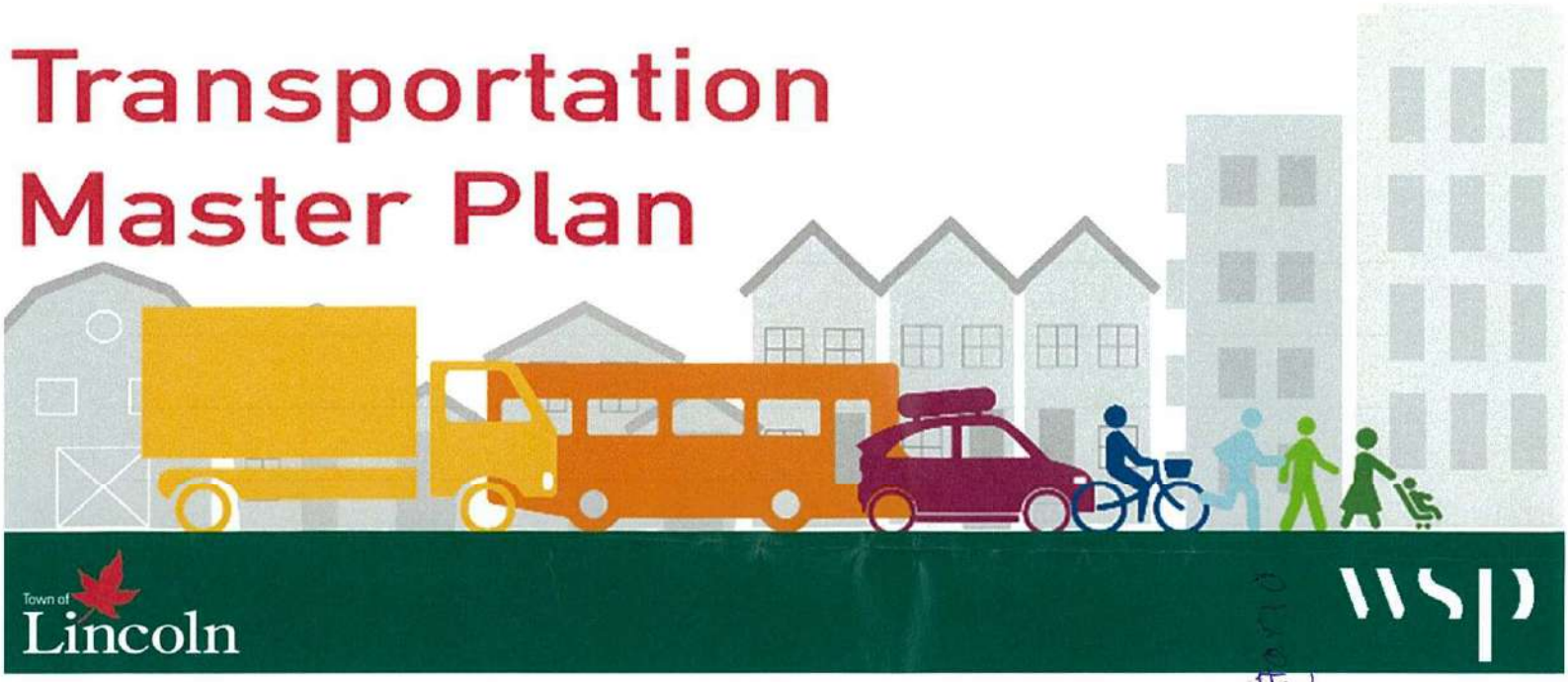
Mehemed Delibasic
WSP
905-882-4211 x 6967
Mehemed.Delibasic@wsp.com

COMMENTS:

TRAFFIC LIGHT IS REQUIRED AT INTERSECTION OF DRAKE AVE, AND REGIONAL ROAD 18 (ONTARIO ST.).

SPEED REDUCTION IN THE NORTHBOUND DIRECTION ON REGIONAL ROAD 18 (ONTARIO ST) BETWEEN THE CN TRAKS AND SOUTH SERVICE ROAD.

Transportation Master Plan



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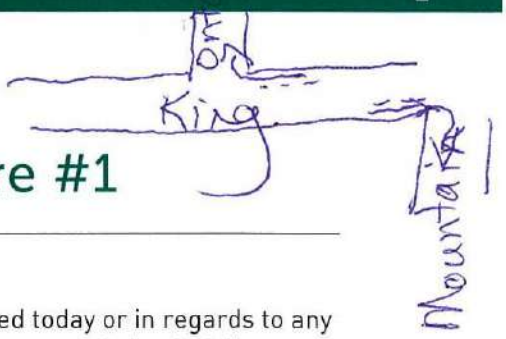

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COMMENTS:

Firstly thank you for acknowledging we need change in our little town of Beamsville
Concerns @ intersections King + Ontario and King + Mountain - there is no traffic flow perhaps because of signal lights, trucks + overall amount of vehicles in a small space designed in the 70's. Would like to see right turn lanes on king to help with flow.

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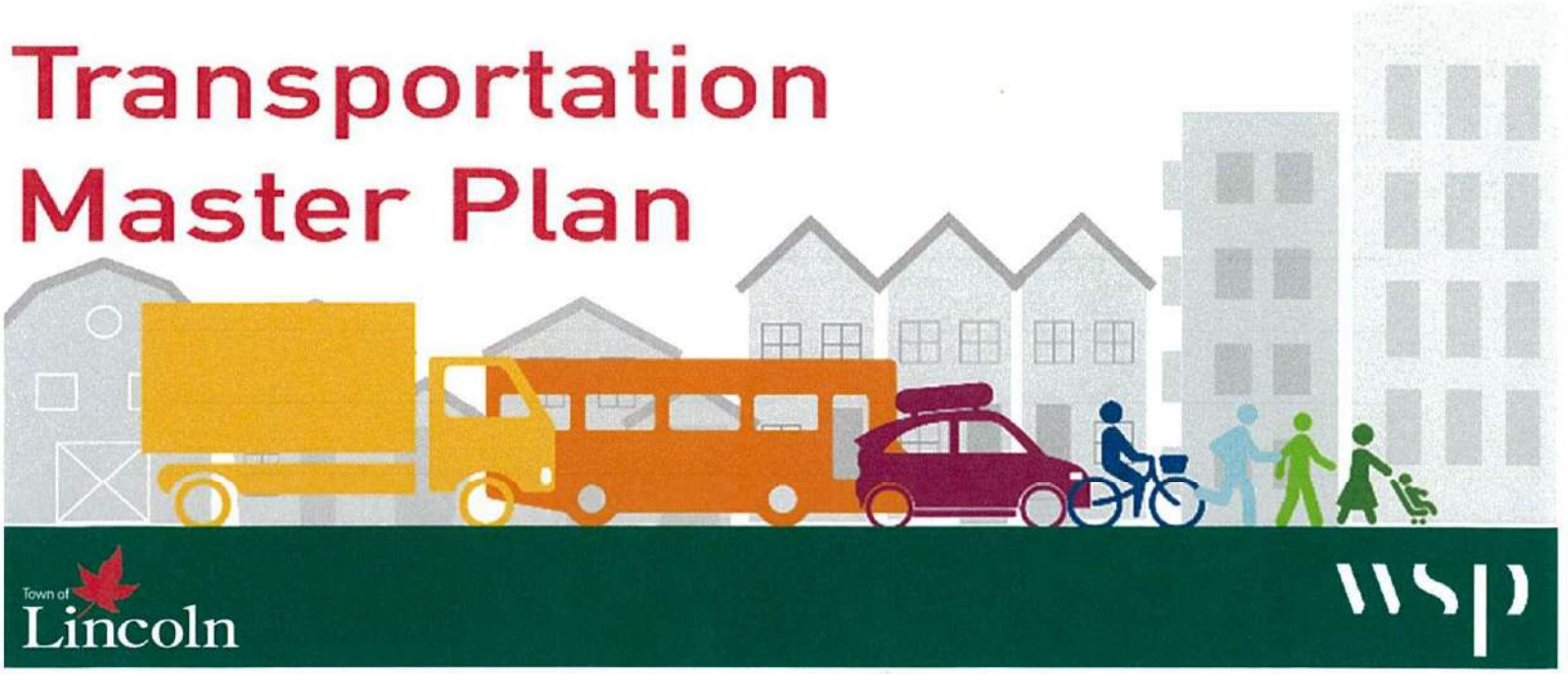

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COMMENTS:

Bridge on Frost Road that is coming down. Suggest replace with pedestrian bridge or a box culvert as like the one on Spruce Rd.

grading shoulders on Mountain Road more often - not safe to bike ride. as it drops off

Gravel Trucks going to fast on Mountain Rd.

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COMMENTS:

NO TRAILS ON 6TH AVE BETWEEN 17TH ST. AND 13TH ST - THIS IS FARM LAND AND WILL NOT MIX WELL WITH TRAIL USERS

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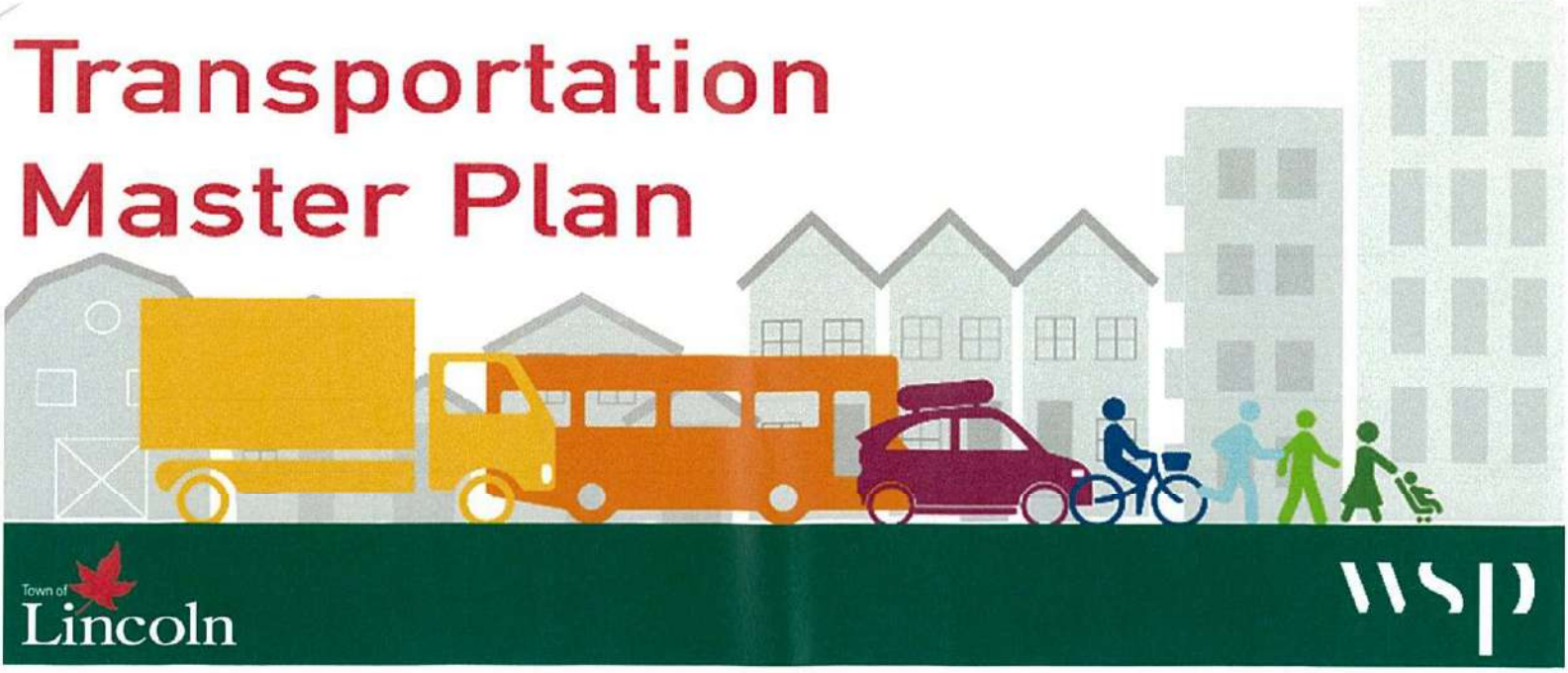

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COMMENTS:

- PLEASE WIDEN NO 8 BETWEEN JORDAN AND VINELAND THROUGH THE HOLLOW FOR SAFETY

- PLEASE BE AWARE OF THE RISKS TO FARMS FROM CONTAMINATION - FROM PEOPLES GARBAGE AND ANIMALS THEY BRING WHEN HIKING AND CYCLING

- PLEASE CONSIDER WHO YOUR PLANNING FOR. YOUR RESIDENTS OR TOURISTS?

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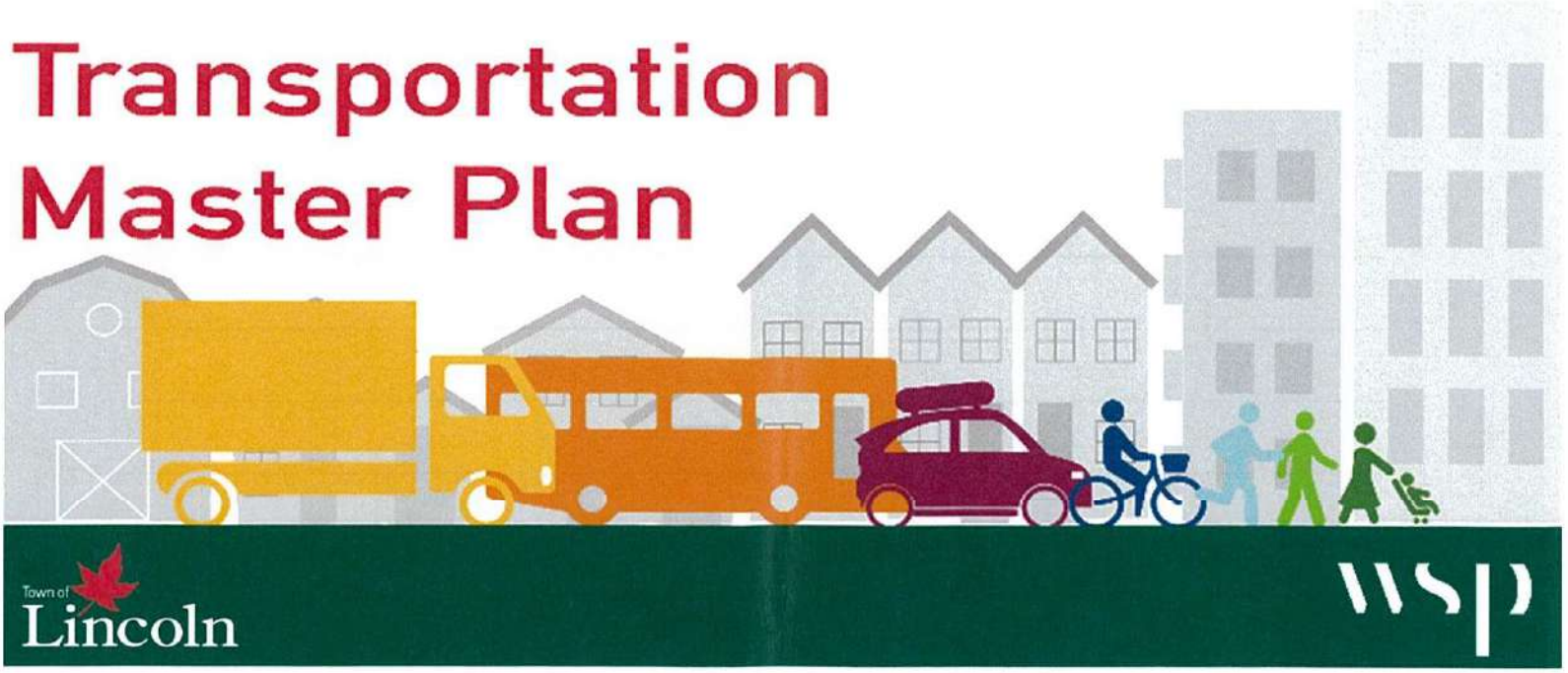

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COMMENTS:

I DO NOT AGREE WITH THE PROPOSED WALKING TRAIL FROM 17TH ST. TO 13TH ST. THROUGH THE 6TH AVE CONCESSION AS WELL AS THE PROPOSED TRAIL ALONG THE FIFTEENTH ST. CONCESSION. AS A LAND OWNER OF THE ADJACENT PROPERTY WE HAVE HAD MANY PROBLEMS WITH TRESPASSERS FROM THE BRUCE TRAIL CAUSING PROPERTY DAMAGE, LITTERING AND THEFT OF TREE STANDS. I FEEL THAT INCREASING PEDESTRIAN TRAFFIC IN OUR NIEGHBOURHOOD WOULD ONLY MAKE THINGS WORSE.

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COMMENTS:

PURPOSE LEADS TO PLAN

BUILD IT and they will come DOES NOT WORK!

A BUS SERVICE NEEDS TO BE A TOOL OF LINKAGE. LINK UP SOURCES OF ECONOMIC VIABILITY, WINE FOOD, ART, PARKS, EVENTS

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COMMENTS:

No TRAIL ON 15TH ST CON.

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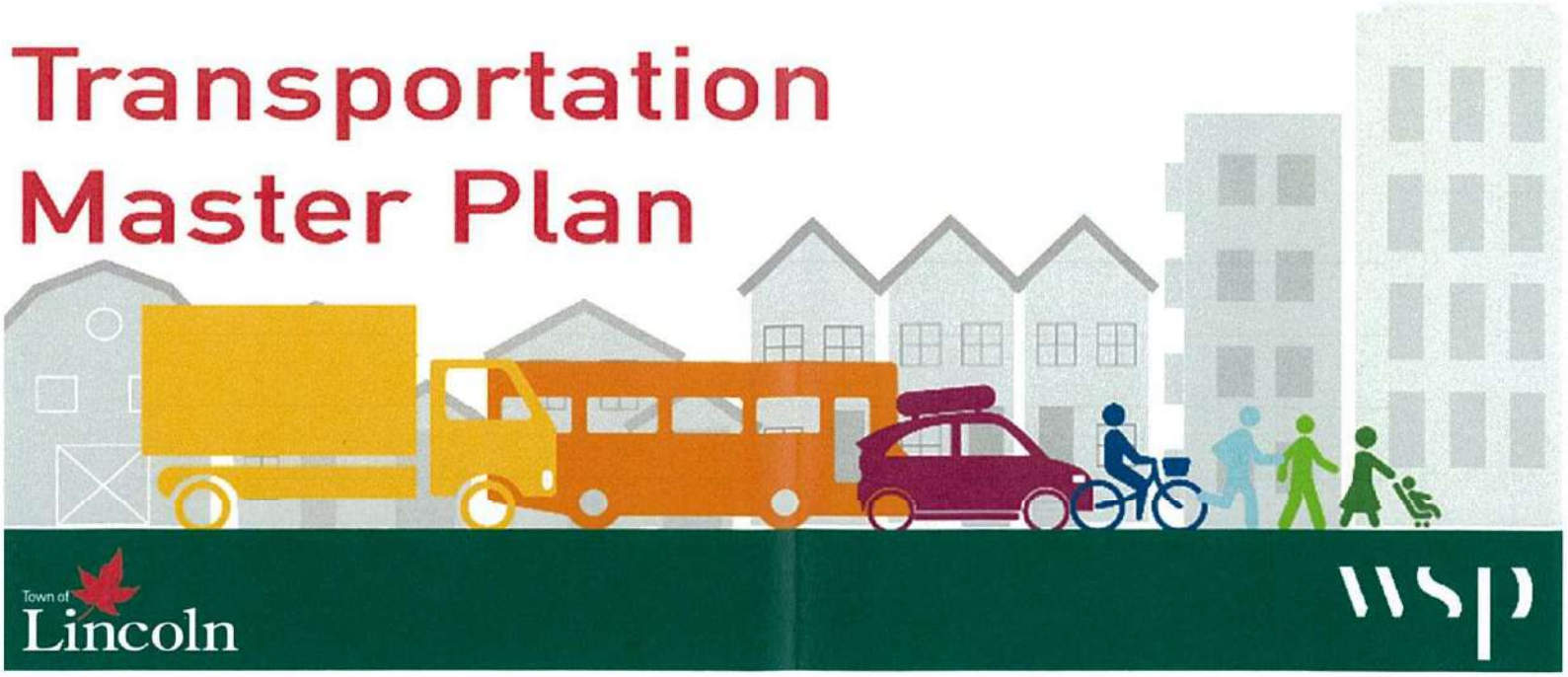

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COMMENTS:

- ~~ALL~~ IMPORTANT & VALUABLE PROCESS
- ACCOUNTING FOR GROWTH IN SMALLER COMMUNITIES IS IMPORTANT
- MOVEMENT TOWARD PROVISION OF ELECTRIC CHARGING STATIONS.
- HOW DO WE MOVE TO LESS CAR DEPENDENCY?

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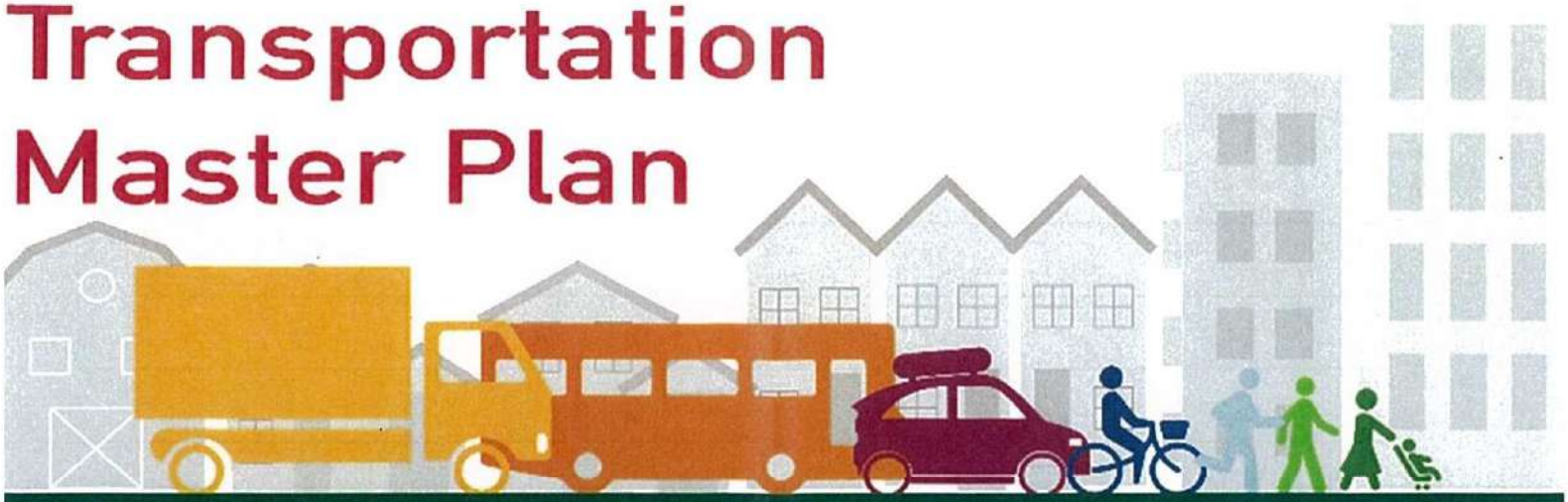

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COMMENTS:

IN regards to proposed trails along unopened road allowances. (Bigger one between 17th st. & 15th Streets. and 15th Street through to Staff Ave.)

Bruce trail conservancy has already tried to put a trail in, and were denied. I believe having a trail through our property would increase the existing problems of trespassing and littering, Not to mention, increased traffic from vehicles. Also huge liability factor. It is also active farmland with heavy machinery crossing road allowance regularly, as well as seasonal hunting of Deer and turkey.

[redacted]

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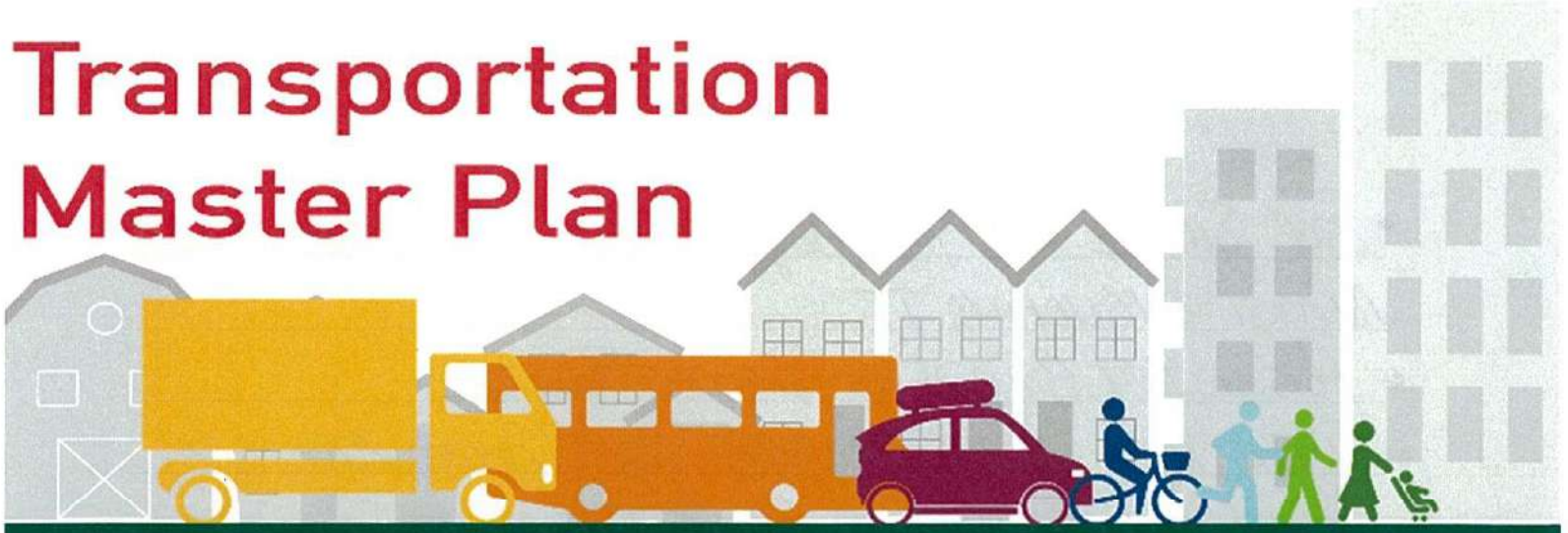

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COMMENTS:

MY SUGGESTIONS ARE THE FOLLOWING:

- CURRENT + FUTURE MAINTENANCE OF OVERGROWTH ALONG ROADSIDES. TAKING INTO CONSIDERATION ALL SIGHT-LINES; PEDESTRIAN, CYCLIST, MOTORIST. I OFTEN HAVE CALLED INTO THE TOWN TO ASK FOR CERTAIN AREAS TO BE CUT BACK/MAINTAINED. A REGULAR SCHEDULE IN LATE WINTER/EARLY SPRING MIGHT BE PRO-ACTIVE.

EG. AT 'T' STOP FOURTH AVE/19TH BY ELECTRICAL CORRIDOR. WALKING NORTH, SIDEWALK ENDS @ CURVE ON ROAD - HUGE WILD BRUSH @ LEAST 5' BLOCKS VIEW OF ALL COMING OR GOING N. ON 19TH.

→

- STOP SIGN @ 19TH/ST. JOHN'S HAS A CEDAR BUSH ALMOST ENGULFING IT
- POISON IVY GROWTH ON BAILEY BRIDGE

THESE ARE JUST EXAMPLES BUT THERE ARE SO MUCH MORE. HAVING STAFF TRAINED TO BE OBSERVANT & SCHEDULED WOULD HELP KEEP SAFETY.

2ND MAINTENANCE OF NEW SIDEWALKS - PLEASE MAKE SURE WHOMEVER IS TENDERED TO PLOW/MOW HAVE PROPER SIZE MACHINES. E.g. NEW SIDEWALK @ SHORE CEMETERY & TURF @ SIDE OF SIDEWALK IS PLOWED DOWN SEVERELY.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone: [redacted]

CONTINUED

Thank you for your participation!

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PLEASE CONNECT WITH REGION ABOUT FUTURE SIDEWALKS. A HUGE OPPORTUNITY WAS MISSED LAST YEAR ON HWY 8 @ JORDAN HOLLOW. IT NEEDS A PROPER SIDEWALK FULLY CONNECTING VINELAND & JORDAN VILLAGE.

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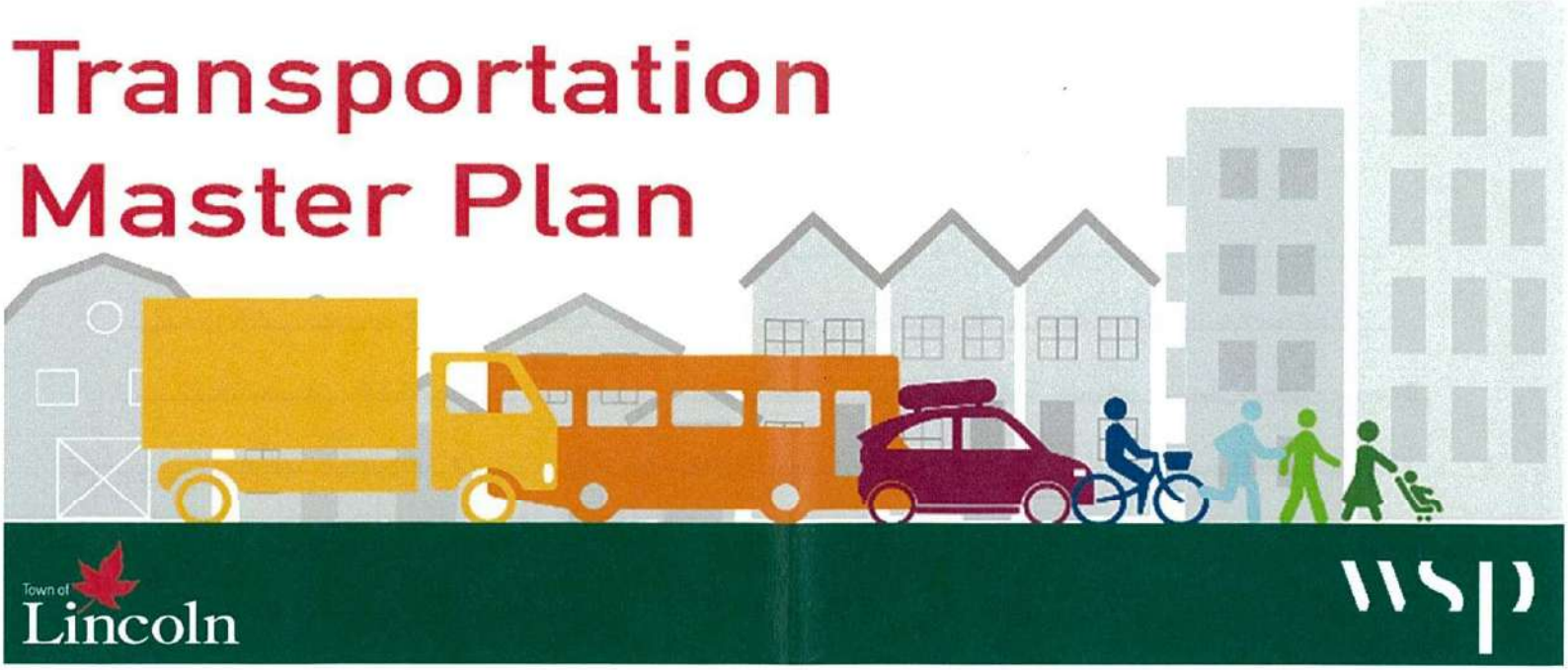

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COMMENTS:

My concerns re safety - my friend & neighbour was killed instantly @ Victoria Ave + 2nd Ave - driver driven on Victoria travelling well above speed limit and person approaching Victoria Ave too slowly I know BUT I feel some signage for N. bound traffic warning of intersection amber flashing light or Warning of intersection just ahead could slow (hopefully) N. bound. There is a blind spot when 2nd Ave approaches Victoria - vehicle can be hidden in the underpass to their view for ~~seconds~~ vital seconds.

Also Calp Rd @ Victoria Ave. Very dangerous! Difficulty entering ~~approaching~~ Victoria Ave from Calp Rd especially left Turn. Travelling south on Victoria to make left turn, even with turning lane in. there

Volume of Victoria Ave traffic + also an overgrown shrub every summer on the center island mars view to south. There should not be a plant or shrub at that spot. Some people have had a near accident there.

Some sort of signage warning (like skbord has) to caution northbound Traffic of this area.

3 subdivisions on Culp Rd is bringing many people from other areas, that are unfamiliar with this area, as we locals are, but find it still unsafe + difficult

PLEASE PRINT (Optional)

Name: _____

Address: _____

Postal Code: _____

E-Mail: _____

Phone: _____

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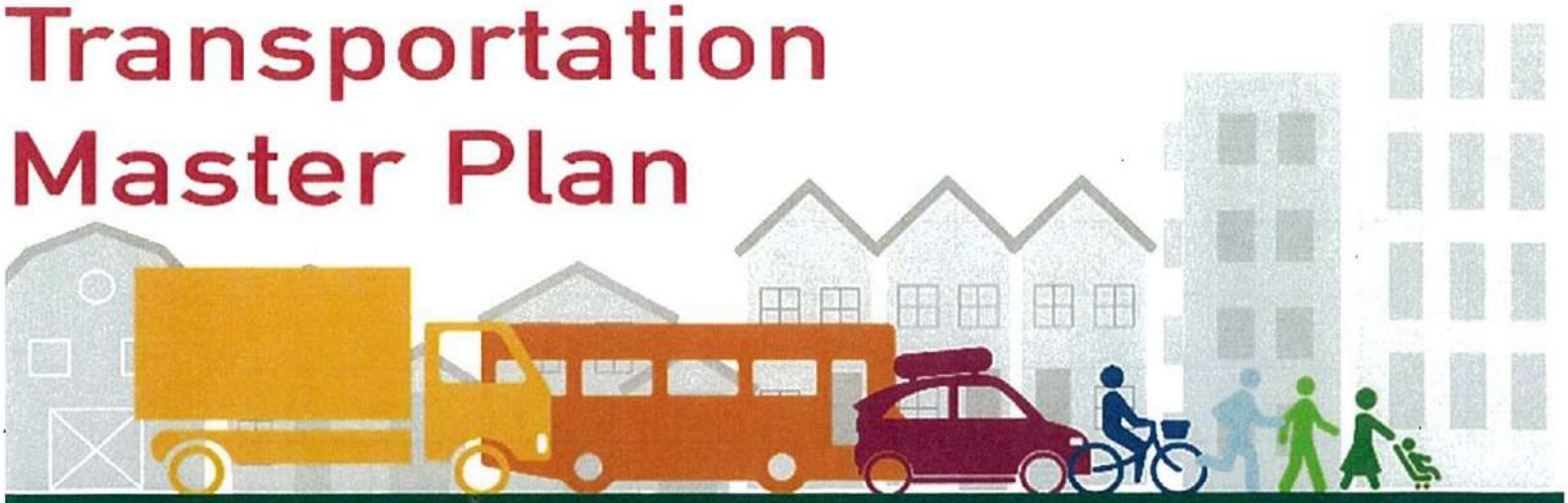

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COMMENTS:

- As per discussion with Christine + Jessie
- I have live for 82 years 2nd house ~~off~~ north of [redacted]
- My adress is, and has been [redacted]
- My taxes are paid to [redacted]
- This means I am on the edge of both [redacted]
- I would ask for reduce rates for occasional use of UBER & when driving privileges are reduce. [redacted]

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail:

Phone: [redacted]

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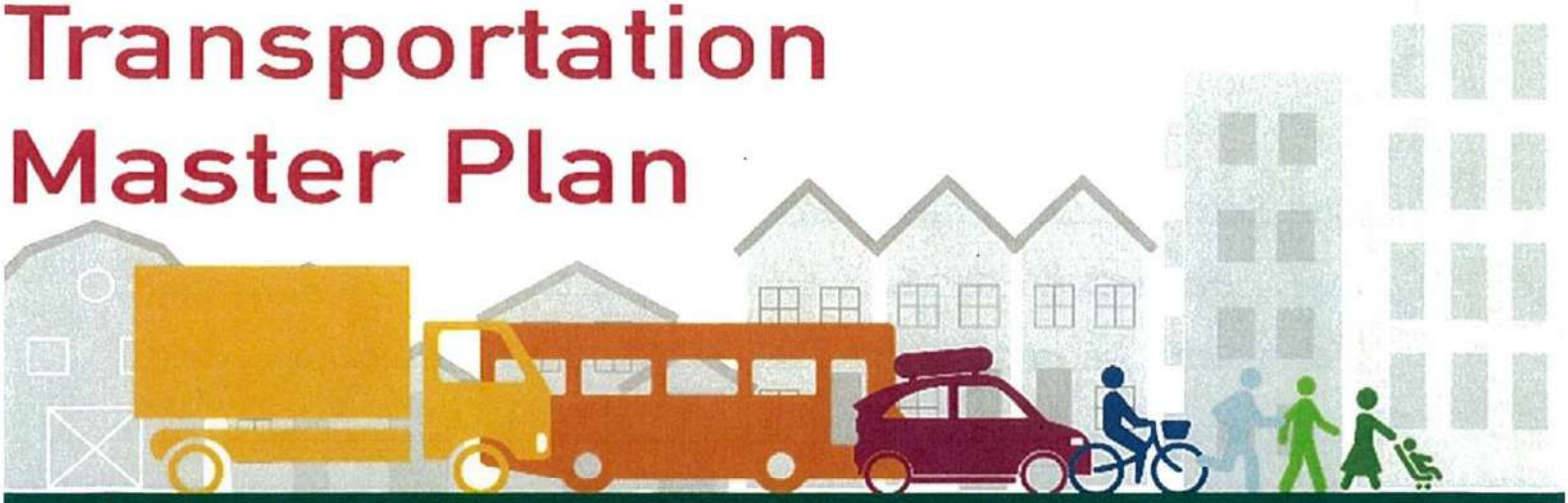

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COMMENTS:

I live on beautiful [redacted]
The biggest issue: Speeding! People think it's a country road and do 80km/hr Kids are playing and lots of people are walking / jogging. The question is not (if) but (when) a terrible accident is going to happen. Noise level is up too because of this. With proposed new subdivision on Mountain St our road will be further destroyed.
Ideas: Sidewalks, Speed bumps
[illegible] people think →

you can't cross them, so pass very closely by pedestrians.

Please - don't ruin our road any further !!

(temporary) summer speed bumps

No heavy traffic allowed, but WHO is enforcing ??

Police invited several times on our driveway. But they are busy on Bartlett where visibility is excellent.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone: [redacted]

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COMMENTS:

Please add my name as a representative of Niagara Bruce Trail Club

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code:

E-Mail: [redacted]

Phone: [redacted]

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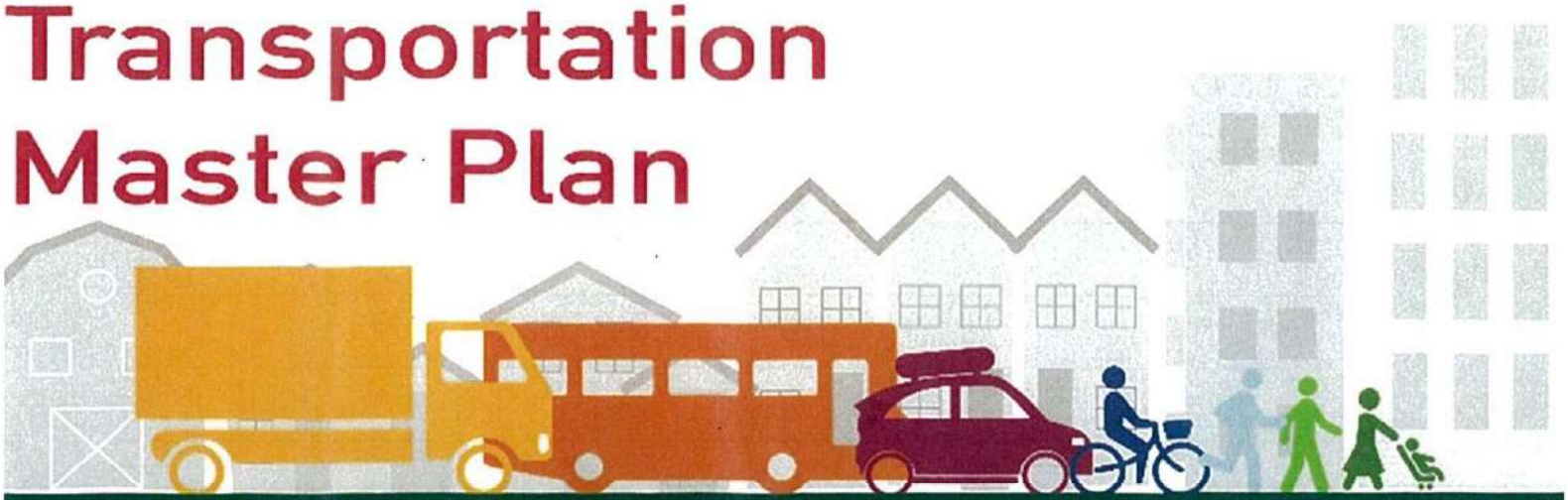

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COMMENTS:

(1) Replace the Bridge at Frost Rd & Spring Creek Rd. People on Quads use the Bridge on private property ([redacted]) to cross Spring Creek. Because the ~~road~~ Bridge is closed.

(2) Change the traffic lights in the Town of Lincoln so that Pedestrians do not have to press the crosswalk Button to cross the street. They automatically get a crosswalk sign.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone: [redacted]

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COMMENTS:

- rural roads should be fixed properly
- putting gravel down and then snow plow removes it next week is wasteful
- also putting a scoop of ashplalt does not last
- Frost Road is barely 2 lanes because both sides have eroded
- worst road is Young between Mountain + Cosby - my husband fell in a sinkhole up to his knee!!

-also spray painting ~~painting~~ broken side walks is still a trip hazard for visually impaired

-stairs on escarpment at Kinsmen Park are not marked for visually impaired

-not dog friendly either

Thanks.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code:

E-Mail: [redacted]

Phone:

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COMMENTS:

Highly recommend planning include grade separation between Ontario street and the railroad tracks to eliminate interuption of road traffic by trains. Currently morning trains (cargo) between 7 and 8 am can back up traffic from the railroad crossing all the way south of John St. This congestion will only increase with the housing developments planned/underway South of John St. Also, while biking on active transportation routes is fairly safe for adults/experienced bikers, I do not feel comfortable letting my children use bike lanes/shoulders within town because of the proximity to traffic. Might there be consideration for some sort of separation method at least within town? →

Else we will continue to have our children to bike on the sidewalk.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone:

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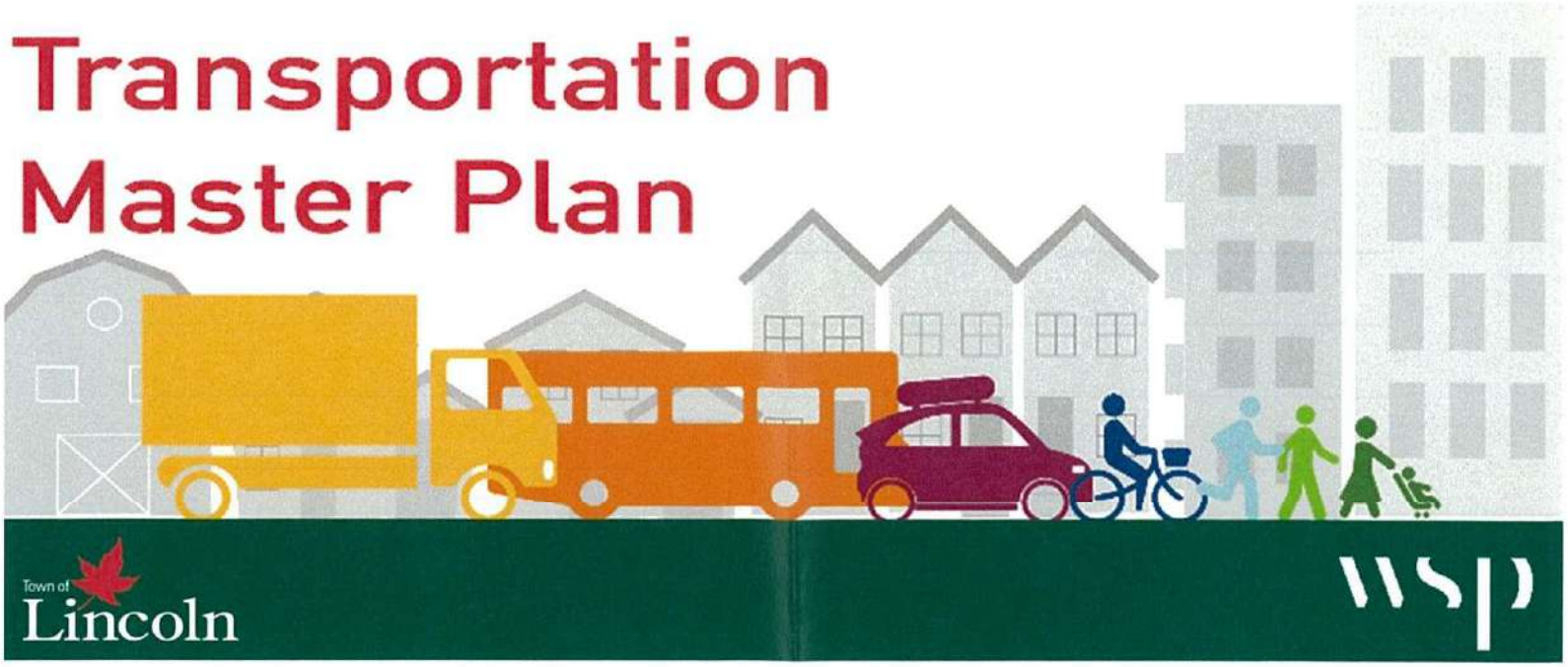

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COMMENTS:

PLEASE INVOLVE THE NIAGARA NORTH FEDERATION OF AGRICULTURE IN STAKEHOLDER CONSULTATIONS GOING FORWARD IN REGARDS TO THE TRANSPORTATION MASTER PLAN. IT IS IMPORTANT TO MAINTAIN MOVEMENT OF AGRICULTURAL GOODS & EQUIPMENT THROUGHOUT THE TOWN OF LINCOLN.

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone:

Thank you for your participation!

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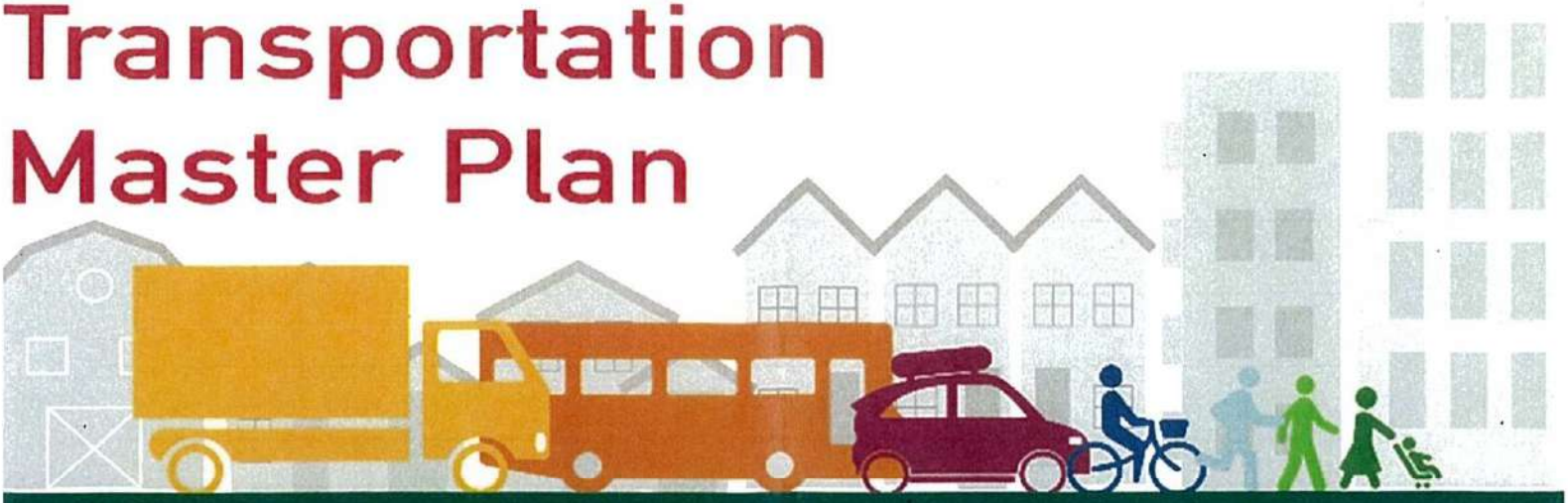
Transportation Master Plan



Town of Lincoln

wsp

Town of Lincoln
Public Information Centre #1

Comment Sheet

Please provide us with your comments regarding any of the material presented today or in regards to any other issues that you feel are relevant to this project. Return your completed comment sheet at the registration table or email one of the study team members:

Walter Neubauer
Town of Lincoln
905-563-8205 x 278
wneubauer@lincoln.ca

[redacted]

Mehemed Delibasic
WSP
905-882-4211 x 6967
Mehemed.Delibasic@wsp.com

COMMENTS:

#8X Stadelbauer - heavy traffic, poor visibility, school area, speed limit on Stadelbauer needs to be reduced to 40.

Barricade at end of Highland Park before new construction begins to eliminate traffic down Highland & Stadelbauer. Must exit to Mtn.
Also new apt. at "T" intersection of Ont & #8.
Where is this traffic going?
Please reply to my concerns via bell. net

Also when construction begins, post visible signs NO HEAVY TRUCKS! Must use CONSTRUCTION ROAD

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone: [redacted]

Thank you for your participation!

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Transportation Master Plan

Town of Lincoln

WSP

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Mehemed Delibasic
WSP
905-882-4211 x 6967
Mehemed.Delibasic@wsp.com

COMMENTS:

① REPAIR KING ST @ STADELBAUR & BAD BUMP

② SPOT LIGHT @ STADELBAUR & KING - SOMEONE WILL GET KILLED THERE - IT IS EXTREMELY DIFFICULT TO ACCESS KING FROM NORTH & SOUTH CORNER / STADELBAUR OR WEST ST. - I COULD TELL YOU HOW MANY MISSES THERE EVERY DAY - THE SCHOOL ZONE/SPEED ZONE ON KING ST ~~WEST~~ BOUND) SIDE ENDS AT THE TOP OF A HILL & DROPS ROUND TO THE RIGHT. TRAFFIC FROM EITHER WEST ST OR STADELBAUR ARE BLIND. TRAFFIC EAST BOUND) ACCELERATE DOWN KING & REALLY CANNOT BE SEEN COMING - PARTICULARLY TRYING TO GET ON TO KING FROM KING

MOTHERS / WITH CHILDREN HAVE A VERY DIFFICULT TIME

CROSSING KING FROM STADIUM ROAD - THE FLEMING CTR LIBRARY IS THE DESTINATION AND PEDESTRIANS CROSSING KING ARE IN MAJOR PERIL. NOT A SAFE CORNER FOR ANYONE WALKING ACROSS KING OR CARS TRYING TO ACCESS KING NORTH OR SOUTH

(3) WHY AREN'T THE TURN ARROWS @ ONTARIO & OTHERS NOT OPERATING MOST OF THE DAY - ESPECIALLY @ ONTARIO & KING -

SOUTHBOUND TRAFFIC TRYING TO TURN RT & KING HAVE TO BE CAREFUL FOR PEDESTRIANS - VERY DIFFICULT TO MAKE A LEFT TURN TO ONTARIO FROM EAST BOUND KING

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: [redacted]

E-Mail: [redacted]

Phone: [redacted]

Thank you for your participation!

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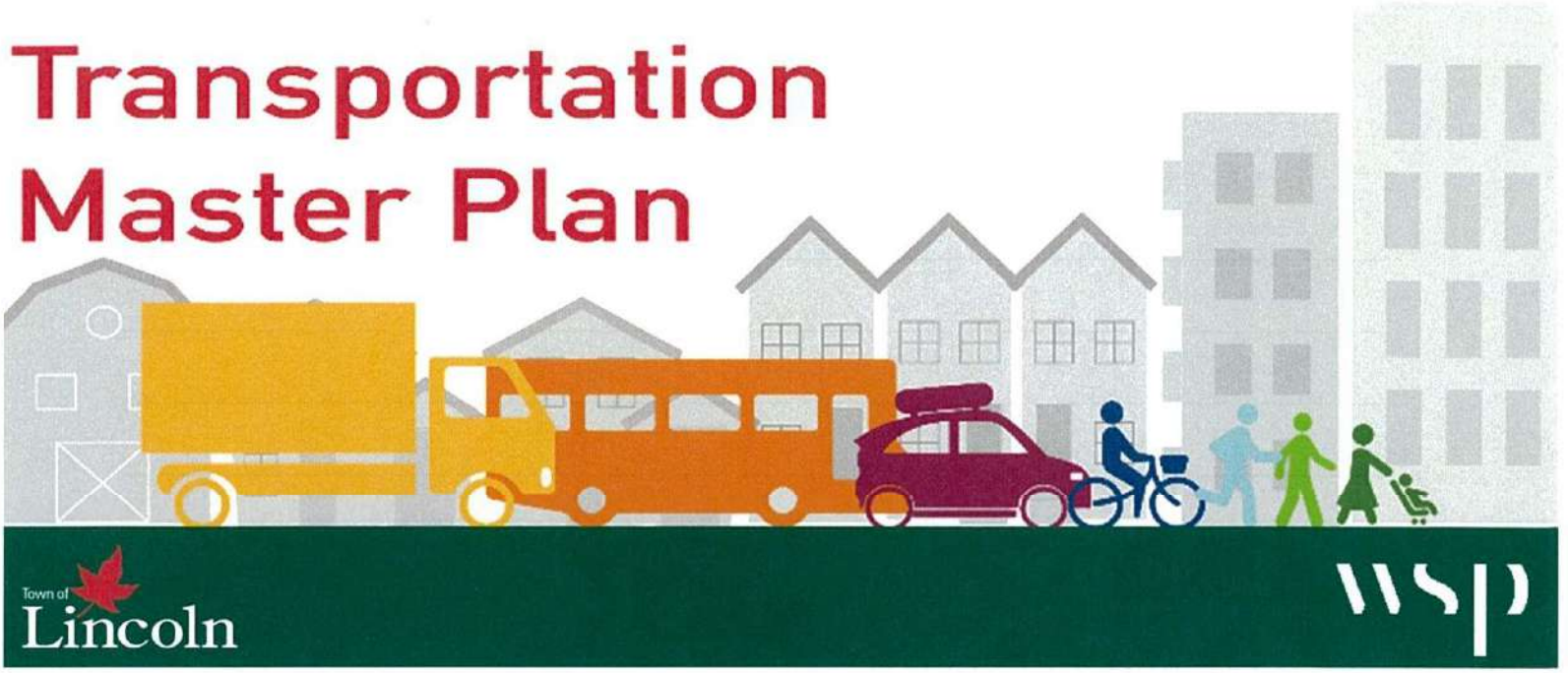

Town of Lincoln

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WSP
905-882-4211 x 6967
Mehemed.Delibasic@wsp.com

COMMENTS:

- pedestrian bridge at Frost + Spring creek greatly appreciated

PLEASE PRINT (Optional)

Name: [redacted]

Address: [redacted]

Postal Code: _____

E-Mail: [redacted]

Phone: _____

Thank you for your participation!

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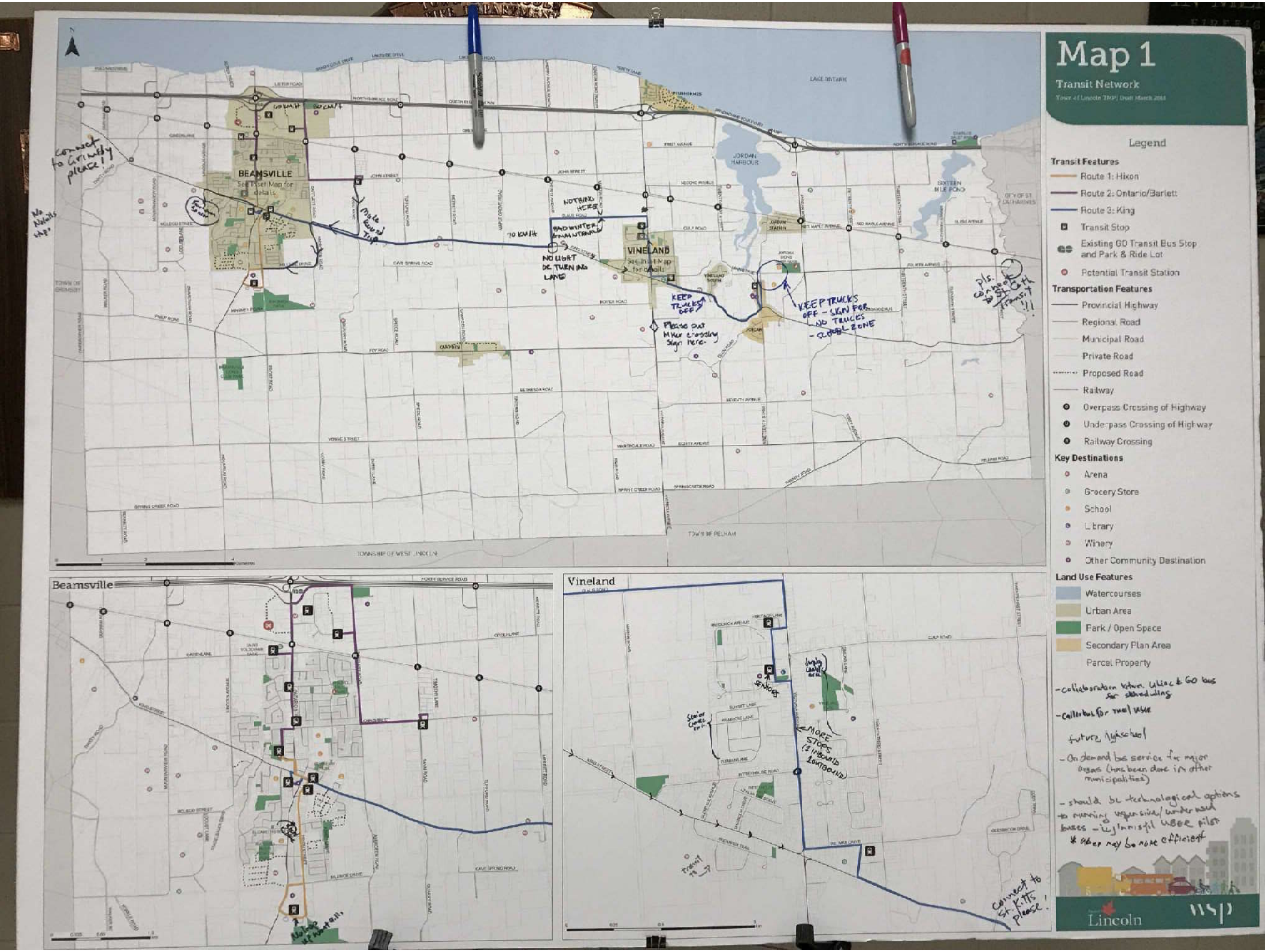
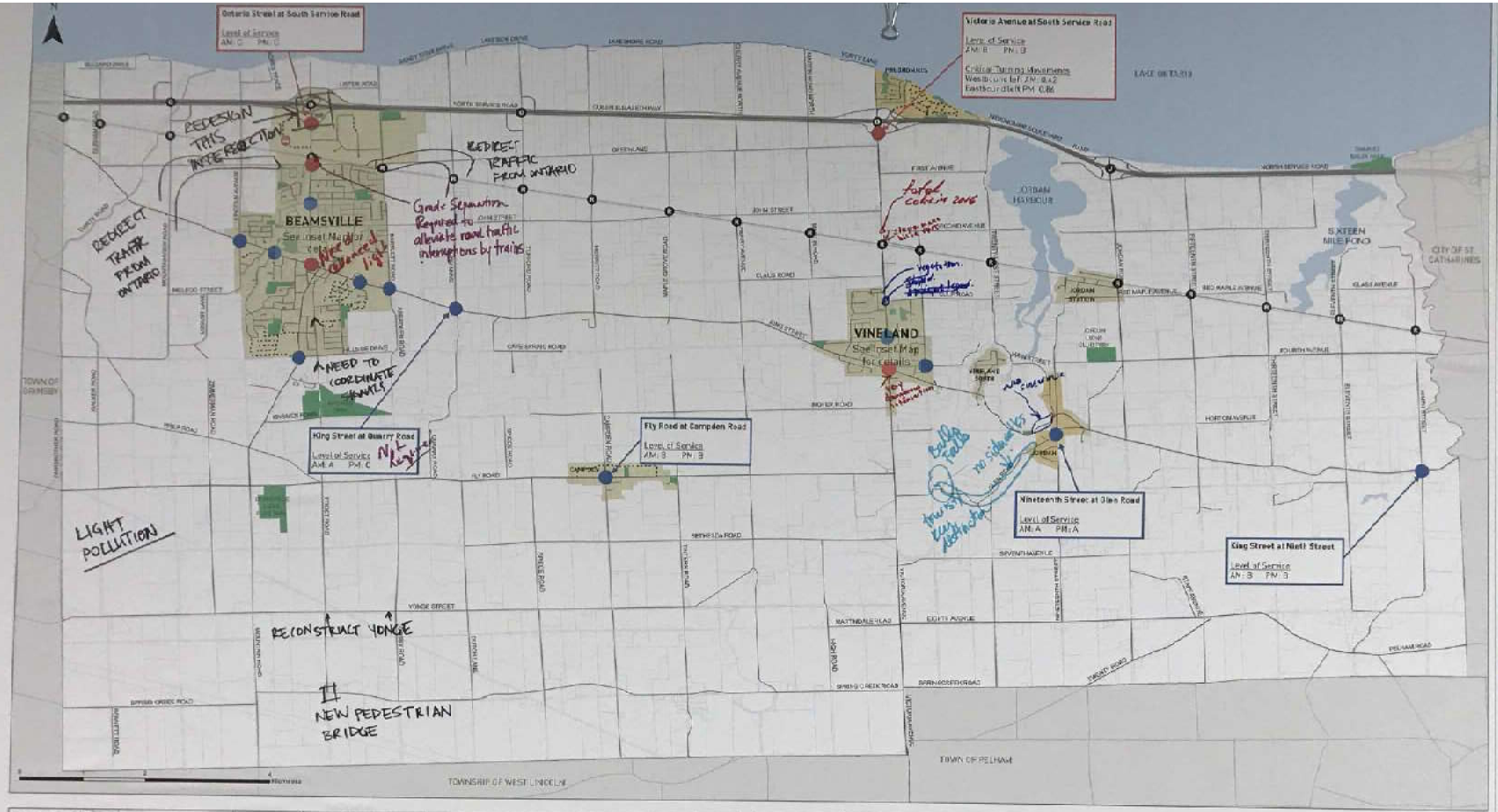
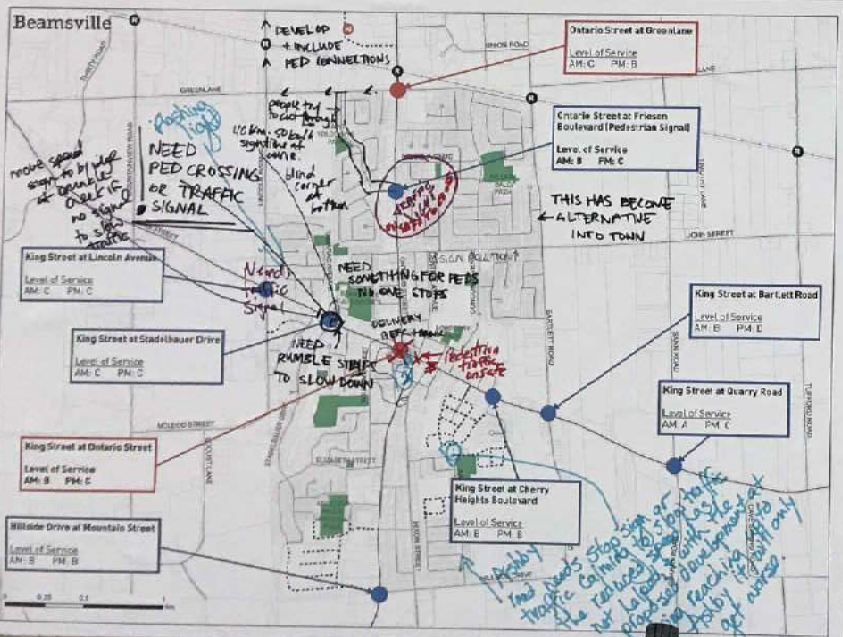
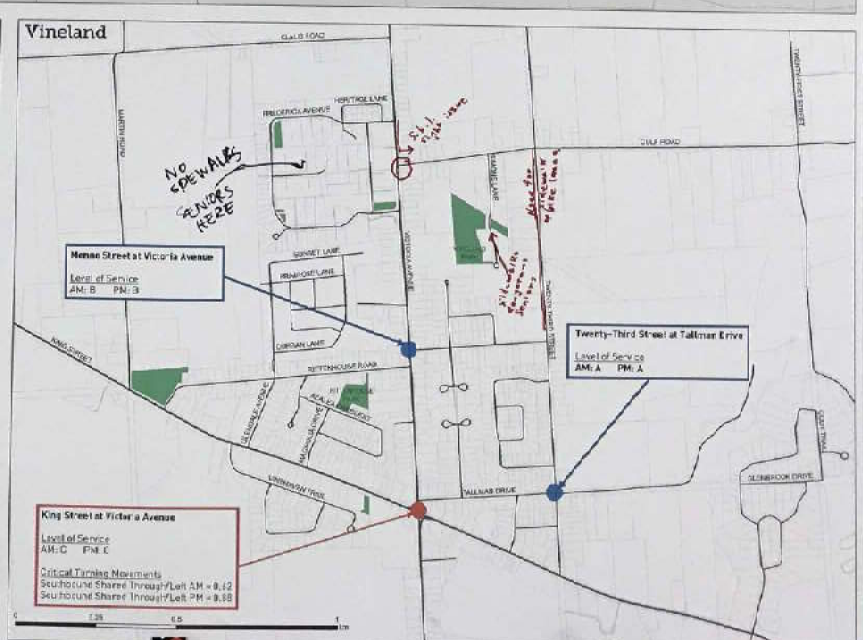

Map 1
Transit Network
Legend
Transit Features
Route 1: Hixon
Route 2: Ontario/Bartlett
Route 3: King
Transit Stop
Existing GO Transit Bus Stop and Park & Ride Lot
Potential Transit Station
Transportation Features
Provincial Highway
Regional Road
Municipal Road
Private Road
Proposed Road
Railway
Overpass Crossing of Highway
Underpass Crossing of Highway
Railway Crossing
Key Destinations
Arena
Grocery Store
School
Library
Winery
Other Community Destination
Land Use Features
Watercourses
Urban Area
Park / Open Space
Secondary Plan Area
Parcel Property
BEAMSVILLE
See Inset Map for details
VINELAND
See Inset Map for details
JORDAN HARBOUR
LAKE ONTARIO
TOWN OF GRIMSBY
TOWNSHIP OF WEST LINCOLN
TOWN OF PELHAM
Connect to Grimsby please!
No Names Map
Mile Road Trip
70 KM/H
NOTHING HERE
BAD WINTER STRAIN/TURN
NO LEFT OR TURN ON LANE
KEEP TRUCKS OFF
Please put Mike crossing sign here.
KEEP TRUCKS OFF - SIGN FOR NO TRUCKS - SCHOOL ZONE
Beamsville
Vineland
MORE STOPS (1 INBOUND 1 OUTBOUND)
Connect to St. Kitts Please!
Lincoln
wsp


Map 2
Existing Active Transportation Conditions
Legend
Existing Active Transportation Facility Types
Previously Proposed Active Transportation Facility Types
Potential Candidate Active Transportation Routes
Previously Proposed Staging Areas
Regionally Significant Routes and Trails
Key Destinations
Transportation Features
Land Use Features
BEAMSVILLE
VINELAND
NEED MORE OFF-ROAD TRAILS
Beamsville
Vineland
Dangerous
NO SIDEWALK
RURAL HIGHWAY
heavy trucks! not safe, noisy
Lincoln







Map 3

Traffic Assessment

Town of Lincoln TMP (Month 2018)

Legend

Selected Intersection for Traffic Assessment[1]

- Unsignalized Intersection
- Signalized Intersection

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Overpass Crossing of Highway
- Underpass Crossing of Highway
- Railway Crossing

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note

1. Intersections have been chosen through comprehensive evaluation based on, citizen complaints, safety concerns, increased vehicular volumes and geometric constraints.

Level of Service Definitions

Level of Service	Average Delay per Vehicle (seconds/vehicle)		Expected delay to Minor Street Traffic from the Major Street
	Signalized	Unsignalized	
A	≤ 10s	0s - 10s	Little or no delay
B	10.1s - 20.0s	> 10s - 15s	Short traffic delay
C	20.1s - 35.0s	> 15s - 25s	Average traffic delay
D	35.1s - 55.0s	> 25s - 35s	Long traffic delay
E	55.1s - 80.0s	> 35s - 50s	Very long traffic delay
F	> 80s	> 50s	Extreme delay encountered with queuing, which may cause severe congestion affecting other traffic movements in the intersection

- King St. & Ontario & Mountain cars don't look before turning - unsafe to cross !!

(1) - Limited flow of traffic on King, Ontario and Mountain with limited space to turn right at lights when traffic stopped. Perhaps a third lane to go up mountain from King and off King turning onto Ontario.

Lincoln

WSP

Complete Streets

18

Tell us what you think!

Please place a dot on what you think is most important when planning and designing roads in Lincoln.

Parking

Street Furniture

- Furniture/Benches but not extended to business.

Transit Stops and Shelters

Sidewalks

In townhouse developments, please put sidewalk adjacent to road, so that a driveway can accommodate 2 parked vehicles (no boulevard)

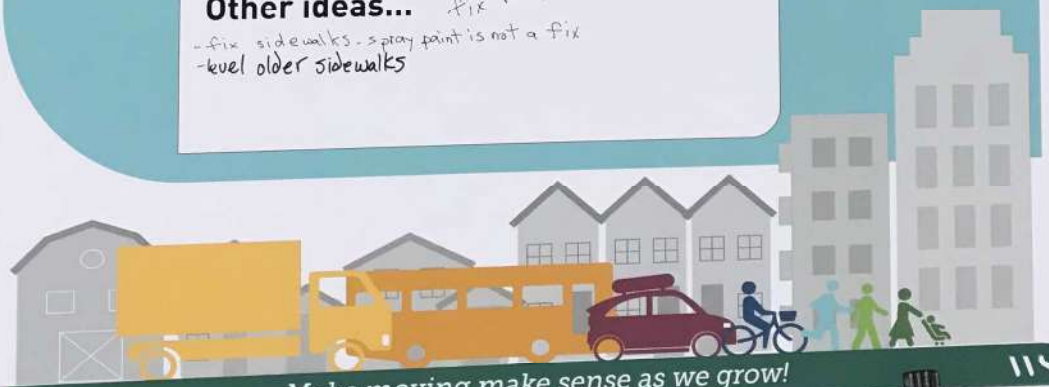
Cycling Facilities

Landscaping

Other ideas...

fix rural roads

- fix sidewalks - spray paint is not a fix
- level older sidewalks

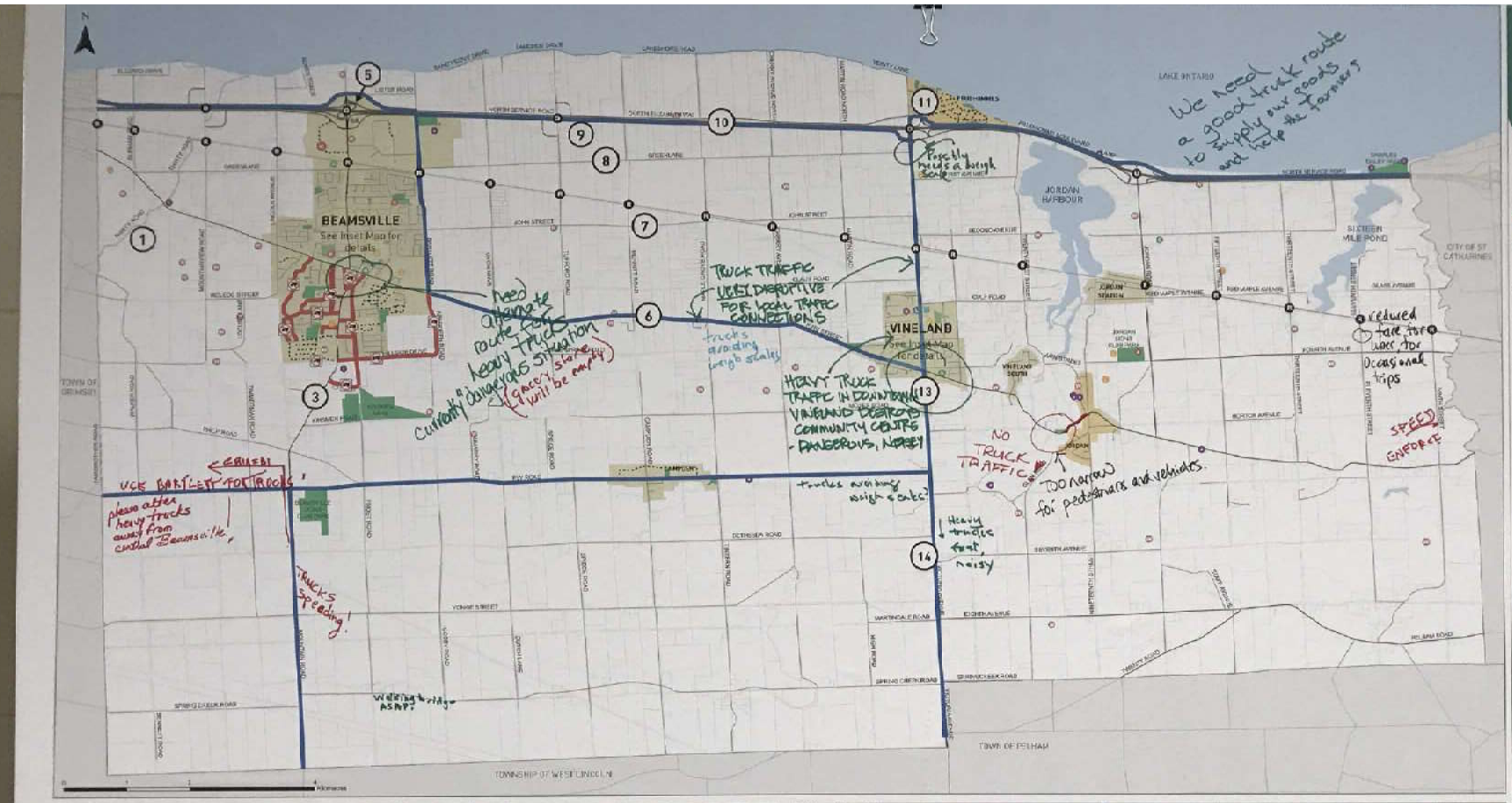


Make moving make sense as we grow!

Town of Lincoln

WSP


Campden
Jordan
Lincoln Key Map
Prudhommes
Jordan Station
Beamsville
Vineland
Map 4
Existing Conditions
Legend
Transportation Features
Provincial Highway
Regional Road
Municipal Road
Private Road
Proposed Road
Railway
Existing GO Transit Bus Stop and Park & Ride Lot
Potential Transit Station
Overpass Crossing of Highway
Underpass Crossing of Highway
Railway Crossing
Key Destinations
Arena
Grocery Store
School
Library
Winery
Other Community Destination
Land Use Features
Watercourses
Urban Area
Park / Open Space
Parcel Property
Lincoln
wsp



Map 5

Existing Goods Movement

Township of Lincoln TMP | Draft (March 2018)

Legend

Heavy Vehicle Routes

- Heavy Vehicles are Prohibited*
- Proposed Heavy Vehicle Route
- (1) Recorded heavy trucking activity

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Overpass Crossing of Highway
- Underpass Crossing of Highway
- Railway Crossing

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Note

1. Refer to By-law No. 2017-08 for a detailed description and provisions of heavy vehicles in the Town of Lincoln.

Existing Truck Volume Percentages During Peak Hour

	Truck Route	Weekday Average Percentage	
1	Trinity Road between Ironshart Road and King Street	Northbound	4.9%
		Southbound	4.7%
2	King Street between Ontario Street and Lincoln Avenue	Eastbound	1.4%
		Westbound	1.7%
3	Mountain Street between Edelbrook Road and Hillside Drive	Northbound	9.4%
		Southbound	4.3%
4	Ontario Street between John Street and Greenlane Road	Northbound	3.8%
		Southbound	2.9%
5	Northbound Ontario Street and QEW On-Ramp	Northbound	10.9%
6	King Street between Tufford Road and Maple Grove Road	Eastbound	7.8%
		Westbound	4.8%
7	John Street between Tufford Road and Maple Grove Road	Eastbound	6.7%
		Westbound	3.3%
8	Greenlane Road between Tufford Road and Maple Grove Road	Eastbound	11.2%
		Westbound	3.7%
9	South Service Road between Tufford Road and Maple Grove Road	Eastbound	19.6%
		Westbound	5.2%
10	QEW between Merritt Road and Cherry Avenue	Eastbound	9.7%
		Westbound	8.4%
11	North Service Road and Victoria Avenue Westbound Left Turn	Southbound	7.2%
12	Victoria Avenue between King Street and Main Road	Northbound	7.7%
		Southbound	7.8%
13	Victoria Avenue between Moyer Road and Johnson Street	Northbound	8.1%
		Southbound	10.7%
14	Victoria Avenue between Bethesda Road and Merrittville Road	Northbound	12.2%
		Southbound	11.3%

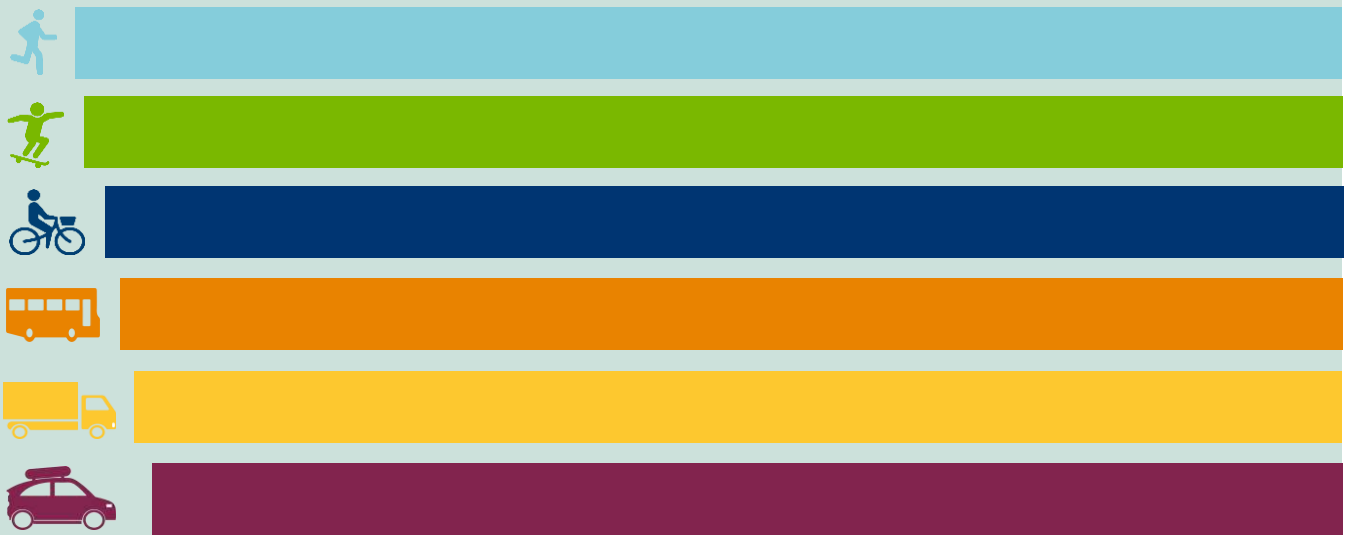
Lincoln

WSP

APPENDIX

D-2

Round 2 Public Information Centre Responses



Make moving make sense as we grow!

Town of Lincoln Transportation Master Plan
Public Information Centre #2 | March 17th, 2019

	Name	Organization	Email
1	[redacted]	[redacted]	[redacted]
2	[redacted]	[redacted]	[redacted]
3	[redacted]	[redacted]	[redacted]
	[redacted]		
4	[redacted]	[redacted]	[redacted]

Sign-in Sheet
Town of Lincoln TMP Public Information Centre #2

Complete Streets

6

Complete Streets refers to the consideration of all modes and people of all ages and abilities when designing roadways or corridors

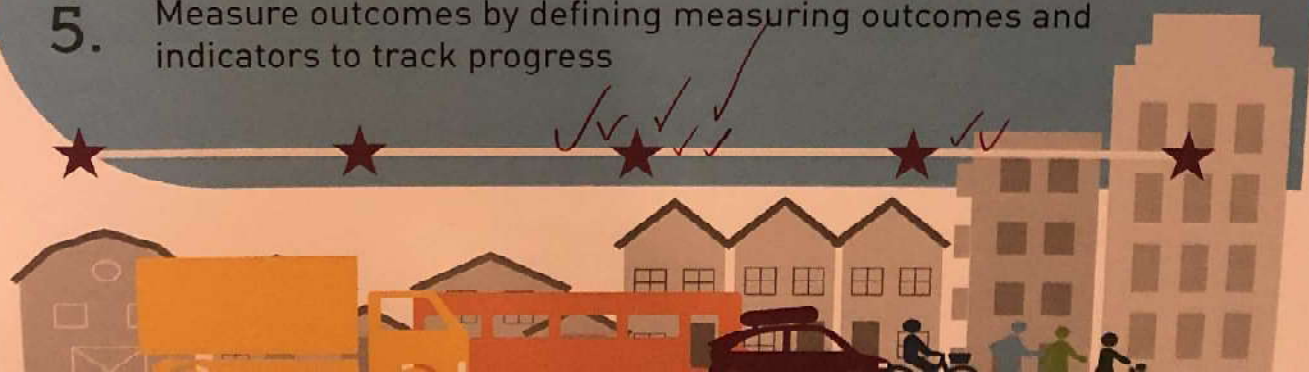
1. Develop policy to integrate complete streets principles into municipal policies and guidelines

2. Educate staff by providing complete streets design and planning training

3. Evaluate road projects as they are identified for reconstruction to integrate complete street design principles

4. Educate users by developing campaigns as complete streets projects are implemented

5. Measure outcomes by defining measuring outcomes and indicators to track progress



Transit

7

Transit strategies refer to the way in which the Town will expand, enhance and improve overall connectivity and quality of local service.

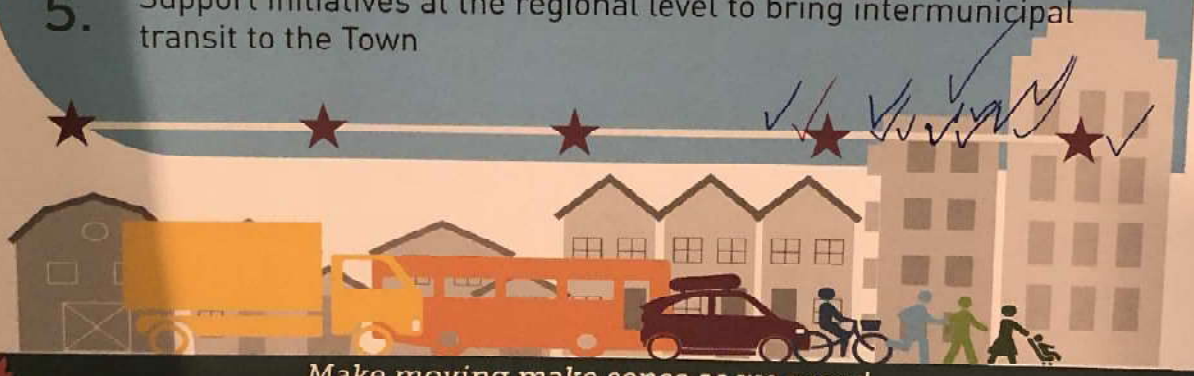
1. Acquire more buses to increase the frequency of service provided throughout the Town

2. Refine uLinc routes to ensure routes access the future GO train station and regional routes

3. Coordinate schedules to ensure that uLinc is coordinated with the GO transit schedule

4. Explore Ride Sharing to integrate with transit and service low-demand areas within the Town

5. Support initiatives at the regional level to bring intermunicipal transit to the Town



Make moving make sense as we grow!

Map 1

Proposed Roadway and Intersection Improvements

Town of Lincoln TMP | Draft: March 2019

- too much signage
- lower speed limits to encourage walking
- enforce by-laws re: handicap
  - any lot w/ more than 10 need handicap parking
- separate bike + walking routes
- visibility / access concerns for pedestrians

- garbage pick-up: improve along bike infrastructure
- community design / gateway planning to enhance pedestrian / cycling
- roads should be brushed clean as soon as it snows
- use coloured marking/paint on intersections

- improve street speed with increase monitoring +/or speed bumps in 40 km/h area

+1 - hidden stop sign coming north down Cherry Ave. There is a sign to warn you the stop sign is coming, but it should be seen. (It's on a blind hill)
- flashing light added??

- where do residents here work? → how do they commute.

need more connections off/on from QEW

sidewalks to arena / splash pad

road at grade/rail - concern of visibility

coming down grade/slope - stop sign not always seen/stop is dangerous

King St and Mountain Rd
Proposed Intersection Improvement:
Improve curb radius to accommodate truck traffic

King St and Stadelbauer Dr
Proposed Intersection Improvement:
Signalize intersection

Legend

Road Improvements
- Proposed Road Improvements
- Intersection Improvement

Transportation Features
- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station

Key Destinations
- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Land Use Features
- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Summary of Proposed Road Improvements

1 Durham Rd

Current State of Roadway

Example of Improvement

Proposed road improvements to include:
- Wider travel lanes
- Implement paved shoulder (needed for truck re-routing along Durham Rd.)

2 Lincoln Ave

Current State of Roadway

Example of Improvement

Proposed road improvements to include:
- Widen travel lanes

3 Greenlane

Current State of Roadway

Example of Improvement

Proposed road improvements to include:
- Widen travel lanes

4 Bartlett Rd (north of Greenlane)

Current State of Roadway

Example of Improvement

Proposed road improvements to include:
- Widen travel lanes

5 Bartlett Rd (south of Greenlane)

Current State of Roadway

Example of Improvement

Proposed road improvements to include:
- Widen travel lanes

Lincoln

Map 2

Proposed Through Truck Route for Beamsville

Town of Lincoln, TMP | Draft March 2019

Legend

Truck Route Recommendations

- Proposed Through Truck Route
- Proposed Through Truck Prohibition

Transportation Features

- Provincial Highway
- Regional Road
- Municipal Road
- Private Road
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station
- Railway

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery

Land Use Features

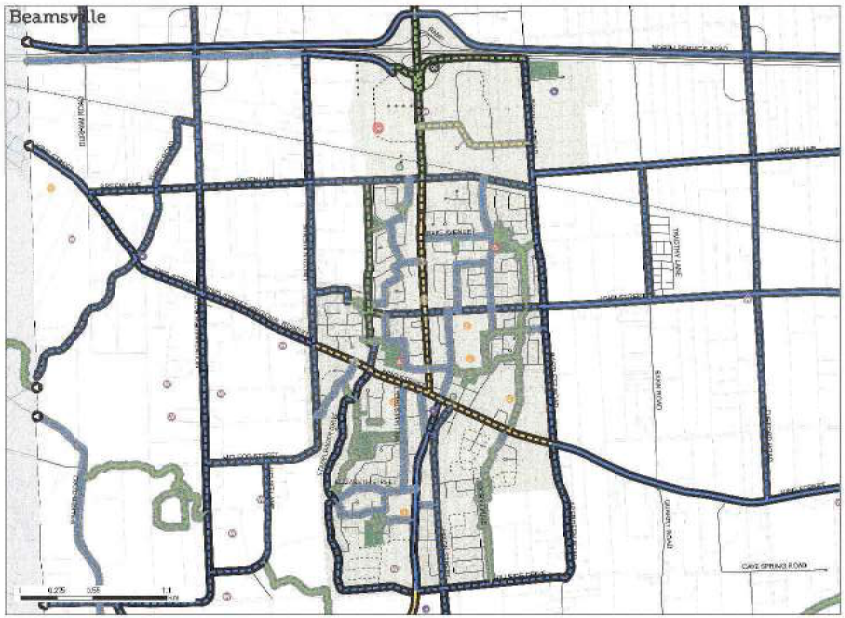
- Watercourses
- Urban
- Park / Open

Lincoln

Map 3

Draft Active Transportation Network and Route Phasing

Town of Lincoln TMP | Draft March 2019



Legend

Active Transportation Network

Existing **Proposed**

- Shared Facility
  Includes signed bike routes, urban shoulders and paved shoulders
- Designated Facility
  Includes bike lanes
- Separated Facilities
  Includes buffered paved shoulders, in-boulevard pathways and off-road trails
- Desired Connection

Route Phasing

Primary Route
Provides direct north-south and east-west connection between the major communities within Lincoln and within the communities to key destinations such as school, employment areas, etc. These routes are considered critical to the implementation of the network and will be implemented in the early stages of the process.

Secondary Route
Provide access to surrounding areas and within the communities with a greater tourism and recreation focus. These routes are considered a complement to the primary network and should be considered for implementation once the primary network has been constructed.

Tertiary Route
Additional connections that provide supplementary connectivity in strategic locations but are not critical to the overall connectivity and continuity of the overall active transportation network for the Town of Lincoln. These routes should be pursued if additional funds are made available.

Other Map Features

Key Destinations

- Arena
- Grocery Store
- School
- Library
- Winery
- Other Community Destination

Transportation Features

- Existing Road
- Proposed Road
- Railway
- Existing GO Transit Bus Stop and Park & Ride Lot
- Potential Transit Station

Land Use Features

- Watercourses
- Urban Area
- Park / Open Space
- Secondary Plan Area
- Parcel Property

Lincoln *Make Moving Make Sense in Lincoln (town)*

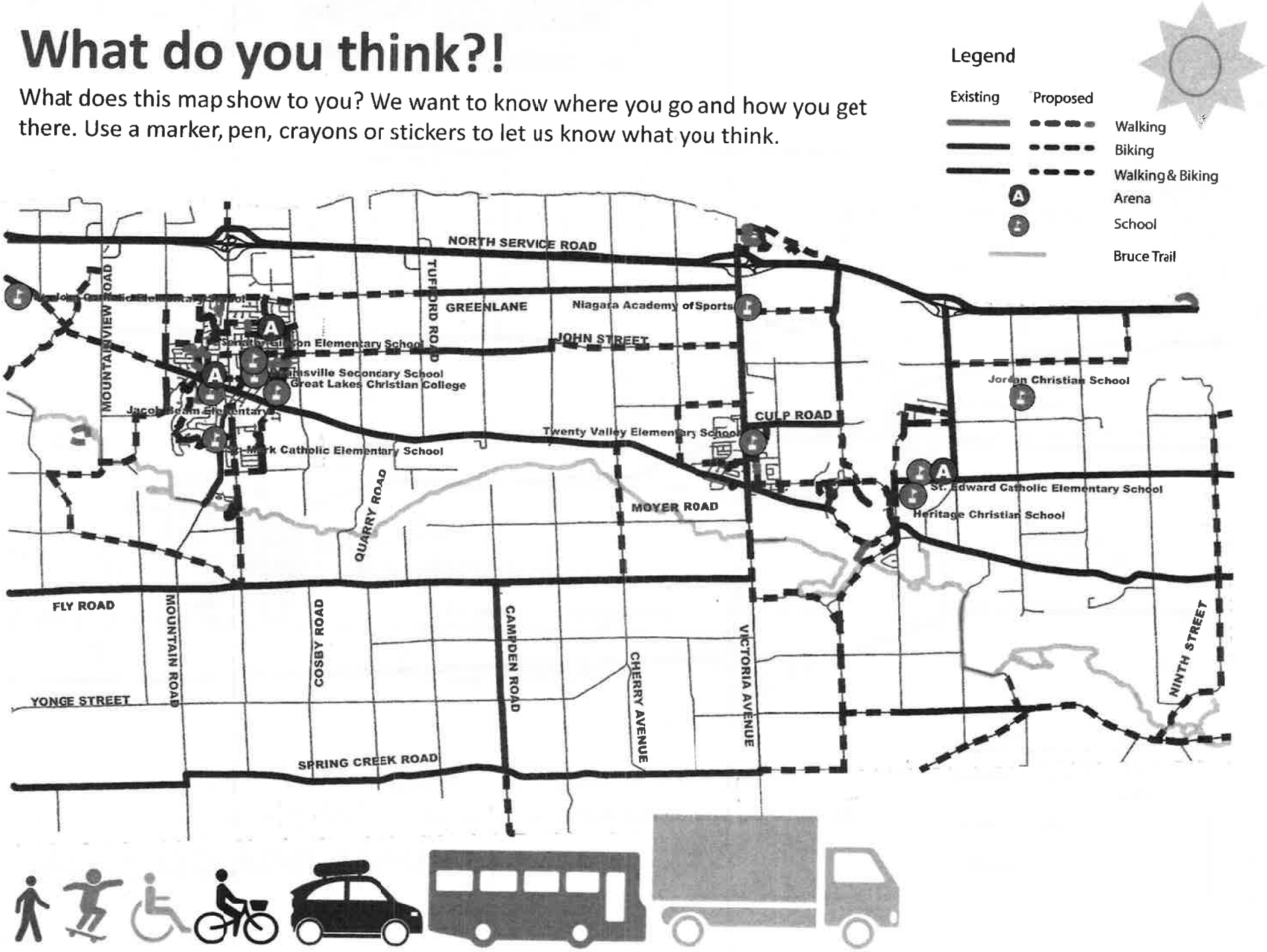
Category	# of Tickets
Goods Movement Routes	5
Transit Improvements	5
Traffic Calming & Safety	15
Road Improvements	26
Walking Improvements	20
Improved Road Maintenance	15
Cycling Improvements	8
Education & Promotion	0

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

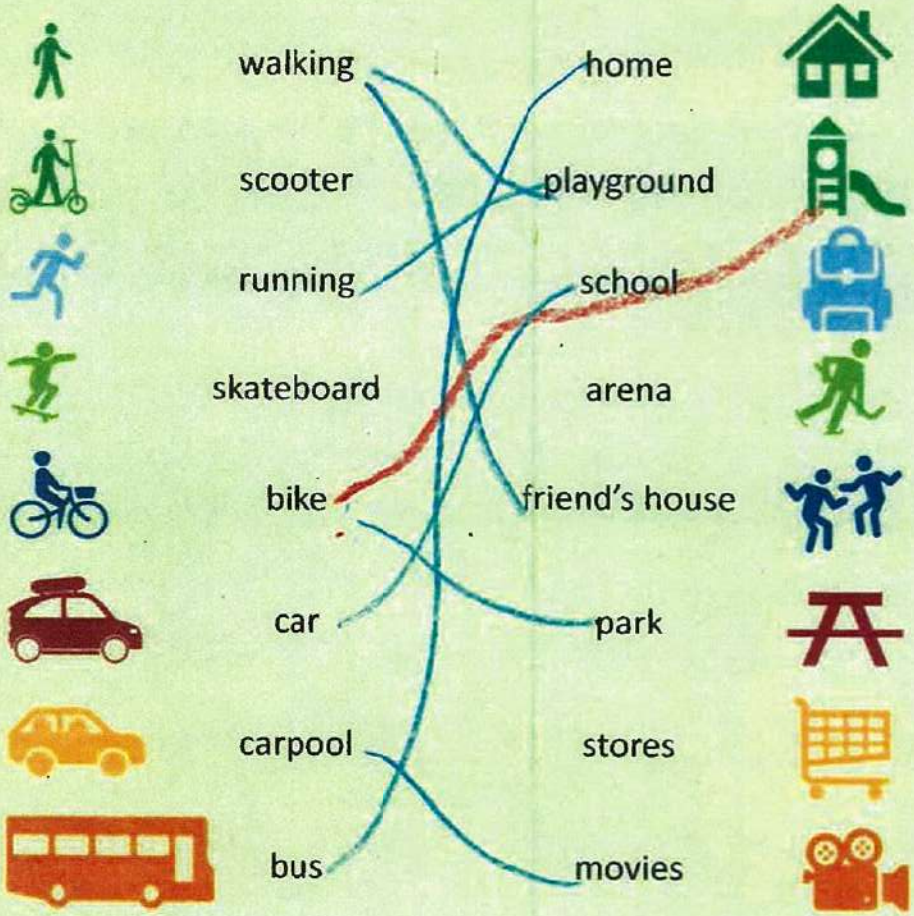
What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

walk

Thanks for helping us!

Name: [redacted]

Age: [redacted]

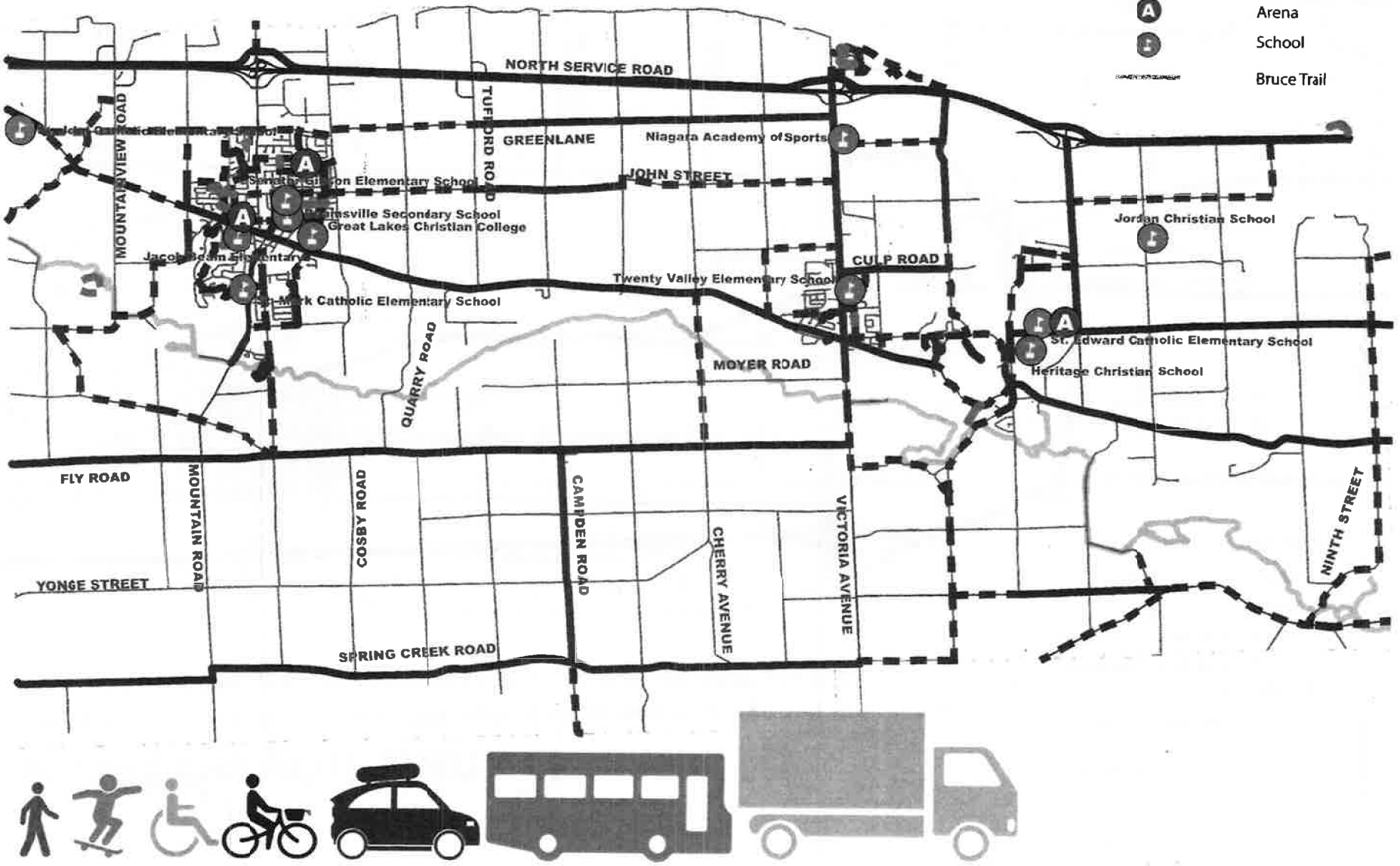
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



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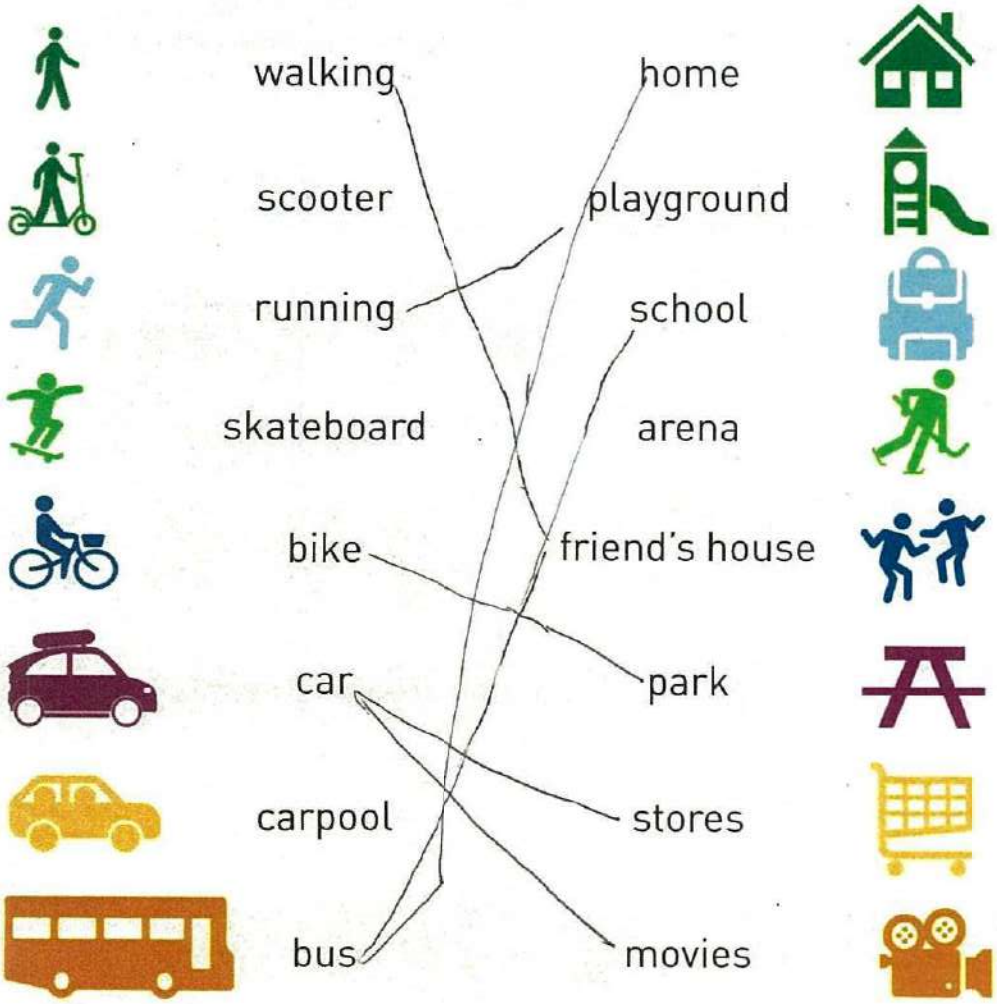


2.

When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3.

What is one word that you think of when you think of getting around? Write it below!

~~Transportation~~ Helpful

Thanks for helping us!

Name: [redacted]

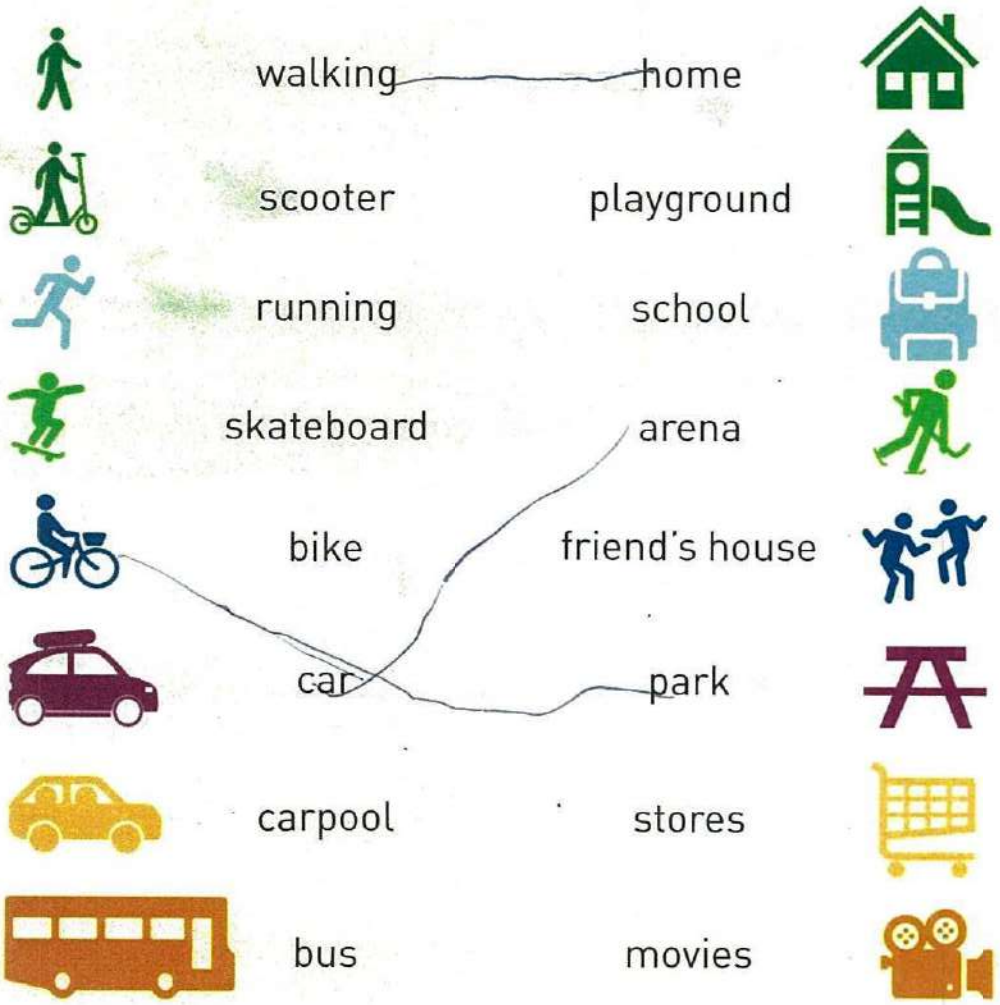
Age: [redacted]

School: [redacted]

What does transportation mean to you?

1.

Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2.

When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3.

What is one word that you think of when you think of getting around? Write it below!

moving

Thanks for helping us!

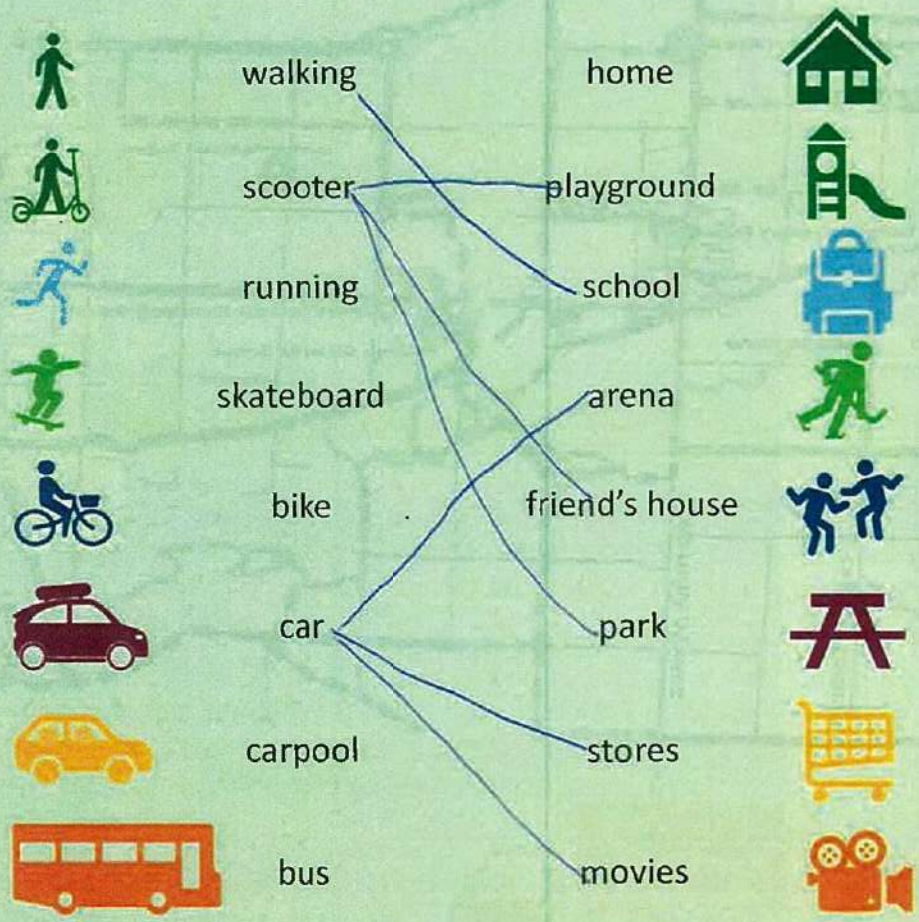
Name: [redacted]

Age: [redacted]

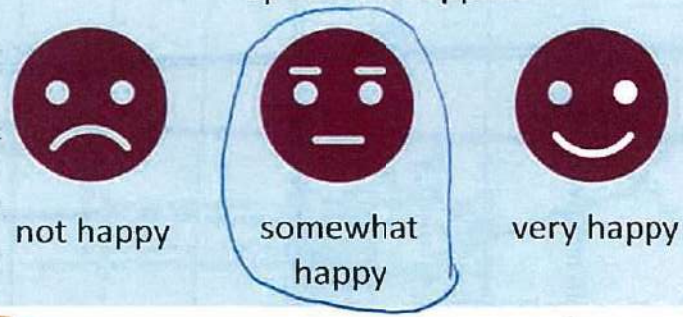
School: [redacted]

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies



3. What is one word that you think of when you think of getting around? Write it below!

Thanks for helping us!

Name: [redacted]

Age: [redacted]

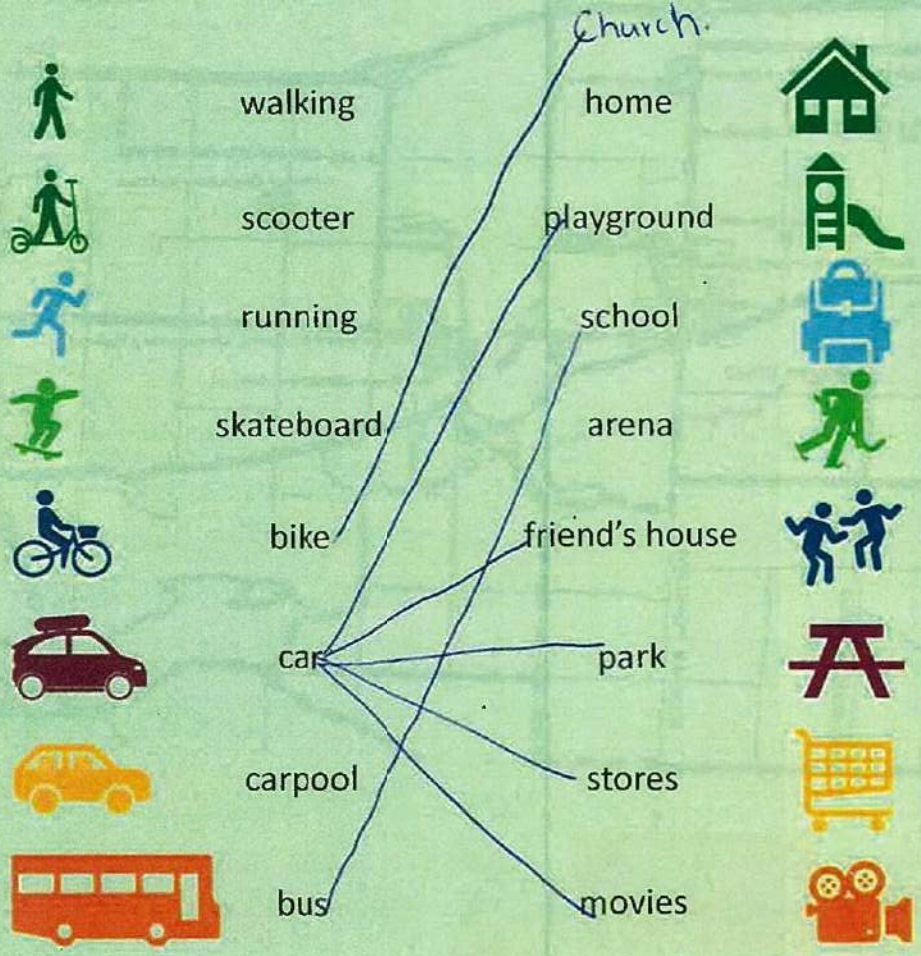
School: [redacted]

What do you think?!

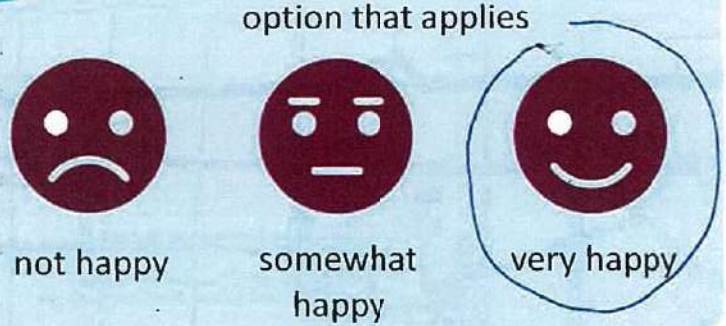
What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies



3. What is one word that you think of when you think of getting around? Write it below!

Easy.

Thanks for helping us!

Name: [redacted]

Age: [redacted]

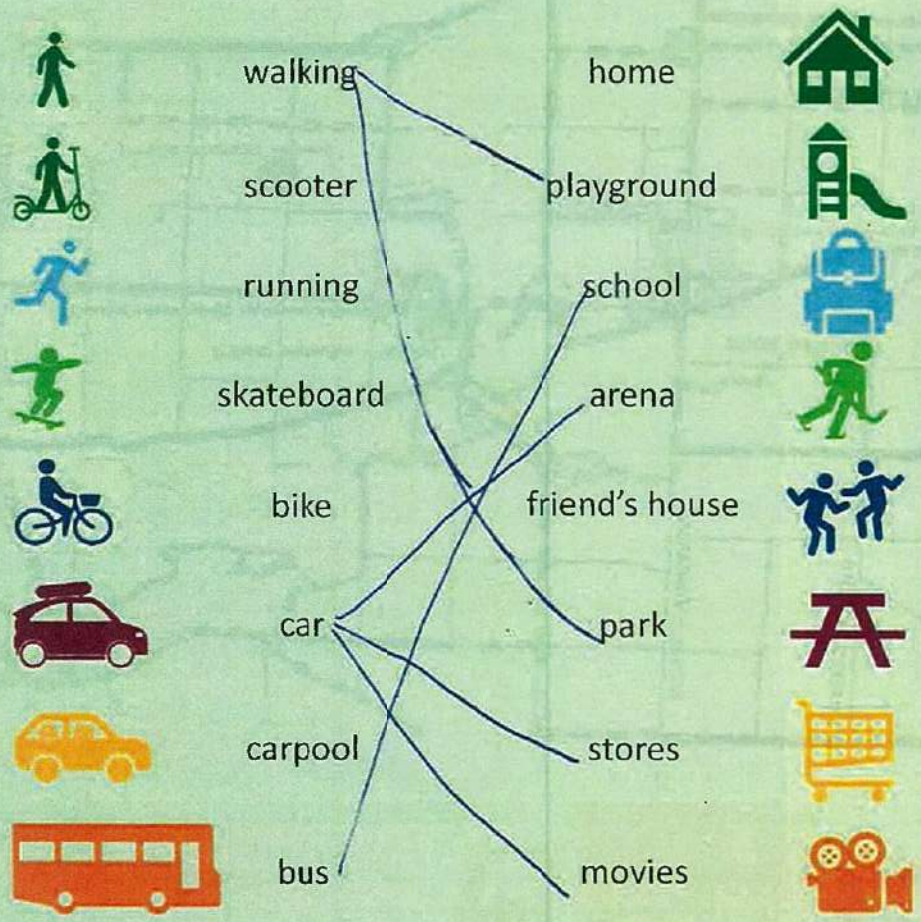
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Thanks for helping us!

Name: [redacted]

Age: [redacted]

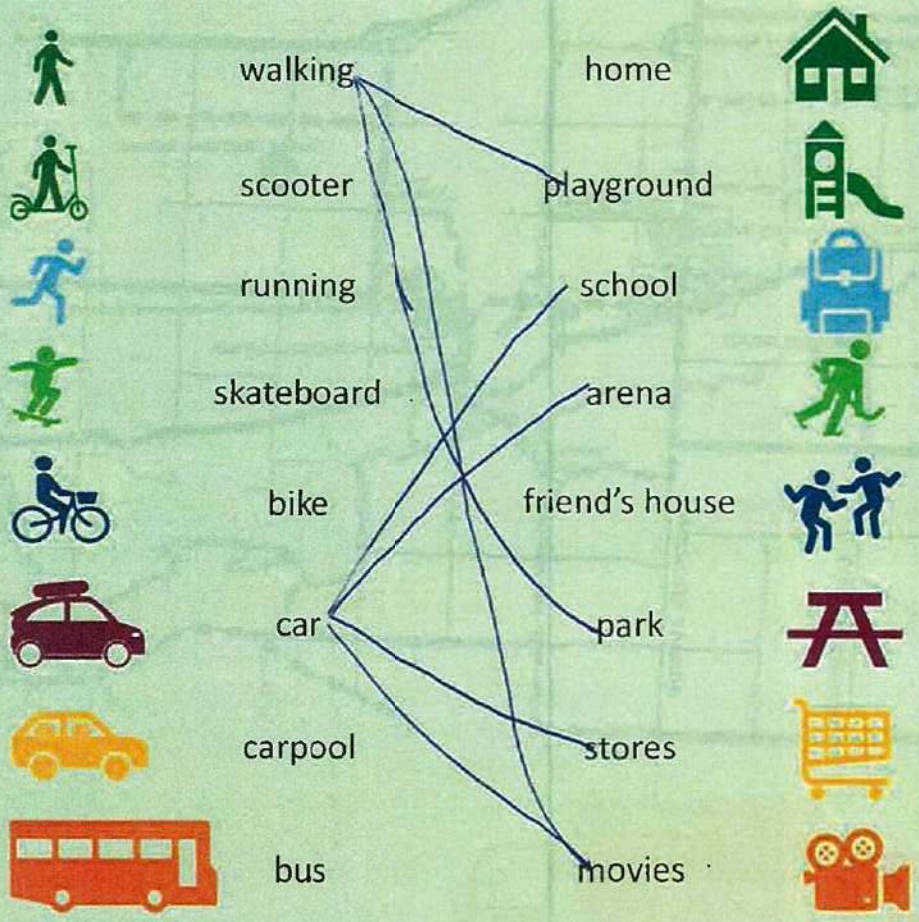
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Sometimes there is traffic

Thanks for helping us!

Name: [redacted]

Age: [redacted]

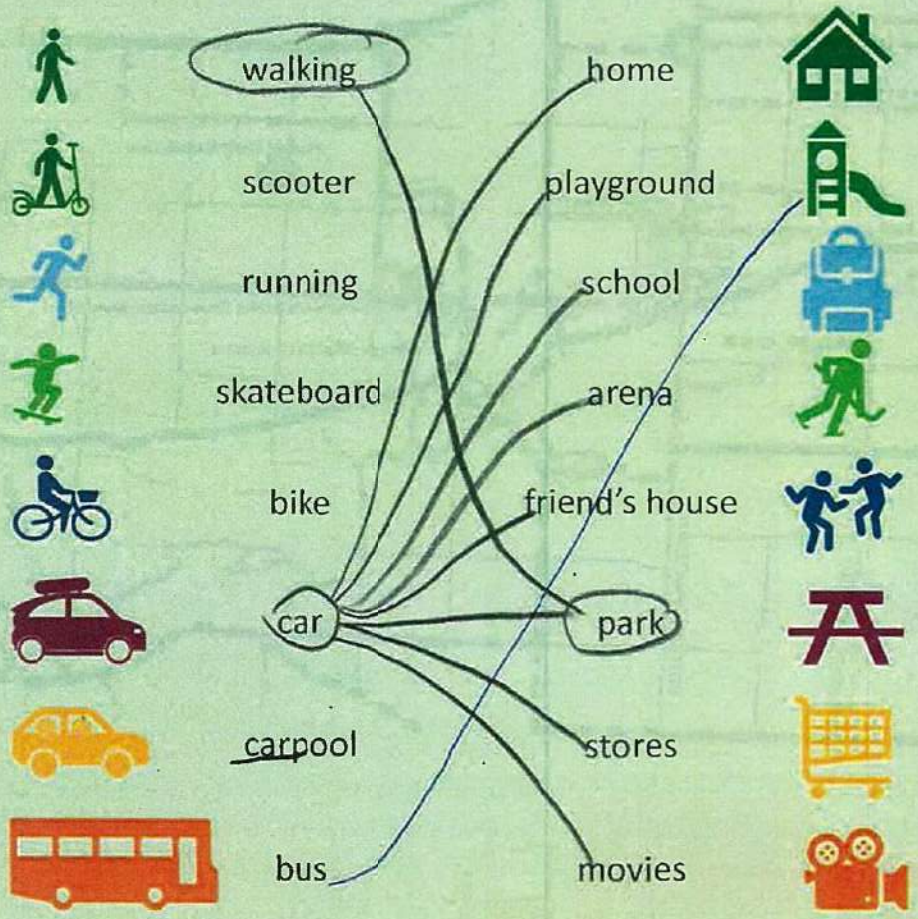
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

car

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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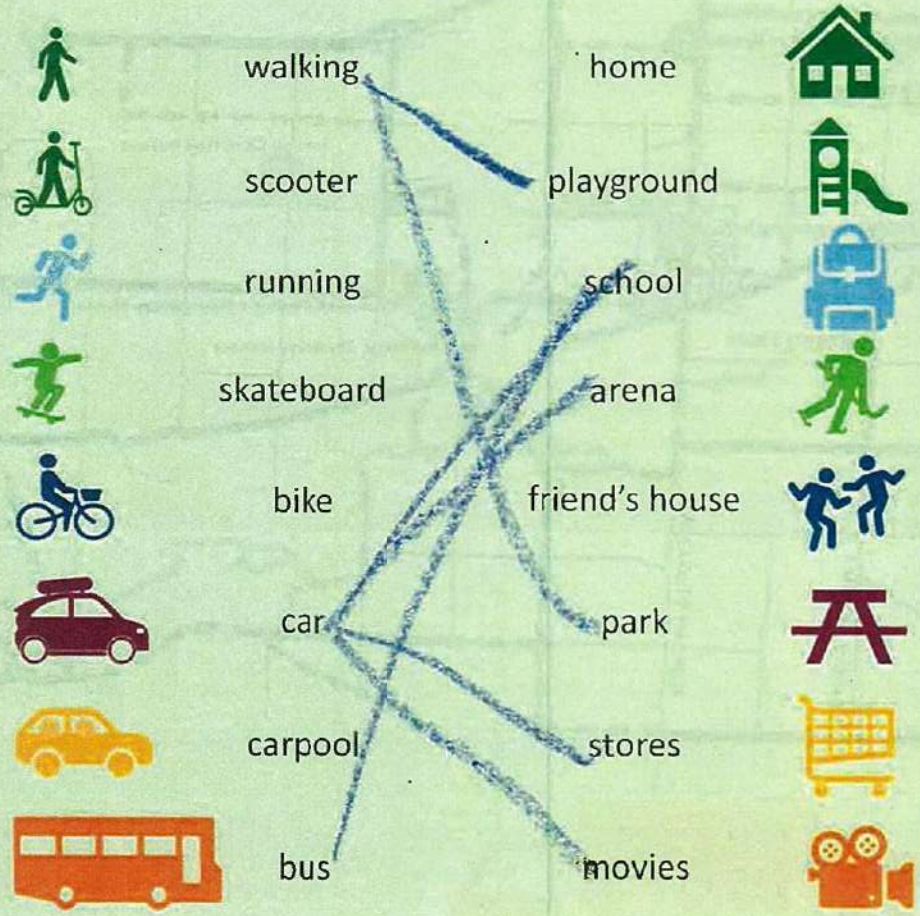


2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

hard

Thanks for helping us!

Name: [redacted]

Age: [redacted]

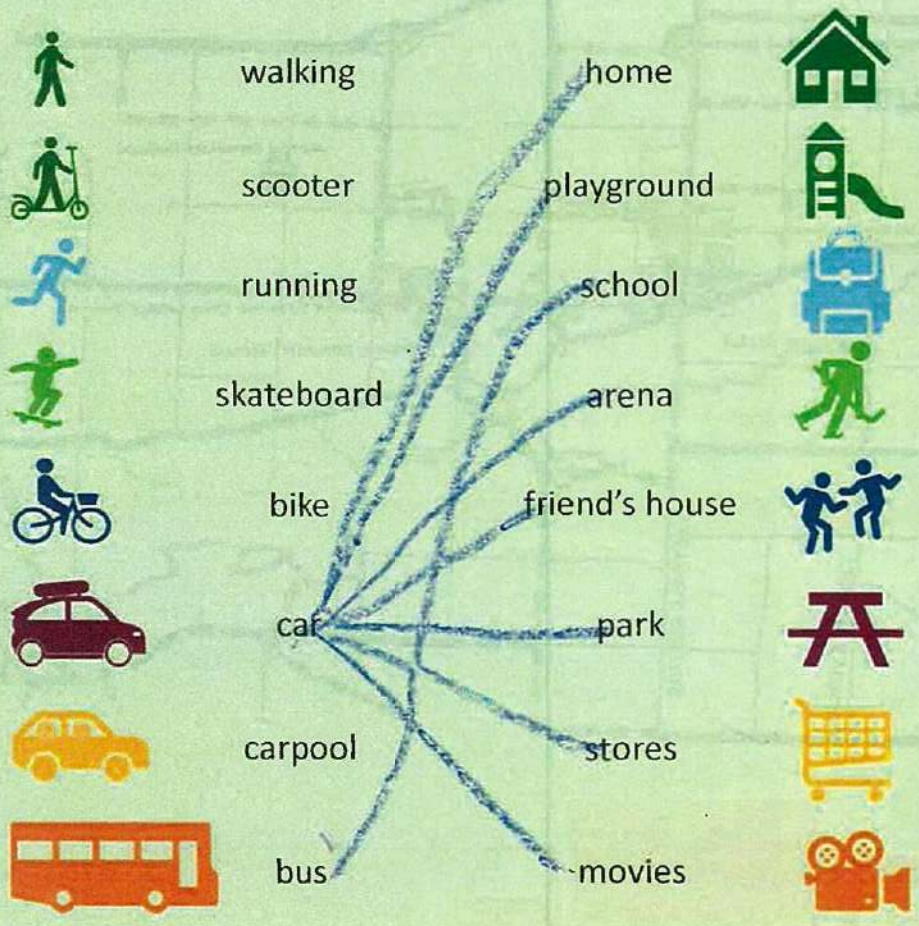
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Hard

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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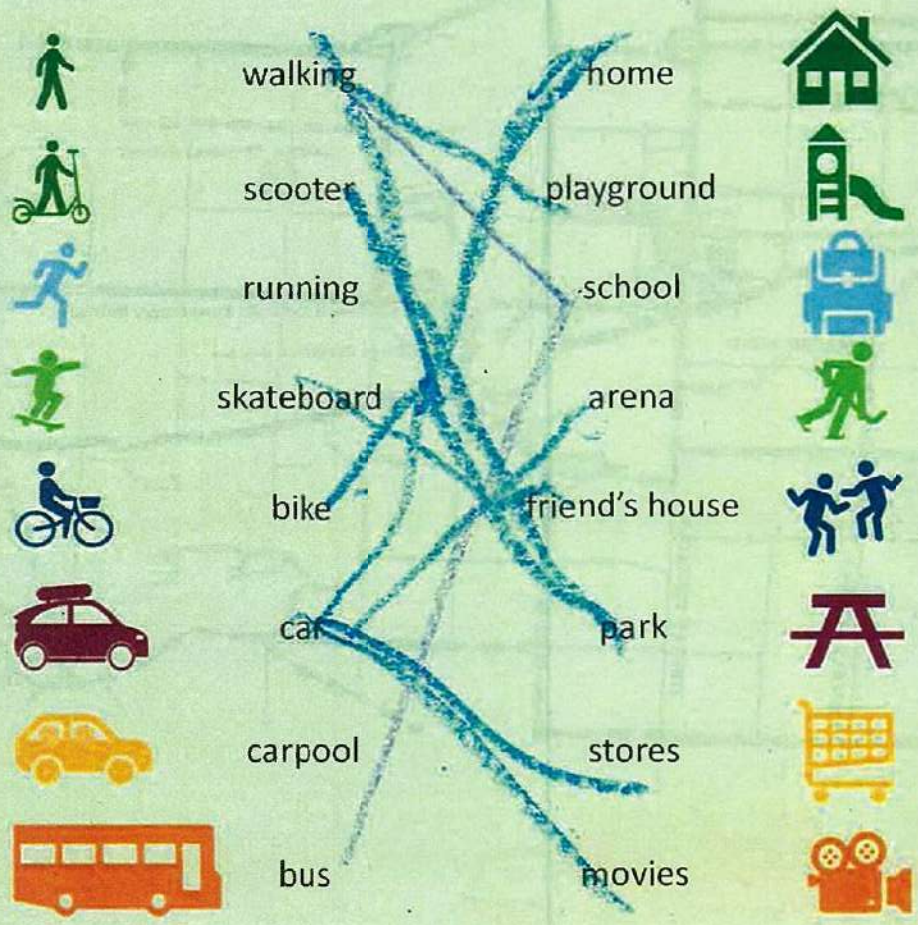

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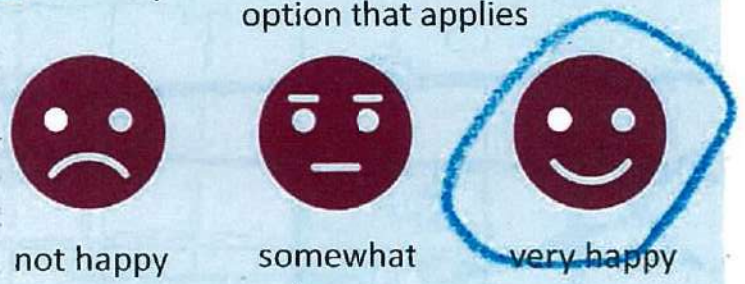

3. What is one word that you think of when you think of getting around? Write it below!

fun

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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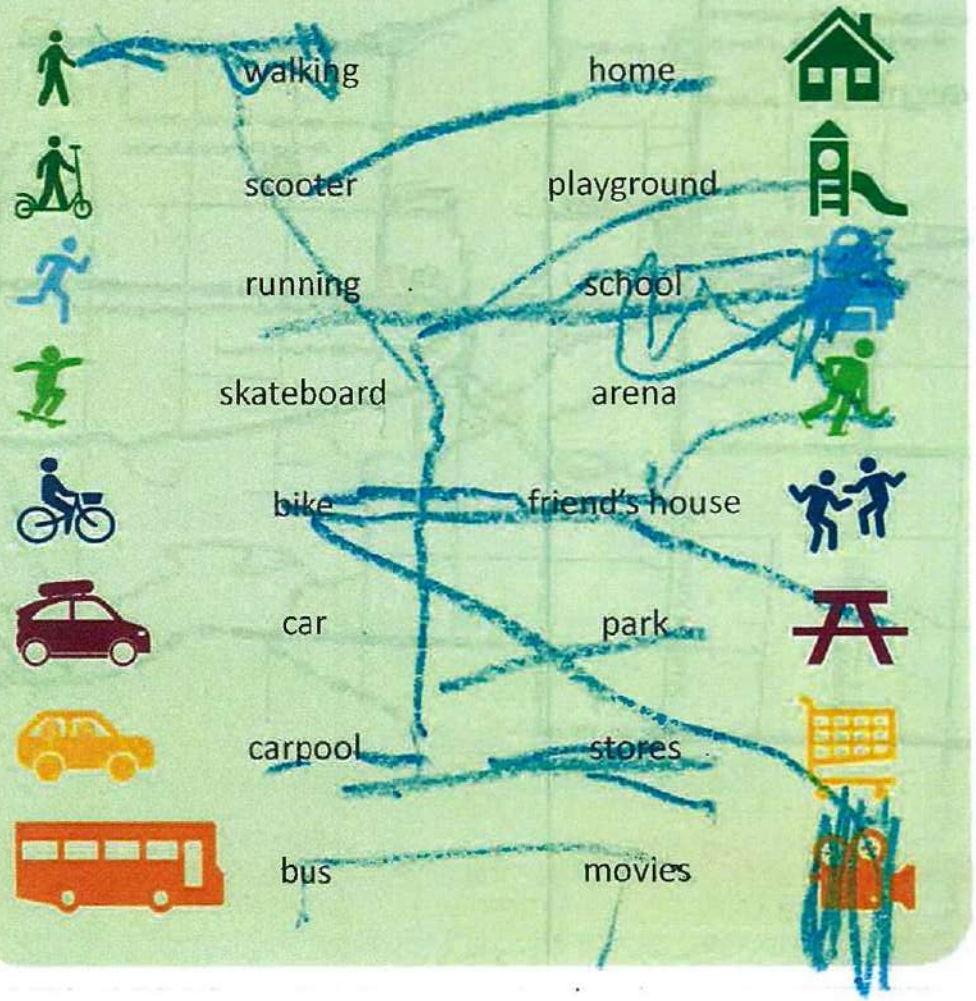

2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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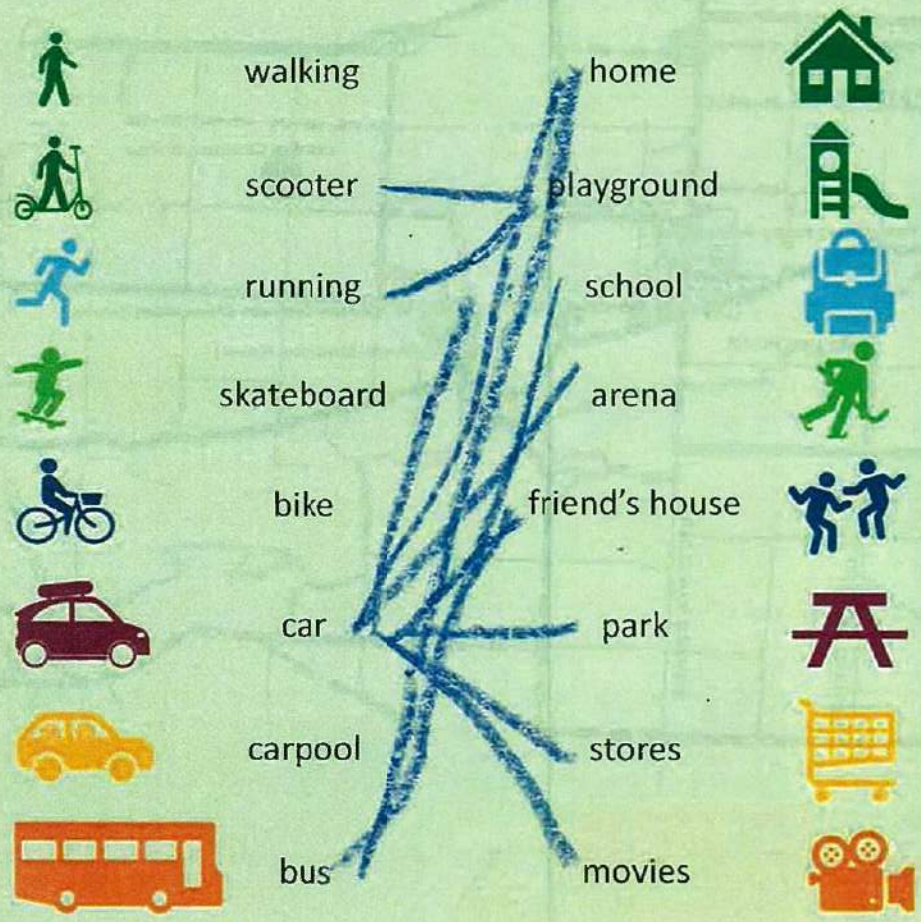

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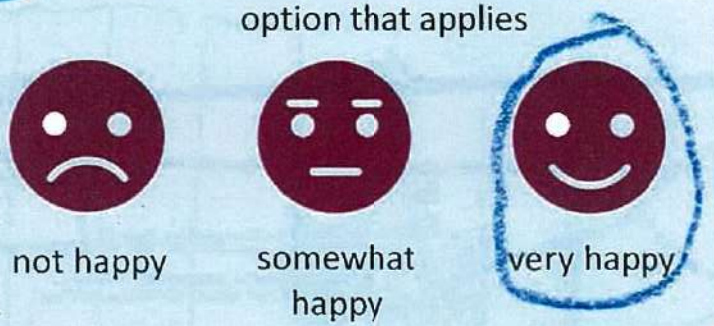


3. What is one word that you think of when you think of getting around? Write it below!

wheraMI going!?

Thanks for helping us!

Name: [redacted]

Age: [redacted]

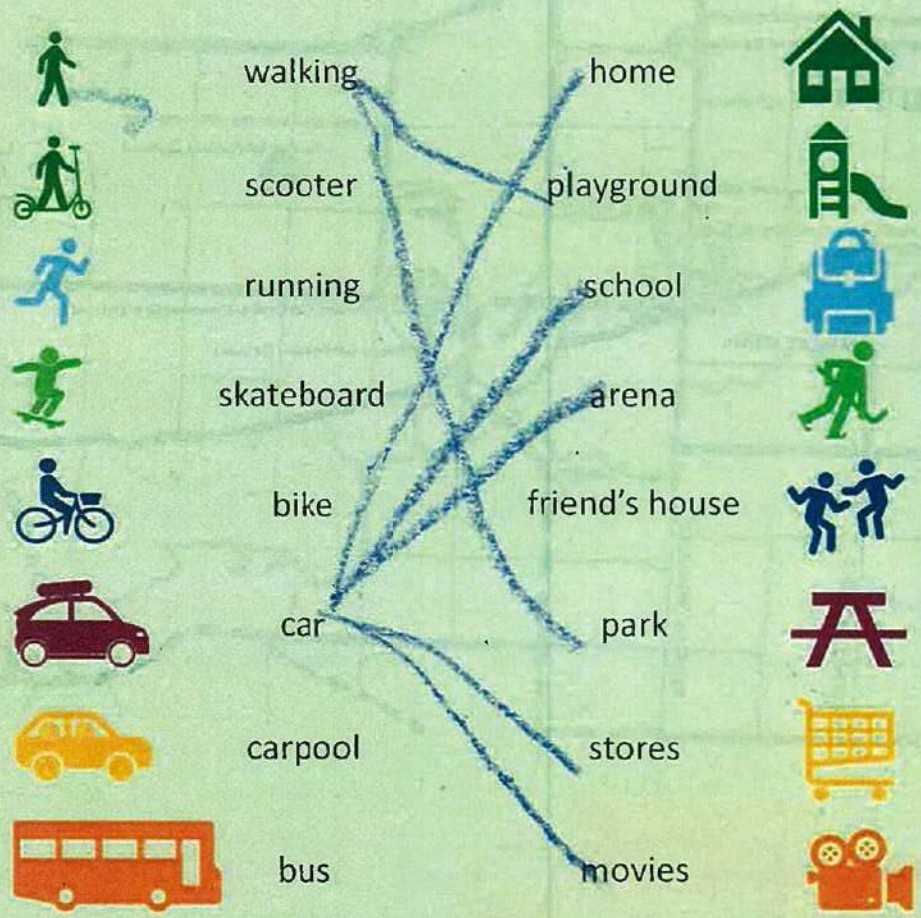
School: [redacted]

What do you think?!

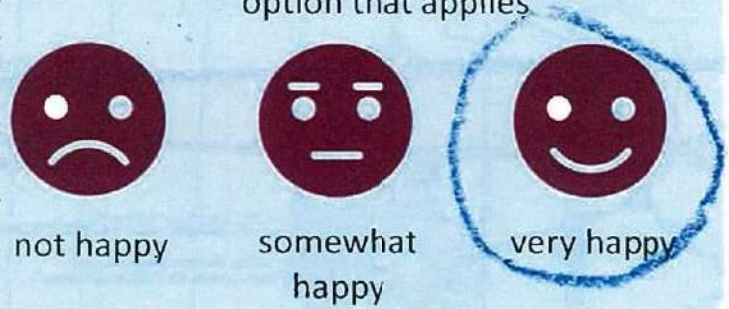
What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies



3. What is one word that you think of when you think of getting around? Write it below!

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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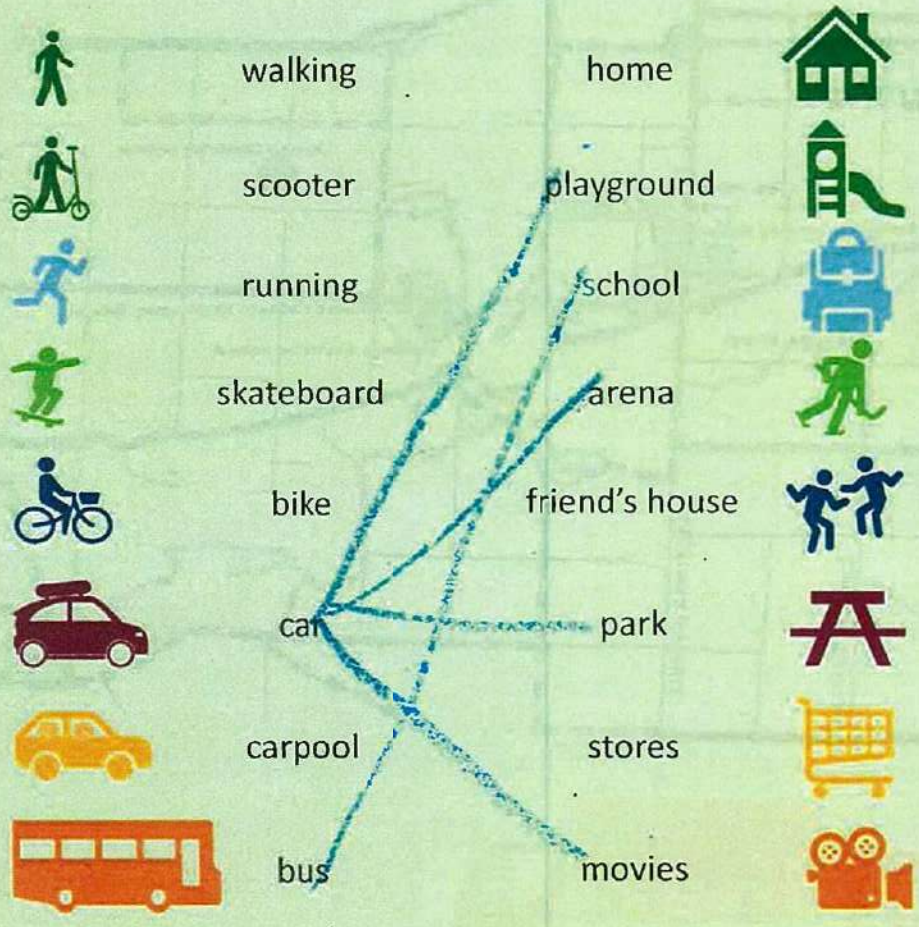


2. When you think about getting around Town how you do feel? Circle the option that applies.

3. What is one word that you think of when you think of getting around? Write it below!

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

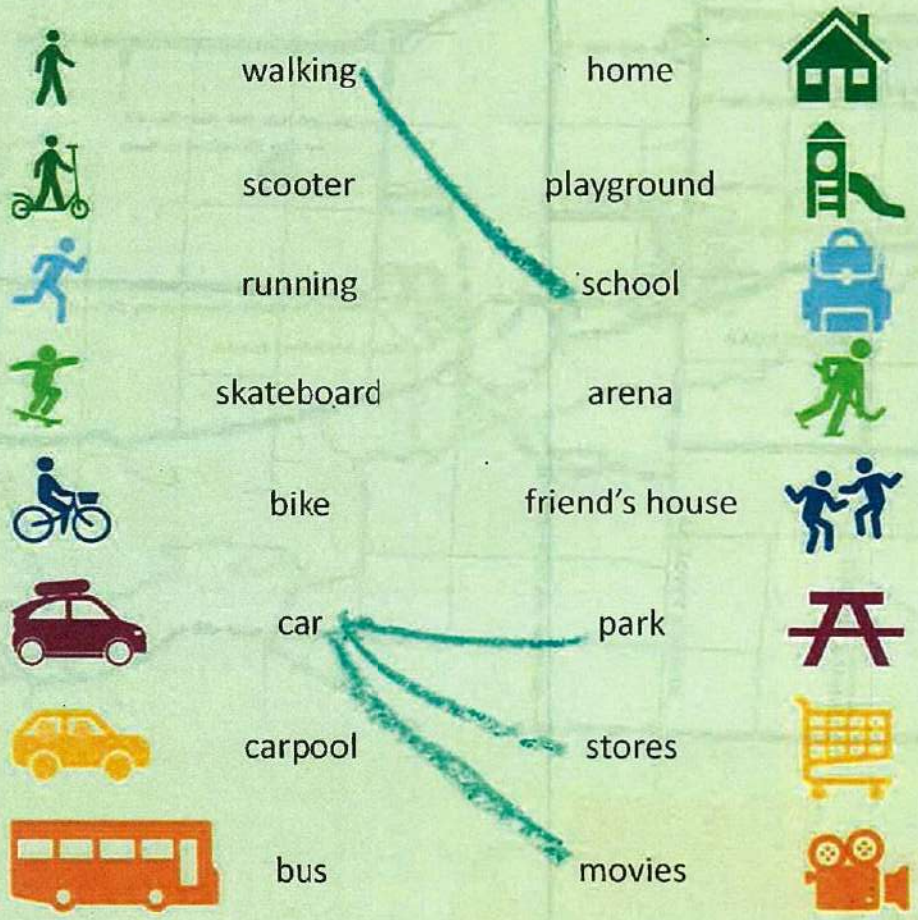
What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1.

Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2.

When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3.

What is one word that you think of when you think of getting around? Write it below!

fast

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

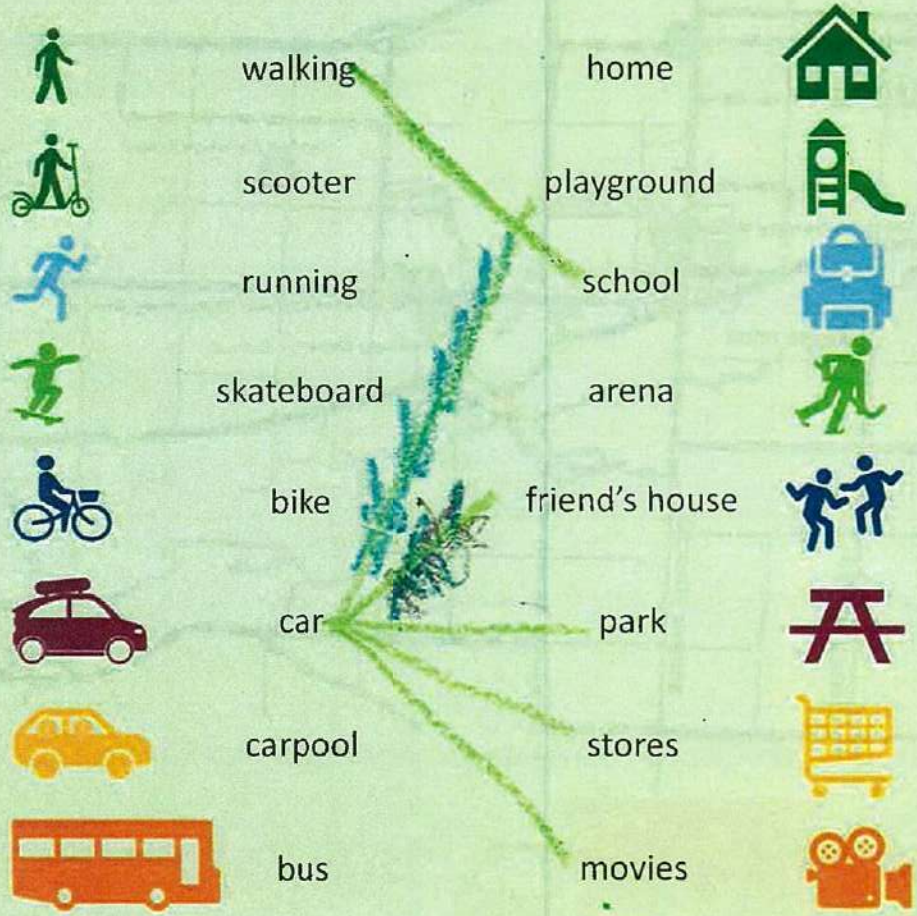
What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

[redacted]

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Safety

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

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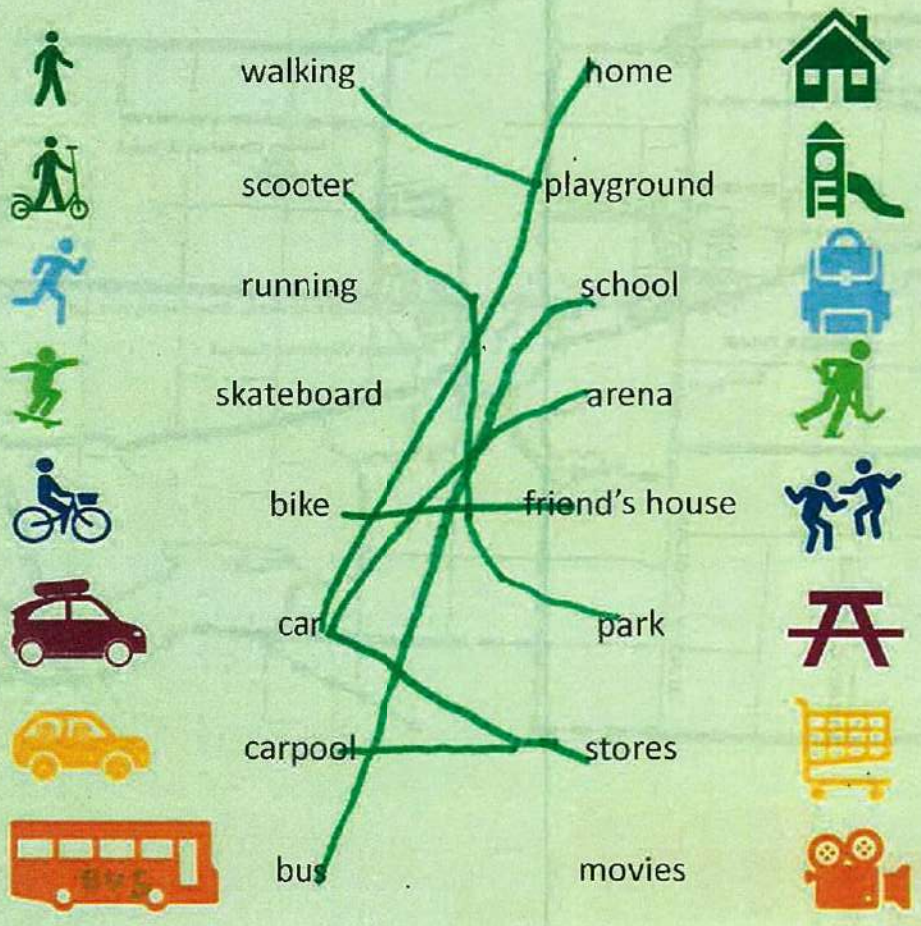


2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

CAR

Thanks for helping us!

Name: [redacted]

Age: [redacted]

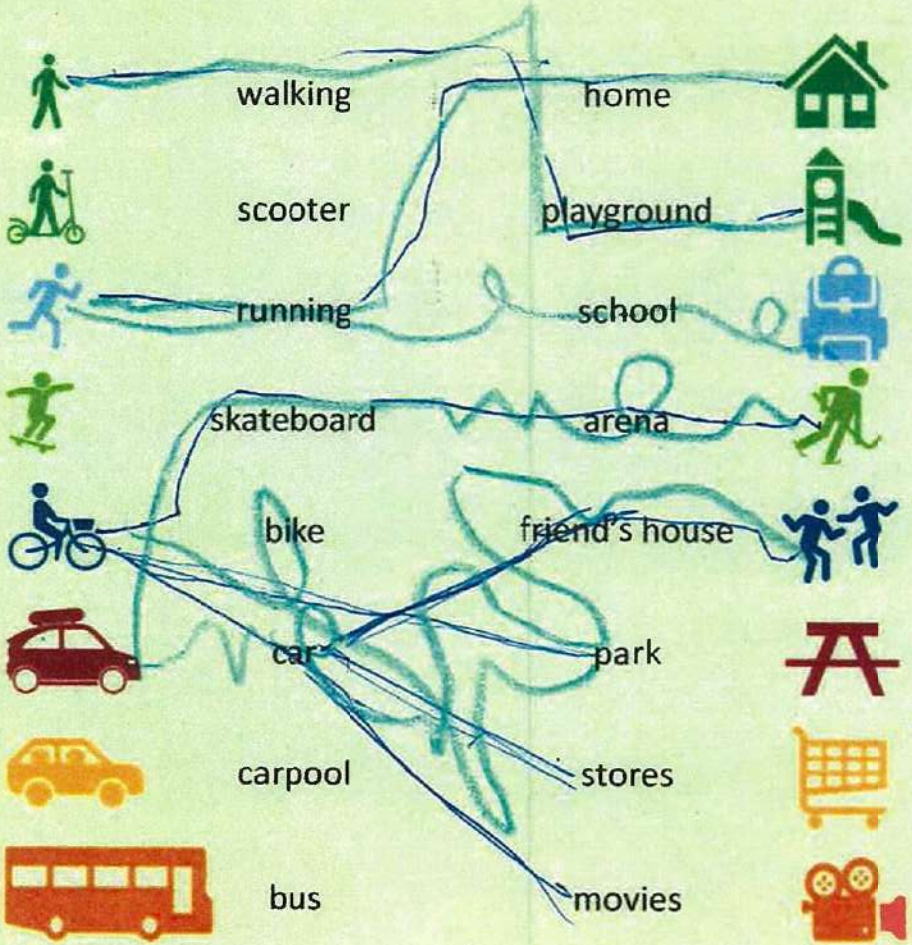
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

HAPPY

Thanks for helping us!

Name: [redacted]

Age: [redacted]

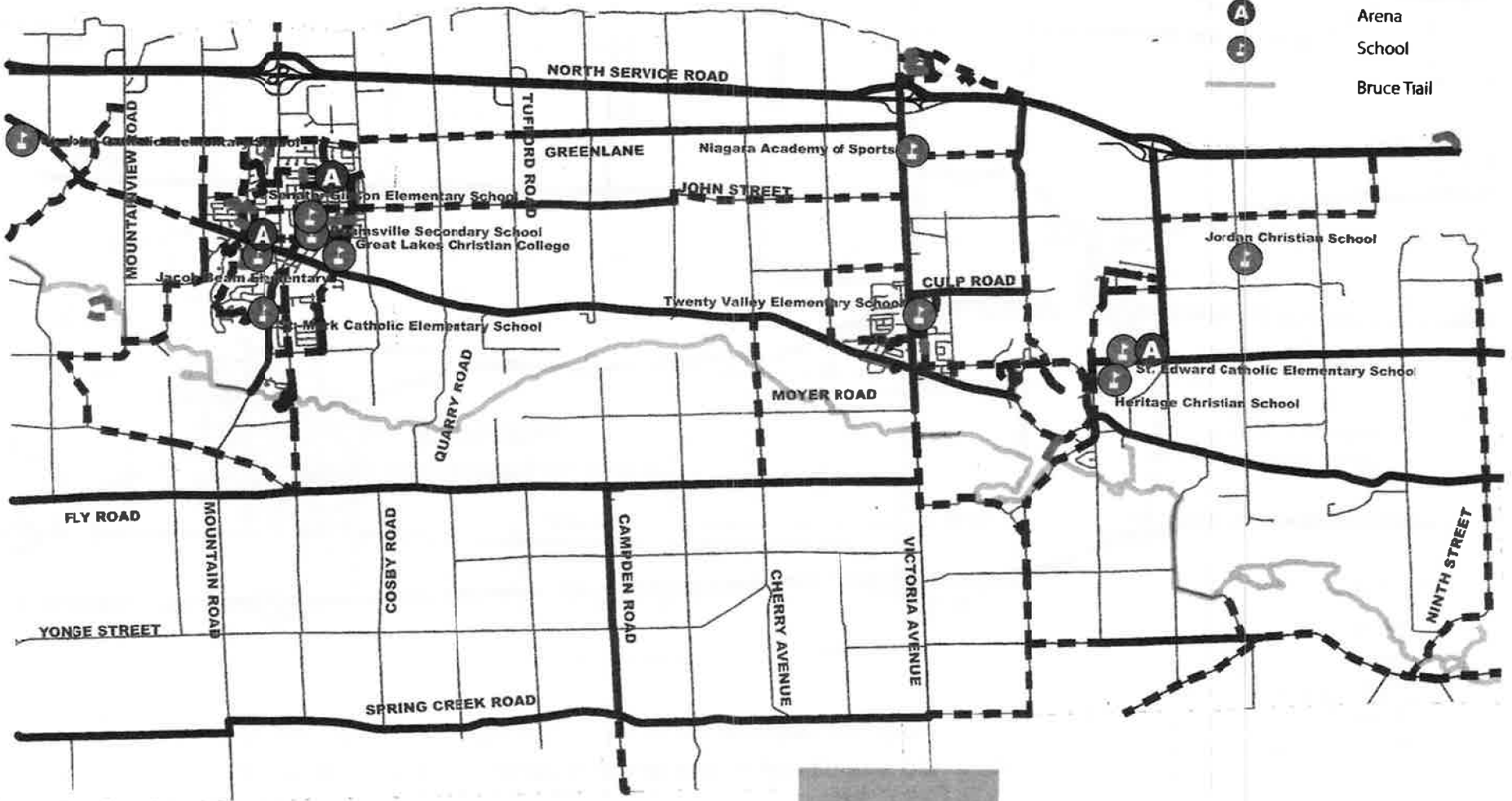
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



What does transportation mean to you?

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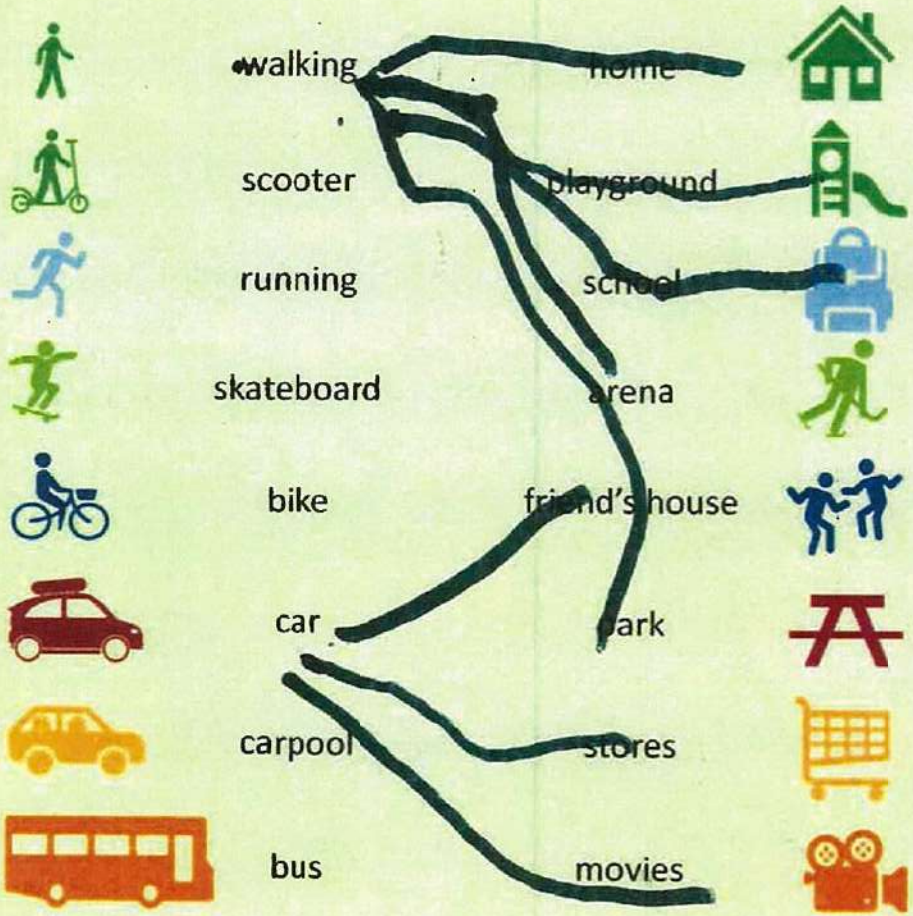
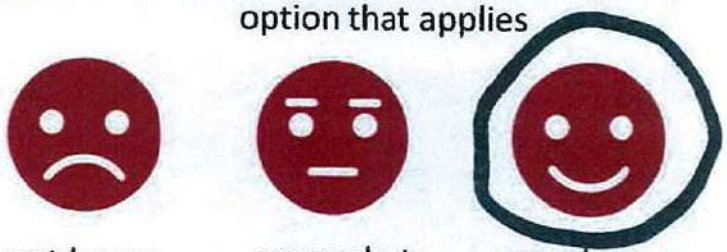


2. When you think about getting around Town how you do feel? Circle the option that applies



not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Driving

Thanks for helping us!

Name: [redacted]

Age: [redacted]

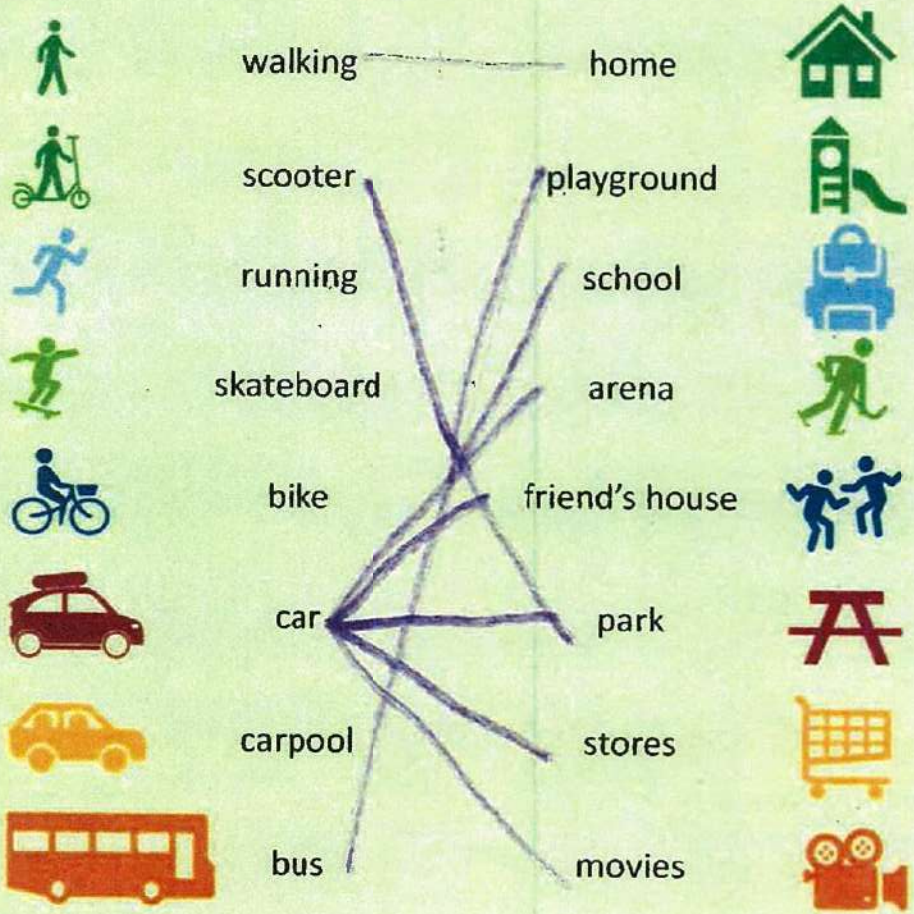
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

car

Thanks for helping us!

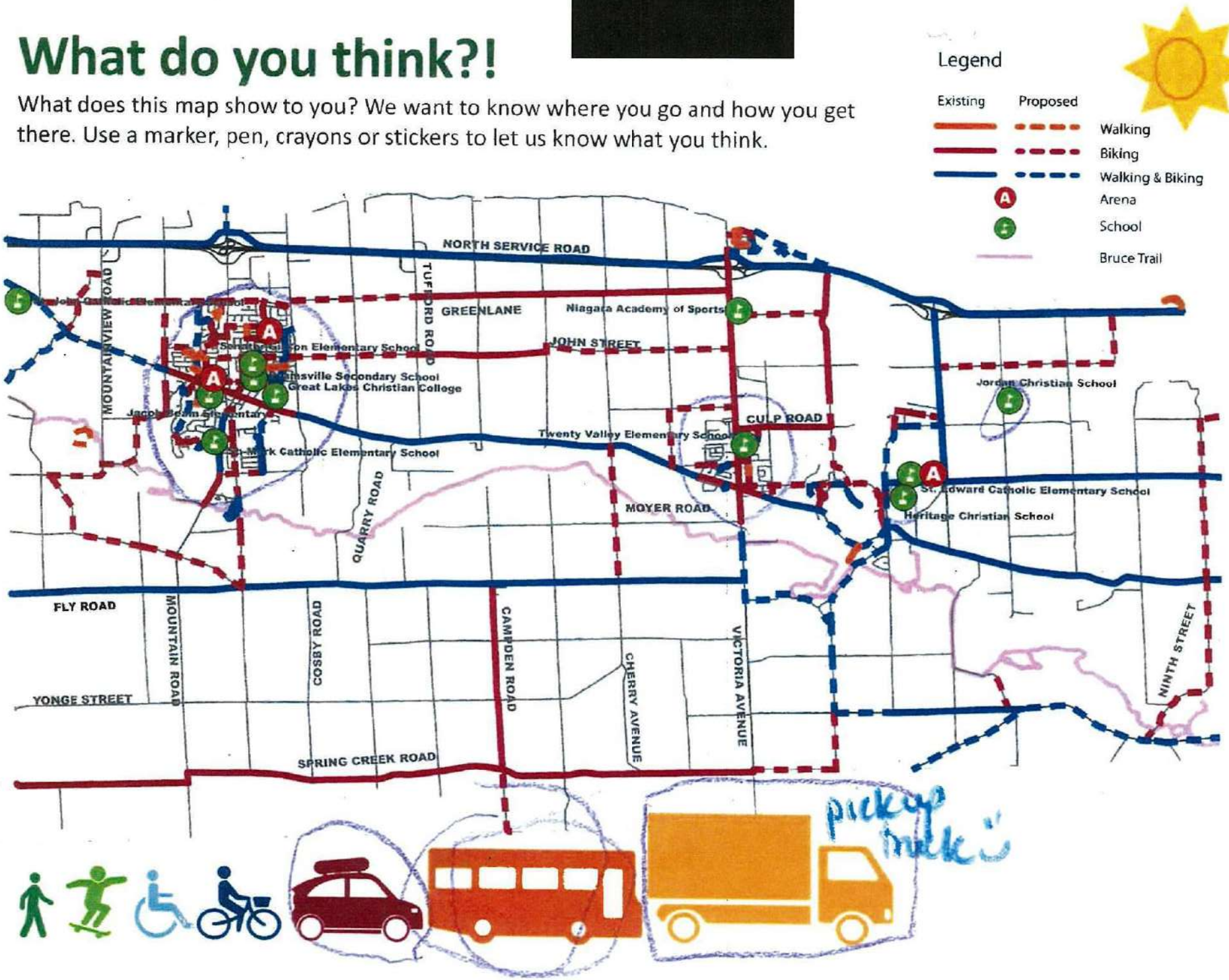
Name: [redacted]

Age: [redacted]

School: [redacted]

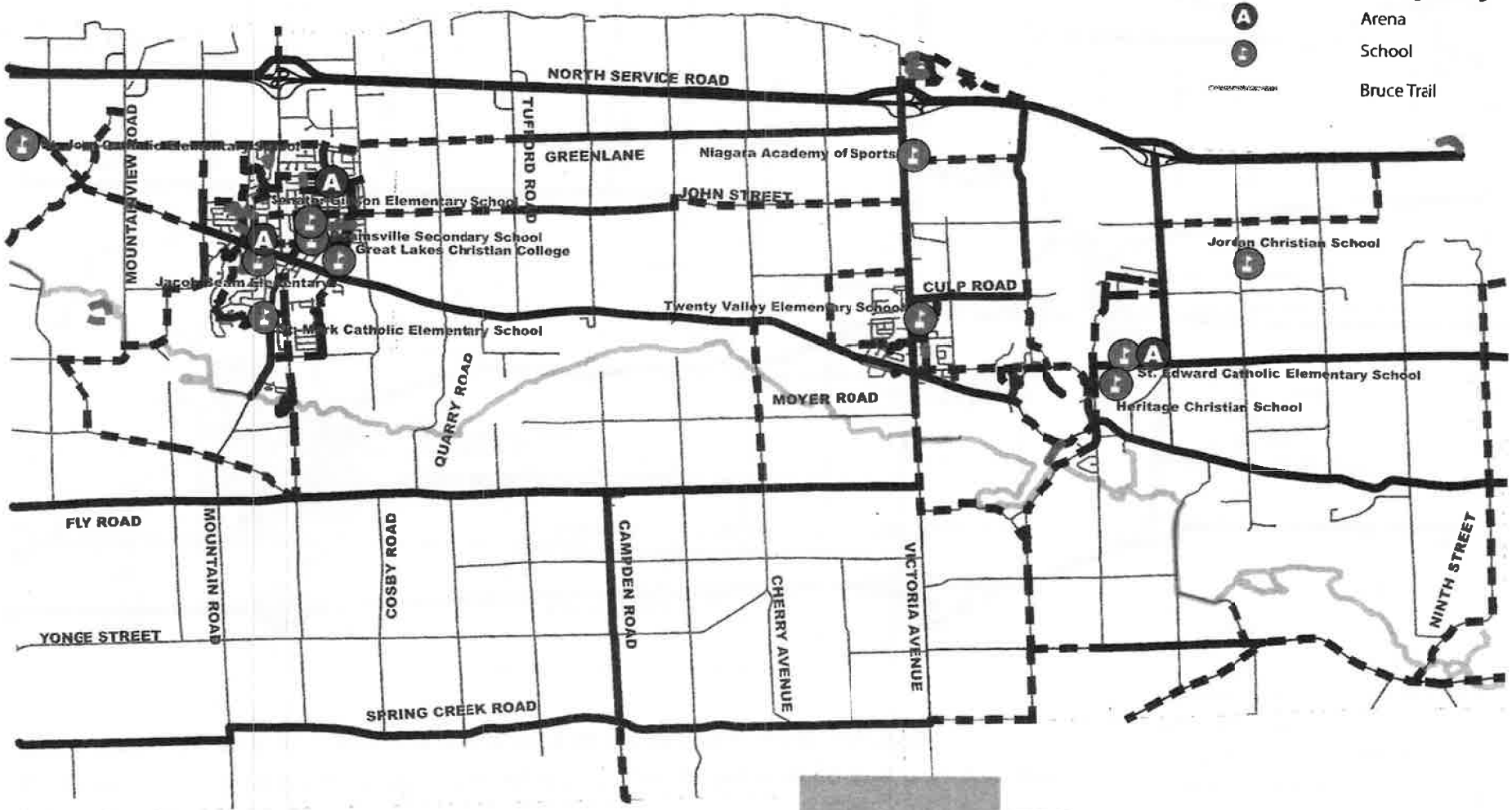
What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



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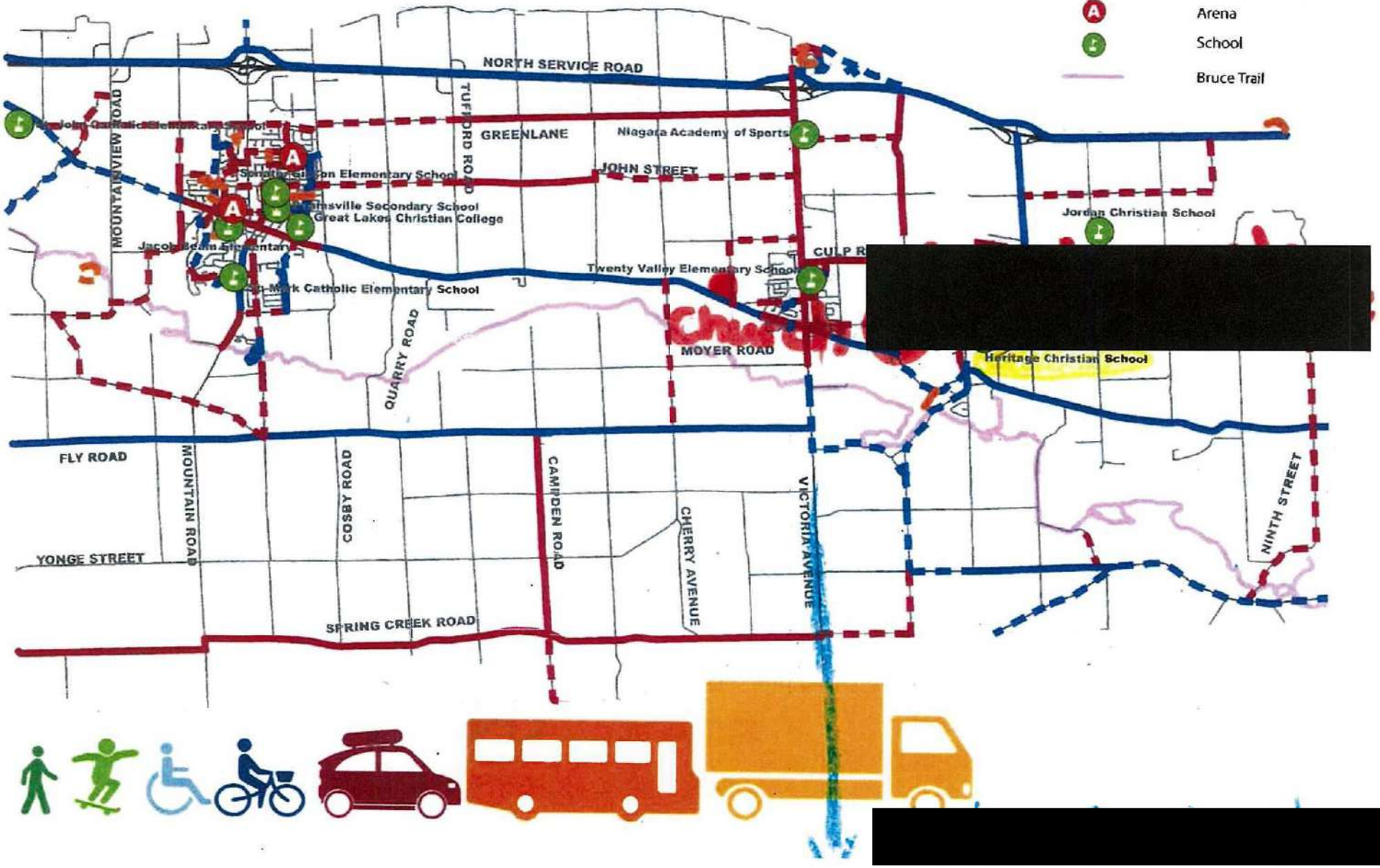

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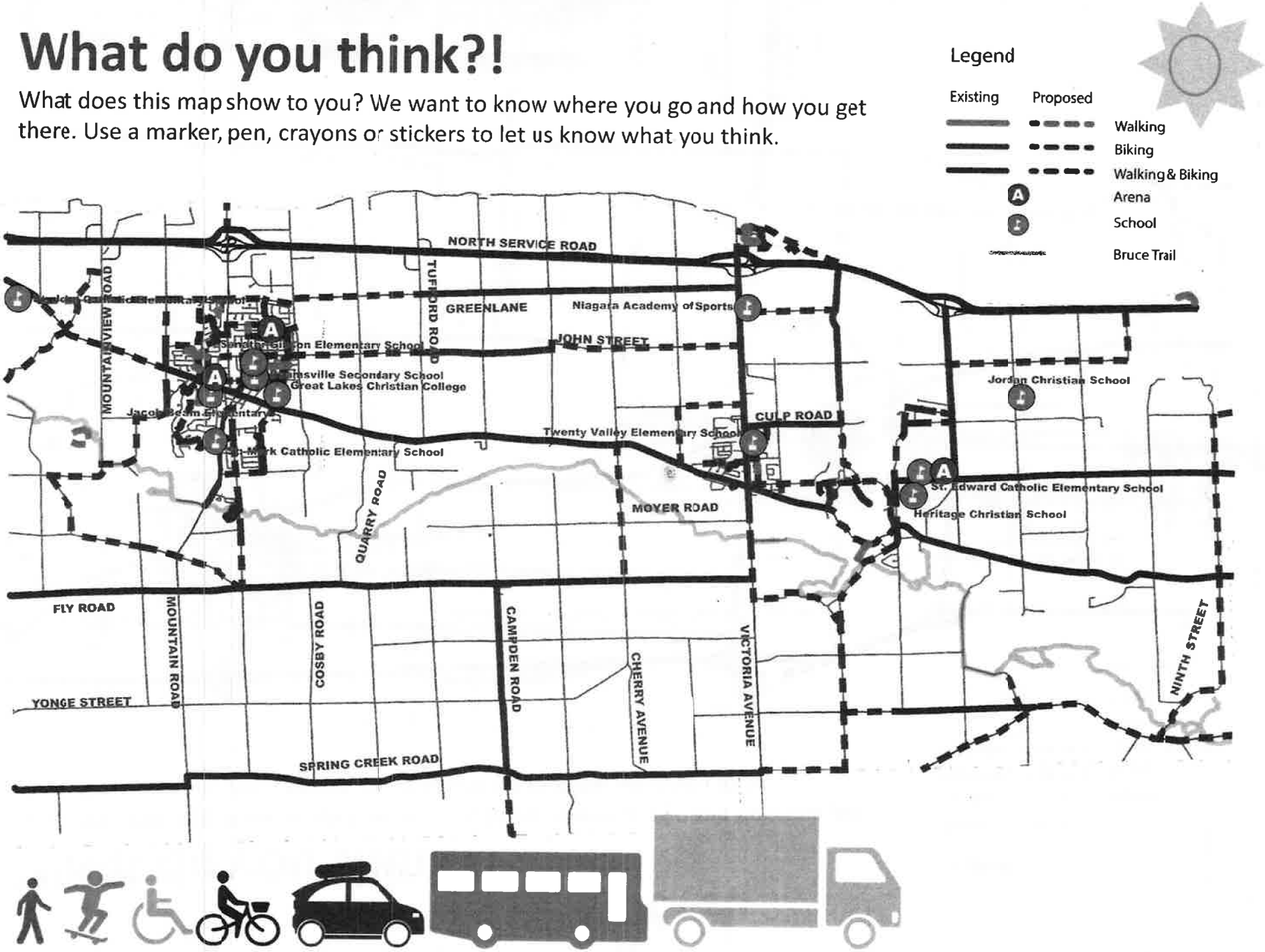
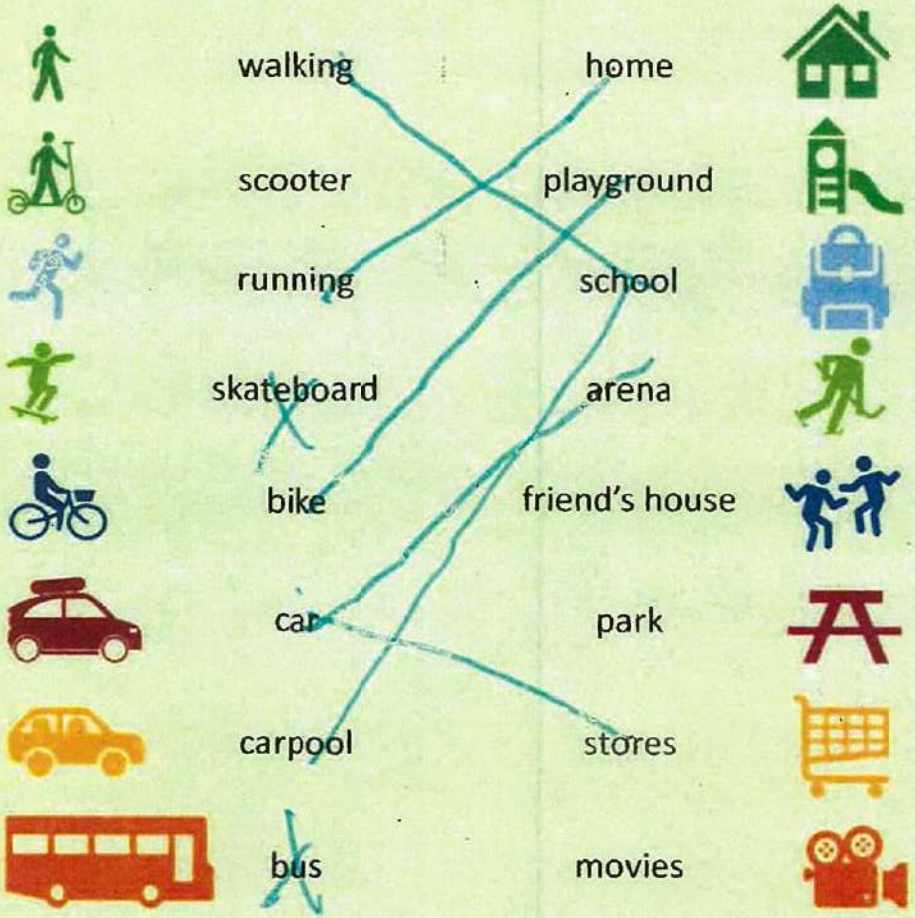


What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

close

Thanks for helping us!

Name: [redacted]

Age: [redacted]

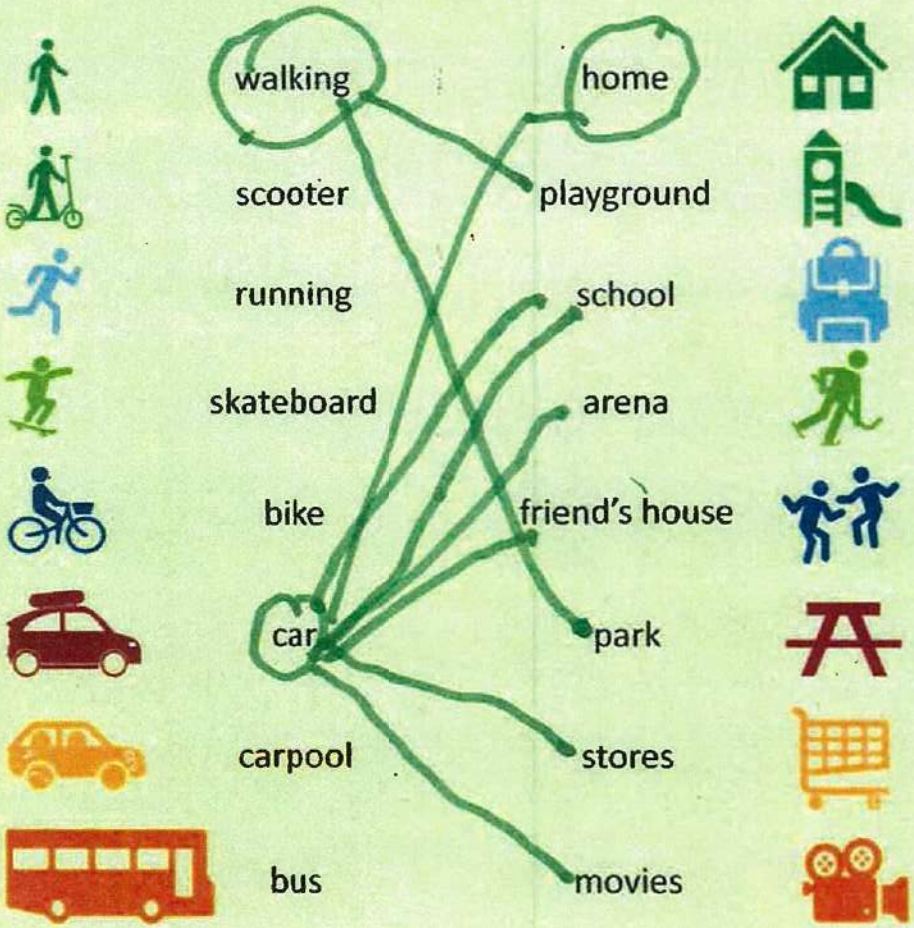
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



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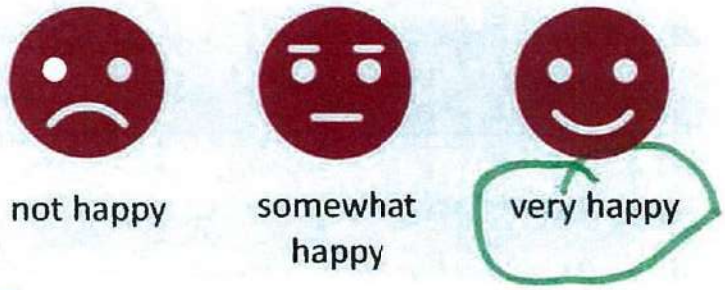


3. What is one word that you think of when you think of getting around? Write it below!

CAR

Thanks for helping us!

Name: [redacted]

Age: [redacted]

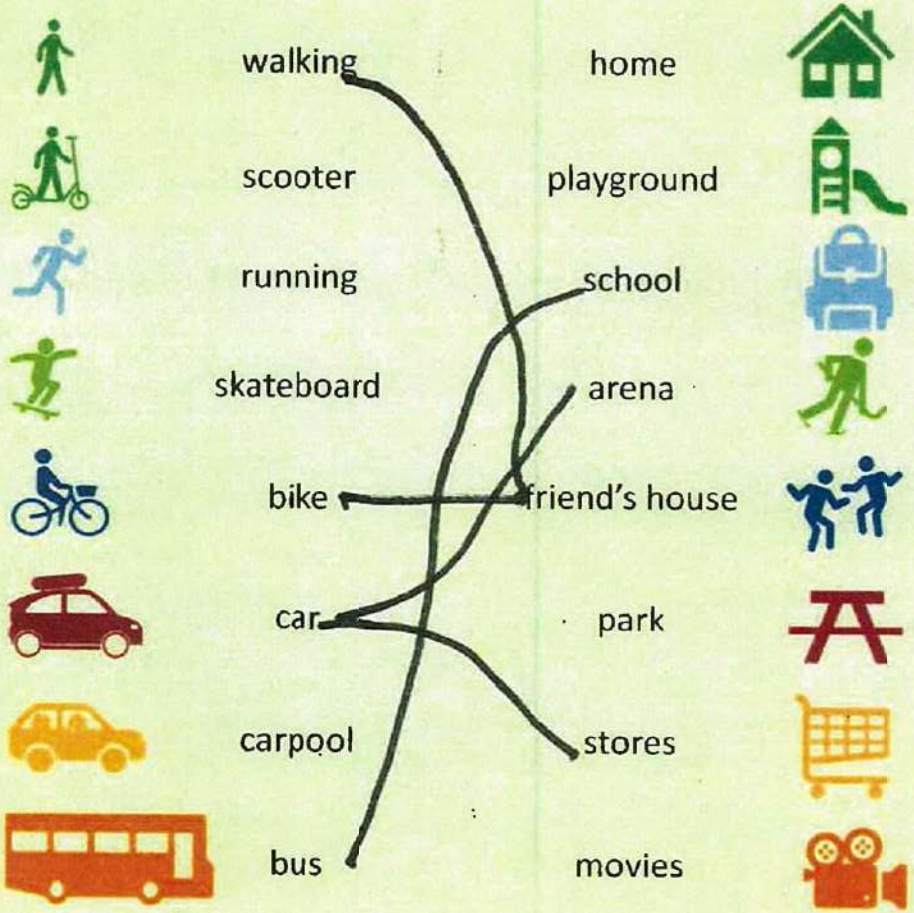
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons.or stickers to let us know what you think.

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

Driving

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

What do you think?!

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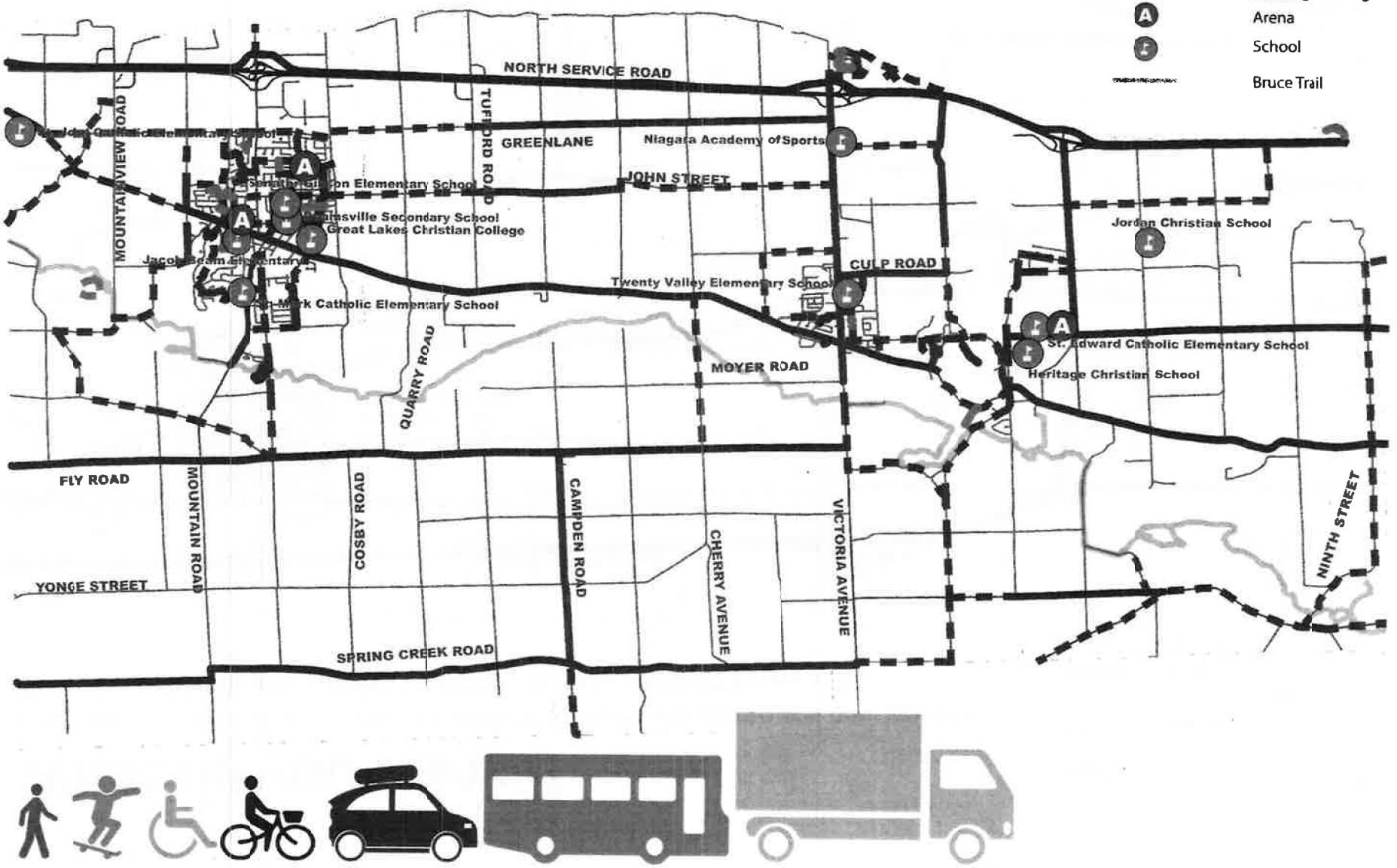

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!

2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

Bicycle Bike

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

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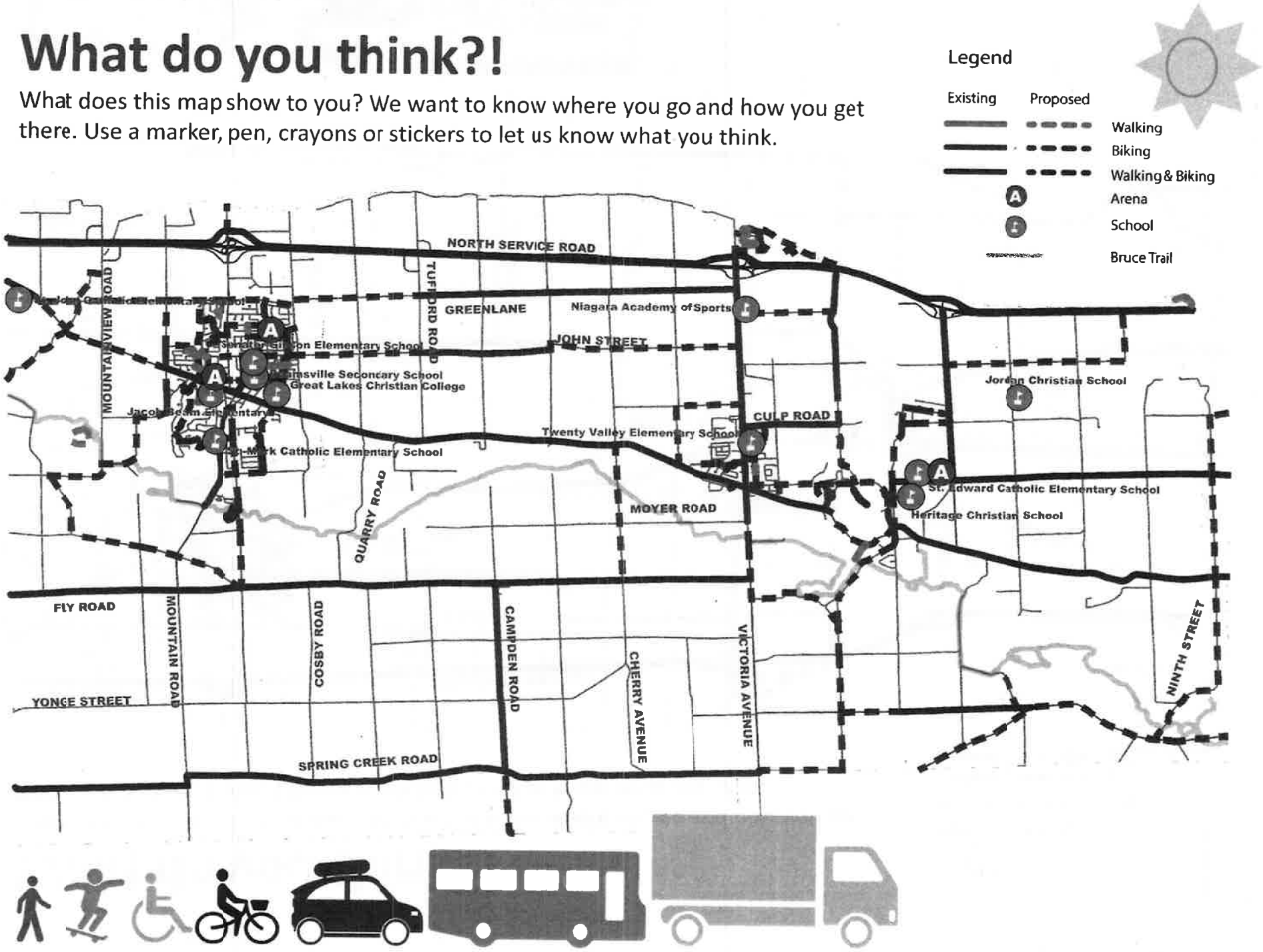

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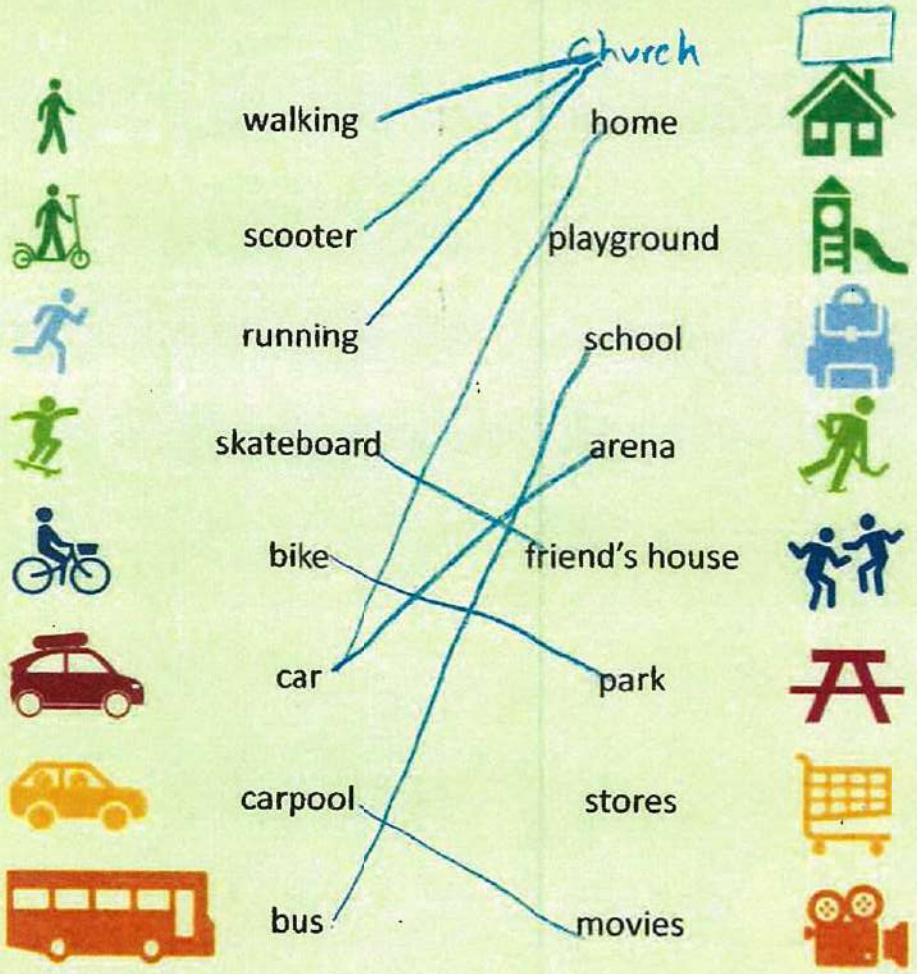

2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

plays

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

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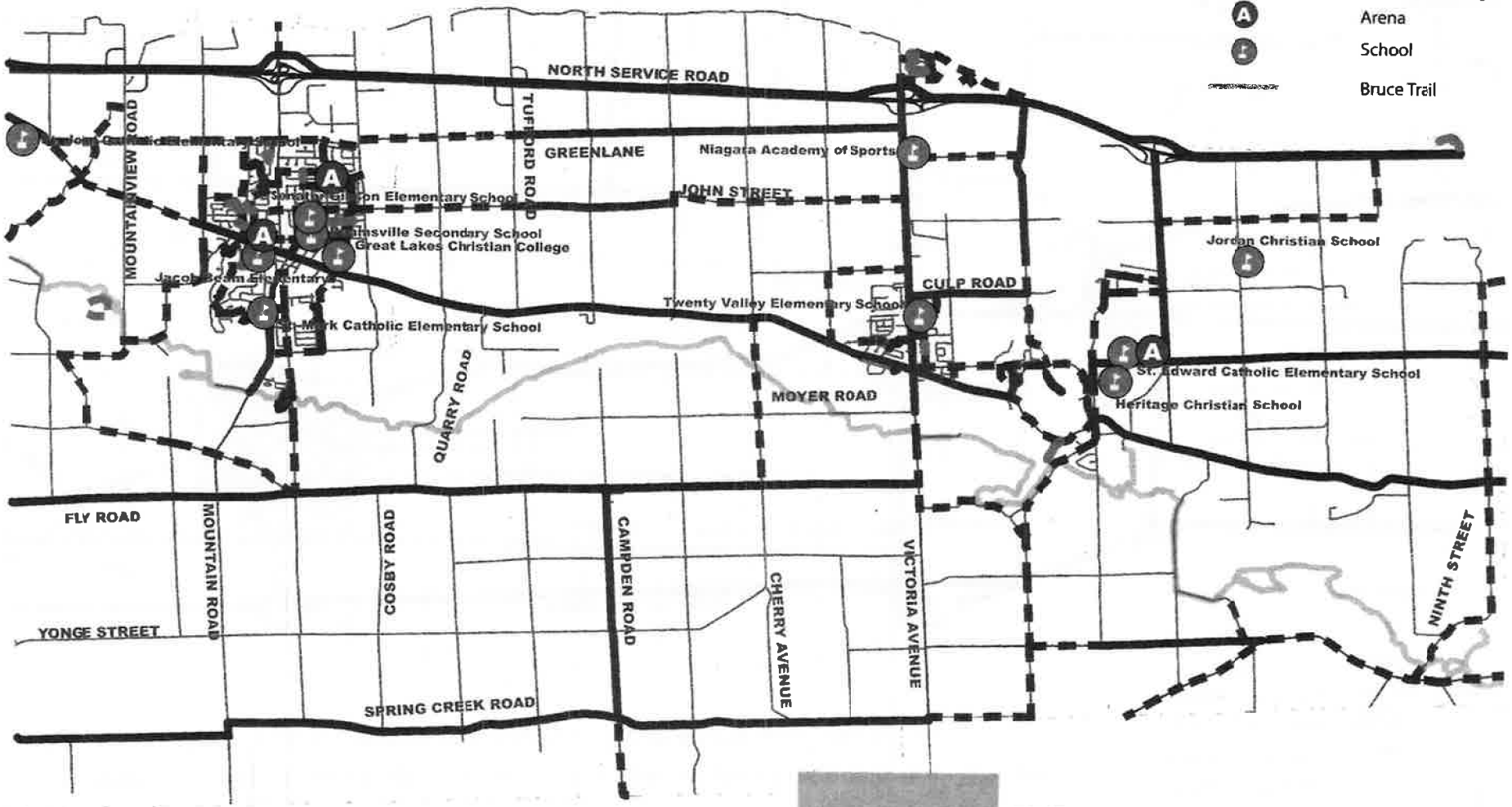

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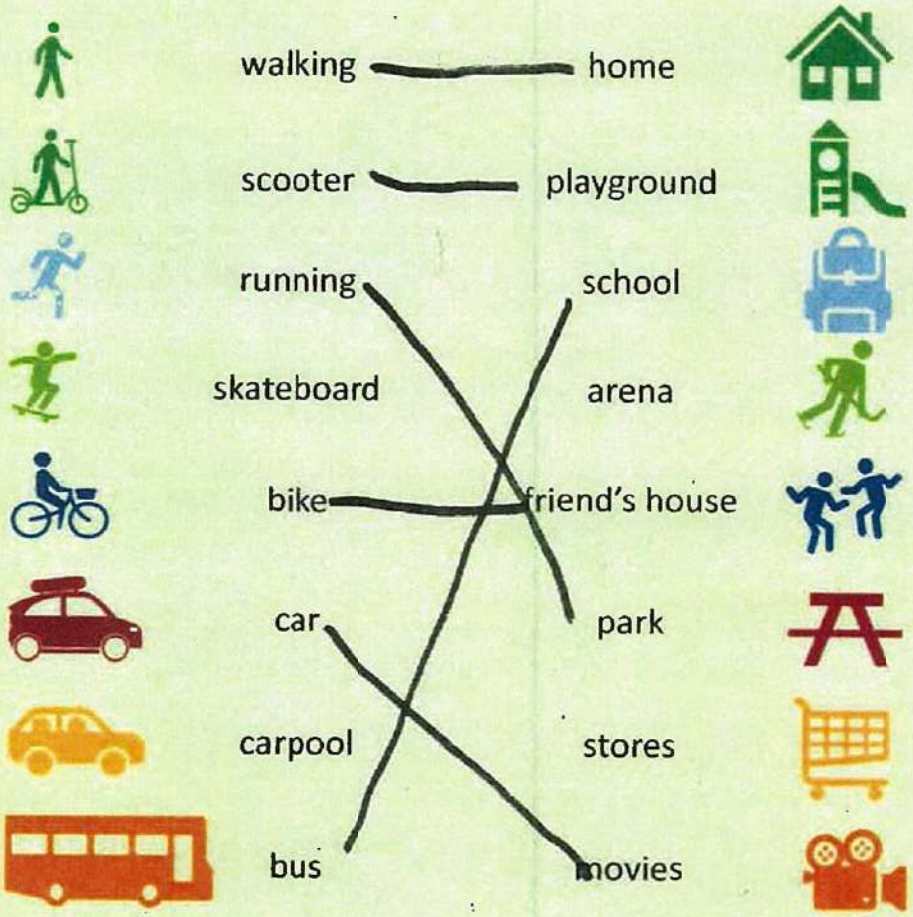

2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

Driving

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

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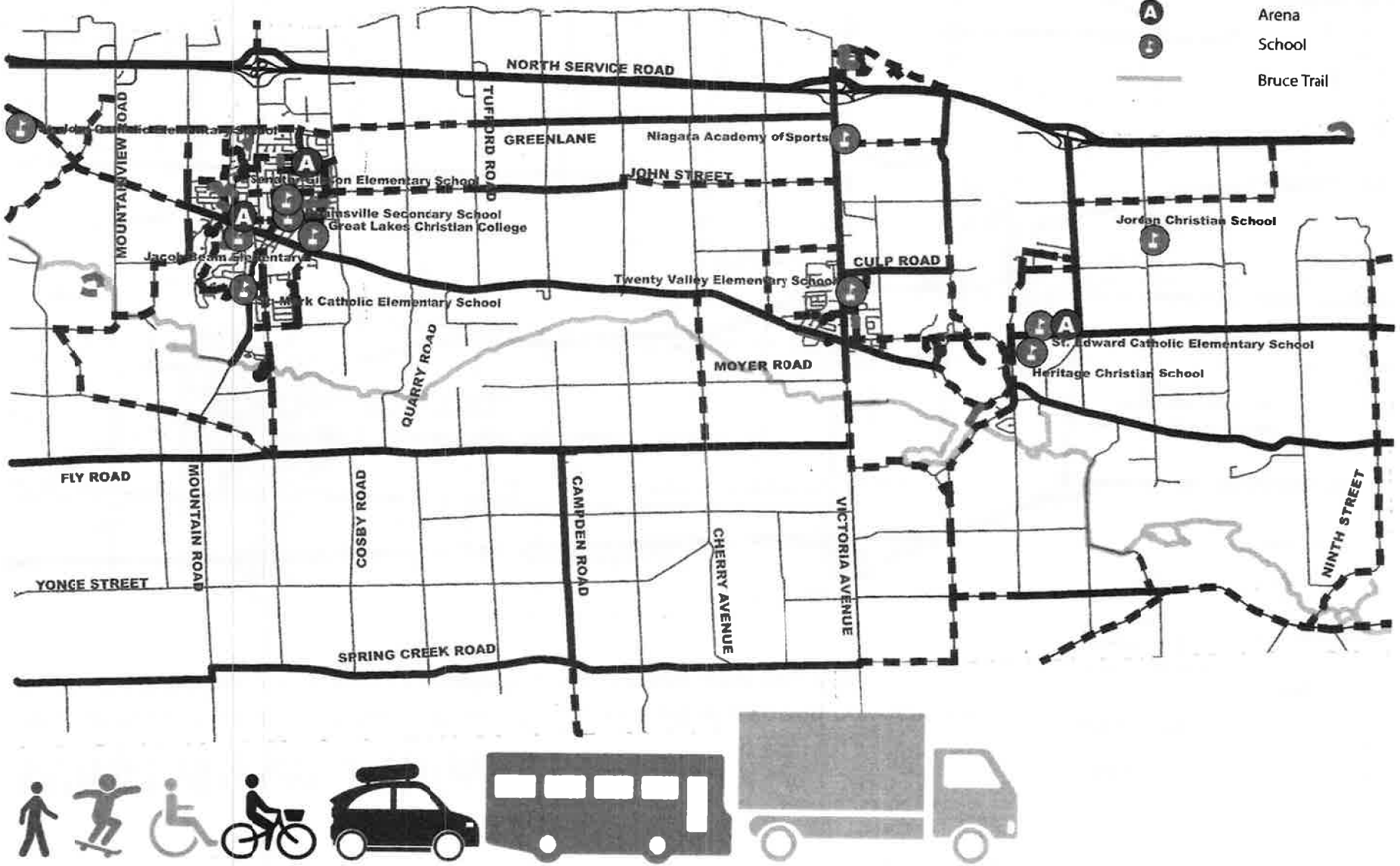

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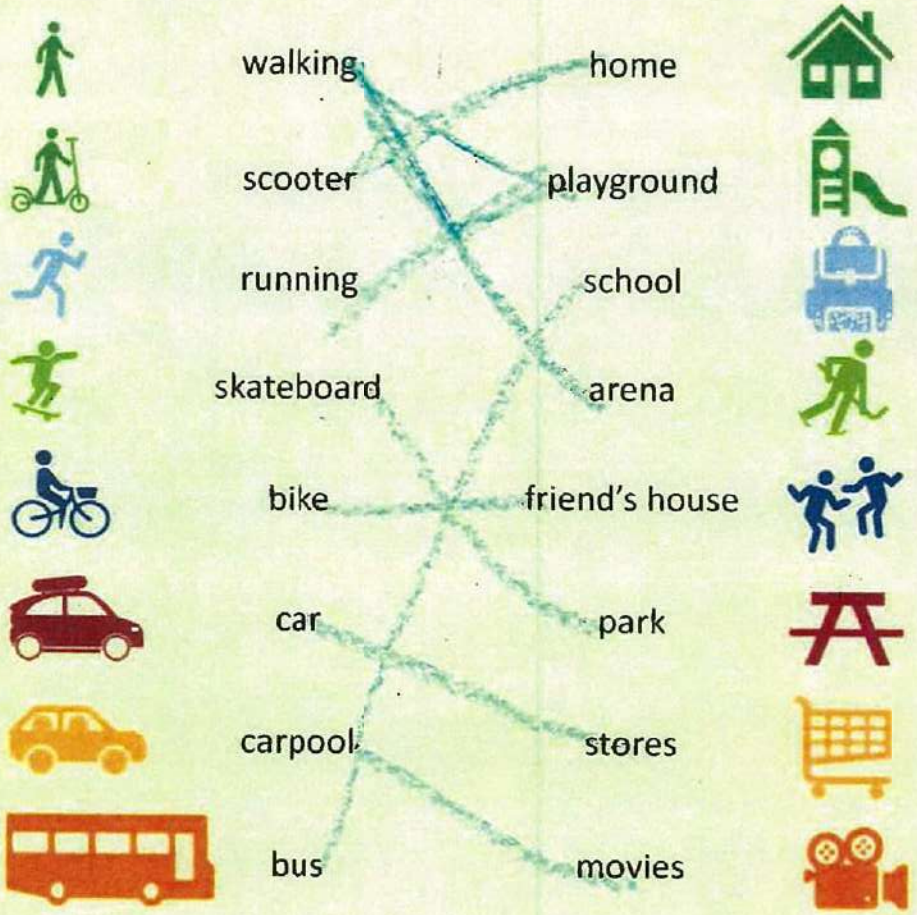

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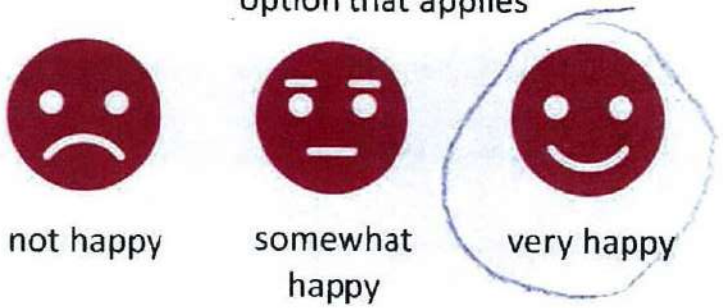

3. What is one word that you think of when you think of getting around? Write it below!

drive

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

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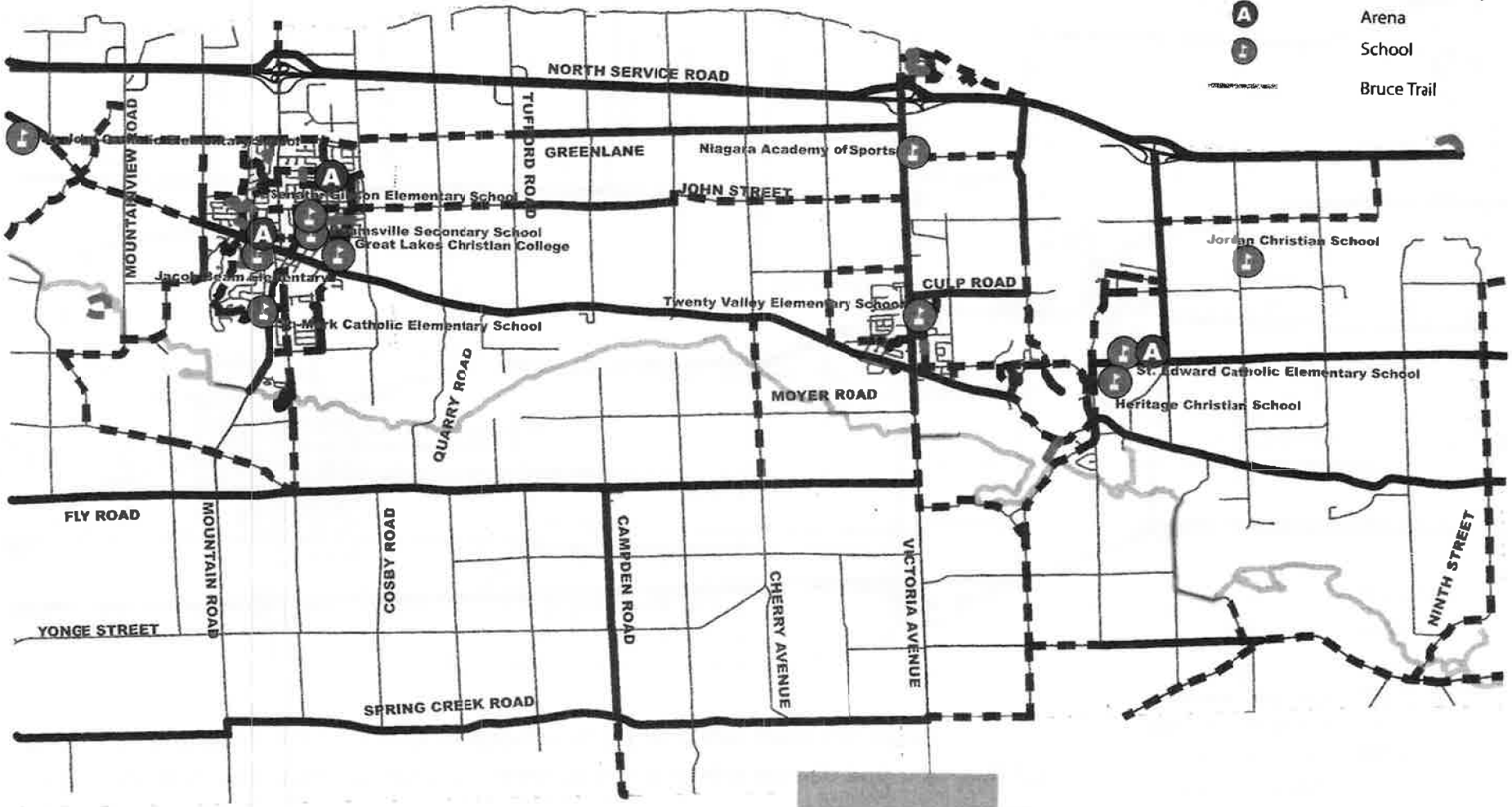

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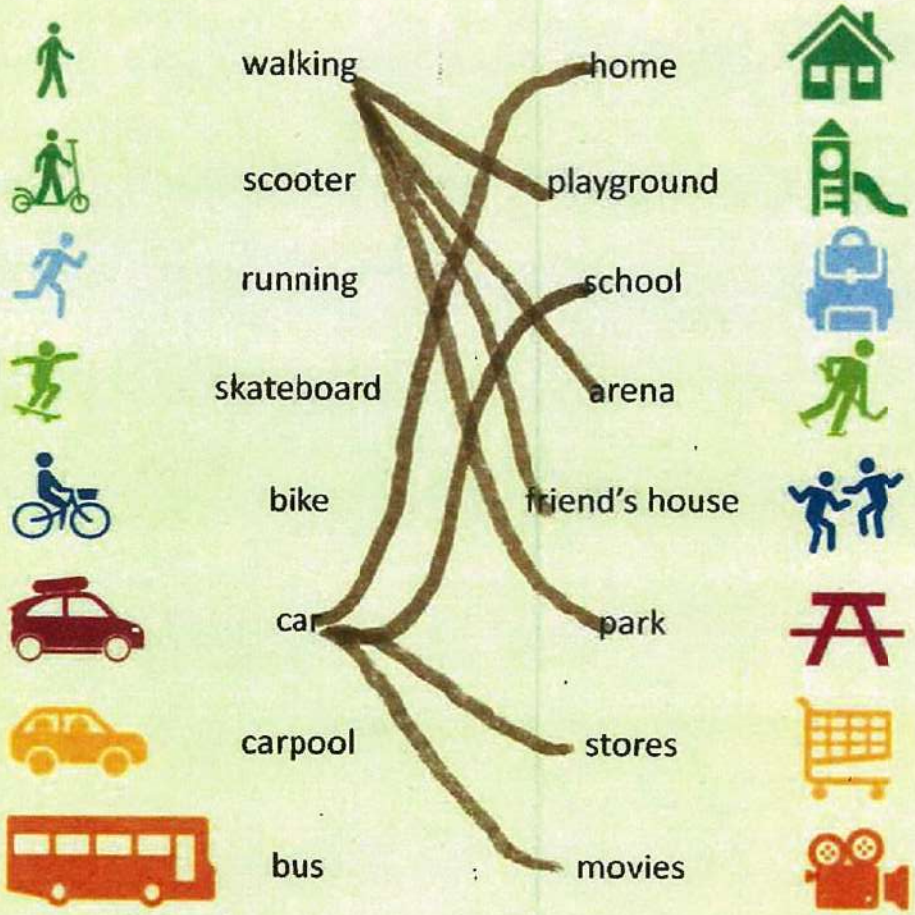


2. When you think about getting around Town how you do feel? Circle the option that applies

3. What is one word that you think of when you think of getting around? Write it below!

FUN

Thanks for helping us!

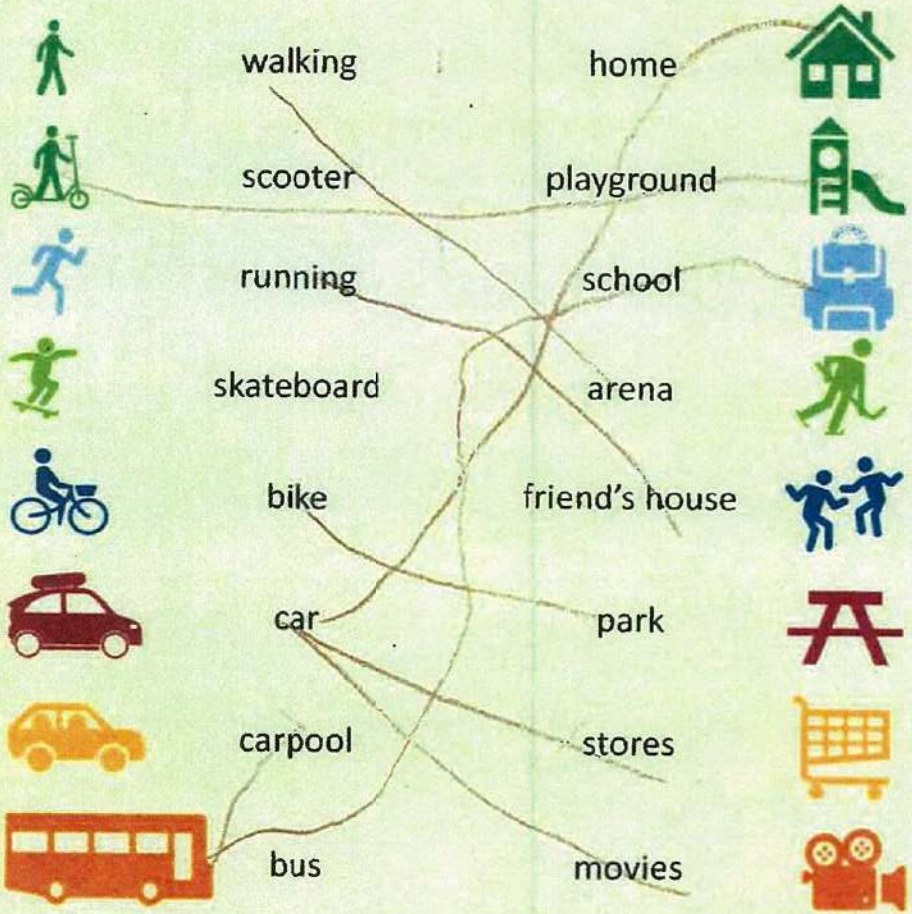
Name: [redacted]

Age: [redacted]

School: [redacted]

What does transportation mean to you?

1. Where do you need to go and how do you get there. Connect the different ways you travel to the places you typically go to!



2. When you think about getting around Town how you do feel? Circle the option that applies

not happy | somewhat happy | very happy

3. What is one word that you think of when you think of getting around? Write it below!

Car

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.

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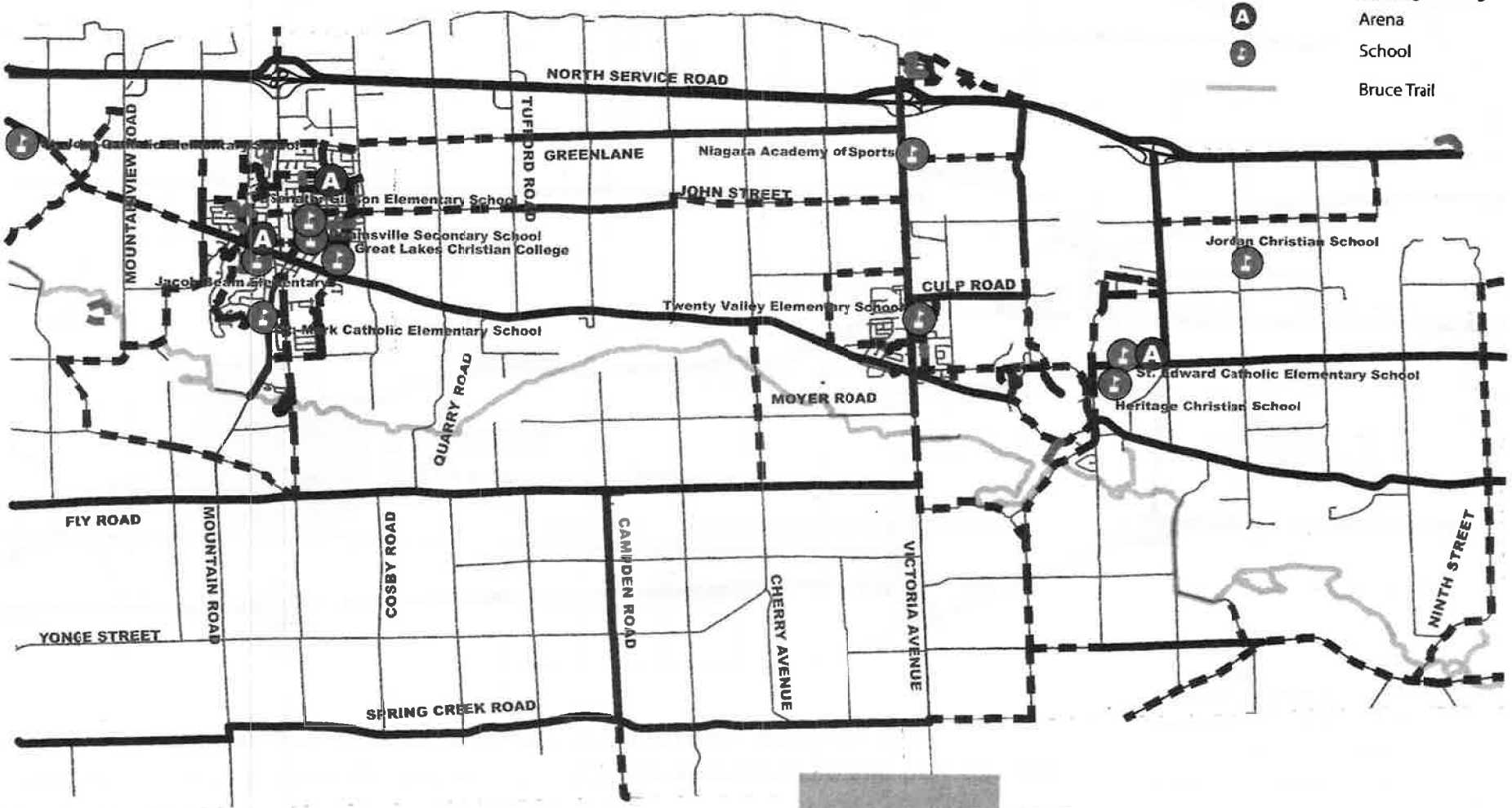

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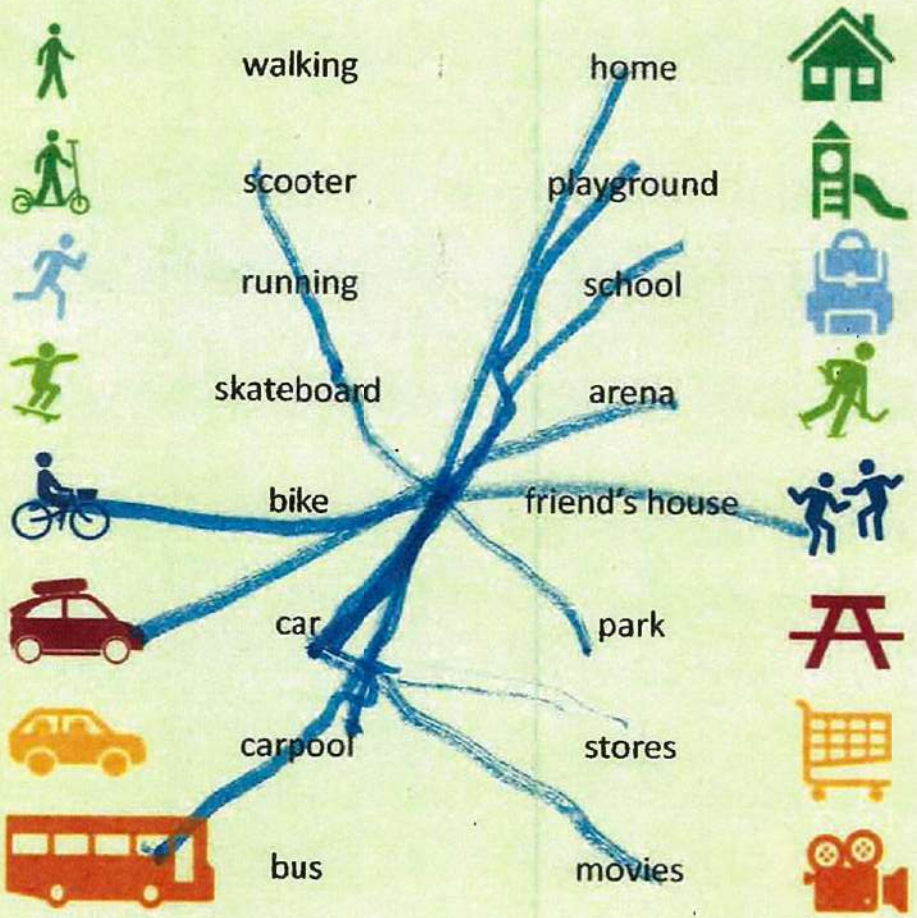

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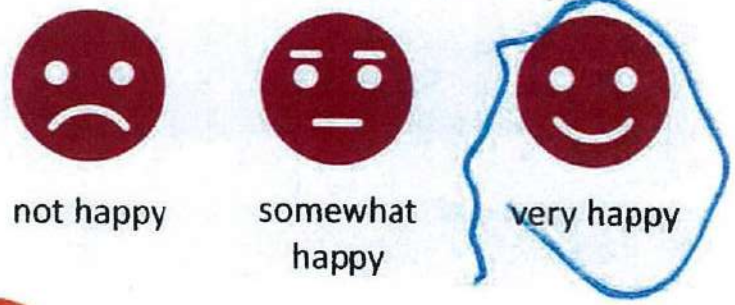

3. What is one word that you think of when you think of getting around? Write it below!

Car

Thanks for helping us!

Name: [redacted]

Age: [redacted]

School: [redacted]

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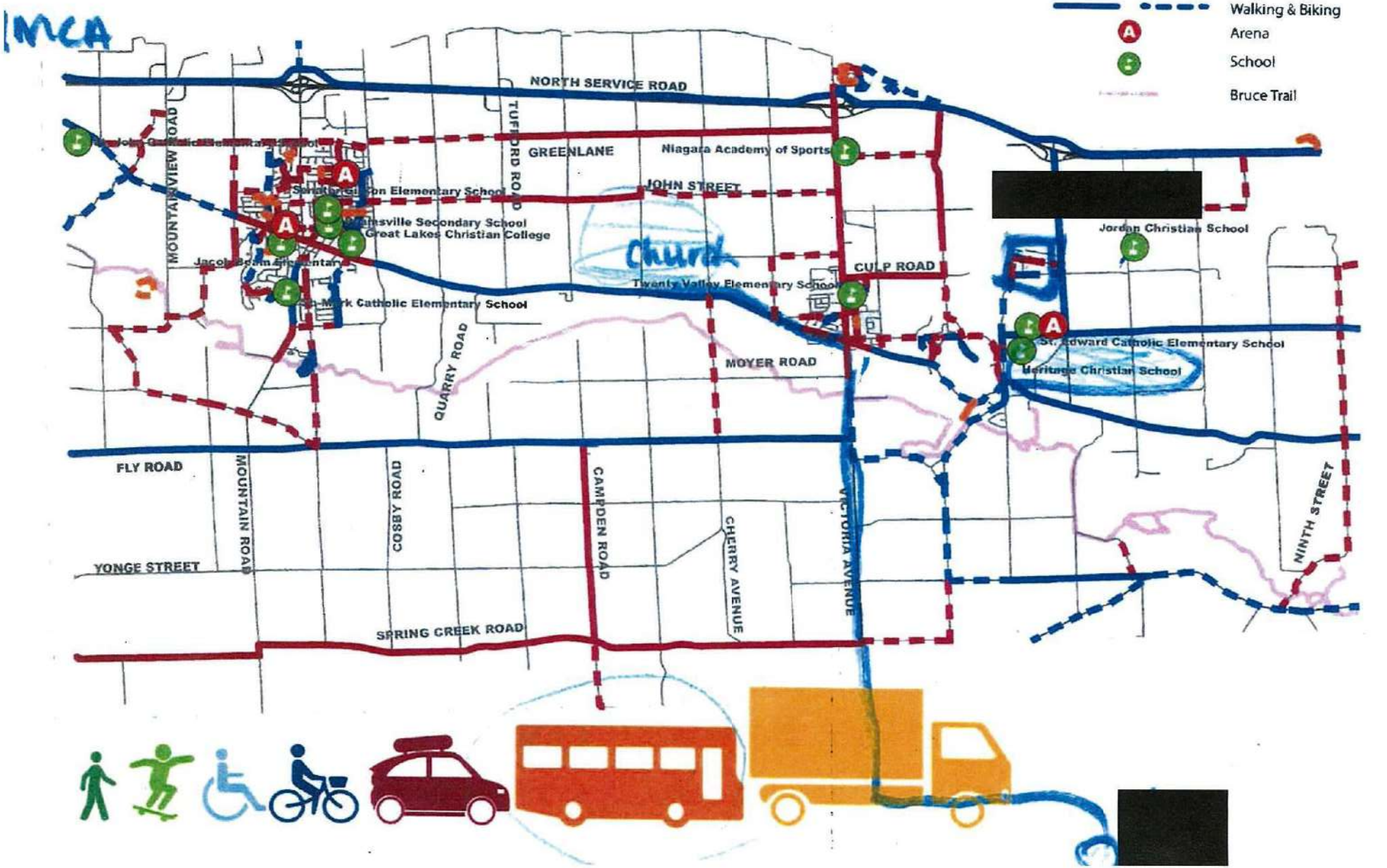

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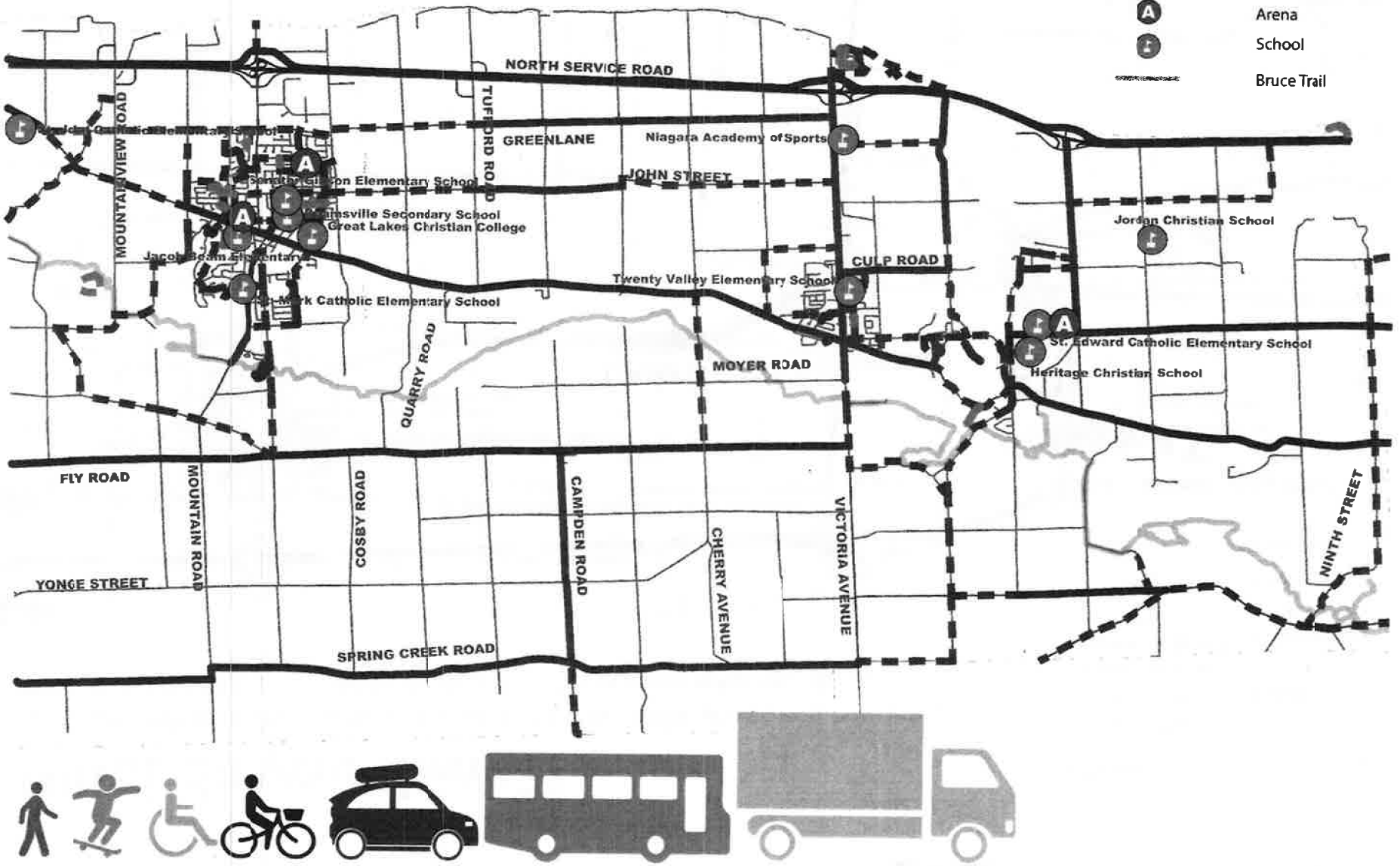

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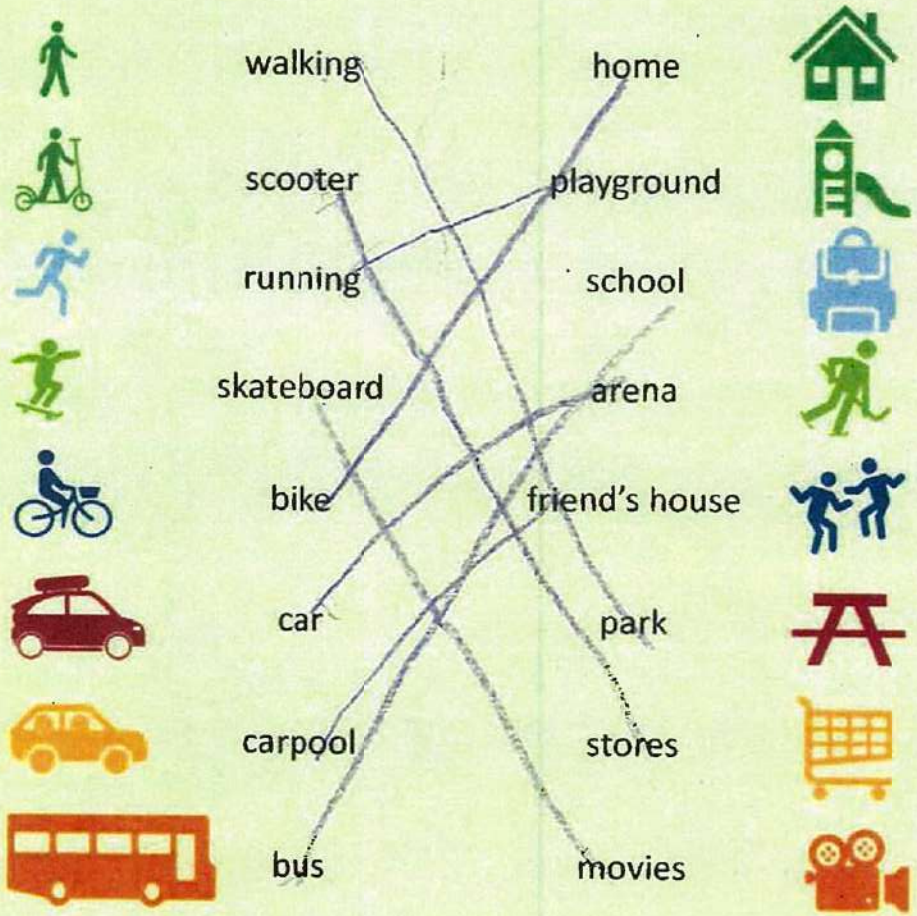

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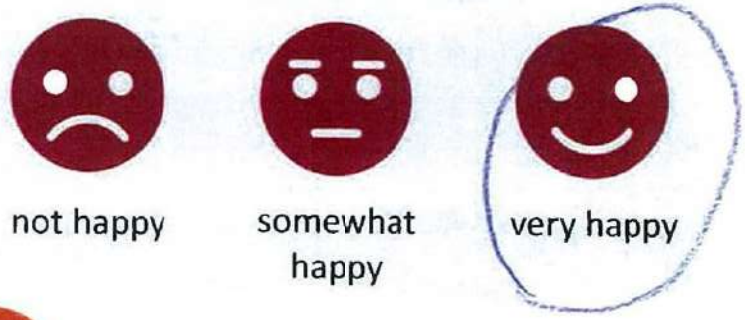


3. What is one word that you think of when you think of getting around? Write it below!

fun

Thanks for helping us!

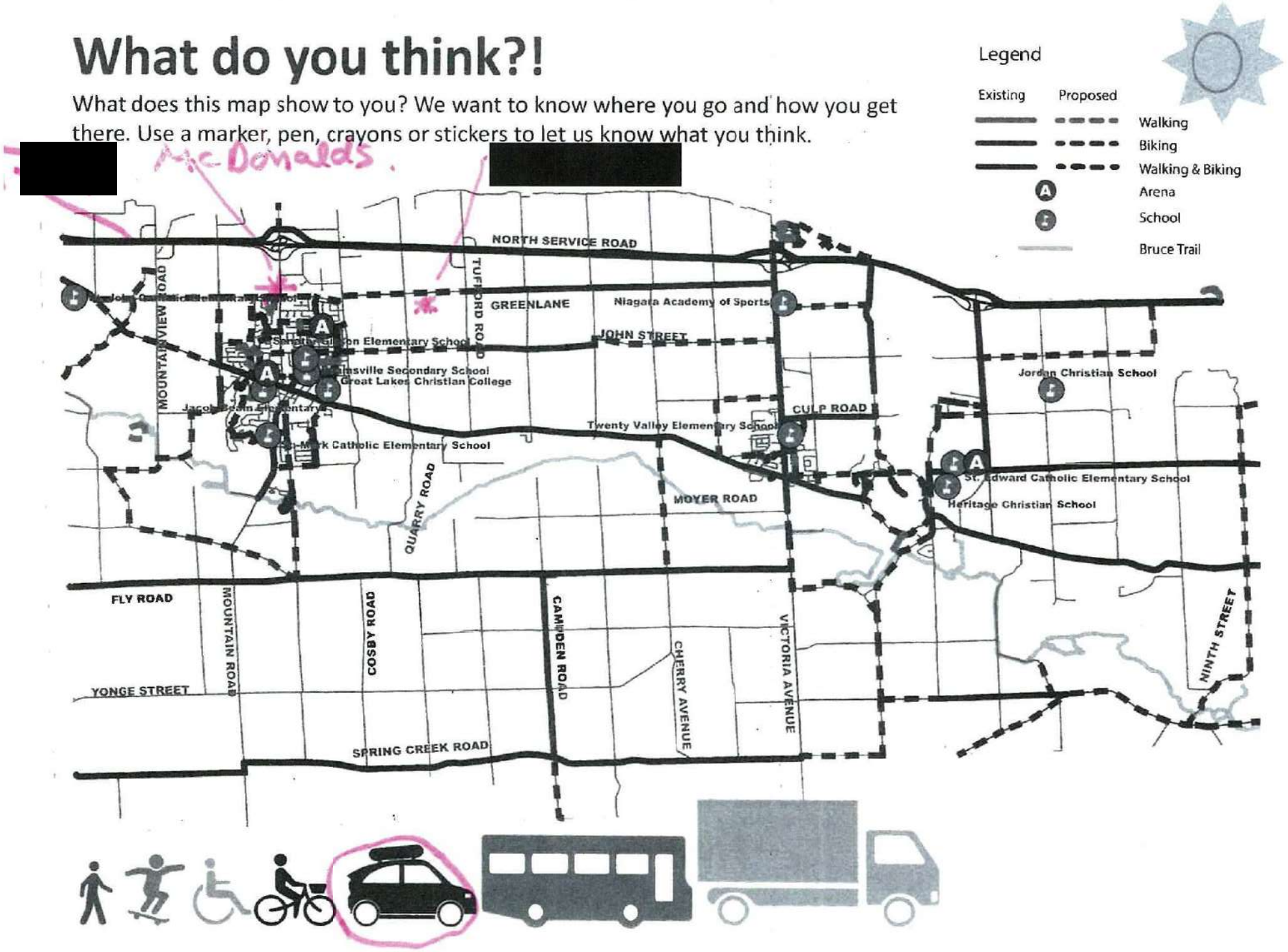
Name: [redacted]

Age: [redacted]

School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



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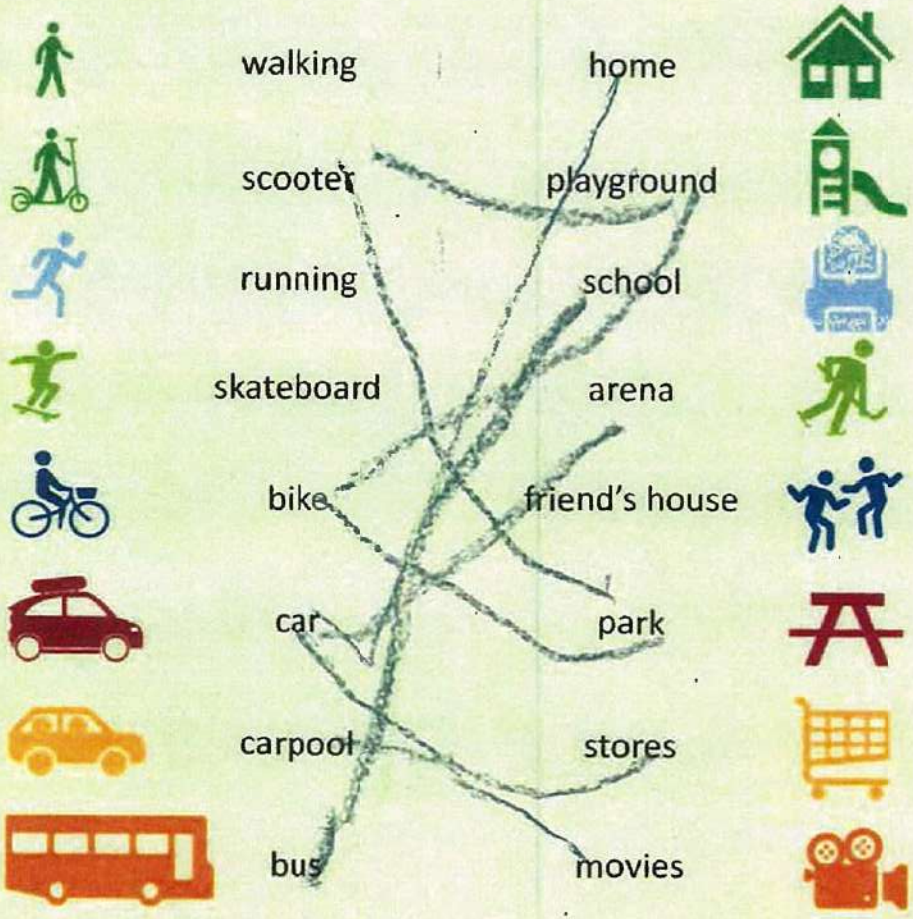

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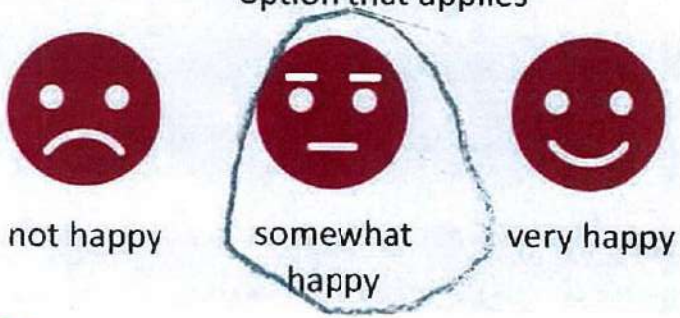


3. What is one word that you think of when you think of getting around? Write it below!

car walk/bike city our town

Thanks for helping us!

Name: [redacted]

Age: [redacted]

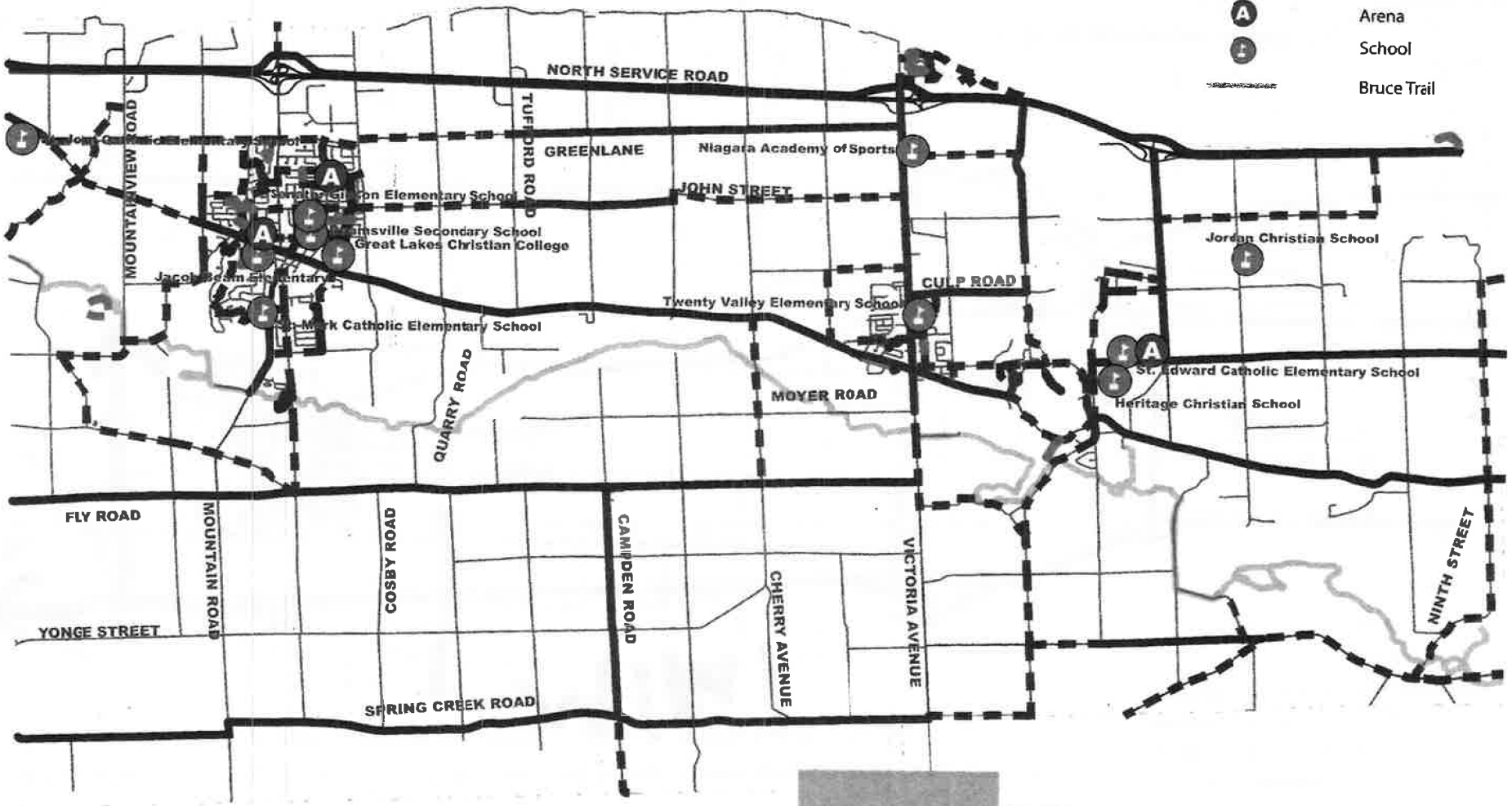
School: [redacted]

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stick [redacted] at you think.

What do you think?!

What does this map show to you? We want to know where you go and how you get there. Use a marker, pen, crayons or stickers to let us know what you think.



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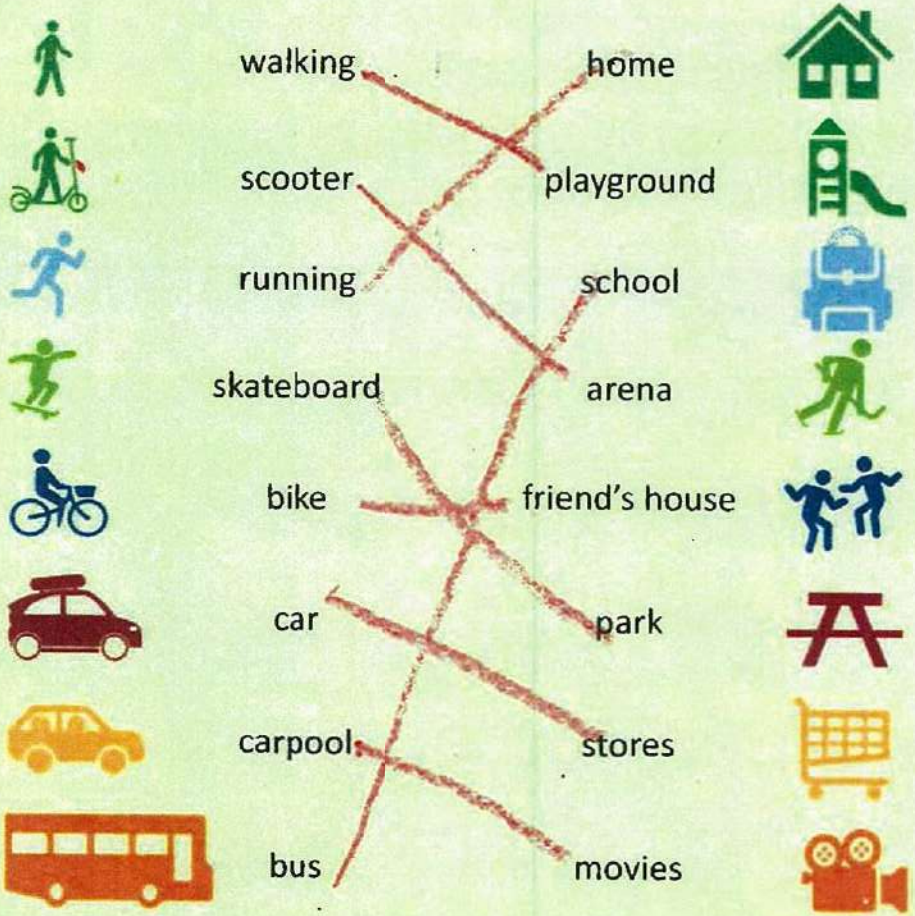

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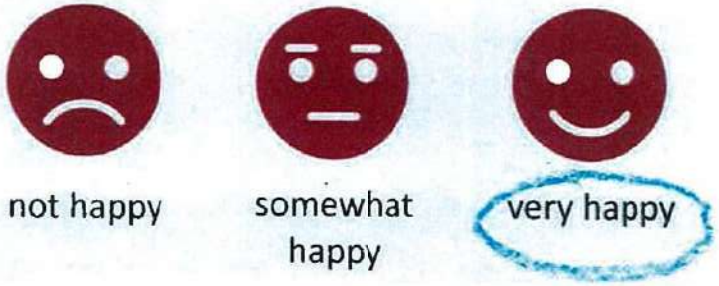


3. What is one word that you think of when you think of getting around? Write it below!

Shopping

Thanks for helping us!

Name: [redacted]

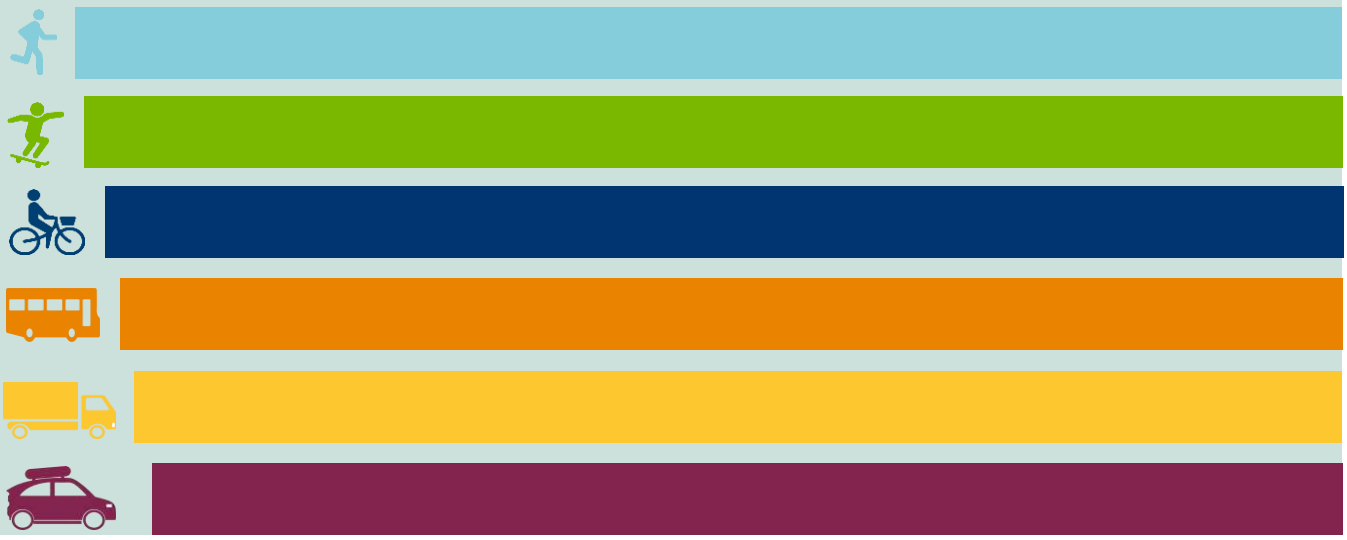
Age: [redacted]

School: [redacted]

[redacted]

APPENDIX

D-3 Niagara Region Comments and Responses



Make moving make sense as we grow!

Response to Niagara Region Comments related to the Lincoln Transportation Master Plan

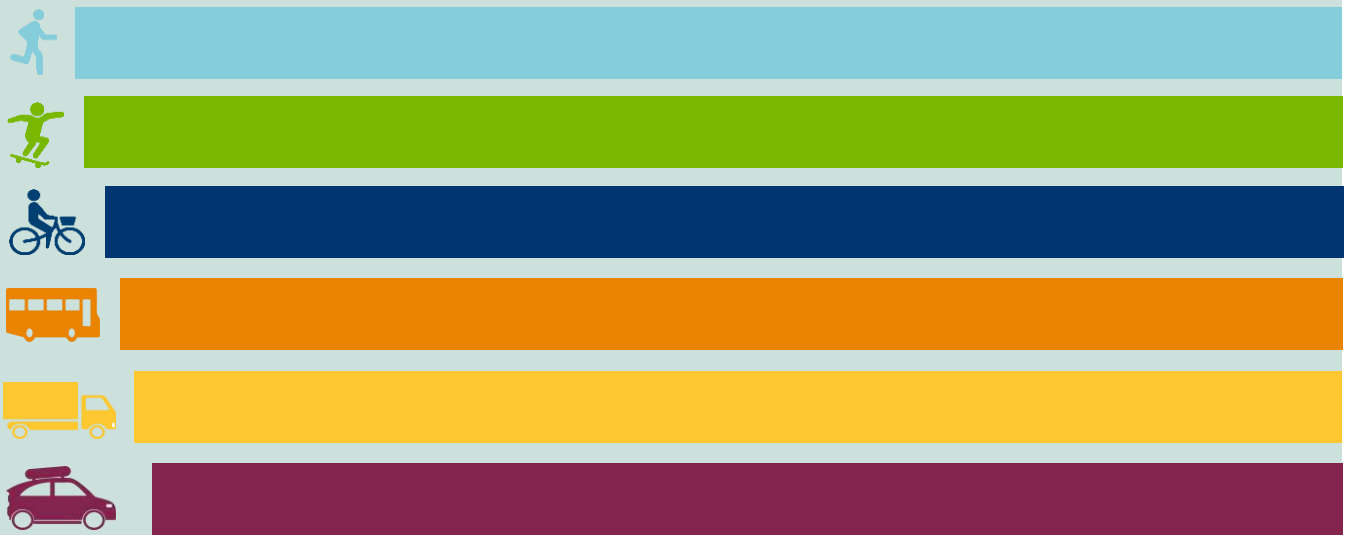
Commenter/Division	No.	Section	Region Comment	Additional Links/References	Response
Transportation Services at Niagara Region (NR)	1	Objectives	The objectives are well defined but do not address the need to support growth, economic development/prosperity, and how the plan will align with Regional objectives to create a synergy for moving transportation forward	-	Text to reflect the need to coordinate with the Region and surrounding municipalities has been added in Section 3.1 of the TMP Report.
	2	Objectives	Staff at Niagara Region are putting a report to Council recommending the adoption of Vision Zero. The Town should consider adopting Vision Zero of employing the principles laid out within it through their TMP in an effort to eliminate fatalities and set a standard to address safety on municipal roadways	-	A section recommending Vision Zero policies has been created. See Section 5.5.1 of the TMP Report.
	3	Roads	There were a couple of intersections recommended for the installation of traffic control signals whereby the Ministry of Transportation Ontario's (MTO's) warrants for the installation of traffic control signals are not met. Niagara Region does not support the installation of traffic control signals without meeting the MTO's warrants and would suggest that if the recommendation is to provide pedestrian connectivity that a pedestrian crossover be reviewed as an alternative	-	Based on the review of current conditions and community needs, WSP's recommendations to install traffic control signals remain the same. We acknowledge that further consultation with the Region will need to happen to finalize the appropriate action to take at the Stadelbauer and King intersection.
	4	Trucking	The Niagara Escarpment Crossing previously identified Park Road and Bartlett Avenue in Grimsby as the preferred alternative. Niagara Region has received new information that may impact this alternative and will be undertaking a new environmental assessment to revisit the alternatives and move the process forward. It is Niagara Region's position that the Town of Lincoln may acknowledge a previously identified preferred alternative but should allow for flexibility in the event that the preferred alternative changes	-	Text has been altered to provide more flexibility in preferred trucking routes. See Section 4.3.1 of the TMP Report.
	5	Trucking	All regional roadways are truck routes and the TMP should not make any recommendations to remove trucks from regional roads	-	Trucking is one of the biggest community concerns in Beamsville. The truck route restrictions provide access to key destinations without undue diversion. The trucking industry representatives that have been contacted by the Town / WSP generally were amenable to the recommendations. These truck route restrictions on Regional roads remain in the report. We acknowledge that further consultation with the Region will need to happen to finalize the appropriate truck routes and through truck restrictions.
	6	Complete Streets	Niagara Region has prepared a Complete Streets Guideline as part of Niagara's TMP and suggest that the Town aligns any efforts in Complete Streets with the Region's to create a cohesive network between the regional and municipal roadways. In addition, the Region will be issuing a Request for Proposals (RFP) for the development of a Complete Streets Design Manual to be used for detailed design, operations, and maintenance	-	The Complete Streets policy has incorporated the Region's guidelines and initiatives.
	7	Active Transportation	Overlay the municipal roadway truck routes with the active transportation network to identify locations where there is an overlap and consider positioning active transportation facilities off-road to reduce the potential conflicts for these contrasting modes of transportation. Also, Niagara Region will be reviewing a wayfinding policy for active transportation (likely in 2020) that aims to create a unified approach for wayfinding throughout the Region with respect to active transportation. The Town may want to consider any creating flexible wayfinding strategies in the Town's TMP that allow for aligning with future plans by the Region	-	The active transportation network proposed is comprehensive and interconnected and typically features alternative AT routes when AT routes coincide with trucking routes. The Town is very supportive of a unified wayfinding policy for active transportation and would like to be involved with the development of the policy.
GO Implementation Office at NR	8	Transit	The Regional TMP recommends strengthening of core transit services and providing transit connections to local municipalities through a combination of fixed-route and demand-responsive transit using existing and emerging technologies to improve efficiency and cost-effectiveness to support local, inter-municipal and inter-regional travel. Key action items: • Develop demand-responsive transit pilot to extend access • Move towards a consolidated transit model • Support the expansion of GO Transit passenger rail service through development / redevelopment of rail stations to serve as major transit station areas	Niagara Region TMP, 2017 (Regional TMP)	This information has been incorporated into recommendations. See Section 4.2.2 of the TMP Report.

Response to Niagara Region Comments related to the Lincoln Transportation Master Plan

Commenter/Division	No.	Section	Region Comment	Additional Links/References	Response
GO Implementation Office at NR	9	Transit	The Dillon Report recommends a number of inter-municipal transit (IMT) service improvements and next steps on transit governance towards a consolidated transit model. This report is endorsed by three major municipal transit operators and Niagara Region.	Niagara Transit Service and Governance Strategy, 2017 (Dillon Report)	This information has been incorporated into recommendations. See Section 4.2.2 of the TMP Report.
	10		In line with recommendations from the two reports Niagara Region is working with local municipal partners under direction from the Linking Niagara Transit Committee (LNTC). The LNTC is an advisory committee to the Regional Public Works Committee for matters related to inter-municipal transit and acts as one voice for Niagara on transit advocacy. The LNTC created an inter-municipal transit working group (IMTWG) consisting of all twelve municipalities and Region.	https://www.niagararegion.ca/priorities/documents/transit-service-and-governance-strategy-final-report.pdf	Noted. The Town will continue to be an active participant in the IMTWG.
	11		An IMT Implementation Strategy report was developed in coordination with the IMTWG and endorsed by the LNTC. This Implementation Strategy includes a number of transit service improvements and framework on transit governance. The reports LNTC 21-2018 to 23-2018 (link below) contain the details. The IMT service improvements are moving at a rapid pace and include the implementation of IMT West pilot project covering Lincoln, West Lincoln, and Grimsby. As well a study related to evaluating options on governance has been initiated.		Noted. The Town supports additional transit service provided by the Region, such as the Grimsby/Beamsville LINK.
	12		Due to fast moving transit service delivery enhancements and the initiation of the governance study, it is recommended that the Town and Regional staff meet to coordinate any transit related recommendations coming out of Lincoln's TMP.	https://www.niagararegion.ca/council/Council%20Documents/2018/LNTC-agenda-sep-12-2018.pdf	Text to encourage coordinate between Lincoln and the Region has been incorporated. See section 4.2.2 of the TMP report.

APPENDIX

D-4 Stakeholder Comments and Responses



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Stakeholder Comments on April 30, 2019 Stakeholder Workshop Presentation

Commenter/ Division	No.	Slide No.	Section	Stakeholder Presentation Reference	Stakeholder Comment	Response
Gervais, J	1	5	Objectives	B - Provide a balanced multi-modal transportation system	Is there an opportunity to include language here about sustainable transportation? It is somewhat captured in B. Here is some language that Vaughan is using if it is of any value to you. https://www.vaughan.ca/projects/projects_and_studies/sustainable_transportation/Pages/default.aspx	Sustainable transportation has been incorporated into multiple aspects of the TMP report.
	2	5	Objectives	G - Review and update parking policies Town-wide	In considering parking, is there an opportunity to consider a staging area for cycling tourists where they can park their vehicle and then head out for a day or a few days of cycling? This area could include: bathrooms, local maps, picnic tables (with three stream trash receptacles), bike lock up areas, etc.	Supporting infrastructure where modes converge and/or where end-of-trip facilities are recommended as part of Complete Streets Policy. See section 2.5 of Complete Streets Policy. This is also addressed in the Active Transportation Strategy.
	3	9	Input Received - Key Themes	Children in Lincoln enjoy travelling using different modes	"Children and youth"	Wording revised.
	4			Lincoln residents have a clear desire to be a part of changing and improving the Town's active transportation network • Strong level of support for proposed network aspects	consider ease of access between different modes	This has been incorporated. See Section 4 of the TMP Report.
	5			The highest number of 4 and 5 star votes in terms of the types of strategies people believe the Town should support / improve were within the categories: • Trucks Movement	truck movement and its impact on active transportation, school zones and downtown	Truck movement is one of the biggest concerns in Beamsville. A trucking strategy has been devised to reduce impacts on the Beamsville downtown area.
	6	10	Key Themes - Transit	Consider expansion to the Town's network, and work with the Region and Metrolinx to bring more of their services to Lincoln.	There also an opportunity for community ownership through sponsorship of transit shelters, benches, special events day on the bus and other resources.	The Transit section of the TMP report includes a number of recommendations to support transit.
	7		Key Themes - Traffic Calming	Develop a data-driven, transparent step-by-step process to determine whether or not a traffic calming measure is warranted. Apply the process uniformly to public requests for traffic calming.	Data driven decision making is important. The challenge is public perception of safety, and those poor perceptions decreasing active transportation (or not seeing the AT uptake desired). Consider how perceptions can be addressed.	Recommendations have been tailored to address this comment. See Section 5.4 of the TMP Report.
	8	11	Outcomes - Complete Streets	How do we ensure that the transportation network is design for all modes of transportation and all transportation users?	Consider skill level of children and the challenges of aging bodies.	This has been considered, see section 4.1.1 of the TMP report.
	9		Outcomes - Trucking	Develop interim and ultimate solution truck routes to eliminate through-trucks from downtown Beamsville.	Partnerships with the industry are great ways to get buy in.	This has been addressed, see section 4.3.1 of the TMP report.

Stakeholder Comments on April 30, 2019 Stakeholder Workshop Presentation

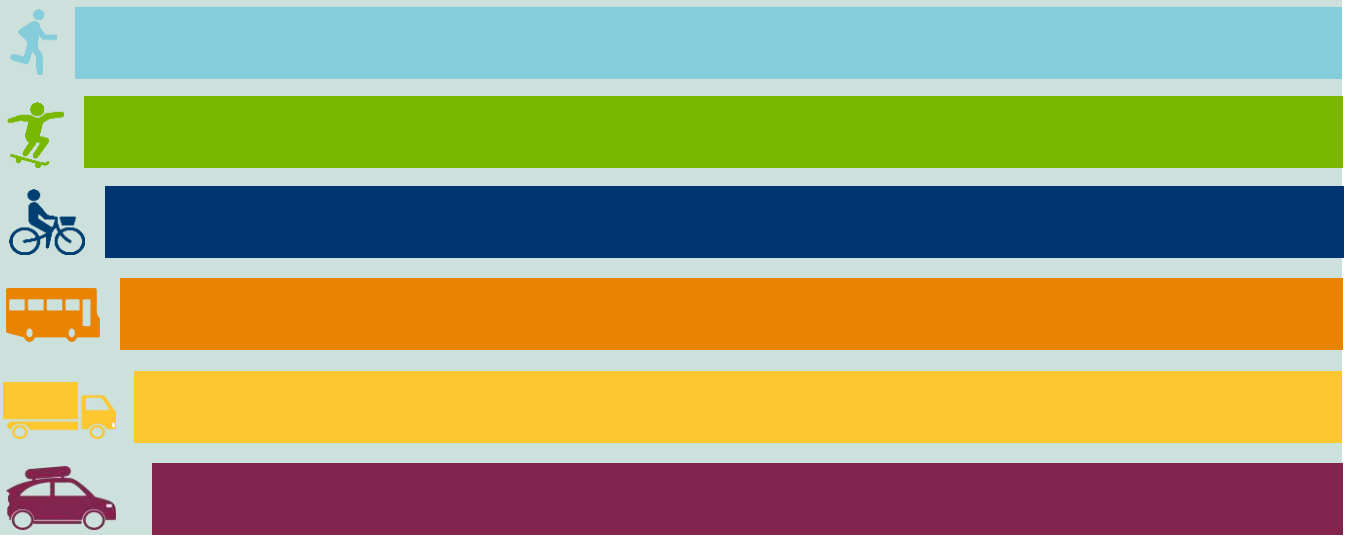
Commenter/ Division	No.	Slide No.	Section	Stakeholder Presentation Reference	Stakeholder Comment	Response
	10	11	Outcomes - Road Network	How do we plan the road network to address existing concerns and future growth?	The locations of schools on Regional Roads and in less walkable areas present a real challenge for AT. The new high school is located in a area that virtually eliminates opportunities for students to walk. Consider "short-cut" multi use paths to support cycling and possible walking. Also consider school bus drop off zones and ample space for school bus congestion, as most of the students will be arriving to school by bus. Look for opportunities to discourage parent drop off of students or consider appropriate drop off facilities to prevent dangerous car congestion around the school	The Active Transportation Strategy includes a comprehensive and interconnected network of facilities Town-wide. These are designed to access schools, including the new high school. We agree with your comments on school bus drop off zones. That level of detail was not studied as part of the TMP.
	11	12	Roads - Approach	Included planning for Prudhommes Secondary Plan area	The QEW makes a divide between people living by the lake wanting to get to town and people in town wanting to get to the lake. Look for opportunities to improve walking and cycling access over or under the QEW. Consider separated and protected facilities.	The Active Transportation Strategy includes a comprehensive and interconnected network of facilities Town-wide and seeks to connect areas on either side of the QEW and on either side of the Niagara Escarpment.
	12			Durham Road, Lincoln Avenue, Green Lane and Bartlett Road	As the high school will be on Durham road, include separated multiuse paths with possible short cuts to the school location to encourage cycling and possible walking.	The Active Transportation Strategy includes a comprehensive and interconnected network of facilities Town-wide. These are designed to access schools, including the new high school. Facility types have been recommended per OTM Book 18 and will be confirmed, and may change, during the detailed design phase.
	13	13	Trucking - Approach	General Comment	Consider working with trucking industry for road solutions to protect pedestrians and cyclists especially on Mountain rd.	This has been addressed, see section 4.3.2 of the TMP report.
	14	14	Trucking - Proposed Recommendations	2. Bypass network should be identified that bypasses the downtown of Beamsville and avoids conflict with active transportation routes	and school zones	The Town-wide active transportation network seeks to provide access to destinations, such as schools, on the most comfortable routes for cyclists.
	15			4. Support Niagara Region's identified escarpment crossing at Park Road and Bartlett Avenue (Grimsby) as the preferred trucking crossing	Based on comments at the Stakeholder meeting about the escarpment crossing consider alternative options in the interim.	Phasing has been identified for an interim solution, until permanent solutions may be implemented. See Section 4.3.2 of the TMP Report.
	16	15	Complete Streets - Approach	Complete Streets are streets that are safe for everyone: people who walk, bicycle, take transit, or drive, and people of all ages and abilities. The complete streets mentality ensures that there is a network of transportation infrastructure that supports a full range of mobility options that are context-sensitive.	Consider adding wording ... and considers the need of vulnerable populations first	Complete Streets thinking "Gives equal consideration to different users regardless of age or ability, especially those who walk, cycle and ride transit" see section 5.1 of the TMP report.
	17			iii. Identify a potential complete streets policy for consideration by the Town	Check with Jordan on the timing of hiring a consultant to develop the Regions Complete Streets guidelines. There may be an opportunity to partner or at least take work that has already been done.	Noted. The TMP references the Region's already completed work on Complete Streets. The Town will continue to be engaged on future Regional initiatives for Complete Streets.
	18	16	Complete Streets - Proposed Recommendations	1. Develop policy to integrate complete streets principles into municipal policies and guidelines	General thoughts for Complete Streets - consider increasing deciduous trees for slowing down traffic, climate change and shade. Consider permeable pavement options or increasing absorption of ground water and decreasing pressure on water treatment.	The Complete Streets policy supports these comments.
	19	17	Transit - Approach	i. Work with the Town's new transit coordinator	Consider language for sustainable transportation	Sustainable transportation has been incorporated into multiple aspects of the TMP report. The standalone Active Transportation Strategy demonstrates the Town's commitment to sustainable transportation.

Stakeholder Comments on April 30, 2019 Stakeholder Workshop Presentation

Commenter/ Division	No.	Slide No.	Section	Stakeholder Presentation Reference	Stakeholder Comment	Response
	20	17	Transit - Approach	iii. Encourage Niagara Region to implement Regional transit plans for Lincoln	Look for ways to link to St. Catharines transit. This may provide better options for post-secondary students and people attending appointments outside of Lincoln.	Recommendations to improve inter-municipal transit have been provided in section 4.2.2 of the main report.
	21	19	Calming - Approach	iii. Develop a framework and identify potential design solutions to address future inquiries	Will there also be an implementation plan?	Implementation has been included as part of the Traffic Calming process. See section 5.2 of the TMP report as well as the dedicated Traffic Calming appendix.
	22	20	Calming - Types of Recommended Measures	General Comment	General comment: Are there more traffic calming options for Lincoln such as bump outs at intersections to make it easier for people to cross and also slow down turning traffic; using strategic street parking as a traffic calming measure, street trees, flexible barriers between bike lanes and the car lane, narrower lanes, school safety zones with painted road treatments.....	A variety of traffic calming measures have been recommended as feasible in Lincoln, see the dedicated Traffic Calming appendix.
	23	25	A.T.	ATS	Is ATS active transportation strategy.	Yes, this abbreviation has been clarified in the report.
	24	27	A.T. - Proposed Recommendations	100 km signed bike routes; 24 km paved shoulders	151 km of AT facilities is great however with 100km being signed bike routes and 24 km being paved shoulders, do these facilities truly support the most vulnerable road users; families, children, etc.?	Facility types have been based on guidance from OTM Book 18. Facility types will be confirmed, and may change, during detailed design.
	25	28	Map 1a	General Comment	Overall comments AT network: * consider more protected walking and cycling facilities to get from one side of the highway to the other. *Mountain Road should have protected walking and cycling facilities given the truck traffic volume * Greenlane will be a significant roadway given the high school location, the future GO station and it is a somewhat quieter east-west roadway. Protected bike lanes/multi use paths would help safely separate vulnerable road users from the traffic and provide better access for children and youth. *The Bruce Trail is an amazing asset, but it really should be identified as a hiking trail vs a walking trail. Walking trails are more AT friendly but the Bruce trail requires appropriate footwear. *Where possible, connector roads between the hamlets should have protected bike lanes/multi use paths.	The TMP report is supplemented by a standalone Active Transportation Strategy that provides a comprehensive and interconnected network of walking and cycling facilities. Facility types have been based on field work and OTM Book 18 and will be confirmed in the detailed design stage.
	26	30	A.T. - Proposed Recommendations	Bicycle Parking	Would it be possible to have a picture of a inverted "u" rack or ring and post rack as opposed to this one. This bike rack only works if the rider has a kickstand and has a super long bike lock to be able to get from the rack to all parts of the bike. This type of rack also is prone to bending wheel rims.	This image was used in this presentation but does not appear in the TMP report or the Active Transportation Strategy.
	27			Route Signage	The Region is looking to hire a consultant to create a wayfinding guidance document. There may be opportunities to partner or build on their work.	The Town supports the notion of a unified Regional wayfinding system.

APPENDIX

E Complete Streets Policy



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Town of Lincoln

Town of Lincoln's Transportation Master Plan

COMPLETE STREETS POLICY

CONTENTS

1 COMPLETE STREETS POLICY DEVELOPMENT FRAMEWORK

1.1 WHAT ARE COMPLETE STREETS?

Complete streets are streets that are planned, designed, constructed, operated and maintained for all modes of transportation and all street users. Complete streets result in a road network that enables people to travel seamlessly on any given mode of transportation from one location to another. While it is not appropriate to accommodate every mode on every street (for instance, public transit is not designed to service every local road), the complete streets mentality ensures that there is a network of transportation infrastructure that supports a full range of mobility options.

1.2 WHAT IS A COMPLETE STREETS POLICY?

A Complete Streets Policy is a tool for engineers, architects, planners, and developers alike to approach any transportation design, retrofit or maintenance project as an opportunity to address all modes of travel. The policy promotes equal consideration to multiple transportation mode users in order to provide a balanced and inclusive transportation network.

1.3 WHAT IS THE PURPOSE OF A COMPLETE STREETS POLICY?

The purpose of a Complete Streets policy is to standardize the process of constructing and maintaining the street network to ensure that it accommodates all modes of travel and all types of users. A Complete Streets policy channels decisions and public investment toward a unifying common local goal to make street space equitable by better balancing infrastructure for the needs of different modes of travel.

1.4 THE 10 GUIDING ACTION ELEMENTS OF A COMPLETE STREETS POLICY

The National Complete Streets Coalition (NCSC) in the United States and Complete Streets for Canada both define ten common elements that a Complete Streets Policy should consider in order to have successful outcomes. Considerable importance is assigned to the language about the implementation or clarity of intent of a Complete Streets policy. Therefore, these 10 "action elements" aspire to guide the Town of Lincoln's design and planning processes into developing equitable and context-sensitive transportation and streetscape projects. **Figure 1-1** lists these ten action elements while **Table 1-1** elaborates on the meaning for each one.

Figure 1-1: The 10 Guiding Action Elements of a Complete Streets Policy

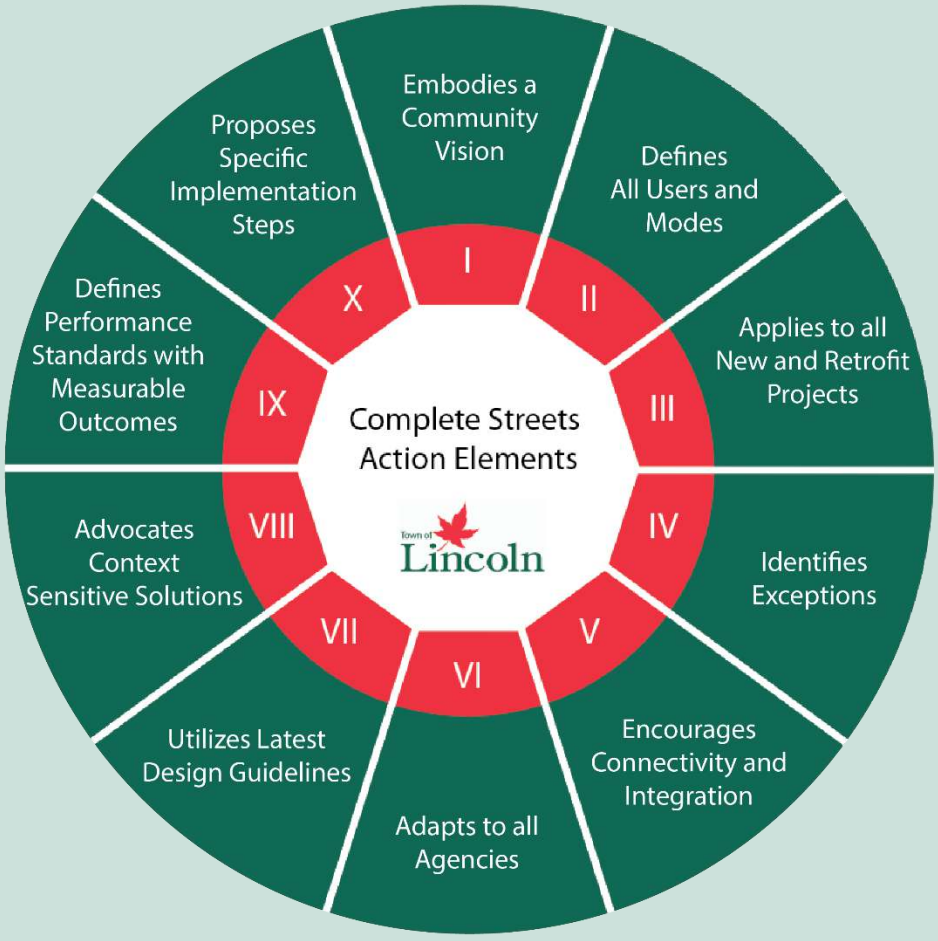


Table 1-1: Description of Each Action Element of a Complete Streets Policy

Action Elements		Description
1	Embodies Community Vision	States Lincoln's community vision and intent of how and why Complete Streets elements will be implemented
2	Defines All Users and Modes	Gives equal consideration to different users regardless of age or ability, especially those who walk, cycle and ride transit
3	Applies to all New and Retrofit Projects	Recognizes opportunities of application to new and retrofit transportation projects as well as existing maintenance operations
4	Identifies Exceptions	Accounts for any appropriate exemptions due to legislative, topographical, technical, cost-benefit limitations or others
5	Encourages Connectivity and Integration	Promotes continuous integration, and connectivity throughout Lincoln's street network and between modes
6	Adoptable by all Agencies	Conveys an approach that can be adoptable and understood by all Town departments and/or agencies that may be involved in the process
7	Utilizes Latest Design Guidelines	Draws from the use of the latest and best design criteria and guidelines to stimulate interaction between users of different modes and the built or natural environment
8	Acknowledges Context Sensitive Solutions	Concedes that solutions will be context-sensitive to Lincoln's different urban, suburban and rural environments
9	Defines Performance Standards with Measurable Outcomes	Establishes qualitative or quantitative performance indicators in order to evaluate and monitor policy impacts over time
10	Proposes Specific Implementation Steps	Lists specific steps for an implementation strategy according to a set time scope

2 APPLICATION OF THE 10 GUIDING ACTION ELEMENTS FOR THE TOWN OF LINCOLN

The application of these 10 action elements is described in this chapter. Implementation of these elements should be incorporated into the new construction, reconstruction, rehabilitation, repair, retrofit or maintenance operations of transportation projects.

2.1 EMBODIES A COMMUNITY VISION

The Complete Streets vision for the Town of Lincoln is:

The Town of Lincoln plans, designs, funds, builds, operates and maintains a connected street network that meets the needs of all transportation users. New construction, reconstruction, rehabilitation, repair, retrofit or maintenance operations carefully assess and support the mobility needs of multiple user types of all ages and abilities; as well as modes, including walking, cycling, riding transit, carpooling, and driving private, commercial vehicles, and emergency vehicles.

2.2 DEFINES ALL USERS AND MODES

The Town of Lincoln strives to provide the transportation network and facilities for all users and modes. These include pedestrians, cyclists, public transit users and motorists (including private vehicles, freight, commercial, and emergency services). Particular emphasis is placed on considering vulnerable groups such as children, seniors, or people with disabilities, which can be users of any or some of these modes. As a general rule, a facility that supports the most vulnerable users will support everyone.

2.3 APPLIES TO ALL NEW AND RETROFIT PROJECTS

The Town of Lincoln's Complete Streets Policy applies to all new road construction as well as all repair, retrofit or rehabilitation projects. The Town will look to "complete the street" in all of its road works.

This policy applies to Town-owned transportation facilities in the public right-of-way. The Town will work with Niagara Region to ensure that this policy is applied to Regional road improvements within the Town boundaries and will work with developers of privately constructed streets to do the same.

2.4 IDENTIFIES EXCEPTIONS

The Town of Lincoln's Complete Streets Policy is intended to be applicable to all transportation and streetscape projects within the practical, technical and financial boundaries. While the Town is

committed to promoting a complete streets approach for every relevant opportunity, it also acknowledges extraordinary circumstances that may hinder its full applicability, such as when:

1. • The project demonstrates that benefits or expected use shows considerable discrepancies with the cost of construction; or
2. • The project exhibits topographical limitations where it is not technically feasible or where supporting more than one mode of transport is not warranted given the potential hazard to users; or
3. • The nature of the road class prohibits by law the placement of infrastructure for non-motorised users; or
4. • A reasonable and/or equivalent transportation alternative in the corridor or neighbourhood already exists or is programmed as part of a separate project; or
5. • The project's proposed geometry or facility affects (i) any routine maintenance operations such as for mowing, sweeping, spot repair, or surface treatments; and/or (ii) accessibility of emergency or service vehicles.

Road works should be context sensitive and analyze the present setting (urban, suburban, or rural) according to current and forecasted multi-modal demand for at least five years in the future.

2.5 ENCOURAGES CONNECTIVITY AND INTEGRATION

The Complete Streets Policy encourages connectivity and integration by:

- Supporting infrastructure at end-of-trip facilities or locations where multiple travel modes converge. These include:
    - Park/kiss-and-ride facilities at major travel nodes
    - Secure Bicycle parking at key travel nodes or public amenities (libraries, community centres, sports complexes)
    - Bicycle friendly business facilities such as bike racks/parking for customers, or showers for employees who commute in that mode
- Supporting a continuous sidewalk network;
- Supporting a continuous on- and off-road bicycle or multi-use trail network to support utility or recreational trips. The networks should connect natural areas and popular destination points such as schools, shopping centres, sports complexes, offices, and other amenities.
- Supporting the mobility and accessibility needs of all users (especially for pedestrians and people with disabilities), particularly at public transit facilities (bus stops, shelters, stations) and their respective crossings. This includes, where applicable, slip resistant flooring, tactile paving, curb and boarding ramps, or other elements that address the purpose.
- Providing appropriate street furniture (waste receptacles, benches, street lamps, shelters, plants, trees, or other relevant elements) in a such as way that it does not interrupt or block pedestrian/cycling pathways; and
- Multiuse public parking with the flexibility to support bicycles, motorbikes, electric - charging docking stations, handicapped and carpooling/taxi stands.

2.6 ADOPTABLE BY ALL AGENCIES

The Complete Streets Policy will be provided and reviewed with all Town departments involved with the implementation of road works. Doing so will help identify challenges with implementation and more importantly, identify solutions so that the vision of a network of complete streets can be realized.

2.7 UTILIZES LATEST DESIGN GUIDELINES

Every Complete Streets project implemented by the Town of Lincoln should utilize the latest design guidelines, standards and procedures, where and when appropriate, during the planning, design, building, operation, and maintenance phases of the project. While there is a wide array of design standards available in Canada and the United States alike, project proposals should observe (but are not limited to) the recommended resources in **Table 2-1** according the nature of the project's infrastructure:

Table 2-1: Recommended Design Guideline Resources

Resource Name		Source	Year
1	Complete Streets for Niagara Model Policy Handbook	Niagara Region	2013
2	Niagara Region Complete Streets Design Guidelines	Niagara Region	2017
3	Pedestrians First, Tools for a Walkable City	Institute for Transportation and Development Policy (ITDP)	2018
4	Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities	National Association of City Transportation Officials (NACTO)	2017
5	Geometric Design Guide for Canadian Roads	Transportation Association of Canada (TAC)	2017
6	Ontario Regulation 191/11 Integrated Accessibility Standards ▶ Transportation Standards ▶ Design of Public Spaces Standards (Accessibility Standards for The Built Environment)	Government of Ontario	2016
7	Transit Street Design Guide	NACTO	2016
8	Healthy Streets: Design Features and Benefits	City of Toronto Public Health Department	2014
9	Urban Bikeway Design Guide	NACTO	2014
10	Complete Streets Rural Context	Active Transportation Alliance	2014
11	Urban Street Design Guide	NACTO	2013
12	Transit-Supportive Guidelines	Ontario Ministry of Transportation (MTO)	2012

The Town will adopt up-to-date design standards when implementing improvements intended to fulfill this Complete Streets policy and will welcome innovative or non-traditional design options where a comparable level of safety and efficiency for users is present. In addition, in order to foster a cohesive community vision of Complete Streets, the town empowers internal and external agencies to promote active training (through workshops, conferences and other means) to their staff according to the practices and best technical recommendations of these resources. This will ensure that staff of multiple disciplines (engineering, architecture, planning, and design) are working towards one coherent goal.

2.8 ACKNOWLEDGES CONTEXT SENSITIVE SOLUTIONS

The Town recognizes that every transportation or streetscape project will have to be context-sensitive and address the specific needs of the particular project site. While typical factors such as traffic volume, speed, road capacity, travel demand, right-of-way, topography, demographics, adjacent land use, or other geographic or technical circumstances all play an important role in determining the degree of implementation of a Complete Streets policy, the design should prioritize the desired goal and not reflect or perpetuate the prioritization of private vehicular travel.

In this sense, all projects should frame the infrastructure/operation investment or intervention under these five questions:

1. Which user(s) is the design/operation supporting?
2. Which user(s) is the design/operation excluding?
3. What kind of travel demand is the design/operation encouraging or inducing?
4. What kind of parallel collateral activities is the design/operation encouraging or inducing?
5. Are there context-specific factors that should be considered before, during, and/or after the implementation takes place?

These questions are key when analyzing context sensitive project proposals, especially related to changes in lane widths, maximum speeds, hierarchy of streets, and supporting facilities. A balanced approach will analyze the trade-offs for each case and have solid technical reasons when exceptions to the policy occur.

2.9 DEFINES PERFORMANCE STANDARDS WITH MEASURABLE OUTCOMES

In order to measure, monitor, and evaluate the implementation of this Complete Streets Policy, the Town of Lincoln understands the importance of defining a data collection framework with qualitative and quantitative indicators. The Complete Streets Policy should be evaluated on a regular basis by Town Council who will appoint a Technical Sub-Committee of representatives of multiple relevant agencies/departments to examine the relevant data and deliver a report with the indicators (where possible to calculate/collect) illustrated in **Table 2-2.**

Table 2-2: List of Measurable Performance Indicators

Mode	Indicator	Unit
Active Transportation	Total kilometres of on-road cycling facilities (bike lanes, cycle tracks, signed routes or sharrows, buffered bike lane, paved shoulder)	km
	Total kilometres of off-road cycling facilities (boulevard trails, off-road trails, multi-use trails)	km
	Total kilometres of new sidewalks	km
	Number of new and rehabilitated Accessibility compliant curb ramps installed along streets	Unit Frequency
	Number of collisions or accidents to pedestrians or cyclists	Unit Frequency
	Number of crosswalks or intersection improvements	Unit Frequency
	Number of bike-friendly business facilities (businesses with bike parking, showers for employees)	Unit Frequency
Active Transportation/ Transit	Number of existing and new bicycle end-trip/multimodal facilities (bike racks, bike share, bus units with bike racks)	Unit Frequency
	Percentage of transit stops accessible via sidewalks and curb ramps	Percentage
Transit	Number of kilometres of existing and new transit routes (Transit coverage)	km
	Number of passenger-fares collected	Passenger-fares
	Effective kilometres travelled by transit units	km
	Operative fleet	Bus Units
	PKI – Passenger-fares per effective kilometre index	Index (Pax/km)
	KVI – Effective kilometre per vehicle	Index (km / u)
Transit / Car	Number of park and ride facilities	Unit Frequency
Car	Number of existing and new public parking lots built	Unit Frequency (spots)
	Number of registered vehicles	Vehicles
	Private vehicle ownership per 1,000 inhabitants	Index (vehicles / 1,000 people)
	Number of collisions or accidents (motorists)	Unit Frequency
	Total lane kilometres of new roads	Lane km
	Total lane kilometres of repaved or newly-treated roads	Lane km
All Modes	Modal split (commuting)	Percentage
	Number of daily trips	Trips
	Number of people reached by educational programs	Persons

2.10 PROPOSES SPECIFIC IMPLEMENTATION STEPS

The Town will implement a series of action items to promote the application of its Complete Streets Policy.

1. The Town Council will appoint a committee who will monitor and evaluate the execution of the Complete Streets Policy. The Committee can in turn appoint a Technical Advisory Subcommittee preferably conformed by representatives of relevant stakeholders who will guide and advise on the implementation of project candidates.

2. The Committee will define the measurable outcomes and establish a baseline of indicators to measure current and future Complete Streets project initiatives. This process can be dynamic as new data is collected with time and as the data-framework becomes more robust.

3. The Implementation Partners who are involved in the planning, programming, funding, design, acquisition, building, operation, maintenance, monitoring, and communication process of Complete Streets Projects will report on a regular basis to the Committee a list of possible candidate projects.

4. The Committee will advise the relevant Implementation Partners to follow the best design guidelines according to the nature of each project, and ensure that coordinated efforts are adopted between departments/agencies during the implementation to optimize fiscal resources.

5. The Town will encourage all relevant Implementation partners to impart professional staff development and training on Complete Streets policies and best design practices through workshops, seminars, conferences or other events.

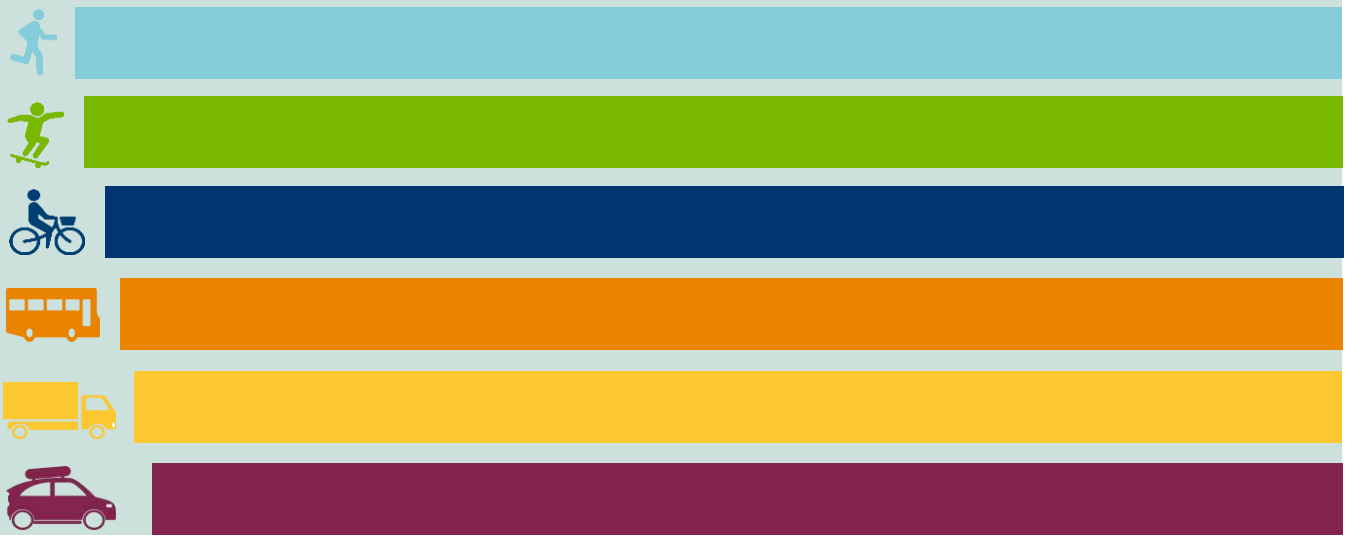
6. The Town will prioritize and approve current and future sources of funding, based on the expected impact and scope of Complete Streets candidate projects.

7. The Town will educate and promote communication campaigns to enhance road-use behaviour and promote active transportation for each Complete Streets project that is implemented.

8. The Town will incorporate Complete Streets principles into all existing plans, manuals, regulations and programs as appropriate to ensure coherent efforts are made.

APPENDIX

F Traffic Calming Policy



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TRAFFIC CALMING POLICY

CONTENTS i

1 INTRODUCTION

This policy aims to guide the implementation process of traffic calming measures for the Town of Lincoln ("The Town"). Section 1 introduces the purposes and components of traffic calming while setting the scope of what the policy aims to address. Section 2 reviews general guidelines to consider in traffic calming implementation, as well as a review of comparable municipal policies in the Region. Section 3 describes the process for ranking traffic calming initiatives according to specific criteria. Finally, Section 4 reviews measures that could be used for traffic calming according to the need or local context.

1.1 WHAT IS TRAFFIC CALMING?

Traffic Calming is a series of design, engineering, educational, and/or enforcement measures implemented to reduce the impacts of high motor-vehicle speeds and traffic volumes on local and collector streets, with the end goal of improving the liveability of neighbourhoods for all road users. Physical interventions can range from the implementation of horizontal or vertical deflections in the roadway such as curb extensions or speed humps. Other mitigation measures may include installation of signs, community road watch programs, or police enforcement. Complementary measures also include the application of Complete Streets principles in facility and community design phases, enhancing street conditions for all users.

1.2 PURPOSE

The purpose of this policy is to provide a framework for commencing, analyzing, reviewing, implementing, monitoring and evaluating traffic calming initiatives for local and collector residential neighbourhood streets in the Town of Lincoln. The policy is intended to address community inquiries about the traffic calming process and the requirements for its implementation. It also provides a toolbox with practical recommendations to consider when analyzing a traffic calming initiative according to the need and local context.

1.3 OBJECTIVES

This policy addresses the negative impacts of high motor-vehicle speeds and traffic volumes in residential local and collector streets. The measures aim to address a series of challenges which are depicted in **Figure 1-1.**

Figure 1-1: Traffic Calming Objectives

2 FRAMEWORK

2.1 STREET CLASSIFICATION SUITABLE FOR TRAFFIC CALMING

The Town's Traffic Calming policy application is limited to residential local and collector roadways. Although arterial roads may face similar issues of speeding or high traffic volumes, implementing physical traffic calming measures (for example, vertical/horizontal deflections) are generally not suitable given that the main function of arterial roads is to move traffic efficiently. However, it is important to recognize that arterial roads can still adopt Complete Street guidelines.

Table 2-1 summarizes the type of roadway suitable for traffic calming with its intended function description.

Table 2-1: Street Classification

Type	Average Daily Traffic Volume (vehicles)	Functionality Description	General Characteristics
Local Road	> 1,000	▸ Provides access to adjacent properties ▸ Not intended to act as through routes or play a main connecting role in the traffic network	▸ Have stop, yield, and sometimes signalized controls at intersections with collectors ▸ Unrestricted pedestrian traffic ▸ Usually unrestricted parking, although narrow roads may have parking restricted to one side
Minor Collector Road	1,000 - 3,000	▸ Provides access between local and major collector and some arterial roads ▸ Helps circulate traffic within individual neighbourhood ▸ Usually shorter in length than major collectors	▸ Have stop, yield, and generally signalized controls at intersections with higher tier roads ▸ May have pedestrian crossing restrictions ▸ May have parking restrictions during peak hours
Major Collector Road	3,000 <	▸ Provides access between local and arterial roads ▸ Generally, intersect with two or more arterial roads ▸ Usually longer in length than minor collectors	▸ Have stop, yield, and generally signalized controls at intersections with arterial roads ▸ May have more lanes (turn lanes or bus bays) ▸ Special crosswalks may be provided for pedestrians when vehicle throughput is high ▸ Some parking restrictions may apply during peak periods

2.2 COMPARABLE POLICIES

The traffic calming policies of three municipalities (Milton, Grimsby, and Thorold) were analyzed to study best practices that could be applicable to the Town's context. The comparator municipalities were selected based on a similar size, population, scale, regional context, and policy context to Lincoln. The summary of this analysis is detailed in **Table 2-2**, where each traffic calming consideration is compared across each municipality.

Table 2-2: Traffic Calming Comparable Policies

Traffic Calming Criteria	Milton	Grimsby	Thorold
Policy Document	"Traffic Calming Policy"	"Dorchester Drive – Traffic Speed and Safety Review – Schedule (A) Town of Grimsby – Traffic Calming Policy and Criteria"	"Neighbourhood Traffic Management Programs - Policy and Procedures for Initiating, Reviewing, and Implementing Speed Control Program"
Year of Release	2011	2016	2008
Suitable Streets	Local and collector roadways within primarily residential neighbourhoods	Local or Collector as per Town's Official Plan, in residential area	Primarily on local streets, and may be considered on residential collector streets
Traffic Calming Measures scope	Vertical and horizontal deflections, obstructions, and traffic regulations	Does not specify which measure could be implemented	Only Speed Humps
Initial Screening Criteria	▸ Street length must be at least 150m ▸ Must have a min of 500 Annual Average Daily Traffic (AADT) count ▸ Posted speed limit must be less than or equal to 50km/h ▸ All reasonable efforts have been made (including engineering, education, and enforcement tools)	▸ Street length must be at least 250m long ▸ At least one road segment with 250m spacing to nearest traffic control device ▸ Road grade less than 8% or no major horizontal curvature ▸ No previous traffic calming measure has been installed in last five years	▸ Street length must be at least 150m ▸ Located at least 30m from intersection ▸ Road grade less than or equal to 5% ▸ Road must be paved ▸ Posted speed limit must be less than or equal to 50km/h ▸ Ideal for two or fewer lanes ▸ Heavy vehicles must not exceed 5% of traffic volume ▸ If on transit route, transit agency must

Traffic Calming Criteria		Milton	Grimsby	Thorold
				support potential speed hump installation
Commencement Process Condition		Public Petition contains at least 51% household support	Does not specify	85th percentile speed is 10 km/h or more over speed limit; and Public Poll contains at least 51% household support
Warrant	Scoring Description	Point based system, to pass: Local road (LR) – min. 35 points Collector road (CR) – min 52 points.	A minimum of four conditions below must be met, OR if 85th percentile speed is over 15km/h no other warrant needed:	Point based system over 100 points.
	Speed	Five points for every 2km/h that 85th percentile is greater than 15km/h over speed limit (max. points = 35)	85th percentile speed must be 9km/h or more over speed limit More than 5% of street traffic must be travelling more than 15km/h	Four points for every 1km/h that 85th percentile is over speed limit (max. points = 60)
Warrant	Volume	LR: Five points for every 1,500 AADT; CR: 5 points for every 2,000 AADT (max. points = 20) Five points if 25% or more shortcutting traffic, additional 5 points for every 10% increment (max. points = 15)	AADT must be at least 1,500 and 4,500 for local and collector street respectively Through (short cutting) traffic must be 15% and 40% of total volume in local and collector street respectively	Local Streets: One point for every 100 vehicles/day Residential Collector: One point for every 200 veh/day (max. points = 10)
	Collisions History	One point for every two collisions/year in the last three years (max. points = 10)	Police Reported Traffic Collisions are over 2.2 accidents/year in last three years	One point assigned for each speed-related collision during the previous three years (max. points = 5)
	Pedestrian Generators	Five points for each nearby pedestrian generator (school, playgrounds) (max. points = 15)	Pedestrian or cyclist generators (schools, playground) that creates higher than normal activity.	Five points for each type of pedestrian generators within a 250m radius of street outside limits (max. points = 15)

Traffic Calming Criteria		Milton	Grimsby	Thorold
	Sidewalks	Five points for no sidewalk with evidence of pedestrian activity (max. points = 5)	No sidewalk on at least one side of street	Five points if no continuous sidewalks on at least one side of roadway (max. points = 5)
	Community Support	At least 51% of the households with direct frontage or flankage onto the section of affected roadway	Not Applicable	Percentage of affected households in support of initiative: ▸ One point if at least 51% - 61% ▸ Three points if at least 61% - 75% ▸ Five points if over 75% (max. points = 5)
Opportunities for Community Participation		Yes	No	Yes
Emergency / Transit / Maintenance Approval or Involvement		Yes	Does not specify	Yes
If Initial Screening Criteria is not Met, Does the Policy Provide Alternative / Flexible Measures?		Yes. Staff will consider "front-line" mitigating measures such as driver feedback boards, Neighbourhood Speed Watch programs, targeted police enforcement, sign installation, pavement marking modifications	No	No
Does the Policy have Any Additional Community Support Approval Process?		Yes, an additional survey round would be sent to community with proposed measures. A minimum of 25% of sent surveys must be returned, with 60% acceptance rate.	No	No
Degree of Process Complexity		High	Low	Medium

Traffic Calming Criteria	Milton	Grimsby	Thorold
Does the Policy Have Monitoring and Evaluation Methods?	Yes, four to six months after implementation. Town will take corrective actions if: Through traffic on parallel streets has increased by 15% or more (with a minimum of 150 vehicles)	No	Yes, six months or as determined by City staff. City will take corrective actions if: ▸ Maximum through traffic increase on adjacent streets of 15% or 150 vehicles in a 24-hour period for Local Road. ▸ Maximum through traffic increase on adjacent streets of 15% or 300 vehicles in a 24-hour period for Local Road.

The Town of Lincoln will draw from the strengths of these policies to apply the most sensitive according to the local needs and context.

2.3 GUIDELINES

The guidelines indicated in **Table 2-3** should be taken into consideration before and during the implementation of a traffic calming intervention. These are general recommendations that recognize important aspects of the investigation and implementation process:

Table 2-3: Traffic Calming General Guidelines

Guidelines	
1	Consider first cost-effective options such as increased enforcement, education or road watch programs, installation of driver speed feedback boards, and/or better street signage
2	Prioritize cases that are located on straight and long residential streets that may attract infiltrating traffic from nearby higher-tier roads
3	Consider widening the scope by studying an area-wide plan instead of a street-specific plan that would likely result in displacement of traffic onto adjacent streets
4	Verify that the proposed measures do not impede or severely affect the access or circulation of pedestrians, cyclists, or alternative modes of transportation (wheelchairs, children strollers, or other)
5	Minimize as much as possible the potential impact on the circulation of emergency, maintenance, or transit vehicles (if applicable)
6	Engage with all relevant stakeholders (community, emergency service staff, transit staff, traffic engineering, public works staff, Council, other organizations) in the investigation and implementation process to reflect the needs of multiple users and analyze the traffic calming measure through different lenses. This would maximize opportunities for buy-in and reduce the risk of other factors not being considered in time
7	Set a clear data-collection framework and performance indicators for each intervention in order to successfully monitor and evaluate the impact of the traffic calming measure before and after its implementation
8	Examine historical information about the area, combined with site visits, residents' observations, and past area studies to gather as much data from a variety of resources
9	Acknowledge that traffic calming may include more than one intervention or design method, which should be based on tested and best design practices (for example, The Canadian Guide to Neighbourhood Traffic Calming)
10	Consider additional variables during the mitigation design process such as utility placement, landscaping, signage requirements, drainage, and others
11	Consider implementing a pilot test for a period of time before committing full resources to permanent traffic calming measures
12	Analyze how to complement or supplant altogether the traffic calming measure through a Complete Streets initiative that would likely address the safety and accessibility needs of all users, especially of pedestrians, cyclists, and vulnerable groups

3 PROCESS

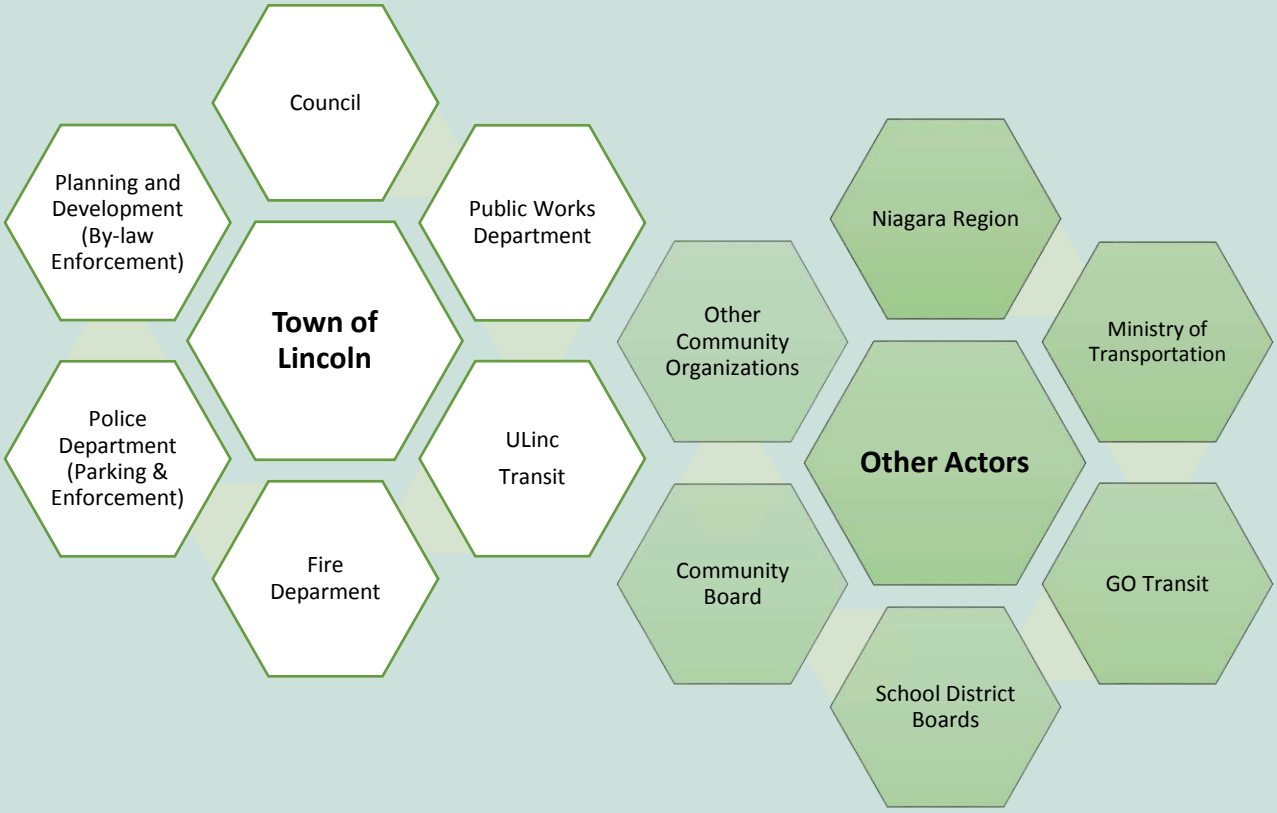
3.1 OVERVIEW

The traffic calming process consists of procedures for eligibility, review, and implementation of a traffic calming measure. The steps are intended to provide a consistent, transparent process and highlight the initial criteria needed to consider a location for traffic calming.

3.2 ACTORS

Various actors play an important role in investigating, defining, implementing, maintaining, monitoring, and evaluating traffic calming interventions. **Figure 3-1** showcases a list of most likely directly involved actors who should be participate according to each specific need.

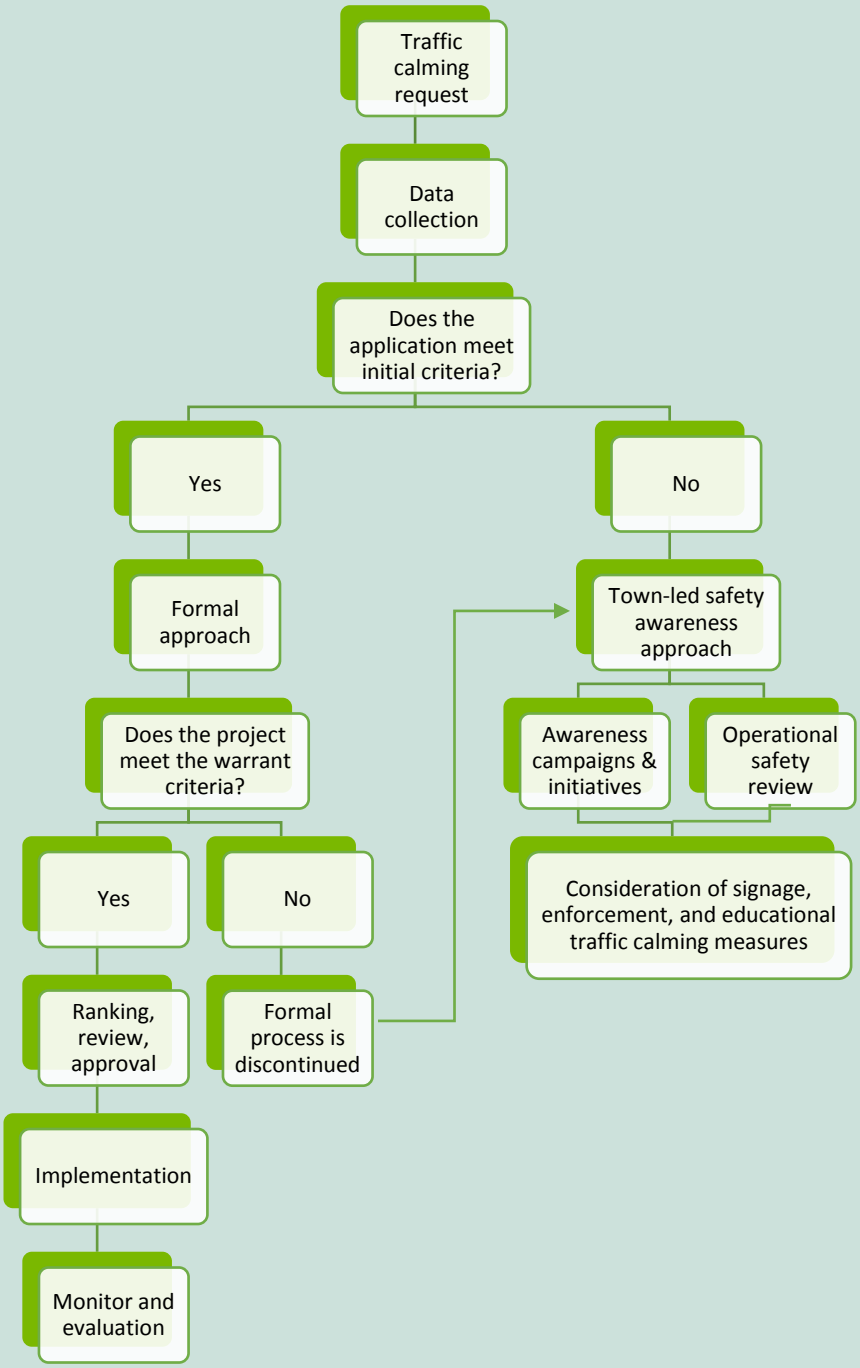
Figure 3-1: Relevant Actors for Traffic Calming Measures



3.3 WORKFLOW

The following subsection lists all the necessary steps (summarized in **Figure 3-2**) required in a formal application of a traffic calming measure. Furthermore, in response to the Town's context, a community based "front-line" approach can also be adopted depending on the degree and scope of the desired implementation measure. This is intended to provide an additional flexible approach to traffic calming that may be more resource effective.

Figure 3-2: Application Process Overview



3.3.1 Initial Criteria

All traffic calming requests must begin with a formal request made to the Town. The Town should review all requests utilizing the initial criteria outlined in **Table 3-1**. If all conditions are met, then a formal traffic calming process can be initiated.

Table 3-1: Initial Criteria

Component		Minimum Criterion
1	Road type	Must be a local or a collector roadway preferably in a residential area
2	Road Length	Must be at least 150 metres, and located at least 30 metres from an intersection
3	Road Surface	Must be paved
4	Posted Street Speed Limit	Must be 50km/h or less
5	Volume	Local roads: Average Annual Daily Traffic must be at least 500 Collector roads: Average Annual Daily Traffic must be at least 1,000
6	Road grade	Must be less than 8% and have no major horizontal curvature
7	Public Support Petition	If the first six criteria are met, the Town will survey residents to gauge support. At least 25% of the households with direct frontage or flankage onto the section of the affected section of roadway must be in support of pursuing further traffic calming studies. Each household is represented by one signature.
8	Other	No traffic calming measure has been installed in the last 5 years.

3.3.2 Ranking Warrant Criteria

Upon successful review of initial criteria, the Town will notify the resident or neighbourhood group that a formal traffic calming process will commence, listing the next steps required for the initiative to be approved. The notice will indicate that further studies will be undertaken by the Town to determine if the warrant criteria (**Table 3-2**) are met or not. **A minimum of four of the first eight conditions OR 'Condition 9' must be met or exceeded to warrant further action by the Town.** The Town may not necessarily need to undertake studies for all nine criteria if it deems unnecessary to do so, or if there are already enough conditions that have met the warrant. If 51% or more of households were supportive of traffic calming during the initial criteria process, 'Condition 8' of the warrant would be considered met. If required, traffic speed and volume studies could also be considered on adjacent or parallel streets that may experience an increase in volume or speed factors due to the implementation of the traffic calming measure.

Table 3-2: Warrant Technical Requirements

Criteria		Warrant Conditions
1	Speed	The 85th percentile speed is greater than 9 km/h over the posted speed limit
2		More than 5% of the total traffic on the street must be travelling more than 15 km/h over the speed limit
3	Volume	The Average Annual Daily Traffic Volume must be at least: - 1,000 veh/day for local streets - 2,500 veh/day for collector streets
4		Through (short cutting) traffic must be more than: - 15% of the total volume of traffic on a local street - 40% of the total volume of traffic on a collector street
5	Collisions History	Police Reported Traffic Collisions are over 2.2 accidents/year based on the average of the last three years
6	Community Destinations	At least two community destinations such as playground, school, community centre, library, retail centres within a 250-metre radius of roadway under review
7	Sidewalks	No continuous sidewalks on: - At least one side of the roadway for local roads - Both sides of the roadway for collector roads
8	Community Support	At least 51% of the households with direct frontage or flankage onto the section of the affected section of roadway must be in support of implementing some type of traffic calming measure
9	Special Circumstance	OR If the 85th percentile speed is over 15 km/h above the speed limit no other warrant needs to be met

3.3.3 Review of Eligible Proposals and Consultation Process

Based on data gathered during the warrant assessment, as well as observations from site visits and residents, Town staff will suggest potential physical design interventions (horizontal or vertical deflections or obstructions) and/or other mitigation measures such as signs, education programs, and localized police enforcement. Reference can be made to the *Canadian Guide to Neighbourhood Traffic Calming* (Second Edition, 2017), but interventions should also leverage the engineering judgement, professional experience, and local knowledge of staff.

The report with the recommended design and/or mitigation measures is then shared with relevant public agencies and departments (including but not limited to emergency and transit services, if applicable) in order to identify potential impacts to operations and/or services. If impacts or concerns are identified, Town staff will work with these departments and/or agencies to modify the proposal in order to incorporate mitigating measures.

If the recommendations are favorable, a public house notice then will be published and the Town will organize a public meeting to showcase the preferred traffic calming measure. This space will be an opportunity to present the purpose, objective, design and process of the traffic calming measure, as well as provide residents an opportunity to provide their feedback. If significant concerns are identified, Town staff would consider incorporating additional mitigating measures or revisiting the design concept.

At this time, consideration should be given to 'piloting' temporary or removable traffic calming measures such as pavement markings, removable raised curbs, planter boxes, for a timeframe that would allow an assessment of the effectiveness of the measures before committing funding to permanent treatments.

3.3.4 Approval of Proposed Measures

Town staff will submit a final report and recommendation for Town Council approval. The report should include:

- Results of initial criteria evaluation;
- Results of the warrant criteria evaluation;
- Summary of stakeholder and public feedback;
- Implementation timeframe; and
- Cost estimate.

If there are multiple traffic calming submissions, locations with the highest warrant score should be prioritized. If funding does not permit all candidate interventions to be installed in one year, they can be carried forward to the next year. After installation of all eligible locations from previous years, new locations would be then eligible for installation, with priority to the highest ranked.

Residents of the candidate roadway to be implemented will be notified by mail whether the traffic calming measure has been approved or not by the Town Council. This notice should also address the implementation timeframe and any identified temporary pilot tests.

3.3.5 Monitor and Evaluation

It is important to measure the effectiveness of traffic calming measures in terms of impact in the immediate area, and to determine if the measure has triggered any undesirable impacts in adjacent or parallel streets. Approximately six months after implementation, Town staff should review speed counts, volume counts, and through-traffic volumes, to evaluate changes in behaviour. If volumes on parallel streets have increased by 15% (with a minimum of 150 vehicles), corrective action should be taken to remedy or reduce the impact.

3.3.6 Alternative Mitigation Measures

When a traffic calming application has not met the initial criteria or passed the minimum technical warrant threshold, the Town will review alternative strategies for mitigation measures that do not involve significant costs or permanent changes to road geometry.

Potential alternative measures are shown in **Table 3-3** and include:

- **Painted Crosswalks:** Crosswalks which slow traffic by drawing drivers' attention;
- **Roadway Painting:** Intersection pavement which slows traffic by drawing drivers' attention;
- **Planter Boxes:** Planter boxes laid down the centre line of a street or along the curb of a street to reduce lane width and slow traffic;
- **Neighbourhood Lawn Signs:** Signs placed on residents' yards encouraging traffic to slow;
- **Pop-up Chicanes:** Temporary chicanes made through movable outdoor infrastructure such as planter boxes, tires and pylons;
- **Parklets:** Temporary re-use of an on-street parking space which slows traffic by reducing the barrier between pedestrian space and vehicular space. Can include a temporary patio or lounge space;
- **Speed Display Signs:** A temporary sign which displays drivers speed on a roadway; and
- **More Frequent Police Enforcement:** Request for more frequent police presence in affected roadway.

Table 3-3: Alternative Traffic Calming Measures

Traffic Calming Measure	Example	Description
Painted Crosswalks[1]		Crosswalks which slow traffic by drawing drivers' attention.
Roadway Painting[2]		Intersection pavement which slows traffic by drawing drivers' attention
Planter Boxes		Planter boxes laid down the centre line of a street or along the curb of a street to reduce lane width and slow traffic
Awareness Campaign Signs		Signs placed on residents' yards encouraging motorists to slow.

[1] Image credit: Peter Lee (https://www.therecord.com/news-story/7341425-kitchener-gives-neighbourhoods-more-ways-to-slow-traffic/)

[2] Image credit: Jennifer Gauthier (http://www.vancourier.com/sports/cycling/vancouver-residents-take-action-to-calm-neighbourhood-streets-1.2050580)

Traffic Calming Measure	Example	Description
Pop-up Chicanes[3]		Temporary chicanes made through movable outdoor infrastructure such as planter boxes, tires and pylons.
Parklets[4]		Temporary re-use of an on-street parking space which slows traffic by reducing the barrier between pedestrian space and vehicular space. Can include a temporary patio or lounge space.
Speed Display Signs[5]		A temporary sign which displays drivers speed on a roadway.
Targeted Police Enforcement		Request for more frequent police monitoring of location.

[3] Image credit: http://www.epmmop.gob.ec/epmmop/index.php/noticias/boletines/item/2273-el-proyecto-"mi-calle"-de-la-floresta-se-ejecutó-con-éxito

[4] Image credit: www.archrecord.construction.com

[5] Image credit: James William (http://www.photonplay.com/blog/types-of-radar-speed-signs)

For traffic calming requests using the alternative mitigation measures approach, the Town will review available measures and, if appropriate, conduct a survey of the affected residents that are within 150 metres of the subject road.

If at least 51% of the responses support the intervention, the Town will analyze possible solutions. The Town reserves the right to approve or disapprove application of mitigation measures given technical justification. The Town also reserves the right to review and monitor initiative to guarantee the safety of residents and efficient operation of other vehicles (transit, emergency, maintenance).

4 TRAFFIC CALMING MEASURES

4.1 RECOMMENDED MEASURES

Traffic calming measures include physical vertical or horizontal deflections, obstructions, and signage. The *Canadian Guide to Neighbourhood Traffic Calming* (Second Edition, 2017) provides a detailed technical analysis of various traffic calming measures. **Table 4-1** provides a summary of typical traffic calming measures that the Town can adopt according to the problem identified and the local context.

Table 4-1: Traffic Calming Measures

Traffic Calming Measure	Example	Description
VERTICAL DEFLECTION		
Speed Hump[6]		▸ Asphalt mounds eight centimetres in height and approximately four metres wide. ▸ Usually designed to encourage speeds of 30 – 40 km/h. ▸ Best suited for local and minor collector roadways.

[6] Image credit: Robert Drdul (http://www.hrg-inc.com/reduce-speeding-with-speed-humps-and-other-traffic-control-techniques/)

Traffic Calming Measure	Example	Description
Speed Cushion[7]		▸ Similar to speed humps but smaller designed so that the wheel base of emergency/transit vehicle straddle the speed cushion, allowing this type of vehicle to pass over it without slowing down. ▸ Generally laid out in sets of two or three cushions. ▸ Suitable for local and collector roadways.
HORIZONTAL DEFLECTION		
Curb Extension[8]		▸ Extends end of curb. ▸ Improve pedestrian safety by reducing crossing road distance. ▸ Improve pedestrian visibility of incoming traffic. ▸ May be used for mid-block or regular intersection crossing. ▸ May be combined with textured crosswalk or median island. ▸ May be used in one, or both sides of the crossing. ▸ Helps to reduce vehicle speed as it gives motorists a reduced-lane sensation. ▸ Suitable for local and collector roadways.

[7] Image credit: Jeff Gulden (https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3pt2.cfm)
[8] Image credit: NACTO (http://www.craftontull.com/insights/insight_posts/view/54/five-key-benefits-of-curb-extensions)

Traffic Calming Measure	Example	Description
Chicanes[9]		▸ Alternating curb extensions that narrow a two-lane road to a one lane road for a short distance as they force drivers to slow down to drive around them. ▸ Suitable for mid-block locations only. ▸ Suitable for one or two-way street traffic ▸ Best results when combined with two or more chicanes. ▸ Not suitable for roads with transit and emergency routes. ▸ Best suited for local and minor collector roadways.
On-Street Parking[10]		▸ Allowing one or two side parallel car parking is an effective way to reduce speed due to narrowed travel space. ▸ For one-way streets that allow parking on one side of the street, the on-street parking could be alternated from one side to the other. This creates some artificial road curvature which forces drivers to check their speed. ▸ Suitable for local and collector roadways.
Curb Radius Reduction[11]		▸ Reconstruction of an intersection corner to a smaller radius in order to slow down right turning vehicle speeds by making corner "tighter". ▸ Only applicable when road geometry allows. ▸ Not recommended for curbs on transit routes. ▸ Suitable for local and collector roadways.

[9] Image credit: Bill Shaw (https://indianapublicmedia.org/news/bloomington-council-debates-speed-bumps-28506/)

[10] Image credit: City of Calgary (http://www.calgary.ca/CSPS/ABS/Pages/Bylaws-by-topic/Streets.aspx)

[11] Image credit: Michael Hintze (http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=28)

Traffic Calming Measure	Example	Description
Raised Median Island[12]		▸ Installed in the centre of roadway to reduce lane widths without affecting road capacity ▸ Effective when combined with curb extensions and/or textured crosswalks ▸ Suitable for local and collector roadways
Traffic Circle[13]		▸ Raised island (smaller than roundabout) located in the centre of an intersection designed to reduce vehicle speed and conflicts ▸ Intersection should have balanced traffic volumes in all directions ▸ Suitable for local and minor collector roadways. (Not suitable for major collectors)
Road Diet[14]		▸ Pavement markings on the road side to visually indicate lane width and define better driving space, parking space, and/or bicycle lanes. ▸ Gives perception of narrower lane width which dissuades drivers from speeding ▸ Pavement marking can be combined with different pavement material/color. ▸ Suitable for local and collector roadways

[12] Image credit: Dan Burden (https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/median-refuge-island/)

[13] Image credit: Rebecca Bollwitt (https://miss604.com/2012/05/west-end-traffic-circle-gardens.html)

[14] Image credit: League of Michigan Bicyclists (https://www.citylab.com/design/2014/09/so-what-exactly-is-a-road-diet/379975/)

Traffic Calming Measure	Example	Description
OBSTRUCTION		
Directional Closure[15]		▸ Created by using a curb extension or other barrier that extends into the roadway almost as far as the centerline. ▸ The device obstructs one side of the roadway to prohibit vehicles from travelling/entering in that direction. ▸ Useful for non-compliance of one-way street sections ▸ Suitable for local and minor collectors, at intersections with major collectors and arterial roadways.
Raised Median Through Intersection[16]		▸ Used on centrelines of roadway to prevent left-turn and through movements at intersecting streets. ▸ Useful for preventing short-cutting and through traffic. ▸ May also be used as pedestrian island ▸ Suitable for local and collector roadways.
Right- in / Right-out Island[17]		▸ Raised triangular islands located on an intersection to limit the side street to right turn movements. ▸ Suitable only for locations where local residential streets intersect any other road class.

[15] Image credit: Richard Drdul (https://www.flickr.com/photos/drdul/180847952/in/photostream/)
[16] Image credit: James R. Barrera (https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3pt3.cfm)
[17] Image credit: Kittelson & Associates, Inc. (https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10002/ppt/)

Traffic Calming Measure	Example	Description
OBSTRUCTION		
Diverter[18]		▸ Raised barriers placed diagonally across an intersection that prevent motorists from travelling straight through an intersection. ▸ Not suitable for transit or emergency vehicle routes.
Full Closure[19]		▸ Barriers that restrict complete access to and from a street. ▸ Typically used as last resort. ▸ Not suitable for transit or emergency vehicle routes.
SIGNAGE		
Maximum Speed[20]		▸ Alerts motorists of maximum speed limit. ▸ Suitable for local and collector roadways.
Through traffic prohibited		▸ Aimed to educate motorists that through traffic is not allowed. ▸ Suitable for local and collector roadways.

[18] Image credit: Paul Krueger (https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3pt3.cfm)

[19] Image credit: Dubois & King, Inc. (https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3pt3.cfm)

[20] Image credit: Jason Kryk (http://windsorstar.com/news/local-news/city-doesnt-support-proposal-to-lower-default-speed-limit)

Traffic Calming Measure	Example	Description
OBSTRUCTION		
Traffic-calmed Neighbourhood		▸ These signs are meant to make motorists more aware that they are entering a traffic-calmed zone. ▸ Complementary when other measures have been installed like chicanes, curb extensions, or speed humps. ▸ Suitable for local and collector roadways.

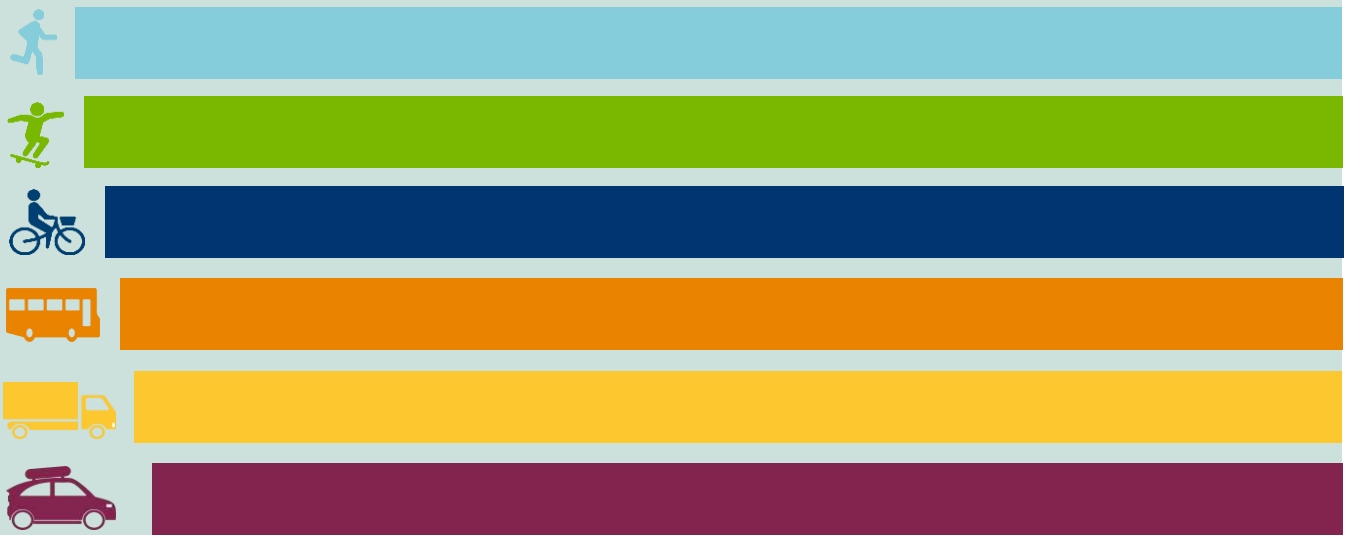
4.2 COMPLETE STREETS SUPPORTIVE MEASURES

Complete Streets play a role in reducing motor vehicle speed and enhancing safety and attractiveness of the public realm. Although some measures may take longer to implement due to an increased scope and cost, they may just be as effective as traditional traffic calming measures. Some recommended Complete Streets supportive measures include implementing and/or extending cycling lanes (applicable mainly to roadways identified as proposed cycling routes), sidewalks, or on-street parking. The implementation of these measures generally implies reducing roadway lane widths, thereby discouraging speeding.

For more information on Complete Streets, please refer to the Complete Streets Policy.

APPENDIX

G On-Street Parking Policy



Make moving make sense as we grow!

TOWN OF LINCOLN'S TRANSPORTATION MASTER PLAN

On-Street Parking Policy

CONTENTS

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1 INTRODUCTION

The Town of Lincoln is currently in the process of developing its first Transportation Master Plan (TMP) to address all modes of travel and to act as a long-range, integrated transportation guide providing flexible tools and strategies to support transportation decision making over the next 20 years and beyond.

One component of the Town's TMP is the development of an On-Street Parking Policy Framework to address ongoing parking concerns and to update the Town's approach by accounting for the lessons learned of similar-sized municipalities. This On-Street Parking Policy Framework provides guidance to the Town in its consideration of (re)development applications and related requests for permanent and temporary use of on-street parking spaces, municipal parking lots, and municipal boulevard areas.

This document will commence with a review of the Town's existing on-street parking policies within the residential neighbourhoods and off-street parking requirements for residential (re)development applications. This will determine the baseline conditions and provide an understanding of the Town's procedure of managing public and private parking demand. This will be followed by a review of parking principles implemented in surrounding and similar-sized municipalities, and a review of the existing issues and gaps identified by the Town and public through the consultation process, and existing conditions review. The information obtained from these reviews will then be utilized to develop an On-Street Parking Policy Framework and provide feedback on the Town's existing parking requirements.

2 BACKGROUND REVIEW

A review of the Town's existing parking policies was conducted to identify the key measures in place to assess and provide on and off-street parking. This included a review of the current on-street parking restrictions per By-Law No. 2017-24, on-street sign posts via a desktop review, and off-street parking requirements contained within the Comprehensive Zoning By-Law No. 93-14-Z1, dated January 2018. Transportation studies for recently approved or ongoing development applications are also reviewed to identify any trends in off-street parking requirement reductions.

2.1 Planning Context

The following highlights key planning policies and regulations as they relate to parking, particularly within the Town of Lincoln Official Plan (OP). The current planning context supports the development of communities with safe and efficient transportation networks to accommodate all road users, with a focus on the reduction of car dependence and an increase in active transportation. The Town is also seeking to establish an efficient use of the existing and planned infrastructure through the development and implementation of transportation demand management strategies.

The OP provides overarching policy directions with respect to the Town's land use planning efforts, as well as strategic directions and policies relating to parking. The OP supports the following strategic directions:

- Encourage high quality redevelopment of properties along the Regional roads. Buildings should be oriented to front, face and feature the road. Large parking areas should be located behind or at the side of buildings and, where visible from the road, must include substantial landscape treatment (Section 6.1.4 b ii)
- Discourage further right-of-way and/or pavement width widening, except to accommodate cycling facilities and/or on street parking within the identified Settlement areas, where appropriate (Section 6.1.4 b ii)
- On local roads, dedicated one side parking shall be established. On arterial and collector roads within Settlement areas, on-street parking shall be promoted to reduce the speed of traffic (Section 6.1.4 f)

2.2 On-Street Parking Restrictions

On-street parking is currently permitted on one side of residential streets with a maximum limit of 24 hours. The Town does not have a parking permit program or any overnight parking restrictions.

In downtown Beamsville, sections of King Street have signed on-street parking spaces with a one-hour parking restriction between 9:00 a.m. to 6:00 p.m. from Saturday to Thursday, and between 9:00 a.m. to 9:00 p.m. on Fridays.

For snow events, the Keep It Clear program encourages no parking on streets for 72 hours to allow snow removal. The program is promoted within 24 hours of a forecasted snowfall of 10 cm or more.

2.3 Zoning By-Law Parking Requirements For Residential Developments

The Comprehensive Zoning By-Law No. 93-14-Z1 provides minimum parking requirements for the various residential uses as follows:

- Apartments – 1.25 spaces per dwelling unit
- All other residential types – 2 spaces per dwelling unit

- Dwelling unit in a mixed-use development – 2 spaces per dwelling unit

For single detached, semi-detached and townhouse units the two spaces per unit requirement can be provided as a tandem space, including a garage and a driveway space.

The Zoning By-Law does not specify an on-street requirement for residential visitor parking for the (re)development of land parcels. However, the Lincoln Fairgrounds Parking and Traffic Calming Assessment Report (Lincoln Fairgrounds Report), dated October 2017, recommended that the Town implement a 0.5 space per residential unit requirement for visitors on top of the existing 2.0 space per residential unit requirement. It is recommended that these spaces be provided using either on-street spaces or an off-street lot maintained by the developer.

2.4 Recent Development Applications

The transportation studies prepared for recently approved and ongoing development applications were reviewed to understand the current parking demand. Based on discussions with Town staff, the following developments were considered:

- Cherry Heights Subdivision located on the south side of King Street between Hixon Street and Aberdeen Road, Beamsville
- Lincoln Square Phase 2 located in the southwest corner of Ontario Street and Serena Drive/May Street, Beamsville
- Losani Residential Development located on the west side of Mountain Street, south of Cassandra Drive, Beamsville

All three developments intend to meet the zoning requirement for parking. Cherry Heights and Losani will provide two spaces per unit, with one space in the garage and the other in the driveway. Lincoln Square, a proposed stacked townhouse development, will provide two resident spaces per unit in a surface lot; additional visitor parking spaces are proposed to be shared with the proposed commercial component.

In accordance with the Lincoln Fairgrounds Report, the Town has been working with developers to provide on-street parking for visitors at a rate of 0.5 spaces per unit. However, this can be difficult to achieve depending on the type of development. For example, a local road providing multiple driveway accesses in a townhouse development would provide limited opportunities for on-street parking, and alternate solutions to accommodate visitor parking may be appropriate.

3 EXISTING CONDITIONS

Based on feedback received from the public and stakeholders, as well as discussions with Town staff, it is evident that the main concern with parking is the availability of on-street parking within residential neighbourhoods. This concern is more prominent during the winter months, especially during snow events. The following comments regarding parking were received during the pubic consultation process:

- Insufficient on-street parking supply year-round
- Issues during winter maintenance events with on-street parking

- Parking needs to be investigated in Jordan Station
- Parking issues in the Ontario Street / King Street area
- Lack of communications regarding parking locations and availability
- Insufficient shoulder widths if on-street parking is expected

Currently, the available on-street parking spaces within residential neighbourhoods are frequently being occupied by residents themselves, resulting in a shortage of visitor parking based on the Lincoln Fairgrounds Report and discussions with Town staff and the public. Use of on-street parking in residential neighbourhoods should be prioritized for visitors, as residents are provided two spaces per unit, with one in the garage and one in the driveway.

4 BENCHMARKING AND BEST PRACTICE REVIEW

A review of similar municipalities' approaches to parking management was undertaken to identify benchmark strategies which could be tailored to address the Town of Lincoln's parking issues. Several municipalities, some surrounding the Town and others with similar characteristics, were selected to conduct a review of the applicable on-street parking management, which include:

- Town of Grimsby
- Town of Milton
- City of Thorold
- City of St. Catharines

A comparison of all the municipalities' on-street parking management strategies, specifically within the residential districts, is provided in **Table 4-1.**

Table 4-1: Comparison of On-Street Parking Management Strategies

Municipality	Time Limit	Overnight Restrictions	Snow Events	On-Street Parking Permit Program	Temporary On-Street Parking Permits
Lincoln	-	-	-*	-	-
Grimsby	16 hours	-	-	-	-
Milton	5 hours	2 a.m. – 6 a.m.	No Parking	Yes, requires a request and at least 51% of signatures of homeowners on the street	Annual limit of 18 temporary overnight parking permits may be obtained per vehicle license plate
Thorold	12 hours	-	No Parking	-	-
St. Catharines	12 hours (3 hours for metered spaces)	2 a.m. – 6 a.m. (3 a.m. – 6 a.m. in the downtown)	No Parking within 24 hours	Yes, for streets zoned "Maximum Time Limit" or "Residents Only"	-

*Keep It Clear program encourages no parking within 72 hours of a snow event

In comparison to the municipalities in the table above, the Town of Lincoln currently does not have any parking restrictions or on-street permit programs. The Keep It Clear program requests residents' assistance toward the Town's snow removal operations, but does not impose parking restrictions that are enforceable.

In addition to on-street parking management, a review of the residential parking requirements was conducted based on zoning by-law requirements and approved development applications in comparable jurisdictions. A summary of the residential parking supply rates in comparison with the Lincoln zoning by-law parking requirement is provided in **Table 4-2**.

Table 4-2: Comparison of Residential Parking Requirements of Similar Municipalities

Municipality	Residential Parking Rates (spaces per dwelling unit)					
	Single / Semi-Detached		Townhouse		Apartment	
	Resident	Visitor	Resident	Visitor	Resident	Visitor
Lincoln (93-14-Z1)	***2.0***	***-***	***2.0***	***-***	***1.25***	***-***
Caledon	2.0	-	2.0	0.25 On-Street	1.5	0.25
Milton	2.0	-	2.0	-	1.5	0.25
Grimsby	2.0	-	1.5	-	1.25	0.25
Thorold	1.0	-	1.0 – 1.5	-	1.25	-
Pelham	1.0	-	1.5	-	1.0	0.25
St. Catharines	1.0	-	1.0	-	1.25	-

Based on the parking requirements reviewed in **Table 4-2**, the parking requirements for single detached, semi-detached, and townhouse units range from 1.0 to 2.0 spaces per unit. Caledon requires an additional 0.25 spaces per unit for visitors, which is to be provided on-street. Lincoln's parking requirements for single/semi-detached and townhouse units are within the higher range of the surveyed municipalities.

Parking requirements for apartments in comparable jurisdictions range from 1.25 to 1.75 spaces per unit inclusive of visitor parking. Lincoln's parking requirement for apartment units is within the lower range of the surveyed municipalities. It is noted that the majority of the surveyed municipalities set out a visitor parking requirement of 0.25 per unit apart from the resident parking requirement. Lincoln, along with Thorold and St. Catharines, do not prescribe the portion of parking to be dedicated to visitors.

5 PARKING POLICY FRAMEWORK

The proposed Parking Policy Framework is intended to provide guidance with respect to the treatment of parking within the Town, particularly in response to redevelopment applications, on-street parking requests and other parking-related issues.

5.1 Goals for Parking

The framework is premised on goals for parking that recognize the existing context within the Town, municipal and stakeholder input, and the Town's existing policies affecting parking. These goals for parking are reflected in the framework, though they may not necessarily be specifically addressed as part of it:

1. Maintain, and strive to maximize to the extent possible, the use of on-street parking in the Town for high-demand, short-duration, high-turnover parking to support visitors, commercial uses and tourism.
2. Balance provision of municipal public parking in the Town with policies and objectives for Transportation Demand Management (TDM), and increased transit, cycling and pedestrian activity.
3. Enable adequate and accessible conditions for winter maintenance activities throughout the Town.

5.2 Off-Street Parking Policy Recommendations

Off-street parking is required to be provided on-site and plays an important role in accommodating parking demands for both residential and non-residential uses. Sufficient off-street parking supply and appropriate on-street parking restrictions work together to ensure that on-street parking is prioritized for short-term use by visitors and patrons. However, an oversupply of off-street parking can encourage car ownership and single-occupant auto travel to the detriment of the Town's city planning and transportation objectives.

As an alternative to on-site parking, public parking can reduce overall parking facility requirements and costs including aesthetic and environmental impacts, encourage efficient use of parking, allow greater flexibility in facility location and site design, and encourage more efficient land use within an area.

This section discusses the potential strategies for off-street parking facilities to ensure appropriate supply and effective use, and to incorporate TDM elements.

5.2.1 Zoning By-Law Review

Parking shortages within residential neighbourhoods was identified as an issue by Town staff and the public. The Lincoln Fairgrounds Report presented survey data indicating that on-street parking spaces

are frequently occupied by residents, resulting in a shortage of visitor parking. In response, the report recommended an additional visitor parking requirement of 0.5 spaces per unit. However, as discussed in Section 4, the Town's residential parking requirements are in line with comparable jurisdictions.

It is evident that residential parking is perceived to be insufficient based on consultation with Town staff and the public. However, there is not enough data to confirm whether an actual parking shortage exists. A preliminary review indicates that the current requirement for 2.0 spaces per unit is consistent with other jurisdictions. To require an additional 0.5 spaces per unit for visitors is above the range but may be necessary given current auto ownership rates and resident parking habits. The recommendations for an on-street education campaign, "Clear Your Garage' campaign and overnight parking restrictions seek to optimize the use of existing residential parking supply, and use a management approach to address the identified parking issues; these recommendations are discussed in future sections within this policy document. The Town should exercise a high degree of caution when considering increasing the residential parking requirement, and make decisions based on empirical evidence.

It is recommended that the Town conduct a zoning by-law review to determine appropriate residential and visitor parking requirements. The scope of the review should include an examination of auto ownership rates associated with various housing types, and residential visitor parking demand during peak periods. The impacts of the recommended "Clear Your Garage" campaign and overnight parking restrictions to residential parking demand also need to be considered when establishing new parking requirements.

5.2.2 Permanent and Temporary Use of Municipal Parking Lots

The permanent and temporary use of municipal parking lots can significantly impact the Town's parking functionality, its TDM Strategy, parking-related income, as well as the goals and objectives of the Town's Official Plan. ***It is recommended that the Town consider the following improvements and uses of municipal parking lots:***

- ***Designate carpool parking spaces*** in highly desirable lots to promote carpooling over single-occupant vehicle travel
- ***Provide secure bicycle parking*** in highly desirable lots to promote cycling over driving
- ***Provide overflow parking*** for nearby land use, special events, and snow events when on-street parking is discouraged

Alternative uses for underutilized municipal parking lots may be considered, including summer patios and seasonal events such as farmer's markets, garden centres, flea markets, and local festivals.

Carpool Parking

Carpool parking supports the Town's goal to reduce single-occupant vehicle trips, and promote alternative modes of travel. Carpool parking is not expected to significantly impact parking supply, given that only a small portion of a facility's parking supply should be designated for carpooling vehicles. Carpool parking spaces should be designated at priority locations within a parking lot or garage, for example near entrances. High visibility to the public and convenience can help to promote carpooling and further the Town's TDM efforts. If successful, carpool programs can contribute to

reduced single-occupant vehicle travel and reduced parking demands, thus helping to manage the parking supply by freeing up parking for other competing uses.

Carpool spaces should be provided at highly convenient off-street locations such as community centres and shopping plazas. The availability of a parking space closest to a demand generator encourages the public to consider switching from private auto use and promotes TDM objectives.

5.2.3 "Clear Your Garage" Campaign

To encourage the use of garage space for parking rather than storage, ***it is recommended that the Town launch a "Clear Your Garage" campaign***. This is recommended prior to and during the introduction of new overnight parking restrictions.

The campaign should provide bulk garage collection to residents at increased service frequencies. For example, the Town may increase the frequency of bulk garbage collection, or offer on-call service to residents. Details about the campaign, including accepted items, pick-up schedule and contact information should be distributed. The Town may also consider offering incentives to residents for their participation.

5.3 On-Street Parking Policy Recommendations

On-street parking tends to be the most desirable public parking facility for sharing, since it is highly visible and convenient. It is therefore helpful to manage on-street parking for maximum use, particularly for visitors in residential neighbourhoods and in busy commercial centers.

In areas where the road allowance is sufficiently wide to accommodate both traffic flow and parking, it is very cost-effective to utilize on-street parking. Additionally, on-street parking uses less land per space than off-street, since it does not require access lanes. By comparison, an off-street space typically requires 25% more land to serve a single destination, compared to the land required for an on-street space. On-street parking also creates a buffer between street traffic and pedestrians, and assists with traffic calming by reducing vehicle travel speeds. It is widely acknowledged that streets with on-street parking tend to have lower travel speeds and that on-street parking is generally an effective tool in helping to create places that are safer, more walkable, require less parking, and have more vitality.

The following strategies are proposed to ensure effective usage of on-street parking supplies.

5.3.1 On-Street Parking Time Limits

Optimizing the use of on-street parking spaces is one of the Town's primary objectives with respect to parking and, as previously identified, provides many benefits. Almost all streets in the Town can provide parking on at least one side, most of which currently are being used in that manner. In residential neighbourhoods, this allows resident and visitor parking. In mixed commercial and residential areas, this allows shared parking between residents, employees, visitors and patrons. In employment areas, visitor parking can be provided on-street and the potential exists for modest amounts of employee parking in specific areas.

The Town's traditional approach to on-street parking is free of charge on a first-come-first-serve basis.

Along main corridors and in predominantly mixed-use and commercial areas, the objective should be to maximize the use of on-street parking for high-demand, short-duration, high-turnover parking. Under these circumstances and in these locations, off-street parking should be promoted to accommodate resident parking needs. This is already being done in the downtown on King Street near Ontario Street, where on-street parking has a duration limit of one hour. This time restriction works to deter all-day employee parkers; therefore, prioritizing commercial visitor parking demand.

It is recommended that the Town consider establishing appropriate time limits of up to three hours in locations where on-street parking is in high demand. Time restrictions should be established to deter all-day parking by area residents and employees, who typically require parking for five hours or longer. Visitors and patrons typically stay in a location for shorter periods. Their parking durations depend on the activities at their destination, and can range from 30 minutes for a convenience stop to three hours or longer for those spending an evening in the downtown. It is suggested that high demand locations have time limits of up to three hours. In highly utilized locations, shorter time limits may be considered to prioritize the shortest stays and highest turnover. When establishing time limits for on-street parking, the Town must ensure that longer-term parking is available nearby for those who need it, either in off-street locations or on-street in an area with lower demand.

5.3.2 Education Campaign

An education campaign is recommended to clearly communicate on-street parking restrictions to the public, to explain the reasons for establishing the restrictions, to suggest potential parking solutions for residents and to provide resources that may be useful. This is recommended prior to and during the introduction of new overnight parking restrictions. As part of the education campaign, it is important that residents be encouraged to clear their garage for parking.

Additionally, on-street parking restrictions should be communicated to future residents of new developments. An information package should be provided at the time of sale, so that potential buyers can make informed choices about where they will live, how many cars they will have and where those cars will be parked.

5.3.3 Overnight Parking Restriction

Currently the Town allows overnight parking in residential areas all year. This allows residents to park their vehicles on-street in addition to within the garage and on the driveway, making ownership of multiple vehicles in a household feasible. This may be viewed as contrary to policy direction supporting and encouraging TDM, and discouraging car ownership. Furthermore, Lincoln's residential parking requirement of 2.0 spaces per unit is likely appropriate based on the review of parking requirements in comparable jurisdictions. The demand for resident on-street parking today is partially due to the use of garage space for storage rather than parking. Given these considerations, provision of additional resident parking on-street Town-wide is likely unwarranted, although this can be provided as needed on a site-by-site basis.

There are other costs associated with permitting long-term resident parking on-street. These include the loss of visitor parking availability and increased road maintenance costs, especially in winter related to snow removal.

In most municipalities, on-street overnight parking is prohibited in residential areas year-round specifically to allow for road maintenance, garbage collection and winter snow clearance. In some municipalities, temporary parking permits are available for residents and their visitors, free of charge, for a specified period. For example, in Milton an annual limit of 18 temporary overnight parking permits per vehicle can be obtained.

It is recommended that the Town establish overnight parking restrictions in residential areas, given the limited opportunities and associated benefits, and focus on maintaining high-demand, short-duration, high-turnover on-street parking. The Town could consider allowing a certain number of free overnight parking permits to park within a nearby municipal lot to allow residents some flexibility with the new restriction.

5.4 Shared Parking

The Town recently adopted an Official Plan that established intensification corridors along Ontario Street and King Street within Beamsville and Vineland Central Business Districts. As these areas develop into denser and more urbanized environments with mixed uses, it is recommended that the Town provide for and support shared parking within the urban boundaries.

Shared parking means that parking spaces are shared by more than one user, which allows parking facilities to be used more efficiently. It is a type of parking management that takes advantage of the fact that most parking spaces are only used during parts of the day depending on the user or group of users, and many parking facilities have a significant portion of unused spaces, with utilization patterns that follow predictable daily, weekly and annual cycles.

There are various degrees of shared parking; a parking space assigned to a specific user is not shared at all. On-street parking located in a busy, mixed-use, urban area tends to be the most shared. In between are parking spaces that are shared among various employees at a work site, parking that is shared by customers at a variety of businesses located in a mall, or arrangements by one facility to use another facility's parking at certain times, such as a commercial building that allows its parking spaces to be used on Sunday mornings by attendees at a nearby church. An assigned employee parking space is typically used about 2,000 hours per year, while an on-street parking space in a busy area often experiences three times as much use. Efficient sharing of spaces can allow parking requirements to be reduced significantly.

The goals for parking in the Town and several of the associated benefits of public parking are an extension of the fact that public and private parking can be shared in a variety of ways and amongst a variety of users. Some of the general benefits of shared public parking in relation to the Town's planning objectives and the identified goals are summarized in **Table 5-1**.

Table 5-1: Benefits of Shared Parking

Objective	Comments
Road and Parking Savings	Can provide significant parking facility savings
Environmental Protection	Reduces paved area
Efficient Land Use	Allows more clustered development
Community Livability	Allows more clustered land use
Congestion Reduction	Depends on parking cost and land use impacts
Transport Choice	Depends on parking cost and land use impacts
Road Safety	On-street parking provides a buffer between pedestrians and traffic

5.4.1 Geographic Considerations

Shared parking is generally limited by the proximity of destinations that share a parking facility. Exactly how close they must be depending on the type of land use and the type of user. Table 5-2 summarizes generally acceptable walking distances to parking for various types of activities. Acceptable walking distance to parking is also affected by the quality of the pedestrian environment, climate, line of site (longer distances are acceptable if people can see their destination), and "friction" (barriers along the way such as crossing busy traffic).

Table 5-2: Acceptable Walking Distances to Parking

Adjacent (Less than 30m)	Short (Less than 250m)	Medium (Less than 400m)	Long (Less than 500m)
People with disabilities Deliveries and loading Emergency services Convenience store	Grocery stores Professional services Medical clinics Residents	General retail Restaurant Employees Entertainment center Religious institution	Airport parking Major sport or cultural event Overflow parking

This table indicates maximum acceptable walking distance from parking to destinations for various activities and users. It assumes good pedestrian conditions (sidewalks, crosswalks, level terrain) that are outdoors and uncovered, with a mild climate.
Source: Shared Parking: Sharing Parking Among Multiple Users, Victoria Transport Policy Institute, March 2013.

In general, the potential for sharing parking is greatest in areas where land use activities are clustered, and the benefits from sharing parking are greatest due to high parking costs.

5.4.2 Implementation

Shared parking is usually implemented by municipal government policy to allow and encourage it, with sharing arrangements made between individual facility developers and managers. It may require changes to the zoning by-law, and development of appropriate standards and practices that local transportation planners can use to evaluate, manage and enforce shared parking arrangements. It can also be encouraged by establishing parking sharing brokerage services to match potential sharing partners, which can be provided by a Transportation Management Association or local government agency. Generic shared parking formulas are documented in the Institute of Transportation Engineers' *Shared Parking* publication, and are increasingly part of municipal zoning by-laws and development applications.

It is recommended that the Town explore the following measures to implement shared parking:

- ***Include shared parking in the next zoning by-law review;***
- ***Permit shared parking in mixed-use developments provided that a satisfactory parking justification report is submitted; and***
- ***Promote shared parking through the provision of public (municipal) parking within the intensification areas.***

5.5 Parking and Transportation Demand Management (TDM)

TDM strives to reduce auto demand, which in turn minimizes the overall size of the road network and related infrastructure requirements. This is achieved by encouraging individuals to make fewer trips, and alternate modes of travel other than single-occupant vehicles.

The TMP presents strategies for managing transportation demand. The recommendations made in this report for on-street and off-street parking policy as well as shared parking make up part of the Town's overall TDM strategy. They are consistent with the goal of TDM, which is to limit the need for significant capital investments in new transportation infrastructure.

6 FUTURE CONSIDERATIONS

This section discusses parking strategies that may be considered by the Town in the future. As development occurs, the Town may experience increased demand for parking as well as competition for curb space for other uses.

6.1 On-street Pick-up and Drop-off Facilities

In some municipalities, lay-bys have been created for loading and pick-up and drop-off functions, but these facilities are not specifically licensed or allocated, even when privately constructed as part of development or redevelopment. Most municipalities accept the use of "No Parking" zones as areas for pick-up and drop-off activities. Where there is available short-term, on-street parking, it too can serve as a pick-up and drop-off area. Many municipalities consider the licensing of boulevard space for pick-up and drop-off activity.

The practicality of the matter is that any designated pick-up and drop-off facility that is provided is likely to be misused for short-term parking, taxis and so forth, particularly in an area where it is sometimes difficult to locate parking. Under such circumstances, enforcement is likely to be costly.

It is recommended that designated pick-up and drop-off facilities be encouraged off-street and sought through approval of development and redevelopment projects within the Town, where feasible. On-street pick-up and drop-off facilities can be considered in cases where solutions are not feasible and a need for a designated zone is demonstrated.

It should be noted that with the integration of autonomous vehicles to our transportation system, this will increase the demand for passenger pick-up / drop-off facilities in the future. Therefore, the accommodation of such activities should be carefully considered as part of the Town's planning for curbside space and within development sites.

6.2 On-Street Accessible Parking

Next to the provision of high-demand, short-duration, high-turnover parking, the provision of accessible parking spaces is likely the next highest priority in mixed-use or commercial areas. This is due to the importance of proximity of an accessible space to the source of attraction or major generator. Given the importance of proximity, accessible parking spaces need to be close to destinations and should be provided with some reasonable level of frequency.

On-street accessible parking space applications should continue to be considered by the Town, upon request. To optimize the use of on-street parking in mixed-use or commercial areas, limitations should be placed on requests for accessible on-street parking spaces.

Additionally, the Town may periodically adjust the number and location of on-street accessible parking spaces. It is anticipated that any adjustments to the supply and location of accessible parking spaces would likely consider:

- the area supply of on-street and off-street accessible spaces (public and private)
- utilization and proximity to high-demand uses
- opportunities for suitable, alternative accessible parking space locations
- other competing parking demands (such as high-turnover parking)

In addition to these important considerations and as a guideline for determining a reasonable overall supply of accessible parking spaces and imposing some general limits on the supply in an area or block, applicable zoning by-law requirements for the provision of accessible parking spaces could be applied on an aggregate basis to an area or block.

6.3 On-street Permit Parking

On-street parking permits are provided in some cities for residents in high-density, mixed-use areas (such as downtown areas). In these cases, resident permits are provided to offset a limited supply of private parking on the residential site. Under these circumstances, the fee for residential permit parking tends to be higher because it is viewed as providing a valuable service to residents and because there is a desire to recover a portion or all the increased costs of providing the service (particularly related to snow removal, road maintenance and garbage collection). In some downtown locations, the desire to deter car ownership and support increased use of transit and TDM objectives also plays a role.

It is recommended that the Town should:

- ***Consider implementing a paid On-Street Permit Pilot Program for residents requiring on-street parking.***

The pilot program can be initiated in Beamsville with the intention to eventually roll out into Vineland and Jordan. Permit fees could be based on the principle of full cost recovery, thus, allowing the program to be financially self-sustaining with limited tax payer support. Such a rate may deter the number of people who wish to use the street, and may encourage residents to use their garages or even reconsider the need for owning multiple vehicles.

6.4 Off-street Permit Parking

For the long-term, it is conceivable with the implementation of additional municipal off-street parking, along with the creation of some surplus parking supply, that consideration might be given to licensing parking in some under-utilized locations at reduced prices, as part of a strategy to attract long-term parkers away from areas where high-demand, short-duration, high-turnover parking is the priority.

Monthly permit parking in a municipal parking lot is a desirable substitution for on-street parking permits, especially for overnight parking in an under-utilized lot. Despite the demand for monthly permit parking, spaces for short-term parking should be protected to ensure no adverse effects to surrounding businesses or commercial uses. It is advisable for the Town to establish limits to the permit (monthly) parking supply; this limit should be regularly monitored and adjusted depending on parking demands.

Many municipalities provide long-term licensing of spaces in under-used municipal parking lots. In most municipalities, licenses are provided for individual use and do not count toward a proposed development's zoning parking requirements. When implementing the licensing of off-street municipal public parking, careful consideration should be given to:

- the impact on the municipal public parking utilization
- the impact on the inventory of municipal public parking spaces that are readily available
- the support of Town objectives related to TDM and parking management
- the impact on revenues and the objective of fiscal self-sufficiency

6.5 Carshare Parking

Carshare supports the Town's goal toward a multi-modal transportation system and provides an alternative to vehicle ownership for occasional drivers. The space requirements for carshare parking are relatively low, and so the provision of carshare parking should not have significant impacts to parking supply. Generally, carshare parking should be provided at priority locations within a parking lot or garage that are convenient and highly visible to be economically viable such as near entrances. Carshare parking may be most appropriate in higher density residential developments, where there is the greatest potential clientele. If successful, carshare programs can contribute to reduced single-occupant vehicle travel and reduced parking demands, thus helping to manage the parking supply by freeing up parking for other competing uses.

While carshare would possibly realize promotional benefit from the exposure of being in a high traffic, on-street location, like carpooling, on-street carshare spaces are not recommended in order to optimize the use of available on-street parking and preserve high-demand, short-duration, high-turnover parking spaces. Carshare spaces may also have initial or future requirements for electric plug-in stations that are likely most suitable to off-street parking lots and structures.

However, the provision and support of carshare parking spaces is regarded as a key priority with respect to the Town's Official Plan objectives pertaining to sustainability, TDM and increased transit, cycling and pedestrian activity. For this reason, carshare spaces should be provided in highly-visible, convenient locations within parking lots (private and public). High visibility for carshare vehicles, along with signage and promotional programs will help to promote TDM objectives, including the use of carshare as an alternative to vehicle ownership. In other municipalities, carshare spaces have been shown to replace the demand of between four to 10 resident parking spaces.

It is recommended that carshare spaces should be considered in areas with higher density. The Town should discuss business opportunities with carshare companies to operate within the Town as a future ready initiative as development density increases.

7 SUMMARY OF RECOMMENDATIONS

The key recommendations contained within this Parking Policy are summarized herein.

Off-Street Parking

It is recommended that the Town:

- Conduct a zoning by-law review to determine appropriate residential and visitor parking requirements
- Consider the following improvements and uses of municipal parking lots:
    - Designate carpool parking spaces in highly desirable lots to promote carpooling over single-occupant vehicle travel
    - Provide secure bicycle parking in highly desirable lots to promote cycling over driving
    - Provide overflow parking for nearby land use, special events, and snow events when on-street parking is discouraged
    - Consider alternative uses for underutilized municipal parking lots
- Launch a "Clear Your Garage" campaign

On-street Parking

It is recommended that the Town:

- Consider establishing appropriate time limits of up to three hours in locations where on-street parking is in high demand
- Initiate an education campaign to clearly communicate on-street parking restrictions to the public
- Establish overnight parking restrictions in residential areas

Shared Parking

It is recommended that the Town explore the following measures to implement shared parking:

- Include shared parking in the next zoning by-law review;
- Permit shared parking in mixed-use developments provided that a satisfactory parking justification report is submitted; and
- Promote shared parking through the provision of public (municipal) parking within the intensification areas.

8 IMPLEMENTATION

The provision of additional parking is an important long-term objective for the Town. However, the planned supply of parking must be considered and integrated with other Town objectives with respect to TDM strategies that seek to reduce the number of vehicular trips and required parking, and integration with the Town's redevelopment initiatives, including streetscape improvements and the provision and enhancement of transit. The provision of parking is a costly endeavour and it is in the Town's interest to avoid over supply of parking spaces.

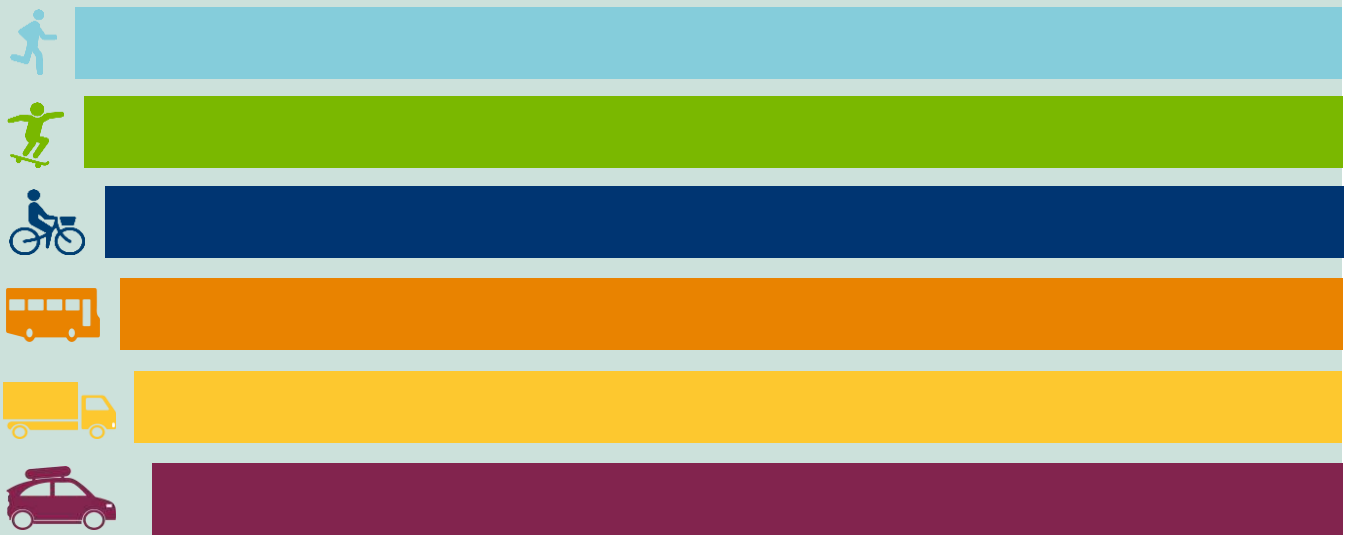
With sustainable funding in place for municipal public parking expansion, the Town should develop a clear plan or strategy for managing on and off-street parking facilities. The strategy should consider, among other possible items, a benchmark or threshold that would trigger the consideration of municipal public parking expansion. Subject to availability of funding, a sustained parking utilization rate of 85% is used by other municipalities as a guideline, and could be considered for the Town or within each community. If utilization is above 85%, consideration is usually given to measures aimed at constraining demand or opportunities for expanding supply.

Monitoring, reporting, and community consultation practices are recommended to be established and communicated, complete with indicators for monitoring and reporting processes. Such practices could help to swiftly make needed adjustments to the implementation of parking initiatives. The recommended monitoring activities include, but are not limited to:

- an on-going inventory of on-street and municipal public parking spaces on a community or area basis
- utilization of the on-street and municipal public parking supply
- the impact on the demand for municipal public parking because of intensification
- the impact on the municipal parking supply because of the residential and municipal parking lot permit programs
- pricing of the permit programs in relation to the demand and supply

APPENDIX

H Transportation Demand Management Policy



Make moving make sense as we grow!

TOWN OF LINCOLN'S TRANSPORTATION MASTER PLAN

TRANSPORTATION DEMAND MANAGEMENT POLICY

CONTENTS

1 WHAT IS TRANSPORTATION DEMAND MANAGEMENT (TDM) AND WHY IS IT IMPORTANT?

Transportation Demand Management (TDM) include policies, programs and services that seek to influence the way people travel and commute to reduce single-occupant vehicle trips, lower carbon emissions, alleviate traffic congestion, and decrease health-related problems due to sedentary lifestyles. These challenges are all tied to a society's travel patterns, and they play an important role in the quality of life and productivity of the community. Through a formal TDM strategy, a Municipality can defer the need for significant capital investments in new road infrastructure, and maximize the use of existing transportation facilities and services. This can be achieved by providing actions, incentives, and policies to encourage walking, cycling, riding transit, and carpooling for utilitarian trips. These are commonly focused on prioritizing moving people (as opposed to cars) with guiding principles to enhance the multi-modality, efficiency, safety, and accessibility of its transportation network.

2 REVIEW OF EXISTING TDM PROGRAMS IN OTHER JURISDICTIONS

A Niagara Region example and a suburban example from the Greater Toronto Area have been highlighted to show how other municipalities are addressing TDM in their communities. Best practice takeaways that can be applied in Lincoln are summarized at the end of this section.

2.1 NIAGARA FALLS SUSTAINABLE TRANSPORTATION STUDY AND MASTER PLAN – TRANSPORTATION DEMAND MANAGEMENT POLICY, (2011)

As part of the Niagara Falls Sustainable Transportation Study and Master Plan (STMP), a number of TDM policies were adopted to promote sustainable mobility and reduce single-occupancy vehicle trips. The STMP includes recommendations for Niagara Falls' TDM in short, medium and long-term horizons in four categories: Education, Promotion and Outreach; Travel Incentives; Land Use and Transportation Integration; and Transportation Supply. The plan focuses on leveraging and expanding the existing active transportation and transit network, as well as promoting potential land use intensification. Furthermore, the plan recommends several actions including:

- Collaboration with local municipalities to align and maximize support of new developments.
- Engagement with workplaces to promote sustainable commute programs, flexible work hours and teleworking.
- Implementation of new information technologies and educational programs to raise awareness of TDM programs.
- Expansion of carpooling program and park-and-ride facilities.

Other initiatives focused around providing infrastructure to support transportation modes such as establishing walking and cycling trails systems, updating the Trails and Bikeway Master Plan, and winter bus stop maintenance. Engagement and educational programs such as Cycle Safety Clinic, participation in Active and Safe Routes to School (ASRTS), and a Guide to Walking Routes in Niagara Falls, Ontario were also developed.

2.2 AJAX'S TRANSPORTATION DEMAND MANAGEMENT PLAN (2015)

The Town of Ajax adopted its TDM Plan in 2015 and developed a vision along with short, medium and long-term TDM goals, actions and programs. The vision seeks to create a balanced, equitable, and efficient transportation system that provides a full range of choices for travel to, from and within the Town through infrastructure, programming, education and promotion. This plan adds to the Town's efforts to increase the share of sustainable modes through a series of education and outreach programs, incentives measures, and land use and urban design actions.

Ajax's recommended action plan includes 25 TDM measures. Each recommended initiative is matched to one or various sustainable modes of transportation, and identifies key partners and specific actions that can be implemented over short, medium, or long-term horizons. The short-term measures (0-2 years) include actions to raise awareness about Ajax's TDM Plans. The medium-term measures (3-5 years) focus on the policy and program incentives to offer a broader range of transportation choices. The long-term measures (beyond 5 years) leverage from infrastructure-oriented projects in the transportation network and intensification of land uses. The Town's TDM Plan is also intended to be revisited after the first five years to evaluate the short and medium-term policies and whether they should be replicated or adjusted to meet long-term goals.

2.3 OWEN SOUND'S TRANSPORTATION DEMAND MANAGEMENT PROGRAM (2010)

As a part of the City of Owen Sound's Transportation Master Plan, a Transportation Demand Management Program was developed with an ambitious goal of achieving a 10% reduction in travel with the help of implementing TDM measures. The TDM Program includes recommendations for the TDM measures which include:

- Reviewing and modifying Official Plan policies, site design guidelines, and traffic impact study requirements to encourage TDM initiatives that acknowledge all modes of transportation.
- Developing TDM supportive parking policies and Park-and-Ride lots to encourage alternative modes of travel and carpooling.
- Reviewing alternative work schedules and encourage tele-commuting to mitigate peak travel time volumes.
- Promoting active transportation and lifestyles and encouraging citizens reduce car use.
- Creating a staff position to support and manage TDM initiatives while ensuring they are compliant with the policies and measures being recommended.

2.4 STRATFORD'S TRANSPORTATION DEMAND MANAGEMENT PLAN (2010)

The City of Stratford developed a Transportation Demand Management Plan as a part of their Transportation Master Plan in 2010. The TDM plan recommended that Stratford should pursue measures to promote healthier lifestyles and liveable communities, reduce travel volumes without significant costs, and improve and prepare the city for the future. Objectives of TDM measures are to increase public transit ridership, implement planning policies that improve the home-to-work relationship, and promote alternative modes of transportation as well as reduced auto trips during peak hours. The TDM plan outlines proposed policies that include:

- Variable Work Hours: Altering work schedules to mitigate volumes and congestion during peak travel time.
- Increased Densities/ Mixed Use Developments: Locating mixed use developments along major arterials close to transit routes to increase transit ridership as well as promoting mixed use developments that offer live/ work opportunities.
- Work at Home/ Telecommuting: Through planning policies, the City will promote businesses to allow telecommuting and working at home initiatives.
- Ridesharing/ Carpooling: Introducing carpool lots and ride-matching services will provide the opportunity to reduce single-occupancy vehicle trips.
- Marketing and Promotion: The City will promote TDM on their website and through brochures, designate an individual/ group to manage TDM initiatives, and hold regular events to promote TDM programs and measures.

The TDM plan also expresses that although traffic reduction is desirable and can be beneficial, it will not replace the need to increase transportation facilities to account for future travel needs of residents.

2.5 LESSONS LEARNED FROM REVIEW OF OTHER JURISDICTIONS TDM PLANS

Lessons learned from these and other municipal TDM plans include:

- Developing a detailed plan with short, medium and long-term actions is vital to a TDM strategy.
- Most TDM programs start with initiatives designed to raise awareness, improve understanding, build positive attitudes and make sustainable transportation more attractive. A supportive environment needs to be established before making changes to the infrastructure and seeing the change in travel behaviour.
- The educational materials should be easily accessible and have high exposure. The public needs easy access to information about transportation choices before any behavioural changes can be made.
- Successful TDM initiatives often include strong presence on municipal web sites and promotions throughout different media channels, with consistent branding and frequent information updates to keep the public engaged.
- Alternative travel modes may not always be the most suitable option for some people. Understanding their needs and rationale for their mode choices is important to develop an effective TDM program.
- Collaboration with internal departments and relevant stakeholders is key to ensure clear coordination of planned initiatives and continuous feedback to improve the programs.
- Monetary incentives and associated disincentives such as parking enforcement, and subsidized transit fares are effective motivators for behavior changes.
- Effective promotion of TDM initiatives acknowledges the audience and demographics of the community when developing the strategy.
- Continuous effort in the maintenance of active transportation and transit facilities throughout the year to ensure the ridership is sustained.
- Setting a goal such as a reduction in travel volumes or congestion can be helpful when it comes to measuring the effectiveness of TDM measures.
- Although traffic reduction is desirable and can be beneficial, it will not replace the need to develop additional transportation facilities to account for future travel needs.

3 GUIDELINES FOR DEVELOPING A TDM PLAN FOR LINCOLN

This section provides strategic guidelines for a future TDM Plan specific for Lincoln. The components of the plan are recommended to be developed in a standalone document similar to the approach the Town of Ajax took in 2015, in order to deliver specific short, medium, and long-term actions that meet the community's needs. This will permit the Town of Lincoln to establish a comprehensive program tailored to the community's travel patterns and future mobility goals. A context-sensitive TDM Plan for Lincoln should:

- Consider the following key elements that have characterized other successful strategies, including: Integrate policies that are aligned with the Town's Official Plan, Transportation Master Plan (TMP), public health initiatives, transit service strategies, and active transportation plans (part of the TMP).
- Identify partnerships with stakeholders, including sustainable transportation advocates, transit services, public health, businesses, school boards that can support the communication campaign as well as provide incentives to sway user transportation preferences.
- Determine existing travel conditions and transportation preferences to set a baseline of the demand and the population segments that the TDM Plan should focus.
- Consider launching a survey of public perception to identify main barriers and challenges dissuading people from using more sustainable modes of transportation.
- Set clear goals and objectives, as well as modal share goals for short, medium, and long-term horizons.
- Explore all the possible TDM opportunities based on best practices that account for different soft and hard measures including: Education, Promotion, Community Outreach, Incentives (monetary or non-monetary), land use, urban design, and transit services.
- Consider piloting the program in one community and launching a survey to collect most recent travel patterns.
- Consider establishing a Commute Ambassador program, where leaders of the community are the active voices of their neighborhoods and help to act as "commute role models".
- Develop an action plan with clear actions, possible resources and partners, and preferably measurable outcomes.
- Design a detailed monitoring plan with a data collection framework to quantify outcomes and evaluate impact of the TDM program.
- Draft an implementation plan.
- Anticipate staffing recommendations.

3.1 ADDITIONAL CONSIDERATIONS FOR THE TDM PLAN

Additional considerations when developing the TDM Plan for Lincoln could include the following:

Overall

- Appoint a Sustainable Mobility Coordinator to administer and monitor the program.
- Develop and promote a TDM page within the Town's official website.
- Collaborate with the Region and Town's departments to gain larger support.
- Create a working group that consists of local cycling and pedestrian groups, car sharing services, school boards and community groups.
- Review and partake in Niagara Region's TDM initiatives.
- Engage with all relevant stakeholders and if possible hold public consultation or social marketing events.
- Support and prioritize land use policies which leverage TDM initiatives.
- Engage with local employers to promote workplace programs that support the needs of commuters, including those at remote locations and employed as shift-workers.
- Develop personalized travel planning programs that provide information of multi-modal transportation options to meet the needs of individuals and households.
- Consider introducing carshare and bikeshare programs through public-private partnerships.
- Conduct small scale, neighborhood pilot projects.
- Design an incentives program with the support of local businesses and public agencies.
- Expand the scope of transportation planning projects to include consideration of all modes.
- Consider the role of developing a multi-modal search engine that provides navigation information and the ability to find commute partners for walking, cycling, carpooling, and riding transit.[1]
- Develop measurable and attainable goals such as a volume reduction %.

Education/Awareness Programs

- Organize engagement and outreach events such as lunch and learn sessions, transportation fairs, and booths at community events.
- Conduct public awareness campaigns.
- Provide guidance for telecommuting, compressed work weeks, and flexible work hours program.
- Integrate educational materials for school zone safety within driver's education program.

[1] In 2018, the Region of Peel launched "ChangeMyRide", an online platform that serves this purpose.

Transit

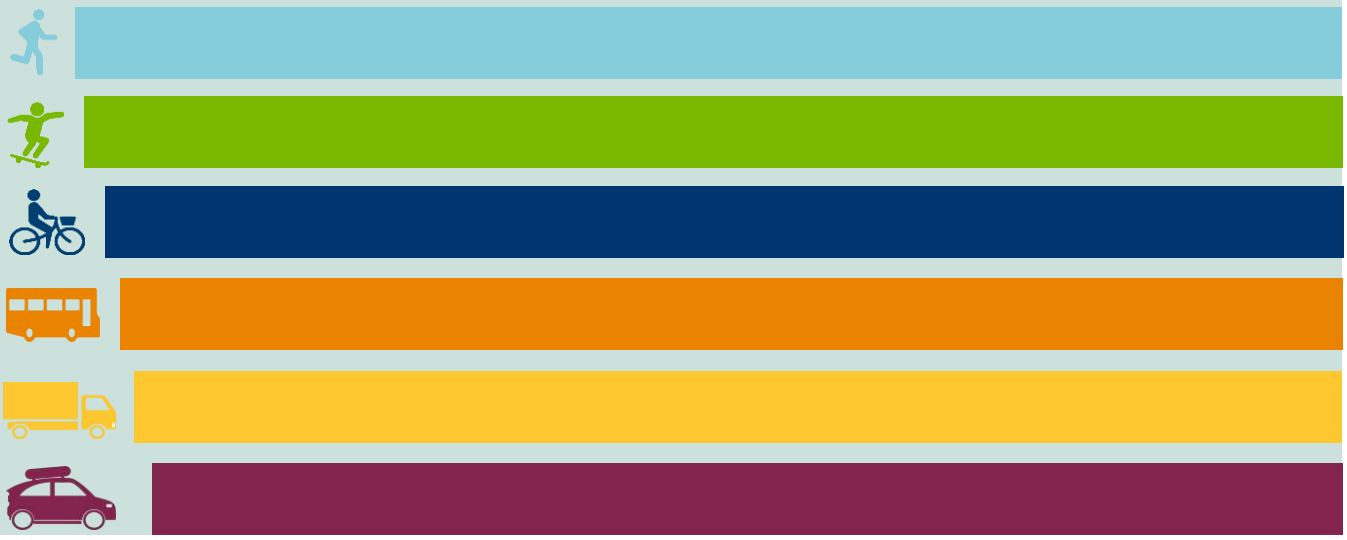
- Support and promote transit services and seek to ensure that they can support TDM policies through routing and schedules.
- Provide weather-protected waiting areas and transit stops.
- Partner with transit agencies to contribute with incentives such as discounted transit passes, guaranteed ride home programs, or other prizes.

Active Transportation

- Encourage the use of active modes and support the development of infrastructure including bicycle parking and end-of-trip facilities (showers and locker rooms).
- Provide on-going maintenance to cycling infrastructures such as winter maintenance to bicycle lanes, well-lit bicycle parking and secure bicycle parking storages.
- Establish a cycling network and pedestrian pathways to connect residence, employment, key destinations and bus stops.
- Support school-based programs that provide parents and students as well as teachers and staff with options for traveling to school which enhance safety, reduce congestion, and encourage more active travel.
- Limit student parking at high schools and in turn, improve other options such as school-bus, transit, cycling and carpooling.

APPENDIX

I Costing Analysis Supporting Tables



Make moving make sense as we grow!

Table 1 provides a summary of proposed active transportation routes located in the Town of Lincoln as part of this TMP. An overview of the unit costs is located in **Table 7**.

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Campden Road	Campden Road terminus	Campden Secondary Plan Area boundary	1.49	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Inter-Community - Secondary	$ 1,200	$ 1,789	Medium
Campden Road	Campden Secondary Plan Area boundary	Fly Road	1.49	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Inter-Community - Secondary	$ 1,200	$ 1,789	Medium
Cherry Avenue	Fly Road	Spring Creek Road	3.58	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 3,585	Medium
Lakeshore Road	Merritt Road North	East of Merritt Road North	0.11	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 114	Medium
Lakeshore Road	East of Merritt Road North	Maple Grove Road North	0.72	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 723	Medium
Lakeshore Road	Maple Grove Road North	Martin Road North	1.73	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 1,733	Medium
Lakeshore Road	East of Merritt Road North	East of Merritt Road North	0.08	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 80	Medium
Lakeside Drive	Tufford Road North	Merritt Road North	0.91	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 908	Medium
Maple Grove Road	John Street	John Street	0.11	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 111	Medium
Maple Grove Road North	Lakeshore Road	North Service Road	1.08	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 1,084	Medium
Martin Road North	Lakeshore Road	North Service Road	1.09	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 1,090	Medium
Mountain Road	Fly Road	Township of West Lincoln boundary	3.33	Lincoln	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Community - Secondary	$ 225,000	$ 748,303	Medium
Tufford Road	Lakeside Drive	Overpass at QEW	1.14	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 1,136	Medium
Tufford Road	Overpass at QEW	King Street	3.33	Lincoln	Rural	Signed Route	N/A	Inter-Community - Secondary	$ 1,000	$ 3,331	Medium
Greenlane	King Street	Thirty Road	0.52	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Primary	$ 1,000	$ 522	Medium
Greenlane	Thirty Road	Lincoln Avenue	0.33	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Primary	$ 1,000	$ 326	Medium
Mountain Road	Fly Road	Township of West Lincoln boundary	1.16	Lincoln	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Secondary	$ 225,000	$ 261,059	Long
Pelham Road (Regional Road 20)	Twenty Road	City of St. Catharines boundary	3.14	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 470,413	Medium
Twenty Road (Regional Road 69)	Eighth Avenue	Town of Pelham boundary	1.82	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 273,136	Medium
King Street (Regional Road 81)	Greenlane	Thirty Road	0.62	Niagara Region	Rural	Paved Shoulder	Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 93,489	Medium
Eighth Avenue (Regional Road 669)	Twenty-First Street	Nineteenth Street	0.78	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 117,480	Medium
Eighth Avenue	Victoria Avenue	Twenty-First Street	1.11	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 166,277	Medium
Victoria Avenue (Regional Road 24)	Sixth Avenue	Spring Creek Road	4.14	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 225,000	$ 932,446	Medium
Eighth Avenue (Regional Road 669)	Victoria Avenue	Twenty-First Street	1.10	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 164,921	Medium
South Service Road (Regional Road 40)	Jordan Road	City of St. Catharines boundary	2.35	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 352,647	Medium
King Street (Regional Road 81)	Thirty Road	Lincoln Avenue	0.57	Niagara Region	Rural	Paved Shoulder	Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 85,663	Medium
Centre Street	Pelham Road	Town of Pelham boundary	0.51	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 506	Long
Durham Road North	Blezard Drive	North Service Road	0.51	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 509	Long
Glass Avenue	Ninth Street	City of St. Catharines boundary	0.21	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 208	Long
South Service Road (Regional Road 40)	Jordan Road	City of St. Catharines boundary	0.97	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Inter-Municipal Link - Primary	$ 150,000	$ 144,755	Medium
Mountainview Road	Blezard Drive	North Service Road	0.64	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 642	Long
Mountainview Road	Town of Grimsby boundary	Klondike Road	0.54	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 540	Long
Ninth Street	Fourth Avenue	Pelham Road	5.17	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 5,166	Long
Ninth Street	Glass Avenue	Fourth Avenue	1.03	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 1,029	Long
Thirty Road	King Street	Town of Grimsby boundary	1.24	Lincoln	Rural	Paved Shoulder	Paved Shoulder	Inter-Municipal Link - Secondary	$ 150,000	$ 186,578	Long
Thirty Road	Mountainview Road	King Street	1.29	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 1,288	Long
Twenty-First Street	Glen Road	Eighth Avenue	2.05	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 2,047	Long
Twenty-First Street	Eighth Avenue	Spring Creek Road	1.03	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 1,029	Long
Wessel Drive	Pelham Road	Town of Pelham boundary	0.37	Lincoln	Rural	Signed Route	N/A	Inter-Municipal Link - Secondary	$ 1,000	$ 374	Long
Aberdeen Road	King Street	Hillside Drive	1.04	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 1,250	Short

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Bartlett Road	South Service Road	Union Road	0.64	Lincoln	Urban	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 95,897	Short
Bartlett Road	Greenlane	Greenlane	0.11	Lincoln	Rural	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 15,803	Short
Bartlett Road	Union Road	Greenlane	0.23	Lincoln	Urban	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 35,126	Short
Bartlett Road	Greenlane	East of Northgate Crescent	0.38	Lincoln	Rural	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 57,638	Short
Bartlett Road	Bartlett Road	King Street	1.56	Lincoln	Urban	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 233,636	Short
Brookside Drive	Epp Street	King Street	0.19	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 232	Short
Cherry Avenue	Greenlane	King Street	2.75	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 2,749	Short
Cherry Avenue	King Street	Fly Road	2.43	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 2,435	Short
Frost Road	Kinsmen Park	Fly Road	1.35	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 1,349	Short
Glen Road	King Street	Sixth Avenue	1.55	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 1,858	Short
Glen Road	Sixth Avenue	Glen Road	0.23	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 227	Short
Glenview Drive	Glenbrook Drive	Epp Street	0.34	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 409	Short
Greenlane	Thirty Road	Lincoln Avenue	0.83	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 833	Short
Greenlane	Lincoln Avenue	Konkle Trail	0.43	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 512	Short
Highland Park Drive	Stadelbauer Drive	Kayla Street	0.43	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 515	Short
Hillside Drive	Mountain Street	Ashby Drive	0.31	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 310	Short
Hillside Drive	Ashby Drive	Aberdeen Road	0.60	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 604	Short
Hillside Drive	Mountain Street	Ashby Drive	0.22	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 221	Short
Hixon Street	Ann Street	Edelheim Street	0.43	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 426	Short
Konkle Creek Trail	Greenlane	West of West Avenue	1.23	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Local Connecting Loop - Primary	$ 350,000	$ 430,407	Short
Konkle Road	Mountainview Road	Philp Road	1.13	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 1,127	Short
Laurie Avenue	Victoria Avenue	Waterfront Trail	0.19	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 233	Short
Lincoln Avenue	King Street	McLeod Street	0.78	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 937	Short
Lincoln Avenue	Greenlane	King Street	1.22	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 1,469	Short
Locust Lane	McLeod Street	Mountainview Road	0.77	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 767	Short
Locust Lane	McLeod Street	Mountainview Road	0.43	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 425	Short
McLeod Street	Locust Lane	Lincoln Avenue	0.42	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 503	Short
McLeod Street	Mountainview Road	Locust Lane	0.45	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 449	Short
Mountainview Road	Konkle Road	Locust Lane	0.91	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 907	Short
Mountainview Road	Locust Lane	Bruce Trail entrance	0.46	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 456	Short
Mountainview Road	Overpass at QEW	Bruce Trail entrance	2.46	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 2,457	Short
Mountainview Road	Overpass at QEW	Bruce Trail entrance	1.05	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 1,051	Short
Nineteenth Street	Red Maple Avenue	King Street	0.84	Lincoln	Urban/Rural	Cycle Track	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 375,000	$ 313,921	Short
Philip Road	Konkle Road	Fly Road	2.48	Lincoln	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 2,479	Short
Proposed Highland Park Drive Extension	Kayla Street	West of Hillside Drive	0.81	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 977	Short
Sixth Avenue	Victoria Avenue	Twenty-First Street	1.15	Lincoln	Rural	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 171,851	Short
South Service Road Trail	South Service Road	South Service Road	0.80	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Local Connecting Loop - Primary	$ 350,000	$ 280,708	Short
South Shore Boulevard	Waterfront Trail in Prudhommes	Waterfront Trail in Prudhommes	0.25	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 298	Short
Stadelbauer Drive	Taylor Court	North West of Highland Park Drive	0.49	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 594	Short
Stadelbauer Drive	Poplar Drive Trail	Taylor Court	0.29	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 348	Short
Stadelbauer Drive	King Street	Proposed off-road trail	0.25	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 297	Short

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Stadelbauer Drive	Saint George's Drive	Proposed trail north of Highland Park Drive	0.09	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 111	Short
Twenty-First Street	Connection to proposed off-road trail	Wismer Street	0.56	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Primary	$ 1,200	$ 673	Short
Victoria Avenue North	Laurie Avenue	North Service Road	0.41	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 494	Short
Wismer Street	Twenty-First Street	Nineteenth Street	0.10	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Primary	$ 1,200	$ 118	Short
Jordan Road (Regional Road 26)	North Service Road	South Service Road	0.36	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 53,726	Short
South Service Road (Regional Road 40)	Bartlett Road	Approximately 510 metres west of Bartlett Road (connect to proposed off-road trail)	0.51	Niagara Region	Urban	Buffered Paved Shoulder	Buffered Paved Shoulder	Local Connecting Loop - Primary	$ 225,000	$ 114,337	Short
Victoria Avenue (Regional Road 24)	Moyer Road	Sixth Avenue	0.35	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Local Connecting Loop - Primary	$ 150,000	$ 52,825	Short
Marina Boulevard	Victoria Avenue	Queen Elizabeth Way South Ramp	0.20	Niagara Region	Rural	Paved Shoulder	Paved Shoulder	Local Connecting Loop - Primary	$ 1,000	$ 203	Short
Marina Boulevard	Queen Elizabeth Way South Ramp	Twenty-First Street	1.12	Niagara Region	Rural	Signed Route	N/A	Local Connecting Loop - Primary	$ 1,000	$ 1,124	Short
Alyssa Drive	John Street	Serena Drive	0.30	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 360	Medium
Bridgeport Drive	Prince William Street	Red Maple Avenue	0.29	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 348	Medium
Glenbrook Drive	Brookside Drive	Cody Trail	0.25	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 306	Medium
Glenbrook/Main Trail	Glenbrook Drive	Main Street	0.19	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Local Connecting Loop - Secondary	$ 350,000	$ 65,394	Medium
Greenlane	Konkle Trail	Bartlett Road	1.27	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Secondary	$ 1,200	$ 1,519	Medium
Hartwood Park Trail	Trail East of Tamara Avenue	Trail West of Alyssa Drive	0.08	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Local Connecting Loop - Secondary	$ 350,000	$ 28,398	Medium
Hixon Street	Ann Street	Edelheim Street	1.17	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 1,405	Medium
Hixon Street	King Street	Ann Street	0.26	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 317	Medium
John Street	Ontario Street	Bartlett Road	0.91	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Secondary	$ 1,200	$ 1,089	Medium
Meadowood Lane	Lincoln Avenue	Mulberry Drive	0.27	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 324	Medium
Mulberry Drive	Meadowood Lane	Tamarac Park	0.09	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 102	Medium
Nineteenth Street	Red Maple Avenue	King Street	1.06	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Secondary	$ 1,200	$ 1,271	Medium
Prince William Street	Bridgeport Drive	Jordan Road	0.61	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 729	Medium
Tallman Drive	Victoria Avenue	Proposed off-road trail	0.39	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Local Connecting Loop - Secondary	$ 1,200	$ 468	Medium
Tallman/Glenbrook Trail	Tallman Drive	Glenbrook Drive	0.18	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Local Connecting Loop - Secondary	$ 350,000	$ 62,827	Medium
Twenty-Third Street	Tallman Drive	King Street	0.26	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 308	Medium
West Avenue	West Avenue terminus	King Street	0.21	Lincoln	Urban	Signed Route	Sidewalk	Local Connecting Loop - Secondary	$ 1,200	$ 256	Medium
Jordan Road (Regional Road 26)	Fourth Avenue	King Street	1.25	Niagara Region	Rural	Buffered Paved Shoulder	Buffered Paved Shoulder	Local Connecting Loop - Secondary	$ 150,000	$ 187,881	Medium
Ontario Street North	Road terminus	North Service Road	0.42	Lincoln	Rural	Bike Lane	N/A	Local Spine Link	$ 53,000	$ 22,508	Short
Ontario Street	Friesen Boulevard	North of John Street	0.28	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 14,901	Short
Ontario Street	John Street	Chestnut Court	0.06	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 3,369	Short
Ontario Street	Chestnut Court	Gibson Street	0.10	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 5,360	Short
Ontario Street	Gibson Street	Fairgrounds Road	0.11	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 6,014	Short
Ontario Street	Fairgrounds Road	May Street	0.11	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 5,681	Short
Ontario Street	May Street	North Lane	0.14	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 7,333	Short
Ontario Street	Greenlane	Homestead Drive	0.25	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 13,345	Short
Ontario Street	North Lane	King Street	0.05	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 2,632	Short

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Ontario Street	Homestead Drive	North of Drake Avenue	0.11	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 5,567	Short
Ontario Street	Chestnut Court	Chestnut Court	0.04	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 2,119	Short
Ontario Street (Regional Road 18)	Drake Avenue	Friesen Boulevard	0.18	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 9,446	Short
Ontario Street	North of John Street	John Street	0.09	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 4,573	Short
Ontario Street	North of Drake Avenue	Drake Avenue	0.06	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 3,259	Short
Ontario Street	North of Drake Avenue	North of Drake Avenue	0.04	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 1,909	Short
Ontario Street	North of Drake Avenue	North of Drake Avenue	0.03	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 1,810	Short
King Street (Regional Road 81)	Lincoln Avenue	Bartlett Road	0.94	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 49,632	Short
King Street (Regional Road 81)	Lincoln Avenue	Bartlett Road	0.11	Niagara Region	Urban	Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 6,036	Short
Victoria Avenue (Regional Road 24)	King Street	Moyer Road	0.61	Niagara Region	Urban	Buffered Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 32,484	Short
King Street (Regional Road 81)	Vinehaven Trail	Orchard Avenue	0.93	Niagara Region	Urban	Buffered Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 49,462	Short
King Street (Regional Road 81)	Lincoln Avenue	Bartlett Road	0.91	Niagara Region	Urban	Buffered Bike Lane	Sidewalk	Local Spine Link	$ 53,000	$ 48,266	Short
Victoria Avenue (Regional Road 24)	Moyer Road	Sixth Avenue	1.04	Niagara Region	Urban/Rural	Buffered Paved Shoulder	Sidewalk (within urban area)	Local Spine Link	$ 150,000	$ 156,174	Short
King Street (Regional Road 81)	Orchard Avenue	Twenty-Third Street	0.17	Niagara Region	Urban	Buffered Paved Shoulder	Buffered Paved Shoulder	Local Spine Link	$ 150,000	$ 26,010	Short
King Street (Regional Road 81)	Brookside Drive	Nineteenth Street	1.39	Niagara Region	Urban/Rural	Buffered Paved Shoulder	Sidewalk (within urban area)	Local Spine Link	$ 150,000	$ 209,249	Short
Ontario Street North	North Service Road	Greenlane	1.26	Niagara Region	Urban	In-Boulevard Trail	In-Boulevard Trail	Local Spine Link	$ 325,000	$ 408,679	Short
King Street (Regional Road 81)	Thirty Road	Lincoln Avenue	0.93	Niagara Region	Urban/Rural	Paved Shoulder	Sidewalk (within urban area)	Local Spine Link	$ 150,000	$ 139,287	Short
Mountain Street	Queen Street	King Street	0.30	Niagara Region	Urban	Signed Route	Sidewalk	Local Spine Link	$ 1,200	$ 357	Short
Union Road	Ontario Street	Bartlett Road	0.92	Lincoln	Urban	Bike Lane	Sidewalk	Tertiary	$ 53,000	$ 48,777	Long
Stadelbauer Trail	Stadelbauer Drive	Stadelbauer Drive	0.81	Lincoln	Urban	N/A	Walking Trail	Tertiary	$ 300,000	$ 242,978	Long
Mountainview Trail	West of Mountainview Road	West of Mountainview Road	0.84	Lincoln	Rural	N/A	Walking Trail	Tertiary	$ 300,000	$ 251,675	Long
Highland Park/William Trail	North of Highland Park Drive	William Street	0.48	Lincoln	Urban	N/A	Walking Trail	Tertiary	$ 300,000	$ 142,854	Long
Poplar/Stadelbauer Trail	Poplar Drive	Stadelbauer Drive	0.12	Lincoln	Urban	N/A	Walking Trail	Tertiary	$ 300,000	$ 37,262	Long
Alyssa/West Trail (upgrade existing)	Alyssa Drive	West Avenue	0.09	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 187,500	$ 17,315	Long
Vineland Estates Park Trail	Simons Lane	Miller Avenue	0.18	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 64,091	Long
Simons/Twenty-Third Trail	Simons Lane	Twenty-Third Street	0.14	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 49,537	Long
Prudhomme Trail	North of North Service Road	South of Prudhomme Trail	0.61	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 214,722	Long
Saint George's Park Trail	Saint George's Drive	Cassandra Drive	0.29	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 100,666	Long
Eastdale/Ashby Trail	Eastdale Drive	Boundary of Cherry Heights Subdivision	0.25	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 88,495	Long
Arejay/King Trail	Arejay Avenue	King Street	0.50	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 176,119	Long
Carlton/Arejay Trail	Southeast of Carlton Court	North of Arejay Avenue	0.06	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 21,427	Long
Central/East Trail	Central Avenue	West of East Avenue	0.29	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 101,787	Long
Prudhomme Trail	Prudhomme Trail	East of Dustan Street	0.35	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 123,400	Long
Concord/East Trail	East of Concord Avenue	West of East Avenue	0.32	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 113,562	Long
Eastdale/Ashby Trail	Boundary of Cherry Heights Subdivision	East of Ashby Drive	0.24	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 83,227	Long
Prudhomme Trail/Niagara Bikeway Network	Northeast of South Shore Boulevard	North of Prudhomme Boulevard	1.04	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 363,152	Long

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Prudhomme Trail	Prudhomme Trail	Prudhomme	0.09	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 32,398	Long
Prudhomme Trail	Prudhomme Trail	Prudhomme	0.09	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 31,666	Long
Prudhomme Trail	Prudhomme Trail	Prudhomme	0.10	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 34,781	Long
Tallman/Glenbrook Trail	Tallman/Glenbrook Trail	West of Brookside Drive	0.33	Lincoln	Rural	Off-Road Trail	Off-Road Trail	Tertiary	$ 200,000	$ 66,112	Long
Comfort/Bartlett Trail	North of Comfort Crescent	West of Bartlett Road	0.14	Lincoln	Urban	Off-Road Trail	Off-Road Trail	Tertiary	$ 350,000	$ 48,621	Long
Sixth Avenue	Victoria Avenue	Twenty-First Street	0.33	Lincoln	Rural	Paved Shoulder	Paved Shoulder	Tertiary	$ 150,000	$ 50,189	Long
Central Avenue	John Street	King Street	0.68	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 818	Long
Hartwood Avenue	Friesen Boulevard	Silverbirch Lane	0.08	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 99	Long
Drake Avenue	Ontario Street	Garden Gate Terrace	0.54	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 642	Long
Miller Avenue	Menno Street	Miller Avenue terminus	0.23	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 282	Long
Tallman Drive	Victoria Avenue	Proposed off-road trail	0.43	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 520	Long
Cherry Heights Boulevard	King Street	Eastdale Drive	0.11	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 129	Long
Saint George's Drive	Stadelbauer Drive	Prokich Court	0.27	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 321	Long
May Street	Ontario Street	Central Avenue	0.18	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 216	Long
Juniper Court	Greenlane	Juniper Court terminus	0.18	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 215	Long
Garden Gate Terrace	Greenlane	Hillary Bald Park	0.50	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 594	Long
Cassandra Drive	Mountain Street	Angelina Macri Prokich Park	0.20	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 234	Long
George Street	Mountain Street	Hixon Street	0.17	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 203	Long
Queen Street	King Street	Mountain Street	0.37	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 449	Long
Michael Avenue	Alexandra Avenue	John Street	0.35	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 421	Long
Rittenhouse Road	Vineland Cemetery Entrance	Victoria Avenue	0.72	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 862	Long
Marlin Court	Menno Street	Marlin Court	0.12	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 143	Long
Alexandra Avenue	Dennis Avenue	Garden Gate Terrace	0.16	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 193	Long
Friesen Boulevard	Hartwood Avenue	Ontario Street	0.21	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 254	Long
Sandy Cove Drive	End of Sandy Cove Drive	Sann Road North	0.50	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 499	Long
Menno Street	Victoria Avenue	Miller Avenue	0.13	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 156	Long
Moyer Road	Campden Road	Tintern Road	0.84	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 843	Long
Silverbirch Lane	Hartwood Avenue	Hartwood Avenue	0.26	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 316	Long
Epp Street	Brookside Drive	Glenview Drive	0.09	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 112	Long
Fletcher Avenue	Davey Court	Tallman Drive	0.23	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 273	Long
Stadelbauer Drive	Saint George's Drive	Proposed trail north of Highland Park Drive	0.13	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 151	Long
Leonard Crescent	Mountain Road	Bruce Trail entrance	0.38	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 381	Long
Lakeside Drive	Lakeside Drive	Tufford Road North	0.65	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 653	Long
Staff Avenue	Bruce Trail	Eighth Avenue	0.80	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 796	Long
Moyer Road	Tintern Road	Cherry Avenue	0.84	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 842	Long
Campden Road	Spring Creek Road	Township of West Lincoln boundary	1.12	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 1,121	Long
Serena Drive	Alyssa Drive	Ontario Street	0.37	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 442	Long
Simons Lane	Culp Road	Vineland Park Loop	0.22	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 262	Long
Moyer Road	Cherry Avenue	Victoria Avenue	1.69	Lincoln	Urban/Rural	Signed Route	Sidewalk (within urban area)	Tertiary	$ 1,200	$ 2,025	Long
Claus Road	Cherry Avenue	Martin Road	0.83	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 828	Long
Ann Street	Mountain Street	Hixon Street	0.07	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 84	Long
Frost Road	Fly Road	Yonge Street	2.08	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 2,075	Long
Frost Road	Yonge Street	Spring Creek Road	1.29	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 1,294	Long
Ivy Gardens Crescent	Cedarbrook Lane	Existing walking trail	0.13	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 156	Long
Hartwood Avenue	Hartwood Park	Silverbirch Lane	0.08	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 94	Long
Main Street	Wismer Street	Church Lane terminus	0.35	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 422	Long
Simons Lane	Vineland Park Loop	Proposed off-road trail	0.12	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 146	Long
Cedarbrook Lane	Saint Volodymyr Park	Friesen Boulevard	0.33	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 395	Long
Garden Gate Terrace	Hillary Bald Park	Dennis Avenue	0.42	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 504	Long
Menno Street	Miller Avenue	Twenty-Third Street	0.30	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 362	Long
Magnolia Drive / Azalea Crescent	Rittenhouse Estates Park	King Street	0.22	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 267	Long
Walker Road	Town of Grimsby boundary	Valentino Road	0.59	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 594	Long
Walker Road	Valentino Road	Fly Road	3.17	Lincoln	Rural	Signed Route	N/A	Tertiary	$ 1,000	$ 3,173	Long
Rittenhouse Road	Vineland Cemetery entrance	King Street	0.09	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 107	Long
Highland Park Drive / Elizabeth Street	Stadelbauer Drive	Mountain Street	0.65	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 777	Long
William Street	King Street	Elizabeth Drive	0.81	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 977	Long
St. George's Drive	Prokich Court	Elizabeth Street	0.25	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 300	Long
Adriana Avenue	Beverley Crescent	Bartlett Road	0.12	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 147	Long
Concord Avenue	John Street	North of Arejay Avenue	0.18	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 216	Long
Garden Gate Terrace	Dennis Avenue	John Street	0.09	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 112	Long
Alexandra Avenue	Michael Avenue	Garden Gate Terrace	0.09	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 106	Long

Table 1: Active Transportation Network Route Details

Road / Route Name	From	To	Length (KM)	Owner	Location	Proposed Facility Types	Recommended Pedestrian Facility Type	Route Purpose	Unit Price	Route Cost	Phasing
Hillview Drive	King Street	Lincoln Avenue	0.52	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 627	Long
Poplar Drive	Hillview Drive	End of Poplar Drive	0.05	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 56	Long
Brookside Drive	Epp Street	King Street	0.14	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 173	Long
Alyssa Drive	John Street	Serena Drive	0.32	Lincoln	Urban	Signed Route	Sidewalk	Tertiary	$ 1,200	$ 387	Long
Ontario Street	North of John Street	North of John Street	0.02	Niagara Region	Urban	Bike Lane	Sidewalk	Tertiary	$ 53,000	$ 1,187	Long
Ontario Street	North of John Street	North of John Street	0.02	Niagara Region	Urban	Bike Lane	Sidewalk	Tertiary	$ 53,000	$ 1,102	Long

Tables 2 and 3 summarizes the proposed active transportation network by priority routes and availability of funding, respectively.

Table 2: Summary of Facility Lengths by Route Purpose

Facility Type	Town of Lincoln - Priority Loops[1]									Niagara Region Distance (KM)[2]
	Distance (KM)	Total	Inter-Municipal Link Primary	Inter-Municipal Link Secondary	Local Connecting Loop Primary	Local Connecting Loop Secondary	Local Spine Link	Inter-Community Secondary	Tertiary	
Cycle Track	0.8	$ 313,921	$ -	$ -	$ 313,921	$ -	$ -	$ -	$ -	0.0
In-Boulevard Trail	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.3
Buffered Paved Shoulder	4.5	$ 1,009,362	$ -	$ 261,059	$ -	$ -	$ -	$ 748,303	$ -	20.5
Buffered Bike Lane	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	2.5
Bike Lane	1.3	$ 71,285	$ -	$ -	$ -	$ -	$ 22,508	$ -	$ 48,777	2.7
Paved Shoulder	5.6	$ 846,718	$ -	$ 186,578	$ 609,952	$ -	$ -	$ -	$ 50,189	2.3
Signed Route	94.6	$ 101,408	$ 848	$ 13,339	$ 31,103	$ 8,801	$ -	$ 17,473	$ 29,845	1.4
Off-Road Trail	7.6	$ 2,598,812	$ -	$ -	$ 711,114	$ 156,620	$ -	$ -	$ 1,731,078	0.0
Walking Trail	2.2	$ 674,769	$ -	$ -	$ -	$ -	$ -	$ -	$ 674,769	0.0
Total	**116.8**	**$ 5,616,275**	**$ 848**	**$ 460,976**	**$ 1,666,090**	**$ 165,421**	**$ 22,508**	**$ 765,775**	**$ 2,534,657**	**30.69**

Notes:
1. Only includes routes located on roads and lands under the jurisdiction of the Town of Lincoln.
2. Refer to the Niagara Region Transportation Master Plan - Strategic Cycling Network Development Technical Paper for phasing and costing of routes under the jurisdiction of Niagara Region.

Table 3: Summary of Facility Lengths by Funding

Facility Type	Distance (KM)	Total	Funding	
			Unfunded	Development Areas
Cycle Track	0.8	$ 313,921	$ 313,921	$ -
In-Boulevard Trail	0.0	$ -	$ -	$ -
Buffered Paved Shoulder	4.5	$ 1,009,362	$ 1,009,362	$ -
Buffered Bike Lane	0.0	$ -	$ -	$ -
Bike Lane	1.3	$ 71,285	$ 71,285	$ -
Paved Shoulder	5.6	$ 846,718	$ 846,718	$ -
Signed Route	94.6	$ 101,408	$ 97,994	$ 3,415
Off-Road Trail	7.6	$ 2,598,812	$ 1,626,971	$ 971,841
Walking Trail	2.2	$ 674,769	$ 674,769	$ -
Total	**116.8**	**$ 5,616,275**	**$ 4,641,020**	**$ 975,255**

Table 4 provides a summary of staging areas proposed as part of this TMP. Staging areas include AT crossings, trailheads, route transitions and other AT amenities.

Table 4: Summary of Proposed Staging Areas

Description	Type	Location
Kings Street at Ontario Street	AT Crossing	Urban
Greenlane at Ontario Street	AT Crossing	Urban
South Service Road at Ontario Street	AT Crossing	Urban
John Street at Ontario Street	AT Crossing	Urban
King Street at Central Avenue/Mountain Street	AT Crossing	Urban
John Street at Concord Avenue	AT Crossing	Urban
King Street at Victoria Avenue	AT Crossing	Urban
King Street at Nineteenth Street	AT Crossing	Urban
Jordan Lions Club Park	Major Trailhead	Rural
Near Sixth Avenue and Bruce Trail	Major Trailhead	Rural
Beamsville Lions Club Park	Major Trailhead	Rural
Kingsmen Park	Major Trailhead	Rural
South East of Prudhomme Boulevard and 21st St	Major Trailhead	Rural
Charles Daley Park	Major Trailhead	Rural
South of Main Street, East of Main and 21st	Minor Trailhead	Rural
North of King Street, West of King and 19th	Minor Trailhead	Rural
Near Glen Road and Bruce Trail	Minor Trailhead	Rural
Near Staff Avenue and Bruce Trail	Minor Trailhead	Rural
Near Pelham and Bruce Trail	Minor Trailhead	Rural
West of Mountainview Road and Bruce Trail	Minor Trailhead	Rural
West of Victoria Avenue and North Service Road	Minor Trailhead	Rural
Park East of Ashbby Drive (End of Nesbitt Street)	Minor Trailhead	Urban
Park East of Park Avenue, West of Serena Drive	Minor Trailhead	Urban
Hillary Bald Park	Minor Trailhead	Rural
West of Vineland Park, East of Twenty Valley Element	Minor Trailhead	Urban
End of Campden Road at Bruce Trail	Minor Trailhead	Rural
North Service Road at Ontario Street	Route Transition	Urban
South Service Road at Ontario Street	Route Transition	Urban
Greenlane at Ontario Street	Route Transition	Urban
Valentino Road at Walker Road	Route Transition	Rural
Mountainview Trail/Bruce Trail at Mountainview Road	Route Transition	Rural
Bruce Trail at Locust Lane	Route Transition	Rural
Bruce Trail at Leonard Crescent	Route Transition	Rural
Leonard Crescent at Mountain Road	Route Transition	Rural
Bruce Trail at Frost Road (Kinsmen Park)	Route Transition	Rural
Hixon Street at Edelheim Road	Route Transition	Rural
Bruce Trail at Campden Road	Route Transition	Rural
Bruce Trail at Victoria Avenue	Route Transition	Rural

Table 4: Summary of Proposed Staging Areas

Description	Type	Location
Bruce Trail at Glen Road	Route Transition	Rural
Bruce Trail at Staff Avenue	Route Transition	Rural
Bruce Trail at Ninth Street	Route Transition	Rural
Bruce Trail at Pelham Road	Route Transition	Rural
Union Road at Ontario Street	Route Transition	Urban
Saint Volodymyr Park at Juniper Court	Route Transition	Urban
Saint Volodymyr Park at Cedarbrook Lane	Route Transition	Urban
Drake Avenue North of Michael Avenue	Route Transition	Urban
Drake Avenue at Garden Gate Terrace	Route Transition	Urban
Beamsville Recreational Trail Northeast of Comfort Crescent	Route Transition	Urban
Beamsville Recreational Trail at Bartlette Road	Route Transition	Urban
Bartlette Creek Trail at John Street	Route Transition	Urban
Beverley Crescent at Adriana Avenue	Route Transition	Urban
Garden Gate Terrace North of Arejay Avenue	Route Transition	Urban
Alyssa/West Trail at Alyssa Drive	Route Transition	Urban
Alyssa/West Trail at West Avenue	Route Transition	Urban
Hartwood Park Trail at John Street	Route Transition	Urban
Greenlane/West Trail at Sumach/Hartwood Walkway	Route Transition	Urban
Mulberry/Tamara Walkway at Mulberry Drive	Route Transition	Urban
Poplar/Stadelbauer Trail at Hillview Drive	Route Transition	Urban
Poplar/Stadelbauer Trail at Stadelbauer Drive	Route Transition	Urban
Highland Park/William Trail at William Street	Route Transition	Urban
Arejay/King Trail at King Street	Route Transition	Urban
Eastdale/Ashby Trail West of Regent Court	Route Transition	Urban
Hillside Estates Trail at Hillside Drive	Route Transition	Urban
St Georges/Cassandra Trail at Cassandra Drive	Route Transition	Urban
St Georges/Cassandra Trail at St Georges Drive	Route Transition	Urban
Stadelbauer Drive at Highland Park Drive	Route Transition	Urban
Vineland Park Loop at Simons Lane	Route Transition	Urban
Vineland Park Trail at Twenty Third Street	Route Transition	Urban
Vineland Park Trail at Simons Lane	Route Transition	Urban
Vineland Park Trail at Miller Avenue	Route Transition	Urban
Rittenhouse Park Trail at Rittenhouse Road	Route Transition	Urban
Rittenhouse Park Trail at Azalea Crescent	Route Transition	Urban
Marlin/Davey Walkway at Marlin Court	Route Transition	Urban
Marlin/Davey Walkway at Davey Court	Route Transition	Urban
Tallman/Glenbrook Trail at Tallman Drive	Route Transition	Rural
Tallman/Glenbrook Trail at Glenbrook Drive	Route Transition	Urban
Glenbrook Drive at Cody Trail	Route Transition	Urban
Valentino Road at Walker Road	Trail/Cycing/Multi-Use Amenity	Rural
Mountainview Trail/Bruce Trail at Mountainview Road	Trail/Cycing/Multi-Use Amenity	Rural
Leonard Crescent at Mountain Road	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail at Campden Road	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail at Cherry Avenue	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail at Victoria Avenue	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail East of Victoria Avenue	Trail/Cycing/Multi-Use Amenity	Rural

Table 4: Summary of Proposed Staging Areas

Description	Type	Location
Bruce Trail South of King Street	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail at Staff Avenue	Trail/Cycing/Multi-Use Amenity	Rural
Bruce Trail at Ninth Street	Trail/Cycing/Multi-Use Amenity	Rural
Greenlane at Ontario Street	Route Transition	Urban

Table 5 summarizes the estimated maintenance costs for the Town of Lincoln, including all proposed routes as part of this TMP. Assumptions for maintenance costs is detailed in Table 6.

Table 5: Estimated Town AT Network Maintenance Costs

Facility Type	Proposed Total (KM)	Existing Total (KM)	Total Existing and Proposed (KM)	Per KM cost (per year)	Cost per year
Cycle Track	0.8	0.0	0.8	$6,650 - $8,050	$5,567 - $6,739
In-Boulevard Trail	0.0	0.0	0.0	$4,235 - $4,860	$0 - $0
Buffered Paved Shoulder	4.5	0.0	4.5	$7,660 - $9,260	$34,363 - $41,541
Buffered Bike Lane	0.0	0.0	0.0	$8,050 - $9,650	$0 - $0
Bike Lane	1.3	0.0	1.3	$6,650 - $8,050	$8,944 - $10,827
Paved Shoulder	5.6	0.8	6.4	$6,260 - $7,660	$40,344 - $49,367
Signed Route	94.6	37.8	132.4	$260 - $260	$34,420 - $34,420
Urban Shoulder	7.6	0.0	7.6	$6,260 - $7,660	$47,637 - $58,290
Off-Road Trail	2.2	4.4	6.6	$1,060 - $1,060	$7,048
Walking Trail	0.0	2.2	2.2	$2,550 - $2,550	$5,728
Total	**116.8**	**45.2**	**162.0**		**$184,051 - $212,788**

Table 6: Cost Assumptions for Additional Maintenance

Item	Unit Price	Assumptions
Painted Line Markings	$2.5 / m	Unit price is for a single 100 mm wide painted line marking, therefore assume - $5 / m for both sides of the road. Maintenance cost assumes that painted line markings are fully replaced / renewed on an annual basis.
Cold Plastic Line Markings	$5 / m	Unit price is for a single 100 mm wide cold plastic line marking, therefore $10 / m for both sides of the road. Maintenance cost assumes that plastic line markings are replaced every 5 years (or 20% annually). See calculations below: » $5 / m x 20% = $1 / m
Painted Stencils	$50 / each	Assumes stencils are placed every 75m as per OTM Book 18, therefore 26 stencils / kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be replaced / renewed on an annual basis. This equates to $400 per year. See calculations below: » $50 x 26 = $1,300 » $1,300 x 30% = $400
Cold Plastic Stencils	$275 / each	Assumes stencils are placed every 75m as per OTM Book 18. 26 signs per 1 kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be placed / renewed on an annual basis. This equates to $2,200 per year. See calculations below: » $275 x 26 = $7,150 » $7,150 x 30% = $2,200
Route Signs	$200 / each	Assumes 26 signs per kilometre (13 on both sides of the road / route). Maintenance cost assumes 5% of all signs will need to be replaced annually. This equates to $260 annually. See calculations below: » $200 x 26 = $5,200 » $5,200 x 5% = $260
Sweeping Costs	$2,400 - $4,000 / km	Assumes sweeping frequency of 6-10 times a year (uni-directional, one side of the road)
Sidewalk Maintenance	$2,550 / km	Includes winter and summer maintenance. Based on Town of Oakville Road and Works Operations budgets. Average cost for winter maintenance in is $1,750 / km. Sidewalks are maintained to a bare pavement standard (regular salt usage). Average cost for summer maintenance is $800 / km and includes annual Minimum Maintenance Standards inspections, rehabilitations and replacement work.

Table 7 provides an overview of the estimated unit costs used as part of this TMP for active transportation facilities and other elements of an active transportation and trails network. All unit prices exclude tax, contingency, design and approvals costs.

Table 7: Unit Prices

ITEM	DESCRIPTION	UNIT	UNIT PRICE RANGE	UNIT PRICE FOR ROUTE CALCULATION	COMMENTS / ASSUMPTIONS
1.0 GENERAL ACTIVE TRANSPORTATION FACILITIES					
Shared Lanes / Paved Shoulders					
1.1	Signed Bike Route in Urban Area	linear KM	$1,200	$1,200	Price for both sides of the road, assumes one sign a minimum of every 500 metres in the direction of travel. Price assumes that signs will be mounted on an existing post. Price includes: - $300 per sign x 4 signs (2 signs on each side of the road)
1.2	Signed Bike Route in Rural Area	linear KM	$1,000	$1,000	Price for both sides of the road, assumes one sign a minimum of every 2 kilometres in the direction of travel. Price assumes that signs will be mounted on a new post. Price includes: - $500 per sign x 2 signs (1 sign on either side of the road)
1.3	Signed Bike Route with Paved Shoulder in conjunction with existing road reconstruction / resurfacing	linear KM	$100,000 to $200,000	$150,000	1.5 metre paved shoulder on both sides of the road. Assumes cycling project pays for additional granular base, asphalt and painted line. Price may vary from $100,000 to $200,000 depending on work needed to improve platform. Price includes: - $300 per sign x 4 signs (2 signs on each side of the road) - $5.5 per metre for painted solid white line (both sides of the road) Price may be higher if road platform needs to be widened.
1.4	Signed Bike Route with Buffered Paved Shoulder in conjunction with existing road reconstruction / resurfacing project	linear KM	$200,000 to $250,000	$225,000	1.5 metre paved shoulder + 0.5-1.0 metre paved buffer on both sides of the road. Assumes cycling project pays for additional granular base, asphalt, painted edge lines and signs (buffer zone framed by white edgelines). Price may vary from $200,000 to $250,000. Price includes: - $300 per sign x 4 signs (2 signs on each side of the road) - $5.5 per metre for painted solid white line (both sides of the road)
Conventional and Separated Bike Lanes					
1.5	Conventional 1.5m-1.8m Bicycle Lanes through Lane Conversion from 4 lanes to 3 lanes	linear KM	$53,000	$53,000	Price for both sides. Includes grinding of existing pavement, markings, signs, painted markings. Assumes road is not to be resurfaced. The price assumes: - $11,000 for painted lane line ($5.5 per metre multiply by 2 for both sides of the road) - $10,400 for painted bike symbols (assumes $400 per symbol, 13 symbols per linear km multiply by 2 for both side of the road) - $2,500 for bike lane signs (assumes $350 per sign and tab, 5 signs per linear km - spaced every 200 metres - multiply by 2 for both sides of the road) - $3,900 for 'No Parking' signs (assumes $150 per sign, 13 signs per linear km multiply by 2). Signs to be mounted on existing and new posts. Price depends on number of stencils and signs used. - $6 to $8 per linear metre for lane line removal (soda blasting). Price varies on markings to be removed on a multi-lane roadway. Remove soda-blasting cost component if the road is being resurfaced. The cost for resurfacing to be part of resurfacing project.

Table 7: Unit Prices

ITEM	DESCRIPTION	UNIT	UNIT PRICE RANGE	UNIT PRICE FOR ROUTE CALCULATION	COMMENTS / ASSUMPTIONS
Conventional and Separated Bike Lanes - CONT'D					
1.6	Buffered Bicycle Lane with Hatched Pavement Markings - Assumes New Road or Road Reconstruction/Widening already Planned	linear KM	$381,000	$381,000	Price for 1.5m bike lanes + 0.5m hatched buffers on both sides of the roadway (1.5m x 2 sides = 3.0m). The price assumes: - $1,980 for catch basin leads ($55/m - assumes 50m catch basin spacing and 1.8m lead) - $360,000 for asphalt and sub-base ($55/m2 = 120 x 1.5m BL x 1000 x 2) - $19,000 for signs, stencils and edge line The roadway project funds all other improvements.
Cycle Tracks					
1.7	Uni-directional Cycle Tracks: Raised and Curb Separated - In conjunction with existing road reconstruction / resurfacing project	linear KM	$250,000 - $500,000	$375,000	Both sides. Assumes cycle track will be implemented as part of road construction. Could include minor utility / lighting pole relocations. Other components such as bike signals, bike boxes etc. are project specific and will impact unit price.
Active Transportation Paths and Multi-Use Trails					
1.8	Two Way Active Transportation Multi-use path within road right-of-way	linear KM	$275,000 - $375,000	$325,000	3.0m wide hard surface pathway (asphalt) within road right of way (no utility relocations). Price depends of scale / complexity of project and if existing sidewalk is being removed (i.e. crushing of existing sidewalk and compacting for trail base).
1.9	Hard Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in an Urban Setting (New)	linear KM	$300,000 - $400,000	$350,000	3.0m wide hard surface pathway (asphalt) within park setting (normal conditions) 90mm asphalt depth. Price depends of scale / complexity of project.
1.10	Hard Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Urban Setting (Upgrade existing granular surface)	linear KM	$150,000 - $225,000	$187,500	Includes some new base work (25% approx.), half of the material excavated is removed from site. Price depends of scale / complexity of project.
1.11	Granular Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Rural Setting (New)	linear KM	$200,000	$200,000	3.0m wide, compacted stone dust surface in complex site conditions (includes cost of clearing and grubbing). Price depends of scale / complexity of project.
2.0 PEDESTRIAN FACILITIES					
2.1	Sidewalk	linear KM	$300,000	$300,000	Price for 1.5m concrete sidewalk. Include site prep., select utility relocation, minor drainage modifications / traffic control.

Notes:

1. Unit Prices are for functional design purposes only, include installation but exclude contingency, design and approvals costs (unless noted) and reflect 2019 dollars, based on projects in southern Ontario.
2. Estimates do not include the cost of property acquisitions, signal modifications, utility relocations, major roadside drainage works or costs associated with site-specific projects such as bridges, railway crossings, retaining walls, and stairways, unless otherwise noted.
3. Assumes typical environmental conditions and topography.
4. Applicable taxes and permit fees are additional.

Table 8 provides an overview of road and intersection improvements proposed for the roads and goods movement networks as part of this TMP. An overview of the unit costs is located in Table 10.

Table 8: Road Network Route Details

Road / Route Name	From	To	Length (KM)	Improvement	Comment	Category	Phase	Unit Cost	Road Cost (rounded to the nearest $1,000)
19th Street	Fourth Avenue	King Street	N/A	Road Improvement	Jordan Village Improvements	Roads	Short	$ -	$ 5,800,000
Bartlett Road	South Service Road	King Street	2.87	Road Improvement		Goods movement and Roads	Short	$ 605,000	$ 1,738,000
Durham Road	South Service Road	King Street	1.01	Road Improvement		Goods movement and Roads	Short	$ 605,000	$ 615,000
Greenlane	Barlett Road	Victoria Avenue	5.84	Road Improvement		Roads	Long	$ 605,000	$ 3,533,000
Greenlane	Lincoln Avenue	Bartlett Road	1.69	Road Improvement		Roads	Medium	$ 605,000	$ 1,022,000
Greenlane	Durham Road	Lincoln Avenue	1.68	Road Improvement		Roads	Short	$ 605,000	$ 1,016,000
Lincoln Avenue	South Service Road	Greenlane	0.98	Road Improvement		Roads	Medium	$ 605,000	$ 591,000
Lincoln Avenue	Greenlane	King Street	1.22	Road Improvement		Roads	Medium	$ 2,000,000	$ 2,448,000
Mountain Street	King Street		N/A	Intersection Improvement	Intersection Improvements (Truck Turning Movements)	Goods movement	Short	$ 65,000	$ 260,000
Ontario Street	Greenlane	South of Union Road	0.29	Road Improvement	Widening	Roads	Medium	$ 4,908,000	$ 1,446,000
Stadelbauer Drive	King Street		N/A	Intersection Improvement	Intersection Signalization	Roads	Short	$ 65,000	$ 260,000
Victoria Avenue	South Service Road		N/A	Intersection Improvement		Roads	Short	$ 65,000	$ 260,000

Table 9 provides a summary of the proposed road and intersection improvements located in the Town of Lincoln by phase.

Table 9: Summary of Road Improvements by Phase

Improvement Type	Short Term		Medium Term		Long Term		Total	
	Distance (KM)	Cost	Distance (KM)	Cost	Distance (KM)	Cost	Distance (KM)	Cost
Road Improvement	5.57	$ 9,169,000	4.18	$ 5,507,000	5.84	$ 3,533,000	15.59	$ 18,209,000
Intersection Improvement	N/A	$ 780,000	N/A	$ -	N/A	$ -	N/A	$ 780,000
Total	**5.57**	**$ 9,949,000**	**4.18**	**$ 5,507,000**	**5.84**	**$ 3,533,000**	**15.59**	**$ 18,989,000**

Table 10 provides an overview of the estimated unit costs used as part of this TMP for road and intersection improvements. All unit prices exclude tax, contingency, design and approvals costs.

Table 10: Unit Prices

			Inflation Factor (2016 to 2019): 7.5%	
ITEM	**DESCRIPTION**	**UNIT**	**2016 MTO PARAMETRIC RATES**	**2019 UNIT RATES (ROUNDED TO THE NEAREST $1,000)**
1.0	**Road Improvement**			
1.1	Resurfacing/ Reconstruction	Cost Per Centre Line km	$562,000	$605,000
	Resurfacing/Reconstruction (include road/curb/storm works to be fully urbanized)	$1,800 to $2,000 per m as recommended by Walter (email August 21, 2019)		$2,000,000
1.2	Widening - Adding 1 New Lane	Adding 1 New Lane, Per Lane km	$4,564,750	$4,908,000
2.0	**Signals and Intersection**			
	Signals	Per intersection leg	$60,000	$65,000

Note:
1) Cost estimate for rail crossing grade separation is based on 'Rail Crossing Grade Separation Prioritization Study - 2016' conducted for the Town of Richmond Hill.