WOOLWICH
TOWNSHIP



Township of Woolwich

Comprehensive Transportation & Mobility Plan

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Prepared For: The Township of Woolwich

egis

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Executive Summary

The Township of Woolwich is experiencing ongoing growth and evolving travel patterns, creating both opportunities and challenges for its transportation network. The 2025 Comprehensive Transportation & Mobility Plan (CTMP) provides a strategic framework to guide investment, policies, and initiatives over the next 20 years to ensure a safe, efficient, and sustainable transportation system for all residents and businesses.

The CTMP integrates multiple modes of transportation, including road networks, active transportation, and transit, while addressing emerging mobility trends, development pressures, and regional coordination. It balances immediate operational needs with long-term infrastructure investments, while ensuring that planning decisions are guided by evidence, public input, and best practices.

Key Goals

- Improve safety for all users, with a focus on vulnerable road users.
- Enhance connectivity and accessibility across the Township, including active transportation networks.
- Support efficient movement of goods and people through coordination with regional transportation networks.
- Foster sustainable and resilient transportation solutions, including transit, emerging mobility, and multi-modal options.
- Align transportation investments with land use planning, growth management, and community priorities.

Recommended Actions and Investments

The CTMP identifies a range of recommendations, including:

- **Road Network Projects**: Most major road projects are on the Region of Waterloo network, requiring coordination with the Region for planning, feasibility studies, and implementation.
- **Active Transportation Infrastructure**: The Township's Active Transportation Master Plan (ATMP) provides a framework for sequencing walking, cycling, and multi-use trail projects.
- **Transit Initiatives**: Collaboration with Grand River Transit (GRT) is required to assess feasibility of new routes, rural transit options, and on-demand services.

- **Planned Subdivision Roads**: New development, such as the Ottawa Street extension and Breslau Connector Road, will include active transportation infrastructure as part of the Township's complete streets policy.
- **Policies and Studies**: Recommendations include policy development, planning studies, and monitoring programs to support effective implementation and ongoing evaluation.
- **Emerging Mobility**: The Township should monitor and integrate new mobility options such as e-bikes, e-scooters, ride-hailing, and shared mobility services in a safe and coordinated manner.

Phasing and Implementation

The CTMP sets out a phased approach to project delivery over short-term (0–5 years), medium-term (6–10 years), and long-term (11–20+ years) horizons. A Phased Implementation Framework provides a high-level overview of when and how projects will be implemented, including Township-led initiatives, policies, studies, and coordination with regional partners. Capital investments, policies, and studies will be implemented based on available resources, feasibility, and regional priorities.

Funding and Cost Estimates

The estimated cost for the Township to implement the 20-year build-out of recommended Township-led infrastructure, policies, and studies is approximately $1,100,000 (or $55,000 per year), excluding active transportation master plan recommendations, major projects undertaken with the Region or development-driven projects funded through subdivision agreements. Funding should be sourced from Township capital budgets, development charges, and other municipal, regional, provincial, and federal programs, including the Canada Community-Building Fund, Infrastructure Ontario loans, and federal active transportation programs. Active transportation infrastructure costs are detailed in the ATMP.

Monitoring and Performance

A set of Key Performance Indicators (KPIs) will allow the Township to track progress in meeting CTMP objectives, including safety, mode share, transit use, and road network performance. Monitoring can be conducted using existing data sources where available, supplemented with targeted studies and surveys.

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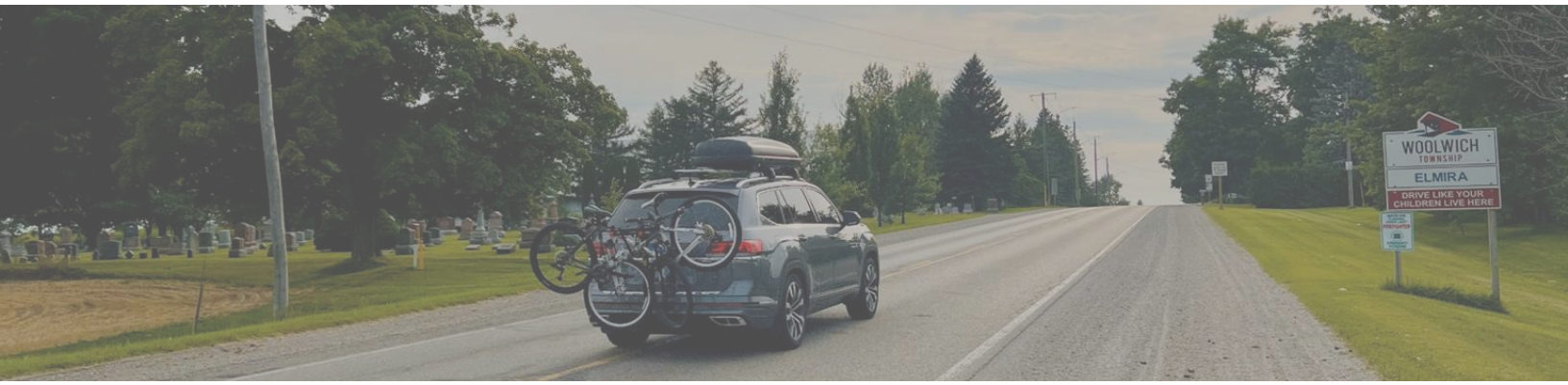
1 Introduction

The Housing Accelerator Fund (HAF) is a federal initiative designed to help municipalities increase housing supply and accommodate population growth. In 2024, following a successful application for HAF funding, the Township of Woolwich engaged Egis to develop its first Comprehensive Transportation and Mobility Plan (CTMP).

The CTMP is a strategic policy document that will guide the Township in addressing future growth and improving connectivity. As part of a broader strategy that includes other HAF-funded initiatives, the CTMP aims to build a more accessible, sustainable, and inclusive transportation network that responds to the evolving needs of the community.

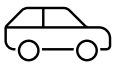
The plan will outline short-, medium-, and long-term strategies for enhancing the Township's road network, public transit, cycling infrastructure, and pedestrian facilities. It will focus on key settlement areas, Breslau, Elmira, and St. Jacobs and prioritize active transportation, carbon reduction, and long-term community resilience.

Ultimately, the CTMP will help ensure that Woolwich remains safe, connected, and sustainable, while aligning with the Region of Waterloo's growth projections to 2051.



1.1 Project Scope

The scope of work for the Woolwich Comprehensive Transportation and Mobility Plan (CTMP) focuses on improving traffic operations, strengthening active transportation connectivity, and evaluating existing infrastructure, including roads, active transportation infrastructure, and transit. It also involves reviewing, updating, and establishing transportation policies, road classifications, and design standards to reflect current and future needs. As part of the study, future traffic volumes will be forecasted to ensure the Township's network can accommodate projected growth. Overall, the scope has been specifically tailored to address Woolwich's unique priorities and support the development of a safe, efficient, and sustainable transportation system.

 **Vision Statement and Objectives**	Develop a vision statement focusing on connectivity, sustainability, safety, and equity with measurable objectives for the transportation network
 **Transportation Infrastructure Analysis**	Provide a comprehensive inventory and assessment of current transportation infrastructure, including roads, public transit, and active transportation networks
 **Demographic and Economic Analysis**	Analyze population growth, employment trends, and economic factors influencing transportation needs with a focus on inclusivity and meeting diverse community needs
 **Stakeholder Engagement**	Organize public workshops, focus groups, and surveys to gather input from various stakeholders, ensuring transparent communication throughout the planning process
 **Transportation Demand Forecasting**	Use appropriate methodologies to predict future transportation needs, especially in growing communities such as Breslau, Elmira, and St. Jacobs
 **Modal Shift Strategies**	Propose strategies to encourage a shift from single-occupancy vehicles to alternative transportation modes such as public transit, cycling, and walking
 **Transit Oriented Development Recommendation**	Identify opportunities for mixed-use, compact developments around transit hubs such as the proposed Breslau GO
 **Parking Analysis**	Evaluate current parking provisions, with a focus on affordable housing, and propose adjustments to prevent over-parking in new developments
 **Sustainability**	Recommend sustainability strategies and safety measures to enhance road safety, accessibility, and minimize environmental impacts
 **Action Plan and Implementation Strategy**	Provide a detailed action plan with specific projects, timelines, funding sources, and recommendations for monitoring and evaluating progress

1.2 Study Process

The CTMP will be developed in accordance with the Municipal Class Environmental Assessment (MCEA) process, following Approach 1 as outlined in the MCEA guidelines. The CTMP will address Phase 1 – Problem and Opportunity, and Phase 2 – Alternative Solutions, of the five-phase MCEA process. This approach will support the streamlining and implementation of recommended capital works. Figure 1 outlines the MCEA planning and design process.

In accordance with the MCEA framework, the CTMP will follow these key steps:

1. Assess the existing conditions, area context and key transportation challenges in the Township.
2. Assess traffic operations and road safety across the network.
3. Identify current and future transportation and mobility needs, with a focus on developing transit-friendly communities and fostering sustainable communities
4. Develop and evaluate alternative solutions to meet the identified needs while enhancing safety, accessibility, and multimodal connectivity.
5. Update or develop relevant policies and design standards to support with the Township's goals.
6. Refine the preferred solutions and prepare a comprehensive CTMP document that guides long-term growth, infrastructure planning, and active transportation integration.

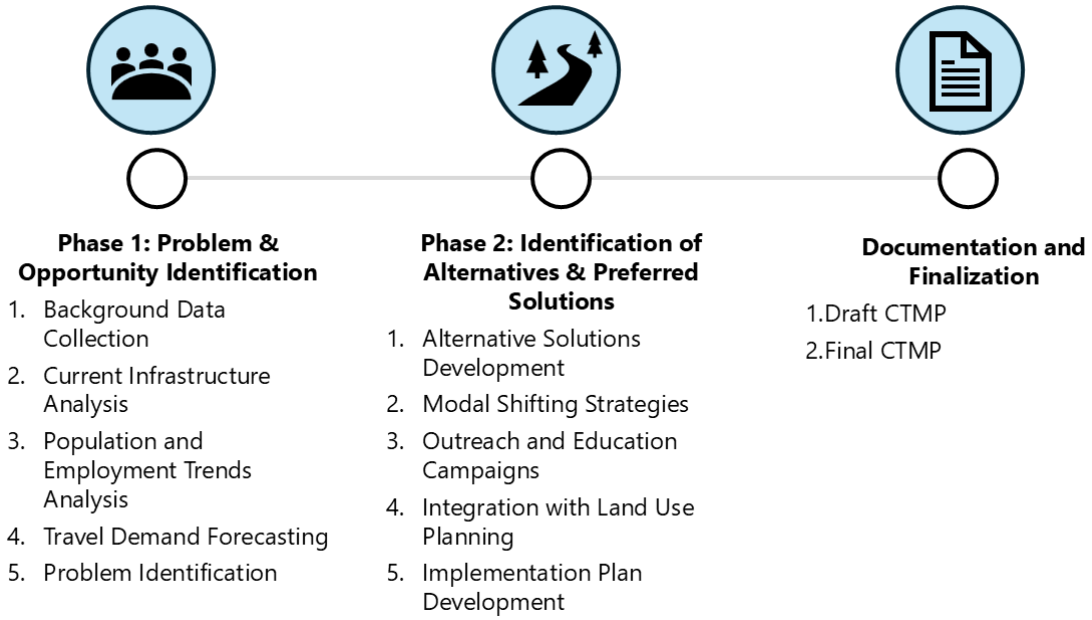


Figure 1: Study Process

1.3 Objectives

The CTMP will serve as a strategic framework to guide the Township of Woolwich in building a future-ready, inclusive, and sustainable transportation system. As the Township continues to grow and evolve, the CTMP aims to address current challenges while proactively planning for future needs. The main objectives of the plan are outlined below.

1. **Plan for Future Growth:** Support the Township's anticipated population and employment growth by ensuring transportation infrastructure is scalable, well-integrated, and capable of meeting increased demand. This includes aligning transportation investments with land use planning and development patterns to maintain mobility and accessibility as the community expands.
2. **Supporting Low Carbon, Resilient Communities:** Advance the Township's environmental and climate goals by promoting transportation solutions that reduce greenhouse gas emissions, increase energy efficiency, and build resilience to climate-related impacts. This includes encouraging mode shift away from single-occupancy vehicles and integrating sustainability into all aspects of transportation planning and design.
3. **Enhance Walking and Cycling Infrastructure:** Create safer, more accessible, and connected active transportation networks that encourage walking and cycling for daily trips. Enhancing pedestrian and cycling facilities will not only improve public health and environmental outcomes but also foster a more inclusive community for residents of all ages and abilities.
4. **Promoting Transit-Ready Communities:** Support the development of Transit-Oriented Communities by strengthening connections to existing transit services and encouraging delivery of a more robust transit network, including GO Transit and regional rail developments. This objective aims to improve regional connectivity, reduce auto dependency, and make transit a more viable option for residents and visitors.
5. **Improving Traffic Flow, Safety and Accessibility:** Enhance the efficiency and safety of the road network by addressing network capacity issues, improving intersection safety, and supporting traffic calming initiatives where appropriate. A key focus will be on ensuring roads are designed to safely accommodate all users, including pedestrians, cyclists, motorists, and vulnerable road users.
6. **Optimizing Parking Policy:** Review and refine the Township's parking strategy to better manage supply and demand, support efficient land use, and enhance the vibrancy of community spaces.

1.4 Public and Stakeholder Engagement

Consultation and engagement is a key component for a master plan. It allows those developing the plan to draw upon a wide range of local expertise, experience and knowledge in charting a path forward. The integration of staff, decision makers, residents, and stakeholders interests and values help to ensure the master plan reflects the needs and desires of those the plan is designed to serve.

During the CTMP's development, multiple audiences were engaged and feedback was incorporates into technical milestones, elements of the process and ultimately the report. A summary of phase 1 and 2, including the engagement tactics, milestones and high-level outcomes is included below. **Appendix A** provides detailed information and consultation material used during the engagement sessions.

Who was Engaged?

Residents: This group represents the individuals who live, work, and play within the Township of Woolwich.

Stakeholders, Technical Agencies, and Treaty Rights Holders: This group included various Township departments and technical agencies such as Ministry of Transportation (MTO), Ministry of Environment, First Nations, Grand River Conservation Authority, School Boards and Region of Waterloo.

Township Staff and Council: This group included those involved in the planning, implementation, decision making, operation, and management of the CTMP.

How Were They Engaged?

Online: Two rounds of virtual public engagement sessions and two focus groups with stakeholders and technical agencies were held.

Outreach: Promotional tools, social media, and the Township's project webpage to post consultation material and keep the public informed about the project.

Survey: Two community surveys were conducted through the Engage Woolwich platform to gather public input. The first survey sought to understand residents' perceptions of existing transportation conditions and their expectations for the future. The second survey focused on identifying key transportation issues and gathering feedback on potential solutions.

When Were They Engaged?

Round 1

- 2024 Dec 5 — First Public Workshop
- 2025 Jan 15 — First Online Survey
- 2025 Mar 5 — First Focus Group

Round 2

- 2025 July 28 — Second Online Survey
- 2025 Aug 21 — Second Focus Group
- 2025 Aug 27 — Second Public Workshop

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

What We Heard?

1. **Poor Road Infrastructure:** Despite cars and motorcycles being the primary modes of travel in the Township, many roads suffer from poor quality, potholes, and lack of maintenance. Prioritizing regular road repairs and investing in long-term infrastructure solutions will help improve safety, reliability, and travel comfort.
2. **Speeding and Safety Concerns:** Excessive speeding in specific areas of the Township, posing risks for pedestrians and cyclists.
3. **Public Transit Limitations:** Public transit ridership in the Township remains low, largely due to the dispersed and rural nature of the population and employment areas. Limited transit service further contributes to this challenge; however, opportunities exist to improve access and connectivity. Enhancing service coverage in communities such as Breslau, Conestogo, and other rural areas, while strengthening regional connections to Kitchener-Waterloo, would support more viable and coordinated transit options. Additionally, providing direct connections between Woolwich transportation hubs and the GO Station in Breslau, without requiring travel through Kitchener-Waterloo, could better serve residents.
4. **Lack of Cycling and Walking Infrastructure:** The Township lacks sufficient dedicated bike lanes and safe pedestrian pathways, especially in high-traffic areas and near schools. Expanding active transportation infrastructure will improve safety, accessibility, and support healthier, more sustainable travel choices.

2 Planning Context

To identify opportunities, recommendations, and strategies for improving the Township's transportation network, a comprehensive understanding of the current community context is essential. The following sections provide an overview of the Township's geographic context, along with a summary of key planning policies and documents that will inform the development of the CTMP.

2.1 Physical and Spatial Characteristics

The Township of Woolwich, located in the northeastern part of the Region of Waterloo in Ontario, is defined by several key physical characteristics:

- **Geographic Location & Size:** Woolwich spans approximately 31,912 hectares (78,854 acres) and had an estimated population of around 27,000 in 2023, making it the largest municipality by land area within the Region of Waterloo. Its expansive territory borders the City of Waterloo and Cambridge to the south and the Townships of Mapleton, Guelph Eramosa and Centre Wellington. This geographic positioning provides a strategic connection between rural communities and the more urbanized centres of the region.
- **Rural-Urban Composition:** The Township exhibits a diverse mix of rural landscapes and semi-urban / urban settlement areas, which include Breslau, Elmira, and St. Jacobs. These communities represent the Township's principal concentrations of population, employment, and development. Elmira, the largest and most urbanized centre, serves as the administrative and service hub and contains the highest number of trip generators and amenities. St. Jacobs is nationally recognized for its vibrant tourism scene, anchored by its artisanal shops and strong Mennonite heritage. Breslau, located adjacent to the Cit of Kitchener, and also containing the Region of Waterloo International Airport, is undergoing rapid residential and commercial growth, positioning it as an important future gateway to the Township.
- **Topography & Natural Features:** Woolwich's physical landscape is primarily flat to gently undulating, characteristic of southern Ontario's glacial plains. Its fertile soils, particularly loam and clay loam, are highly productive and support a wide range of agricultural uses. The Grand River and Conestogo River, which flow through the Township and are designated a Canadian Heritage Rivers, are the most significant natural feature. They are complemented by several smaller tributaries, creeks, wetlands, and forested woodlots, many of which serve critical environmental and recreational functions across the community.
- **Land Use:** The predominant land use across Woolwich is agricultural, characterized by extensive farm holdings that support both crop production and livestock operations. In

addition to its agricultural landscape, the Township's settlement areas feature a balanced mix of residential neighbourhoods, commercial nodes, industrial zones, and institutional uses, including schools and community facilities. Woolwich is also home to numerous protected and environmentally sensitive areas, particularly along the Grand River and Conestogo River corridors, where floodplains, wetlands, and woodlands are actively managed to preserve ecological integrity and mitigate development risk.

- **Transportation Infrastructure:** Woolwich is supported by an interconnected network of regional and provincial roads that enable movement within the Township and provide direct access to adjacent urban centres. Notably, Highway 7 runs through the southern part of the Township, linking Breslau to Kitchener, Guelph, and beyond. Rail infrastructure remains an important feature, especially in Breslau and Elmira, where active freight and passenger corridors exist. The planned development of the Breslau GO Station is a major infrastructure initiative that is expected to enhance regional mobility, attract new development, and reinforce Breslau's role as a key growth area within the Township. Furthermore, the Region of Waterloo International Airport serves A crucial gateway for the municipality.

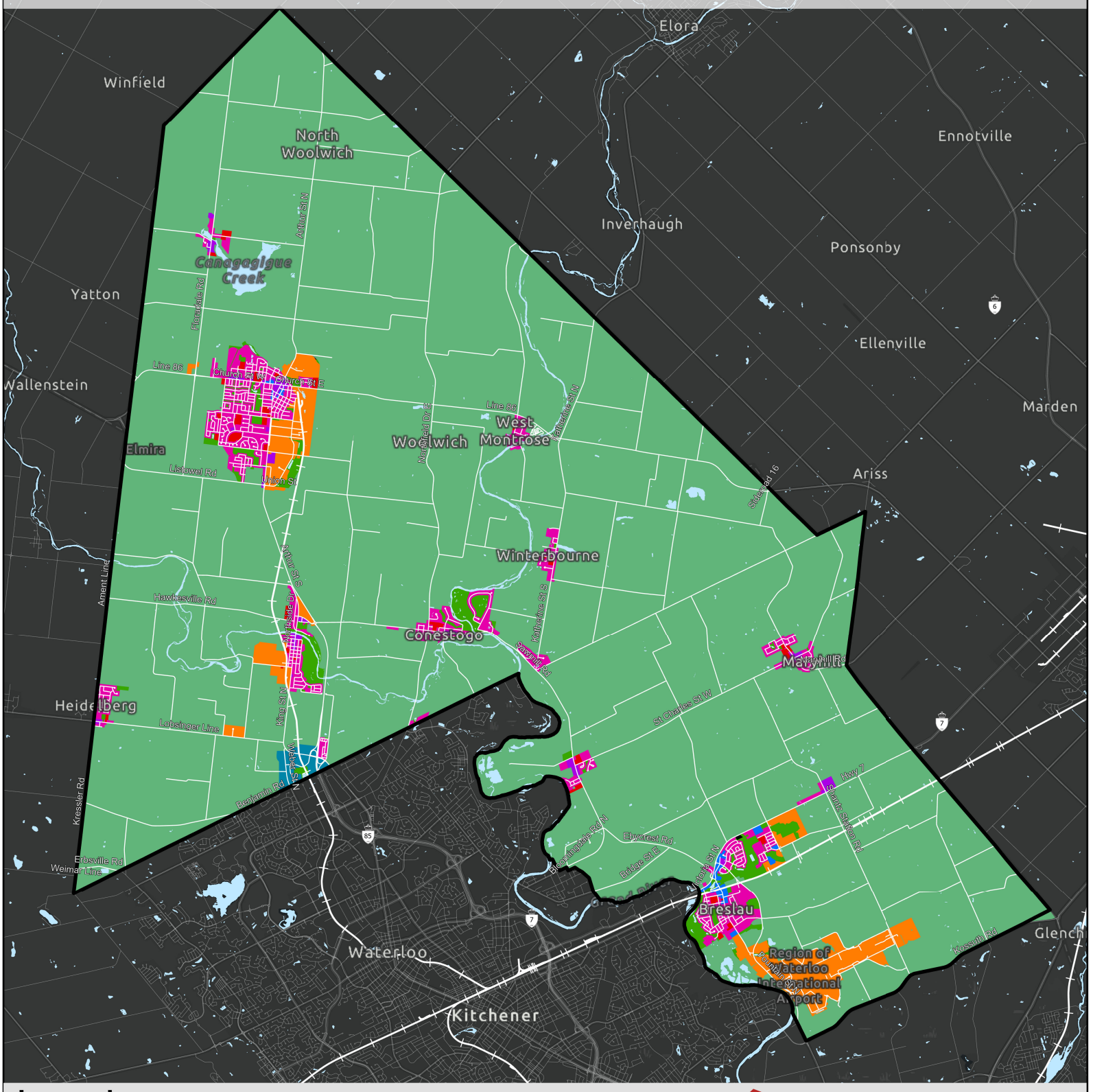
Map 1 presents the existing land use across the Township, while **Map 2** illustrates Woolwich's location within the Region of Waterloo, highlighting its settlement areas and key activity generators. These maps clearly highlight the following key observations, which align with the features described previously:

- Woolwich contains extensive areas designated for agriculture, which dominate the rural landscape.
- In settlement areas such as Breslau, Elmira, and St. Jacobs, land parcels are primarily designated for Residential and Employment uses.
- The Cities of Kitchener and Waterloo, located southwest of Woolwich, function as the primary employment centre in the broader region.
- Major activity generators across the Township include community centres, fire halls, libraries, police stations, schools, and the Region of Waterloo International Airport.
- Among these, schools are the most evenly distributed throughout the Township.
- Activity generators are predominantly concentrated in Elmira, followed by St. Jacobs, Conestogo, and Breslau.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 1: Existing Land Use



Legend

- Municipal Boundary
- Waterbody

Land Use

- Agriculture
- Commercial
- Employment
- Mixed-Use
- Open Space
- Instituitional
- Residential
- Stockyards
- Railway
- Road Network

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

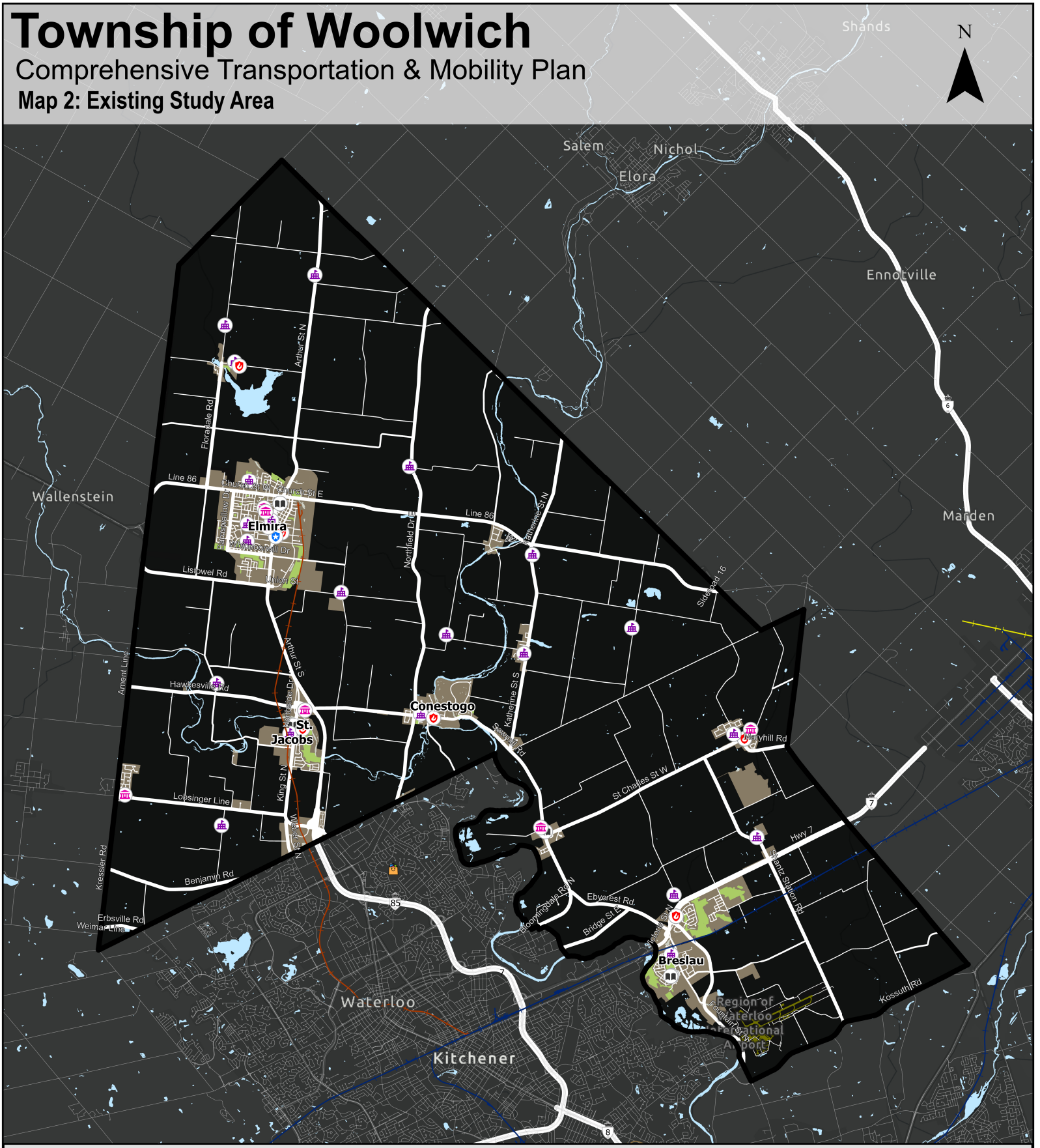
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GIS data provided by Township of Woolwich on December 2024

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 2: Existing Study Area



Legend

- Municipal Boundary
- Settlement Areas
- Park
- Airport
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Community Sites

- Community Centre
- Fire Hall
- Library
- Police Station
- School

Landmarks

- University
- Mall

0 1 2 4 Kilometers

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GIS data provided by Township of Woolwich on December 2024

2.2 Review of Relevant Literature

2.2.1 Federal

Federal Housing Accelerator Fund (HAF)

The Housing Accelerator Fund (HAF) is a federal initiative designed to help municipalities expand housing supply and accommodate population growth. In 2024, the Township of Woolwich secured $6.7 million, in four installments over the span of three years, to accelerate new housing development, focusing on ten initiatives within its urban centres of Breslau, and St. Jacobs. This funding will support the construction of 190 housing units over the next three years, contributing to the Township's plan to develop over 1,600 homes within the next decade. These efforts align with the Region of Waterloo's Official Plan, which projects a population of 51,000 by 2051. Due to this, the Township of Woolwich launched the development of this CTMP to address future growth and improve connectivity across the Township. As part of a wider strategy, including other HAF-funded projects, the CTMP aims to build a more accessible, sustainable, and inclusive transportation network that aligns infrastructure with future housing needs.

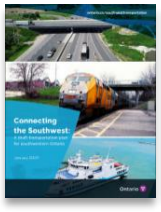
2.2.2 Provincial

Provincial Planning Statement (2024)

The Provincial Planning Statement (PPS) aims to provide a more flexible and streamlined approach to land use planning across Ontario while continuing to support key provincial priorities, including housing supply, economic development, infrastructure investment, and environmental protection. It emphasizes the integration of transportation and land use planning to facilitate the development of efficient, multimodal transportation systems. It supports compact and transit-supportive communities, enhanced connectivity, and infrastructure planning that aligns with long-term growth. The direction of the new PPS reinforces the importance of aligning municipal transportation planning with provincial objectives for mobility, sustainability, and growth management.

Connecting the Southwest: A draft transportation plan for southwestern Ontario (January 2020)

The transportation plan for southwestern Ontario provides a roadmap to help navigate the challenges of the region, explore opportunities and build an integrated transportation system for the people residing in this area of the Province. The plan is organized around the following goals to achieve the transportation vision of southwestern Ontario: (1) Getting people moving and connecting communities; (2) Supporting a competitive, open for business



environment; (3) Improving safety; (4) Providing more choice and convenience; and (5) Preparing for the future.

2.2.3 Greater Golden Horseshoe Area

Metrolinx 2041 Regional Transportation Plan (RTP)

The Metrolinx 2041 Regional Transportation Plan (RTP) lays out a blueprint for creating an integrated, multimodal regional transportation system that will serve the needs of residents, businesses, and institutions across the Greater Golden Horseshoe area. The RTP prescribes several key improvements affecting the Township of Woolwich, presented below. These planned improvements are designed to enhance connectivity, support regional growth, and provide more sustainable transportation options for residents of the Township.

- **Passing Track in Breslau:** As part of the Kitchener Line GO Expansion, a 2.6-kilometer passing track is being constructed in Breslau. This addition will allow trains traveling in opposite directions to pass each other, facilitating increased service frequency and reliability on the line.
    - It is also understood that the Region of Waterloo has acquired a strategic parcel of land in the Breslau area to support the potential development of a future GO Station. This site presents an opportunity to enable transit-oriented development, including new residential areas with a focus on affordability. The proposed station is anticipated to eventually accommodate a projected daily ridership of approximately 2,480.
- **Integration with Regional Growth Plans:** The RTP emphasizes strengthening connections between the Greater Toronto and Hamilton Area (GTHA) and surrounding regions, including the Region of Waterloo. This includes integrating transportation planning with land use to support anticipated population and employment growth in areas like Woolwich.
- **Active Transportation Initiatives:** While specific active transportation projects in Woolwich are not detailed, the RTP advocates for enhancing active transportation options, such as cycling and walking infrastructure, to promote sustainable and healthy communities. These initiatives align with Woolwich's own Active Transportation Master Plan, aiming to improve non-motorized mobility within the Township.

The Township of Woolwich has already expressed concerns regarding the latest 2041 Regional Transportation Plan (RTP). Key areas of concern included:

- **Limited Inclusion in Regional Transit Expansion:** While the 2041 RTP outlines goals to improve transit connectivity across the GTHA, the Township of Woolwich has identified a lack of targeted initiatives within its boundaries. The RTP primarily focuses on

enhancing service in major urban centres, which may result in the unique transit needs of smaller and rural communities not being addressed as the Province's role in inter-regional transit does not overlap with the GRT and the Region of Waterloo's role in delivering intra-regional transit. This raises concerns about equitable access to regional transit improvements and the need for more inclusive planning that supports mobility across all municipalities in the Greater Golden Horseshoe Area (GGHA).

- **Need for Integrated Land Use and Transportation Planning:** The Township is planning for significant growth in areas such as Breslau, Elmira, and St. Jacobs. However, there appears to be a disconnect between Metrolinx's transportation initiatives and Woolwich's land use planning objectives. The Township is concerned that without integrated planning, transportation infrastructure may not adequately support anticipated residential and commercial development.
- **Concerns Over Funding and Implementation:** Woolwich has expressed apprehension regarding the financial implications of proposed transportation projects. Specifically, there is concern that the Township may bear a disproportionate share of costs for infrastructure improvements, such as the proposed Breslau GO Station and associated road enhancements. The Township seeks clarity on funding responsibilities and assurances that costs will be equitably distributed among all stakeholders.
- **Desire for Enhanced Collaboration and Communication:** The Township has highlighted the need for more effective collaboration with Metrolinx to ensure that local perspectives and priorities are adequately reflected in regional transportation planning. Improved communication channels are sought to facilitate timely information sharing and joint decision-making processes.

2.2.4 Region of Waterloo

Moving Forward 2018 Waterloo Transportation Master Plan (June 2019)

The 2018 Transportation Master Plan Update (TMP) for the Region of Waterloo is a strategic document that outlines the needs for active transportation (cycling and walking), public transit, and regional roads to the year 2041. It includes a series of regional policies to encourage and shape sustainable travel and economic growth, to support land-use planning, and to support the Region as "a community where people matter and ideas grow." As a key stakeholder municipality, the following recommendations for Woolwich were outlined in the Region's TMP:

- **Road Network:** Several road network projects are planned by the Region that are located within the Township boundaries. These projects are presented in **Table 1**. and reflected in the Region's Travel Demand VISUM model that was used to forecast future traffic demand in Woolwich. For more information, refer to Chapter 5.

- **Active Transportation:** Enhance walking and cycling infrastructure for safer, accessible routes.
- **Public Transit:** Specific transit improvements were not identified for the Township. However, the Region aims to increase bus fleet sizes and provide higher frequency service across all routes served by Grand River Transit.
- **Connectivity:** Support and promote GO Transit and high-speed rail development.
- **Safety:** Implement road safety measures and ensure accessibility for people with disabilities.

Table 1: Region of Waterloo Planned Road Projects (Source: Region of Waterloo 2018 TMP)

Timeline	Region of Waterloo Projects in Woolwich
Planned Before 2031	• Fountain Street North extension from Victoria Street to 1.0 km northerly • New Highway 7 connecting the Region to Guelph and passing through the southern part of the Township (under MTO jurisdiction) • Ottawa Street Extension from Fountain Street to Keewatin Avenue
Planned 2031 – 2041	• Arthur St S widening from Sawmill Road to Listowell Road • Shantz Station Road widening from new highway 7 to Kossuth Road • Fountain Street North widening from Kossuth Road to Victoria Street • Kossuth Road widening from Fountain Street to Hespeler Road
Deferred Beyond 2041 (not included in the 2051 model)	• King Street N widening Northland Road to Bridge Street W • New Elmira By-Pass road

Regional Transit Strategy – GRT Business Plan (2025)

The GRT Business Plan, adopted by Regional Council in 2025, sets a ten-year roadmap for transit investment across the Region of Waterloo. Guided by the Region's Strategic Plan, the Business Plan aligns with growth-with-care objectives, climate-aligned mobility commitments, equitable access and expansion of service coverage.

Key strategic elements relevant to the Township and the broader Region include:

- A conventional bus and train network plan which targets the creation of a frequent transit network (FTN): on up to 16 key routes achieving approximate headways of 10 minutes on weekdays (7 a.m.–7 p.m.) and 15 minutes at other times.
- A consistent, all-day, evening and weekend schedule structure to make transfers more intuitive and reduce waiting time.
- A "highway express" service component, and a 24/7 overnight network on key routes, improving connectivity for shift workers and non-traditional travel periods.
- A Township Transit Strategy, addressing rural and low-density areas including the Townships of Wilmot and Woolwich, with enhancements to fixed-routes, on-demand zones, connections to the Region's core network, and exploring alternative delivery models to improve service efficiency in rural settings.
- A fares strategy component, which includes (among other things) free travel for children 12 and under, expanded discounts for low-income riders, and fare pricing aligned with service expansion and inflation.

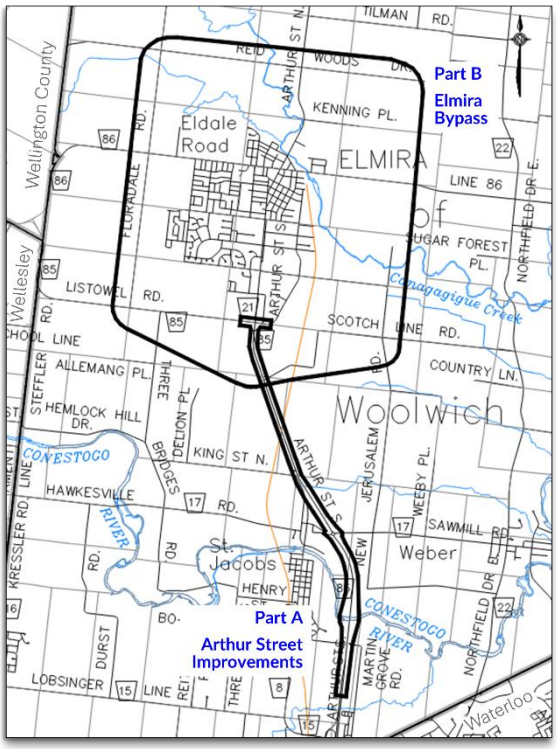
For Woolwich, although the earlier 2018 Transportation Master Plan did not identify specific fixed-route expansions within the Township, the GRT Business Plan offers a concrete framework to achieve improved coverage and service frequency.

GRT fares are not zone-based (i.e., there is no higher fare for travelling across different municipal boundaries, whether cities or townships). A single fare structure applies uniformly across the Region (cities and townships alike). This means Township residents benefit from the same fare rates as urban city residents, supporting equitable access to transit throughout the Region.

In summary, the 2025 GRT Business Plan strengthens the transit service dimension of the Region. For Woolwich, it provides both the strategic direction and service-delivery tools to support enhanced public transit options, stronger links to employment and services, and improved transportation sustainability and equity.

Arthur Street Improvements and Elmira Bypass Environmental Assessment (2024, Ongoing)

The Region of Waterloo is considering potential changes to Arthur Street (Regional Road 85) to improve conditions for all modes of travel and support a growing Waterloo Region. The Region initiated a Municipal Class Environmental Assessment Study (MCEA Study) with a Study Area divided into two parts, as summarized below. The recommendations from the study outcomes will inform the Township's CTMP document.



- **Part A (Arthur St)**: A 6 km section of Arthur Street (Regional Rd 85) from ~900 m north of Hwy 85 and King St. overpass to Listowel Rd will be assessed for potential widening. This segment extends from the City of Waterloo to the southern limits of Elmira.
- **Part B (Elmira Bypass)**: To redirect traffic - especially trucks - away from Elmira's downtown, a potential bypass will be evaluated. This study aligns with the Region's 2023-2027 Strategic Plan. The EA is expected to be ready for Regional Council approval by late 2025 or early 2026. It should be noted that Region has initiated their EA for the Elmira By-pass and that work could take place prior to the date outlined in the Region's 2018 TMP.

2.2.5 Township of Woolwich

The Township of Woolwich Official Plan (June 2022)

The Township's 2022 Official Plan (OP) is informed by the population and employment forecasts contained in the previous Regional Official Plan. That document projected population growth from approximately 21,100 in 2006 to 36,500 by 2031, together with an increase in employment from 13,540 to 19,000 over the same period. The majority of this growth was anticipated to occur within the Elmira and St. Jacobs Urban Areas.

The new Regional Official Plan (ROP) now includes additional growth associated with the urban boundary expansion in Breslau. Although the Township's Official Plan has not yet been updated to reflect this change, the population growth to 2031 has since been adjusted due to the phased development of expanded settlement areas. An update to the Official Plan is currently underway to ensure consistency with the new ROP and the Provincial Planning Statement, however, the revised document has not yet been finalized.

The OP emphasizes the integration of land use planning with infrastructure investment and environmental protection as a foundation for building complete and sustainable communities. A key component of this vision is the development of a balanced and integrated transportation system. The OP's transportation policies aim to support the safe and efficient movement of people and goods, while also reducing greenhouse gas emissions and minimizing environmental impacts. The OP also identifies key opportunities and challenges related to transportation within the Township, which are summarized below.

Opportunities

- **Promoting active transportation:** Focus on creating walkable, connected communities with amenities within 15 minutes of homes.
- **Enhancing public transit:** Plans to strengthen public transit and regional connectivity between rural and urban areas.

Challenges

- **Reducing car dependence:** Addressing the challenge of reducing private vehicle reliance, especially in rural areas.
- **Aligning transportation with growth:** Ensuring infrastructure grows to meet increasing population and employment demands.

Active Transportation Master Plan (June 2023)

The Active Transportation Master Plan (ATMP) provides a forward-looking strategy to guide the planning, coordination, implementation, and design of an integrated, sustainable transportation system capable of satisfying mobility needs for all members in the community. It identifies key opportunities and challenges associated with facilitating active transportation in the Township, these include:

Opportunities

- **Developing a regional cycling network** with N-S and E-W connectivity, even on higher-volume or higher-speed roads.
- **Enhancing existing trails and sidewalks** in settlements to create a strong foundation for future AT connectivity.

Challenges

- **Limited funding and resources** for the development and maintenance of the AT network.
- **Encouraging greater AT use in settlements** like Breslau, Elmira, and St. Jacobs to reduce reliance on motorized vehicles for local trips.

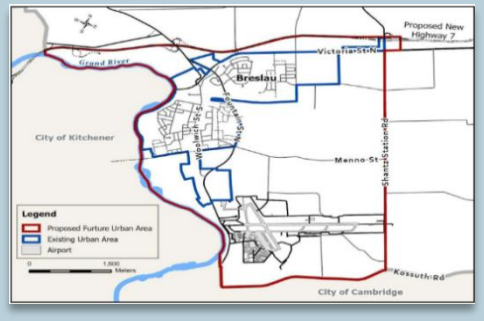
The planned sidewalk and cycling network including the network phasing as presented in the ATMP are provided in **Appendix B**.

Breslau Settlement Area Transportation Network Strategy (April 2024)

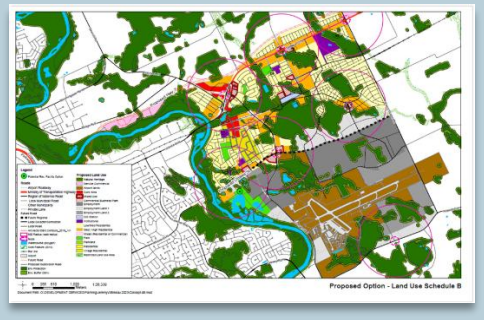
The Breslau Settlement Area, part of the Township of Woolwich, is located adjacent to the Region of Waterloo International Airport. It comprises residential communities, employment lands, commercial and retail activities, and recreational opportunities. With a current population of approximately 7,000 residents along Woolwich St. S and north of the Metrolinx rail line, Breslau is planned to evolve into a complete community, offering a diverse range of housing options, employment opportunities, and amenities. By 2051, the population is projected to grow to 32,000, with employment potentially reaching 42,500, contingent on infrastructure and airport expansion.

In April of 2023, the Province expanded Breslau's urban area as part of its approval of Regional Official Plan Amendment #6. As a result of the Province's expansion, Breslau's new urban boundary represents an approximate 400% increase of its existing urban limits or an increase approximately 1900 hectares. In 2024, the Township initiated an Official Plan update to incorporate the changes to the Brelsau's urban boundary into a new Official Plan aimed at guiding growth until 2051. To support this process, the Township also undertook a Transportation Network Strategy study, the findings of which will inform the Township's TMP.

The strategy identifies key transportation assets within the area, including Highway 7, the Metrolinx rail line, the Region of Waterloo International Airport, a proposed GO Station in Breslau, and an interconnected network of regional and local roads. Despite these assets, the study also highlights notable gaps in Breslau's transit service, which is currently limited to the on-demand Route 79. In addition, active transportation connections in the area remain underdeveloped. The ongoing construction of the new Highway 7 between Kitchener and Guelph, led by the Ministry of Transportation of Ontario (MTO), is anticipated to further shape the area's transportation dynamics and regional connectivity.



Breslau Expanded Settlement Area



Breslau Land Use

3 Existing Conditions

As part of the development of the Comprehensive Transportation and Mobility Plan (CTMP), it is essential to establish a holistic understanding of current conditions in the Township. This section presents an overview of existing conditions based on data provided by the Township, supplemented by additional analysis. These insights help identify key mobility challenges and will serve as a foundation for developing future strategies and recommendations. The following subsections outline the existing conditions in Woolwich using the structure below:



Traffic Data Overview
This section provides a summary of the traffic data reviewed and analyzed to date that informs our understanding of the Township's existing condition.



Transportation Network
This section presents the current inventory of transportation infrastructure for vehicles, transit, pedestrians and cyclists, and identify any gaps in the network for future consideration.



Traffic Volumes
This section presents the existing (2024) vehicle volumes on Woolwich's road network.



Travel Demand Trends
This section presents the important insights into how people travel, the modes they choose, and key destinations they access, from a regional and Township level.



Traffic Operations
This section reviews the operation and potential problem areas at key intersections in Woolwich, in terms of level-of-service and collision frequency.



Current Infrastructure Analysis
This section presents an assessment of the current quality of transportation infrastructure in Woolwich.



Summary
This section presents a summary of all content presented in Section 3 Existing Conditions.

3.1 Traffic Data Overview

All traffic data used in this phase of the study was provided by the Region of Waterloo or Township of Woolwich and is summarized below:

- **Signal Timing Plans and Turning Movement Counts (TMC)** was provided by the Region of Waterloo for the key intersections analyzed in **Section 3.3**. Note that four of the intersections were not analyzed as traffic data was not provided by the Township. For certain intersections, the provided data was from 2021. In those cases, we elected to use counts from earlier years to reflect recovered traffic patterns from a post-COVID-19 period.
- **2024 Average Annual Daily Traffic (AADT)** was provided by the Region of Waterloo in order to support our understanding of the existing traffic demands in Woolwich and building the future traffic demand forecast. A summary of AADT volumes for Woolwich is provided in **Section 3.3.**
- **Historical Collision Data for 2019 and 2024** was provided by the Region of Waterloo and used to identify problem areas in the Township. Results from the analysis are available in **Section 3.5**.
- **2016 Transportation Tomorrow Survey (TTS)** data was used to identify travel demand patterns in the Region of Waterloo and beyond. It was determined that mobility data from a pre-pandemic period would be representative of typical, baseline conditions, therefore, the 2022 survey data was not used. Furthermore, the 2022 survey data was released in December 2024 and the CTMP had already commenced before that. The TTS is a cooperative effort by local and provincial government agencies to collect information about travel in southern Ontario. The data collected helps local and regional governments, as well as the Province and its agencies make informed transportation decisions on future planning and investment for roads, public transit, and other transportation facilities.

3.2 Transportation Network

The Township's transportation network plays a fundamental role in shaping the physical, social, and economic fabric of the community. It supports daily mobility and commerce for both residents and visitors. The following sections outline the current context of the transportation network in Woolwich.

3.2.1 Vehicle Network

3.2.1.1 Road Classification

The road network in Woolwich is composed of Provincial, Regional, and Municipal roads. The jurisdictional responsibilities for these roads are illustrated in **Map 3**.

Proper road classification enhances the efficiency and effectiveness of the roadway network by ensuring that roads are planned, designed, and operated according to their intended functions. This classification supports a range of activities, including roadway design, maintenance, and asset management planning. The current road classification system in Woolwich is illustrated in **Map 4** and described below.

- **Provincial Highways:** They are operated and maintained by the MTO. Their primary function is to facilitate the efficient movement of through traffic, rather than to provide direct access to adjacent lands.
- **Regional Roads:** The Regional Road network consists primarily of arterial roads designed to provide safe, direct, accessible, and multi-modal transportation links for the movement of people and goods across the Region of Waterloo and to adjacent municipalities.
- **Township Roads:** Township roads include both collector and local roads that serve dual functions: facilitating internal traffic movement within the Township and providing direct access to adjacent land uses. These roads also connect to the broader Provincial and Regional Road systems, supporting local and regional mobility.

The current road classification system in Woolwich appears functionally adequate, with clear distinctions between Provincial, Regional, and Township responsibilities. It aligns well with standard transportation planning principles by assigning roadway functions based on jurisdiction, access control, and mobility roles. However, to fully assess its long-term adequacy, the system should be evaluated under future conditions to determine whether it continues to reflect evolving travel patterns, emerging land use changes, and the needs of all travel modes, including active transportation and transit. If the existing classifications are found to be misaligned with these future conditions, updates or refinements to the system will be recommended to ensure continued effectiveness and integration with broader planning objectives.

For the purposes of this plan, Township roads were reviewed and mapped using the TAC road classification system rather than the Minimum Maintenance Standards (MMS) regulation applied for maintenance. The TAC system was selected because it reflects industry best practice and aligns with the approach used by the Region for transportation planning.

3.2.1.2 Posted Speed Policy

The Township of Woolwich adheres to a posted speed policy that aims to balance road safety, traffic efficiency, and the needs of all road users across its rural and urban contexts. Speed limits are established based on roadway classification, surrounding land uses, traffic volumes, and safety considerations, and are aligned with provincial legislation and best practices.

In general:

- **Urban Settlement Areas (such as Breslau, Elmira, and St. Jacobs)** have posted speed limits of 40 km/h to 50 km/h, depending on road function, adjacent land use, and pedestrian activity. Recent initiatives have focused on lowering speeds in residential and school zones to enhance safety for vulnerable road users.
- **Rural Local Roads** typically have posted speed limits between 60 km/h and 80 km/h. Speed limits are adjusted where necessary based on factors such as roadway geometry, sightlines, and the presence of curves, intersections, or driveways.
- **Arterial and Collector Roads**, many of which fall under the jurisdiction of the Region of Waterloo, generally maintain higher speed limits ranging from 60 km/h to 80 km/h. Specific segments may be adjusted based on traffic conditions, adjacent development, and community feedback.

The Township also supports traffic calming initiatives and speed management strategies in areas where speeding concerns are identified. These may include speed limit reductions, signage improvements, and physical traffic calming measures, implemented in coordination with the Region as needed.

The posted speed policy is reviewed periodically to respond to growth, changing travel patterns, and evolving community priorities, particularly in areas experiencing increased development or shifts in road usage.

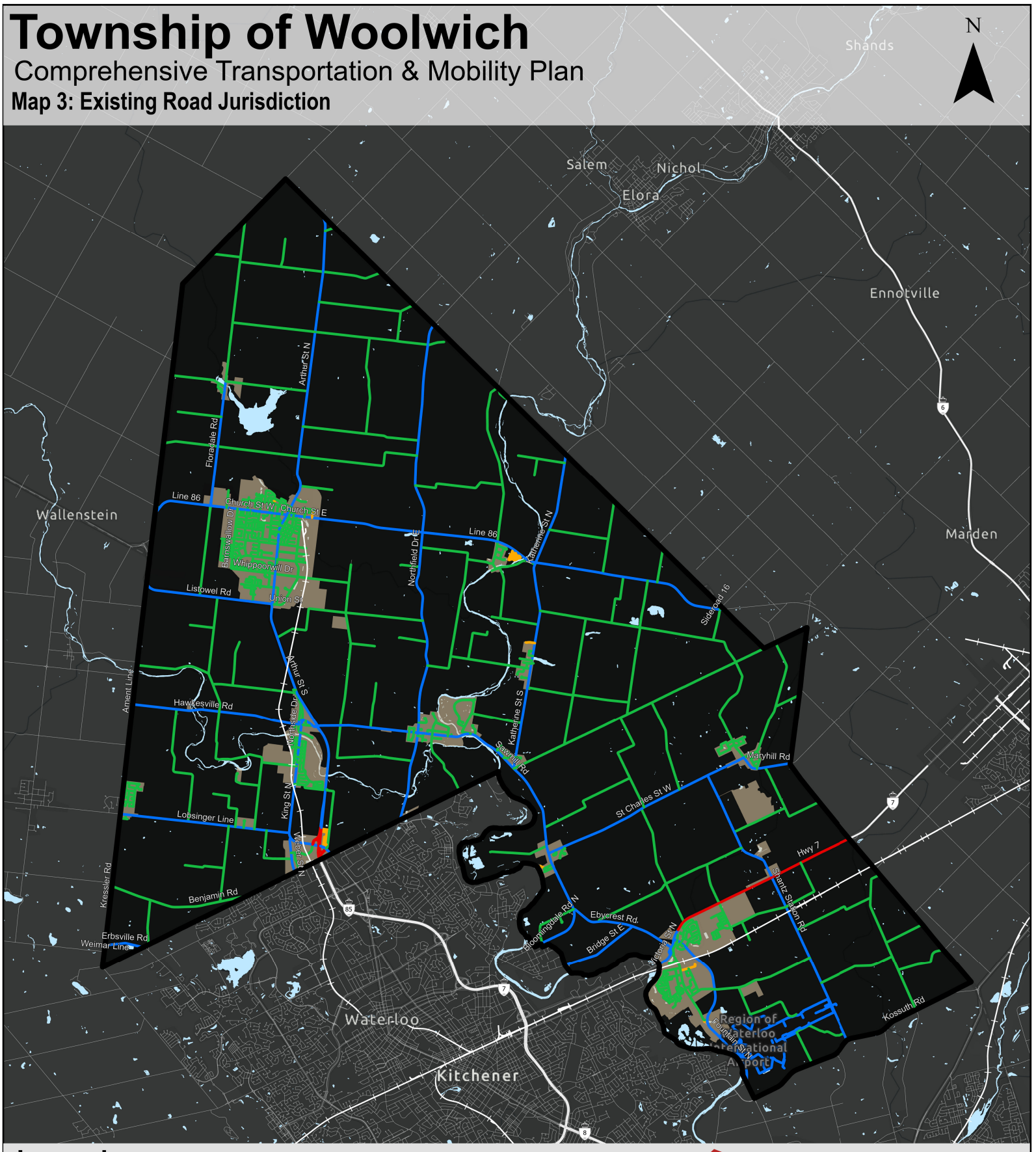
3.2.1.3 Right-of-Way

Right-of-Way (ROW) width refers to the distance measured perpendicular to the roadway centerline that defines the extent of Township-owned land. The ROW encompasses the space available for current and future transportation infrastructure, including roadway widenings, sidewalks, cycling facilities, utilities, and other public uses. For roadways under the jurisdiction of the Township of Woolwich, ROW widths are illustrated in **Map 5**. The map shows that most roadways in the Township have less than 13 meters of ROW. It should be noted that ROW widths are not always consistent along a given segment; for example, a road may narrow to 10 m in one portion and widen to 15 m in another. This variability, combined with ROWs generally below the Township standard of 20 m for new roads, suggests limited physical space for future roadway widening or the addition of new transportation infrastructure, which may pose challenges to expanding multimodal facilities and accommodating future growth.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 3: Existing Road Jurisdiction



Legend

- Municipal Boundary
- Settlement Boundary
- Waterbody
- Railway
- Road Network

Road Jurisdiction

- Provincial Road
- Regional Road
- Local Road
- Private Road

0 1 2 4 Kilometers

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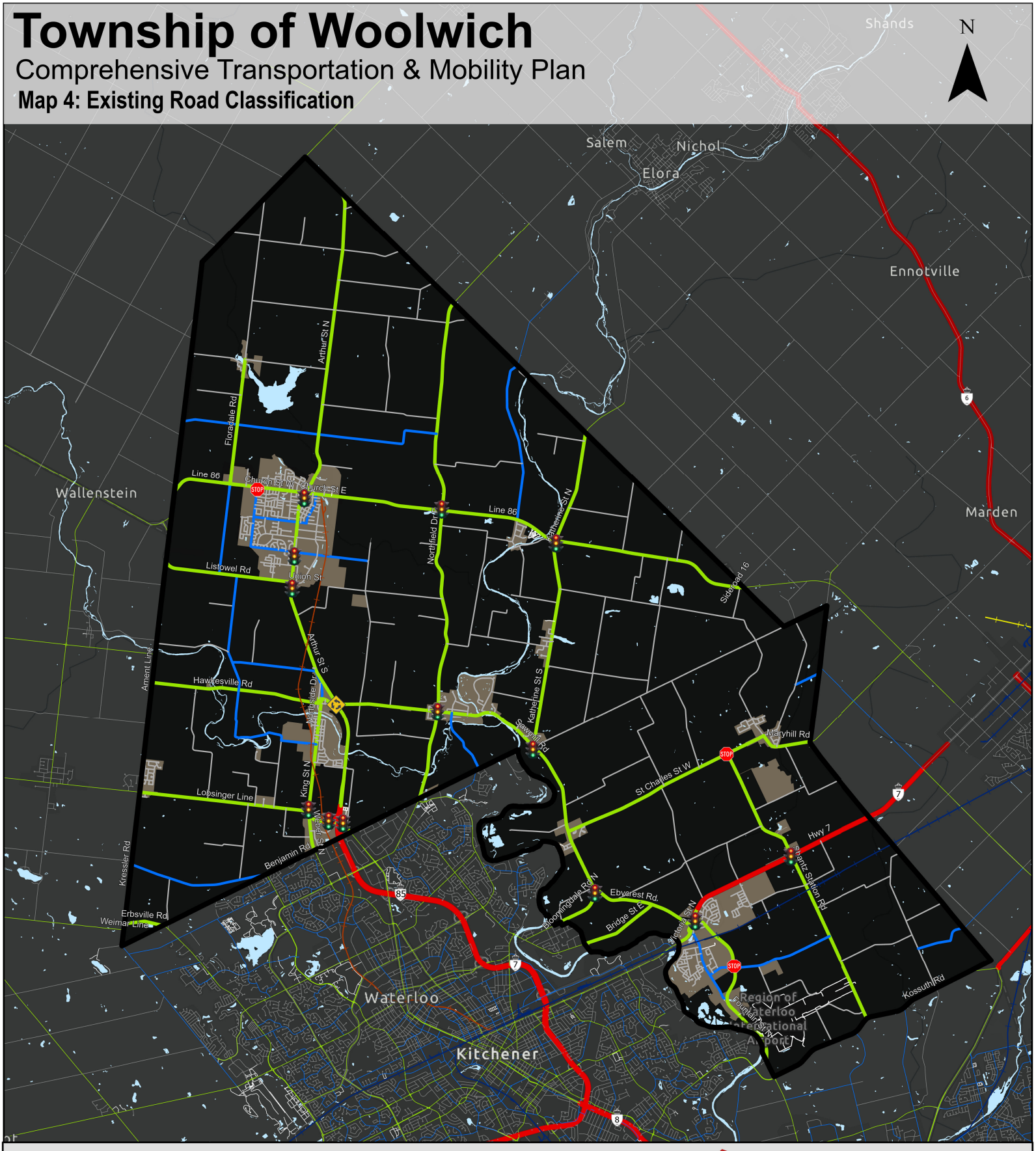
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GIS data provided by Township of Woolwich on December 2024

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 4: Existing Road Classification



Legend

- Municipal Boundary
- Settlement Area
- Waterbody

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Road Classification

- Provincial Highway
- Regional
- Collector
- Local
- Private Roads

Intersection Control

- Stop-Controlled Intersection
- Signalized Intersection
- Roundabout

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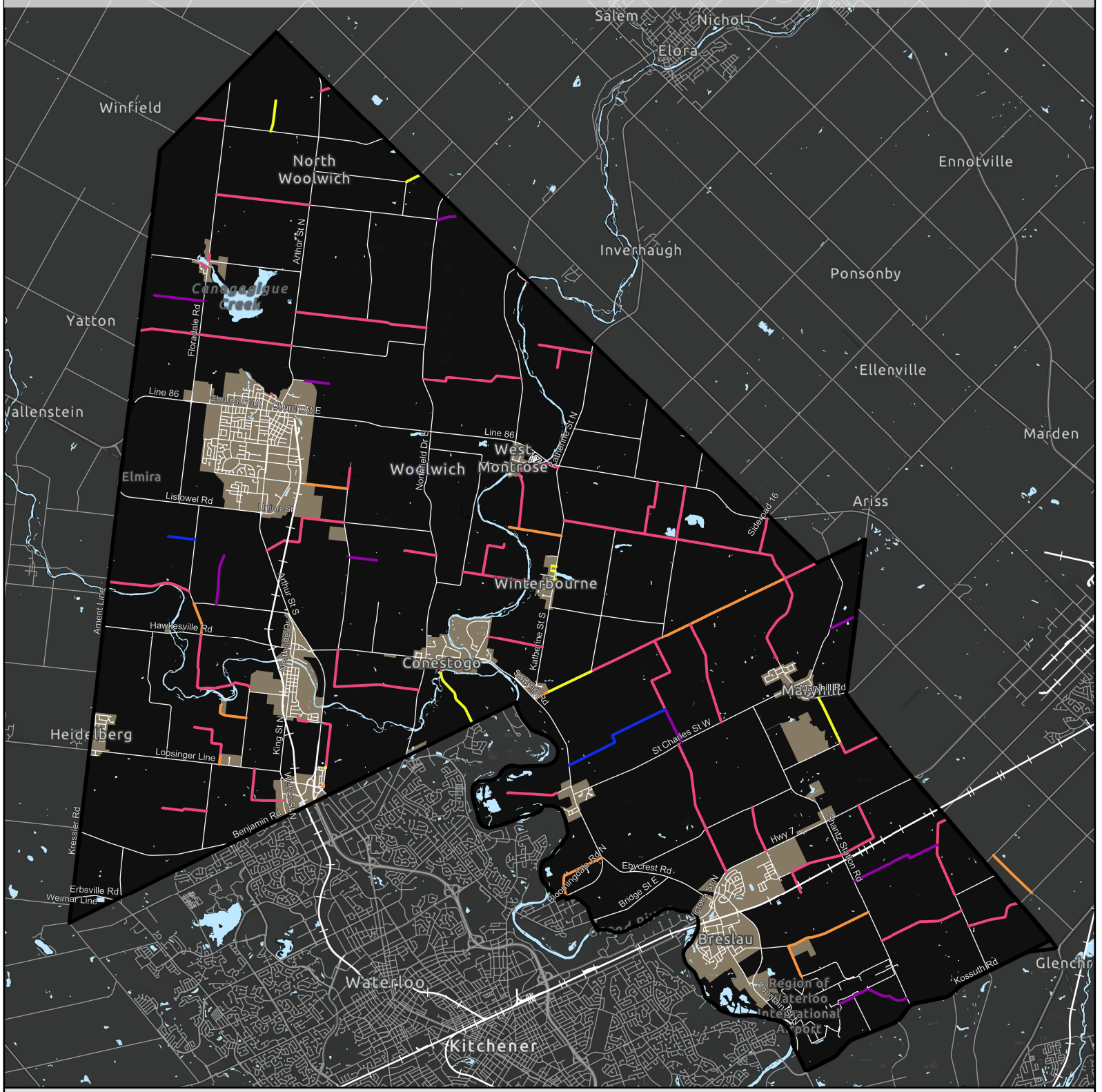
0 1 2 4 Kilometers

GIS data provided by Township of Woolwich on December 4th, 2024

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 5: Existing Right-of-Way Width (m)



Legend

- Municipal Boundary
- Waterbody
- Settlement Boundary
- Railway

Right-of-Way Width

- 4m - 7m
- 7m - 10m
- 10m - 13m
- 13m - 16m
- 16m - 20m
- Unknown

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich in December 2024

3.2.2 Truck Route Network

The Township of Woolwich maintains a designated truck route network to support goods movement while minimizing impacts on residential areas, local roads, and sensitive land uses. Commercial vehicles are generally directed to use arterial and collector roads that are designed to accommodate heavier vehicle loads and higher traffic volumes.

Key truck routes are listed below and further highlighted in **Section 3.3.2.**

- **Regional Road 17 (Sawmill Road):** This corridor serves as a major north-south and east-west connector through Elmira and St. Jacobs, providing access to industrial areas and links to Highway 85.
- **Regional Road 86 (Line 86):** Located along the northern edge of the Township, this route provides east-west connectivity to Wellington County and surrounding agricultural and industrial zones.
- **Regional Road 23 (Katherine Street):** Facilitates truck access between Breslau, the Region of Waterloo International Airport, and adjacent employment lands.
- **Regional Road 15 (King Street):** Connects to the southern part of the Township and supports movements toward Kitchener and Waterloo.

Within settlement areas like Breslau, Elmira, and St. Jacobs, trucks are generally required to remain on approved truck routes unless making local deliveries. The Township's truck route policy is aligned with Waterloo Region's transportation framework and is reviewed periodically to respond to growth in industrial activity, safety considerations, and road infrastructure capacity.

In Elmira, the lands east of Arthur Street are predominantly occupied by commercial and industrial uses, resulting in frequent truck traffic along Arthur Street to access the highway and facilitate goods movement throughout the Township. This has led to concerns related to noise, air pollution, and safety for residents living in and around the downtown Elmira area. The presence of heavy traffic in the downtown core causes poor traffic operations during peak hours, such as at the Arthur Street and Listowel Road intersection, and also conflicts with the Township's vision of creating a more pedestrian-focused corridor. An Elmira Bypass is currently being considered by the Region of Waterloo and the Township of Woolwich, with the goal to divert traffic away from the downtown area by providing a direct connection between industrial zones in the east and south and the regional truck network, enabling efficient access while minimizing impacts on residential streets. For more information on the Elmira Bypass MCEA project, refer to **Section 2.2.5**.

3.2.3 Transit Network

The existing transit network in Woolwich is illustrated in **Map 6**. Transit service in the Township of Woolwich is provided by Grand River Transit (GRT), which also serves other area municipalities. Currently, there are only three fixed GRT routes, and one on-demand route that enters the Township with stops in Breslau, Elmira, and St. Jacobs. All other routes, including the express routes operated by GRT do not enter the Township boundaries.

As shown on **Map 6**, the following bus routes provide stops within the Township:

- **Route 19 Hazel** is a fixed route with service every 30-minutes that connects St. Jacobs Market / Northfield Station to the University of Waterloo. At both Northfield Station and University of Waterloo station, commuters can transfer to/from the 301 ION Light Rail. Commuters can also transfer to the GO bus service at University of Waterloo Station. Route 19 operates from approximately 6 am to midnight Monday to Saturday and approximately 8 am to midnight on Sundays and Statutory Holidays.
- **Route 21 Elmira** is a fixed route service that connects Arthur Street at Church Street in Elmira to Conestoga station in Waterloo, while passing through St. Jacobs. The route operates every 30 minutes from approximately 6 am to 10 pm on weekdays and 7 am to 7 pm on weekends. At Conestoga station, commuters can transfer to/from to the 301 ION light rail.
- **Route 78 Fountain** is a fixed service route operating every 30 minutes between Sportsworld Station and the Region of Waterloo International Airport. At Sportsworld Station commuters can also transfer to the GO bus service.
- **Route 79 Breslau** is a transit service in Breslau and surrounding area, with connections to other GRT routes in Kitchener. It operates as an on-demand flex service, providing trips as needed to locations within the coverage area. Key destinations of this route include Breslau, Breslau Community Centre, Conestoga Meat Packers, Region of Waterloo International Airport, Waterloo-Wellington Flight Centre, Woodland Christian High School, Kitchener Train Station and Central Station. Route 79 operates Monday to Friday, 6-10 a.m., 2-6 p.m. and 10:45-11:45 p.m. and trips can be booked up to two days in advance via the GRT Flex app.

The following bus routes operate mainly in the Kitchener-Waterloo area, providing stops near Township boundaries from the south.

- **Route 7 King** is a fixed service route operating every 15 minutes and connects Fairway Station to Conestoga Station.

In addition, GRT operates seven express bus routes that provide frequent, limited-stop service along major corridors. Of these, two routes provide direct connections for residents to the Township routes 19, 21, and 79:

- **Route 201 iXpress Fischer-Hallman** runs between Conestoga Station in the north end of Waterloo and Conestoga College Doon Campus in the south end of Kitchener.
- **Route 202 iXpress University** runs between Conestoga Station in the north end of Waterloo and The Boardwalk Station on the west side of Kitchener.

The 2025 GRT Business Plan identifies enhancements that will benefit Woolwich residents, including increased service frequency on key routes, expanded coverage through on-demand and flexible transit zones, and stronger integration with the Frequent Transit Network and express routes. These improvements aim to provide more reliable and convenient travel options, strengthen connections to major regional hubs, and better link Township routes 19, 21, and 79 with the broader GRT network.

Additionally, Kiwanis Transit offers specialized transit in the Township, including the Elmira Community Bus pilot project, funded by GRT and free for customers. This includes fixed-route service within Elmira and a specialized transit service for registered people with disabilities throughout Woolwich.

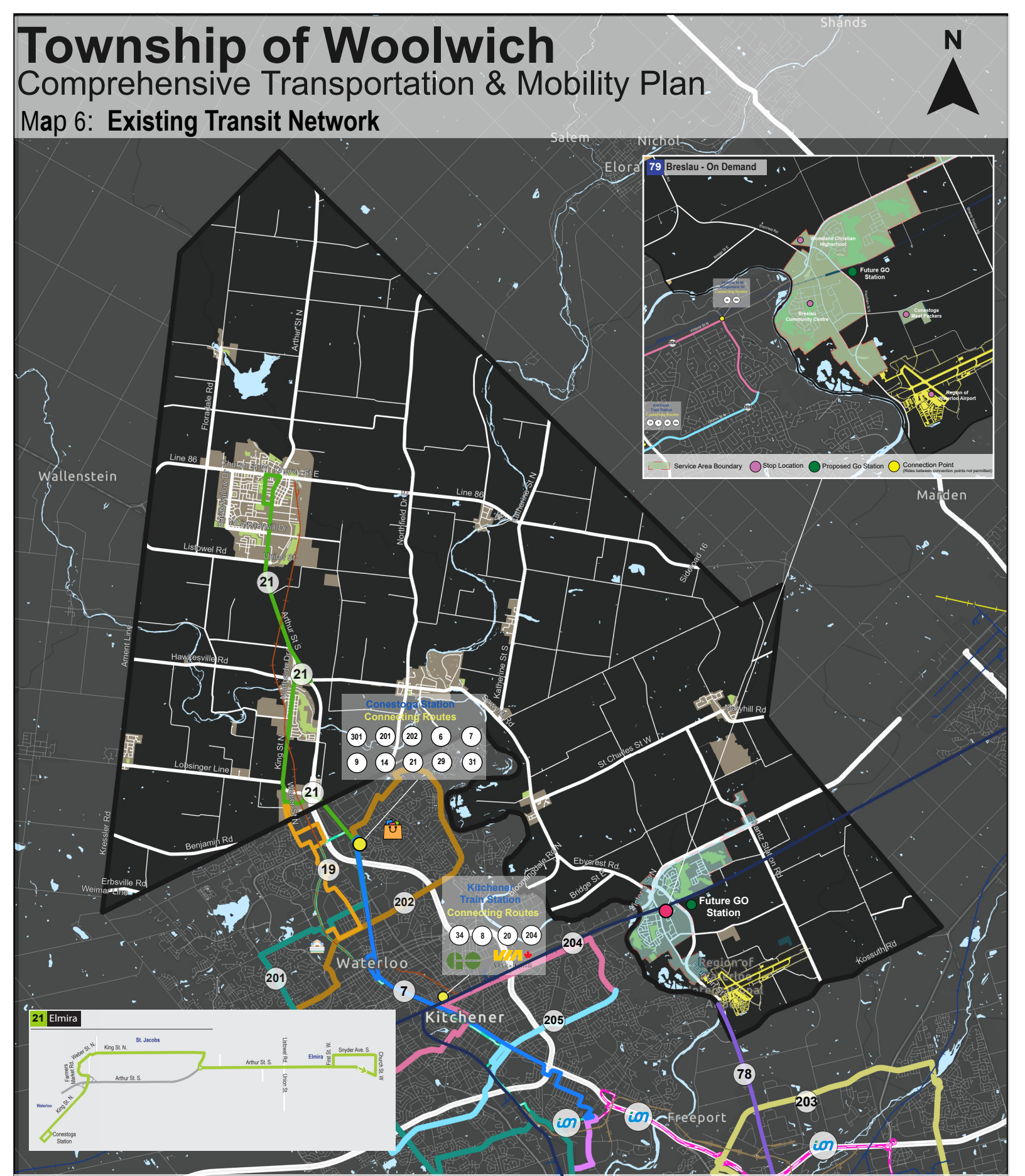
The Region of Waterloo has also purchased a strategic parcel of land for a potential GO Station in Breslau, with additional transit-oriented development and affordable housing. While plans to deliver this station have not yet been formalized by the Region and Metrolinx, a station in the Township could unlock significant opportunities to provide Township-wide transit connectivity.

It should be noted that the Regional Municipality of Waterloo has legislated authority for the provision of public transit service in the Township; however, other transit providers also operate cross-border services in Woolwich, such as PC Connect and Metrolinx.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 6: **Existing Transit Network**



Legend

GRT Bus Routes
- 21 - Elmira
- 19 - Hazel
- 7 - King
- 78 - Fountain

iXpress
- 201 -Fischer Hallman
- 202 - University
- 203 - Maple Grove
- 204 - Highland-Victoria
- 205 - Ottawa

- Municipal Boundary
- Settlement Areas
- Airport
- Waterbody

Railway
- Waterloo- Central Railway
- Kitchener GO Line
- Provincial Highway
- Road Network

Landmarks
- Mall
- University

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3.2.4 Active Transportation Network

The Township of Woolwich 2023 Active Transportation Master Plan (ATMP) provides the basis for the active transportation network presented in this section.



Figure 2: Pedestrian Facility Design Criteria (Source: Township of Woolwich ATMP)

Pedestrian facilities in Woolwich primarily consist of sidewalks and multi-use trails. In settlement areas such as Elmira and St. Jacobs, walking is generally safe and convenient, supported by existing infrastructure and the short distances between destinations. However, in the more rural parts of the Township, area gaps in the pedestrian network remain common. To address this, the ATMP undertook a comprehensive process to identify and close these gaps and to develop a future pedestrian network that is connected and permeable, accessible and comfortable, safe, and aligned with the Township's unique context. Pedestrian facility selection criteria is illustrated in **Figure 2**.

The existing pedestrian network in Woolwich is illustrated in **Map 7** which highlights roads without sidewalks, roads with sidewalks on only one side or incomplete segments. **Map 7** also shows the existing trail network, which complements the pedestrian network by providing off-road options for walking and cycling. For more information on the Township's proposed future pedestrian improvements, refer to the ATMP.

Despite local improvements, active travel between settlement areas presents significant challenges. Woolwich's topography, characterized by frequent and steep elevation changes, makes long-distance walking and cycling more difficult. For example, there is an elevation change of nearly 60 meters between Breslau and Elmira, with several steep climbs and descents along the route. This terrain can be particularly demanding for cyclists or individuals who are not in peak physical condition. Additionally, the considerable distances between settlement areas, such as the 25-kilometre stretch between Breslau and Elmira, can make inter-settlement travel by active modes impractical for most users.

The 2023 ATMP recognizes these challenges and outlines a vision for a more complete cycling network. It prioritizes the implementation of physically separated bikeways, in-boulevard multi-use paths, and shared cycling facilities such as paved shoulders and mixed-traffic operations as part of its future cycling network. This network is guided by the key criteria presented in **Figure 3**.

Map 8 presents the existing and proposed cycling network, incorporating Township, Regional, and Provincial routes. While the proposed network offers improved connections between settlement areas and supports travel beyond the Township's boundaries, the feasibility of active transportation between these areas remains limited due to topography and distance. Nonetheless, enhancing connections within urban areas remains a key opportunity to promote walking and cycling across Woolwich.

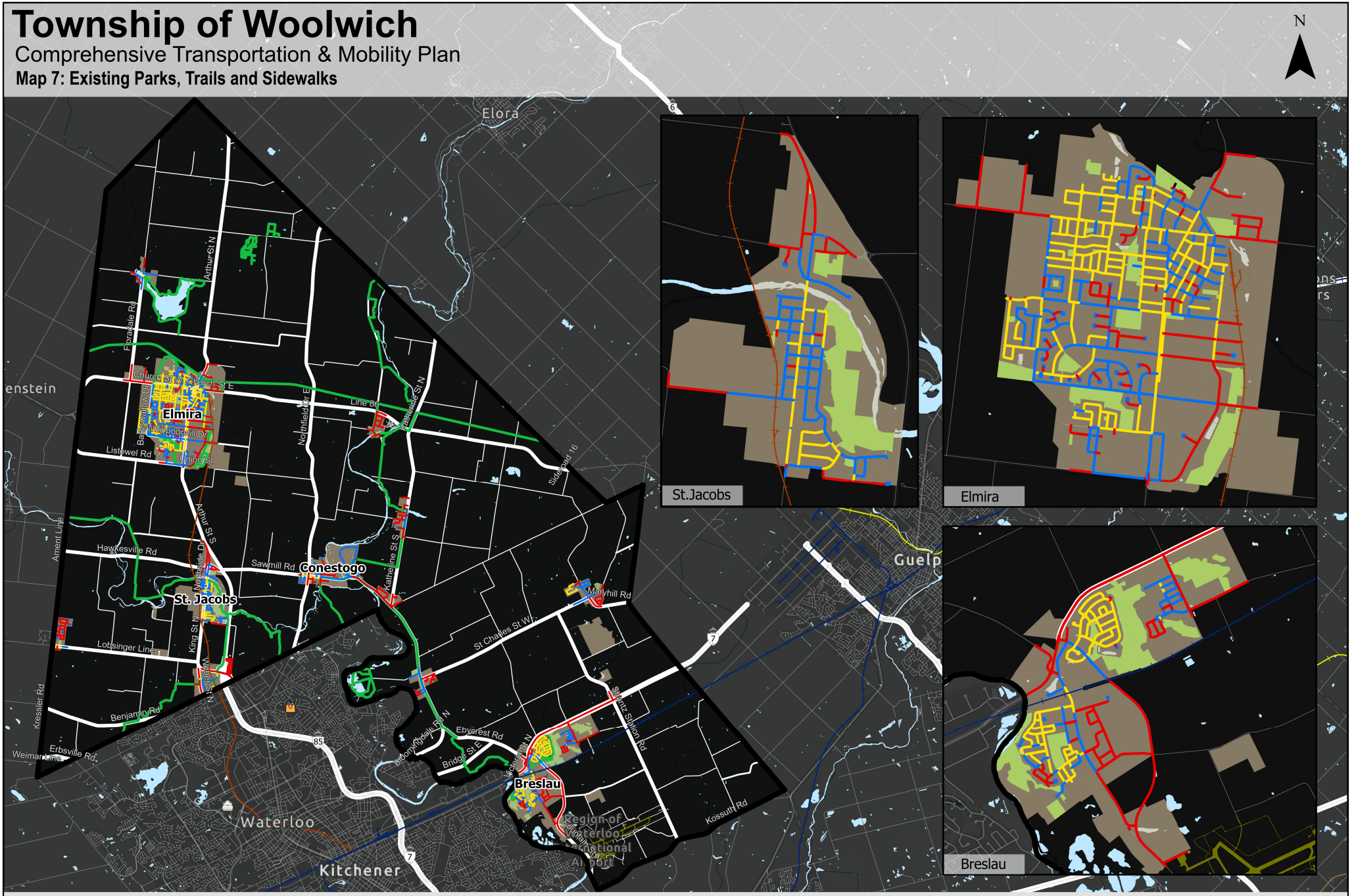


Figure 3: Cycling Facility Design Criteria (Source: Township of Woolwich ATMP)

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 7: Existing Parks, Trails and Sidewalks



Legend

- Trail

Sidewalks

- Full Sidewalk
- Partial Sidewalk
- No Sidewalk

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

- Municipal Boundary
- Settlement Areas
- Park
- Airport

- Waterbody
- Road Network
- Provincial Highway

0 1.3 2.5 5 Kilometers

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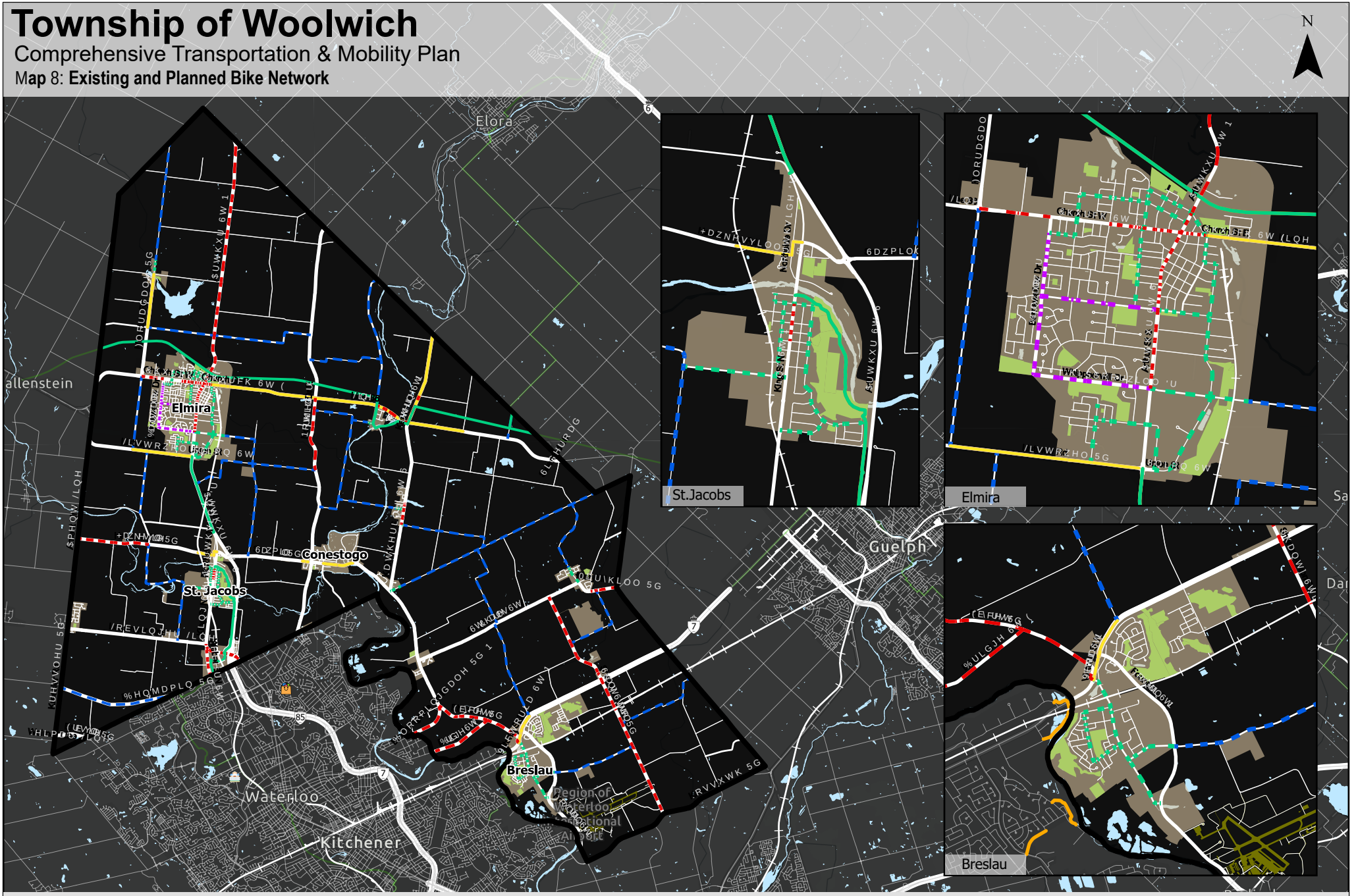
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GIS data provided by Township of Woolwich in December 2024

Township of Woolwich

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Map 8: **Existing and Planned Bike Network**



Legend

Regional Cycling Routes
- Existing Cycling Route
- Future Cycling Route
- Recommended Regional or Provincial Route

Planned Cycling Network
- Planned Signed Route
- Planned Paved Shoulder
- Planned Multi-use Path
- Municipal Boundary
- Settlement Boundary
- Park
- Airport
- Waterbody
- Road Network
- Provincial Highway
- Railway

0 1.3 2.5 5 Kilometers

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3.3 Traffic Volumes

3.3.1 Annual Average Daily Traffic

Existing traffic volumes provide valuable insight into travel demand patterns within the Township. Annual Average Daily Traffic (AADT) is a key metric used to evaluate the performance and functionality of the road network, including:

- Establishing adequacy of the available roadway capacity in comparison to the roadways traffic demand;
- Establishing design and maintenance classifications for the roadway; and
- Establishing the relative priority for maintenance, reconstruction, and rehabilitation.

Current (2024) AADT volumes for all roads within the Township of Woolwich are illustrated in **Map 9**. The busiest roads where AADT is greater than 10,000 are:

- Arthur Street, between Listowel Road and King Street North;
- Northfield Drive East, to the south of Sawmill Road;
- King Street North, between Lobsinger Line and Highway 85;
- Victoria Street North (Hwy 7) and Fountain Street North (Hwy 17) in the Breslau Area.

In general, most Regional Roads have AADT volumes ranging between 5,000 and 10,000 vehicles.

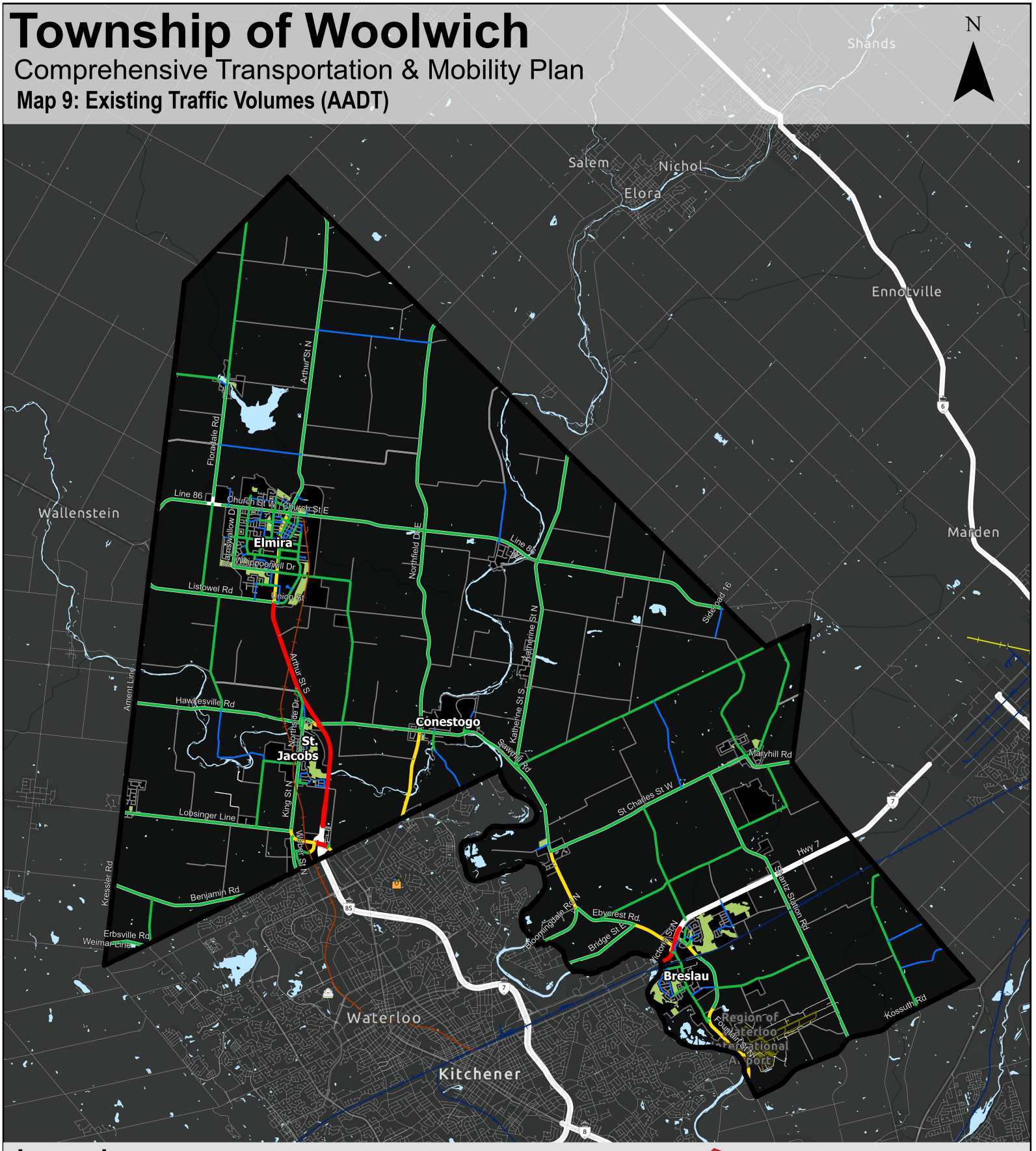
3.3.2 Truck Traffic

The proportion of truck traffic within the AADT (Annual Average Daily Traffic) varies across different roads. Truck traffic estimates are based on observed peak-hour truck percentages from turning movement counts at key intersections in Woolwich. As expected, the highest truck percentages were observed along the designated truck routes outlined in **Section 3.2.2**, including Regional Road 17 (Sawmill Road), Regional Road 86 (Line 86), Regional Road 23 (Katherine Street), and Regional Road 15 (King Street). In addition to these designated routes, elevated truck volumes were also noted on Lobsinger Line and Township Road 80 (Menno Street), largely due to the presence of industrial businesses.

Township of Woolwich

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Map 9: Existing Traffic Volumes (AADT)



Legend

- Municipal Boundary
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Traffic Volumes (AADT)

- 0 - 500
- 501 - 1,000
- 1,001 - 10,000
- 10,001 - 20,000
- > 20,000

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

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3.3.3 Weekday Peak Period Traffic

Weekday peak period traffic volumes along key roadways in the Township of Woolwich were estimated using turning movement counts at key intersections (see **Section 3.5**) and presented in **Table 2**.

Table 2: Weekday Peak Hour Traffic Volumes

Road	Volume Observed At	Traffic Lanes / Direction	Max Directional Volume*	
			AM	PM
Arthur Street	Listowel Road/Union Street	1	763	1,090
Church Street	Arthur Street	1	234	312
Listowel Road / Union Street	Arthur Street	1	451	397
Sawmill Road	Northfield Drive	1	404	481
Northfield Drive	Sawmill Road	1	382	762
Line 86	Northfield Drive	1	267	354
Farmers Market Rd / Hwy 85 SB Ramp	King Street	1	524	604
King Street	Farmers Market Rd / Hwy 85 SB Ramp	1	585	1,127
Whippoorwill Dr. / Southfield Dr.	Arthur Street	1	241	354
Lobsinger Line	King Street	1	372	333
Highway 7 / Victoria Street	Shantz Station Road	1	846	954
Shantz Station Road	Victoria Street	1	233	224
Katherine Street	Line 86	1	194	210
Victoria Street	Ebycrest Rd/Woolwich Street	2	1,278	1,514
Ebycrest Road / Woolwich Street	Victoria Street	1	325	478
Katherine Street/Crowsfoot Road	Sawmill Road	1	321	363
Martin Grove Rd / Hwy 85 NB Ramp	King Street	1	445	389
Fountain Street	Menno Street	1	260	378
Menno Street	Fountain Street	1	52	77

*Volumes are per lane per direction

Consistent with AADT data, the busiest roadways in Woolwich where the maximum directional volumes exceed 800 vehicles per hour are listed below. This threshold is commonly used in traffic engineering to identify segments of roadways where potential capacity issues may occur, consistent with guidelines provided by the Ontario Ministry of Transportation, Traffic Impact Study Guidelines and the Ontario Traffic Council, Roadway Capacity Guidelines.

- AM Peak Hour:
  - Highway 7 / Victoria Street
- PM Peak Hour:
  - Arthur Street
  - King Street
  - Highway 7 / Victoria Street

This indicates that these corridors are likely to experience recurring congestion during peak periods and should be prioritized for closer monitoring and potential capacity improvements.

3.4 Travel Demand Trends

Travel demand trends at both the Township and Regional levels provides important insights into how people travel, the modes they choose, and key destinations they access. This understanding helps identify areas where infrastructure investments may be needed and provides background for effective transportation planning to ensure that transportation systems remain efficient, safe, and sustainable as communities grow. This section summarizes key insights into Woolwich's existing travel patterns, based on the 2016 Transportation Tomorrow Survey (TTS) data which is travel a survey on how Ontarians in the Greater Golden Horseshoe and surrounding areas use the transportation system and helps local and regional governments, as well as the Province and transit agencies, make transportation planning and investment decisions.

3.4.1 Mode Choice

An assessment of mode choice in Woolwich reveals a strong reliance on automobiles. Specifically, 76% of trips are made by car, while 19% involve other modes (including a notable share of vehicle passengers). Transit and active transportation modes (cycling and walking) account for only 5% of total trips, as illustrated in **Figure 4**.

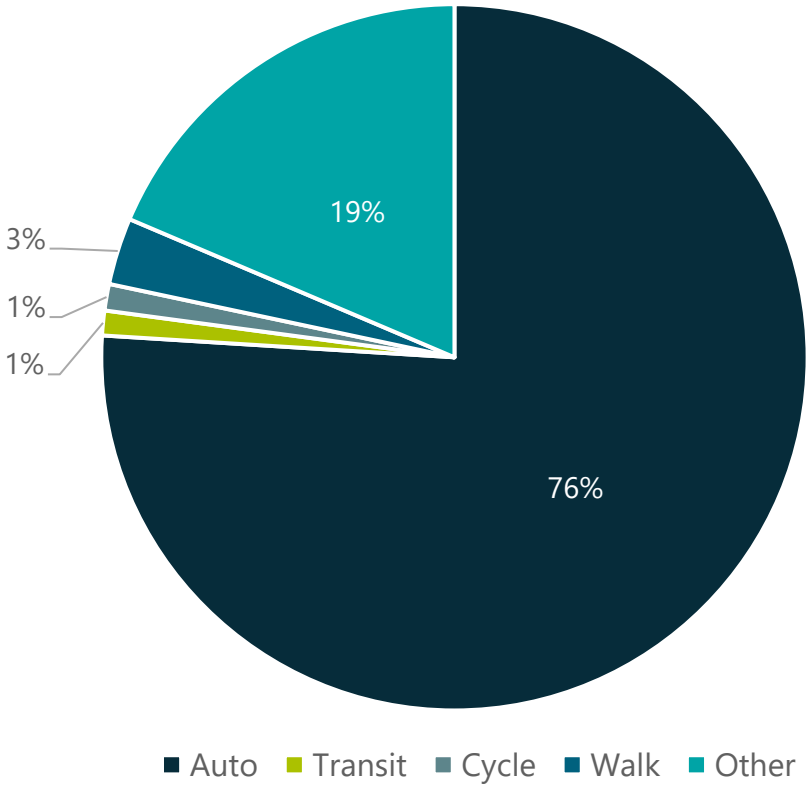


Figure 4: Mode Choices in Woolwich

Source: TTS 2016, 24h Period

We also examined how travel distance influences mode choice. As shown in **Figure 5**, nearly half (48%) of trips are longer than 10 kilometers, with 80% of these trips made by car. Furthermore, 26% of trips cover distances under 5 kilometers, where walking and cycling could serve as practical alternatives. However, only 8% of these short-distance trips use active modes. A similar trend is observed for medium-distance trips (5-10 kilometers), where driving remains the predominant choice.

The reliance on auto modes illustrates that continued maintenance and strategic expansion of the road network will be important to accommodate the demand of the auto modal split. Additionally, the data highlights opportunities to encourage walking and cycling by improving pedestrian and cycling infrastructure, enhancing safety, and promoting active transportation through community programs. Understanding barriers to transit and active transportation could reduce auto-dependency and support a more balanced mode share.

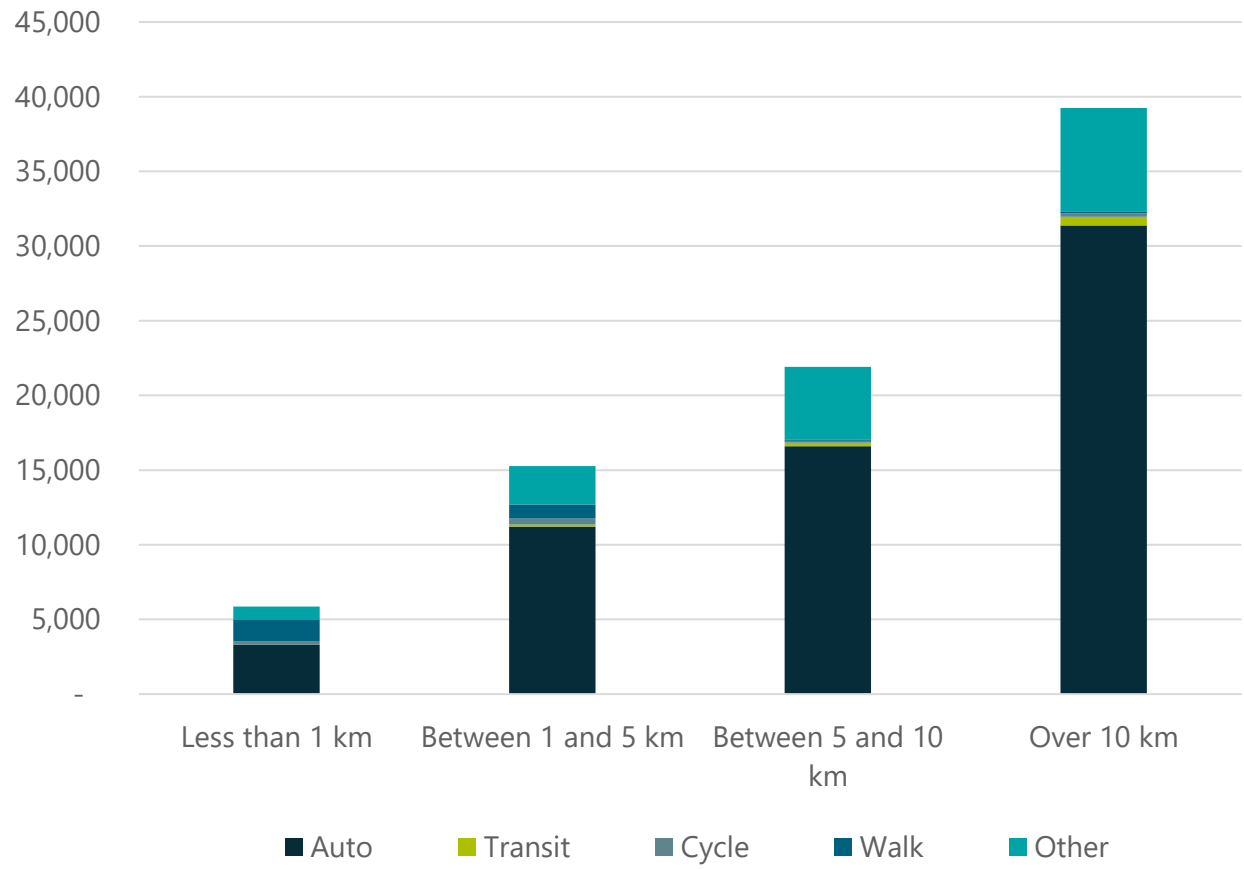


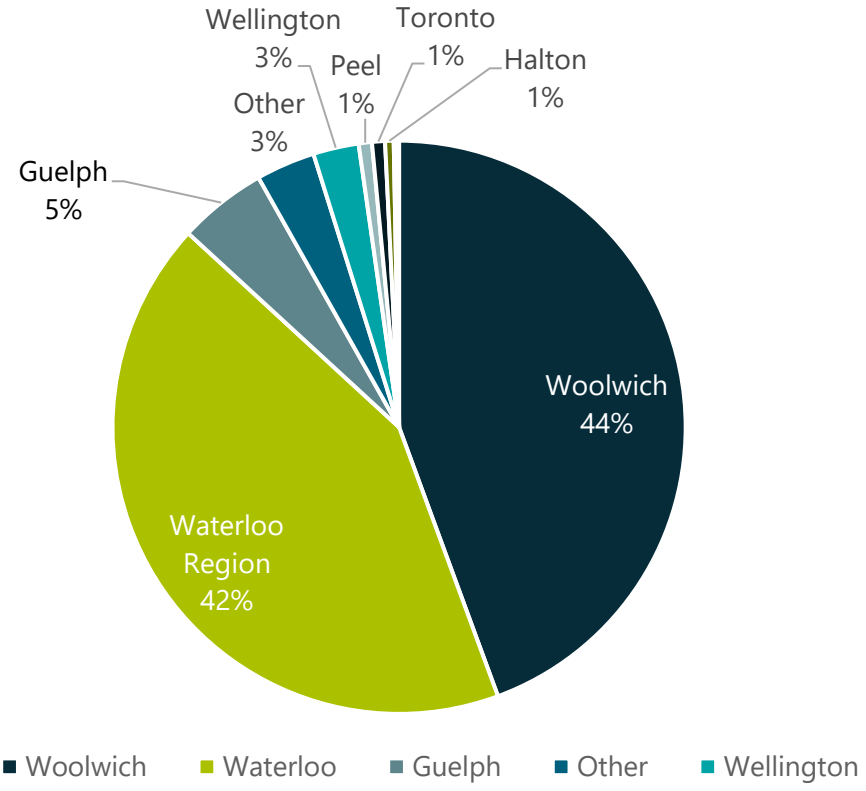
Figure 5: Mode Choice Versus Distance Travelled

Source: TTS 2016, 24h Period

3.4.2 Trip Distribution

3.4.2.1 Regional Level

Travel patterns are analyzed to identify the destinations of trips originating in Woolwich daily. Results show that 86% of these trips remain within the Waterloo Region, with 44% staying within Woolwich itself. Significant external destinations include Guelph (5%) and Wellington (3%), while the remaining 6% of trips extend to the GTHA and beyond. **Figure 6** visually represents these trip destinations from Woolwich. The majority of trips remaining within Waterloo Region highlight a strong reliance of local travel for commuting, errands, and other activities. This suggests a need for continued investment in local road networks, transit services, and active transportation infrastructure to enhance intra-regional connectivity. While external trips to the GTHA and beyond are limited, maintaining strategic transportation corridors for goods movement and long-distance commuting remains important. Monitoring traffic growth and assessing potential for expanded transit options can support long-term travel demand.



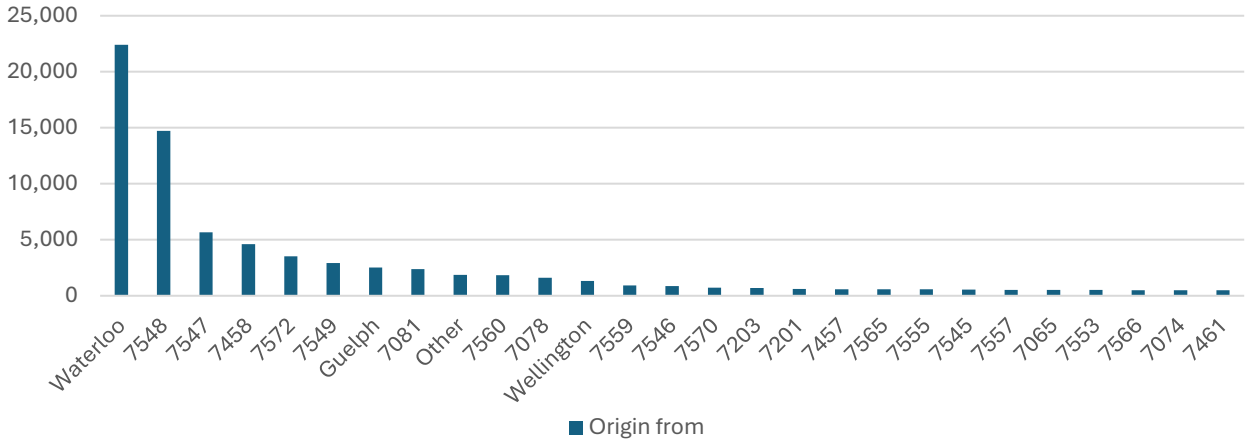
Source: Transportation Tomorrow Survey, 2016

Figure 6: Destination of Trips from Woolwich

3.4.2.2 Township Level

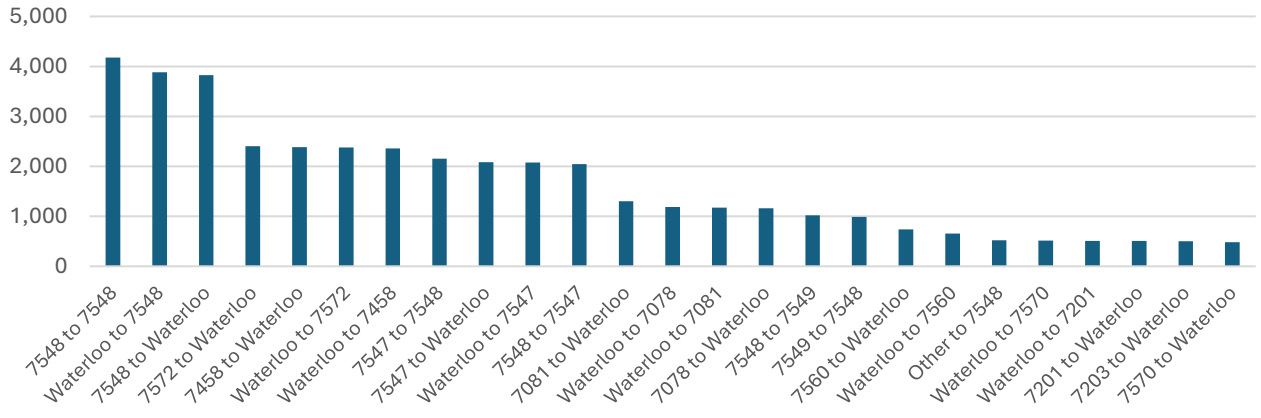
Figure 7 illustrates the primary origins of trips within Woolwich, while **Figure 8** highlights the most significant desire lines. **Map 10** shows the traffic analysis zones that are used in the TTS (shown on the x axis) and referenced in both figures. The analysis of these charts reveals the following key insights:

- 27% of trips originate from the City of Waterloo.
- Another 25% of trips originate from Elmira.
- The most significant desire lines in Woolwich are:
  - Within Elmira (5.2% of total trips)
  - From Region of Waterloo to Elmira (4.7%)
  - From Elmira to Region of Waterloo (4.6%)



Source: Transportation Tomorrow Survey, 2016

Figure 7: Most Trip Generators (90% of total) in Woolwich



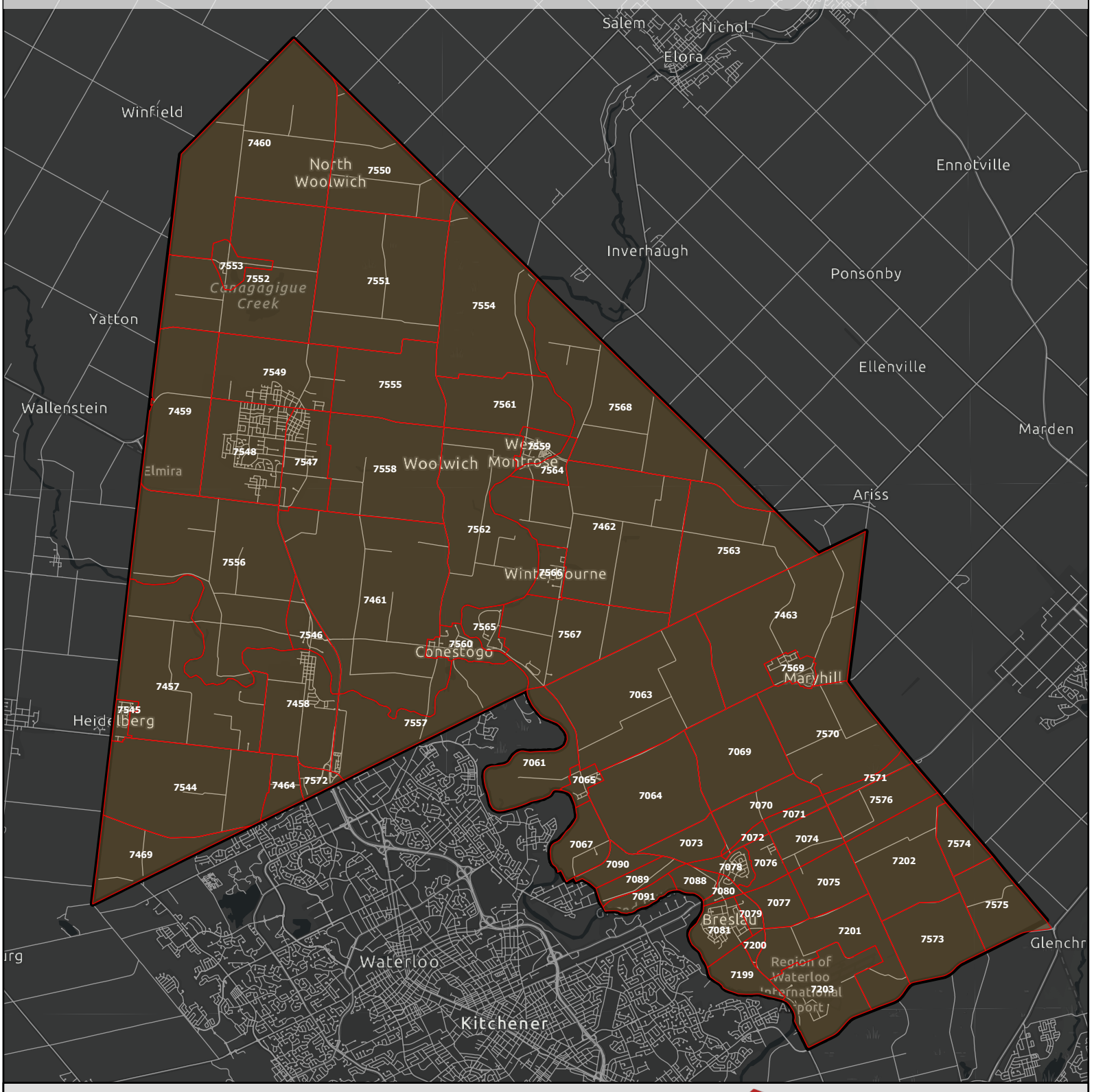
Source: Transportation Tomorrow Survey, 2016

Figure 8: Most Important Desire Lines (50% of total) in Woolwich

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Map 10: Transportation Analysis Zones



Legend

- Municipal Boundary
- Transportation Analysis Zone (TAZ)
- Road Network

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GIS data provided by Township of Woolwich in December 2024

3.4.2.3 Vehicle Trip Itinerary on Major Road Corridors

The Region's travel demand model enables the estimation of vehicle trip routes that pass through specific roadway segments. **Figures 9, 10, and 11** illustrate the typical travel patterns associated with the following roadway links, respectively:

- Arthur Street, north of St. Jacobs
- Line 86, east of Elmira
- Victoria Street, northeast of Breslau

Key findings from the Select Link Analyses (SLA) are summarized below:

- **Arthur Street**

  During the PM peak, Arthur Street primarily functions as a regional connector, accommodating significant volumes of local and regional traffic, particularly between Woolwich, Kitchener, and Waterloo.

- **Line 86**

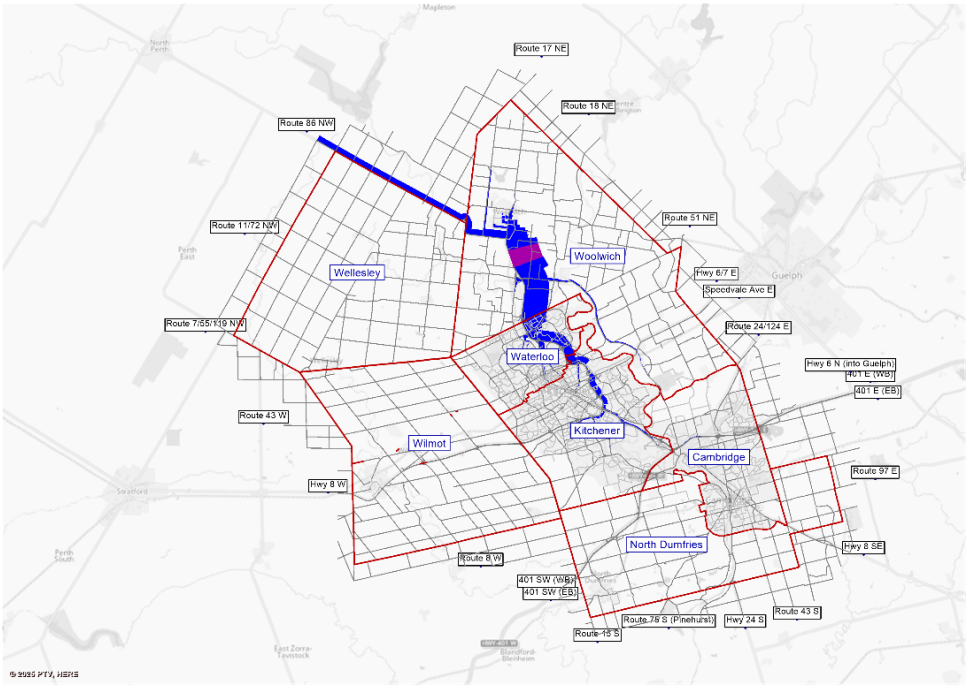
  In the PM peak, Line 86 also acts as a regional connector, facilitating major travel flows between Woolwich, Cambridge, and Wellesley.

- **Victoria Street**

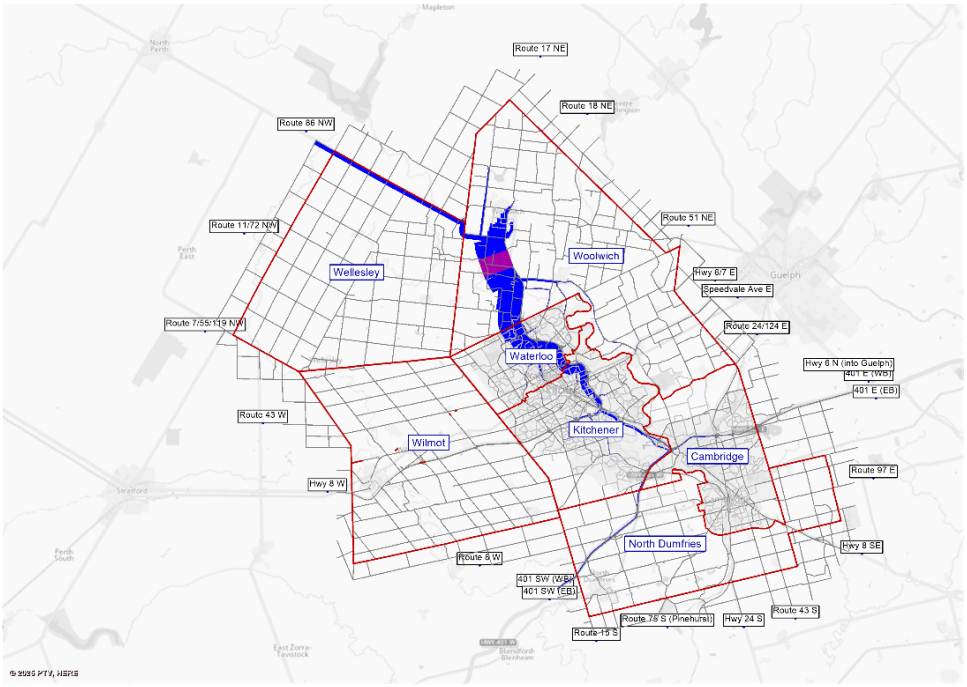
  During the PM peak, Victoria Street serves two distinct functions:

  - **Bypass Route (Westbound):** In the westbound direction, Victoria Street acts as a bypass corridor, carrying a large share of external traffic - particularly from Kitchener (93%).
  - **Regional Connector (Eastbound):** In the eastbound direction, the road supports regional connectivity, with major traffic flows originating from Kitchener (78%) and Waterloo (14%) heading toward areas outside the Region.

Northbound



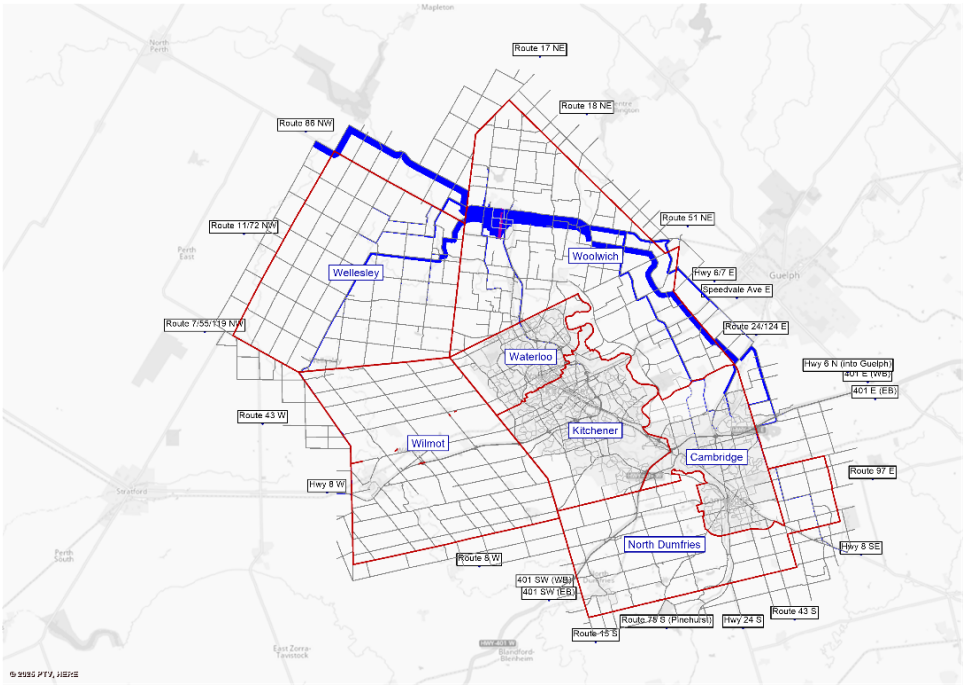
Southbound



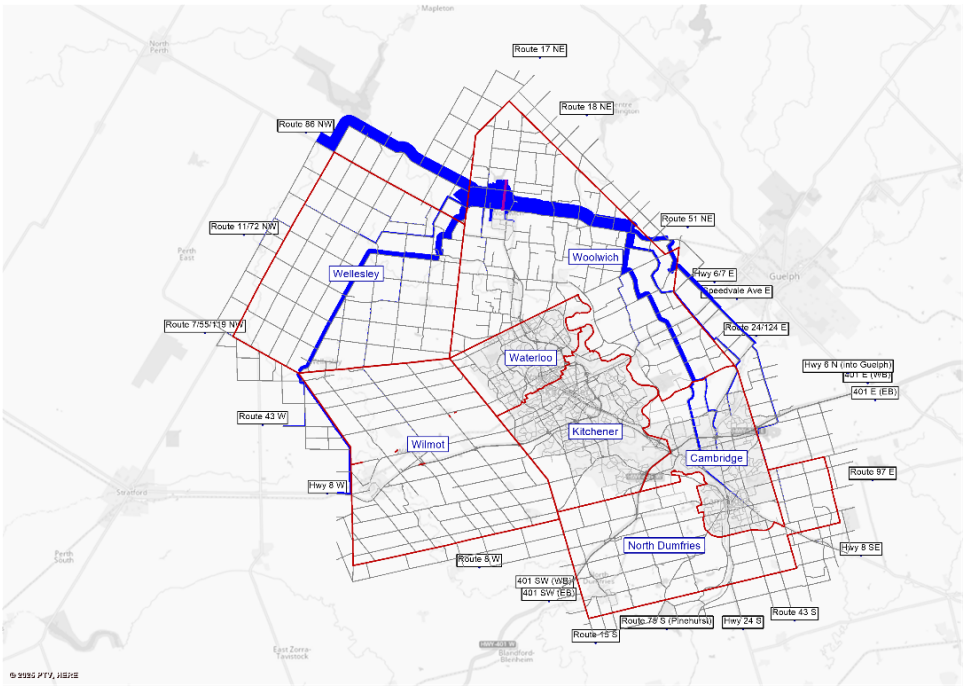
Source: Waterloo Regional Travel Demand Model, 2018 Baseline

Figure 9: Vehicular Trip Itinerary on Arthur Street – Weekday PM Peak Hour

Eastbound



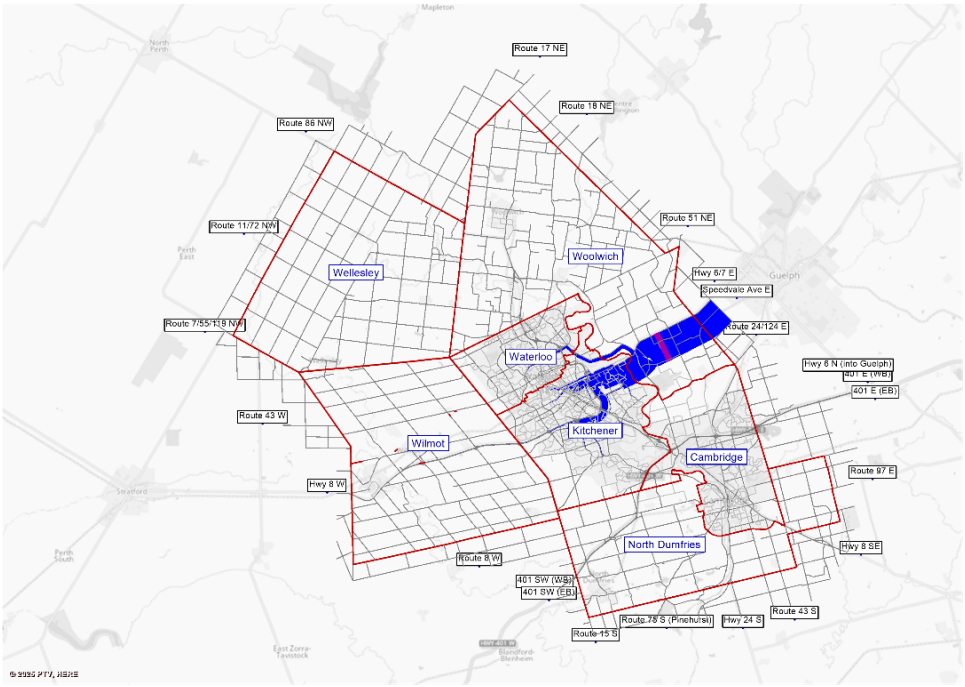
Westbound



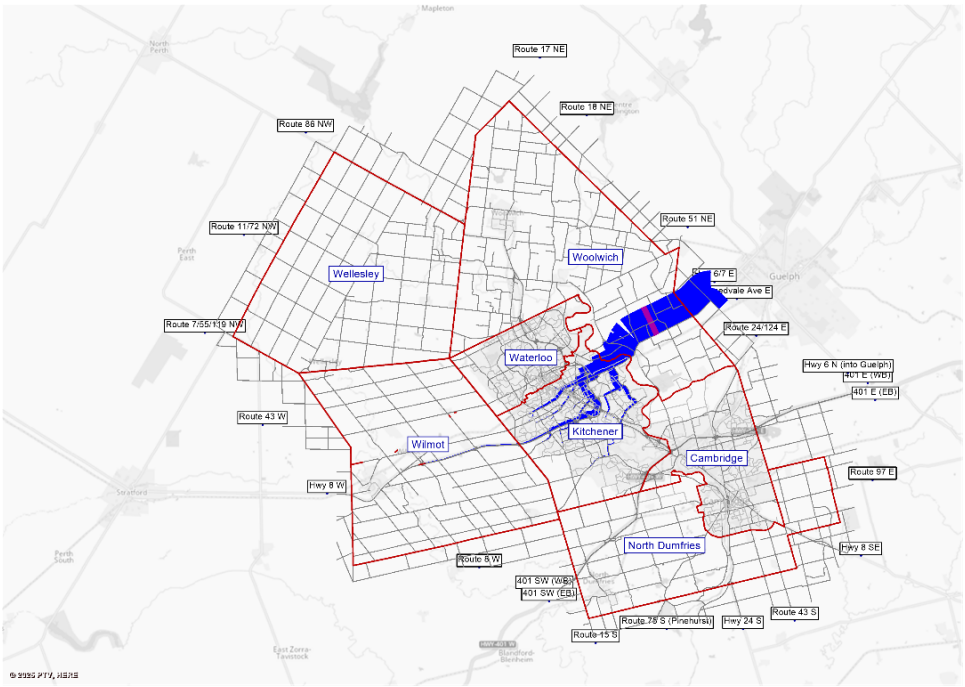
Source: Waterloo Regional Travel Demand Model, 2018 Baseline

Figure 10: Vehicular Trip Trajectory on Line 86 – Weekday PM Peak Hour

Eastbound



Westbound



Source: Waterloo Regional Travel Demand Model, 2018 Baseline

Figure 11: Vehicular Trip Itinerary on Victoria St – Weekday PM Peak Hour

3.5 Traffic Operations

As part of this CTMP, a total of 17 intersection locations were selected for review. These intersections were selected based on discussions with Township and Regional staff and are considered major intersections in Woolwich. These intersections are listed in **Table 3** and illustrated in **Map 11**. Turning movement count (TMC) data for the intersections were provided by the Region of Waterloo and is available in **Appendix C**.

Intersection operations were assessed using Synchro 11 traffic analysis software which utilizes methodologies established within The Highway Capacity Manual (HCM) 6th Edition published by the Transportation Research Board National Research Council (TRBNRC). Further details on analysis methodology and metrics are provided in the subsequent sections and the Synchro Reports are provided in **Appendix D**.

Table 3: Summary of Key Intersections Reviewed

No.	Intersection	Road Classification	Jurisdiction	Control Type
1	Highway 7/Victoria St North at Shantz Station Rd	Highway/Arterial	Provincial	Signalized
2	Township Rd 80/Menno St at Fountain St North	Collector/Arterial	Regional	All-Way Stop
3	Highway 7/Victoria Street North at Woolwich Street South	Arterial/Collector	Regional	Signalized
4*	Bloomingdale Rd North/Sawmill Rd at Ebycrest Rd	Arterial/Arterial	Regional	Signalized
5*	St Charles Street West at Shantz Station Rd	Arterial/Arterial	Regional	Unsignalized
6	Sawmill Rd at Katherine Street South	Arterial/Arterial	Regional	Signalized
7	Line 86 at Katherine Street North	Arterial/Arterial	Regional	Signalized
8	Line 86/Church Street East at Northfield Drive East	Arterial/Arterial	Regional	Signalized
9	Church Street East/Church St West at Arthur St North	Arterial/Arterial	Regional	Signalized
10*	Church Street West at Barnswallow Drive	Arterial/Arterial	Regional	Unsignalized
11	Whippoorwill Drive/S Field Drive at Arthur Street South	Arterial/Arterial	Regional	Signalized

No.	Intersection	Road Classification	Jurisdiction	Control Type
12	Listowel Rd/Union St at Arthur St South	Arterial/Arterial	Regional	Signalized
13	Sawmill Rd at Arthur St South	Arterial/Arterial	Regional	Roundabout
14	Sawmill Rd at Northfield Drive East	Arterial/Arterial	Regional	Signalized
15	Lobsinger Line at King St North	Arterial/Arterial	Regional	Signalized
16	Hwy 85 SB Ramps at King St North	Highway/Arterial	Provincial	Signalized
17	Highway 85 NB Ramps at King St North	Highway/Arterial	Provincial	Signalized

*Turning movement counts were not collected at this time

3.5.1 Capacity at Intersections

Intersection Level of Service (LOS) is a measure used to assess how efficiently an intersection operates under existing or future traffic demand. It evaluates traffic conditions based on the relationship between demand (traffic volumes) and capacity (the ability of the intersection to accommodate those volumes). Synchro 11 software was used to analyze the intersections listed in the previous section.

The results are presented as a Level-of-Service (LOS) metric, from LOS A to LOS F as illustrated in **Map 12**. Each LOS corresponds to a specific threshold of average vehicle delay (seconds per vehicle) as outlined in **Table 4**, which provides the interpretation of LOS results for signalized and unsignalized intersections.

Table 4: LOS Thresholds and Descriptions (Source: Synchro Modelling Guidelines[1])

LOS	Description	Control Delay (s)	
		Signalized Intersection	Unsignalized Intersection
A	Free Flow	≤10	≤10
B	Reasonably Free Flow	10 – 20	10 – 15
C	Stable Flow	20 – 35	15 – 25
D	Approaching Unstable Flow	35 – 55	25 – 35
E	Unstable Flow/At Capacity	55 – 80	35 – 50
F	Forced/Breakdown Flow	> 80	> 50

[1] https://vancouver.ca/files/cov/synchro-modelling-guidelines.pdf

All intersections are currently operating at acceptable Levels of Service (LOS A to C) under existing conditions. Two intersections are observed to be operating at LOS D during specific periods:

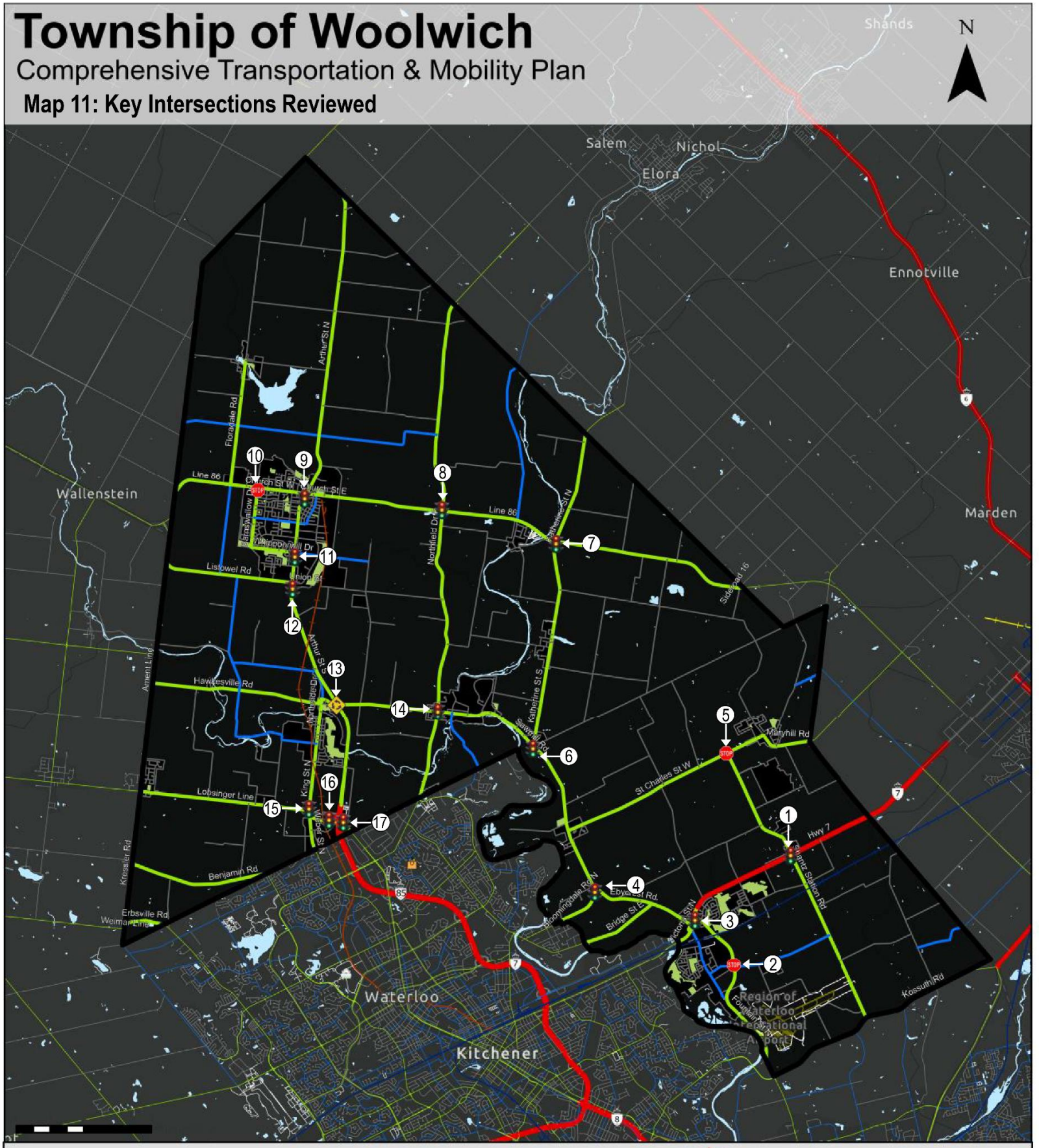
- **Sawmill Road at Katherine Street** – LOS D during the PM peak period.
- **Farmers Market Road at King Street** – LOS D during both the AM and PM peak periods.

Despite these results, no significant operational concerns have been identified under existing conditions.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 11: Key Intersections Reviewed



Legend

- Municipal Boundary
- Settlement Boundary
- Park
- Airport
- Waterbody

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Road Classification

- Provincial Highway
- Regional
- Collector
- Local
- Private Roads

- Stop-Controlled Intersection
- Signalized Intersection
- Roundabout

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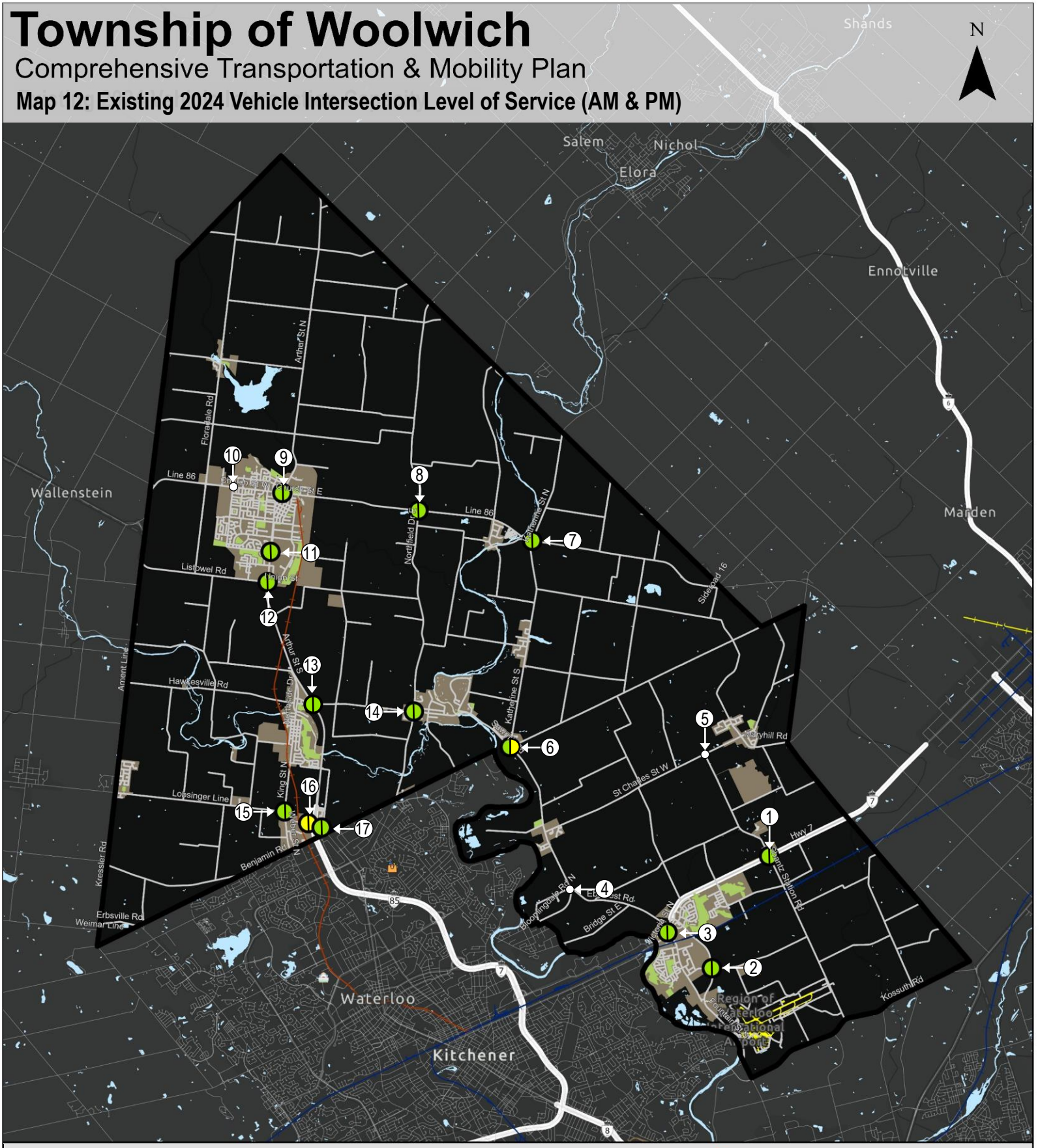
GIS data provided by Township of Woolwich on December 2024

0 1 2 4 Kilometers

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 12: Existing 2024 Vehicle Intersection Level of Service (AM & PM)



Legend

- Municipal Boundary
- Settlement Areas
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Intersection Level of Service

(AM)	(PM)
A-C	A-C
D	D
E	E
F	E

- Intersection LOS Not Available

0 1 2 4 Kilometers

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GIS data provided by Township of Woolwich in December 2024

3.5.2 Collision Frequency

A collision analysis is conducted for Woolwich's road network using 2019 to 2024 collision data, with a focus on a previously identified shortlist of key intersections. **Map 13** highlights the locations with the highest collision frequencies across the Township. This heatmap is created by overlaying six years of collision data to identify areas with higher collision densities. Collisions occur most frequently along arterial roads, with the greatest concentrations in Breslau and Elmira, where traffic volumes are highest.

A review of the data shows that most reported incidents involve property damage only, followed by non-fatal collisions. Only one fatal collision is recorded during the six-year period, involving a motorcycle. A seasonal trend is evident, with a higher number of collisions during winter months, likely due to icy or slippery road conditions. However, there is limited correlation between surface condition and collision frequency, as most incidents occur on roads classified as being in good condition. This likely reflects a data bias, as the majority of Woolwich's roads are rated in good condition, meaning collisions are more frequently recorded on well-maintained roads simply because they make up most of the network.

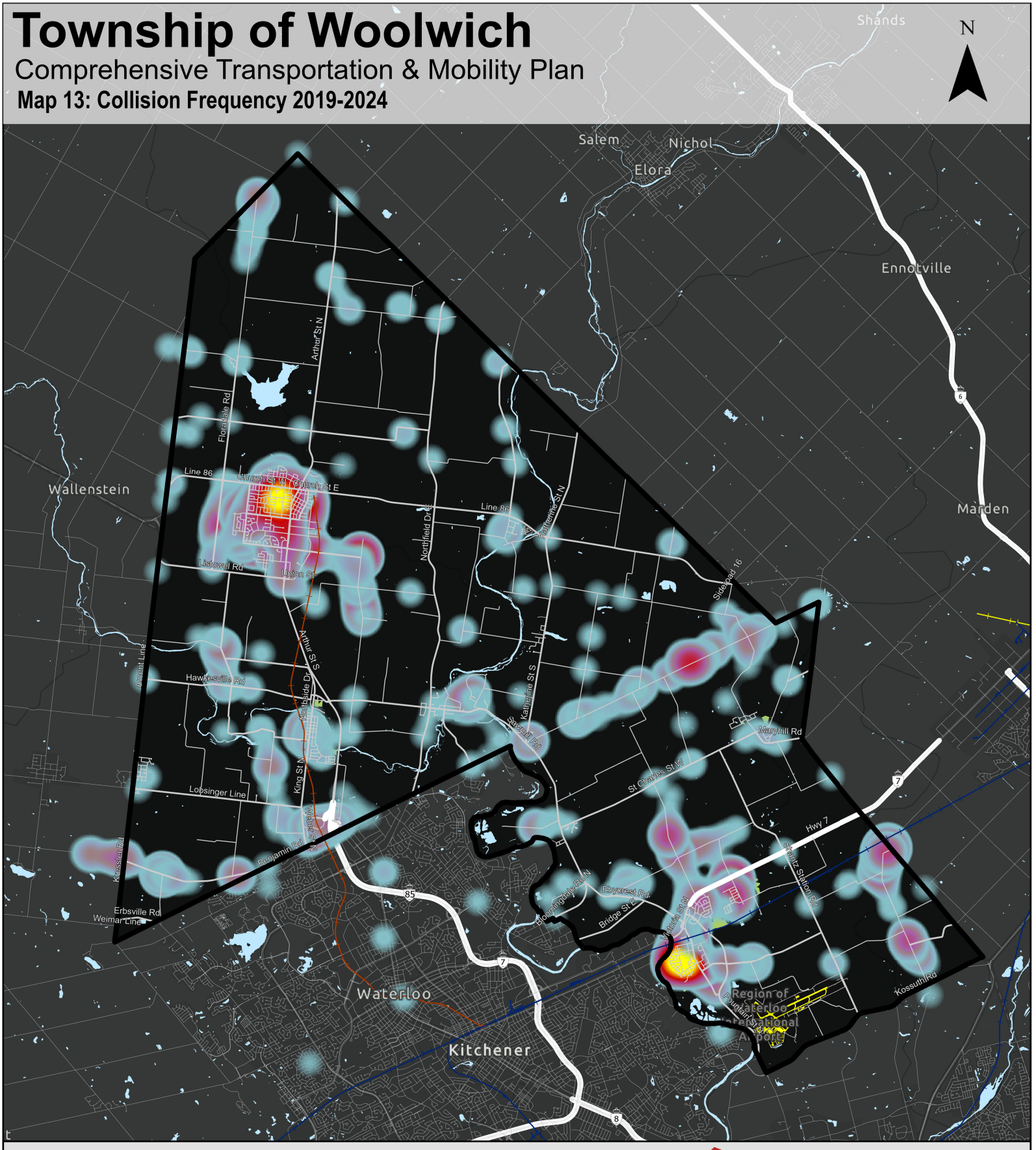
Most collisions take place mid-block rather than at intersections. Passenger vehicles, including vans and station wagons, are involved in the majority of collisions, with a smaller share involving larger vehicles such as trucks or farm equipment.

While no critical safety concerns are identified, certain trends - such as the seasonal rise in winter collisions - suggest opportunities for targeted improvements. These could include enhanced winter road maintenance, public awareness campaigns focused on safe winter driving, and additional warning signage in high-risk areas.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 13: Collision Frequency 2019-2024



Legend

- Municipal Boundary
- Airport
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Collision Density

- Low
- High

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich on December 4th, 2024

3.6 Current Infrastructure Analysis

The existing transportation infrastructure is reviewed to assess its current condition, identify deficiencies, and prioritize improvements for all road users. The assessment focuses primarily on Regional and Collector roadways, given their higher traffic volumes and their role as key connectors between settlement areas within the Township of Woolwich and adjacent municipalities in the Region of Waterloo. Due to their importance in linking residential communities, these corridors must provide safe and accessible infrastructure not only for motorists, but also for cyclists, pedestrians, and horse-and-buggy users. It should be noted, however, that any improvements on Regional Roads are subject to regional studies.

3.6.1 Vehicle

The condition of Woolwich's roadway network is documented in the Township's 2024 Asset Management Plan (AMP), utilizes the Ministry of Transportation's 1991 Inventory Manual for Municipal Roads to assess roadway conditions. According to the AMP, the overall condition of the Township's roads is rated between Fair and Good.

For more detailed methodology and assessment criteria, refer to the full 2024 Asset Management Plan.

3.6.2 Active Transportation

The City of Ottawa's Multimodal Level of Service (MMLOS)[2] methodology is applied to assess the existing pedestrian and cycling infrastructure in Woolwich. This framework evaluates infrastructure performance based on key factors such as safety, comfort, and user experience, providing a clear and consistent approach for identifying gaps and prioritizing areas for improvement. While the methodology offers a strong foundation for analysis, it is important to note that the Township of Woolwich differs significantly from the City of Ottawa in its rural context and unique transportation characteristics, including the presence of horse-and-buggy traffic, which influences roadway design, user interactions, and safety considerations. Accordingly, the MMLOS framework has been interpreted with these local conditions in mind.

Table 5 below shows the description of each Level of Service (LOS) for Pedestrians and Cyclists as provided in the Ottawa MMLOS guidelines.

[2] hBttps://documents.ottawa.ca/sites/default/files/mmlos_guidelines_en.pdf

Table 5 Description of Each Letter Score for Cycling and Pedestrian LOS

LOS	Results for Cycling and Pedestrian Facilities
A	Very Comfortable
B	Comfortable
C	Fairly Comfortable
D	Less Comfortable
E	Uncomfortable
F	Very uncomfortable / does not meet minimum design guidelines

3.6.2.1 Bicycle MMLOS

The evaluation of Woolwich's existing cycling infrastructure is based on factors such as bike lane width, traffic volumes, number of travel lanes, and vehicular operating speeds, to assess overall comfort and safety for cyclists. A limited number of roadways - such as Arthur Street, Sawmill Road, and St. Charles Street - feature rural or reserved bike lanes. Rural bike lanes, located on roadway shoulders in less developed areas, are shared by cyclists and horse-and-buggy vehicles, which introduces additional operational and safety challenges. The presence of slower-moving, non-motorized vehicles can force cyclists to maneuver into adjacent travel lanes, increasing their exposure to higher-speed traffic.

Applying the City of Ottawa's Multimodal Level of Service (MMLOS) methodology, the average level of service for cycling infrastructure in Woolwich is rated 'D', indicating a moderately poor experience for cyclists. Most rural and reserved bike lanes are unprotected and directly adjacent to motor vehicle travel lanes, resulting in lower levels of comfort. The network also suffers from poor connectivity, forcing cyclists to share the roadway with high-speed motor vehicles, further reducing safety and comfort. Table xx shows what each Level of Service indicates for bicycle comfort.

Major intersections in Woolwich also lack dedicated cycling infrastructure, requiring cyclists to merge with vehicle traffic - particularly at turning movements - thereby increasing the risk of conflict, especially with right-turning vehicles. These findings underscore the need to expand protected cycling facilities, improve intersection treatments, and enhance network connectivity to support safer, more accessible active transportation.

Map 14 illustrates the existing level of service for cycling infrastructure across the Township.

3.6.2.2 Pedestrian MMLOS

The physical condition of sidewalks in Woolwich is documented in the Township's 2024 Asset Management Plan (AMP). Based on the 2024 AMP, the condition of the sidewalks and footbridges have been classified as Good.

The evaluation of pedestrian Leven of Service (LOS) considers several factors, including sidewalk and boulevard widths, annual average daily traffic (AADT), presence of on-street parking, crosswalk treatments, and vehicular operating speeds. While sidewalks are generally present within residential areas, pedestrian infrastructure is lacking along major roadways outside of these neighbourhoods. This limits overall connectivity and accessibility between residential areas and requires pedestrians to walk along road shoulders, often in close proximity to fast-moving traffic - posing significant safety concerns.

At several signalized intersections outside settlement areas, standard transverse crosswalks are present. However, these crossings often provide a false sense of connectivity due to the absence of formal pedestrian infrastructure along adjacent roadways. In many cases, crosswalks lead directly to unpaved shoulders, further limiting accessibility and reducing pedestrian safety. **Figure 12** illustrates this issue at the intersection of Line 86 and Katherine St N, where crosswalks are present on all legs, but no pedestrian infrastructure along adjacent roadways. It should be noted, however, that any improvements recommended for Regional infrastructure are subject to Regional studies and approvals.

These findings highlight the need for strategic sidewalk expansion and improved pedestrian infrastructure, particularly along high-speed corridors and at intersections that currently lack full connectivity.

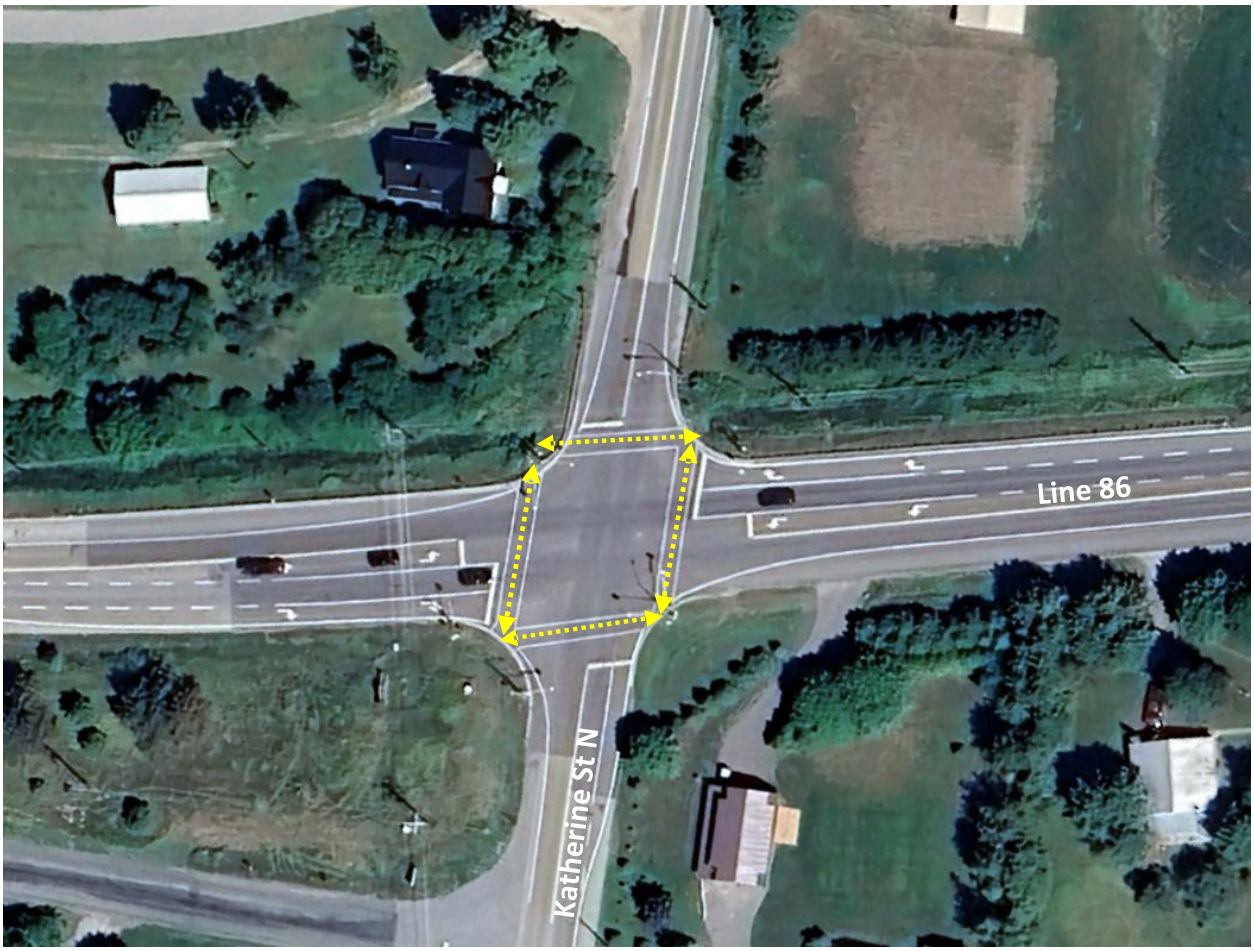


Figure 12: Line 86 and Katherine Street North Intersection

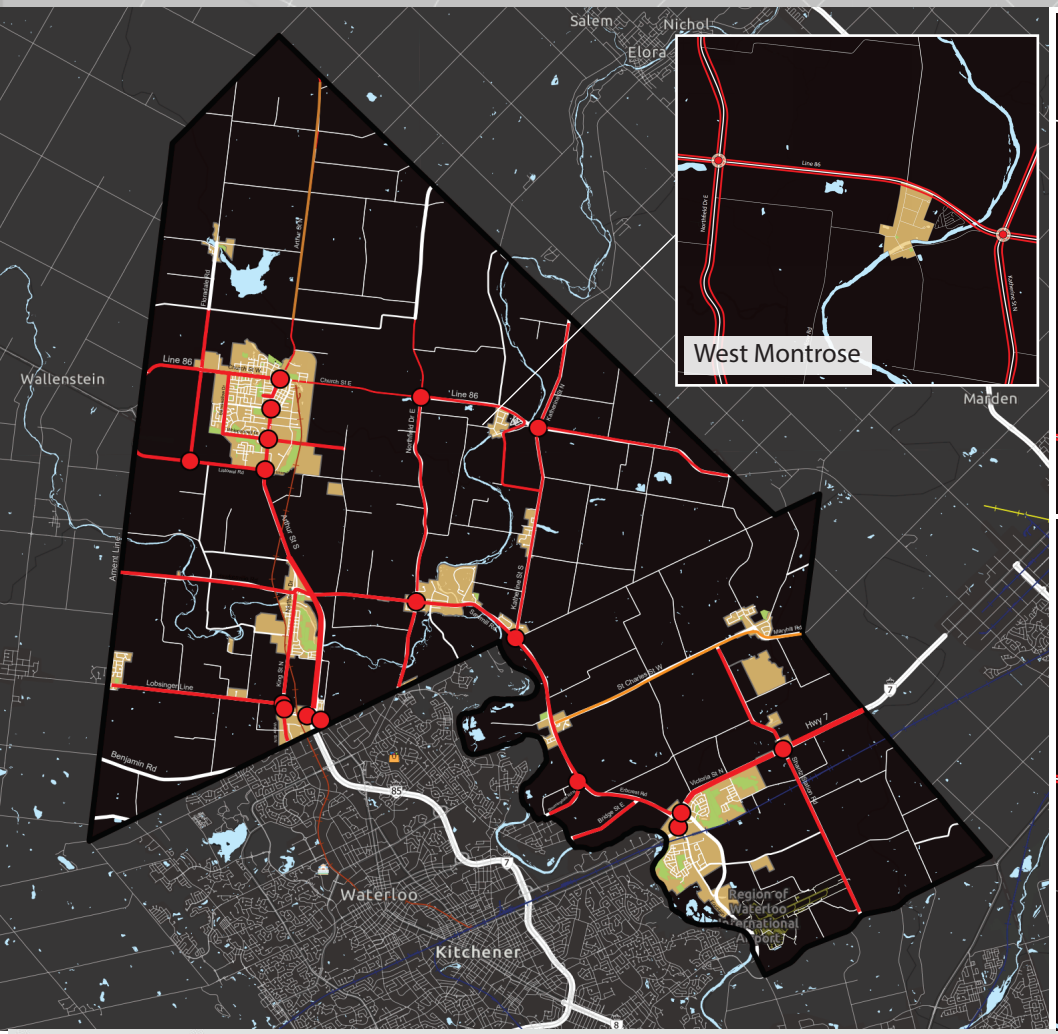
Applying the City of Ottawa's Multimodal Level of Service (MMLOS) methodology, the average level of service for pedestrian infrastructure in Woolwich is rated 'E', indicating a poor overall walking experience with low comfort and elevated safety risks for pedestrians. **Map 15** illustrates the MMLOS results for pedestrian facilities across the Township.

These findings highlight the critical need to expand pedestrian infrastructure along major roadways to improve safety, accessibility, and overall walkability in support of a more inclusive transportation network.

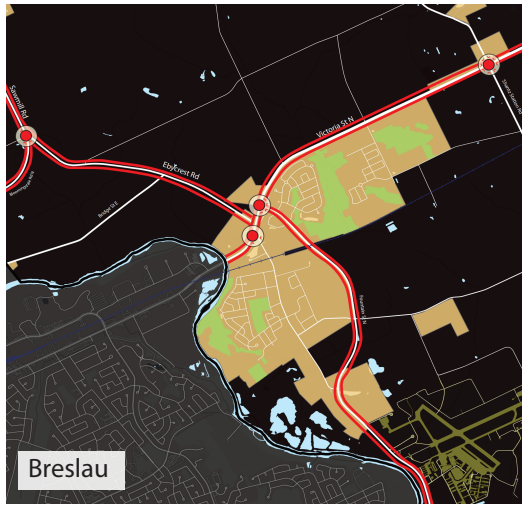
Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 14: Existing Cycling Levels of Service











Legend

Cycling Level of Service

- A
- B
- C-D
- E-F

- Municipal Boundary
- Settlement Areas
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

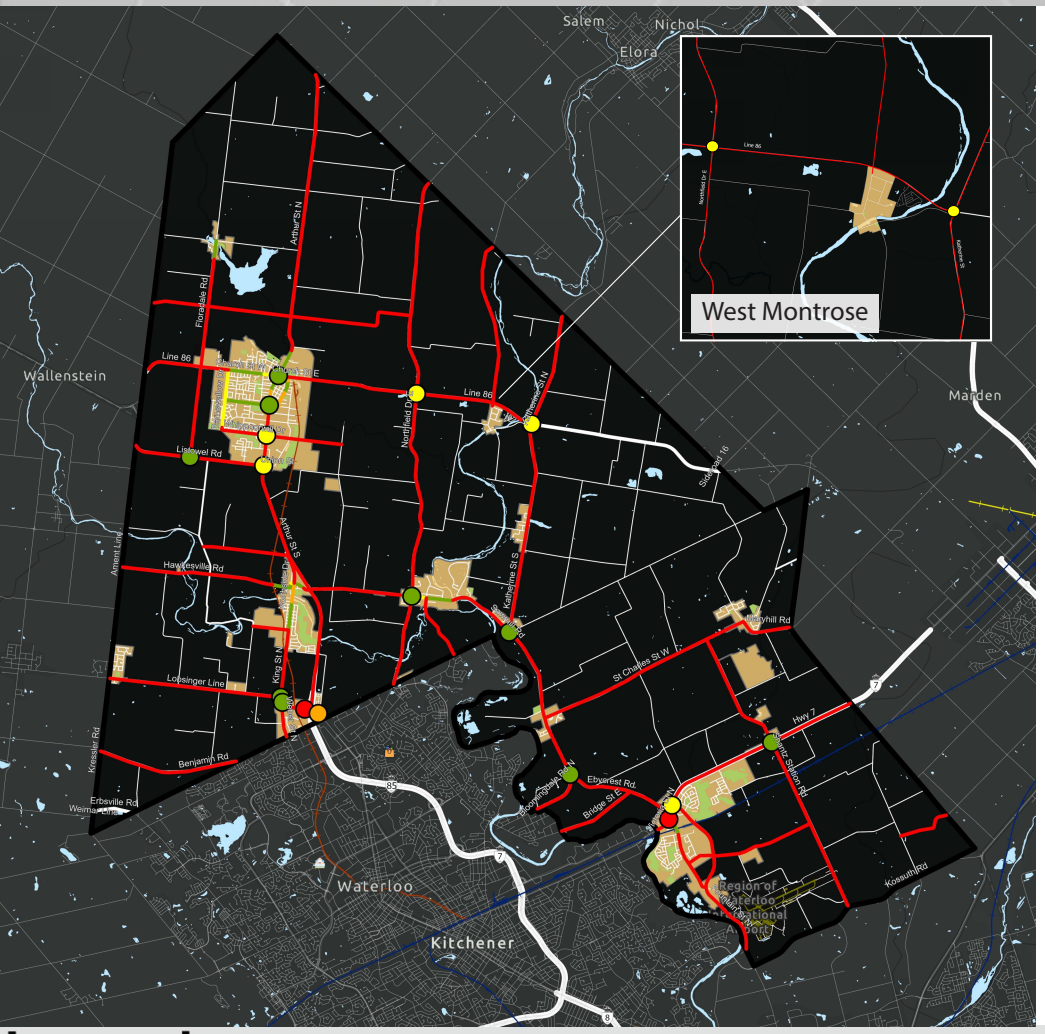
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GIS data provided by Township of Woolwich in December 2024

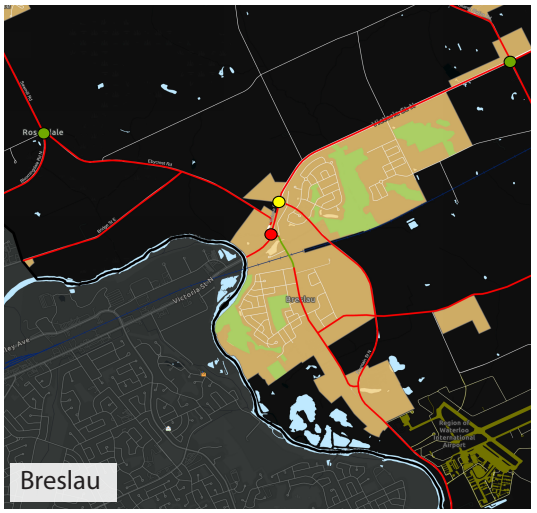
Township of Woolwich

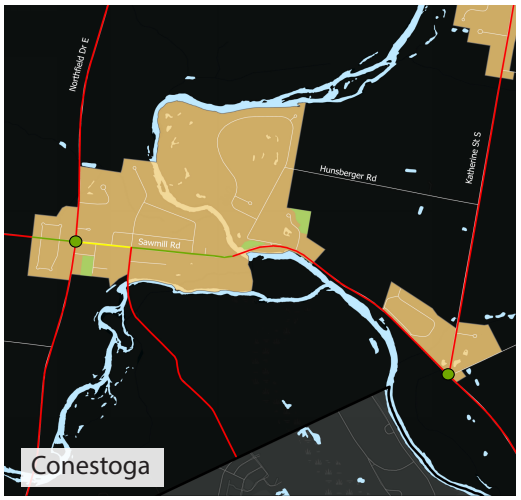
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Map 15: Existing Pedestrian Levels of Service











Legend

Pedestrian Level of Service
- A-C
- D
- E
- F

Municipal Boundary

Provincial Highway

Road Network

Settlement Areas

Park

Waterbody

Railway
- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

0 0.15 0.3 0.6 Kilometers

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich in December 2024

3.6.3 Transit

As noted in **Section 3.2.3**, the Township is currently served by the following routes: Route 19 which connects St. Jacobs Market / Northfield Station to the University of Waterloo; Route 21, which connects Elmira, St. Jacobs, and Conestoga Station; Route 78 which provides bus access between Kitchener-Waterloo and the Region of Waterloo International Airport; and Route 79, an on-demand service operating in Breslau. The Township also offers community bus services in Elmira and specialized transit options for persons with disabilities.

Overall, transit accessibility within the Township is very limited, particularly for travel across the Township or to key regional destinations. This likely explains why transit priority measures such as Transit Signal Priority (TSP) or dedicated bus lanes have not been implemented. Transit vehicles currently operate in mixed traffic, reducing overall reliability and travel time competitiveness.

The Region has demonstrated an opportunity to deliver a potential **GO Rail** station in **Breslau** on the Kitchener Line. This station would present a major opportunity to improve regional connectivity. This future station could serve as a hub, allowing for better integration of existing and future transit routes and supporting the development of an inter-regional, multimodal transit network.

Using the City of Ottawa's MMLOS methodology to evaluate transit service attractiveness and its potential to increase mode share, a preliminary assessment found that the Transit Level of Service (TLOS) for routes serving the Township has an LOS D. **Table 6** shows the qualitative description of the TLOS scores.

Table 6 Qualitative Description of TLOS Scores

LOS	Results for Segments	Result for Intersections
A	Transit Vehicles are not impeded by other traffic	Free flow
B	Transit vehicles are rarely impeded by other traffic	Stabel flow / slight delays
C	Transit vehicles are occasionally impeded by other traffic	Stable flow / acceptable delays
D	Transit vehicles are often impeded by other traffic	Approaching unstable flow
E	Transit vehicles are very often impeded by other traffic	Unstable flow

LOS	Results for Segments	Result for Intersections
F	Transit vehicles are almost always impeded by other traffic	Forced flow / jammed

While this methodology is primarily designed for corridors with existing or planned rapid transit or transit priority features, it can still be applied to corridors with regular bus service. It allows for both qualitative and quantitative assessments, including metrics such as the ratio of average transit speed to posted speed limits and the number of driveways or pedestrian crossings. However, due to limited data availability, only a qualitative assessment was possible in this case.

In the Township's case, the low transit mode share is largely influenced by the rural and dispersed nature of its population and employment areas, which makes it challenging to provide viable, fixed-route transit service across the entire Township. However, within the urban areas, existing GRT routes already serve a high proportion of residents and employment locations, supporting local mobility effectively.

3.6.4 Parking

Currently, parking in Woolwich is available via municipally owned public parking lots in Elmira and St. Jacob's, on-street parking on local roads through the Township, and on private parking lots per Woolwich's zoning bylaws. The bylaws currently specify off-street parking rates that need to be delivered on site for residential buildings, businesses, retail, schools, entertainment venues, and other facilities throughout the Township.

Free on-street parking is available in the downtown cores of Elmira and St. Jacobs for up to two hours in Elmira and three hours in St. Jacobs, unless posted otherwise. In these downtown areas, the Township also offers off-street parking for free between the hours of 2:30 a.m. and 6:00 a.m. The locations of the public parking lots are summarized in **Table 7** and illustrated in **Figure 13**.

Table 7: Municipal Parking Lots in Woolwich

Elmira	St. Jacobs
➢ Wyatt Street Parking Lot – All Day	➢ Front Street Parking Lot (Bus Parking) – All Day ➢ Alberta/Water Street Parking Lot (Car, Camper and Bus) – All Day

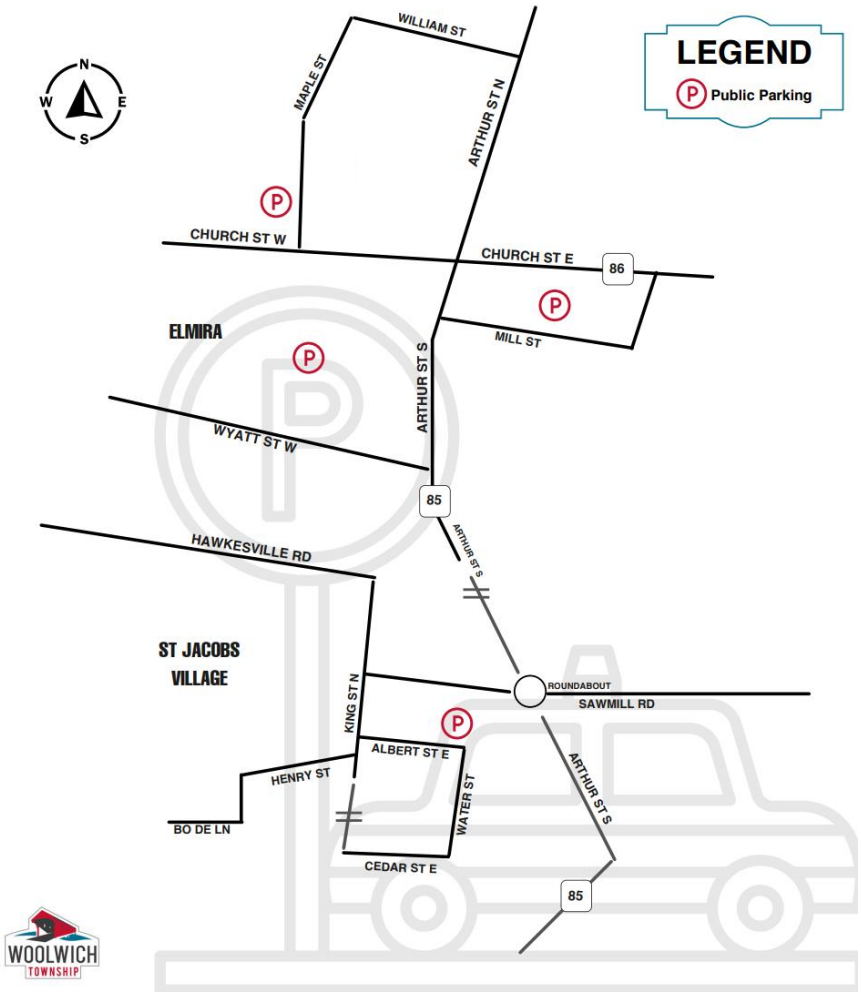


Figure 13 : Woolwich Parking Map (Source: Township of Woolwich)

Outside of Downtown Elmira and St. Jacobs, residents are able to park their vehicles on-street for up to 24-hours where on-street parking is permitted. Between December 1st until March 31st every year, parking is prohibited on Township roads during 4:00 am and 9:00 am to allow for effective snow clearing, sanding, and salting operations. Outside of the winter parking ban period, parking bans may also be in place during the declaration of a snow events.

In Breslau, parking is primarily accommodated through on-site spaces in residential developments, commercial areas, and municipal facilities such as the Breslau Community Centre. On-street parking is generally available on local roads where roadway width allows, and current demand remains moderate given the area's lower density and reliance on private driveways. However, with continued community growth and the planned Breslau GO Station, parking demand is expected to increase. The future station is anticipated to have a park-and-ride facility which will help accommodate commuters but may also generate additional parking pressures within surrounding neighbourhoods. Ongoing monitoring and updated parking

management strategies will be important to balance accessibility, local character, and future transit-oriented development.

Overall, parking in Woolwich is currently abundant, which is consistent with the high auto mode share observed across the Township. This supply supports access to key destinations by residents and visitors alike. However, as Woolwich continues to experience growth and increasing development density, there is an opportunity to reconsider how parking is planned and provided. Implementing strategies that better manage and consolidate parking facilities can contribute to more efficient land use, enhance the public realm, and support the Township's vision for a vibrant and evolving community.

3.7 Existing Conditions Summary

The review of existing conditions offers a comprehensive inventory and assessment of the current transportation infrastructure and facilities within the Township of Woolwich. This analysis identifies key issues and trends that form the foundation for developing future improvements across all modes of travel. The key findings, presented below, reflect the Township's diverse geographical context and highlight the need for a safe, connected, and efficient multimodal transportation system.

Road Network and Traffic Conditions

- The Township's road network is made up of Provincial, Regional, and local roads.
- Key Regional (arterial) roads such as Arthur Street and Victoria Street experience the highest traffic volumes with AADT > 20,000. High truck percentages are observed on Arthur Street, where heavy vehicles account for approximately 10–15% of total daily traffic volumes, based on recent traffic count data.
- Several Regional intersections, including Sawmill Road at Katherine Street and Farmers Market Road at King Street are operating at LOS D during peak periods, however, no significant operational concerns have been identified during existing conditions.

Collision Trends

- Most collisions involved property damage only, with only one fatal collision recorded over a five-year (2019-2024) period. Collisions are more frequent in winter months.
- Most incidents occurred mid-block rather than at intersections.
- Passenger vehicles were involved in the majority of collisions.
- Safety improvements such as enhanced winter maintenance, signage, and awareness campaigns are recommended.

Active Transportation

- Existing active transportation facilities are limited in Woolwich, especially outside settlement areas.
- Steep topography and long distances between communities hinder inter-settlement walking and cycling.
- Multimodal Level of Service (MMLOS) evaluation rates cycling infrastructure at LOS D and pedestrian infrastructure at LOS E, highlighting significant opportunities for improvement.

Transit

- The Township is directly served by GRT Route 19 (University of Waterloo to St. Jacobs), Route 21 (Conestoga Station to Elmira), Route 78 (Sportsworld Station to the Region of Waterloo International Airport), and Route 79 (On-demand transit service in Breslau). Outside of these services, most areas in Woolwich are not connected by fixed route transit.
- The potential GO Station in Breslau presents a transformative opportunity for regional connectivity.
- Transit improvements in Breslau will be needed with the development of the expanded settlement area and increased densities in this area.

Travel Demand Patterns

- Automobile use dominates, accounting for 76% of all trips. Active transportation and transit comprise only 5%.
- Short-distance trips (<5 km) are rarely made by walking or cycling, indicating opportunities for mode shift.
- Most trips (86%) stay within Waterloo Region, suggesting a strong need for robust intra-regional connectivity.

Infrastructure Condition and Parking

- Road and sidewalk infrastructure conditions are generally rated Fair to Good by the Township's 2024 Asset Management Plan.
- Existing bicycle facilities are narrow and unprotected leading to low comfort levels.
- Pedestrian infrastructure is lacking along major roads reducing accessibility.
- Parking is abundant and mostly free; however, future growth presents an opportunity to better manage parking supply. Refer to **Section 7** for more information.

4 Future Conditions

4.1 Population and Employment Trends



To assess projected population changes in the Township of Woolwich, a comprehensive growth analysis was conducted. This analysis draws on historical census data, discussions with Township staff regarding future plans, and alignment with the Township's Official Plan. Woolwich's population is projected to reach up to 68,195 by 2051, representing an increase of 39,785 people, or 140% compared to 2021 levels. This growth is expected to occur across the Township's settlement areas, with the following breakdown:

- **Elmira:** Projected to grow by 79% by 2051.
- **Breslau:** Expected to nearly quadruple, increasing from approximately 7,800 to 31,900 (+306%).
- **St. Jacobs:** Could grow up to 71%, but will not achieve this growth under the current wastewater capacity restraints.
- **Other Settlement Areas:** Growth is expected to be limited, with increases of up to 5%, due to an even distribution of baseline population data.

Map 16 illustrates how this population growth is distributed across Woolwich's settlement areas. As shown, the majority of growth will be concentrated in Breslau, Elmira, and St. Jacobs, with Breslau experiencing the most significant increase. By 2051, Breslau is projected to surpass Elmira in population, largely due to the expansion of the Breslau Urban Boundary, as outlined in the Township's Official Plan Review.

In addition to population growth, employment in the Township is forecasted to reach 33,000 jobs by 2051, an increase of 15,700 jobs, or 90%, from 2021 levels as mentioned in the Township's Draft Official Plan. To support this growth, Woolwich has established intensification targets in its Official Plan, including a minimum annual residential intensification rate of 20% and the development of 1,620 new residential units within the Delineated Built-Up Area by 2051.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 16: Projected Population in Settlement Areas (2051)



Legend

Projected Population (2051) in Settlement Areas

- 100 - 1,000
- 1,000 - 3,000
- 3,000 - 7,000
- 7,000 - 20,000
- 20,000 - 32,000

- Municipal Boundary
- Park
- Waterbody
- Provincial Highway
- Road Network
- Railway

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich in December 2024

4.2 Road Network in 2051

As previously noted, the Region of Waterloo has planned a number of road network improvements within Woolwich and the broader Region through to 2041. In parallel, the Ministry of Transportation of Ontario (MTO) is advancing the delivery of the new Provincial Highway 7, which will connect the Region to Guelph and pass through the southern portion of Woolwich. This new highway will feature two lanes in each direction and integrate with Woolwich's road network at three interchanges: Shantz Station Road, the new extension of Fountain Street North, and Bridge Street East. Once completed, Highway 7 is expected to provide a high-capacity, high-quality corridor that supports the Region's largest inter-regional commuter flow. The Region is also progressing the Ottawa Street Extension, which will further enhance connectivity between Kitchener, Breslau, and Woolwich by improving access to regional employment areas and future development lands

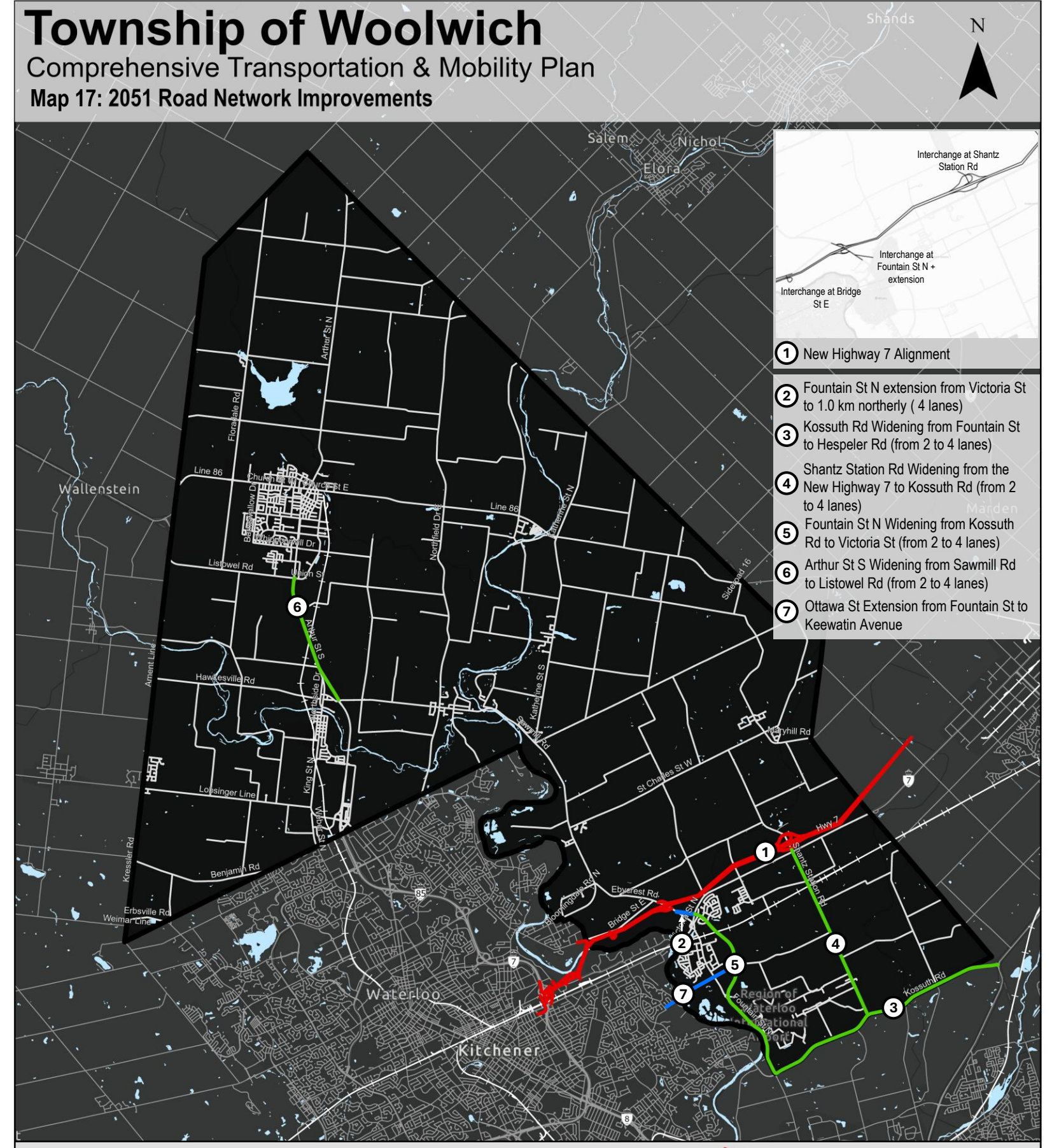
These planned improvements are incorporated into the Region's travel demand model (see Section 5.3), which is being used to forecast future traffic volumes across the network. **Map 17** illustrates the projected 2051 road network in Woolwich, highlighting the Region's planned infrastructure upgrades.

It should be noted that, the Elmira Bypass has also been identified by the Region as a longer-term project currently under review to address traffic congestion and truck movements through Elmira's core area. However, as the Elmira Bypass is still in the early stages of consideration and not identified within the Region's current 2041 planning horizon, it was not included in the travel demand modelling for this study.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 17: 2051 Road Network Improvements



Legend

- Municipal Boundary
- Waterbody
- Road Network
- Railway

Network Improvements

- Road Widening
- Road Extension
- New Highway 7 Alignment

0 1 2 4 Kilometers

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich in December 2024

4.3 Travel Demand Forecast

The Region of Waterloo Transportation System demand model, known as the ROWTS model, is a comprehensive four-stage model aimed at forecasting daily travel demand across various transportation modes. It specifically focuses on travel by private passenger vehicles and commercial vehicles, incorporating adjustments to account for peak hour demand during the evening. The resulting traffic is then assigned to the network. The perimeter of the ROWTS model is illustrated in **Figure 14**.

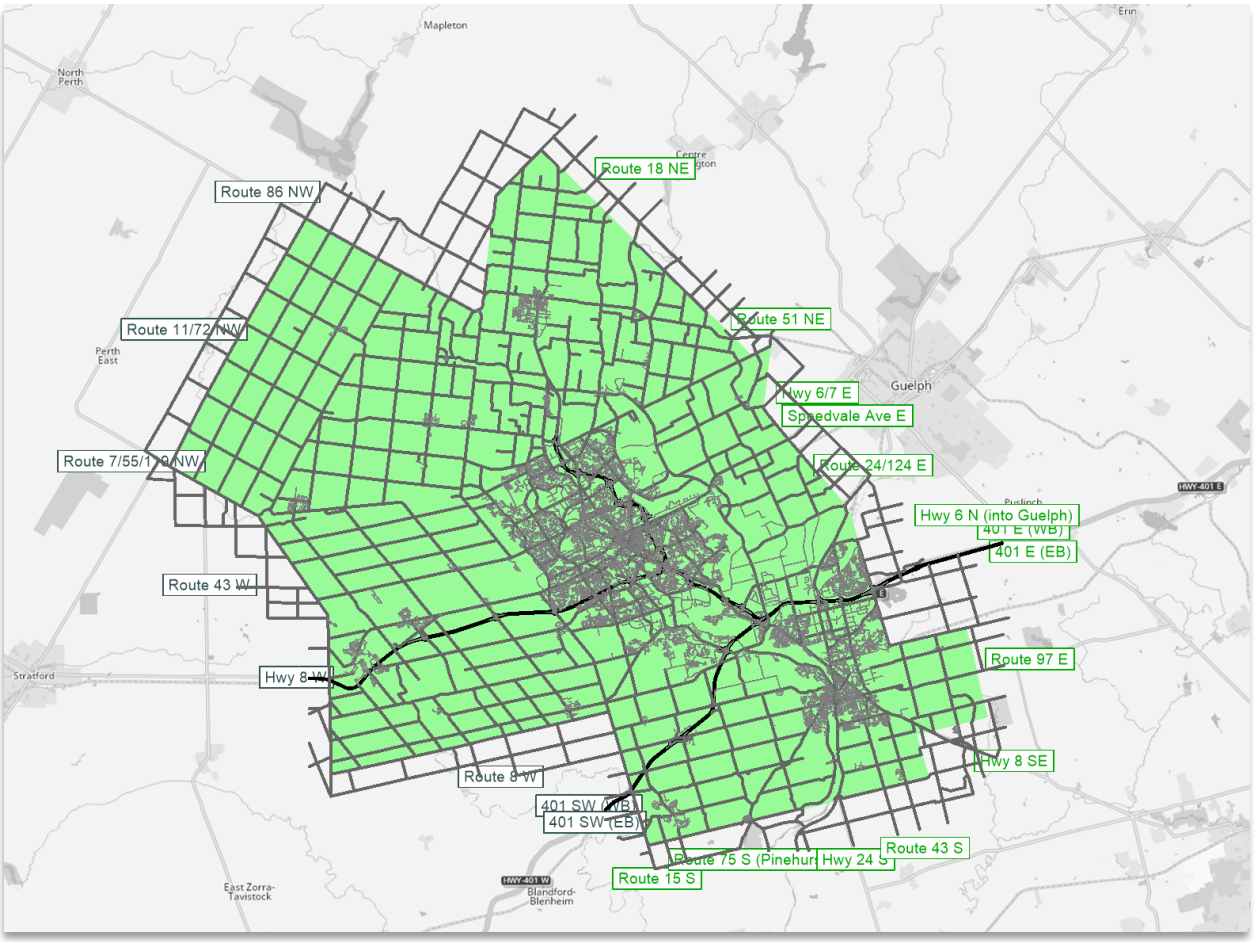


Figure 14: Perimeter of the Regional Model

The Region's strategic travel demand model, developed using VISUM software, is used to forecast future vehicular travel demand to the 2051 horizon year. Within the model, population data zones are linked to transportation analysis zones (TAZs) in Woolwich, allowing for a refined distribution of projected population and employment based on land use data and forecasts from the ROWTS model. **Figure 15** provides an illustration of the transportation zones within the Township of Woolwich used in the VISUM model.

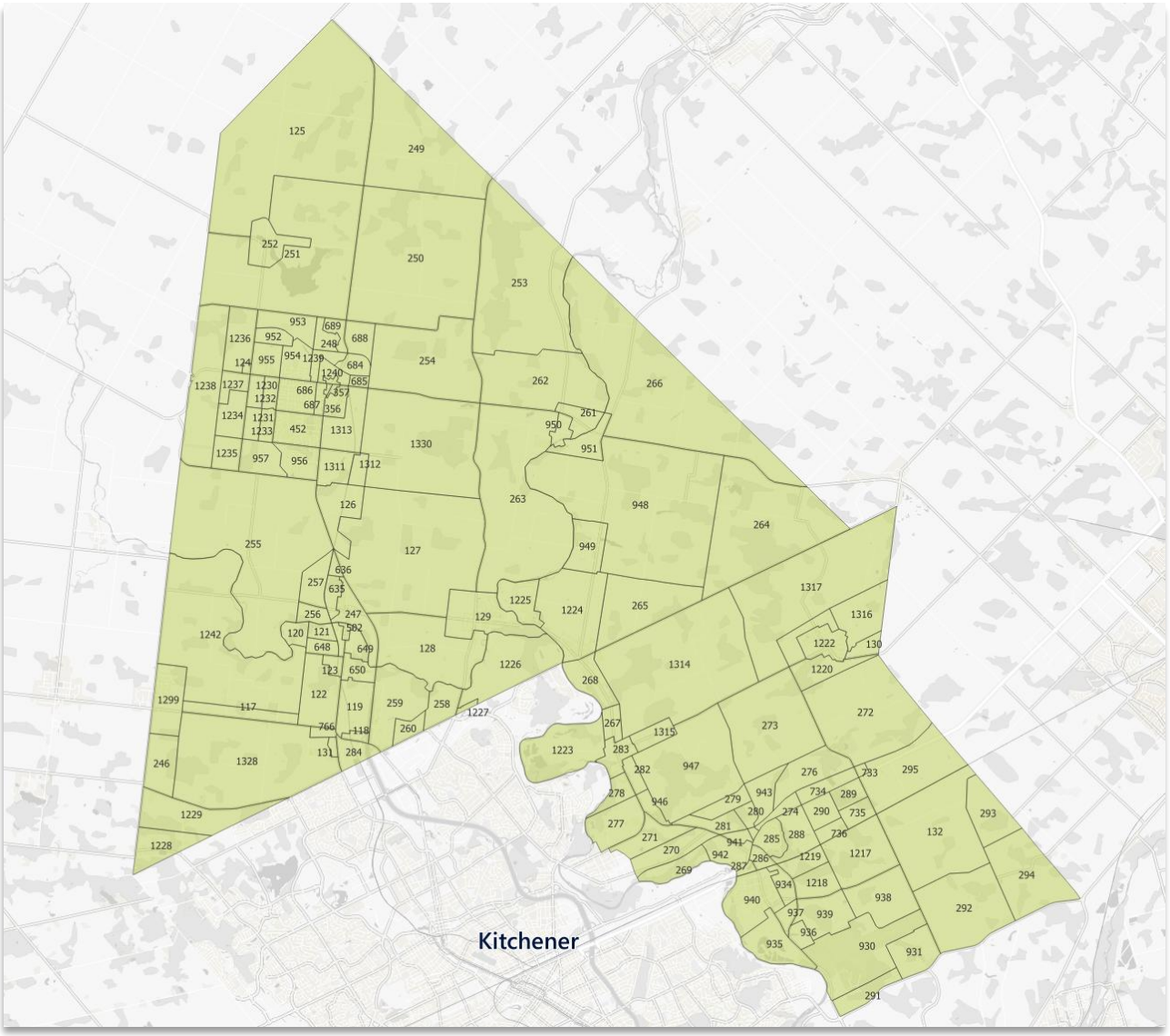


Figure 15: Transportation Zones in Woolwich

The VISUM model incorporates a range of planned urban and infrastructure developments at both the provincial and regional levels for the 2051 horizon year, as outlined in the Region of Waterloo's 2018 Transportation Master Plan (TMP). Details of these road projects are provided in **Section 5.2**. It is anticipated that these network improvements will significantly influence traffic patterns and demand across the Township by 2051.

To assess these changes, growth rates were determined by comparing traffic demand between the base year model (2011, updated in 2018) and the projected 2051 scenario. These growth rates were applied to roadways across the Township to estimate future volumes. In addition, travel demand matrices generated by the model were used to analyze origin-destination patterns for the 2051 horizon year.

Figure 16 and **Figure 17** present a comparison of link volumes across Woolwich's road network under existing and future conditions. Roadways with the most significant traffic growth—defined as an increase of more than 300 vehicles per direction (in peak hour volume) include:

- New Highway 7
- Shantz Station Road
- Woolwich Guelph Townline
- Township Road 75 (Chilligo Road)
- Township Road 74 (Rider Road)
- Kossuth Road
- Fountain Street North
- St. Charles Street East
- Crowsfoot Road
- Line 86
- Township Road 62 (Middlebrook Road)
- Arthur Street South
- Listowel Road
- Floradale Road

Conversely, some roadways are projected to experience reductions in traffic volumes, primarily due to traffic being diverted to the new Highway 7. The following roads are expected to see decreases of 300 vehicles or more per direction (in peak hour volume):

- Victoria Street North
- Township Road 68 (Hopewell Creek Road)
- Village View Road

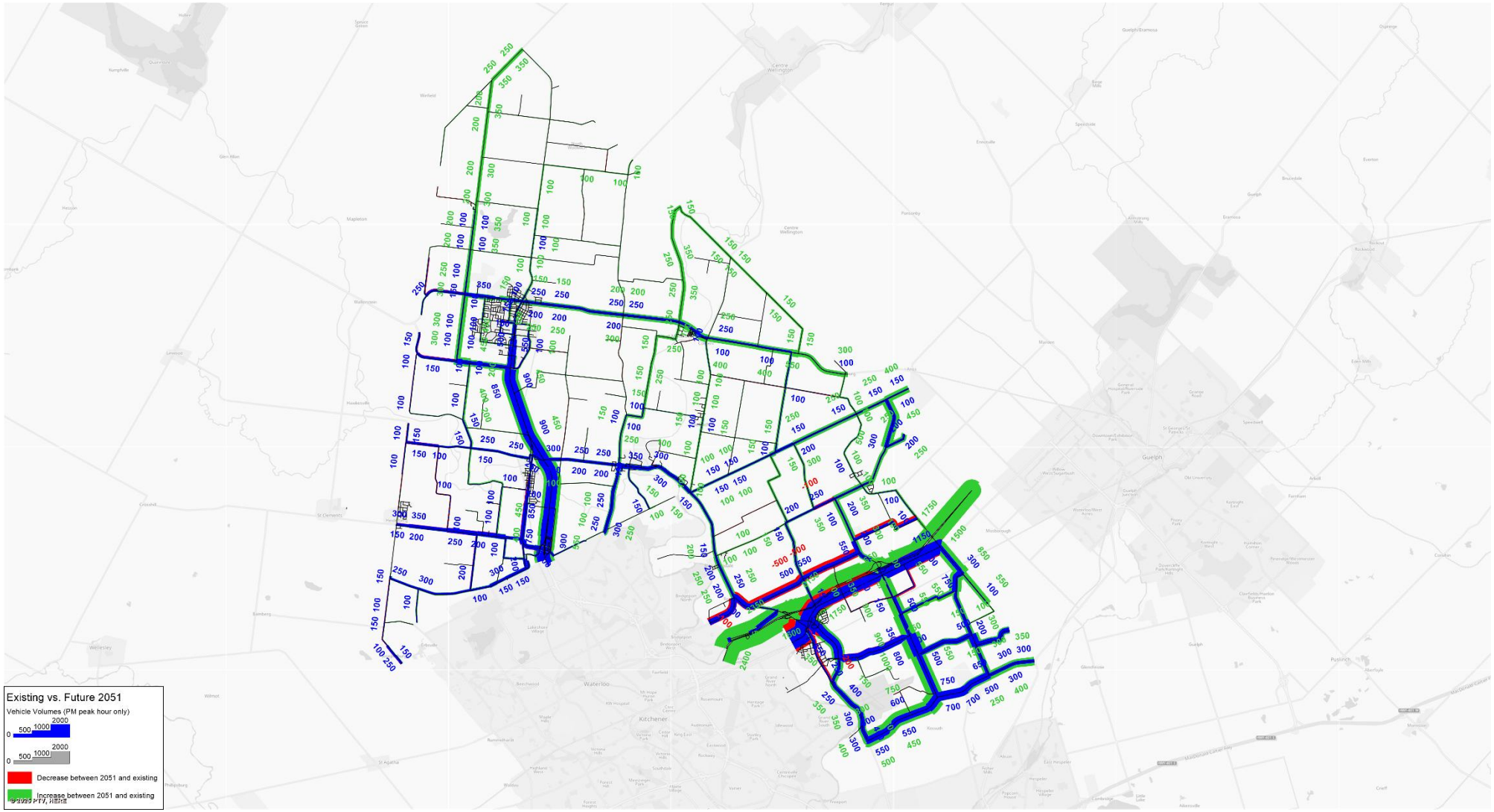


Figure 16 Link Volume Comparison (2018 vs. 2051)

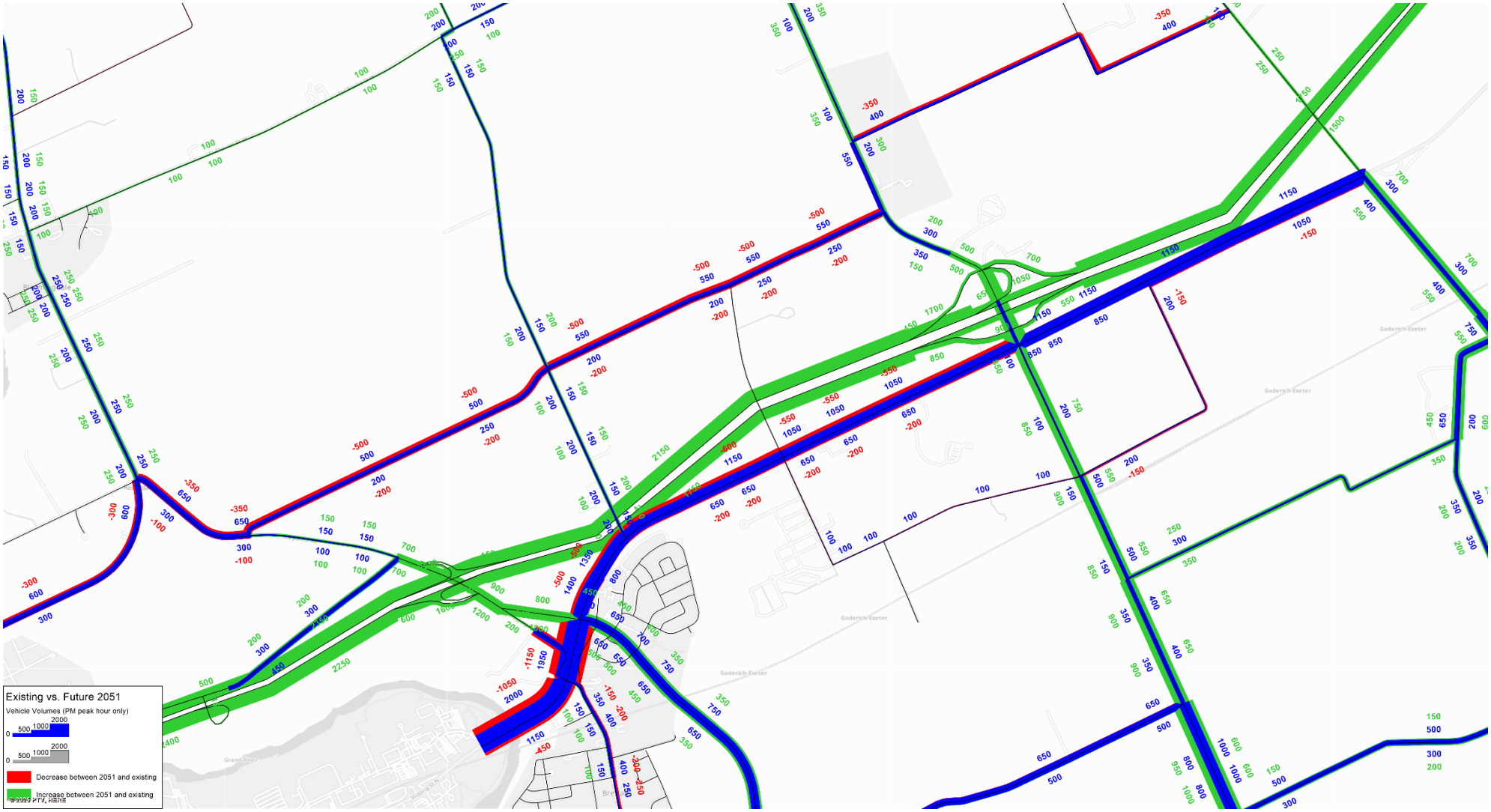


Figure 17: Link Volume Comparison on New Highway 7 (2018 vs. 2051)

4.4 Annual Average Daily Traffic (AADT)

Based on the growth rates established through VISUM modelling, future (2051) AADT volumes for all roads within the Township of Woolwich are presented in **Map 18**. The conversion from peak hour model outputs to AADT was based on the bidirectional percentage change derived from the PM peak period model. For each network segment, the percentage change in bidirectional traffic volumes between existing and future scenarios was calculated using the PM model results. This percentage change was then applied to the existing AADT to estimate future AADT volumes. Since only PM peak model data were available, it was assumed that the bidirectional change observed during the PM peak period is representative of the overall bidirectional change in daily (AADT) volumes. To estimate AM peak volumes, the directional changes from the PM peak were reversed, while the AADT estimates were based on the bidirectional percentage change.

The busiest roads where current (2025) and future (2051) AADT is greater than 10,000 are listed **Table 8** and most of these are Regional Roads. There are also a number of roadway segments on Arthur Street, Line 86, Katherine Street, Sawmill Road, Shantz Station Road, Fountain Street, and Farmer's Market Road where AADT volumes exceeded 20,000.

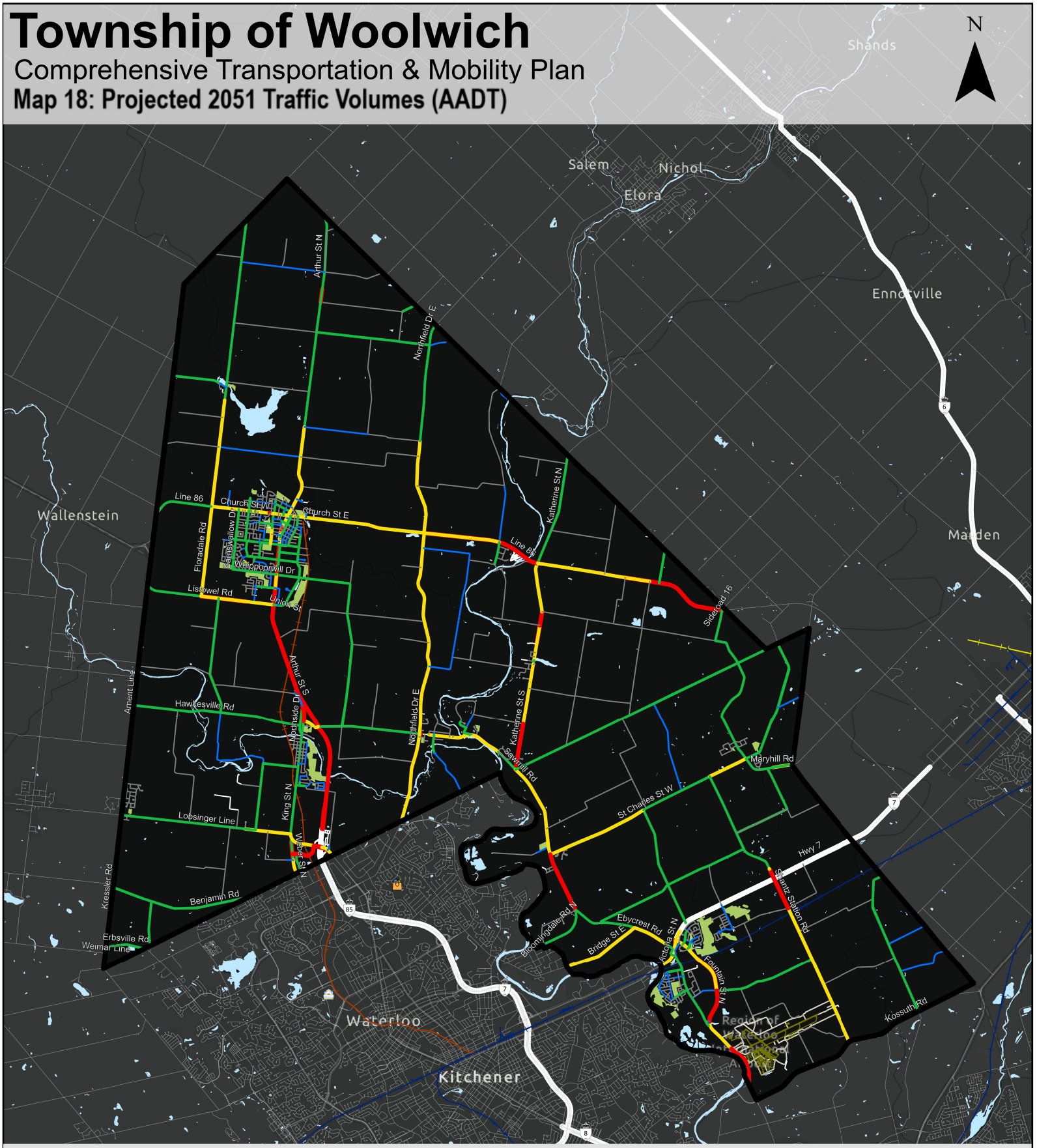
Table 8: Township Road Segments With AADT Volumes >10,000

Existing (2025) Roads	Future (2051) Roads
• Arthur Street • Northfield Dr. East to the south of Sawmill Rd • King St N between Lobsinger Line and Hwy 85 • Victoria Street North/Highway 7 • Fountain St North/Regional Road 17 in the Breslau Area	• Arthur Street • Church Street/Line 86 • Shantz Station Rd to the south of the new Hwy 7 • Farmer's Market Road • Floradale Road in the Elmira Area • Sawmill Rd between Northfield Dr. and Bloomingdale Rd • St Charles St between Sawmill Rd and Spitzig Rd • St Charles St between Shantz Station Rd to Maryhill Rd • Katherine St between Line 86 to Sawmill Rd • Northfield Dr. East to the south of Tilman Rd • Victoria St North/Highway 7 • Fountain Street North/Regional Road 17 in the Breslau Area

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 18: Projected 2051 Traffic Volumes (AADT)



Legend

- Municipal Boundary
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Traffic Volumes (AADT)

- 0 - 500
- 501 - 1,000
- 1,001 - 10,000
- 10,001 - 20,000
- > 20,000

0 1 2 4 Kilometers

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GIS data provided by Township of Woolwich in December 2024

4.5 Transportation Network Capacity

Key intersections in Woolwich were assessed using Synchro 11 based on future traffic volumes to determine the intersection capacity Level of Service (LOS). These results are reported in **Table 9** and **Map 19**.

Overall, a worsening of traffic operations was generally observed across the network. The intersections experiencing the most constraints in 2051 are:

- Shantz Station Road and Victoria Street North due to the significant increase in northbound and southbound demand as a result of the new Highway 7 interchange at Shantz Station Road, just north of this intersection.
- Sawmill Road and Katherine Street/Crowsfoot Road due to the natural growth of the Township resulting in increased traffic on all intersection approaches
- Northfield Drive and Line 86 due to increased demand throughout the entire east-west corridor of Line 86
- Arthur Street South & Listowel Road/Union Street due to the widening of Arthur Street in the future network which assigns more demand to Arthur Street

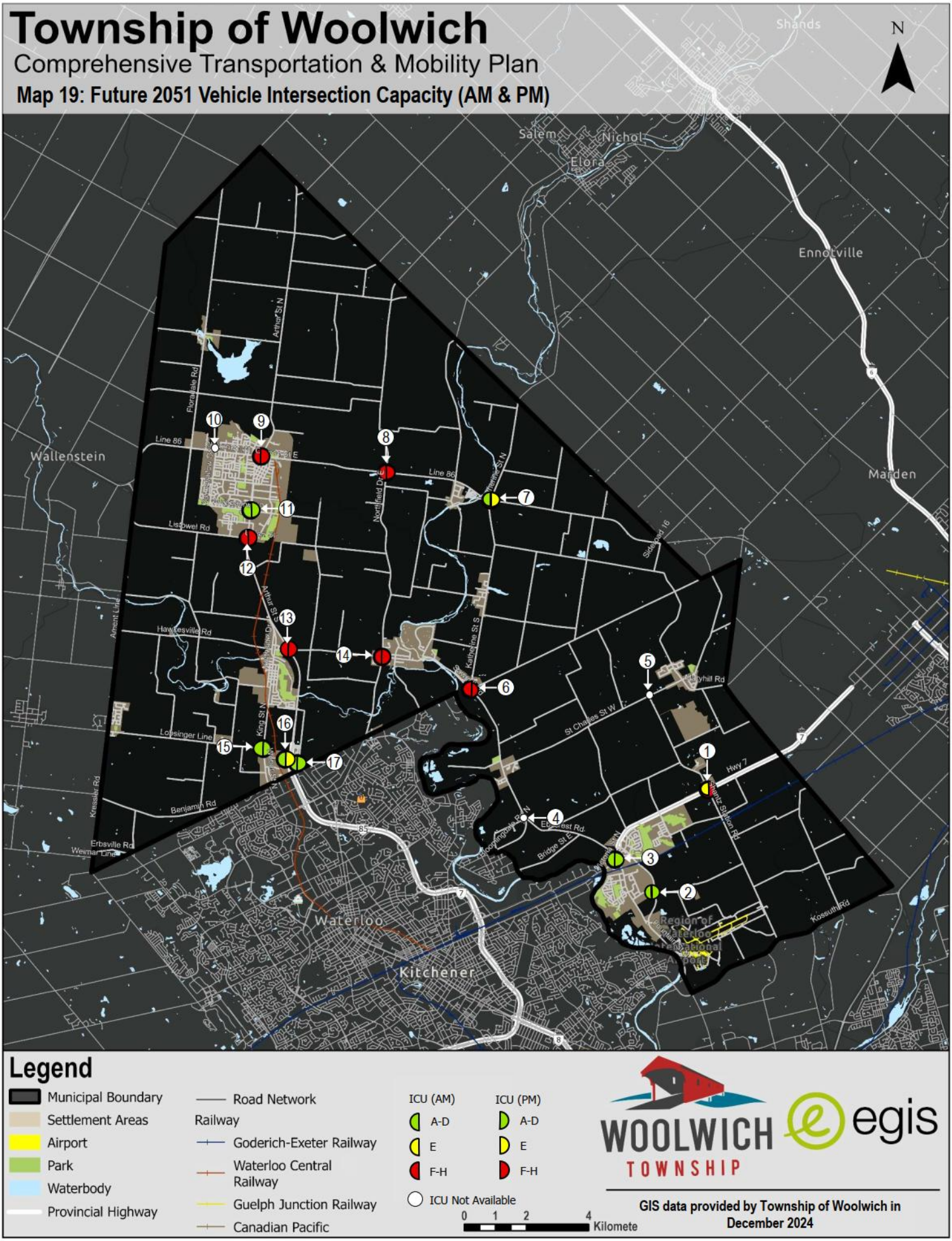
There are two intersections where an improvement in intersection performance is observed:

- At Woolwich Street/Ebycrest Road and Victoria Street North, there is an overall reduction in both AM and PM traffic volumes at this intersection due to the new Highway 7 interchange that will be located to northwest, redirecting a significant portion of traffic.
- At Arthur Street South and Whippoorwill Drive, there is a reduction in traffic volumes due to the east leg of the intersection being closed in the future model.

Other trends that were observed through this assessment included a reduction of southbound traffic at the King Street and Lobsinger Line intersection due to more demand shifting to Arthur Street, given the Region's planned expansion of the road (see Section **2.2.4** for more information), as well as a reduction in the east-west movements at the Victoria Street North and Shantz Station Road intersection due to the new Highway 7 that will cross just north of the intersection.

Table 9: Vehicle Intersection Capacity (Existing 2024 vs. Future 2051)

No.	Intersection	Intersection Level of Service			
		Existing AM	Future (2051) AM	Existing PM	Future (2051) PM
1	Shantz Station Road & Victoria Street North	C	F	C	F
2	Fountain Street North & Menno Street/Township Road 80	A	A	A	A
3	Woolwich Street South/Ebycrest Road & Victoria Street North	A	A	A	A
6	Sawmill Road & Katherine Street/Crowsfoot Road	B	F	D	F
7	Katherine Street North & Line 86	B	C	B	E
8	Northfield Drive East & Line 86	B	F	C	F
9	Arthur Street South/North & Church Street West/East	C	E	C	C
11	Arthur Street South & Whippoorwill Drive/South Field Drive	A	A	A	A
12	Arthur Street South & Listowel Road/Union Street	B	E	C	F
13	Arthur Street South & Sawmill Road	A	F	A	F
14	Northfield Drive East & Sawmill Road	C	C	C	D
15	King Street North & Lobsinger Line	B	B	B	B
16	Farmer's Market Road & King Street North	D	D	D	D
17	Hwy 85 NB Ramp/Martin Grove Road & King Street North	B	B	C	C



Map 19: Future 2051 Vehicle Intersection Capacity

5 Problem or Opportunity Identification

5.1 Problem Statement

The problem statement for the Comprehensive Transportation and Mobility Plan (CTMP) defines the Township of Woolwich's transportation-related challenges and opportunities, and sets the direction for where the Township aims to be by 2051. It is grounded in extensive technical analysis and community engagement, reflecting local priorities and shaping a long-term roadmap for decision-making.

As the Township of Woolwich continues to grow and evolve, there is a unique opportunity to shape a transportation system that fosters a vibrant, inclusive, and sustainable future. By building on the strengths of the existing network, the Township can improve connectivity, enhance safety and accessibility for all users, and promote community well-being through low-carbon, climate-resilient design. Aligning transportation planning with land use to support transit-ready communities -alongside modernizing parking policies to reflect shifting needs and travel behaviours - will enable Woolwich to develop a more efficient, equitable, and future-focused mobility network that serves both current and future residents.



5.2 Strengths, Weaknesses, Opportunities, and Threats

The following SWOT analysis summarizes key insights from the review of Woolwich's existing transportation network. These findings will inform the development of alternative solutions and the implementation strategy in the next phase of the CTMP.

Strengths

- **Strong Population Growth:** Woolwich's population is projected to increase by 140% by 2051, driven in part by the Federal Housing Accelerator Fund. Breslau alone is expected to grow by over 300%. This growth highlights the Township's desirability and reinforces the need for scalable transportation infrastructure.
- **Future GO Station:** The planned Breslau GO Station, part of Metrolinx's RER expansion, is anticipated to attract significant ridership and catalyze transit-oriented development. The Region's land acquisition supports a mixed-use hub that can reshape Breslau's urban fabric.

Weaknesses

- **High Auto-Dependency:** Across the Township of Woolwich, approximately 95% of trips are made by car, reflecting the overall rural and dispersed settlement pattern. While residents in urban settlement areas generally have more modal choice and access to transit, auto dependency remains high Township-wide, highlighting the need for strategies that support more balanced, multimodal transportation options to enhance sustainability and inclusivity.
- **Road User Safety:** Gaps in active transportation infrastructure and low levels of service for pedestrians and cyclists contribute to safety concerns, particularly in high-traffic areas like Breslau and Elmira.
- **Capacity Concerns:** Key intersections, such as Shantz Station Road at Victoria Street, Sawmill Road at Katherine Street, Northfield Drive East at Line 86, Arthur Street South at Listowel Road, and Arthur Street at Sawmill Road are experiencing operational issues that will worsen without targeted improvements.

Opportunities

- **Multimodal Network Focus:** There is strong potential to build a safer, more inclusive transportation system that supports active transportation and reduces reliance on private vehicles.
- **Planning and Policy:** The CTMP is an opportunity to update Woolwich's transportation policies to prioritize safety, sustainability, and equity - including the adoption of complete streets and proactive planning for growth.
- **Growth and Intensification:** With population and employment forecasted to grow by 140% and 90% respectively by 2051, the CTMP can shape a more resilient and connected transportation network aligned with intensification goals.

Threats

- **Climate Change:** Increasing extreme weather events and rising emissions call for low-carbon transportation solutions. The CTMP supports this shift through sustainable travel modes and electrification.
- **Economic Uncertainty and Rising Costs:** Inflation and rising construction costs create financial risks. Planning should incorporate contingencies and prioritize investments based on value and need.
- **Operations and Maintenance Cost:** Long-term operations and maintenance costs are often underestimated. A lifecycle approach is required to ensure infrastructure investments remain financially sustainable over time.

5.3 Key Issues

Through community input and technical analysis, the following transportation challenges have been identified as priorities for the next phase of the CTMP:

- **Improve Active Transportation Infrastructure:** Close sidewalk and cycling gaps to support safe, 15-minute active trips across major corridors and intersections.
- **Strengthen Transit and Connectivity to Key Nodes:** The Township should continue to support and coordinate with GRT and Regional land use planning efforts to improve connections to major population and activity nodes, including the future Breslau GO Station and key urban areas within Woolwich and the broader Waterloo Region. Implementation of service improvements will remain at the discretion of Regional Council, making this a collaborative planning effort.
- **Maintain and Upgrade Road Infrastructure:** Ensure roads are in good condition and ready to accommodate expected population, employment, and traffic growth.
- **Address Safety and Capacity Issues:** Advocate for continual improvements to community safety while looking for operational efficiency where possible.
- **Support Transit-Oriented and Mixed-Use Development:** Plan compact, integrated communities around the future GO Station in Breslau that align with urban growth strategies.
- **Strategic Parking Management:** Balance accessibility and land use efficiency, especially in growth areas and affordable housing developments.
- **Integrate Emerging Mobility Options:** Plan for the safe and effective integration of micromobility (e.g., e-scooters, e-bikes), car sharing, and other new mobility solutions by updating infrastructure, policies, and regulations to support user adoption, equitable access, and operational safety.
- **Advance Complete Streets Principles:** Prioritize inclusive, sustainable street design to support diverse user needs across all travel modes.
- **Focus on Implementation:** Develop a prioritized, costed action plan with clear timelines, funding strategies, and performance metrics.

6 Guiding Vision Development

6.1 Guiding Vision Options

Phase 2 of the Municipal Class Environmental Assessment (MCEA) process focuses on identifying opportunities and alternative solutions to address the Township's transportation challenges. Several approaches were considered to help shape the future transportation network. These guiding vision options outline broad directions for how the system could evolve, each placing different emphasis on priorities such as road improvements, active transportation, transit, and safety.

The purpose of presenting these options is to explore potential pathways for meeting both current and future mobility needs. Public and stakeholder feedback was incorporated to help identify which vision best reflects community values and supports a sustainable, efficient, and safe transportation system for all users.

Four alternative guiding vision options have been developed for the CTMP and are described below:



Option 1: Do Nothing

Maintain the current transportation network and policy/programming. This alternative would not include further development of roads under the jurisdiction of the Township, but all regional improvements would proceed as planned.



Option 2: Road Network Strategy

Focus investment on strategic road network improvements, such as road urbanization, local traffic operation, and safety improvements. Corresponding strategic investment will be made towards providing safer pedestrian and cycling facilities but will focus on improving the network predominantly for motorists.



Option 3: Active and Transit-First Strategy

Emphasis on sustainable and people-centric modes of travel by prioritizing the development of high-quality active transportation and public transit infrastructure. The goal is to reduce reliance on single-occupant vehicles and promote a shift towards more sustainable, safe, and accessible transportation options.

Option 4: Hybrid / Integrated Network Strategy

Focus on strategic road network capacity improvements, while also promoting and enhancing the active transportation network and the public transit system. The Township will target investments to where they are needed and prepare itself to adapt to meet the changing conditions due to emerging trends and transportation technologies.

6.2 Evaluation Framework

The guiding vision options were evaluated against the key issues identified in Section 5.3. Each issue was assessed based on how effectively the vision addressed it, using a relative scoring scale of Low, Medium, or High. The results of this evaluation, comparing the four guiding vision options, are summarized in **Table 10**.

An important part of the evaluation framework was to consider strategies that help the Township move away from the "transportation doom loop" (**Figure 18**), where reliance on cars leads to congestion, road expansion, and further car dependence. The guiding vision options were assessed on their ability to break this cycle and support more sustainable, balanced mobility choices.

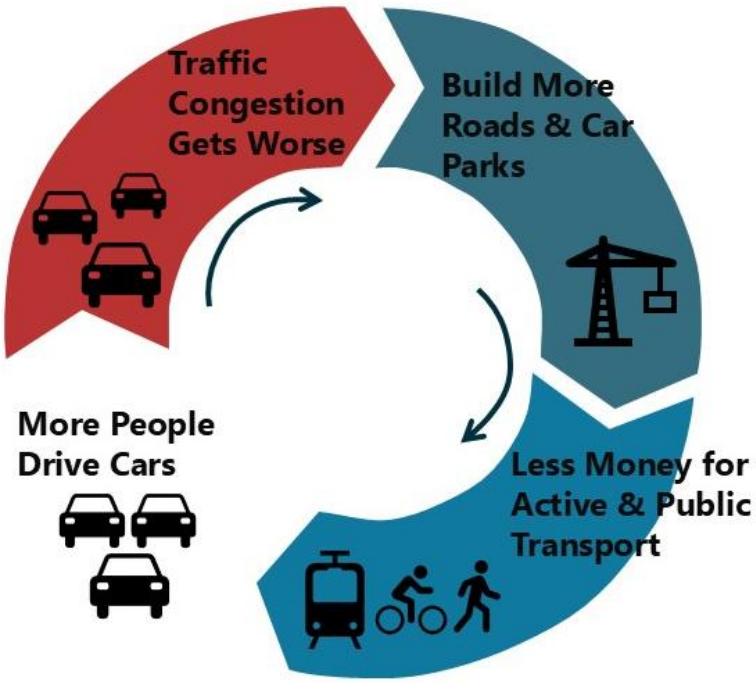


Figure 18: The Transportation Doom Loop

Table 10 Evaluation of Guiding Vision Options

Key Issue	Option 1: Do Nothing	Option 2: Road Network Strategy	Option 3: Active and Transit First Strategy	Option 4: Integrated Network Strategy
Improve Active Transportation Infrastructure	**Low** – No new active transportation investments are proposed, leaving existing sidewalk and cycling network gaps unaddressed.	**Medium** – Active transportation is added incrementally, mostly as secondary improvements alongside road projects. Gaps may persist where road work is not prioritized.	**High** – Major investments in sidewalks, trails, and crossings focus on safety, continuity, and accessibility, especially for short local trips.	**High** – Strategic gaps in high-demand corridors are prioritized, with targeted upgrades to improve active transportation connectivity in tandem with road and transit investments.
Strengthen Transit and Connectivity to Nodes	**Low** – No expansion of local or regional transit services; existing car reliance persists.	**Low** – Minimal upgrades to transit infrastructure or services; limited alignment with future GO Station or inter-settlement travel needs.	**High** – Robust focus on transit service between settlement areas and regional hubs (e.g., Breslau GO), including support for future ridership and integrated land use.	**Medium** – Transit improvements are incorporated but balanced with road and active transportation investments; GO Station connections and regional integration is moderately addressed.
Maintain and Upgrade Road Infrastructure	**Medium** – Township relies on essential maintenance and planned Regional upgrades only; limited proactive capacity improvements.	**High** – Road network is the central focus, with capacity, urbanization, and operational upgrades prioritized to address congestion and accommodate growth.	**Low** – Limited investment in road upgrades, as emphasis shifts toward sustainable travel and mode shift goals.	**High** – Targets key road corridors for upgrades while integrating multimodal features; ensures transportation system's readiness for population and employment growth.
Address Safety and Capacity Issues	**Low** – Does not address existing safety and capacity challenges particularly at critical intersections.	**High** – Intersections and corridors are upgraded with a focus on vehicular safety and traffic operations.	**Medium** – Prioritizes safety for active transportation users but may overlook improvements needed for vehicle movement and intersection efficiency.	**High** – Addresses safety issues across all modes including active transportation, cars, and transit; addresses collision hotspots and LOS deficiencies.
Support TOD and Mixed-Use Development	**Low** – No policies or infrastructure investments to support compact growth or intensification near nodes.	**Low** – Continues auto-oriented development pattern without strategic integration of land use and transportation.	**High** – Strong alignment with planning policies for TOD, especially around the future GO Station; supports complete communities.	**Medium** – Supports TOD in Breslau but distributes focus to multiple modes and growth nodes across the Township.
Strategic Parking Management	**Low** – Retains existing parking conditions with no new strategies for efficiency, equity, or land use integration.	**Medium** – Expands traditional supply tools such as surface parking, permits, and lot development, but limited innovation.	**Medium** – Incorporates progressive strategies such as shared parking, reduced minimums, and TOD-aligned policies.	**Medium** – Blends traditional management with modern tools (e.g., EV charging, wayfinding, shared parking) for flexibility in different contexts.
Integrate Emerging Mobility Options	**Low** – No provisions for micromobility, EVs, or shared services lacking future readiness.	**Low** – Emerging technologies and mobility options are largely excluded from the strategy.	**Medium** – Introduces pilot programs for EV infrastructure, e-bikes, and shared modes, but may lack long-term integration plans.	**High** – Actively integrates EV charging, micromobility, and shared services into infrastructure and policies to future-proof the network.
Advance Complete Streets Principles	**Low** – Streets remain car-centric with minimal accommodation for pedestrians, cyclists, or accessibility.	**Medium** – Some improvements to streetscape and cross-sections, particularly where they align with major road projects.	**High** – Embeds inclusive design across all streets; prioritizes vulnerable users and diverse modes in all contexts.	**High** – Applies context-sensitive complete streets design throughout the network, with tailored cross-sections for rural and urban areas.
Focus on Implementation	**Low** – No clear roadmap, prioritization, or costing plan to support delivery of infrastructure or policy goals.	**Medium** – Provides phasing for road projects but limited integration of multimodal strategies or funding diversity.	**Medium** – Action plan focuses on active transportation and transit but lacks strong financial planning for broader implementation.	**High** – Includes detailed implementation strategy with project prioritization, timelines, funding mechanisms, and monitoring frameworks.

6.3 Recommended Transportation Vision

Based on the evaluation, the Hybrid / Integrated Network Strategy (Option 4) is the preferred approach to be carried forward. This strategy best reflects the priorities of the CTMP and aligns with provincial policy objectives by improving overall connectivity while integrating all modes into a cohesive, adaptable network. It also incorporates feedback from public and stakeholder consultations, ensuring the plan responds to community values and expectations.

The Hybrid / Integrated Network Strategy provides the greatest flexibility to address current challenges—such as localized congestion and road network gaps—while positioning the Township to respond to emerging transportation trends. By combining targeted road improvements with investments in transit, active transportation, and supportive policies, this approach promotes long-term system efficiency, reduces automobile dependency, and builds a safer, more sustainable transportation future.

Key benefits of the Hybrid / Integrated Network Strategy include:

- **Balanced Approach:** Combines strategic road network upgrades with strong support for active transportation and public transit investments.
- **Future Ready:** Enables the Township to adapt to emerging trends, new technologies, and evolving travel needs.
- **Responsive to Key Issues:** Directly addresses congestion, safety, limited transit access, and the need for sustainable travel choices.
- **Supports Growth:** Aligns transportation improvements with land use planning to accommodate population and employment growth.
- **Promotes Equity and Accessibility:** Ensures infrastructure serves all users, including drivers, cyclists, pedestrians, and transit riders.
- **Balanced Support for Environmental Sustainability:** Encourages low-emission travel, supports compact growth, and aligns with Woolwich's climate goals while accommodating essential road improvements.

7 Alternative Solutions Development and Evaluation

7.1 Long List of Alternatives

A long list of potential transportation alternatives was developed as a response to the key issues identified in **Section 5.3**. The alternatives were informed by background research, technical analysis, and feedback from the community and stakeholders. It should be noted that some of the transportation alternatives listed below fall under the jurisdiction of the Region, such as transit service and road network improvements related to Regional roads. Township-led initiatives focus on local infrastructure, active transportation, parking management, and land use integration.

The alternatives identified are provided below.

Active Transportation Infrastructure

- Construct new cycling routes to close gaps along key corridors (e.g., Line 86, Sawmill Rd, as recommended in the ATMP) and in high growth areas and ensure they comply with OTM Book 18 where appropriate.
- Develop a Township-wide active transportation network, focusing on connections to schools, employment areas, settlement areas and recreation nodes.
- Ensure that existing bike lanes comply with OTM Book 18 where appropriate and follow current industry best practices to enhance safety and accessibility for all users. While protected bike lanes may be considered on higher-speed roads, implementation must account for the Township's unique horse-and-buggy travel needs, as these rural users require shared roadway access. In some locations, full separation of bicycles and horse-and-buggies may not be feasible or appropriate. Focus protected cycling facilities on continuous segments and key intersections to ensure safe crossings and minimize conflicts where conditions allow.
- Create pedestrian priority zones in Breslau, Elmira, and St. Jacobs to encourage walkability and vibrant street life.
- Improve crossing infrastructure (e.g., raised crosswalks, pedestrian refuge islands, rapid flashing beacons) at high-traffic or wide intersections.
- Implement traffic calming in residential and school zones to promote walkability and safety.
- Adopt a Township wide winter maintenance program for key cycling and walking routes.

Public Transit and Regional Connectivity

- Coordinate with GRT to explore opportunities to enhance inter-settlement mobility and connectivity between Breslau, Elmira, and St. Jacobs, recognizing that implementation

of frequent or rapid transit services is at the discretion of Regional Council and dependent on operational and financial feasibility.

- Support flexible transit solutions for low-density rural areas, such as on-demand shuttles or shared-ride services, in coordination with GRT to better meet the mobility needs of dispersed populations.
- Advocate and partner with GRT to maintain and enhance express or commuter-oriented services connecting Breslau, Elmira, and St. Jacobs to the ION LRT system and Kitchener GO Station, noting that the service between Elmira and St. Jacobs already exists and is planned for Breslau, and transfers may still be required along the journey.
- Coordinate with GRT and Metrolinx to improve connections from Township settlement areas to the future Breslau GO Station, including planning for safe and accessible first/last-mile infrastructure such as bike lanes, walking paths, and transit shelters.

Road Network Enhancements

- Adopt standardized cross-sections for new and reconstructed roads Township roads, designed using Complete Streets principles to accommodate all users and support future growth.
- Revise the road classification framework for Township roads to align with evolving land use, traffic volumes, and growth patterns, ensuring appropriate design and operational standards are applied.
- Apply asset management strategies to prioritize resurfacing and pavement rehabilitation on key corridors with increasing traffic loads, ensuring the durability of roads.
- Support the Region in the planning and implementation of the Elmira Bypass to redirect trucks and other through traffic away from Elmira's Downtown Core, supporting a desire to shift to a pedestrian-focused environment and other improvements in active transportation options.

Safety and Capacity Improvements

- Collaborate with the Region on capacity improvements for key corridors with known operational issues, including Arthur Street, Listowel Road, Line 86, Northfield Drive, Shantz Station Road, and Sawmill Road. Any road widenings or operational upgrades on these Regional roads will be subject to Regional planning, studies, and approval, with Township input where appropriate.
- Implement speed management measures (e.g., radar feedback signs, traffic calming, gateway treatments) on Township-owned rural and suburban roads with high collision or speeding rates. It should be noted that input from Regional stakeholders where

appropriate including Emergency and Paramedic Services and Waste Services will be required where appropriate.

- Enhance rural intersection safety on Township roads by improving sightlines through vegetation clearing, upgrading signage, and realigning lanes where feasible.
- Coordinate with the Region for operational upgrades (e.g., left-turn lanes or roundabouts) at intersections on Regional roads experiencing congestion or collisions, such as Shantz Station Road and Arthur Street intersections. This would be subject to Regional led studies with Township input where appropriate.
- Conduct Road Safety Audits and implement Vision Zero-aligned strategies in growth areas to achieve a roadway system with no fatalities or serious injuries involving road traffic, with Township responsibility limited to local roads and collaboration with the Region for Regional road segments.

Land Use Integration (Transit-Oriented Development and Mixed-Use Development)

- Integrate land use and mobility planning in Breslau to support compact, walkable TOD around the GO Station as well as support compact, walkable communities within all settlement areas of the Township.
- Revise subdivision design guidelines to ensure new developments include sidewalks, multi-use paths, transit infrastructure and traffic calming
- Identify and prioritize infill and intensification areas with strong transportation access
- Ensure transportation impact assessments (TIAs) for new developments prioritize multi-modal infrastructure upgrades.
- Introduce a local street grid to improve connectivity around the GO Station and throughout other settlement areas, linking new residential developments to employment nodes, parks, and key destinations.
- Prioritize mixed-use zoning within walking distance of existing and planned conventional transit service.
- Promote 15-Minute Community Principles in Settlement Areas that support residents' ability to access daily needs within a 15-minute walk, bike ride, or transit trip.

Parking Management

- Implement paid parking or time-limited zones in Township centres to encourage turnover and reduce cruising.
- Introduce residential parking permit programs near high-demand areas to manage spillover parking.
- Reduce or eliminate minimum parking requirements in TOD zones and affordable housing projects to support compact, walkable development.

- Implement parking maximums and shared parking requirements in new developments (e.g., mixed-use) to reduce over-parking and support land use efficiency.
- Provide EV charging infrastructure in public lots and new residential or commercial developments.
- Develop a municipal parking strategy for high-growth areas like Breslau and Elmira balancing access, efficiency, and land use.
- Enhance wayfinding and placemaking, including signage, and streetscape improvements to improve user experience.

Emerging Mobility

- Establish micromobility pilot zones for shared e-scooters/e-bikes.
- Develop a regulatory framework and by-laws for safe micromobility operation.
- Install micromobility parking corrals near high-traffic destinations.
- Facilitate carshare programs in new developments or municipal facilities.
- Plan for integration of electric vehicle (EV) charging infrastructure, especially near employment and GO station areas.

Complete Streets and Design Standards

- Adopt a Township-wide Complete Streets policy and update road cross-section standards accordingly.
- Retrofit Township roads to include sidewalks, bike lanes, and transit amenities (where applicable).
- Include street trees, pedestrian-scale lighting, and curb extensions in street reconstructions.
- Prioritize Complete Streets upgrades in school zones, town centres, and new subdivisions.

Implementation and Monitoring

- Develop a 20-year capital plan that groups transportation improvements by implementation horizon (short-, medium-, long-term) and includes cost and feasibility ratings to guide budgeting and delivery
- Identify and apply for applicable federal and provincial funding programs
- Create a Transportation Performance Dashboard tracking KPIs (e.g., mode share, safety, connectivity
- Develop a cost-benefit-based project evaluation framework for prioritizing infrastructure investments
- Align infrastructure phasing with growth triggers (e.g., 2031 and 2051 population targets)

- Collaborate and invest in conventional transit service improvements in coordination with GRT and the Region of Waterloo. Any expansion of service, introduction of new routes, or increases in service frequency would require Township financial participation which is consistent with the approach taken by other Area Municipalities.

7.2 Evaluation Criteria and Methodology

The alternatives were evaluated based on four key inputs: the baseline future conditions assessment, stakeholder and public feedback, technical analysis, and the Township's identified priorities. Each alternative was assigned a priority ranking from **Very High** to **Low** to reflect its relative importance in addressing the Township's transportation needs and supporting the Hybrid / Integrated Network Strategy.

The priority rankings are summarized as follows:

- **Very High Priority:** Alternatives that directly address multiple key issues, provide significant benefits to safety, connectivity, and sustainability, and are technically and financially feasible in the short to medium term.
- **High Priority:** Alternatives that provide strong benefits to one or more key issues, align with Township priorities, and are feasible to implement, though with more moderate impact or longer timelines.
- **Medium Priority:** Alternatives that provide targeted benefits, address some issues, or require significant resources or longer-term planning to implement.
- **Low Priority:** Alternatives with limited impact on key issues, lower feasibility, or that are best considered as long-term options or supporting initiatives.

This approach ensures that prioritization is grounded in evidence, aligned with Township priorities, responsive to community input, and informed by technical feasibility, enabling the Township to focus on solutions that provide the greatest overall benefit.

7.3 Prioritization of Alternatives

The alternatives were prioritized for each key issue identified in Section 5.3 based on their effectiveness, feasibility, and alignment with Township priorities. Justification for the assigned priority reflects the expected benefits of each alternative in addressing specific challenges, as well as input from public and stakeholder consultations.

Only the **Very High priority alternatives** for each key issue are summarized in **Table 11** below, while the full evaluation of all alternatives is provided in **Appendix E**.

Table 11: Very High Priority Alternatives and their Justification

Key Issue	Alternative Solution	Justification
Active Transportation Infrastructure	Ensure that existing bike lanes comply with OTM Book 18 where appropriate and follow current industry best practices to enhance safety and accessibility for all users. While protected bike lanes may be considered on higher-speed roads, implementation must account for the Township's unique horse-and-buggy travel needs, as these rural users require shared roadway access. In some locations, full separation of bicycles and horse-and-buggies may not be feasible or appropriate. Focus protected cycling facilities on continuous segments and key intersections to ensure safe crossings and minimize conflicts where conditions allow.	Provides significant safety and comfort benefits, particularly for less confident cyclists, while maintaining compliance with OTM Book 18 where appropriate to ensure consistency with industry standards. Protected lanes on higher-speed roads offer critical separation, though implementation must consider the Township's unique horse-and-buggy travel needs. While more complex and costly to implement, protected facilities should be prioritized on high-demand corridors and at key intersections where safety and connectivity gains are greatest.
	Improve crossing infrastructure (e.g., raised crosswalks, pedestrian refuge islands, rapid flashing beacons).	A cost-effective and high-impact solution that directly addresses road user safety, especially at high-risk intersections in both urban and rural contexts.
Public Transit and Regional Connectivity	Monitor the need for and advocate for if necessary future express or commuter-oriented service connecting Breslau, Elmira, and St. Jacobs to the ION LRT system and Kitchener GO Station	Strengthens regional integration and supports long-distance commuters by providing an alternative to driving. Aligns with Woolwich's vision for regional transit connectivity, with advocacy and coordination undertaken in collaboration with GRT and Metrolinx.
	Monitor the need for and advocate for if necessary connections to the future Breslau GO Station from the Township's settlement areas.	Ensuring Township-wide access to the future Breslau GO Station is a top priority for supporting regional rail connectivity and leveraging transit-oriented development (TOD) opportunities. It is critical to achieving long-term mode shift and advancing economic development objectives.
Road Network Enhancements	Revise the road classification framework for Township roads to align with evolving land use, traffic volumes, and growth patterns.	An updated road classification system ensures appropriate design standards, access management, and multimodal integration across the network. It is foundational for long-term planning, investment prioritization, and implementation of Complete Streets principles.
Safety and Capacity Improvements	Advocate for continual improvements to community safety while looking for operational efficiency where possible.	Corridors with a history of congestion and collisions, should be monitored to improve community safety. Advocating for targeted operational upgrades where feasible can enhance travel reliability and safety, particularly in growth areas and along major commuting route.
Land Use Integration (TOD and Mixed-Use Development)	Integrate land use and mobility planning in Breslau to support compact, walkable TOD around the GO Station as well as support compact, walkable communities within all settlement areas of the Township.	Breslau is the Township's primary growth area and the site of the future GO Station. Applying TOD principles in Breslau and other settlement areas that are served or planned to be served by conventional transit is essential to maximize transit ridership, support mode shift, and ensure development occurs in a sustainable, compact, and efficient manner.
	Revise subdivision design guidelines to ensure new developments include sidewalks, multi-use paths, transit infrastructure and traffic calming	Critical for building walkable, safe, and connected neighbourhoods from the outset. Ensures future development is aligned with active transportation goals and avoids costly retrofits.
Parking Management	Develop a municipal parking strategy for high-growth areas like Elmira and Breslau	Enables a proactive, coordinated response to emerging parking issues as growth accelerates. Ensures policies align with broader transportation and land use goals.

Key Issue	Alternative Solution	Justification
Emerging Mobility	Plan for integration of electric vehicle (EV) charging infrastructure, especially near employment and GO station areas	Directly supports climate goals, EV adoption, and future commuter travel behavior. Critical near the Breslau GO Station, Elmira industrial areas, and major trip generators. Aligns with long-term sustainability and growth plans.
Complete Streets and Design Standards	Adopt a Township-wide Complete Streets policy and update road cross-section standards accordingly	Establishes a foundational policy framework to ensure all future road projects support safe, multimodal access. Critical for integrating active transportation, transit, and accessibility into routine planning and design. Enables consistency across urban and rural contexts.
	Prioritize Complete Streets upgrades in school zones, Township centres, and new subdivisions	Directly improves safety for vulnerable users in high-traffic areas. Aligns with Vision Zero principles and supports Township growth areas. Targeted implementation makes this both impactful and feasible in the near term.
Implementation and Monitoring	Develop a 20-year capital plan that groups transportation improvements by implementation horizon (short-, medium-, long-term) and includes cost and feasibility ratings to guide budgeting and delivery.	Essential for translating the CTMP vision into actionable infrastructure planning. Provides a clear roadmap for budgeting, phasing, and decision-making.
	Align infrastructure phasing with growth triggers (e.g., 2031 and 2051 population targets)	Ensures that infrastructure delivery matches actual demand, avoiding overbuilding or delayed responses. Critical for Breslau GO and other intensification areas where timing is key.

8 Multimodal Strategies

8.1 Road Network Strategy

Improving the policies and standards related to road network planning is a significant priority for the Township. Ensuring that Township roads are planned, designed, and operated according to their intended function not only improves operations for all users but also ensures the network is well positioned to accommodate future growth. A consistent, forward-looking approach to road planning will strengthen safety, efficiency, and system resilience. It should be noted that this section only applies to roads under the Township's jurisdiction. The Region of Waterloo maintains its own road classification framework as outlined in the 2013 Context Sensitive Regional Transportation Corridor Design Guidelines, which is currently undergoing an update to reflect evolving transportation and design priorities.

8.1.1 Road Classifications

Development of a Road Classification Policy specific to the Township is critical to ensuring its roads function effectively and are able to accommodate future growth. While in principle the current hierarchical classification system employed by the Township is adequate, there are currently minimal standards attached to these classifications. This creates an opportunity through the CTMP review to refine and strengthen the framework to better reflect the Township's needs and growth objectives.

It should be noted that the Township currently applies the Minimum Maintenance Standards (MMS) regulation for road maintenance purposes. However, for the purposes of developing and applying a consistent road classification policy, the Transportation Association of Canada (TAC) guidelines were used as the baseline. This ensures that classification recommendations align with national best practices while still being tailored to the Township's local context. The TAC-based system categorizes roads according to factors such as traffic volume, function, and surrounding land use, enabling more informed decision-making and ensuring resources are allocated efficiently to enhance safety, functionality, and long-term sustainability.

The TAC Geometric Design Guidelines for Canadian Roads (2017) provide comprehensive descriptions of road classifications. Since the Township has both rural and urban roads, design guidelines differ for each context and are summarized in **Table 12** for rural roads and **Table 13** for urban roads. Overall, the TAC hierarchy remains consistent with the Township's existing system of Local, Collector, and Arterial/Regional roads. However, TAC also recognizes important functional differences within classifications, for example, residential versus industrial/commercial Collectors, or residential versus industrial/commercial Locals. While the overarching principles are consistent (e.g., access control, design speed, intersection spacing), the physical characteristics of these subcategories vary.

It is also important to note that road classification should not be based solely on traffic volumes. Instead, classification should reflect the intended function of the road within the broader network. The principle of *"build it, and they will come"* underscores the need to design roadways that accommodate anticipated future volumes and planned growth, rather than allowing current traffic levels to dictate classification. Overdesigning a road based only on present demand can induce unnecessary automobile trips, while under-designing can lead to congestion and safety concerns. A balanced approach ensures roads support long-term land use objectives, multimodal accessibility, and sustainable growth.

The goal of this review is to establish a functional classification system that balances land access and mobility while supporting a full range of travel modes.

Map 20 illustrates the recommended functional classification for roads within the Township, reflecting future growth trends, AADT projections, and current and planned land use patterns. Notably, the map also identifies the planned Breslau Connector Road included in the Breslau Secondary Plan, which will play an important role in supporting growth and connectivity in the Township's urban areas.

Land use should be carefully considered in the selection of new roads or when reclassifying existing ones. Overall, the recommended road classification changes are relatively minor and reflect anticipated travel patterns and growth needs. The Township already benefits from a well-developed road network; however, many roadways currently provide direct access for residential developments regardless of classification. While this can help moderate volumes on some Local roads, it also leads to dispersed traffic. By placing greater emphasis on traffic movement along Collector roads and limiting direct property access, the Township can improve capacity and reduce travel times while lowering volumes on Local streets.

Accordingly, only a limited number of upgrades from Local to Collector are recommended:

- Maryhill Road from St Charles St W to Crowsfoot Road
- St Charles St E from Maryhill Road to Crowsfoor Road
- Crowsfoot Road from St Charles St E to Sawmill Road
- Hopewell Creek Road from Ebycrest Road to Shantz Station Road
- Chilligo Road from Kossuth Road to Woolwich Guelph Townline

Table 12: Characteristics of Rural Road (TAC Geometric Design Guidelines)

	Rural Locals	Rural Collectors	Rural Arterials	Rural Freeways
Service function	Traffic movement secondary consideration	Traffic movement and land access of equal importance	Traffic movement primary consideration	Optimum Mobility
Land service	Land access consideration	Traffic movement and land access of equal importance	Land access secondary consideration	No primary access
Traffic volume Vehicles per day	<1000 AADT	<5000 AADT	<12000 AADT	> 8000 AADT
Flow characteristics	Interrupted flow	Interrupted flow	Uninterrupted flow except at signals	Free flow (grade separated) major intersections
Design speed (km/h)	50 – 110	60 – 110	80 – 130	100 – 130
Average running speed (km/h) (free flow conditions)	50 – 90	50 – 90	60 – 100	70 – 110
Vehicle type	Predominantly passenger cars, light to medium trucks and occasional heavy trucks	All types, up to 30% trucks in the 3 t to 5 t range	All types, up to 20% trucks	All types, up to 20% heavy trucks
Normal connections	Locals collectors	Locals Collectors arterials	Collectors Arterials freeways	Arterials Freeways

Source: TAC Geometric Design Guide for Canadian Roads (2017)

Table 13: Characteristics of Urban Roads (TAC Geometric Design Guidelines)

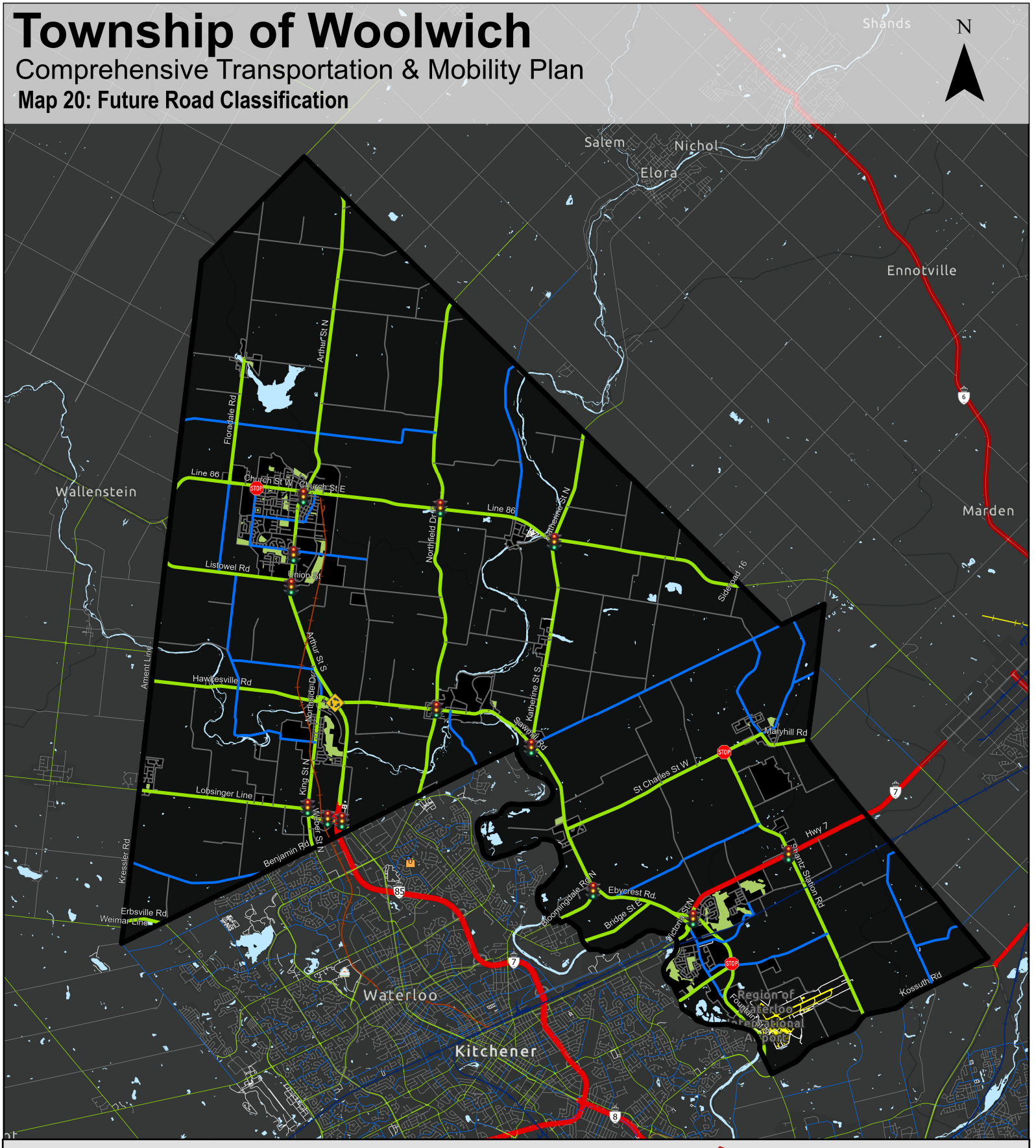
	Locals		Collectors		Arterials	
	Residential	Industrial / Commercial	Residential	Industrial / Commercial	Minor	Major
Traffic service function	Traffic movement not a consideration		Traffic movement and land access of equal importance		Traffic movement major	Traffic movement primary consideration
Land service / access	Land access only function		Traffic movement and land access of equal importance		some access control	rigid access control
Traffic volume (veh/day) (typical)	< 1,000	< 3,000	< 8,000	< 1,000 - 12,000	5,000 - 20,000	10,000 - 30,000
Flow characteristics	Interrupted flow		Interrupted flow		Uninterrupted flow except at signals and crosswalks	
Design Speed (km/h)	30 - 50		50 - 80		50-70	60-100
Average running speeds (km/h) (off-peak)	20 - 40		30 - 70		40 - 60	50 - 90
Vehicle type	Passenger and service vehicles	All types	Passenger and service vehicles	All types	all types	all types up to 20% trucks

	Locals		Collectors		Arterials	
	Residential	Industrial / Commercial	Residential	Industrial / Commercial	Minor	Major
Desirable connections	Private roads, locals, collectors		Locals, collectors, arterials		collectors, arterials, expressways, freeways	
Transit service	generally avoided		permitted		express and local buses permitted	
Accommodation of pedestrians	Sidewalks normally on both sides	Sidewalks provided where required	Sidewalks normally on both sides	Sidewalks provided where required	sidewalks may be provided, separation for traffic lanes preferred	
Accommodation of cyclists	No restrictions or special facilities		special facilities considered		No restrictions; special facilities considered	
parking (typical)	No restrictions or restrictions one side only		Few restrictions other than peak hour		Peak hour restrictions	Prohibited or peak hour restrictions
minimum intersection spacing (m)	60		60		200	400
Right-of-way width (m) (typically)	15 - 22		20 - 24		20 - 45	

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 20: Future Road Classification



Legend

- Municipal Boundary
- Park
- Airport
- Waterbody

Railway
- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Future Road Classification
- Provincial Highway
- Regional
- Collector
- Local
- Private Road

Intersection Control
- Stop-Controlled Intersection
- Signalized Intersection
- Roundabout

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egis

0 1 2 4 Kilometers

GIS data provided by Township of Woolwich on December 4th, 2024

8.1.2 Roadway Design Standards

Cross-section elements for the roadway, such as lane and shoulder widths, should be based on design classifications. For roadways with existing or planned bus service, consultation with the transit authority is recommended to confirm minimum lane width requirements that can accommodate transit operations. Lane widths play a fundamental role in influencing driver speed on a roadway. While lane widths must be wide enough to provide adequate levels of service to vehicle traffic, lanes that are too wide encourage higher operating speeds. **Table 14** summarizes the recommended lane widths based on design speed ranges.

Table 14: Through Lane Widths - Urban Roadways

	Design Domain			
Design Speed	**Practical Lower Limit**	**Recommended Lower Limit**	**Recommended Upper Limit**	**Practical Upper Limit**
60 and less	2.7 m	3.0 m	3.7 m	4.0 m
70 to 100	3.0 m	3.3 m	3.7 m	4.0 m
110 and higher	3.5 m	3.7 m	3.7 m	4.0 m

Roadways in the Township should be designed to provide acceptable levels of service and safety for all users, including pedestrians and cyclists of all ages and abilities. Standardization of roadway cross-sections is important to ensure existing and future roads in the Township support the safe movement of people and goods.

At a strategic planning level, it is critical to determine the width of a roadway's right-of-way (ROW) and the elements within it. These widths are the primary consideration of this section. The ROW width determines the available space to accommodate travel paths for all users, drainage, and utilities. If additional ROW is required through land acquisition to accommodate additional roadway elements, such as extra lanes or pedestrian facilities, the cost of land acquisition can be significant.

In summary of this section and in consideration of cross-section standardization, **Table 15** summarizes the TAC Geometric Design Guide requirements for urban roads with design speeds less than 60 km/h. For Regional Roads within Woolwich, roadway design standards should continue to align with the Region of Waterloo's approved policies and by-laws, including the Regional Official Plan designated rights-of-way, Scenic Roads and Special Character Streets Guidelines, Context Sensitive Regional Transportation Corridor Design Guidelines (2013, currently under update), and the Region of Waterloo Controlled Access By-law. Coordination

with the Region will be essential to ensure that Township-led projects on or adjacent to Regional corridors remain consistent with Regional design intent and functional classifications.

Table 15: Urban Roadways ≤ 60 km/h Design Speed

Element	Recommendations	Reference
Right-of-Way Width	20 - 45 m	TAC 2017 Table 2.6.5
Through Lane Width	3.0 - 3.7 m (Min. 3.3 m where buses and larger trucks are expected regularly)	TAC 2017 Table 4.2.3
Aux. Lane Width	Generally, the same as the through lane. May be 0.2-0.25 m less than the through lane, but not less than 3.25 m	TAC 2017 Section 4.3
Median Width (when provided)	2.0 - 6.0 m	TAC 2017 Section 4.5.3
Curb	Standard Curb and Gutter (OPSD 600.040)	TAC 2017 Section 4.7
Boulevard Width	2.0 - 3.0 m (1.5 m min.) (when provided)	TAC 2017 Section 4.6.2
Sidewalk Width	1.8 – 2.0 m (1.5 m min. if constrained)	TAC 2017 Section 2
Parking Lane Width	2.4 m (when provided)	TAC 2017 Section 4.3.2.4
Minimum Horizontal Alignment Radius	80 m	TAC 2017 Table 3.2.4
Max Superelevation	4% (General Standard for Ontario)	TAC 2017 Section 3.2.2.4 and Table 3.2.4

Source: TAC Geometric Design Guide for Canadian Roads (2017)

8.1.3 Road Safety and Winter Design Considerations

In Woolwich, winter weather conditions such as snow and wind can create hazardous driving situations, including snow drifting across roadways and reduced visibility. To enhance winter safety, the Township should consider incorporating roadside windbreaks, including strategically planted trees and vegetation, as part of roadway design, maintenance, and long-term planning. Existing tree planting initiatives along Township roads provide a foundation for this approach and demonstrate the dual benefits of roadside vegetation for both safety and environmental

stewardship. Windbreaks help reduce snow drifting, improve visibility, and enhance winter roadway operations, particularly on exposed rural roads where wind impacts are greatest.

Where feasible, future road construction, reconstruction, and maintenance projects should evaluate opportunities to integrate windbreaks while ensuring sightlines, snow removal operations, and roadway clearances are maintained. In addition, roadside windbreaks can contribute to active transportation safety by reducing snow accumulation on adjacent shoulders or trails, improving conditions for cyclists and pedestrians during winter months. Integrating these features into the Township's rural roadway network supports long-term resilience, safety, and usability for all road users

8.1.4 Access Management

Access to the public road system for new development or redevelopment. The primary objective is to provide safe, orderly, and efficient access that is consistent with the functional and operational requirements of the roadway while meeting the accessibility needs of adjacent land uses.

The TAC Geometric Design Guide for Canadian Roads (Chapter 8) provides best practice guidance on access management, including design domains for critical geometric features such as access widths, density and spacing, and throat length. The following sections provide a high-level overview of these considerations and their application to driveways in the Township.

Access Management by Design Classification

Access management should be applied in accordance with functional road classification to ensure that roadway operations are aligned with their intended use. The desirable number and location of accesses differ by classification, reflecting the balance between traffic mobility and land access.

Collector and Local Roads

On urban Collector roads, land access and traffic movement are equally important functions, while on Local roads, land access is the primary role. For both classifications, maintaining reasonable spacing between adjacent driveways is critical to preserving safety and operations. **Table 16** summarizes the recommended maximum number of accesses for new developments based on site frontage. However, the number and placement of entrances are also regulated through the Township's Zoning By-law, which dictates allowable access based on property zoning and land use type, not solely frontage and should be consulted when determining access design.

Table 16: Maximum Number of Driveways Based on Property Frontage on Collector Roads

Frontage (m)	Minimum number of Driveways [a]
15	1 [b]
16-50	2
51 - 150	3[c]
> 150	4 or more [c]

[a] Subject to TAC spacing guidelines.
[b] Single family residential properties should be restricted to one driveway, irrespective of frontage. However, for corner lots Zoning By-law permits two entrances, one on each frontage.
[c] For larger developments, the location and design elements of driveways should be assessed as part of transportation impact studies.

Driveway Width

Driveway widths play a critical role in the overall function and safety of the roadway environment. They must be wide enough to accommodate efficient site ingress and egress; however, without maximum width limits, driveways can become excessively wide, resulting in large paved areas, poorly defined travel lanes, and negative impacts on the streetscape. Overly wide driveway accesses can also create challenges for pedestrians by increasing crossing distances and exposure time to traffic.

Similarly, driveway entry radii are an important design consideration, as they influence turning movements and help promote appropriate operating speeds. **Table 17** provides a summary of typical design domains for driveway throat widths and entry radii for both two-way and one-way operations. While these dimensions are generally desirable, flexibility should be maintained to account for the anticipated design vehicles expected to access a given site.

Table 17: Typical Driveway Widths

Dimension	Land Use		
	Residential	Commercial	Industrial
Width (W)			
One-Way	3.0 [a] - 4.3	4.5 [a] - 7.5	5.0 - 9.0
Two-Way	2.0 [a] - 7.3	7.2 [a] - 12.0 [c]	9.0 [a] - 15.0 [b]
Right turn Radius	3.0 - 4.5	4.5 - 12.0	9.0 - 15.0

[a] Minimum widths are normally used when radii are near the upper end of the specified range.
[b] Increased widths may be considered for capacity purposes. Where 3 exit lanes and 2 entry lanes are used, a maximum width of 17 m may be used (exclusive of medians).
[c] Applicable to driveways only, not intersections.

Clear Throat Length

For major driveways to operate efficiently, both along the roadside and within the development, it is desirable to provide a "no-conflict and storage zone" within the driveway. This zone is commonly referred to as the **setback distance** or **clear throat length**. Clear throat length is defined as the distance between the driveway curb return radii at the roadway and the first point of conflict on-site (e.g., internal circulation roads, parking aisles, or loading areas).

If clear throat lengths are inadequate, entering vehicles may block on-site circulation, creating internal congestion and queues that extend back to the public roadway. This not only reduces operational efficiency but can also increase the potential for collisions at the driveway. **Table 18** summarizes the recommended clear throat lengths based on land use and development size.

Table 18: Clear Thorat Lengths by Land Use and Road Classification

Land Use	Development Size	Minimum Clear Throat Length (m)	
		Collector	Arterial
Light Industrial	< 10,000 m^2	8	15
	10,000 - 45,000 m^2	15	30
	> 45,000 m^2	15	60
Discount Store	> 3,000 m^2	8	15-25
Shopping Centre	< 25,000 m^2	8	15
	25,000 - 45,000 m^2	15	25
	45,001 - 70,000 m^2	25	60
	>70,000 m^2	40	75
Supermarket	< 2,000 m^2	15	25
	> 2,000 m^2	25	40
Apartments	< 100 units	8	15
	100 - 200 units	15	25
	> 200 units	25	40
Quality (Sit Down) restaurant	< 1,500 m^2	8	15
	> 1,500 m^2	8	25
Fast Food restaurant	< 200 m^2	8	25
	> 200 m^2	15	40

Land Use	Development Size	Minimum Clear Throat Length (m)	
		Collector	Arterial
General Office	< 5,000 m^2	8	15
	5,000 - 10,000 m^2	8	25
	10,001 - 20,000 m^2	15	30
	20,0001 - 45,000 m^2	30	45
	> 40,000 m^2	40	75
Motel	<150 rooms	8	25
	>150 rooms	8	30

8.1.5 Capacity at Intersections with Improvements

Intersections are critical points that often determine the overall performance of the road network. Evaluating intersection capacity through LOS analysis provides insight into how well intersections accommodate existing and future traffic demand, and identifies operational bottlenecks where upgrades may be required. Such upgrades can include signal timing adjustments, additional turn lanes, lane reconfigurations, or other operational strategies to improve efficiency.

Intersection performance was evaluated under 2051 horizon year traffic conditions, accounting for population and employment growth within Woolwich and the broader Region. Planned upgrades and capacity improvements on the Regional Road network were incorporated into the analysis to provide a realistic assessment of future operations.

The analysis of a 2051 “do nothing” scenario, with only Regional improvements and without any intersection optimizations, indicated that several intersections would operate at LOS E or F, highlighting potential congestion and operational issues. **Map 21** illustrates the 2051 intersection LOS with improvements applied and **Table 19** shows the results with the specific improvements applied. With these improvements, most intersections are projected to operate at LOS D or better, which is considered acceptable for urban and suburban contexts.

It is important to note that signalized intersections are under Regional jurisdiction and are subject to Regional approval and funding. Any concerns regarding operations or upgrades at these intersections would be addressed through detailed Regional assessments. The Region’s 2018 Transportation Master Plan (TMP) recommendations serve as preliminary guidance based on high-level transportation modeling and require detailed confirmation on a project-by-project basis as potential improvements move closer to implementation. These recommended

improvements are primarily linked to Regional roads, and coordination between the Township and the Region will be essential to ensure that they are advanced, refined, and implemented effectively.

Incorporating intersection LOS assessments into the CTMP enables the Township to proactively address congestion, improve safety, and prioritize investments at key network nodes, while ensuring coordination with Regional planning and operational responsibilities.

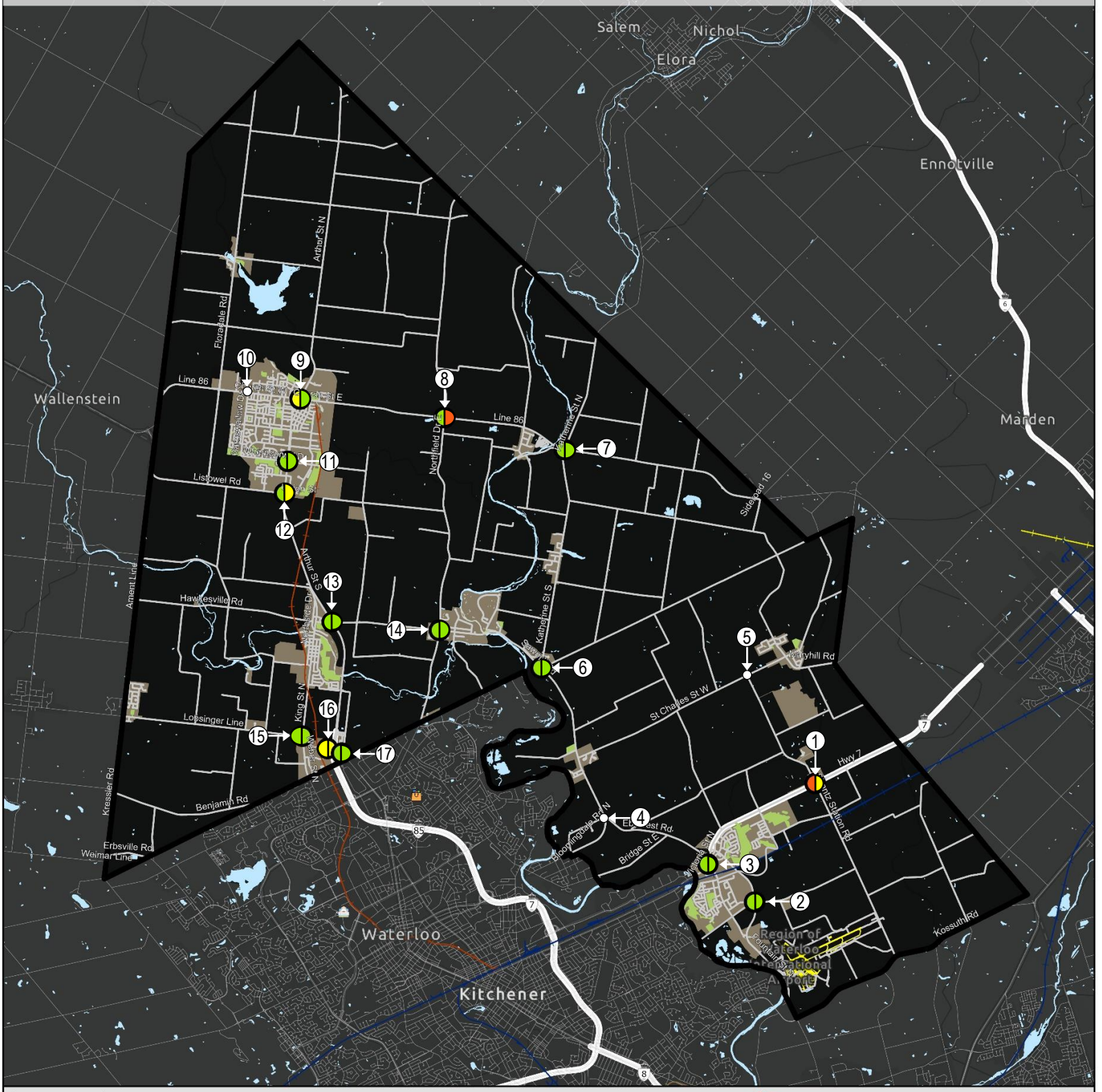
Table 19: 2051 Intersection LOS with Improvements Applied

No.	Intersection	Intersection Level of Service Future (2051) AM	Future (2051) PM	Improvement Applied
1	Shantz Station Road & Victoria Street North	E	D	Shantz Station Road widening (Do nothing) + northbound right and southbound right movements
2	Fountain Street North & Menno Street/Township Road 80	A	A	Fountain St N widening (Do nothing)
3	Woolwich Street South/Ebycrest Road & Victoria Street North	A	A	
6	Sawmill Road & Katherine Street/Crowsfoot Road	C	C	Add one storage lane for southbound left and westbound left movements (intersection optimization)
7	Katherine Street North & Line 86	C	E	Optimization of the traffic signal plan only
8	Northfield Drive East & Line 86	C	E	Add one storage lane for northbound left and right and southbound left and right movements
9	Arthur Street South/North & Church Street West/East	D	C	Add 1 storage lane for southbound right and northbound right movements
11	Arthur Street South & Whippoorwill Drive/South Field Drive	A	A	
12	Arthur Street South & Listowel Road/Union Street	C	D	Arthur Street S widening south of the intersection (Do northing) + optimization of traffic signal plan
13	Arthur Street South & Sawmill Road	C	B	Add a bypass for northbound right and southbound right movements
14	Northfield Drive East & Sawmill Road	B	C	Add one storage lane for northbound left, southbound left, and southbound right movements
15	King Street North & Lobsinger Line	B	B	
16	Farmer's Market Road & King Street North	D	D	
17	Hwy 85 NB Ramp/Martin Grove Road & King Street North	B	C	

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 21: Future 2051 Vehicle Intersection Level of Service



Legend

- Municipal Boundary
- Settlement Areas
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

Intersection Level of Service

(AM)	(PM)
A-C	A-C
D	D
E	E
F	E

ICU Not Available

0 1 2 4 Kilometers

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GIS data provided by Township of Woolwich in December 2024

8.2 Active Transportation Strategy

Active transportation provides residents with safe, affordable, and efficient travel options while promoting physical activity and healthier lifestyles. Encouraging walking and cycling is a key priority of the CTMP, supporting sustainable travel choices and enhancing connectivity within the Township. Active transportation improvements also help accommodate projected growth and encourage shifts toward more sustainable modes of travel.

For the development of recommended pedestrian and cycling facilities, the following process was undertaken:

- **Review of existing active transportation infrastructure** within the Township, including sidewalks, trails, and multi-use pathways.
- **Consideration of anticipated growth** and its impact on the transportation network.
- **Identification of key destinations**, including schools, community centres, employment hubs, commercial areas, and recreational facilities.
- **Identification of gaps** in the existing and planned active transportation network that could result in discontinuities.
- **Selection of appropriate facility types** based on traffic volumes, operational characteristics, and design speeds to achieve acceptable levels of comfort and safety for all users.

It should be noted that while the recommendations from the recent Active Transportation Master Plan (ATMP) were not formally carried forward by Council, Council endorsed implementing them where appropriate as part of future infrastructure projects. To assess the effectiveness of potential active transportation improvements, a bicycle Multi-Modal Level of Service (MMLOS) and pedestrian PLOS analysis were conducted using the City of Ottawa's MMLOS methodology. Although the Township of Woolwich differs significantly from Ottawa, particularly due to its rural context and the presence of horse-and-buggy travel, the Ottawa framework was selected because it is a widely recognized, evidence-based methodology commonly applied across Ontario. It provides a consistent and practical approach for evaluating the comfort, safety, and connectivity of active transportation facilities while allowing for contextual adjustments to reflect the Township's unique travel characteristics.

Based on this process, the ATMP recommendations, and guidance from the Region and Provincial planning documents, the recommended improvements to Woolwich's active transportation network are detailed in the subsequent sections.

8.2.1 Cycling Facilities

The existing cycling network for the Township comprises of paved and unpaved Multi-Use Trails (MUTs) located outside the road right-of-way. It should be noted that MUTs take various forms in the Township and are classified as such for study purposes.

The Township's ATMP provided the foundation for a safe and connected cycling network. While the Township's 2023 Active Transportation Master Plan and the Region's 2018 Transportation Master Plan identify Arthur Street (Regional Road 85) through downtown Elmira as a potential cycling route, Arthur Street (Regional Road 85) between South Street and Church Street is not shown as a recommended cycling route on Map 22 of this Plan. Following further consideration during the development of the CTMP, including significant concerns expressed by Township Council regarding the suitability of on-street cycling facilities through the downtown core, the Township determined that it was not appropriate to advance this recommendation at this time. As a result, the route has been removed from the CTMP's recommended cycling network, despite its identification in earlier plans.

All other recommendations from Section 4 of the ATMP[3] have been carried forward into the CTMP, with the addition of:

- The Provincial cycling network connection on Highway 7, and
- The Regional bike route on Fountain Street.
- New bike lanes on Ottawa Street Extension and Breslau Connector Road

These additions strengthen Woolwich's integration with broader Regional and Provincial cycling networks, supporting both commuter and recreational travel.

While OTM Book 18 and related industry guidance inform the selection of appropriate cycling facility types, their application in Woolwich must be adapted to reflect the Township's **rural** context, presence of horse-and-buggy travel, and current maintenance practices. In many rural areas, physically separated cycling facilities are not practical or maintainable, as the Township does not currently have the equipment or resources to provide winter maintenance at the required standard:

Accordingly, the Township should apply OTM Book 18 principles where appropriate, emphasizing shared or designated operating spaces that balance cyclist safety with the needs of all road users, including horse-and-buggy traffic**. Table 20** outlines the range of facility types and levels of separation that may be considered, depending on roadway conditions and context. The facility selection framework from **Table 20**, when applied in combination with

[3] https://www.woolwich.ca/media/qa1cfh1d/active_transportation_master_plan.pdf

traffic volumes (AADT) and posted speed limits on Township roads, helps determine the most suitable facility type for each corridor, as shown in **Figure 19**.

Table 20: Different Levels of Separation for Cycling Facilities

	Shared Operating Space	Designated Operating Space	Physically Separated Bikeways
			
Description	Cyclists are expected to share traffic lanes with motor vehicles, which may be indicated in pavement markings or signage. This scenario is most appropriate on roads with low motor vehicle traffic volumes and speeds.	Space in the road right-of-way is designated exclusively for cycling, but there are no physical barriers separating people cycling from motorists. These facilities are preferred on corridors with relatively low motor vehicle speeds and volumes.	Cyclists ride on dedicated cycling facilities that are separated from motor vehicle traffic by horizontal space and physical barriers. Various kinds of physical barriers can be used ranging from flexible bollards to curbs, concrete barrier walks and guided rails. These facilities should be considered where motor vehicle volumes and speeds are moderate or high.
Facility Type Options	• Shared Roadway • Neighbourhood Bikeway • Advisory Bicycle Lanes	• Bicycle Lanes • Buffered Bicycle Lanes • Contraflow Bicycle Lanes	• Separated Bicycle Lanes • Cycle Tracks • In-boulevard Multi-use Paths

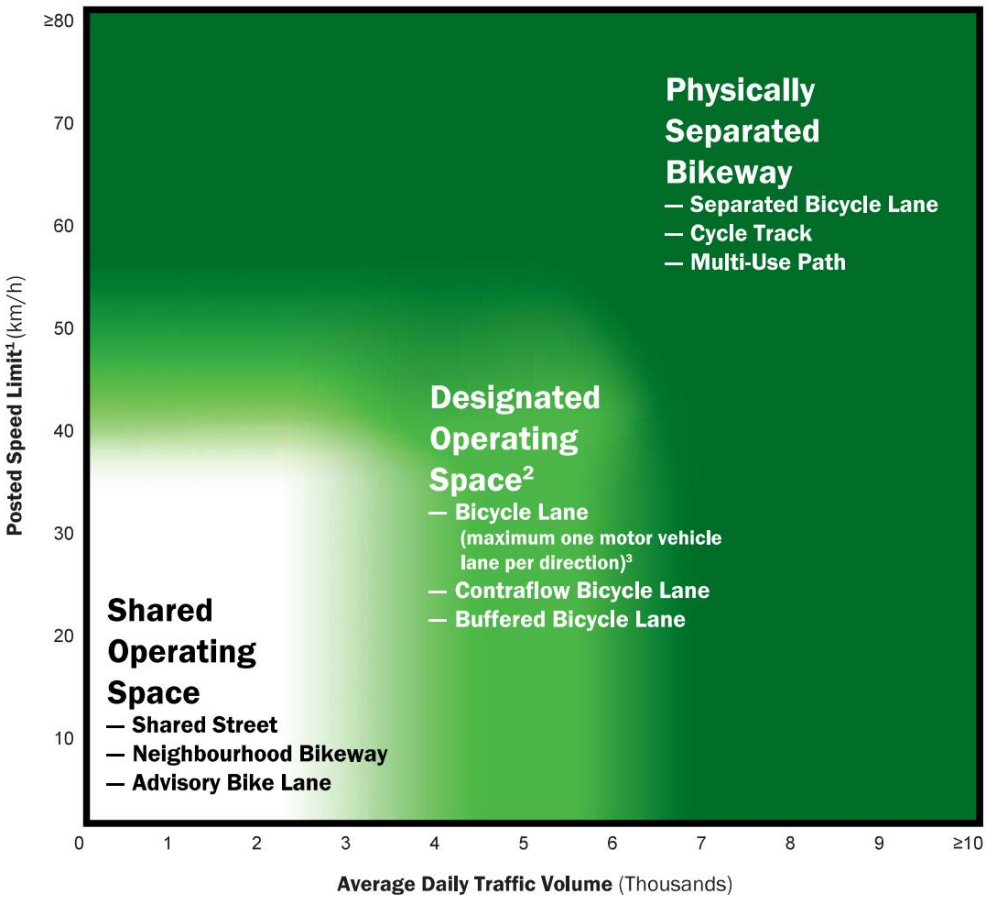


Figure 19: Desirable Cycling Facility Pre-Selection Nomograph Urban/Suburban Context (OTM Book 18)

In addition to expanding the cycling network, improving access to existing trails should be a key priority. Many of Woolwich's paved and unpaved trail systems already offer high-quality recreational opportunities and important active transportation connections, but their visibility and accessibility can be improved. The Township should explore opportunities to enhance access points to existing trails through measures such as improved signage, wayfinding, and trailhead visibility from main streets and community destinations. Additional considerations may include enhancing connections between on-road cycling routes and off-road trail segments, improving crossing treatments at trail-road interfaces, and working with community partners and the Region of Waterloo to promote awareness of the Township's trail network. These actions will help integrate trails more effectively into the overall cycling and active transportation system, encouraging greater year-round use by residents and visitors.

Furthermore, all new subdivisions should incorporate cycling facilities consistent with these context-sensitive standards to ensure continuous and connected active transportation infrastructure as communities grow.

Research shows that one of the most effective measures for improving overall cyclist safety within a road network is increasing the number of cyclists using the system. However, in order to encourage cyclists of different ages and abilities, a variety of bicycle facilities with different degrees of separation between motor vehicles and cyclists must be available. **Table 21** shows the type of cyclists; over 50% fall in the "interested but concerned" category, also known as design cyclists, in which people are open to the idea of cycling but are uncomfortable sharing the street with motor vehicles (except on very low-volume, low-speed neighbourhood streets). Designing facilities for the "**interested but concerned**" group, who represent the majority of potential riders, ensures that cycling becomes a practical and attractive option for short- to medium-length trips. This approach also accommodates more confident cyclists, maximizing the benefits of a connected network.

Separation between motor vehicles and cyclists becomes increasingly important as traffic volumes and operating speeds increase (and on corridors with a high propensity for conflicts). The quality and extent of cycling facilities are key factors in determining whether these individuals choose cycling as a viable option for short to moderate length trips. Therefore, the intent is to accommodate the design cyclist group and create a cycling network that is acceptable for cyclists of all ages and abilities. Furthermore, separate bikeways should be provided wherever possible to ensure the safety of cyclists. By designing facilities to appeal to the design cyclist group, the needs of the other two demographics in **Table 21** are also accommodated, which significantly increases the scale of potential benefits associated with cycling.

Table 21: Type of Cyclists

	DESIGN CYCLIST		
	Interested but Concerned	**Somewhat Confident**	**Highly Confident**
	• Strong preference for separated cycling facilities or very low-volume and low-speed streets • Cycling frequency depends heavily on having a network of low-stress facilities • Can generally negotiate simple low-speed interactions with motor vehicles at intersections	• Comfortable cycling on-street and interacting with moderate-speed traffic • Preference for separated cycling facilities or low-volume and low-speed streets • Cycling frequency increases as network of low-stress facilities expands	• Comfortable cycling on-street and interacting with higher-speed traffic • Preference for cycling facilities that allow for easy overtaking and efficient movement • Cycling frequency not necessarily affected by network
			
% of population	• 51–56%	• 5–9%	• 4–7%
Stress tolerance	• Low	• Moderate	• High
Skill level	• Experience varies • Ability to anticipate and mitigate basic hazards	• Comparatively experienced • Ability to anticipate and mitigate common hazards	• Highly experienced • Well-developed ability to anticipate and mitigate most hazards
Typical demographic profiles	• Age: All* • Gender: any • Ability: includes individuals who may have a disability or are new to cycling	• Age: 18–65+ • Gender: women are under-represented • Ability: individuals with a disability are under-represented	• Age: 18–65+ • Gender: women are under-represented • Ability: individuals with a disability are under-represented
Typical travel speed	• 10–25 km/h	• 15–25 km/h	• 20–35 km/h

Map 22 illustrates the long-term cycling network for Woolwich, which carries forward all ATMP recommendations, incorporates the additional routes as mentioned earlier.

Generally, there are four types of cycling facilities that are distinguished based on their degree of separation from traffic and placement within the road right-of-way. These facility types and their associated geometric requirements are summarized in **Table 22**.

Table 22: Types of Cycling Facilities and their Requirements per OTM Book 18

Facility	Type	Desired Width	Suggested Minimum Width
Separated Bike Lane	Bike Lanes	• 1.8 m lane • 1.0 m buffer	• 1.5 m lane • 0.5 m buffer
Painted Bike Lane		• 1.8 m lane • 1.2 m buffer (if on-street parking)	• 1.5 m lane • 0.5 m buffer (if on-street parking)
Signed Route	Shared Roadways	• 4.0 – 4.5 m shared lane	• 3.0 – 4.0 m shared lane
Paved Shoulder		• 1.5 – 2.0 m shoulder	• 1.2 m shoulder
Gravel Shoulder		• 1.5 – 2.0 m shoulder (where paving not feasible)	• 1.0m shoulder
Raised Cycle Tracks		• 2.0 m lane • Up to 1.0 m curb	• 1.5 m lane • Up to 1.0 m curb
Multi-Use Path	In-Boulevard Facilities	• 4.0 m two-way operation • Up to 1.0 m curb • 1.5 – 2.5 m buffer (two-way operation)	• 3.0 m two-way operation • Up to 1.0 m curb • 0.6 m buffer (two-way operation)

When choosing the appropriate facility for roadways with designated on-road cycling facilities, consideration should be given not only to traffic volumes and lane widths but also to the Township's maintenance limitations, particularly snow removal capabilities, and the presence of horse-and-buggy traffic. Where traffic volumes are sufficiently high and lane widths allow, conventional bike lanes are recommended. Where traffic volumes and roadway operating speeds are relatively low and lane widths are between 3.25 m and 4.0 m, a signed bicycle route can be considered. For roadways with physically separated bikeways, in-boulevard multi-use paths are recommended, provided they can be safely maintained and do not conflict with horse-and-buggy use. Despite all recommendations provided within this CTMP, due process should be conducted to determine the most appropriate facility type for each context, balancing safety, accessibility, and operational feasibility.

To further assess cyclist experience, a Bicycle Level of Service (BLOS) analysis was undertaken on the recommended cycling network using the City of Ottawa's Multimodal Level of Service (M-MLOS) Guidelines which evaluate bicycle comfort and safety based on bike lane width, traffic volumes, number of travel lanes, and vehicular operating speeds. The results are shown in **Map 23** and illustrate that the Township's cycling conditions improve from an average LOS D (in **Section 3.6.2.1**) under existing conditions to LOS C with the future cycling network. While

the future infrastructure will be reasonably safe, certain corridors may still feel uncomfortable for less experienced riders due to higher traffic speeds, volumes, or limited separation. Overall, however, the analysis demonstrates that cycling in Woolwich will become safer, more comfortable, and more appealing, supporting greater adoption of cycling as a mode of travel.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 22: Future (2051) Bicycle Network



Legend

Regional Cycling Routes
- Existing Cycling Route
- Future Cycling Route
- Recommended Regional or Provincial Route

Planned Cycling Network
- Planned Signed Route
- Planned Paved Shoulder
- Planned Multi-use Path

- Provincial Highway
- Road Network
- Railway

- Municipal Boundary
- Settlement Boundary
- Park
- Airport
- Waterbody

0 1.3 2.5 5 Kilometers

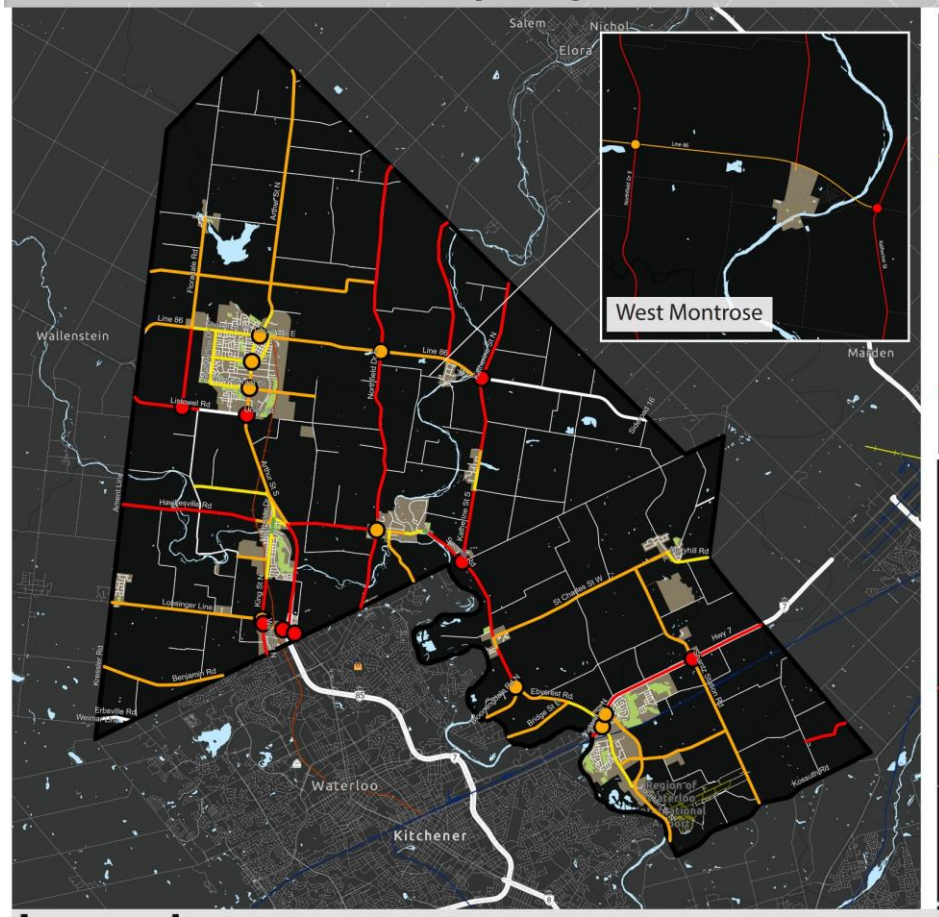
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GIS data provided by Township of Woolwich on December 4th, 2024

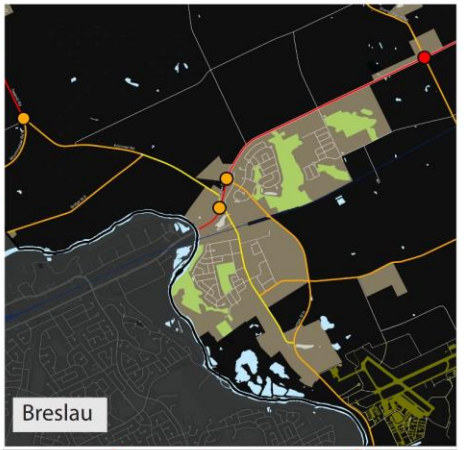
Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 23: Future (2051) Cycling Levels of Service











Legend

Cycling Level of Service

- A
- B
- C-D
- E-F

- Municipal Boundary
- Settlement Areas
- Airport
- Park
- Waterbody
- Provincial Highway
- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

0 1 2 4 Kilometers

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GIS data provided by Township of Woolwich in December 2024

8.2.2 Pedestrian Network

Sidewalks are an integral part of Woolwich's transportation system, providing essential connections within and between neighbourhoods, schools, community facilities, commercial areas, transit service, and key destinations. They also play a central role in supporting Township livability by encouraging active lifestyles, improving safety, and enhancing accessibility for all ages and abilities.

To identify recommended pedestrian facilities, the existing sidewalk network was reviewed to determine gaps, particularly near schools, community facilities, and high-activity areas, as well as along collector and arterial streets in settlement areas. Input from the public consultation process and direction from the Township's Active Transportation Master Plan (ATMP) were incorporated to ensure community needs are addressed. The implementation of sidewalks on Regional roads should be coordinated with the Region of Waterloo's implementation plans.

Key pedestrian-related recommendations include:

- Sidewalks on both sides of the street in new subdivisions to support walking as a primary mode of transportation.
- Sidewalks on both sides of the street near schools, community facilities, and high-activity areas to maximize safety and accessibility.
- Sidewalks on at least one side of every street in settlement areas, with a long-term objective of achieving sidewalks on both sides within settlement areas, across the Township.
- Carrying forward all recommendations of the Active Transportation Master Plan (ATMP) related to the pedestrian network.

Map 24 illustrates the recommended future pedestrian network for Woolwich. It should be noted that confirmation of whether sidewalks are required on one or both sides of a given street will be determined during the planning and design of each facility. Furthermore, where multi-use pathways are provided, additional sidewalks may not be required as these pathways accommodate both pedestrians and cyclists.

All new and reconstructed sidewalks should meet Accessibility for Ontarians with Disabilities Act (AODA) requirements. While an unobstructed width of 2.0 m is optimal for multi-use trails and high-volume pedestrian corridors, it should be considered a target rather than a standard for typical sidewalks. For standard sidewalks, a minimum unobstructed width of 1.8 m is appropriate, with 1.5 m permitted only in highly constrained locations or short sections. Sidewalks should be provided on both sides of all new or reconstructed collector roads, and on at least one side of new or reconstructed local roads, to ensure safe and accessible pedestrian circulation throughout the Township.

To assess the effectiveness of the planned pedestrian network, the City of Ottawa's MMLOS guidelines were applied. Pedestrian LOS was evaluated based on; Sidewalk and boulevard widths, Annual Average Daily Traffic (AADT), Presence of on-street parking, Crosswalk treatments, and Vehicular operating speeds.

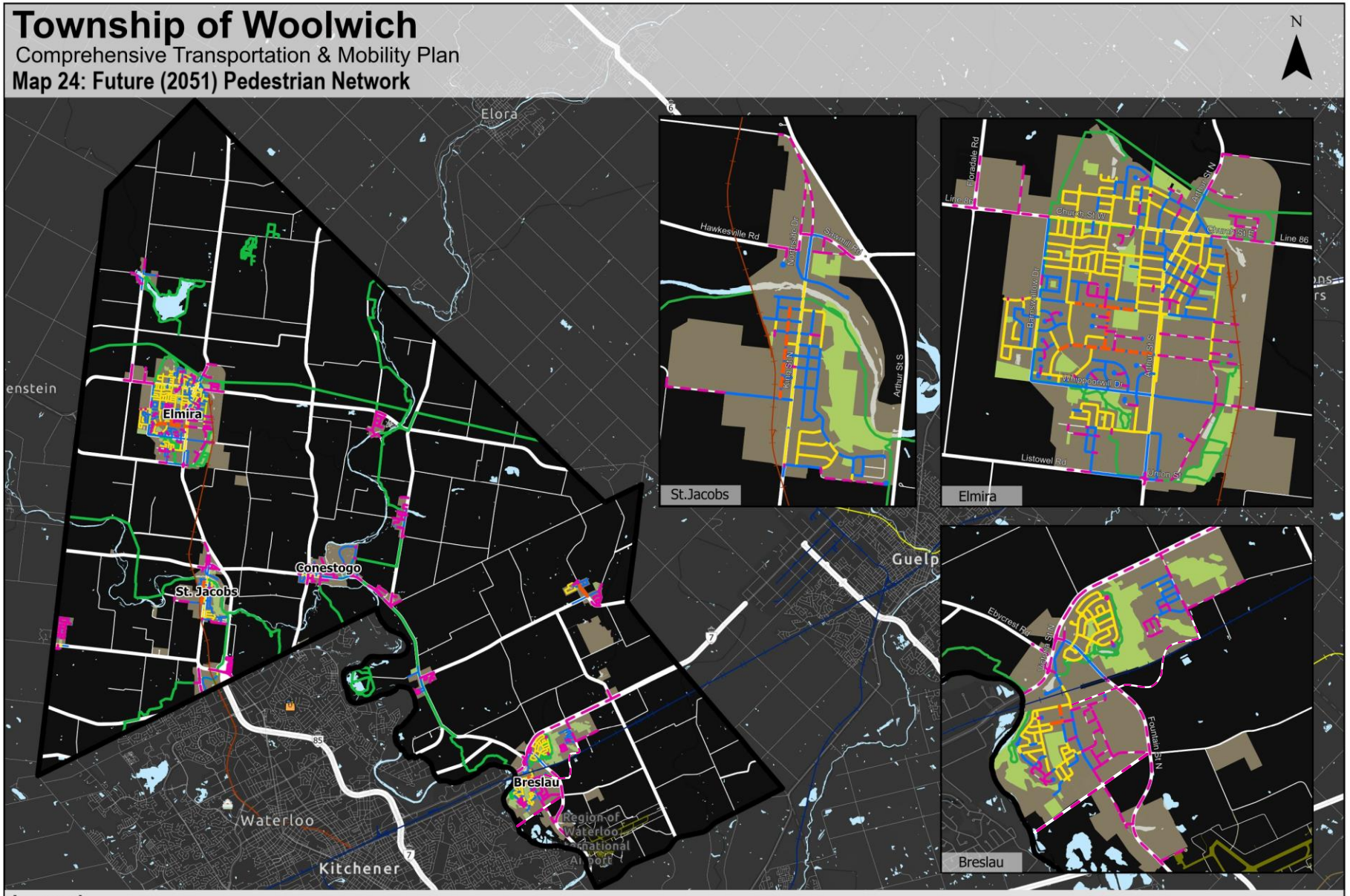
The analysis indicates that the average pedestrian LOS in Woolwich will improve from LOS E under existing conditions (Shown in **Section 3.6.2.2**) to LOS C with the recommended network as shown in **Map 25**. This represents a significant improvement, providing a comfortable walking experience in most urban and settlement areas. However, pedestrian LOS is expected to remain poor along rural arterials and in rural areas, where there is limited pedestrian demand and supporting infrastructure is not warranted.

Overall, the future pedestrian network will be safer, more connected, and more accessible, encouraging walking as a viable and attractive mode of transportation while supporting the Township's broader goals for livability, sustainability, and active mobility.

Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 24: Future (2051) Pedestrian Network



Legend

- Trail

Sidewalks

- Existing Sidewalk
- Partial Sidewalk
- Recommended Sidewalk
- Recommended Partial to Full Sidewalk

- Road Network

Railway

- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

- Municipal Boundary
- Settlement Areas
- Park
- Airport
- Waterbody

0 1.3 2.5 5 Kilometers

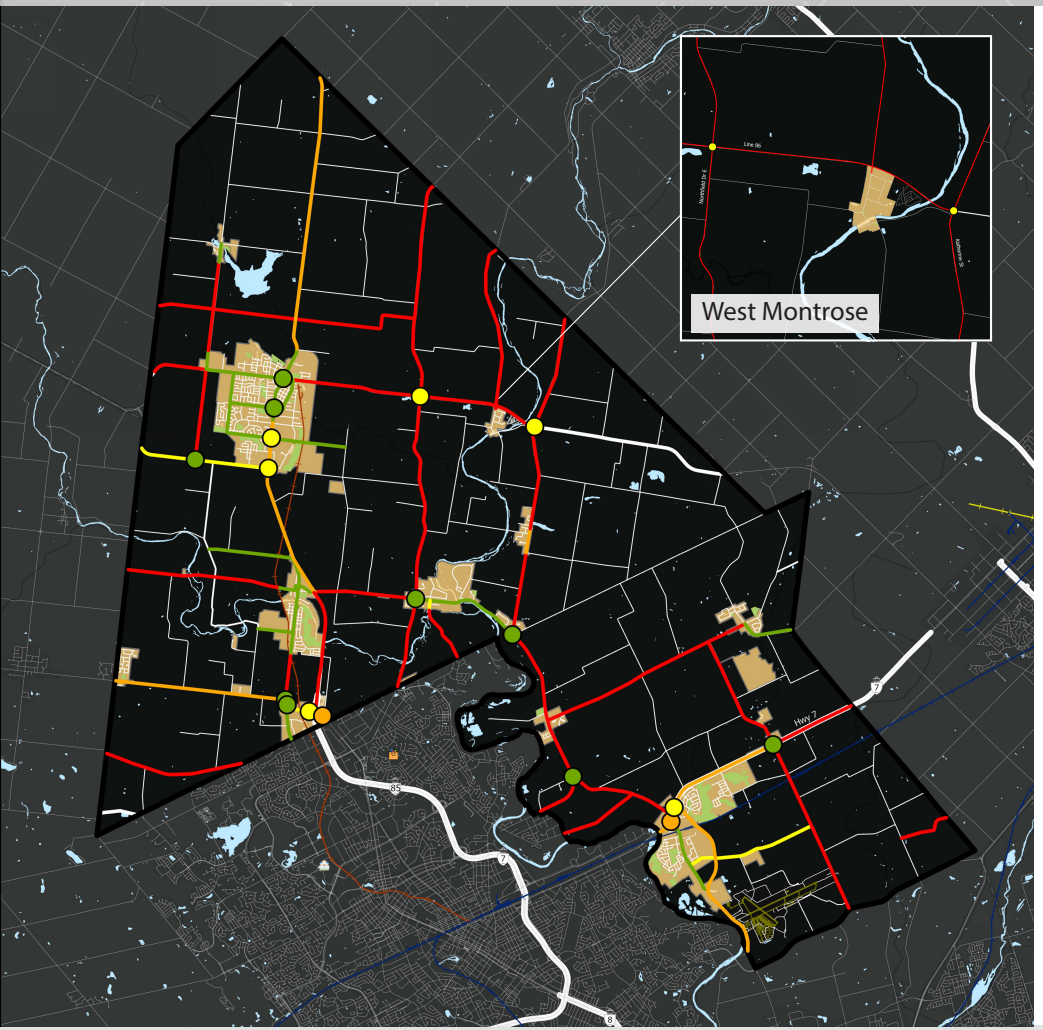
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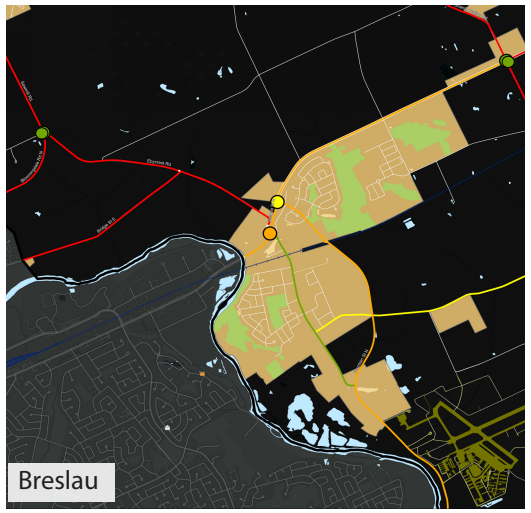
Township of Woolwich

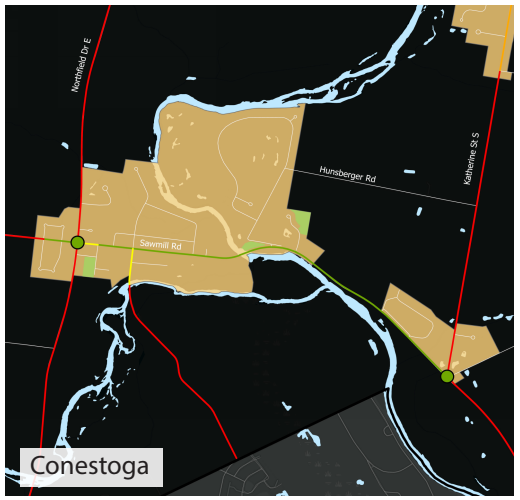
Comprehensive Transportation & Mobility Plan

Map 25: Future (2051) Pedestrian Levels of Service











Legend

Pedestrian Level of Service
- A-C
- D
- E
- F
- Municipal Boundary

- Settlement Areas
- Park
- Waterbody

Railway
- Goderich-Exeter Railway
- Waterloo Central Railway
- Guelph Junction Railway

- Provincial Highway
- Road Network

0 0.15 0.3 0.6 Kilometers

WOOLWICH TOWNSHIP

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GIS data provided by Township of Woolwich in December 2024

8.3 Transit Strategy

Public transit plays a vital role in providing accessible, sustainable, and efficient mobility for residents of Woolwich. To support anticipated growth, improve regional connectivity, and encourage transit use, a series of conceptual transit initiatives have been identified. These initiatives are conceptual only and would require detailed study, consultation, and coordination with Grand River Transit (GRT), Metrolinx, and the Region of Waterloo prior to any implementation. The Township is not responsible for implementing new routes or extending existing routes, but can collaborate, monitor, and advocate as needed to support service improvements.

Key transit recommendations include:

- **Monitor and Advocate for New or Enhanced Routes:** The Region of Waterloo, including GRT, together with the Township, should monitor the need for additional transit service within the Township and advocate for new or enhanced routes where appropriate. These efforts would improve regional connectivity, provide access to higher-order transit, support growth, and enhance mobility between Township settlement areas.
- **Coordination with Metrolinx:** Woolwich would primarily coordinate with GRT, to ensure service improvements align with existing and future transit operations. GRT works with Metrolinx to coordinate GO bus and train schedules wherever feasible. This coordination would help reduce travel times, improve transfer efficiency, and facilitate smoother movement between Township settlements and regional transit hubs.
- **Enhanced Access to Kitchener GO Station:** Monitor and advocate for potential extensions of GRT Route 21 from Elmira to the Kitchener GO Station. Any such service would require close collaboration with GRT to assess operational feasibility, service integration, and alignment with regional transit planning.
- **On-Demand Transit Service:** Support the exploration of flexible on-demand transit options in lower-density and rural areas. These services would complement fixed-route transit, ensuring residents in less populated areas have accessible mobility options, particularly seniors, students, and those without access to a personal vehicle. Planned on-demand zones and service, as outlined in the **2025 GRT Business Plan**, have already been approved by Regional Council and are subject to future regional budget processes. Implementation of on-demand transit service lies solely with Regional Council, with the Township playing a coordinating and advocacy role to ensure local needs are considered.

Map 26 illustrates the areas of further transit feasibility analysis for Woolwich. The objectives of these recommendations are:

- Improve regional connectivity by linking key destinations and transit hubs to Woolwich communities.
- Support transit-oriented growth by providing reliable and convenient transit options in areas expected to experience population and employment growth.
- Promote public transit use, reduce car dependency, and encourage sustainable travel patterns.
- Enhance accessibility for seniors, students, and residents without private vehicles.
- Provide flexible and responsive transit options through on-demand services, particularly in rural and lower-density areas.
- Facilitate smoother travel between Township settlements and regional transit services, reducing wait and transfer times through improved coordination.

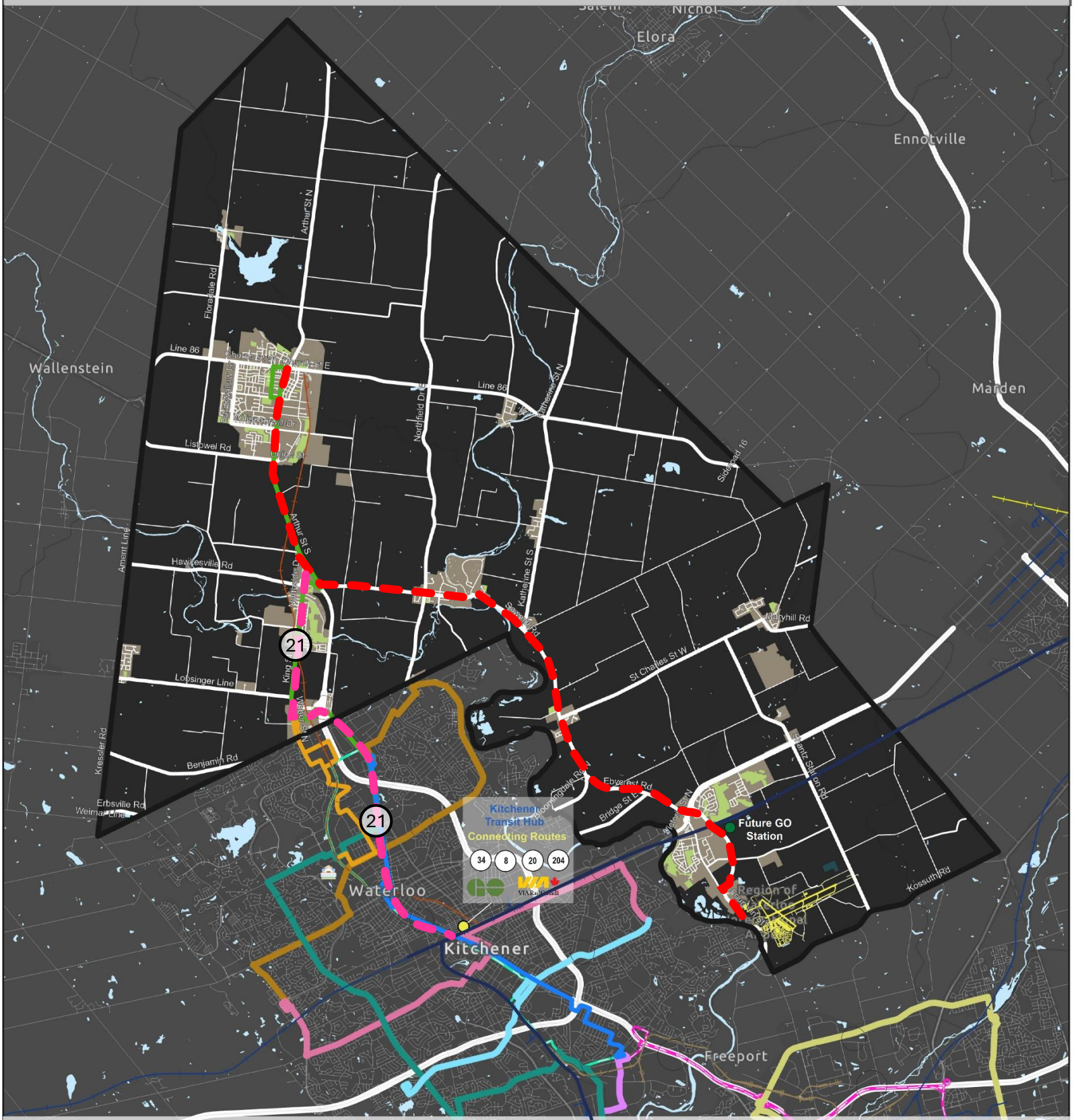
Further technical studies, stakeholder consultation, and collaboration with GRT and the Region of Waterloo will be required explore the areas for transit feasibility analysis. These conceptual recommendations provide a framework for collaboration, monitoring, and advocacy, supporting long-term sustainable mobility goals in the Township. It should be noted that the delivery of intra-regional transit services remains the sole responsibility of the Region of Waterloo, and future transit planning within Woolwich Township should align with the Region's approved policies and plans, including the 2025 GRT Business Plan



Township of Woolwich

Comprehensive Transportation & Mobility Plan

Map 26: Areas of Further Transit Feasibility Analysis



Legend

GRT Routes
- 21 - Elmira
- 19 - Hazel
- 7 - King
- 78 - Fountain

iXpress
- 201 -Fischer Hallman
- 202 - University
- 203 - Maple Grove
- 204 - Highland-Victoria
- 205 - Ottawa

- Recommended Route Extension
- Recommended Route
- Municipal Boundary
- Settlement Areas
- Airport
- Waterbody

Railway
- Waterloo-Central Railway
- Kitchener GO Line
- Provincial Highway
- Road Network

WOOLWICH TOWNSHIP

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8.4 Emerging Mobility

Emerging mobility solutions have the potential to transform how residents, businesses, and visitors move within and beyond the Township of Woolwich. These innovations aim to improve accessibility, reduce congestion, enhance sustainability, and provide more flexible travel options. As travel behaviors and technologies evolve, it is important for Woolwich to proactively consider emerging mobility as part of its long-term transportation planning. Emerging mobility includes a wide range of services and technologies such as on-demand transit and micro transit, shared mobility options like carsharing, bike-sharing, and e-scooters, connected and autonomous vehicles, and smart traffic management systems to optimize flow and safety.

By adopting an emerging mobility strategy, Woolwich can increase accessibility and connectivity across urban, suburban, and rural areas, provide more equitable transportation options, particularly for seniors, youth, and residents without access to private vehicles, encourage sustainable travel behaviors, support economic growth by connecting residents and businesses to employment, commercial, and regional hubs, and enhance the resilience and flexibility of the transportation network to adapt to evolving technologies and travel patterns.

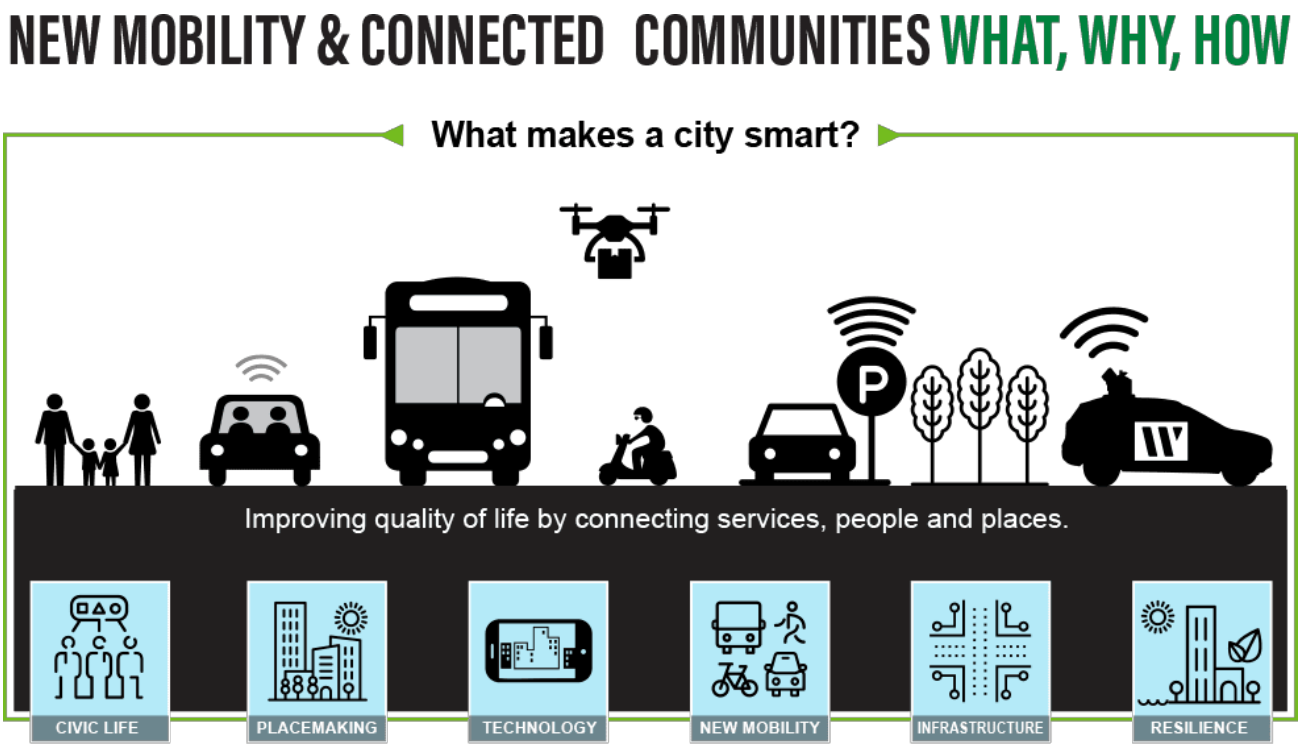
Key initiatives considered in this strategy include expanding on-demand transit services to cover low-density and rural areas and improve connections to settlement areas, schools, community centres, employment hubs, and transit stations. This approach aligns with the 2025 GRT Business Plan, which outlines the planned expansion of on-demand service models within Woolwich Township and across the Region. Shared mobility programs, such as carsharing, bike-sharing, and e-scooters, are encouraged in urban centres and high-demand corridors, supported through safe pickup/drop-off locations, parking infrastructure, and mobility hubs. Connected and autonomous vehicle technologies are being monitored for potential applications in transit, freight, and emergency services, and roadway infrastructure and traffic management systems should be prepared to accommodate these technologies as they become viable. Smart traffic management, including intelligent transportation systems, real-time monitoring, and optimized signal coordination, is also proposed to improve efficiency, safety, and environmental performance across the network.

To support the transition to cleaner transportation, the Township should also plan for the expansion of electric vehicle (EV) charging infrastructure, particularly on main streets in settlement areas where access to public charging will encourage EV adoption among residents, businesses, and visitors. The Township should require or incentivize EV charging infrastructure in private development applications and prioritize developments that include charging facilities as part of site plan review. This proactive approach will ensure Woolwich's built environment

evolves in step with emerging mobility trends and supports the broader transition toward low-emission transportation

All emerging mobility initiatives should align with Woolwich's objectives for sustainability, safety, accessibility, and equity. Pilot programs and phased implementation are recommended to test new technologies and services before full-scale deployment. Partnerships with Grand River Transit, Metrolinx, private mobility partners (such as ride-hailing companies, carsharing providers, and micromobility operators), and Regional stakeholders will be essential to ensure successful integration. Data collection and ongoing monitoring will support evaluation of performance, user experience, and community acceptance. Particular attention should be given to rural and settlement-area contexts, ensuring solutions accommodate Mennonite travel patterns, slower-moving vehicles, and lower-density areas.

The anticipated benefits of these initiatives include improved mobility options for all residents, reduced car dependency and associated congestion and emissions, enhanced integration between modes, increased resilience and adaptability of the transportation network, and greater safety for vulnerable road users. Detailed feasibility studies, stakeholder consultation, and implementation planning will be required to create a framework for the Township to introduce emerging mobility services, refine service concepts, align funding and operational strategies, and guide pilot programs, ensuring Woolwich's transportation system is prepared for evolving travel behaviors and emerging technologies.



Source: wginc.com

9 Policies and Supporting Strategies

The following policies and strategies outline the Township of Woolwich's approach to creating a safe, accessible, and well-managed transportation network. They provide guidance on topics such as Vision Zero, Complete Streets, traffic calming, speed management, parking management, and pedestrian crossings. These strategies are intended to support a transportation system that prioritizes safety, equity, and sustainability for all users. It is important to note that the policies and strategies described in this section apply only to Township roads under Woolwich's jurisdiction; Regional and Provincial roads remain subject to the policies, standards, and programs of the Region of Waterloo and the Province of Ontario.

9.1 Vision Zero

Vision Zero is an evidence-based road safety approach that prioritizes the elimination of fatalities and serious injuries on the transportation network. The core principle of Vision Zero is that traffic deaths and serious injuries are preventable and that the transportation system should be designed and managed in a way that accounts for human error while reducing the likelihood of severe outcomes. For the Township of Woolwich, Vision Zero provides a framework to integrate safety into all aspects of transportation planning, design, operations, and enforcement.



Source: visionzeronetwork.org

The Township will adopt a Vision Zero philosophy that places the safety of vulnerable road users, such as pedestrians, cyclists, seniors, children, and horse-and-buggy users, at the centre of decision-making. This aligns with broader Regional and Provincial safety objectives while ensuring the unique needs of Woolwich's rural, urban, and settlement contexts are addressed.

Key directions for advancing Vision Zero in Woolwich include:

- **Safe Speeds:** Implement context-sensitive speed management strategies that balance safety with mobility. Lower speed limits in settlement areas, school zones, and high pedestrian activity areas will reduce the risk and severity of collisions.
- **Safe Roads and Streets:** Apply Complete Streets principles to ensure that roadway designs prioritize safety, accessibility, and comfort for all users. New road projects and

reconstruction will include design treatments that naturally calm traffic, provide safe crossings, and create dedicated space for walking and cycling.

- **Safe Intersections and Crossings:** Enhance pedestrian and cyclist crossing opportunities at high-demand and high-risk locations through crosswalks, curb extensions, median refuges, and other safety treatments, guided by OTM Book 15 and Book 18 standards.
- **Safe Users:** Develop education and outreach programs that promote safe behaviours among all road users, including targeted campaigns for speeding, distracted driving, impaired driving, and safe passing distances for cyclists and horse-drawn buggies.
- **Data-Driven Decision-Making:** Strengthen traffic safety monitoring by collecting and analyzing collision data, traffic volumes, and speed studies to identify high-risk locations. Regular monitoring will support evidence-based interventions and measure progress toward safety goals.
- **Partnerships and Collaboration:** Work with the Region of Waterloo, Waterloo Regional Police Service, Grand River Transit, and other partners to align enforcement, education, and investment strategies with Vision Zero principles.

The long-term goal of the Vision Zero strategy is to eliminate fatal and serious injury collisions in Woolwich by creating a safer, more forgiving transportation system. Progress should be measured through key performance indicators such as reductions in collision severity, improved levels of service for vulnerable users, and increased community awareness of safety initiatives.

By embedding Vision Zero into policies, planning processes, and infrastructure investments, the Township can ensure that safety becomes a shared responsibility and the highest priority across all transportation initiatives

9.2 Complete Streets Policy

Complete Streets is a street design approach that prioritizes safety, comfort, and accessibility for all road users, including pedestrians, cyclists, transit riders, and motorists—regardless of age or ability. Complete Streets not only support safe mobility but also create attractive, people-oriented places that contribute to a vibrant and animated public realm.

From a planning and design perspective, Complete Streets address the combination of roadway elements that make up a typical cross-section, including sidewalks, cycling facilities, parking lanes, travel lanes, boulevards, and transit stops. **Figure 20** illustrates these typical cross-section elements which take into account the lane width recommendations discussed in **Section 8.1.2**. Importantly, Complete Streets are tailored to respect the function of each roadway corridor within the broader network of pedestrian, cycling, transit, and vehicular facilities.

Streets designed for all users play a critical role in creating livable and equitable communities, ensuring residents can fully participate in society while supporting active and healthy lifestyles. In addition to their social and safety benefits, Complete Streets provide economic and environmental advantages and have been shown to help revitalize corridors. Within the Township, this approach will complement initiatives such as downtown revitalization and expansion of the active transportation network.

Recognizing their importance in building a balanced and sustainable transportation system, the CTMP recommends adopting a Complete Streets policy for the Township. This would affirm the Township's commitment to providing roads that are safe, efficient, and equitable for all users. While Complete Streets should be applied to all road construction and reconstruction projects, the approach must remain flexible to account for financial, contextual, and right-of-way constraints.

Application of Complete Streets principles will vary by context. In settlement areas, Complete Streets may include the full range of elements, such as sidewalks, cycling facilities, street trees, and parking, to create safe, accessible, and people-oriented streetscapes. In contrast, rural areas and agricultural corridors will not include all Complete Street components but can still apply the underlying principles of safety and multimodal accommodation through context-appropriate features such as wider paved shoulders, signage, and traffic calming where needed.

Furthermore, the larger settlement areas of Breslau, Elmira, and St. Jacobs will have a more urbanized application of Complete Streets principles, with greater emphasis on sidewalks, cycling infrastructure, and transit connections, reflecting higher activity levels and denser built form. Smaller rural settlement areas, such as Maryhill and Conestogo, will apply a more limited and context-sensitive approach that balances multimodal needs with available right-of-way and the surrounding rural character

A phased, incremental strategy, where Complete Streets elements are introduced as opportunities arise, provides a cost-effective way to transition toward a multi-modal road network. In addition, some priority corridors (e.g., those within settlement areas or forming part of the cycling network) should be identified for early implementation.

Finally, it is important to note that adopting Complete Streets principles does not mean prioritizing one mode at the expense of another. While trade-offs may be required in constrained rights-of-way, the goal is to balance mobility needs in a way that supports the local economy, maintains emergency access, and enhances the quality of life for all Township residents.

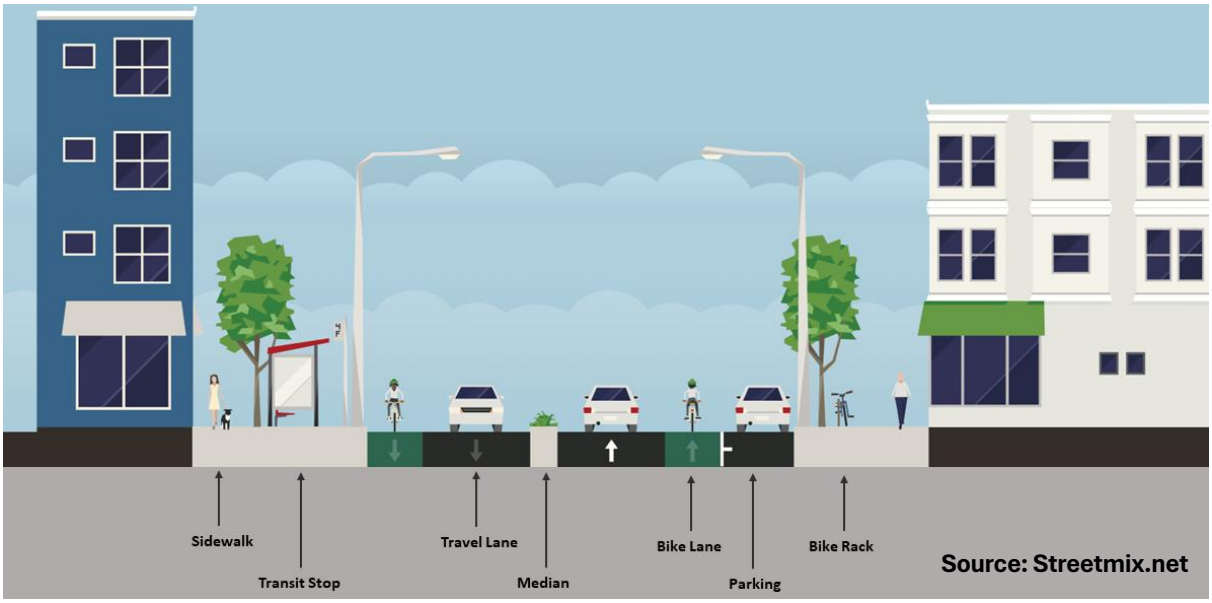


Figure 20: Cross-Section Elements of a Complete Street

The Township of Woolwich currently applies typical cross-sections for its roadways based on standard right-of-way (ROW) widths. In support of the recommended Complete Streets approach and associated design parameters, a series of updated cross-sections have been developed for consideration in establishing a Township road classification and design policy (**Figure 21** through **Figure 24**). These sections reflect the Township's multimodal priorities while recognizing its unique rural and agricultural context.

It is important to note that the cross-sections are intended as typical design references and may not be feasible in all situations due to existing ROW constraints, topography, or other site-specific factors. Nonetheless, the overall design principles should be applied wherever possible to guide roadway reconstruction and new development.

The proposed cross-sections have been developed for the recommended road classifications and the general ROW widths currently in use within the Township. Some considerations for context sensitive variations include:

- **Rural roads with significant Mennonite travel** – For roads where horse-drawn buggies are common, consideration should be given to providing a wider paved shoulder of more than 2.0 m. This can serve as shared space for both cyclists and horse-drawn buggies, giving cars room to pass safely.

- **Neighbourhood streets** – On local residential streets with slower posted speeds, buggies can operate safely in mixed traffic alongside motor vehicles, provided drivers are educated on safe passing behavior and adequate passing opportunities exist. Signage, pavement markings, and traffic calming can reinforce awareness and encourage cautious driver behavior.

This flexible approach allows Woolwich to build a network of roadways that are safe, multimodal, and reflective of local context, while also accommodating the Township's unique travel patterns and rural character.



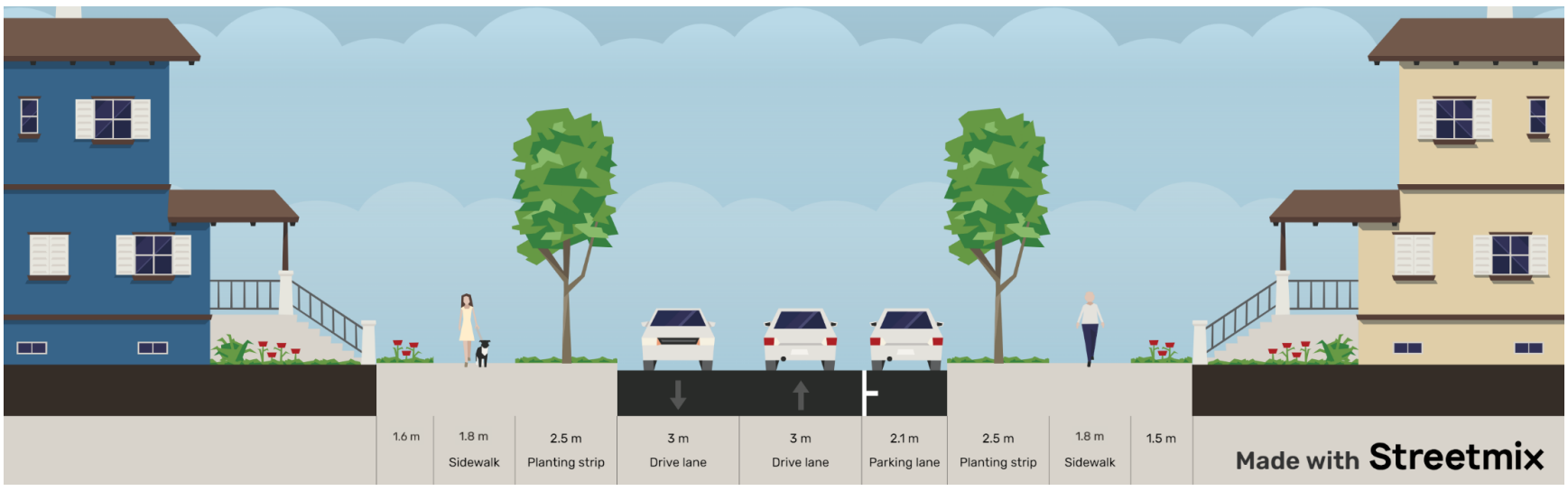


Figure 21: Local Road (20 m Right-of-Way) - On Street Parking (One-Side)

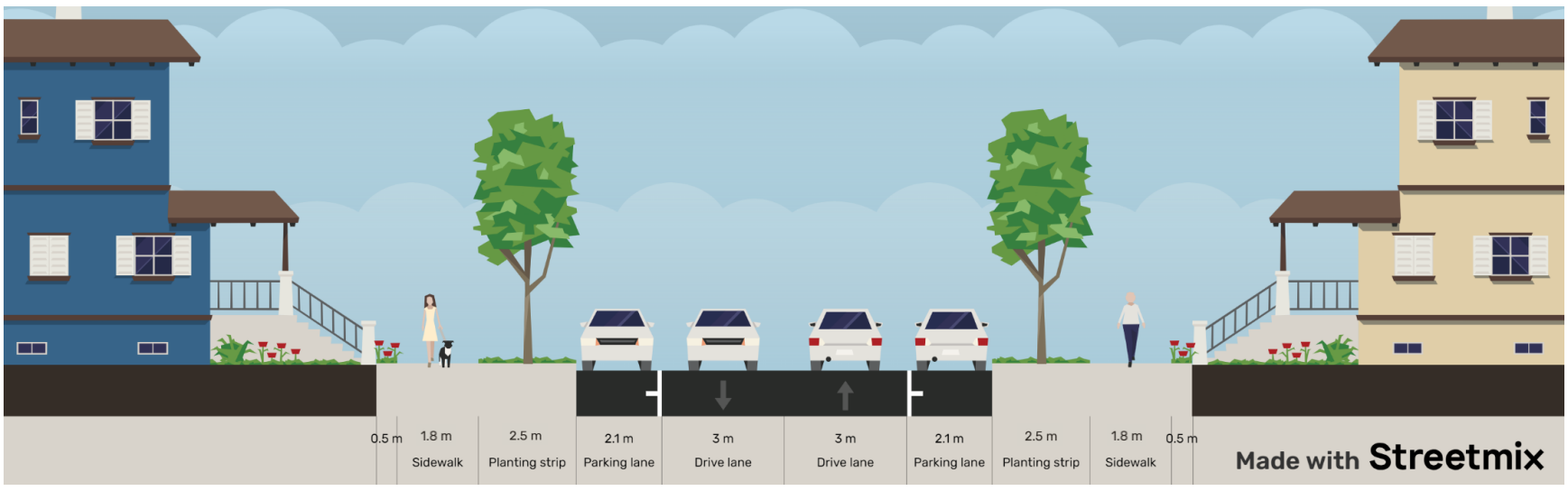


Figure 22: Local Road (20 m Right-of-Way) On-Street Parking (Both-Sides)

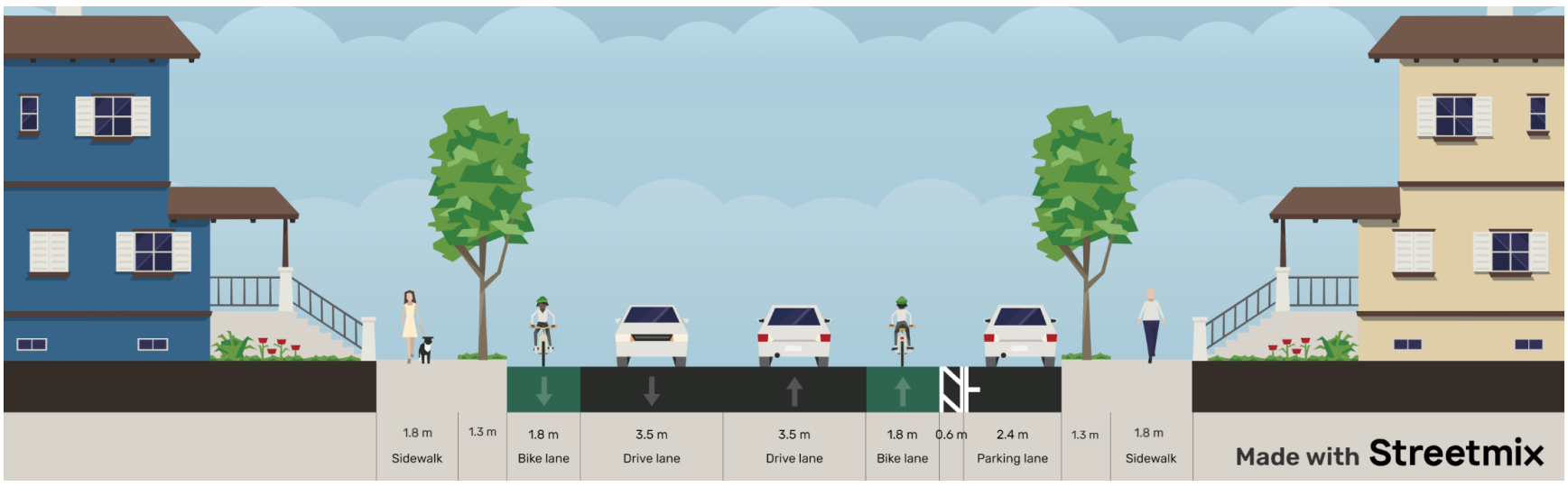


Figure 23: Collector Road (20 m Right-of-Way) On-Street Parking (One-Side) with Bike Lanes

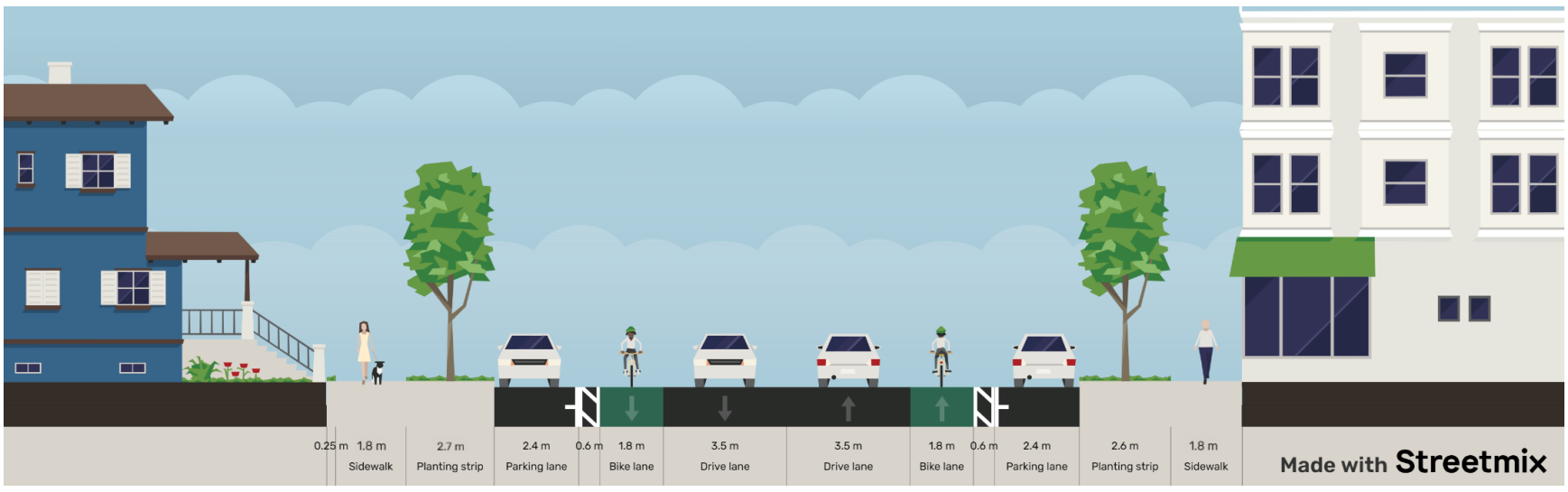


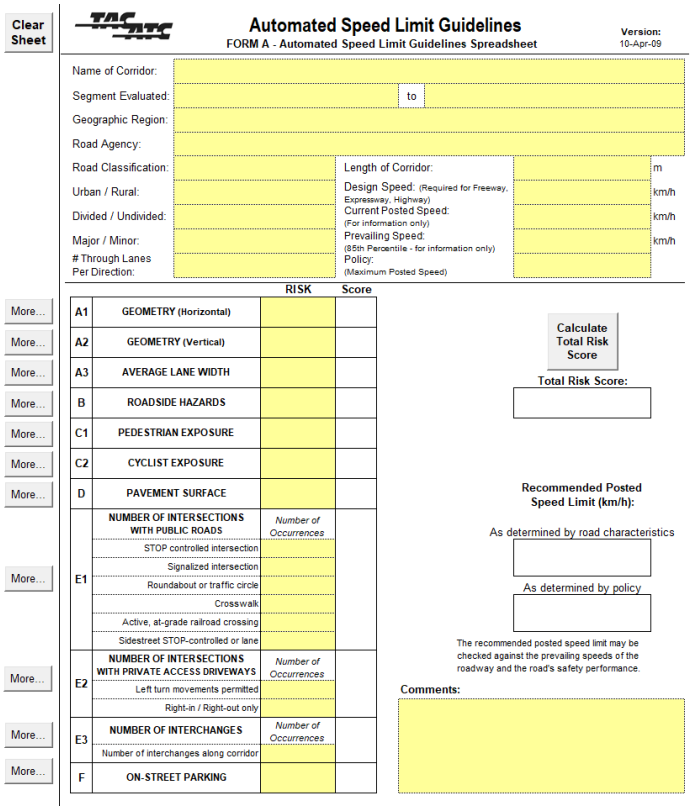
Figure 24: Collector Road (26 m Right-of-Way) On-Street Parking (Both-Sides) with Bike Lane

9.3 Speed Management

Speed management is a cornerstone of road safety, directly influencing the likelihood and severity of collisions. Establishing clear policies on speed limits, automated enforcement, special speed zones, and community safety zones will help Woolwich create safer, more consistent, and more predictable travel environments for all road users.

9.3.1 Speed Limit Policy

Road safety may be enhanced through credible posted speed limits (that match the expectation of drivers for a given roadway and its surrounding area). Speed limits set lower than the design speed make a significant number of reasonable drivers "illegal" for each 10 km/h increment of speed decreased, place unnecessary burden on law enforcement personnel, lead to lack of credibility of speed limits, and lead to increased tolerance by law enforcement. Therefore, speed limits should be carefully set to reflect the classification, function, and physical characteristics of the road. The selection of posted speed limits must also take into consideration legislative regulation, public recognition and understanding, ease of implementation, and adherence to recognized engineering standards and practices.



The Highway Traffic Act (HTA) establishes the regulatory framework for setting speed limits in Ontario. HTA Subsection 128.(1) states that no person shall drive a motor vehicle at a rate of speed greater than the following:

- 50 km/h on a roadway within a local municipality or a built-up area.
- 80 km/h on roads not within a built-up area and within local municipality that had the status of a Township on December 31, 2002.

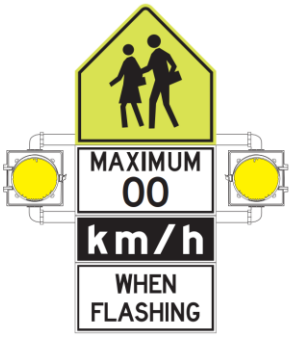
These legislative provisions are more commonly known as statutory speed limits and apply to all roads without a Maximum Speed sign posted. HTA Subsection 128. (2), however, permits municipal councils to prescribe rates of speed that differ from these statutory limits on roads under their jurisdiction so long as they are posted less than 100 km/h.

The Township currently does not have a speed limit policy. The TAC Canadian Guidelines for Establishing Posted Speed Limits (2009) were developed to provide guidance and to enhance constancy in the evaluation of posted speed limits. As part of the guidelines, an automated

spreadsheet was developed to facilitate application of the procedures involved in determining the recommended posted speed limit. As part of the CTMP process, the spreadsheet was circulated to the Township for future reference.

It should be noted that, while generally considered a suboptimal practice, there are circumstances where a lower posted speed limit than the design speed of a road may be desired. In these circumstances, a road may have been designed to accommodate higher speeds; however, development and land use changes over time warrant consideration for a speed lower than the road was initially designed for. This is often observed in rural roads in areas that have seen some degree of urbanization and development. In these circumstances, consideration must be given to reducing the roadway design speed to that of the posted speed limit. This can be achieved through traffic calming, which is discussed in **Section 9.4.**

9.3.2 Special Speed Zone



Traffic conditions near school zones and playgrounds represent particular concern to communities. The safety of vulnerable road users as they arrive and depart from these community nodes is a sensitive issue that demands particular attention. One way to enhance safety near schools is to alert drivers that they are entering a section of roadway with a school or playground. This is accomplished through signing and pavement marking to define the area. Under the HTA, the Township has authority to designate (through the installation of regulatory signs) school zones and playground zones for heightened safety and enforcement with an emphasis on roads abutting schools and community facilities.

9.3.3 Community Safety Zone



Community Safety Zone signs (Rc-9) and optional Begins tab signs (Rb-85t) inform drivers entering an area the community has deemed paramount to the safety of its citizens. These sections of roadway are typically near schools, playgrounds, community centres, senior citizen residences, hospitals, etc. Traffic-related offences within these zones carry increased fines, and in many cases are doubled. Implementation of Community Safety Signage and monetary penalty are established through municipal by-law. The signage does not change the rules of the road but increases the mentalities associated with any traffic act violation. The signage is installed to define the legal limits of the zone as prescribed in the zoning by-law and installed at the beginning and end of the zone. Depending on the length of the zone, signage may be installed within the zone as well.

9.3.4 Reduced Speed Zone Areas



World Health Organization (WHO) statistics show a significant improvement in survival rates when speed limits are decreased. For example, there is a reported 1.5 in 10 survival rate for pedestrians being struck at 50 km/h, compared to 9 in 10 at 30 km/h. These global findings are supported by Canadian research and municipal experience.

Major cities such as Edmonton and Toronto have lowered residential speed limits to 40 km/h or 30 km/h as part of Vision Zero strategies, resulting in measurable reductions in collisions and improved safety for pedestrians and cyclists. Similar initiatives have also been successfully adopted in townships and rural municipalities, providing valuable precedents for Woolwich. For example, the Township of South Stormont adopted a Speed Management Policy in 2025 establishing 40 km/h residential zones and a structured process for speed limit changes under Township jurisdiction, demonstrating how a policy-led framework can ensure consistent application across rural and settlement roads. Likewise, the Township of Centre Wellington implemented a 40 km/h Neighbourhood Pilot Program in built-up residential areas, using gateway signage and monitoring to test community acceptance and evaluate safety outcomes before wider application. The Township of Zorra in Oxford County introduced speed reductions and traffic calming measures in small villages such as Embro and Kintore, achieving measurable reductions in operating speeds and collisions, highlighting the effectiveness of targeted speed management in rural settlement areas.

In May 2018, the Highway Traffic Act (HTA) was amended to allow for speed limits other than 50 km/h without the need for block-by-block signage within designated, bounded zones. When a road authority, through municipal by-law, designates an entire area to have a speed limit other than the default 50 km/h, standard Maximum Speed signs must be used with the Area tab sign, as outlined in Ontario Traffic Manual (OTM) Book 5.

It is recommended that the Township develop and adopt a formal Speed Management Policy to guide the identification, implementation, and evaluation of reduced speed areas. Such a policy-based approach ensures consistency, transparency, and alignment with broader Township objectives related to safety, livability, and equity. Implementation would be led by the Township, in coordination with enforcement agencies and community stakeholders.

As part of this policy, the Township should begin implementing Reduced Speed Zone Areas within areas designated as Established Residential and Low / Medium Density Residential in the Township's Official Plan. 40 km/h gateway signage (40 km/h Maximum Speed signs with Area tabs) should be installed at all entrances and exits to these zones. Additional 40 km/h Maximum

Speed signs should be considered within each area to ensure proper driver awareness and compliance.

In addition to the reduced speed zone areas, and in consideration of the previous sections, School Zones should be reduced to 30 km/h, identified as Community Safety Zones, and signed appropriately to enhance visibility and compliance.

Given the scope of the proposed changes to the Township's overall road network, implementation should be phased, allowing sufficient time to assess driver adherence, monitor safety outcomes, and apply complementary traffic calming measures as needed to reinforce lower speeds and improve safety for all road users.

9.4 Traffic Calming Strategy

Traffic calming is an important tool to improve road safety, reduce vehicle speeds, and discourage cut-through traffic in neighbourhoods. It is generally a retroactive process, applied to existing roads where speeding or short-cutting has become a concern, but it should also be considered proactively in the design of reconstructed streets and new residential subdivisions. By creating road environments that naturally encourage slower operating speeds, traffic calming improves safety for all road users, particularly pedestrians, cyclists, and other vulnerable groups.

Traffic calming is most effective when road design matches the intended posted speed. Signs alone are only marginally effective at influencing driver behavior; drivers typically choose speeds based on the design features of the roadway. If posted speeds are reduced on roads that were built for higher-speed operation, complementary traffic calming measures should be introduced to ensure operating speeds align with the new limit.

A variety of tools can be applied in Woolwich, ranging from low-cost, quick-build options to permanent physical changes. Examples include:

- **Speed Display Devices** – Portable or solar-powered radar signs that show drivers their current speed. These provide instant feedback and can help address community concerns by making both drivers and residents more aware of actual travel speeds.
- **Speed Posted Bollards** – Vertical posts with speed limit signage installed at the edge of traffic lanes, visually narrowing the roadway and encouraging lower speeds.
- **Speed Humps** – Raised areas built across the road to reduce vehicle speeds. Seasonal (removable rubber) speed humps can be deployed where permanent construction is not appropriate.
- **Raised Crosswalks** – Pedestrian crossings elevated above road level, improving visibility and slowing vehicle speeds at mid-block crossing points.

- **Curb Extensions (Bump-outs)** – Narrowing the roadway at intersections or mid-block to shorten pedestrian crossing distances, calm traffic, and prevent unsafe parking near corners.

Where speeding concerns are raised, data collection should be used to confirm issues and guide the selection of appropriate measures. Portable radar traffic counters can support this process by capturing vehicle speeds and traffic volumes without the need for in-road sensors, allowing the Township to quickly respond to community requests and prioritize interventions.

The Township's CTMP establishes traffic calming as a key safety and speed management strategy, integrated with broader initiatives such as Vision Zero, speed limit policies, community safety zones, and complete streets design. Traffic calming will be considered both reactively, where problem areas are identified through data and public input, and proactively, by embedding speed-moderating designs into all new subdivision road networks and reconstruction projects.

9.5 Parking Management

Parking plays an important role in supporting mobility, economic activity, and overall quality of life in Woolwich. While current parking supply is generally abundant, reflecting the Township's high reliance on private vehicles, continued growth will require a more strategic approach to managing this resource. An effective parking management strategy will help maintain a balance between supply and demand while supporting broader Township objectives related to sustainability, community vibrancy, and economic vitality. This approach will also encourage efficient land use, promote active and transit modes, and ensure parking supports, rather than drives, travel behavior.

Well-managed parking can reduce unnecessary congestion, improve land use efficiency, and support placemaking by making downtowns more walkable and welcoming.

Guiding Principles

The following principles will guide the Township's approach to parking management:

- Balance Supply and Demand – Provide enough parking to meet needs without oversupplying, which can encourage excess driving and inefficient land use.
- Support Economic Vitality – Ensure convenient short-term parking is available in downtowns to support local businesses and visitors.
- Promote Sustainable Transportation – Manage parking in a way that encourages walking, cycling, and transit use for short trips and commuting.
- Enhance the Public Realm – Design parking facilities and on-street spaces to improve walkability, aesthetics, and the character of village and downtown areas.

- Plan for Growth and Change – Regularly review and update parking standards to reflect evolving land use patterns, development densities, and mobility trends.

Key Strategies

Optimize On-Street Parking Management

- Maintain free, time-limited parking in Breslau, Elmira and St. Jacobs downtowns, while reviewing time limits periodically to ensure appropriate turnover. It should be noted that this only applies to Township roads and any changes to parking on Regional Roads are subject to Regional review and approval.
- Explore options for digital parking management (e.g., license plate recognition, mobile apps) to improve enforcement and data collection in the long term.
- Evaluate opportunities to designate priority curb space for loading, accessible parking, and active transportation amenities (e.g., bike parking, parklets) where appropriate.

Consolidate and Improve Public Parking Lots

- Review existing municipally owned lots in Elmira and St. Jacobs to ensure they are well-located, accessible, and designed to complement the surrounding public realm.
- Incorporate landscaping, pedestrian connections, and wayfinding into parking lot design to improve aesthetics and walkability.
- Explore opportunities for shared parking between public facilities, private developments, and community destinations to maximize efficiency.

Update Zoning By-law Parking Requirements

- Review and modernize off-street parking standards to reflect current and future needs, recognizing opportunities for reduced minimums in mixed-use and walkable areas.
- Encourage shared parking and land use synergies (e.g., between daytime office uses and evening entertainment uses).
- Consider parking maximums in certain areas to discourage over-provision and support more compact development.

Leverage Parking as a Transportation Demand Management (TDM) Tool

- Align parking policies with broader Township objectives to reduce single-occupant vehicle use and promote sustainable modes.
- Encourage developments near major transit corridors and nodes to provide fewer parking spaces and invest instead in bike parking, pedestrian amenities, and mobility hubs.

- Explore the use of flexible parking standards to support evolving mobility trends (e.g., ride-hailing, carshare, e-bikes).
- Collaborate with GRT on coordinated marketing, outreach, and education initiatives to promote transit use, highlight available services, and encourage shifts toward more sustainable travel options.

Enhance Winter and Event Parking Management

- Maintain existing winter overnight parking bans to ensure safe and effective snow clearing, with clear communication to residents.
- Develop event-specific parking management plans in St. Jacobs and Elmira to handle seasonal tourist activity and community events, reducing congestion and supporting visitor experience.

Implementation Considerations

- Establish a monitoring program to track parking utilization in downtowns and key destinations, ensuring that supply and demand remain balanced.
- Integrate parking planning into the Township's capital program, ensuring that upgrades to parking facilities are coordinated with streetscaping, active transportation, and accessibility improvements.
- Collaborate with the business community and local institutions (e.g., churches, schools, community centres) to encourage shared use of parking resources.
- Communicate parking policies clearly to residents, businesses, and visitors through signage, the Township website, and digital platforms.

9.6 Pedestrian Crossing Guidelines

Pedestrian crossings are an important part of improving safety and connectivity for vulnerable road users across Woolwich's settlement areas. The Ontario Traffic Manual (OTM) Book 15 provides the framework for pedestrian crossovers (PXOs) in Ontario and recognizes that municipalities may adopt approaches that reflect local conditions. In Woolwich, the Township should follow the OTM Book 15 guidance when identifying candidate locations and selecting appropriate crossing types, supported by professional engineering judgment to ensure solutions reflect community needs and local context.

Awareness and education are also critical to the success of pedestrian crossings. The Township should implement communication efforts to build public awareness of the proper use and function of PXOs for both drivers and pedestrians. Outreach could include Township web content, social media updates, and information in school newsletters.

By applying OTM Book 15 consistently and supporting it with public education, the Township can improve safety, provide clear and consistent decision-making, and strengthen pedestrian connectivity across settlement areas.

9.7 Public Outreach and Education Campaign

Public outreach and education play a vital role in shaping travel behaviour and building community support for the Township's transportation vision. Infrastructure improvements alone cannot achieve the desired outcomes without residents and visitors understanding how to use them safely and effectively. Education campaigns provide opportunities to share information, raise awareness, and encourage cultural shifts toward safer, more sustainable, and more inclusive mobility choices.

The Township should establish a comprehensive and ongoing public education program focused on key transportation themes, such as:

- **Road safety awareness** – educating drivers about speed management, sharing the road with vulnerable users, and understanding new roadway treatments.
- **Active transportation promotion** – highlighting the health, environmental, and economic benefits of walking and cycling, while encouraging use of new pedestrian and cycling facilities.
- **Pedestrian crossings** – building awareness of the proper use of crosswalks and pedestrian crossovers, as outlined in OTM Book 15.
- **Seasonal and rural mobility** – providing reminders related to winter driving, horse-and-buggy interactions, and farm vehicle safety.



Campaigns should use a variety of outreach channels to ensure broad engagement, including the Township's website, social media platforms, school partnerships, workplace initiatives, and community events. In addition, materials should be developed in clear, accessible language and tailored for key audiences such as youth, seniors, drivers, cyclists, and pedestrians.

By coupling infrastructure investments with proactive outreach and education, the Township can foster a culture of safety and shared responsibility, reduce conflicts between modes, and support long-term goals for sustainable growth and vibrant, connected communities.

10 Implementation Plan

10.1 Capital Investment

The 2025 CTMP contains a wide range of recommendations, including physical infrastructure projects, transit service improvements, and supporting studies intended to enhance Woolwich's transportation network and make the Township more resilient to growth and changing travel patterns.

Not all recommendations are required immediately or concurrently, nor does the Township have the capital budget to deliver all projects at once. Based on population and employment forecasts, anticipated operational improvements, and a feasible implementation timeline, the following planning horizons have been established for the proposed improvements:

- Short-Term (within 5 years);
- Medium-Term (6 to 10 years); and
- Long-Term (11 to 20 plus years).

To maximize efficiency of capital investment, projects that involve multiple improvement types at the same location (e.g., road rehabilitation combined with active transportation facilities) should be delivered concurrently. Coordinating projects in this way avoids duplication of effort, reduces overall costs, and minimizes community disruption compared to delivering incremental improvements over time.

This Implementation Plan provides the framework for advancing the identified projects, including high-level descriptions and conceptual cost estimates. It is important to note that each project must undergo further definition, budget allocation, and approvals before advancing to implementation.

The capital investment estimates presented in this CTMP are intended as order-of-magnitude planning-level costs, expressed in 2025 dollars. These estimates were developed using benchmark unit cost assumptions (see **Table 23**) and exclude property acquisition or structural works, which can vary significantly and require project-specific evaluation.

The total estimated cost for the Township to implement the 20-year build-out of recommended infrastructure projects is approximately **$1,100,000 (or $55,000 per year)**. This estimate primarily reflects policies, studies, and Township-led initiatives and does not account for the cost of major road and infrastructure projects that are under the jurisdiction of the Region of Waterloo. Similarly, the cost of implementing active transportation infrastructure is addressed in detail in the Township's Active Transportation Master Plan and is therefore not included in this estimate. Development-driven projects identified in this plan will also be funded through subdivision agreements, rather than the Township's capital program. Costs and timing for the Township-led components will continue to be refined through the annual capital budgeting process.

Table 23: Benchmark Costs

Construction Type	2025 Costs ($ per km)
Urbanization	$2,500,000 per lane
Reconstruction	$2,000,000
Reconstruction (within existing pavement structure)	$75,000
Widening (2-4 Lanes)	$1,000,000
New Roadway (2-4 Lanes)	$2,400,000
Multi-use Path (3.0 m wide)	$270,000
Sharrows (20 / km)	$4,000
Painted Bike Lanes	$28,000 including buffer
Sidewalks (1.5 – 2.0 m)	$200,000
Traffic Signals	$900,000
PXO	$175,000

10.2 Phasing and Prioritization of Projects

The successful implementation of the CTMP requires a phased approach to project delivery, guided by feasibility, coordination with partner agencies, and available resources. To provide clarity on both the relative complexity and timing of implementation, a Phased Implementation Framework has been developed (see **Table 24**). While the framework is presented in terms of short-, medium-, and long-term time horizons, these categories also reflect the relative ease of implementation, with short-term actions generally representing “quick wins” or lower-complexity initiatives, and longer-term projects involving higher levels of coordination, funding, and design complexity. This table provides a high-level overview of when projects are expected to occur, their relative difficulty, and which agency will lead their delivery. The detailed write-up for each project category follows the table.

Table 24: Phased Implementation Framework

Timeframe	Road Network Projects	Active Transportation Projects	Transit Initiatives	Subdivision / Development-Driven Projects	Policies & Studies	Emerging Mobility
Short-Term (0–5 years)	Collaborate with Region on priority road rehabilitation; initiate feasibility studies for regional improvements.	Deliver early ATMP priorities: sidewalk infill, trail connections, crosswalks.	Work with GRT to assess proposed routes; explore rural/on-demand pilots.	Plan and secure AT infrastructure through subdivision approvals (e.g., Ottawa St. extension).	Launch key studies (e.g., traffic calming, road safety, transit feasibility).	Begin monitoring trends in e-bikes, e-scooters, and ride-hailing; establish policies to manage safe use.
Medium-Term (6–10 years)	Advance jointly prioritized road upgrades with Region; integrate AT where feasible.	Expand ATMP projects: bike lanes, multi-use trails, neighbourhood connectors.	Coordinate with GRT to launch new routes; refine rural transit services.	Begin construction of Breslau Connector Road with AT facilities.	Continue policy development; monitor KPIs; refine CTMP recommendations.	Pilot shared mobility services (e.g., carshare, micro-mobility) in growth areas; review charging infrastructure needs.
Long-Term (11–20+ years)	Deliver major road expansion projects with Region; monitor corridor performance.	Complete long-term ATMP build-out; focus on network connectivity and retrofits.	Introduce long-term GRT service improvements: higher frequency, stronger regional links.	Ongoing subdivision-led infrastructure delivery with complete streets integration.	Undertake CTMP update (next planning cycle).	Integrate emerging mobility with regional networks; support electrification of transit and freight.

10.2.1 Road Network Projects

Most major road projects identified in this plan are located on the Region of Waterloo's network. The Township will need to collaborate with the Region to advance these projects and ensure feasibility through additional studies and integration with regional priorities.

The planned Highway 7 extension is a key component of the long-term transportation network, providing additional capacity to accommodate forecasted growth and development. However, if Highway 7 is delayed or does not proceed, the Township's existing road network will need to accommodate higher traffic volumes, particularly along local and collector roads. In this scenario, key corridors and intersections may experience increased congestion and reduced levels of service under forecasted development conditions. To address this, the Township should consider a combination of strategic roadway upgrades, such as widening, turn lanes, and traffic signals, along with Transportation Demand Management strategies, transit improvements or shuttle services, and strengthening the internal collector and distributor road network to manage traffic flows.

In addition, development policy measures such as conditional approvals, caps, or phased growth may be warranted to ensure that new development aligns with the capacity of the existing road network. Furthermore, aligning land use and transportation policies to prioritize developments with minimal traffic impact that incorporate TDM strategies, transit-supportive features, and active transportation connectivity can help manage growth effectively. This scenario-based approach ensures that Woolwich is prepared for uncertainties regarding Highway 7 while maintaining safe, reliable, and efficient mobility for residents, businesses, and visitors.

It should be noted that, in the event the Region does not proceed with a by-pass for Elmira, the Township should continue to advocate for improved regional connectivity and transportation efficiency. This includes exploring opportunities to establish an eastern by-pass through future planned subdivisions, providing a viable alternative route to divert traffic away from the downtown core. Such a corridor would complement Floradale's function as a western by-pass, ensuring balanced traffic distribution around Elmira and supporting the broader regional transportation network. Continued collaboration with the Region will be essential to ensure that future development aligns with long-term mobility objectives and maintains accessibility and livability within the community.

10.2.2 Active Transportation Infrastructure

The phasing and prioritization of active transportation projects should be guided by the Township's Active Transportation Master Plan[4]. The ATMP provides the framework for

[4] https://www.woolwich.ca/media/qa1cfh1d/active_transportation_master_plan.pdf

sequencing investments in sidewalks, cycling facilities, and multi-use trails, ensuring they are implemented in a connected and logical manner.

10.2.3 Transit Initiatives

The Township will need to work with Grand River Transit (GRT) to assess the feasibility of proposed new and expanded routes. In rural areas, opportunities for on-demand or community-based transit should also be explored in partnership with GRT and Kiwanis Transit.

10.2.4 Emerging Mobility

New forms of mobility, such as e-bikes, e-scooters, ride-hailing services, and shared mobility, are becoming more prevalent across the Region and may have implications for Woolwich in the years ahead. In the short term, the Township should monitor emerging mobility trends and establish policies to ensure safe and equitable integration (e.g., by regulating speeds and ensuring compatibility with AT infrastructure). In the medium term, pilot programs such as shared mobility or micro-mobility services could be tested in growth areas like Breslau. In the long term, emerging mobility should be fully integrated with regional networks, including electrification of transit and freight, charging infrastructure, and supportive policies to reduce reliance on single-occupant vehicles.

10.2.5 Planned Subdivision Roads

The Ottawa Street extension and the proposed Breslau Connector Road are tied to approved and future plans of subdivision. As per CTMP policy, active transportation infrastructure will be required as part of these developments to ensure they are delivered as complete streets from the outset.

10.2.6 Studies and Policies

Costing for recommended policies and supporting studies is provided in **Table 25** below. These initiatives will guide implementation, support evidence-based decision-making, and ensure the Township continues to adapt to growth and evolving transportation needs.

Table 25: Recommended Phasing and Indicative Costs of Proposed Policies, Studies, and Implementation

Policy	Consultation Required (YES / NO)	Indicative Cost	Comments
Short-Term (0 – 5 Years)			
Road Classification & Design Standards	Yes	$ 10,000	Assumed to be done in house
Posted Speed Limit Review	No	$ 10,000	Costs contingent on signage requirements
Expand Traffic Data collection program	No	-	Utilization of traffic counting devices used for Traffic Calming Policy
Community Safety Zone Implementation	No	$ 10,000	Costs associated with contingency for additional signage
Prepare and Adopt Traffic Calming Policy and Begin implementing Measures	No	$ 385,000	Assumes $65,000 / year for temporary traffic calming measures + $60,000 for two portable radar traffic counting device
Prepare and Adopt Pedestrian Crossover Policy	No	$25,000	
		Short-Term Total:	**$440,000**
Medium-Term (6 – 10 Years)			
Continued Traffic Calming Implementation	No	$ 250,000	Assumes $50,000 / year for temporary and permanent traffic calming measures
Implement 40 km/h neighbourhood zones	No	$ 10,000	Costs associated with contingency for additional signage
		Medium-Term Total:	**$260,000**
Long-Term (10 – 20+ Years)			
Continued Traffic Calming Implementation	No	$ 400,000	Assumes $40,000 / year for temporary and permanent traffic calming measures
		Long-Term Total:	**$400,000**

10.3 Funding and Partnership Opportunities

The implementation of the CTMP will require significant investment from the Township, with additional funding support from contributing partners, including the Federal, Provincial, and Regional governments, as well as other key stakeholders. It is recommended that future investment options be monitored by the Township to leverage opportunities and increase funding to implement the various facets of the TMP. The Township will have 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 section outlines the potential funding sources that can be explored to support the implementation of the CTMP. Municipal staff should continue to explore external funding sources to help fund implementation of the proposed transportation network improvements.

10.3.1 Federal Funding

Federal Gas Tax Fund: Provides municipalities with long-term funding for the construction and rehabilitation of public infrastructure, including roads, bridges, public transit, and recreational facilities.

Community Improvement Fund: This fund consists of the Gas Tax Fund and the incremental Goods and Services Tax Rebate for Municipalities. It provides over $32 billion to municipalities across Canada for projects such as roads, public transit, recreational facilities, and other community infrastructure.

Investing in Canada Plan: Starting in 2016, the federal government has committed more than $180 billion over the next 12 years in five main infrastructure priorities, including public transit, green infrastructure, social infrastructure, rural and northern communities, and transportation infrastructure. The program is being delivered by Infrastructure Canada in partnership with other federal departments and agencies, including Natural Resources Canada, the Canada Mortgage and Housing Corporation, Employment and Social Development Canada, and Transport Canada.

Active Transportation Fund, Infrastructure Canada: The first ever Active Transportation Fund is a national, merit-based contribution program intended to support projects that improve active transportation infrastructure across Canada. Announced in March 2021, the Fund will make available $400 million over five years to help build new and expanded networks of pathways, bike lanes, trails, and pedestrian bridges, as well as support of Active Transportation planning and stakeholder engagement activities.

The program offers two funding streams, the first of which is the planning projects stream which involves the development or enhancement of formal active transportation strategic planning documents or stakeholder engagement funded through grants up to 100% of the eligible costs (to a maximum of $50,000). The second stream is the capital projects stream, which involves new construction, enhancement of existing infrastructure, and/or improvements to design and safety features that encourage active transportation, funded

through contributions up to $50 million, with maximum contribution rate between 40-100%, depending on the recipient and project location.

10.3.2 Provincial Funding

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. The Ontario government invested almost $380 million in 2023-24 to help municipalities improve local transit.

Infrastructure Ontario (IO): IO offers a loan program that 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.

Federation of Canadian Municipalities Green Municipal Fund (GMF): The GMF provides funding for municipal environmental initiatives that improve air, water, and soil, and reduce greenhouse gas emissions. Funding is available to all Canadian municipal governments and their partners for eligible projects.

10.3.3 Regional/Local Funding

Region of Waterloo: Proposed infrastructure improvements located on roads and lands under the jurisdiction of the Region of Waterloo should be funded through the Region's capital budget and other available funding sources. Capital projects are identified on an annual basis, and they include the construction and rehabilitation of roadway and active transportation projects. Active transportation improvements can be completed at the same time as roadway projects to achieve improved cost efficiencies.

In addition to road and bridge projects, the Region of Waterloo also provides funding for existing and expanded GRT operations. Transit projects and planned service expansions are identified within the GRT Business Plan[5], which guides system improvements, new service delivery models, and infrastructure investments. Coordination with the Region will therefore be essential to ensure that local transportation planning in Woolwich aligns with regional transit priorities and future GRT service enhancements.

Local: Other sources of funding may include local business donations, local charity events, and development charges.

10.4 Monitoring and Performance Measurements

A robust monitoring program is essential to track the implementation of the CTMP's recommendations and evaluate their effectiveness in shaping travel patterns for people and

[5] https://www.grt.ca/en/about-grt/grt-business-plan.aspx#township

goods within and through the Township. Monitoring progress against key performance indicators (KPIs) will allow the Township to assess whether it is moving toward the vision and objectives established in this plan and to make data-driven adjustments over time.

The following KPIs are recommended to be tracked annually, where possible. One exception is residents' travel behaviour, which may be measured through Canadian Census data or third-party mobility data platforms (e.g., StreetLight) that provide multi-modal travel insights. Much of the information needed to track these KPIs is already available through existing sources, such as transit service operators and the Ontario Provincial Police (OPP). However, in some instances, additional data collection may be required, such as traffic counts at key locations.

The CTMP recognizes that immediate monitoring of all indicators may not be feasible. The objective is to establish a baseline for each KPI and track changes over time to measure progress toward the Township's transportation goals.

- Traffic Volumes & Congestion: Average daily traffic counts, peak hour congestion, and Level of Service (LOS) at key intersections and corridors
- Implementation of Plans: Percent of Active Transportation (AT) network strengthening plans completed.
- Active Transportation Safety: Cycling and pedestrian safety at strategic locations to assess usage and capacity of the multi-use path (MUP) network.
- Collision Incidents: Detailed reporting of vehicle, pedestrian, and cyclist collisions, including type of impact, severity, and contributing factors such as road conditions.

10.5 Summary of Recommendations

The implementation of the Township's CTMP depends on ongoing collaboration with the Region, which owns and manages several major transportation corridors, provides public transit services through GRT, and delivers regional active transportation and road safety programs. The Township and Region share common goals related to safety, sustainability, and connectivity. The CTMP reinforces these shared objectives and identifies specific areas where continued partnership will support successful plan implementation.

The key areas of coordination with the Region are summarized below. The intent is to ensure Township initiatives align with existing Regional priorities, programs, and investment plans. The Township will continue to engage Regional staff through capital planning processes, technical reviews, and inter-agency working groups to maintain consistency across the broader transportation network.

- **Vision Zero and Safety Alignment:** Continue collaboration with the Region to support shared road safety goals through data sharing, joint monitoring of collision trends on Regional corridors within the Township, coordination on speed management and

school-zone safety initiatives, and delivery of education programs targeting vulnerable road users.

- **Complete Streets Design Consistency:** Work with Regional staff to apply Complete Streets principles on Region-owned corridors within Woolwich's settlement areas, ensuring consistent design and cross-section standards. Advocate for the integration of pedestrian, cycling, and transit facilities into Regional corridor upgrades, and engage in early consultation during project design to identify opportunities for cost-sharing or design synergy in settlement areas.
- **Transit Service and Infrastructure:** Maintain coordination with the Region and GRT on planned on-demand and conventional service expansions outlined in the 2025 GRT Business Plan, including integration of transit facilities and stops within Township road projects. Collaborate on joint marketing and outreach initiatives to promote transit use and improve public awareness of available services.
- **Active Transportation Network Integration:** Collaborate with the Region on active transportation corridors and trail connections that cross jurisdictions, including consistent signage, wayfinding, maintenance coordination, and seasonal operations to ensure network continuity.
- **Capital Project Coordination:** Continue to align Township improvements with Regional projects such as the Ottawa Street Extension and Fountain Street improvements and monitor longer-term studies including the Elmira Bypass. Should Regional priorities or timelines change, the Township will adapt its implementation plan accordingly.
- **Public Outreach and Education:** Partner with the Region on consistent messaging and community education related to road safety, active transportation, and sustainable mobility options.
- **Funding and Implementation Partnerships:** Explore opportunities to partner with the Region on funding applications and cost-sharing for mutually beneficial initiatives, such as active transportation infrastructure on Regional corridors, Complete Streets retrofits, safety improvements, and electric-vehicle charging infrastructure in main street and mobility hub locations. Joint delivery and funding coordination will help achieve cost efficiencies and ensure a cohesive network that supports both Township and Regional objectives.

These recommendations reaffirm Woolwich's intent to align with Regional policies and priorities while advancing local transportation goals through a cooperative and coordinated planning approach.



WOOLWICH TOWNSHIP

Comprehensive Transportation & Mobility Plan

Appendix A

Stakeholder Engagement Documentation

egis

News Release

November 21, 2024

For Immediate Release

Notice of Public Workshop 1 for Township of Woolwich's Comprehensive Transportation and Mobility Master Plan

The Township of Woolwich is launching its first Comprehensive Transportation and Mobility Plan (CTMP) and has engaged Egis for support. This strategic policy document will promote alternative transportation modes and guide short- and long-term infrastructure improvements. Focusing on active transportation, transit-oriented development, and multimodal connectivity, the CTMP aims to enhance safety and accessibility for pedestrians, cyclists, and transit users across the Township. The plan ensures that Woolwich remains connected, safe, and sustainable, aligning with growth projections through 2051.

The plan's main objectives are to guide the Township of Woolwich in:

- Promoting transit-ready communities by supporting GO Transit and rail developments.
- Supporting low-carbon climate resilient and sustainable communities.
- Enhancing walking and cycling infrastructure to promote active transportation and ensure safer, accessible routes.
- Improving traffic flow, safety and accessibility.
- Optimizing parking policies.
- Planning for future growth by ensuring infrastructure grows to meet the increasing population and employment demands of the Township.

The Process

The Comprehensive Transportation and Mobility Plan (CTMP) will be developed in accordance with the Provincial Environmental Assessment (EA) Act, following Approach 1 as outlined in the 2023 Municipal Class Environmental Assessment (MCEA) document. The CTMP will cover Phase 1, Problem and Opportunity, and Phase 2, Alternative Solutions, of the MCEA process and facilitate streamlining and implementation of recommended capital works.

Have your say

An important part of this study is engaging with residents, stakeholders, and the Township's agency partners. We want to hear from you on the issues and opportunities that you see for the Township's transportation system to the horizon year of 2051.

The Township will be organizing Public and Stakeholder Engagement events to better understand the needs and concerns of the community. The project team will host the first of three workshops to gather public input and present findings of the CTMP study.

At any time during this study, you can provide comments, questions, and concerns to the project team on the Township of Woolwich project website: https://www.engagewr.ca/woolwich-transportation-mobility-plan

Details for the first Public Workshop are as follows:

Public Workshop 1 Meeting:

- **Date:** Thursday, December 5th, 2024
- **Time:** 5:00pm – 7:00pm
- **Location:** Virtual via Teams Platform
- **Teams Link:** **Join the meeting now**
    - Meeting ID: 221 335 292 378 | Passcode: odJD79

At the public workshop, you'll have the opportunity to learn about our approach and preliminary findings, ask us questions, and share your thoughts and feedback. Your participation is invaluable to us.

The virtual workshop will feature a presentation highlighting the project goals and preliminary findings, followed by a Q&A session designed to encourage participants to share their experiences and expectations regarding mobility in Woolwich. Attendees will have access to informative resources, including maps and data visualizations, to support and enrich the discussion. Feedback will be gathered in real-time, ensuring the community's needs are effectively captured.

If you are unable to attend the workshop, the presentation recording will be available online on the Township's project website to download and access.

Next Steps

Following the completion of the first round of consultation the project team will:

1. Review public feedback received to better understand the community's needs and priorities;
2. Outline the transportation needs, issues and opportunities, and build on the public's input for the CTMP study;
3. Develop supporting policies and strategies; and
4. Present future findings, analysis, and recommendations at the following rounds of public consultation.

Upcoming public and stakeholder engagement events:

a. Public Workshop #2 – Winter 2025
b. Public Workshop #3 – Summer 2025

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Contact us

For further information or to be added to the study's mailing list, please contact the study team:

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Junior Planner - Housing
Development Services
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Toll Free - 1-877-969-0094, Ext. 6068
Email: jdellicolli@woolwich.ca

Francois Tomeo, P. Eng
Project Manager, CTMP
Egis Group
Email: Francois.TOMEO@egis-group.com

Alina Ahmad, BES
Transportation Planner
Egis Group
Phone: +1 365-527-2810
Phone: alina.ahmad@egis-group.com

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Comprehensive Transportation & Mobility Plan

Township of Woolwich



IMAGINE
CREATE
ACHIEVE
a sustainable future

1

Welcome to Public Workshop #1

Woolwich Comprehensive Transportation & Mobility Plan



We want to hear from you as your involvement is key to the success of the Comprehensive Transportation and Mobility Plan (CTMP)



The Public Workshop #1 will be used to present information about the CTMP, provide you with the chance to have your say, speak with the project team and learn more about transportation in the Township of Woolwich



We want to hear your ideas and concerns about the transportation system. They will be reviewed as part of the study process

To provide your input during this stage of the CTMP visit :

Woolwich Transportation and Mobility Plan | EngageWR

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2

What is a CTMP & Municipal Class Environmental Assessment Master Planning Process?

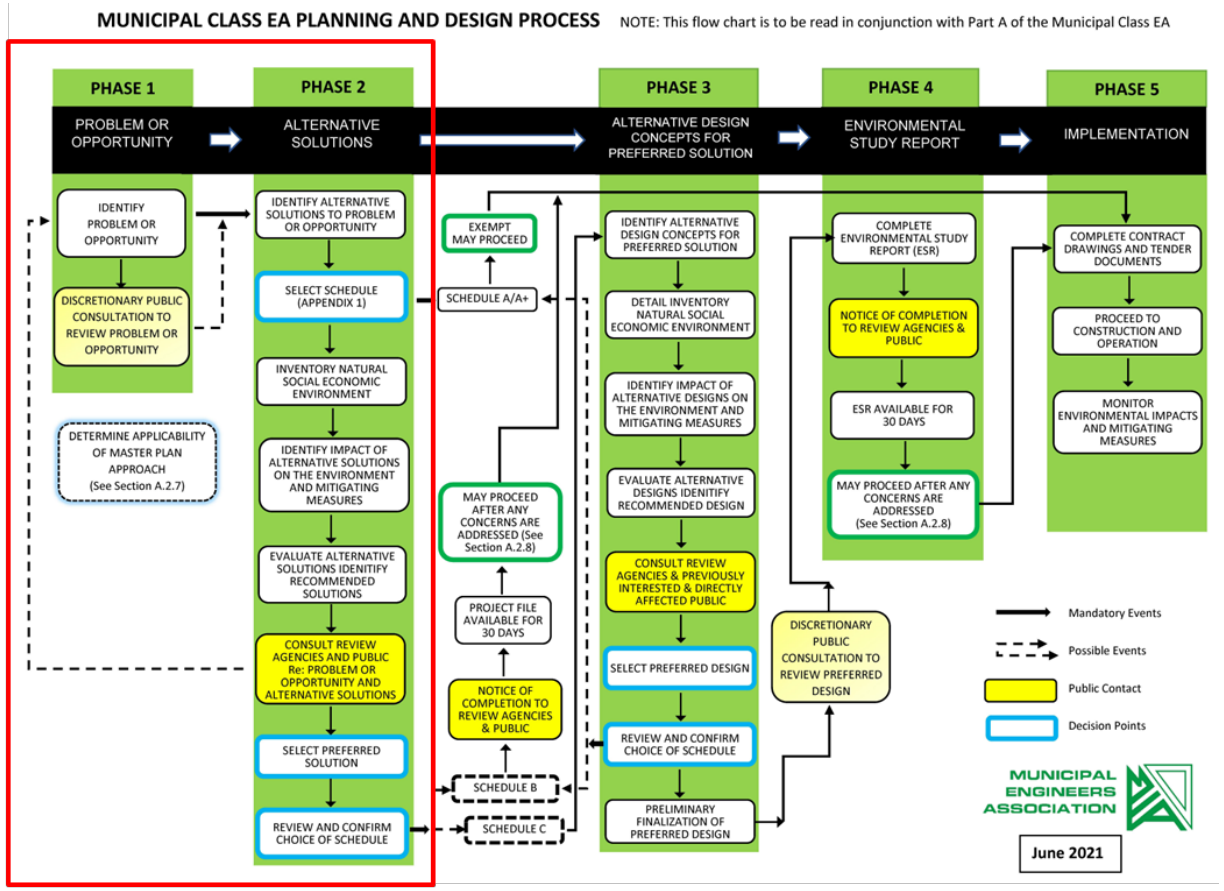
Woolwich Comprehensive Transportation & Mobility Plan

What is a Comprehensive Transportation and Mobility Plan (CTMP)?

The Township of Woolwich is launching its first Comprehensive Transportation and Mobility Plan (CTMP) and has engaged Egis for support. This strategic policy document will promote alternative transportation modes and guide short- and long-term infrastructure improvements. Focusing on active transportation, transit-oriented development, and multimodal connectivity. The CTMP aims to enhance safety and accessibility for walking, cycling, and transit across the Township. The plan will ensure Woolwich remains connected, safe, and sustainable, aligning with growth projections through 2051.

Municipal Class Environmental Assessment Master Planning Process

The CTMP will be developed in accordance with the Provincial Environmental Assessment (EA) Act, following Approach 1 as outlined in the 2023 Municipal Class Environmental Assessment (MCEA) document. The TMP will cover Phase 1, Problem and Opportunity, and Phase 2, Alternative Solutions, of the MCEA process and facilitate streamlining and implementation of recommended capital works.



*Completed as part of the TMP Process

3

Objectives of the CTMP

Woolwich Comprehensive Transportation & Mobility Plan

Main Objectives

- Promote Transit-Ready Communities
- Support Low-Carbon, Climate-Resilient Communities
- Improve Safety and Accessibility
- Optimize Parking Policies
- Plan for Future Growth

Woolwich Comprehensive Transportation & Mobility Plan

Some background

Township of Woolwich's Official Plan

Opportunities:
- Promoting active transportation: Focus on creating walkable, connected communities with amenities within 15 min. of homes
- Enhancing public transit: Plans to strengthen public transit and regional connectivity between rural and urban areas

Challenges:
- Reducing car dependence: Addressing the challenge of reducing private vehicle reliance, especially in rural areas
- Aligning transportation with growth: Ensuring infrastructure grows to meet increasing population and employment demands

2018 Waterloo Transportation Master Plan

- **Road Network:** Improve traffic flow, build Elmira By-Pass, and widen Arthur Street
- **Active Transportation:** Enhance walking and cycling infrastructure for safer, accessible routes
- **Public Transit:** Improve routes in Woolwich and connect to Waterloo Region and major transit hubs like Breslau GO Station
- **Connectivity:** Support GO Transit and high-speed rail development
- **Safety:** Implement road safety measures and ensure accessibility for people with disabilities

Federal Housing Accelerator Fund (HAF)

- The Federal Housing Accelerator Fund (HAF) provides $6.7 million to Woolwich
- It supports the construction of 190 housing units in three years
- Over 1,600 homes are planned for development over the next decade
- Significant population growth and economic opportunities are expected
- Increased housing will require improvements in transportation and infrastructure to support the growing population

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Expected Outcomes

Woolwich Comprehensive Transportation & Mobility Plan

Expected Outcomes

Vison Statement and Objectives

Develop a vision statement focusing on connectivity, sustainability, safety, and equity, with measurable objectives for the transportation network

Transportation Infrastructure Analysis

Provide a comprehensive inventory and assessment of current transportation infrastructure, including roads, public transit, and active transportation networks

Demographic and Economic Analysis

Analyze population growth, employment trends, and economic factors influencing transportation needs, with a focus on inclusivity and meeting diverse community needs

Stakeholder Engagement

Organize public workshops, focus groups, and surveys to gather input from various stakeholders, ensuring transparent communication throughout the planning process

Transportation Demand Forecasting

Use appropriate methodologies to predict future transportation needs, especially in growing communities such as Elmira, Breslau, and St. Jacobs

Modal Shift Strategies

Propose strategies to encourage a shift from single-occupancy vehicles to alternative transportation modes such as public transit, cycling, and walking

Transit-Oriented Development (TOD) Recommendations

Identify opportunities for mixed-use, compact developments around transit hubs like the proposed Breslau GO Station and bus routes

Parking Analysis

Evaluate current parking provisions, with a focus on affordable housing, and propose adjustments to prevent over-parking in new developments

Sustainability and Safety Improvements

Recommend sustainability strategies and safety measures to enhance road safety, accessibility, and minimize environmental impacts

Action Plan and Implementation Strategy

Provide a detailed action plan with specific projects, timelines, funding sources, and recommendations for monitoring and evaluating progress

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5

Project's Scope and Key Milestones

Woolwich Comprehensive Transportation & Mobility Plan

Problem / Opportunity Identification

1. Background Data Collection
2. Current Infrastructure Analysis
3. Population and Employment Trends Analysis
4. Problem Identification

Engagement Round #1

Identification of Alternatives and Preferred Solutions

1. Transportation Demand Forecasting
2. Alternative Solutions Development
3. Modal Shifting Strategies
4. Integration with Land Use Planning
5. Implementation Plan Development

Engagement Round #2

Documentation and Finalization

1. Draft CTMP
2. Final CTMP

Engagement Round #3

End
Fall 2025

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Background

Woolwich Comprehensive Transportation & Mobility Plan

Forecasted Growth and Intensification Target



Population

The Township's population is forecast to grow to **51,200 people by 2051,** which represents an increase of **22,300 people or 78% from 2021 levels**.



Employment

Employment in the Township is forecast to grow to **33,000 jobs by 2051**, which represents an increase of **15,700 jobs or 90% from 2021 levels**.



Intensification Target

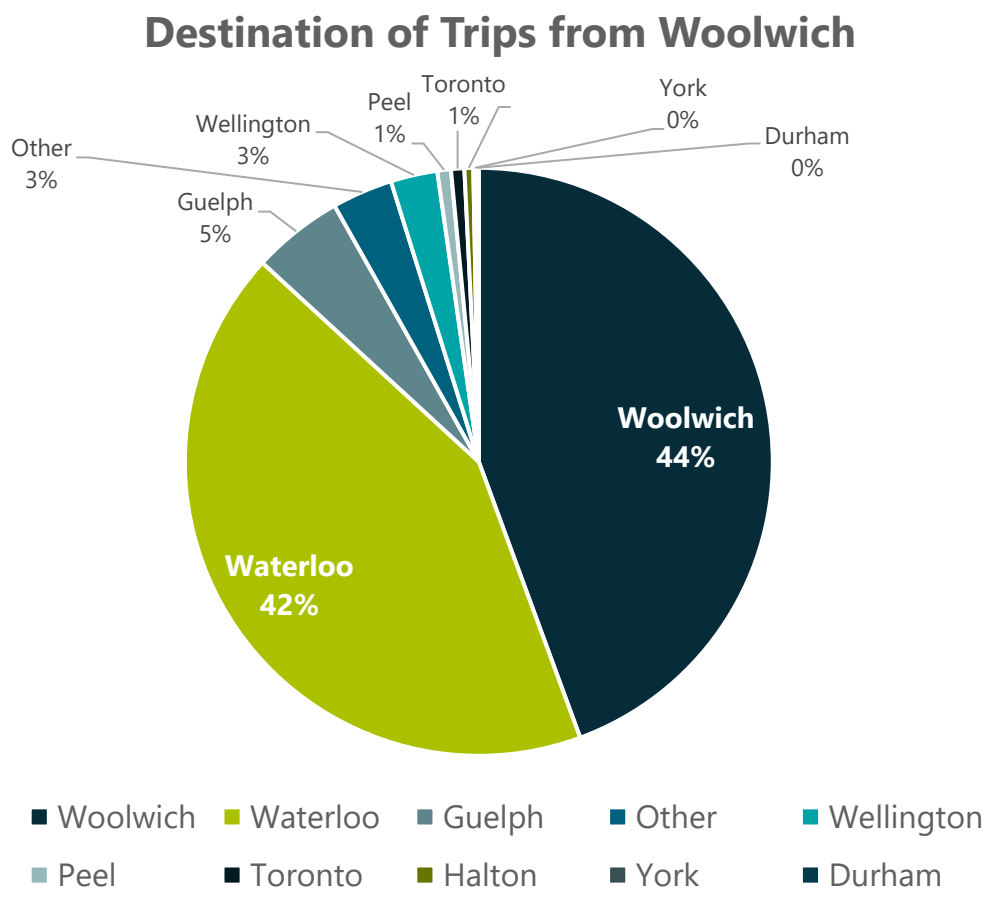
The Township is to achieve a minimum **residential intensification rate of 20% annually and a total 1620 new residential units** within the Delineated Built-up Area by 2051.

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Preliminary Findings

Woolwich Comprehensive Transportation & Mobility Plan

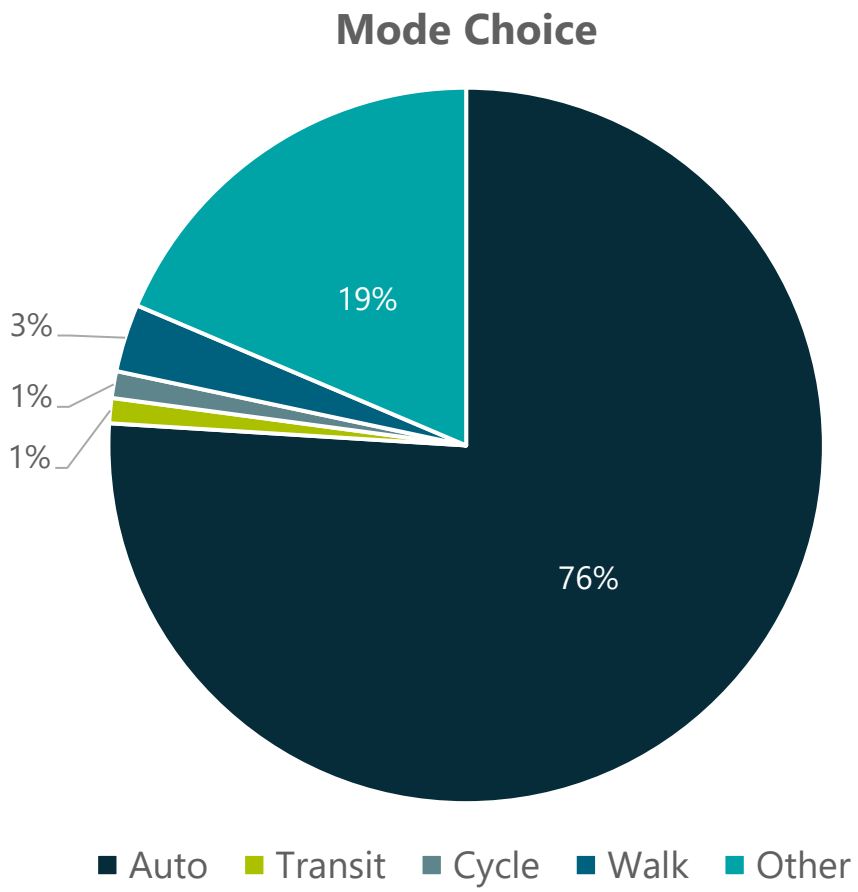


Source: TTS 2016, 24h Period

Where Do People Traveling in Woolwich Go?

- 86% of trips originating in Woolwich remain within the Waterloo Region, with 44% staying within Woolwich itself
- Other significant destinations include:
  - Guelph
  - Wellington
  - Others, including external areas beyond the GTHA

Woolwich Comprehensive Transportation & Mobility Plan

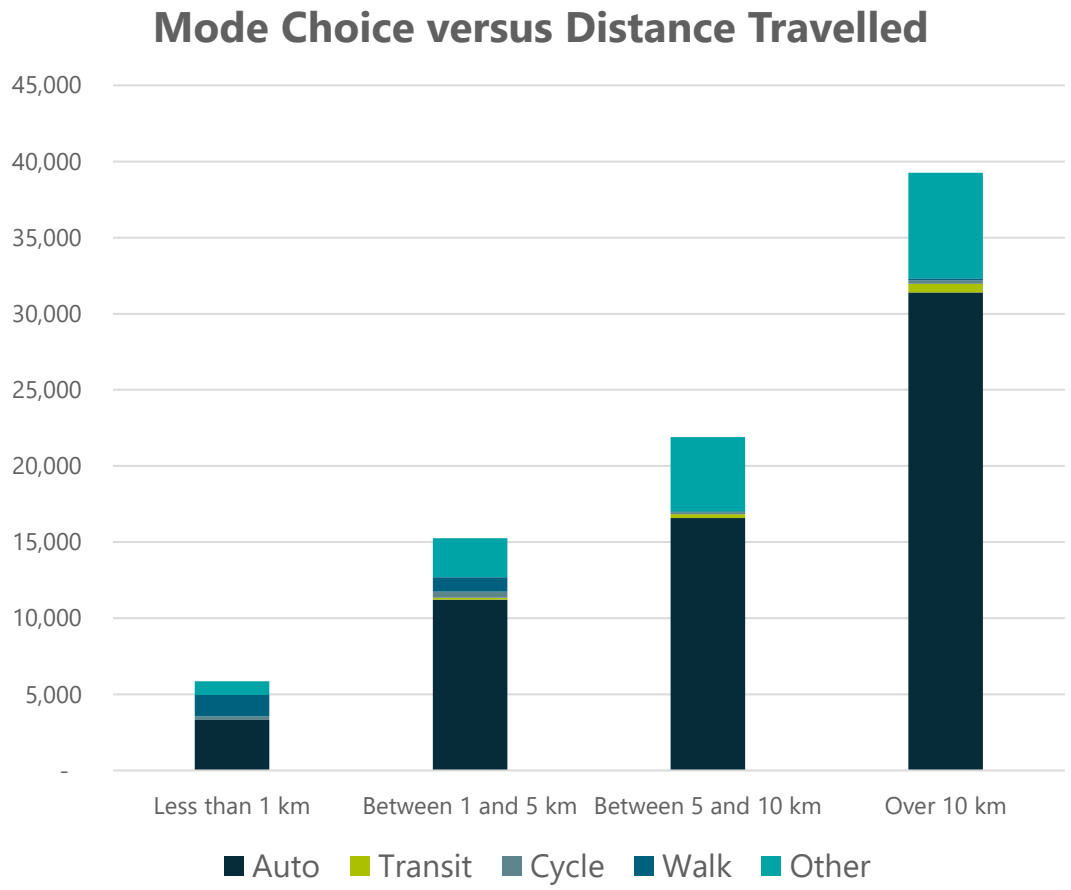


Source: TTS 2016, 24h Period

Which Modes of Transportation Do People Use in Woolwich?

- 76% of trips generated in Woolwich are made by driving a car
- 19% use other modes, which include a significant proportion of vehicle passengers
- Transit, cycling and walking represent 5% of mode share in Woolwich

Woolwich Comprehensive Transportation & Mobility Plan



Source: TTS 2016, 24h Period

How Does Travel Distance Affect Mode Choice?

- 48% of trips cover distances greater than 10km, with 80% of these trips made by driving a car
- 26% of trips are under 5 km, where walking or cycling should be attractive options. However, in Woolwich, only 8% of these short-distance trips use these modes

8

Online Survey

Woolwich Comprehensive Transportation & Mobility Plan



Please visit the following website to complete the survey:

https://www.engagewr.ca/woolwich-transportation-mobility-plan/surveys/township-of-woolwich-transportation-and-mobility-plan-survey-1

Help shape the future of your transportation system.
Share your insights on potential challenges and opportunities and thank you for your participation!

- As part of the CTMP for the Township of Woolwich, we are gathering valuable feedback from residents, businesses, and stakeholders to help shape the future of transportation in the region
- The purpose of this survey is to better understand the current transportation challenges, opportunities for improvement, and the priorities of the community. Your input will guide the development of the plan that enhances transportation options, improves road safety, supports growth, and promotes sustainable travel choices
- This survey should take approximately 10 minutes to complete. We appreciate your time and insights, which will play an important role in helping us create a transportation and mobility plan that meets the needs of all residents and users of the road network



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Thank You

www.egis-group.com

Photos © | Egis, Adobestock, 10Design, Eva Bocek, Infrastructure Ontario, Studio Cabrelli

Comprehensive Transportation and Mobility Plan Survey 1: Township of Woolwich Needs your Input

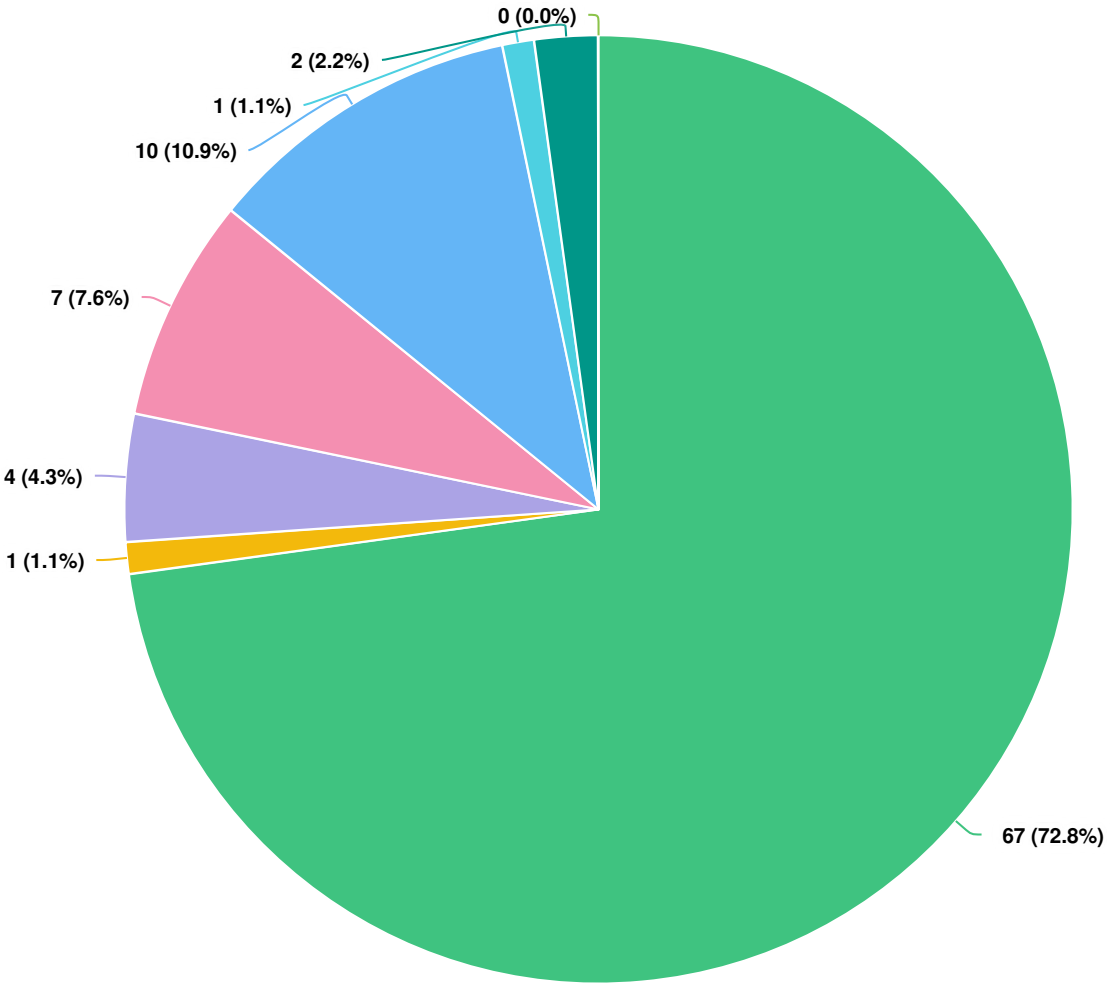
SURVEY RESPONSE REPORT
15 January 2025 - 13 February 2025

PROJECT NAME:
Woolwich Transportation and Mobility Plan

GRANICUS

SURVEY QUESTIONS

Q1 Please select the option that best describes yourself.

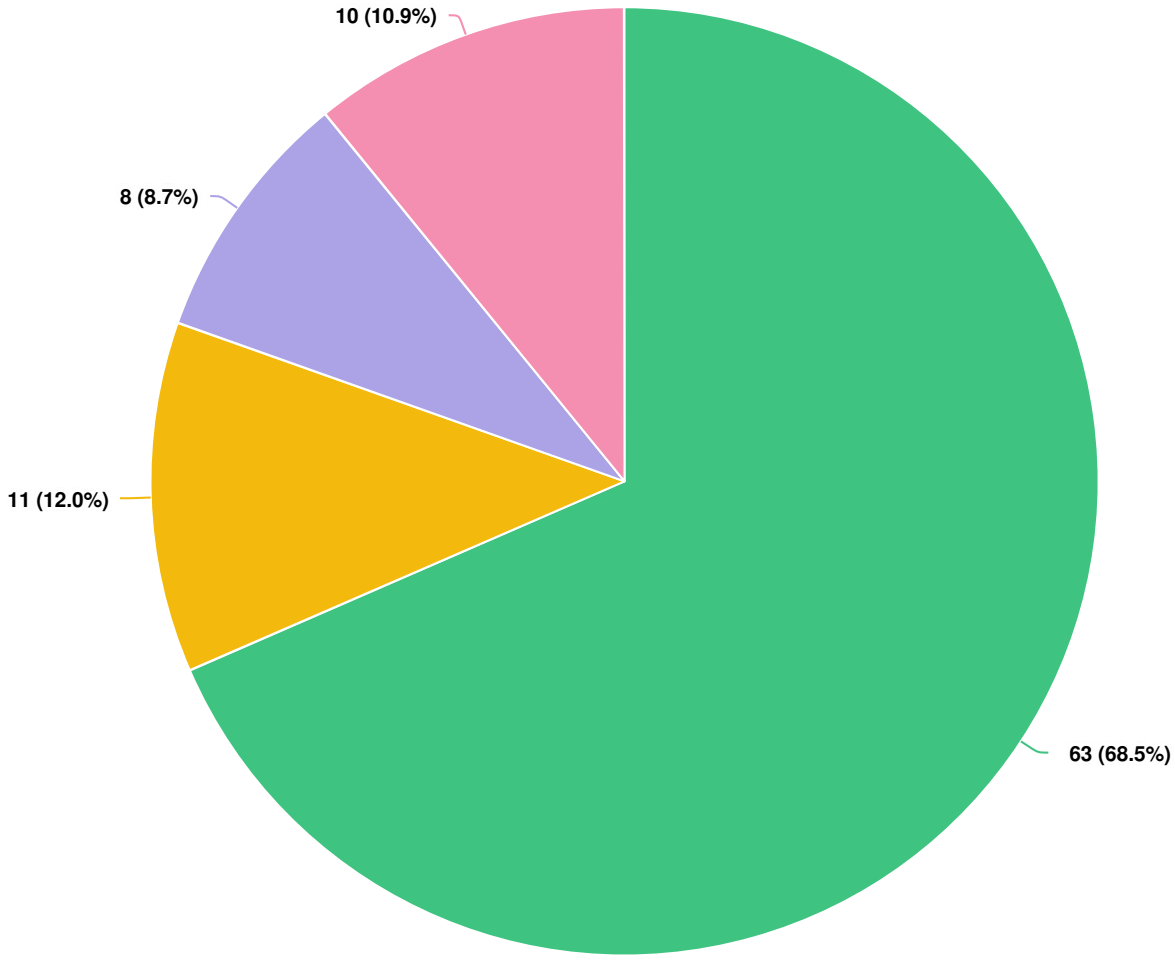


Question options

- Full Time Resident
- Seasonal Resident
- Business Owner
- Both a Resident and Business Owner
- Working in Woolwich but living elsewhere
- Visitor
- Full Time Resident not a business owner working in Woolwich
- Other (please specify)

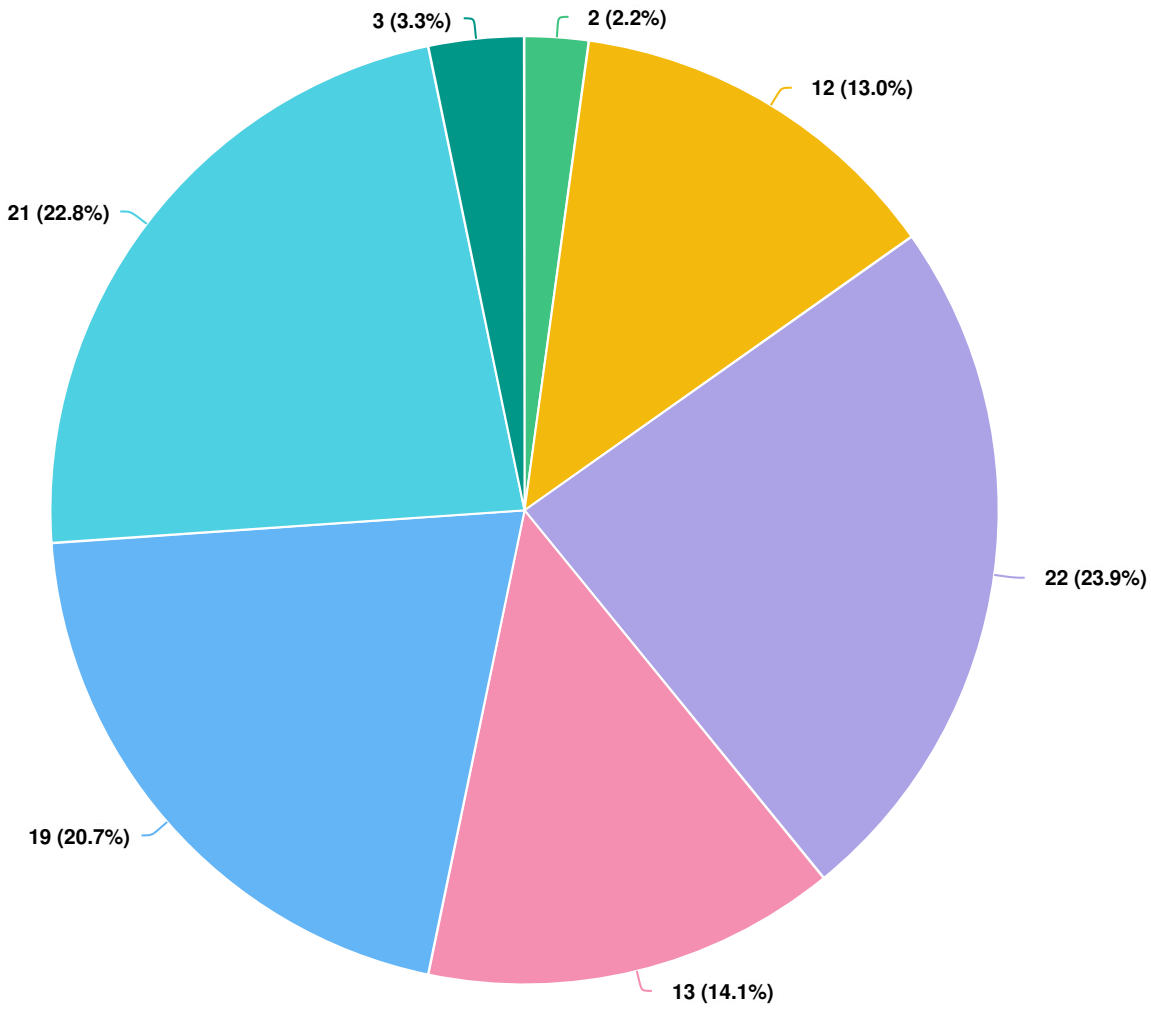
Mandatory Question (92 response(s))
Question type: Radio Button Question

Q2 What area within the Township of Woolwich do you live, work or own a property?



Mandatory Question (92 response(s))
Question type: Radio Button Question

Q3 Which age group applies to you?

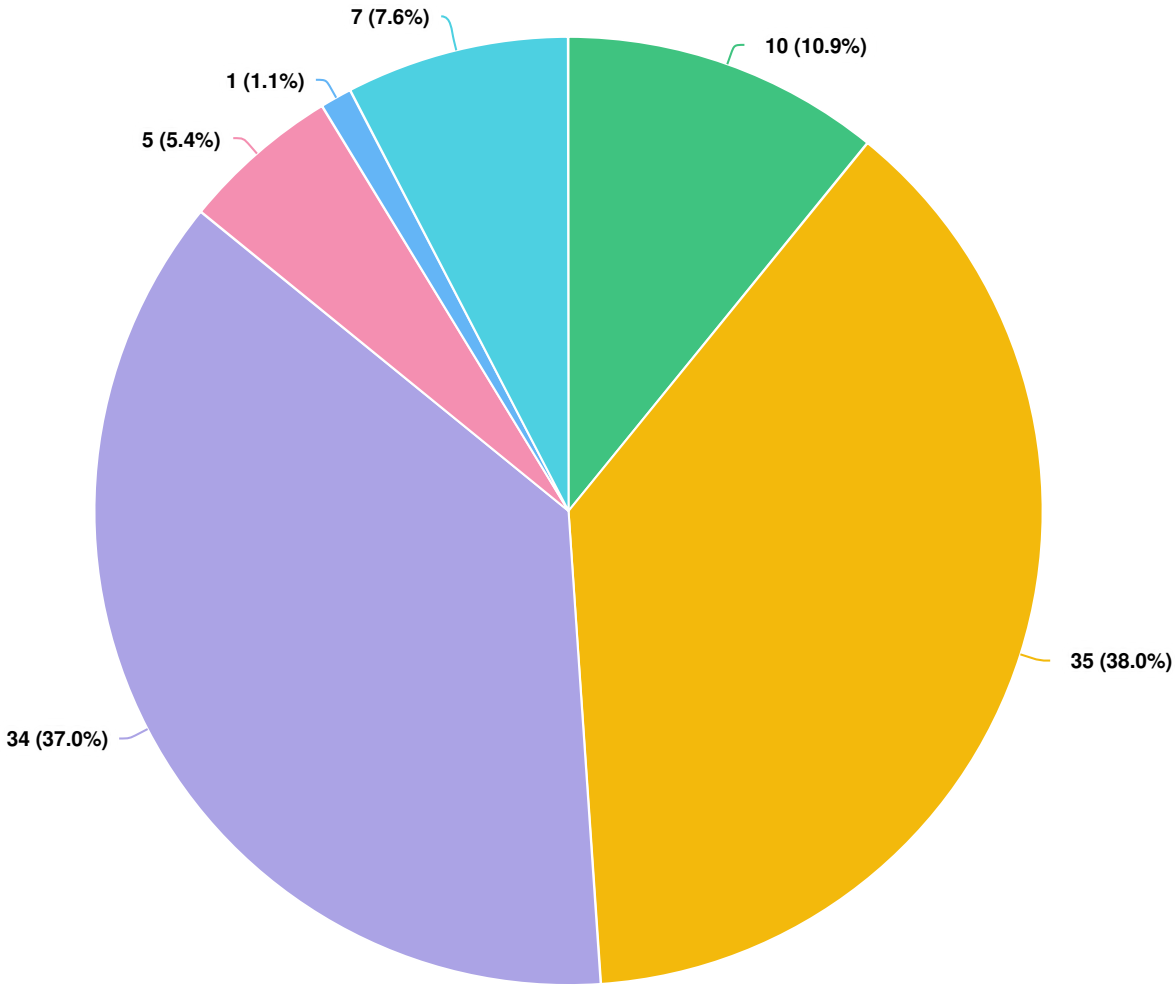


Question options

18-24 25-34 35-44 45-54 55-64 65+ Prefer not to say

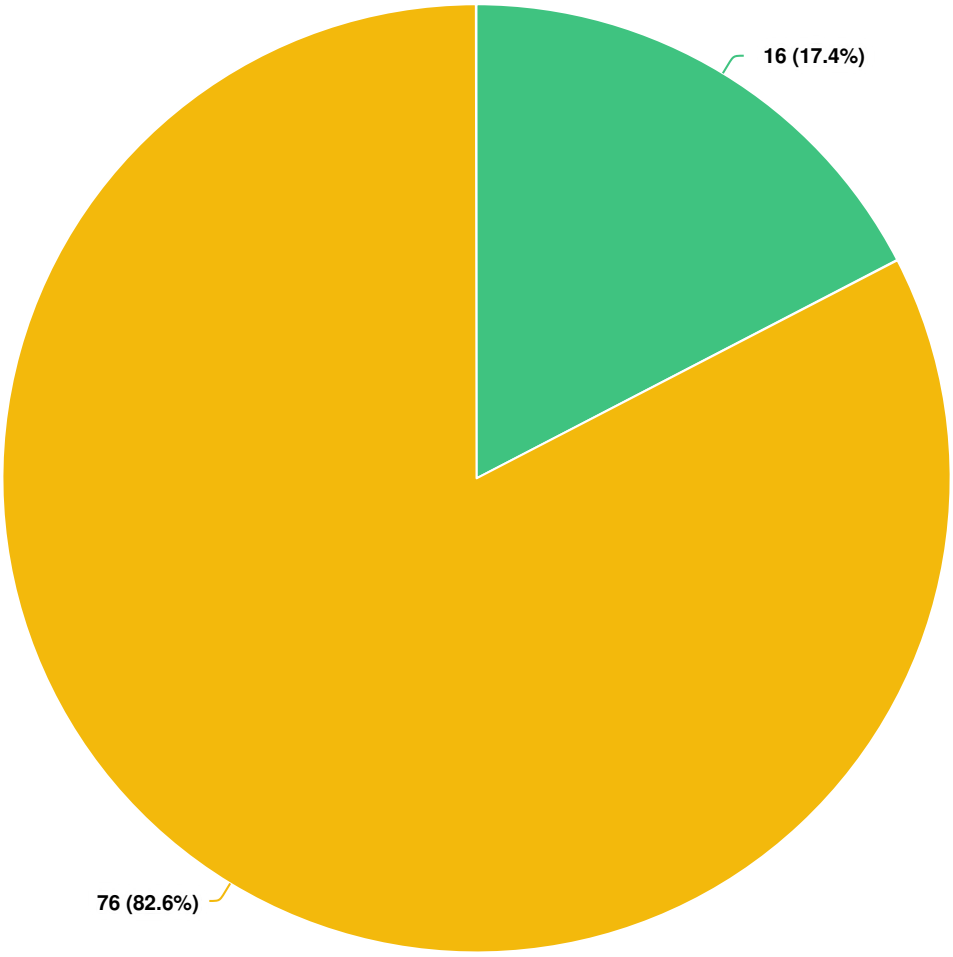
Mandatory Question (92 response(s))
Question type: Radio Button Question

Q4 What best describes your household composition? (Please select the option that most accurately reflects your household.)



Mandatory Question (92 response(s))
Question type: Radio Button Question

Q5 Do you use public transit?

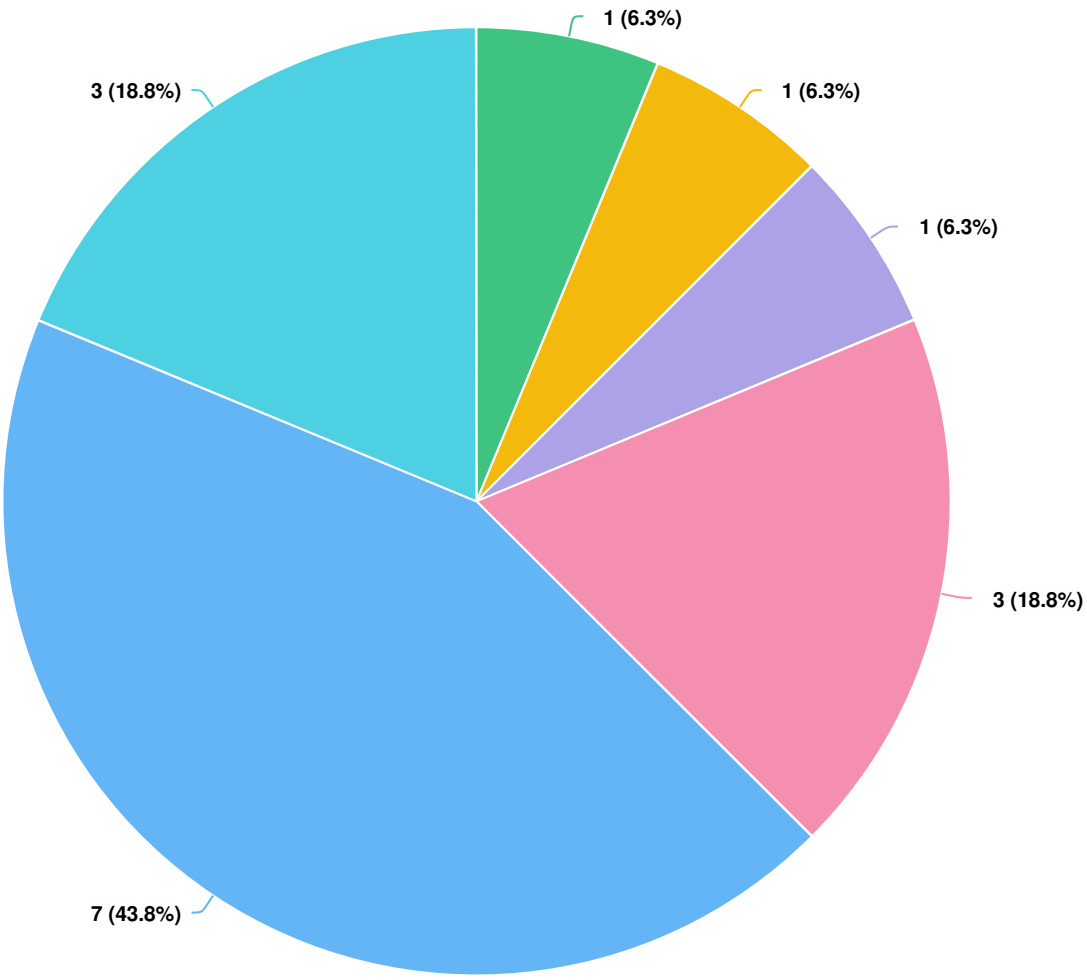


Question options

Yes No

Mandatory Question (92 response(s))
Question type: Radio Button Question

Q6 How often do you use public transit?

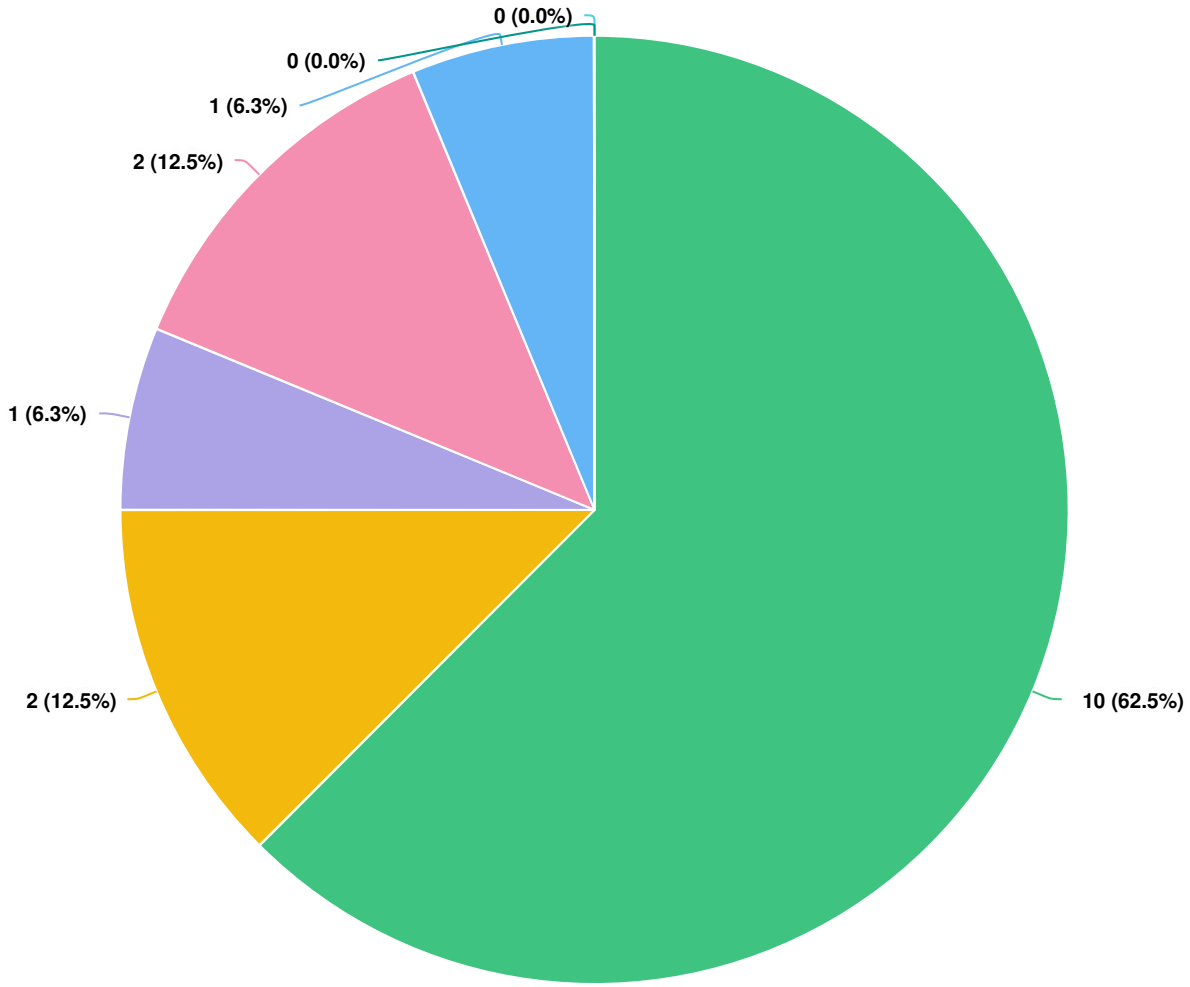


Question options

Daily | 4-6 times per week | 2-3 times per week | Once a week | 1 to 2 times per month | Rarely

Mandatory Question (16 response(s))
Question type: Radio Button Question

Q7 Which type of public transit do you primarily use for your commute?

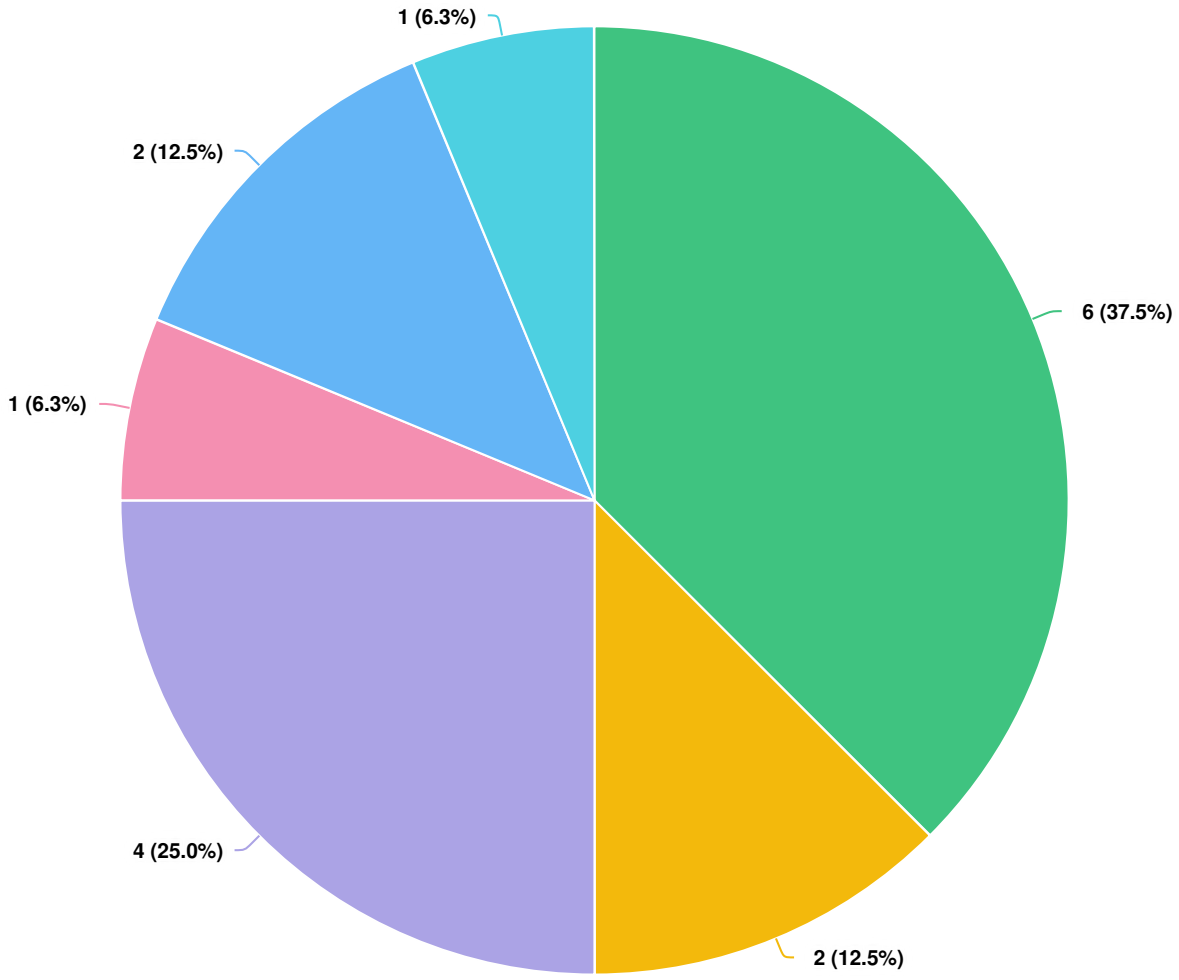


Question options

Bus (e.g., GRT, and Kiwanis transit) | Both Bus and Train | ion/LRT | Go Train | Other (please specify) | GO Bus | Via Rail

Mandatory Question (16 response(s))
Question type: Radio Button Question

Q8 What is your main reason for using public transit in the Township of Woolwich?

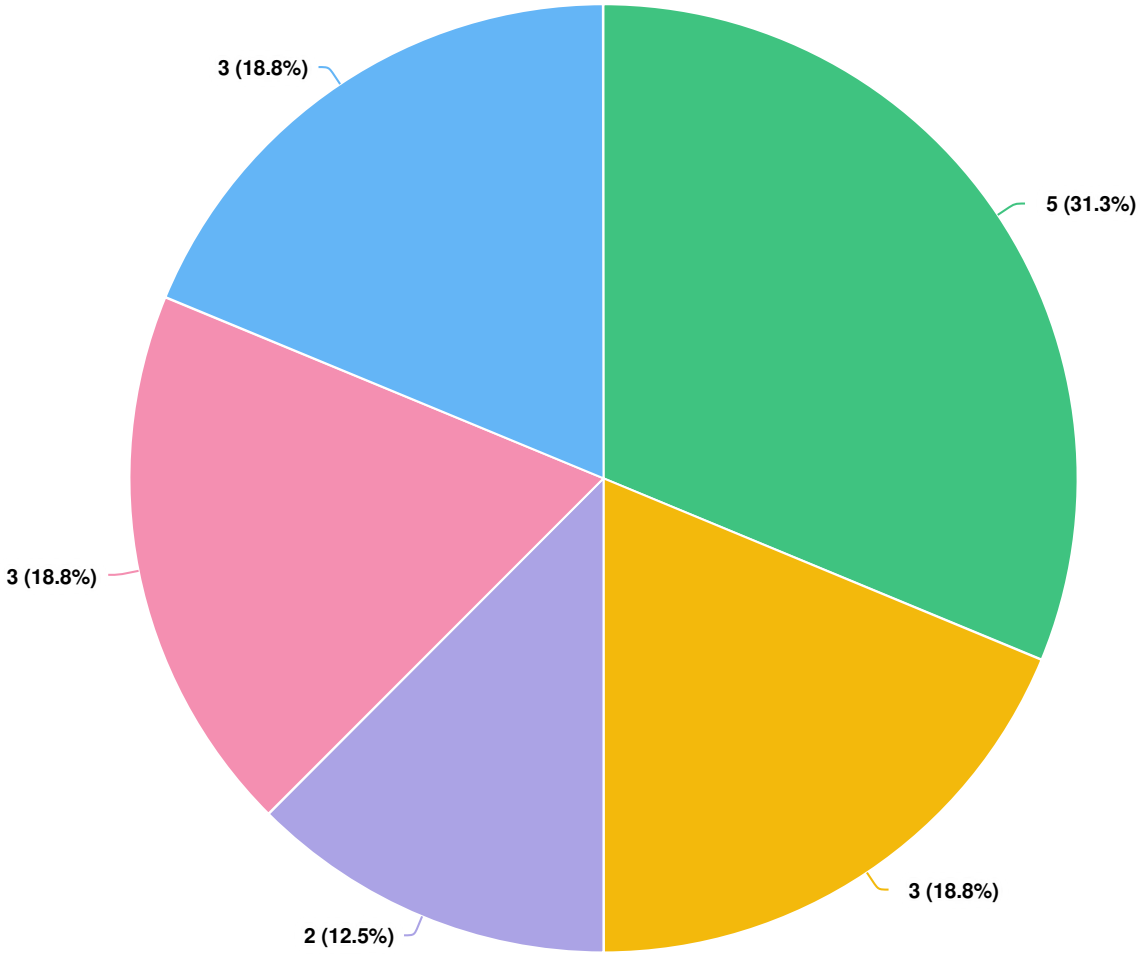


Question options

- Commuting to work or school
- Recreation or Leisure
- Accessing essential services (e.g., grocery store, medical appointments)
- Convenience
- Environmental reasons (e.g., reducing carbon footprint)
- Other (please specify)

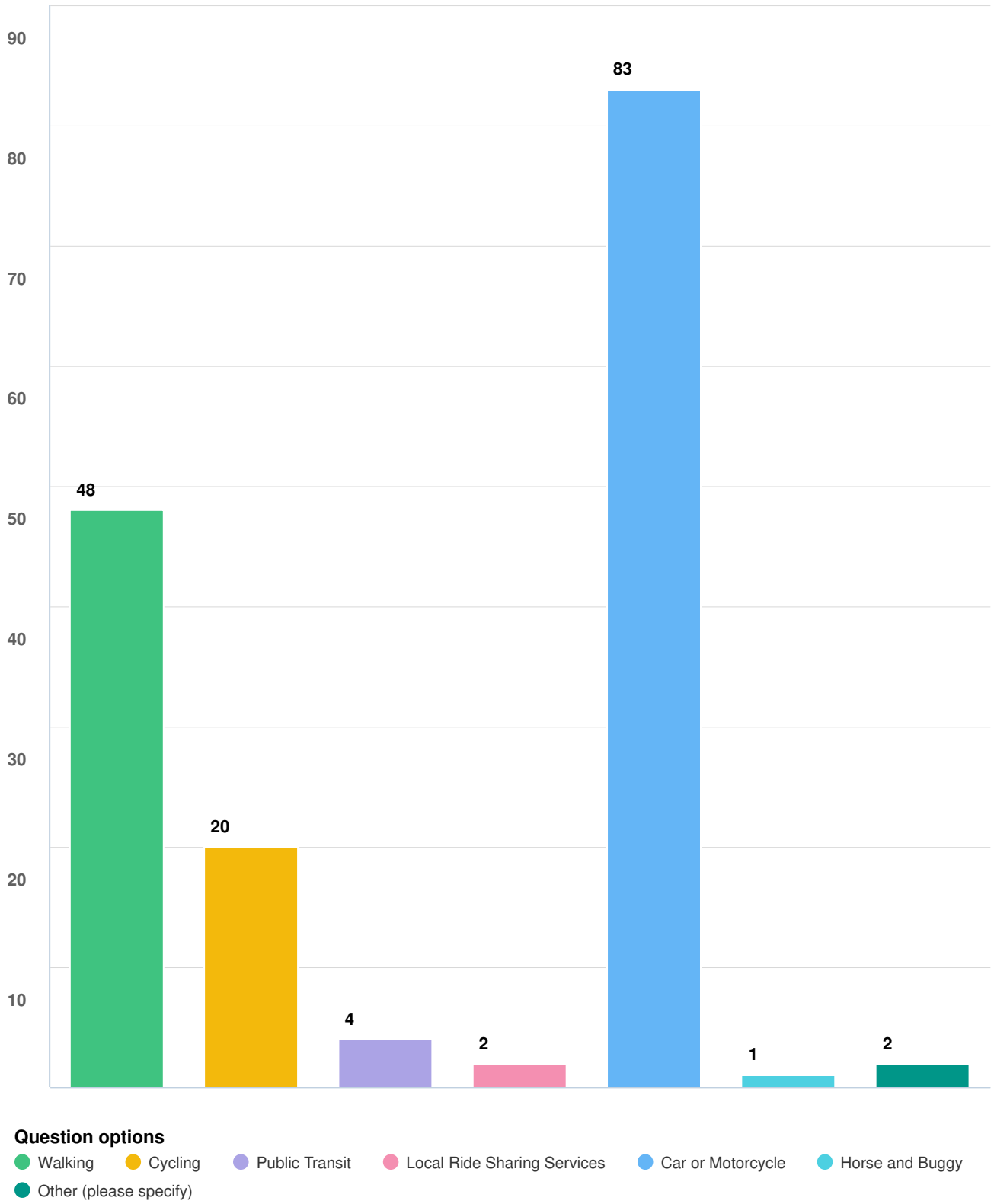
Mandatory Question (16 response(s))
Question type: Radio Button Question

Q9 Are you satisfied with the current public transit options in Woolwich?



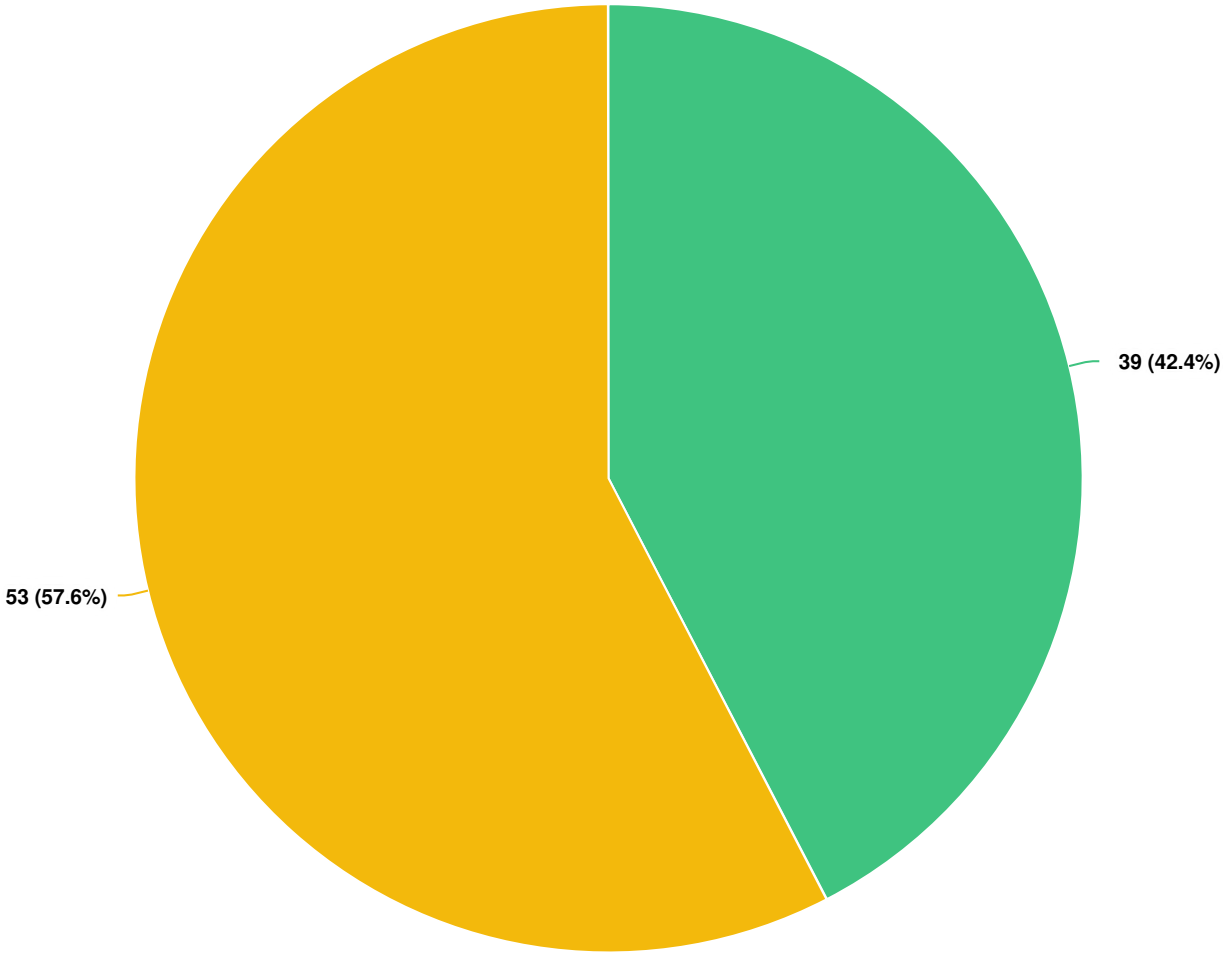
Mandatory Question (16 response(s))
Question type: Radio Button Question

Q10 Which of the following travel modes do you use the most when travelling within the Township? Select all that apply.



Mandatory Question (92 response(s))
Question type: Checkbox Question

Q11 Do you think everyone in the community has equal access to transportation options?

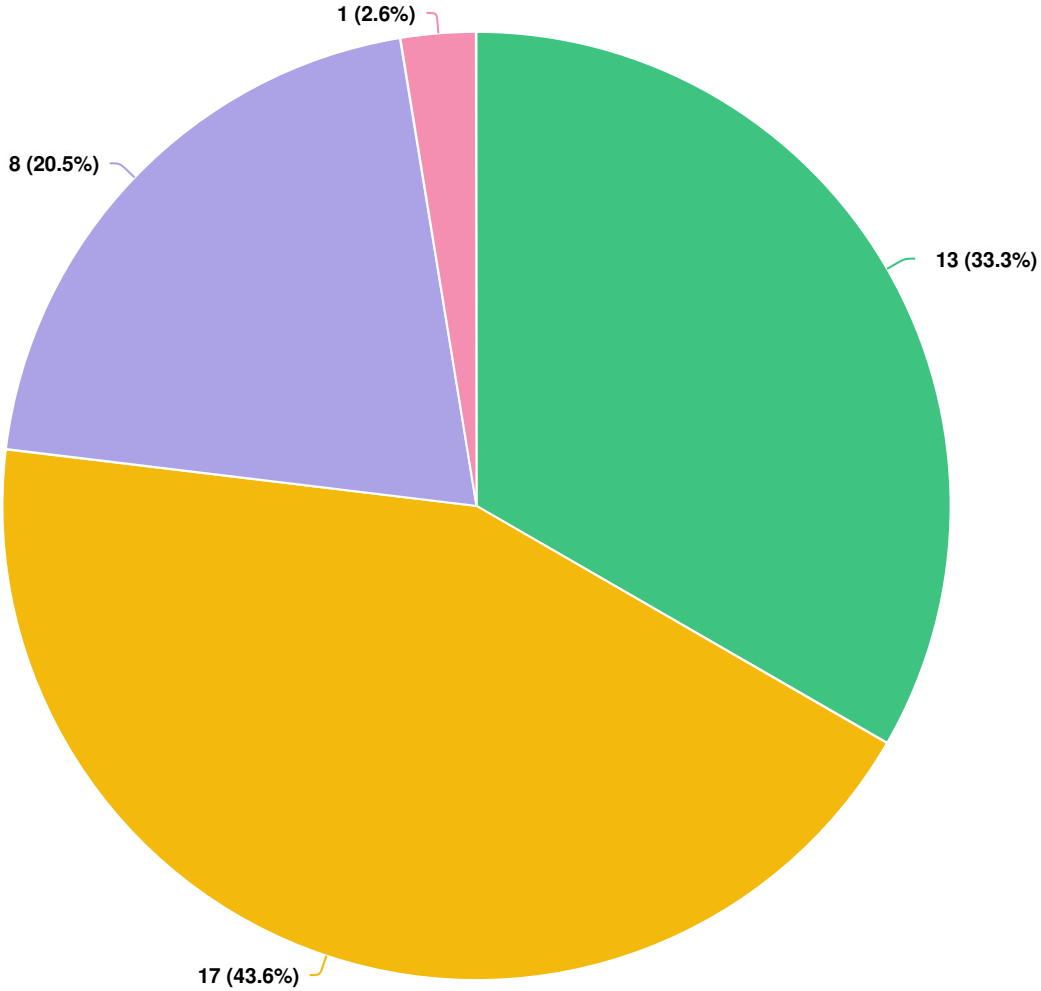


Question options

Yes No

Mandatory Question (92 response(s))
Question type: Radio Button Question

Q12 What factor do you believe contributes to equal access to transportation in your community?



Question options

- Affordable transportation options
- Well connected routes
- Alternative transportation options (e.g., biking, ridesharing)
- Other (please specify)

Mandatory Question (39 response(s))
Question type: Radio Button Question

Q13 What barriers or challenges do you think prevent equal access to transportation in the Township?

Anonymous 1/17/2025 02:48 PM	We have very limited public transit. And anyone from Kitchener or Waterloo that requires Mobility Plus for transportation can’t access or visit friends and family in the townships.
Anonymous 1/17/2025 04:01 PM	Access, routes, cost, no infrastructure
Anonymous 1/18/2025 08:40 AM	Minimum city bus routes
Anonymous 1/18/2025 11:39 AM	On demand during limited times. My shift would be finished at midnight and have no other option but to drive too and from work because of this.
Anonymous 1/19/2025 03:47 PM	Economic reasons that will never be equal
Anonymous 1/19/2025 04:52 PM	Only one bus route in the city makes it difficult for the people in the centre or Barnswallow area of town
Anonymous 1/20/2025 08:37 PM	Not many bus options in Breslau, only gave tge on demand 79 bus, hard to book and need to plan ahead if want to use it. Also only runs during curtain hours.
Anonymous 1/21/2025 03:38 AM	No public transport
Anonymous 1/21/2025 04:34 PM	Horse & buggies. Poor road conditions.
Anonymous 1/22/2025 01:52 PM	Geography
Anonymous 1/22/2025 01:55 PM	Bus stops are not in residential areas of Elmira. Only on main roads which proposes challenges for people to get to them.

Anonymous 1/22/2025 01:55 PM	Difficult connection for biking and bus routes.
Anonymous 1/22/2025 02:00 PM	Not many people know we have transit options. Would be nice to have permanent bus routes.
Anonymous 1/22/2025 02:04 PM	Lack of public transit options.
Anonymous 1/22/2025 02:17 PM	Limited transit options for employees commuting in from surrounding areas. The limited options that are available don't run often enough or efficiently.
Anonymous 1/22/2025 02:19 PM	Grand River Transit only travels through St Jacobs and Elmira.
Anonymous 1/22/2025 03:17 PM	Cost of some transportation..
Anonymous 1/22/2025 03:20 PM	accessibility sidewalks , curb cut outs for wheelchairs & walkers, bus transportation
Anonymous 1/22/2025 03:21 PM	Disabilities. Seniors with no vehicle
Anonymous 1/22/2025 03:36 PM	Financial situation
Anonymous 1/22/2025 03:53 PM	Accessibility, financial costs
Anonymous 1/22/2025 03:56 PM	Cost of bus passes. Timing of busses (people can't work shift work in city). No public transit from Elmira to Breslau (growing community
Anonymous 1/22/2025 04:53 PM	Bikes not allowed on the Elmira bus (not even small kid ones). If this is seen as a way to connect people to the main bus system, not allowing bikes doesn't support that initiative.
Anonymous	If you don’t own a car, it’s make life very difficult to do your shopping,

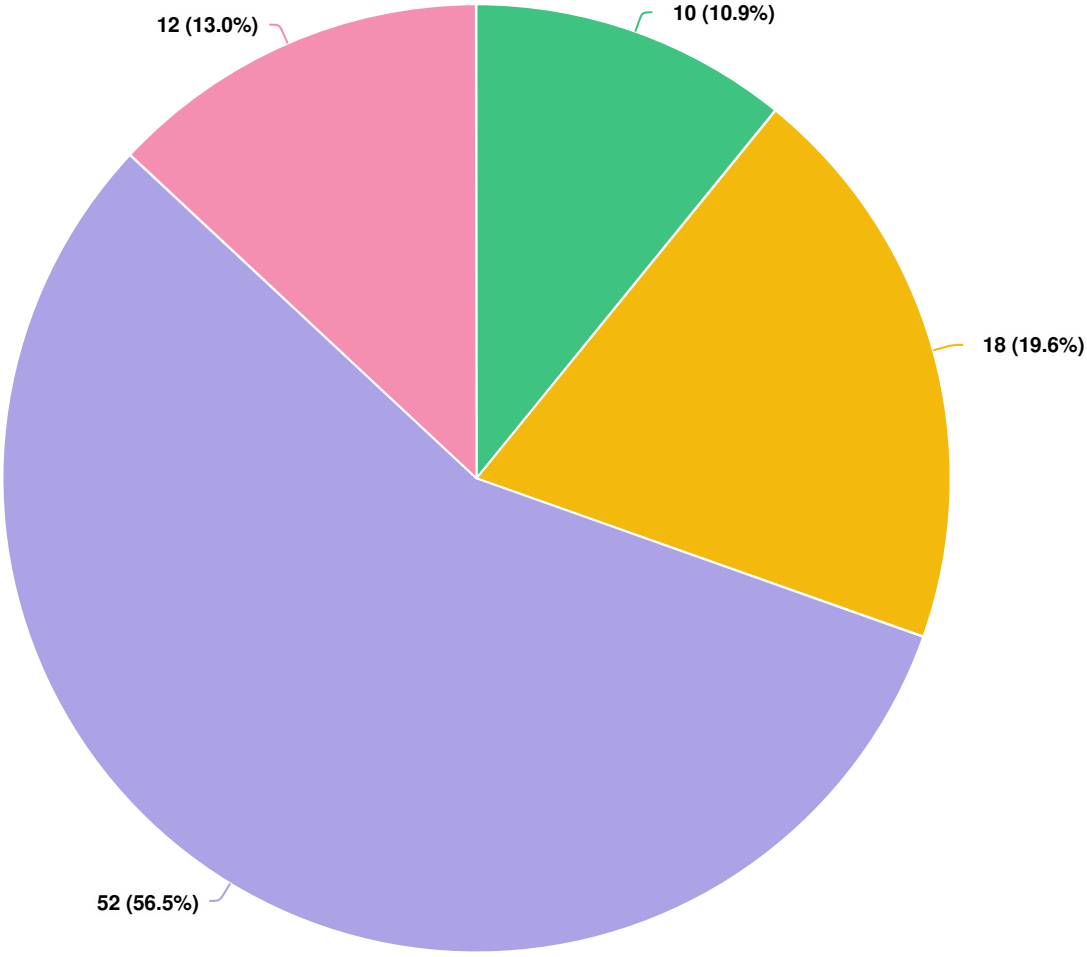
1/22/2025 06:50 PM	go to your appointment, etc by public bus transport.
Anonymous 1/22/2025 08:32 PM	Distance from public transportation in rural areas.
Anonymous 1/22/2025 10:03 PM	Hard for some to access the city bus stops that are only located near uptown m.
Anonymous 1/22/2025 10:57 PM	No public transit
Anonymous 1/23/2025 04:45 AM	Lack of public transit options or availability.
Anonymous 1/23/2025 07:05 AM	People with limited resources who live in more isolated locations would be subject to reduced mobility opportunity. This is unfortunately a fact of life, and may not be totally solvable problem.
Anonymous 1/23/2025 07:19 AM	For Elmira: financial for car ownership, location for access to public transportation, unsafe roads due to heavy truck traffic on Arthur St
Anonymous 1/23/2025 10:26 AM	Because of poor planning you allowed all growth and retail to the South of Elmira. You have made it very difficult for people to access getting groceries. The township it's self created this inequality
Anonymous 1/23/2025 10:52 AM	Walking up a hill to get downtown. The bus is currently uphill from us.
Anonymous 1/23/2025 11:07 AM	Cost and proximity to services.
Anonymous 1/23/2025 01:02 PM	Price - With a lack of local taxi service, costs are prohibitive for local transportation, especially give the distances needed to travel within or between townships.
Anonymous 1/23/2025 06:01 PM	Conestogo has no public transportation
Anonymous	Rural community.

1/23/2025 06:53 PM	
Anonymous 1/24/2025 05:12 AM	Limited Hours Of Operations, Especially On Weekends.
Anonymous 1/24/2025 07:49 AM	I believe there should be a bus stop in Conestoga
Anonymous 1/24/2025 05:12 PM	Lack of options for public transit, limited safe cycling infrastructure
Anonymous 1/25/2025 07:36 AM	Financial, frequency of buses, lack of safe cycling infrastructure
Anonymous 1/25/2025 08:14 AM	A large geographical area making it difficult to cover all areas efficiently
Anonymous 1/25/2025 11:45 AM	Bus line times returning to the city as well as frequency of buses.
Anonymous 1/25/2025 01:24 PM	Accessibility
Anonymous 1/25/2025 07:07 PM	No public transportation
Anonymous 1/26/2025 09:22 AM	Transit stops are very limited. Times are also limited.
Anonymous 1/27/2025 10:46 AM	Vehicles costs are high, lower income earners, be it youth or minimum wage earners have difficulty purchasing and supporting vehicle ownership
Anonymous 1/27/2025 03:10 PM	Time. Availability (some places have no public transit).
Anonymous 1/27/2025 07:35 PM	Age, money
Anonymous 1/28/2025 05:09 PM	poor connections to go train and very long commute to pick up waterloo options

Anonymous 1/29/2025 09:57 AM	no public transportation options for people living in the small villages
Anonymous 2/01/2025 05:58 PM	Availability and locations/destinations of public transit.
Anonymous 2/02/2025 09:56 AM	Not enough routes for farm areas
Anonymous 2/03/2025 11:12 AM	cost of public transportation. limited route not within walking distance of peoples homes

Mandatory Question (53 response(s))
Question type: Single Line Question

Q14 What is the top factor influencing your travel within the Township?

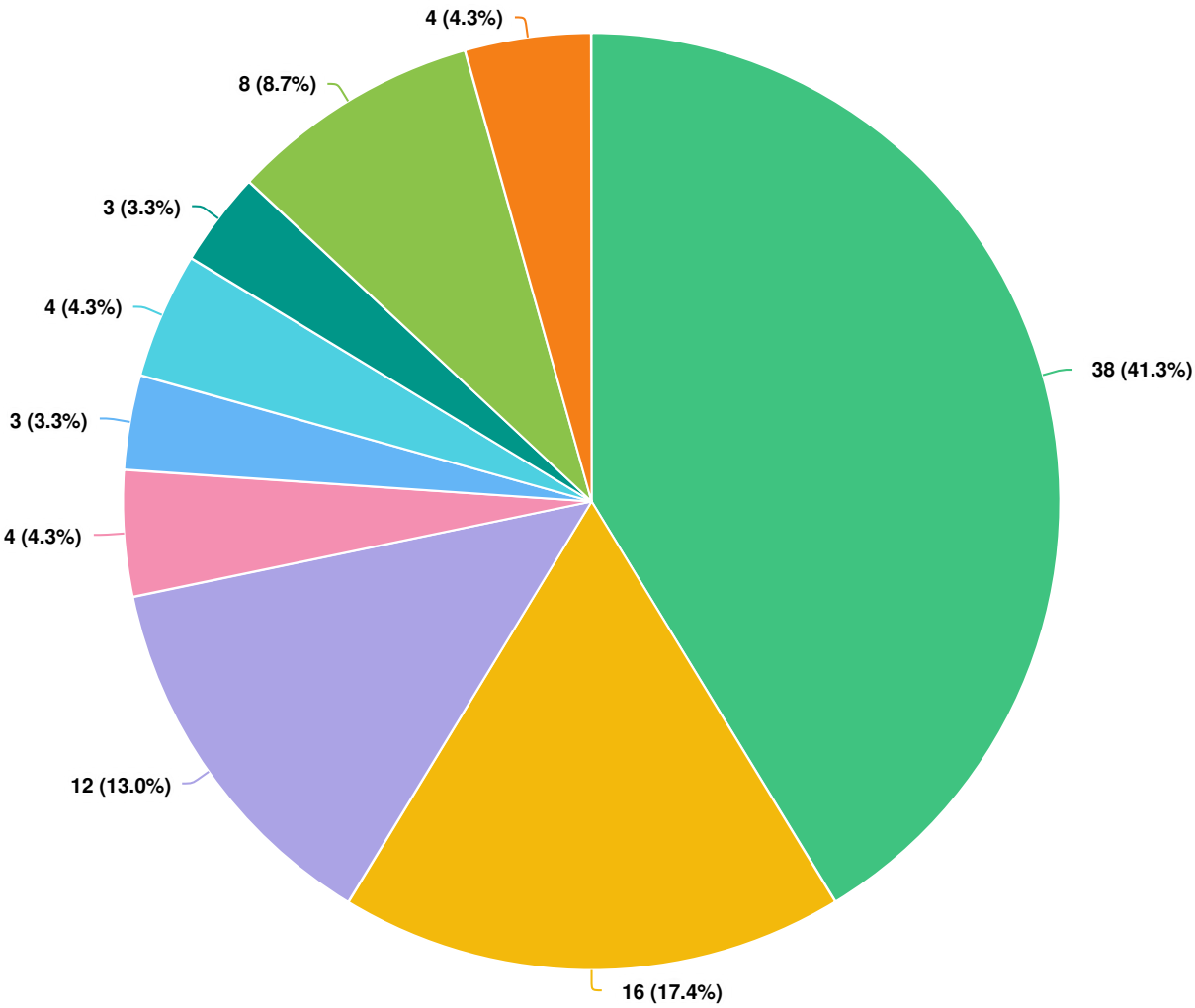


Question options

Cost Reliability Travel Time Other (please specify)

Mandatory Question (92 response(s))
Question type: Radio Button Question

Q15 Which transportation related issue do you think has the most significant impact in your community?



Question options

- Road Infrastructure
- Public Transit
- Cycling and Walking Infrastructure
- Parking (i.e., On-street, Township Parking Lots)
- Accessibility
- Environmental Concerns (i.e., Noise, Pollution)
- Safety
- Connectivity and Convenience
- Other (please specify)

Mandatory Question (92 response(s))
Question type: Radio Button Question

Q16 Rank the following in order of importance (1 being the highest priority)

OPTIONS	AVG. RANK
Road Infrastructure	2.86
Safety	3.98
Public Transit	4.05
Connectivity and convenience	4.47
Accessibility	4.76
Cycling and Walking Infrastructure	4.79
Parking	5.33
Environmental Concerns (i.e., noise, pollution)	5.76

Mandatory Question (92 response(s))
Question type: Ranking Question

Q17 Do you have any other comments or suggestions for the Transportation and Mobility Master Plan?

Anonymous 1/17/2025 01:14 AM	Conestogo is too small to handle all the commuter traffic especially with the horse and buggies. Not enough shoulder space for the horse and buggies and cars. The pollution also created by all the commuters is a concern.
Anonymous 1/17/2025 02:48 PM	Public Transit and Mobility Plus are necessary in the townships.
Anonymous 1/17/2025 04:01 PM	Yes. There are countless streets and roads in the Township of Woolwich that are desperate need to repair. When can we expect the township to investigate in infrastructure across the township? There are communities who are ignored by this Township.
Anonymous	With many comments from permanent residents, the biggest issue is

1/17/2025 04:08 PM	the roads and how messed up they are. With more than half the roads not smooth and potholes everywhere. It makes me concerned my vehicle could get damaged driving on Woolwich roads.
Anonymous 1/17/2025 09:30 PM	Please fix the pot holes in Elmira, especially on whipoorwill.
Anonymous 1/18/2025 08:40 AM	Fix the damn roads! The amount of potholes in this town are ridiculous! Numerous people are having damage done on their cars because of it.
Anonymous 1/18/2025 10:47 AM	Fix the roads. Dangerous potholes everywhere even on main highway
Anonymous 1/18/2025 11:39 AM	N/A
Anonymous 1/18/2025 09:39 PM	We do not need any other transportation. Keep this small town a small town.
Anonymous 1/19/2025 03:47 PM	Fix current road infrastructure before expanding or worrying about silly climate change goals that only increase the cost of living and ultimately have no actually effect
Anonymous 1/19/2025 04:52 PM	Maintaining the roads that we do have. Significant potholes throughout Elmira and surrounding roads/highways.
Anonymous 1/20/2025 08:37 PM	Better bussing options and need road connecting Fountain Street to Ottawa street
Anonymous 1/21/2025 11:05 AM	Some roads in Elmira are absolutely terrible. Every year Whippourwhil has the same potholes which we bandaid fix with pylons or filling them slightly. However at this point if you hit one of these 8 holes your rim and tire are done for.
Anonymous 1/21/2025 04:34 PM	The township does an appalling job at maintaining the roads already within the township and hasnt kept up with growth in Elmira/St Jacobs. The walking trails are nice. Expanding public transit is fine but lessens the small town feel. Have more amenities

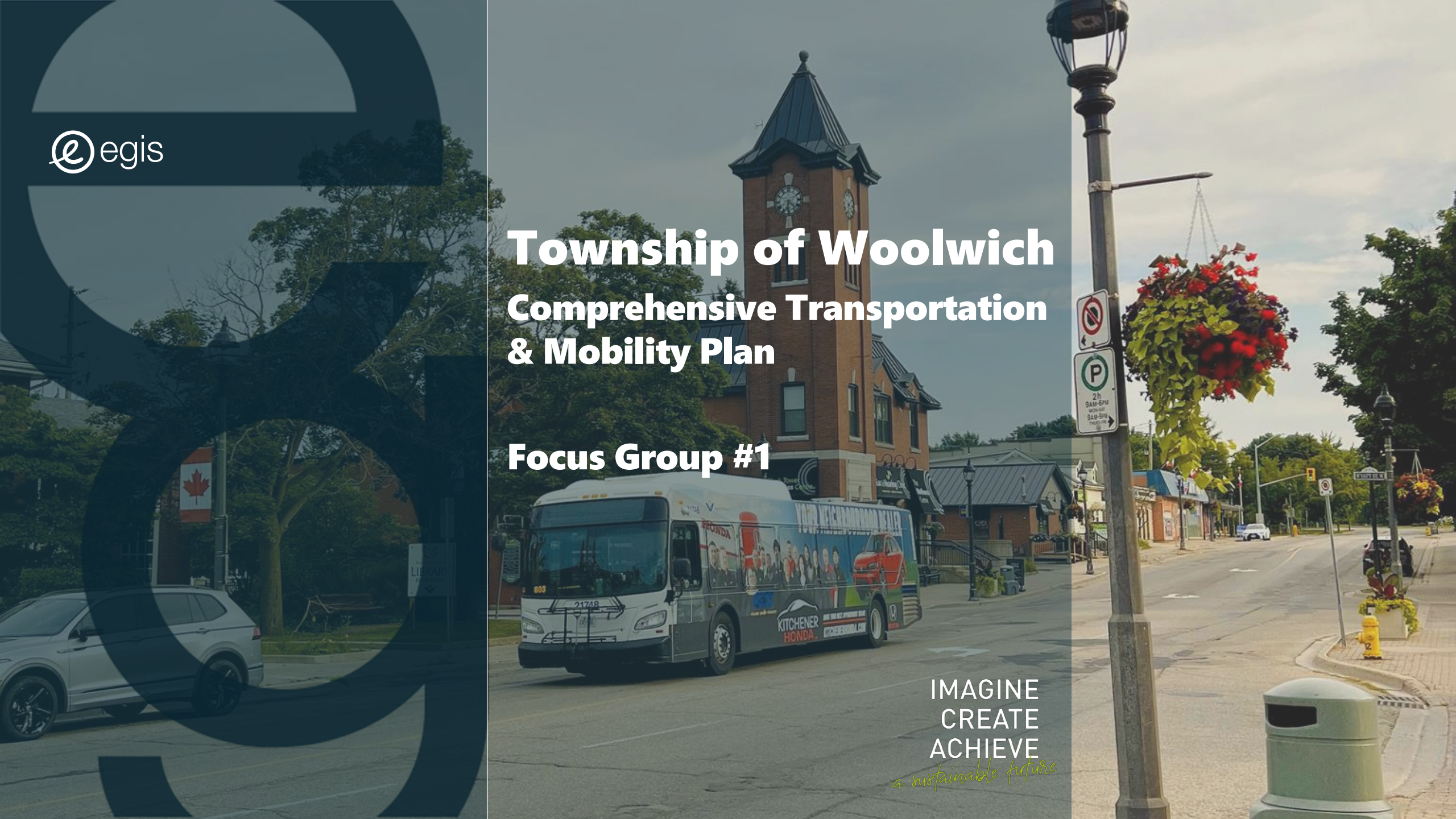
Anonymous 1/22/2025 02:02 PM	We need the bridge twinned after the St. Jacobs roundabout as we have added so many subdivisions within Elmira that travelling to Kitchener Waterloo is very congested and there are lots of accidents because of it.
Anonymous 1/22/2025 02:15 PM	Traffic into and out of Elmira is awful. From Whipporwill to the Listowel Rd. sometimes takes over 15 minutes. 55 minutes. Also the deplorable condition of some of our roads in the township and more specifically Elmira embarrassing.
Anonymous 1/22/2025 02:17 PM	There needs to be more options for employees to get to work from areas outside the Township or even in different areas in the Township. Woolwich is losing talented workers because of the barrier of transporting to work.
Anonymous 1/22/2025 02:19 PM	None.
Anonymous 1/22/2025 02:52 PM	No
Anonymous 1/22/2025 03:02 PM	Road infrastructure has not kept up with increase in population. Public transit is great, but not feasible for everyone when living in a smaller rural community
Anonymous 1/22/2025 03:17 PM	It get too congested some days
Anonymous 1/22/2025 03:20 PM	When looking at it consider the physically disabled people that live in our community, the seniors and having small children in strollwes
Anonymous 1/22/2025 03:21 PM	Fix downtown Elmira!
Anonymous 1/22/2025 03:31 PM	N/A
Anonymous 1/22/2025 03:36 PM	Improve the roads: pot holes. Improve the sidewalks: some areas are flooded with water in the spring and ice in the winter. Difficult for

	walkers, runners and accessibility. Look at stop lights: add advanced signals & count downs.
Anonymous 1/22/2025 03:36 PM	Vehicle traffic travelling on the highway from Elmira to Waterloo is too heavy for the current road as constructed and the problem is only going to become exacerbated by the future development planned for Elmira.
Anonymous 1/22/2025 04:37 PM	A bypass route needs to be developed as soon as possible. This would address many concerns, infrastructure degrading, safety, allow for walking and cycling safety. etc.
Anonymous 1/22/2025 04:40 PM	Bypass needed and downtown speed limit enforcement
Anonymous 1/22/2025 04:53 PM	When Arthur St gets redone, incorporate plans to complete it quicker, even if it means shutting road down completely to shorten the timeline. I'm not certain but I would assume allowing access in some areas delays. worth asking businesses their opinion
Anonymous 1/22/2025 06:50 PM	Built a bypass around Elmira to free Arthur and Chuch street from the trucks and car going somewhere else than Elmira.
Anonymous 1/22/2025 07:03 PM	The highway from Elmira to st Jacobs needs a repair and expansion
Anonymous 1/22/2025 08:32 PM	Slanted sidewalks are an insult to pedestrians and those using mobility devices.
Anonymous 1/22/2025 10:03 PM	I would like to see continued efforts into a truck bypass.
Anonymous 1/23/2025 04:45 AM	Roads need to be safer for horse and buggy travel. (ie: curbs, dust curtain. Tie ups) School.zones must be more equitable!!! Why are some zones 40, 50, unmarked? (Parochial.schools are treated unequitably). Make public transit more accessible.
Anonymous 1/23/2025 07:05 AM	Affordability needs to be a stated constraint. I may be able to afford marginally increased tax levies, but can those who are already facing uncomfortable financial choices?

Anonymous 1/23/2025 07:19 AM	The lights and cross walks on Arthur street in down town should be reconsidered. Most people cross the street downtown at the intersection of Arthur and Wyatt and this intersection has no cross walks or lights, while other less used ones do.
Anonymous 1/23/2025 10:26 AM	DO NOT create biking lanes down the mainstreet of ELMIRA. Retailers require more sidewalk space to create out door seating, charm and accessibility. Biking can be done on secondary roads and still get around quickly.
Anonymous 1/23/2025 10:52 AM	I think there should be more police presence or monitoring of speed, traffic problems during rush hour and locating stop lights at Duke and Church streets so children crossing over to bolendar park.
Anonymous 1/23/2025 01:02 PM	The Elmira Community Bus and its free service is something to champion, promote, protect, and expand. Replacing this with a fare based system will hurt many already marginalized communities within Elmira. This service should be made permanent.
Anonymous 1/23/2025 01:19 PM	I noted horse and buggy as an option on here. Most folks that use horse and buggy wouldn't have access to an electronic survey.
Anonymous 1/23/2025 06:01 PM	The conestogo bridge on glassgow st s has to open to 2 way traffic! fire truck can't go over that bridge. It should be made accessible before construction on scheifele bridge , Northfield university to conestogo should not be a 80km
Anonymous 1/23/2025 06:53 PM	Trails off of our main regional roads for cycling and buggies to travel on. Safety!
Anonymous 1/24/2025 07:49 AM	Adding a bus stop in Conestoga would be incredibly helpful for students with/looking for jobs, as well as providing transportation for the elderly who may not feel comfortable driving
Anonymous 1/24/2025 05:12 PM	Build towards a comprehensive connected cycling infrastructure with protected bike facilities

Anonymous 1/25/2025 11:45 AM	Arthur St in Elmira is frequently in a chokehold by crossing lights and transport trucks. I work on that street and there are near misses and congestion daily. Also delivery trucks to Never Enough Thyme park in the Main Street and clog traffic, buses etc.
Anonymous 1/25/2025 01:24 PM	Do not make a bypass that will totally negate coming to Elmira. Core area already struggles and you put a bypass people will also use it and not come to Elmira and that will hurt us even more struggles
Anonymous 1/25/2025 01:54 PM	FIX THE ROADS!!!
Anonymous 1/25/2025 07:07 PM	No
Anonymous 1/27/2025 10:46 AM	Infrastructure for better public transportation, in particular to smaller communiites is vital
Anonymous 1/29/2025 09:57 AM	The township should consult with the cycling community to find out what barriers there are, if any, for cyclists travelling to, from and within the township. For many cyclists from KW, highway 85 is not a safe option for travelling to the township.
Anonymous 1/29/2025 04:37 PM	I do worry about safety of our visitors. People still drive very quickly through the village. I am very happy that there is a bus route for people to travel to the village from Kitchener/Waterloo.

Optional question (51 response(s), 41 skipped)
Question type: Single Line Question



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Township of Woolwich

Comprehensive Transportation & Mobility Plan

Focus Group #1

IMAGINE
CREATE
ACHIEVE
a sustainable future

Contents

1 . Context & Objectives of the CTMP

2 . Planning Context

3 . Existing
- a) Travel Demand Trends
- b) Transportation Network
- c) MMLOS Analysis

4 . Population, Employment and Growth

5 . Questions & Answers

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1

Context and Objectives of the CTMP

Woolwich Comprehensive Transportation & Mobility Plan

Main Objectives

- Plan for Future Growth
- Support Low-Carbon, Climate-Resilient Communities
- Promote Transit-Ready Communities
- Improve Safety and Accessibility
- Optimize Parking Policies

Woolwich Comprehensive Transportation & Mobility Plan

Expected Outcomes

Vison Statement and Objectives

Develop a vision statement focusing on connectivity, sustainability, safety, and equity, with measurable objectives for the transportation network

Transportation Infrastructure Analysis

Provide a comprehensive inventory and assessment of current transportation infrastructure, including roads, public transit, and active transportation networks

Demographic and Economic Analysis

Analyze population growth, employment trends, and economic factors influencing transportation needs, with a focus on inclusivity and meeting diverse community needs

Stakeholder Engagement

Organize public workshops, focus groups, and surveys to gather input from various stakeholders, ensuring transparent communication throughout the planning process

Transportation Demand Forecasting

Use appropriate methodologies to predict future transportation needs, especially in growing communities such as Elmira, Breslau, and St. Jacobs

Modal Shift Strategies

Propose strategies to encourage a shift from single-occupancy vehicles to alternative transportation modes such as public transit, cycling, and walking

Transit-Oriented Development (TOD) Recommendations

Identify opportunities for mixed-use, compact developments around transit hubs like the proposed Breslau GO Station and bus routes

Parking Analysis

Evaluate current parking provisions, with a focus on affordable housing, and propose adjustments to prevent over-parking in new developments

Sustainability and Safety Improvements

Recommend sustainability strategies and safety measures to enhance road safety, accessibility, and minimize environmental impacts

Action Plan and Implementation Strategy

Provide a detailed action plan with specific projects, timelines, funding sources, and recommendations for monitoring and evaluating progress

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Woolwich Comprehensive Transportation & Mobility Plan

Problem / Opportunity Identification

1. Background Data Collection
2. Current Infrastructure Analysis
3. Population and Employment Trends Analysis
4. Problem Identification

Engagement Round #1

Identification of Alternatives and Preferred Solutions

1. Transportation Demand Forecasting
2. Alternative Solutions Development
3. Modal Shifting Strategies
4. Integration with Land Use Planning
5. Implementation Plan Development

Engagement Round #2

Documentation and Finalization

1. Draft CTMP
2. Final CTMP

End
Summer '25

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2

Planning Context

Woolwich Comprehensive Transportation & Mobility Plan

Some background (1 of 2)

Township of Woolwich's Official Plan

Opportunities:
- Promoting active transportation: Focus on creating walkable, connected communities with amenities within 15 min. of homes
- Enhancing public transit: Plans to strengthen public transit and regional connectivity between rural and urban areas

Challenges:
- Reducing car dependence: Addressing the challenge of reducing private vehicle reliance, especially in rural areas
- Aligning transportation with growth: Ensuring infrastructure grows to meet increasing population and employment demands

2018 Waterloo Transportation Master Plan

- **Road Network:** Improve traffic flow, build Elmira By-Pass, and widen Arthur Street
- **Active Transportation:** Enhance walking and cycling infrastructure for safer, accessible routes
- **Public Transit:** Improve routes in Woolwich and connect to Waterloo Region and major transit hubs like Breslau GO Station
- **Connectivity:** Support GO Transit and high-speed rail development
- **Safety:** Implement road safety measures and ensure accessibility for people with disabilities

Federal Housing Accelerator Fund (HAF)

- The Federal Housing Accelerator Fund (HAF) provides $6.7 million to Woolwich
- It supports the construction of 190 housing units in three years
- Over 1,600 homes are planned for development over the next decade
- Significant population growth and economic opportunities are expected
- Increased housing will require improvements in transportation and infrastructure to support the growing population

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Woolwich Comprehensive Transportation & Mobility Plan

Some background (1 of 2)

2023 Township of Woolwich's ATMP

Opportunities:
- Developing a regional cycling network with N-S and E-W connectivity, even on higher-volume or higher-speed roads
- Enhancing existing trails and sidewalks in settlements to create a strong foundation for future AT connectivity

Challenges:
- Limited funding and resources for the development and maintenance of the AT network
- Encouraging greater AT use in settlements like Elmira, Breslau, and St. Jacobs to reduce reliance on motorized vehicles for local trips

Arthur Street Improvements and Elmira Bypass EA

Part A (Arthur St):
- A 6 km section of Arthur St (Regional Rd 85) from ~900 m north of Hwy 85 and King St. overpass to Listowel Rd will be assessed for potential widening. This segment extends from the City of Waterloo to the southern limits of Elmira.

Part B (Elmira Bypass):
- To redirect traffic- especially trucks - away from Elmira's downtown, a potential bypass will be evaluated. This study aligns with the Region's 2023-2027 Strategic Plan. The EA is expected to be ready for Regional Council approval by late 2025 or early 2026.

2024 Breslau Settlement Area Transportation Network Strategy

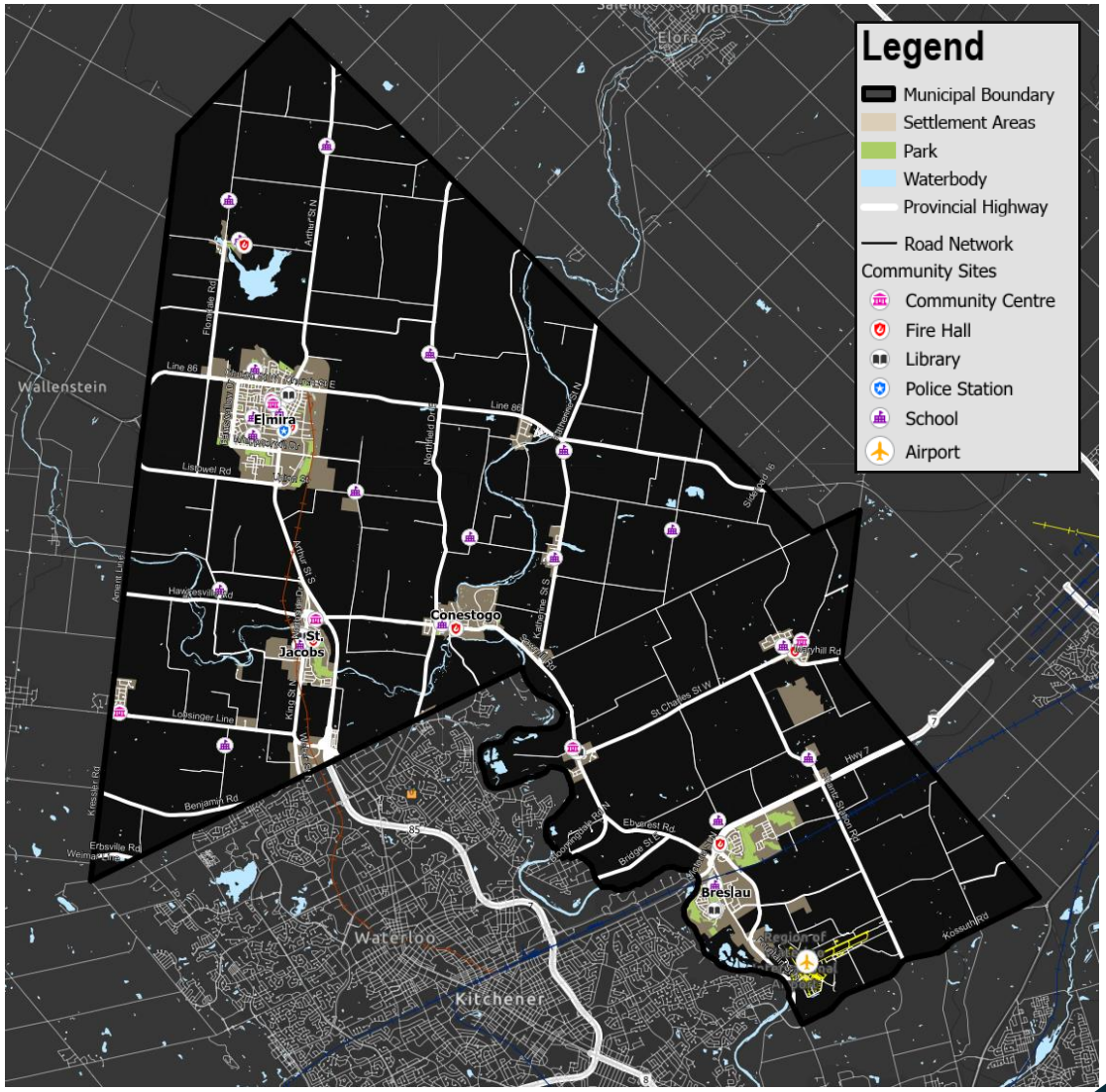
- **Current Population:** Breslau has ~7,000 residents along Woolwich St. S and north of the Metrolinx rail line.
- **Future Growth:** By 2051, population could reach 43,000, with employment up to 42,500, depending on infrastructure and airport growth
- **Transportation Network:** Key assets include Highway 7, Metrolinx rail, an airport, a proposed GO Station, and regional/local roads
- **Transit Service:** Breslau lacks regular transit and is currently only served by on-demand Route 79.
- **Active Transportation:** AT links are limited, while MTO is advancing the new Highway 7 from Kitchener to Guelph.

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Woolwich Comprehensive Transportation & Mobility Plan

Town of Woolwich

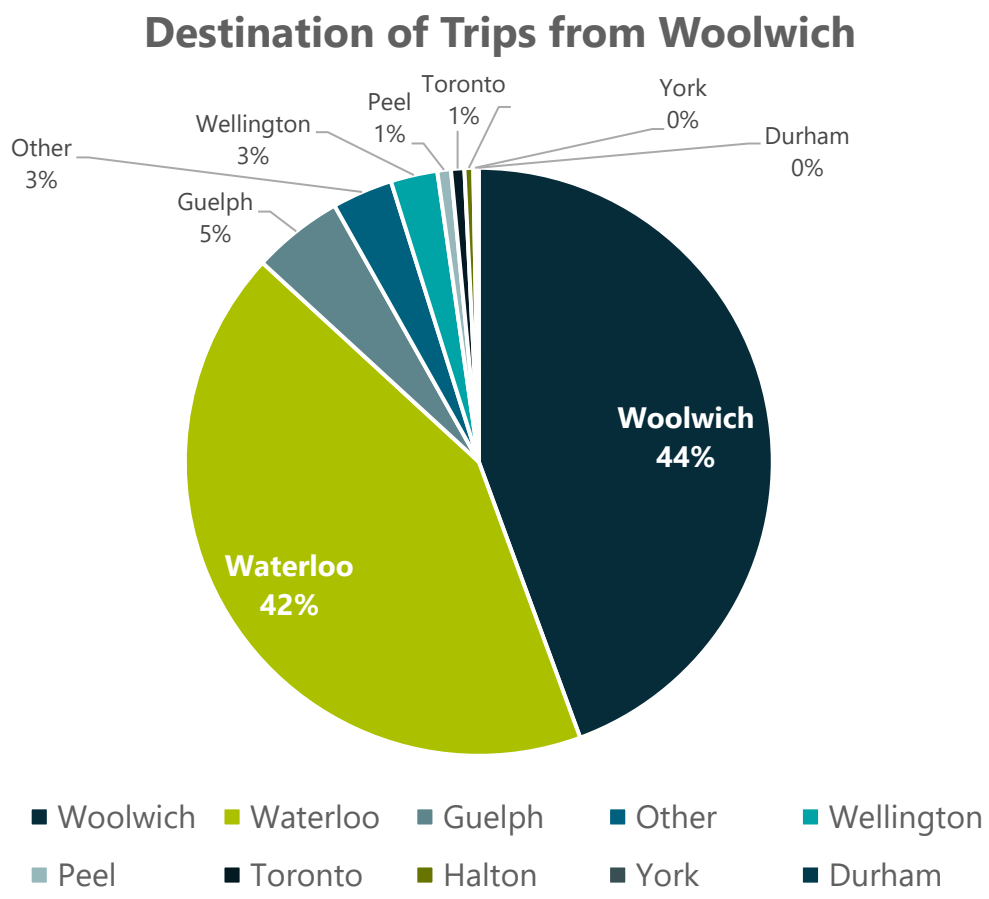
- The map to the right highlights the different settlement areas in Woolwich and their respective generators
- Elmira, the largest community in the township, has the highest concentration of generators. Other significant settlement areas include:
  - St. Jacobs, a well-known tourist destination famous for its farmers' market, antique shops, and Mennonite heritage
  - Breslau, a rapidly growing community near Kitchener and the Region of Waterloo International Airport



3a

Existing Travel Demand Trends

Woolwich Comprehensive Transportation & Mobility Plan

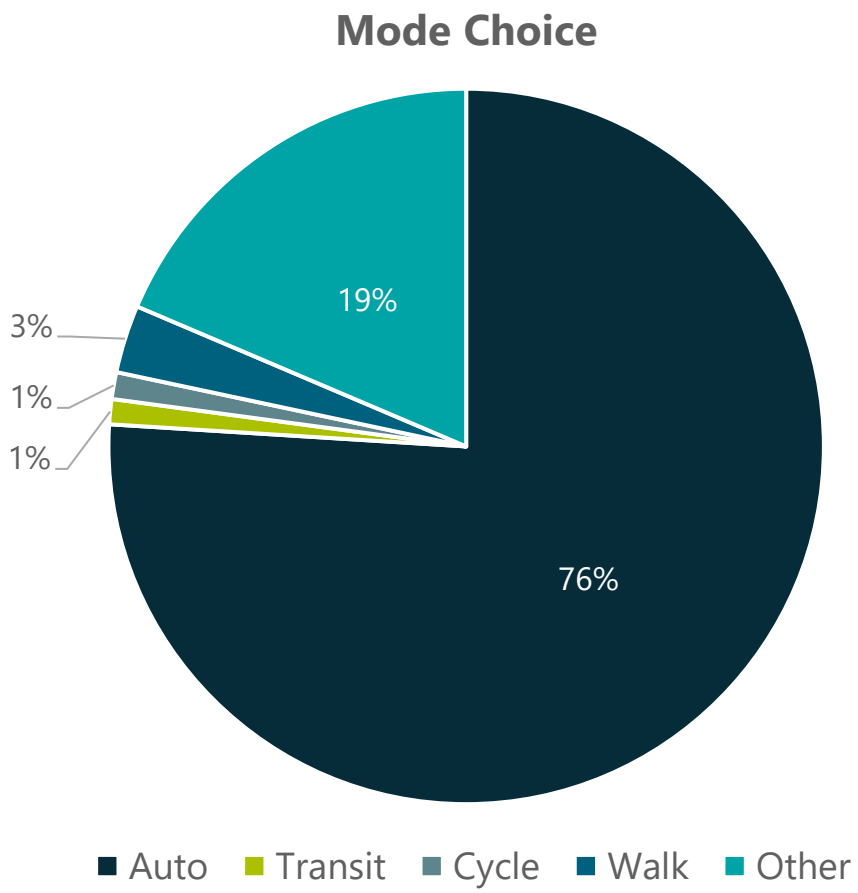


Source: TTS 2016, 24h Period

Where Do People Traveling in Woolwich Go?

- 86% of trips originating in Woolwich remain within the Waterloo Region, with 44% staying within Woolwich itself
- Other significant destinations include:
  - Guelph
  - Wellington
  - Others, including external areas beyond the GTHA

Woolwich Comprehensive Transportation & Mobility Plan

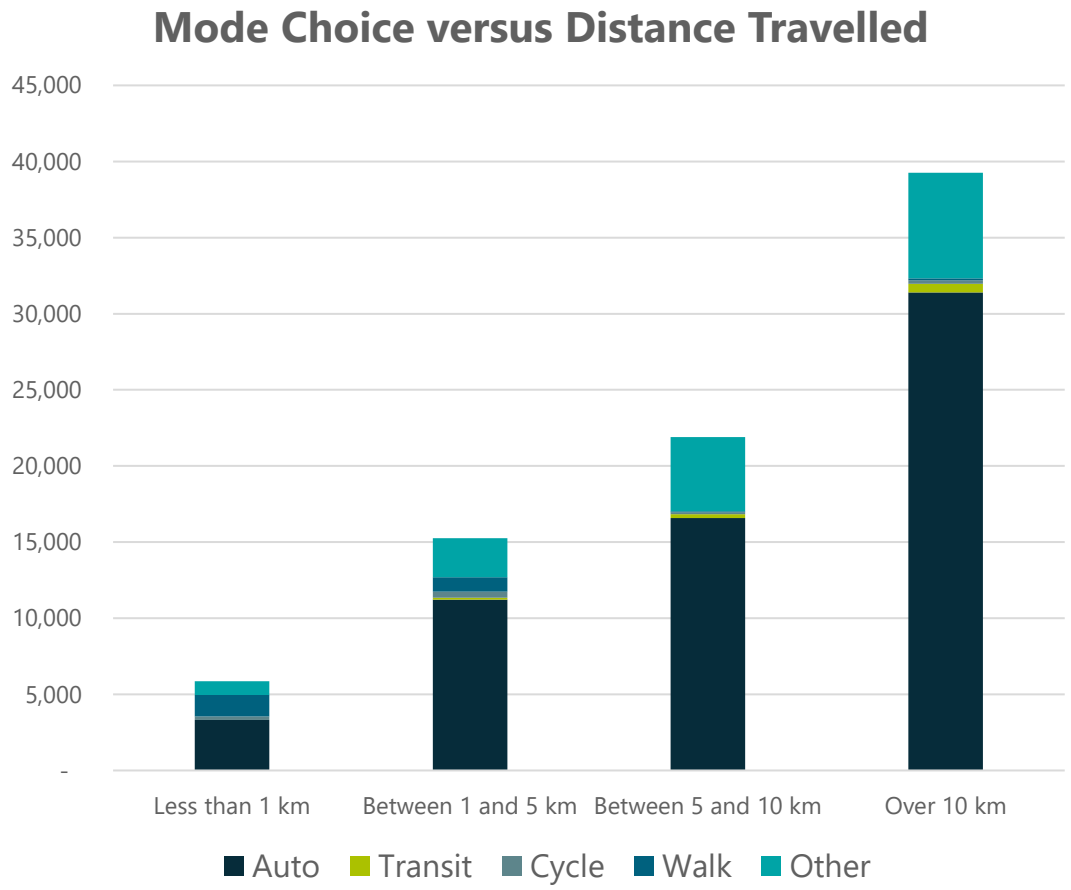


Source: TTS 2016, 24h Period

Which Modes of Transportation Do People Use in Woolwich?

- 76% of trips generated in Woolwich are made by driving a car
- 19% use other modes, which include a significant proportion of vehicle passengers
- Transit, cycling and walking represent 5% of mode share in Woolwich

Woolwich Comprehensive Transportation & Mobility Plan



Source: TTS 2016, 24h Period

How Does Travel Distance Affect Mode Choice?

- 48% of trips cover distances greater than 10km, with 80% of these trips made by driving a car
- 26% of trips are under 5 km, where walking or cycling should be attractive options. However, in Woolwich, only 8% of these short-distance trips use these modes

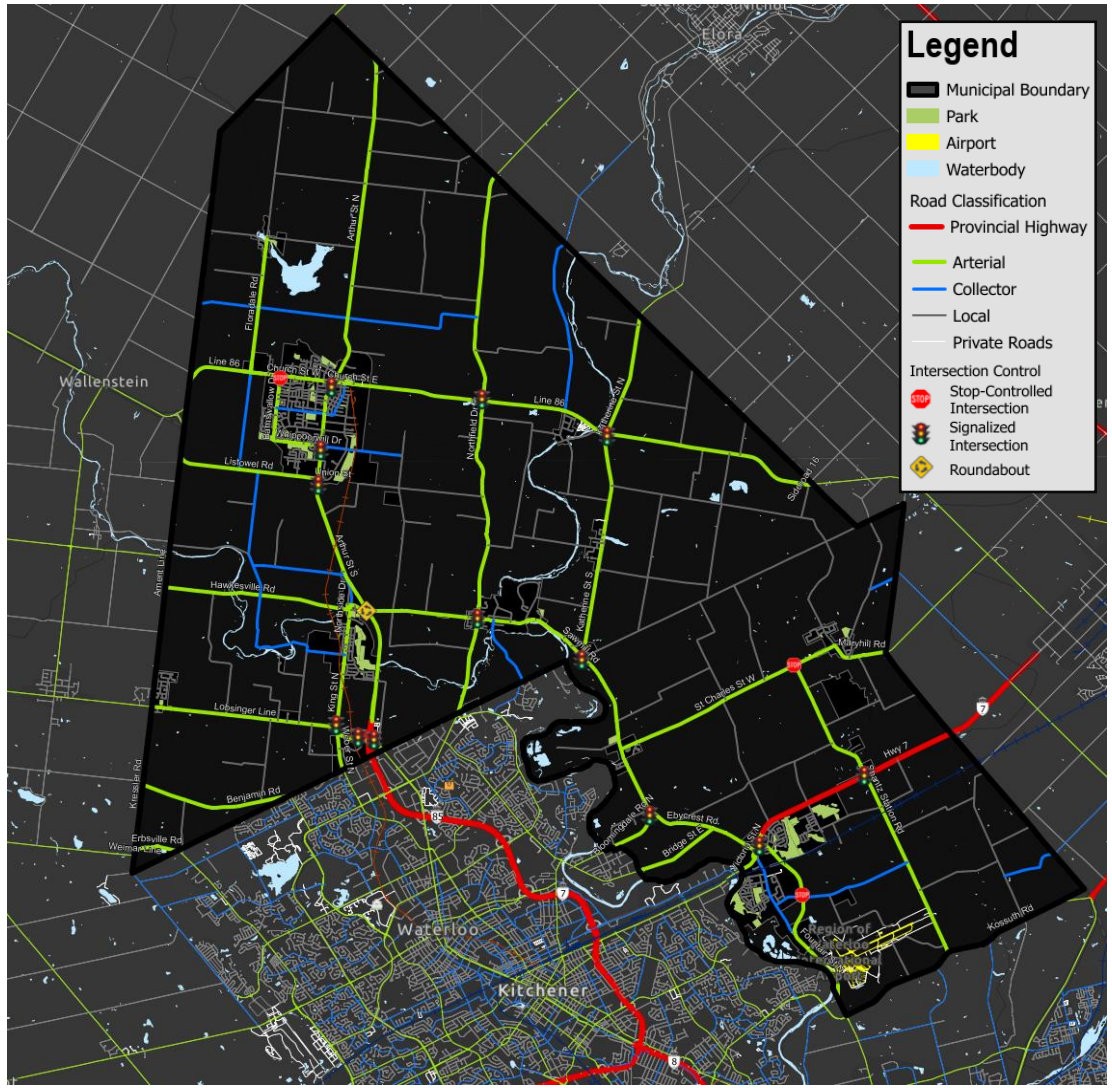
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Existing Transportation Network

Woolwich Comprehensive Transportation & Mobility Plan

Existing Road Classification

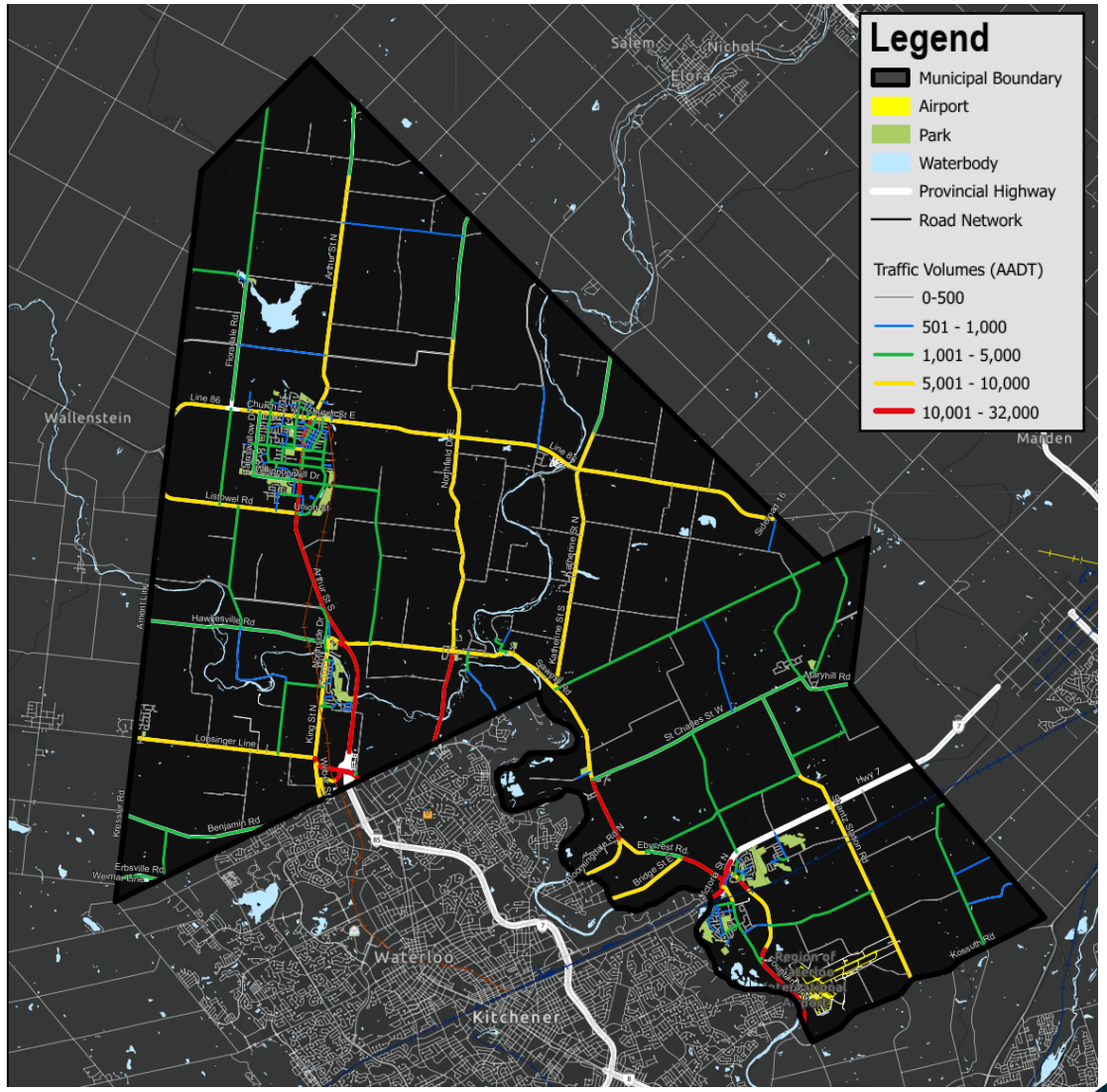
- The map to the right illustrates the current road classification in Woolwich, which include provincial highways, arterials and collectors
- The most important arterial roads in Woolwich are:
  - Provincial Roads:
    - ✓ Highway 85 (Conestoga Pkwy)
    - ✓ Highway 7 (Victoria St N)
  - Regional Roads (RR):
    - ✓ RR 8, 17 and 28 (Fountain St)
    - ✓ RR 15 (King St)
    - ✓ RR 17 (Sawmill Rd)
    - ✓ RR 22 (Northfiled Dr)
    - ✓ RR 21 & 85 (Arthur St)
    - ✓ RR 86 (Line 86)



Woolwich Comprehensive Transportation & Mobility Plan

Existing Average Annual Daily Traffic Volumes

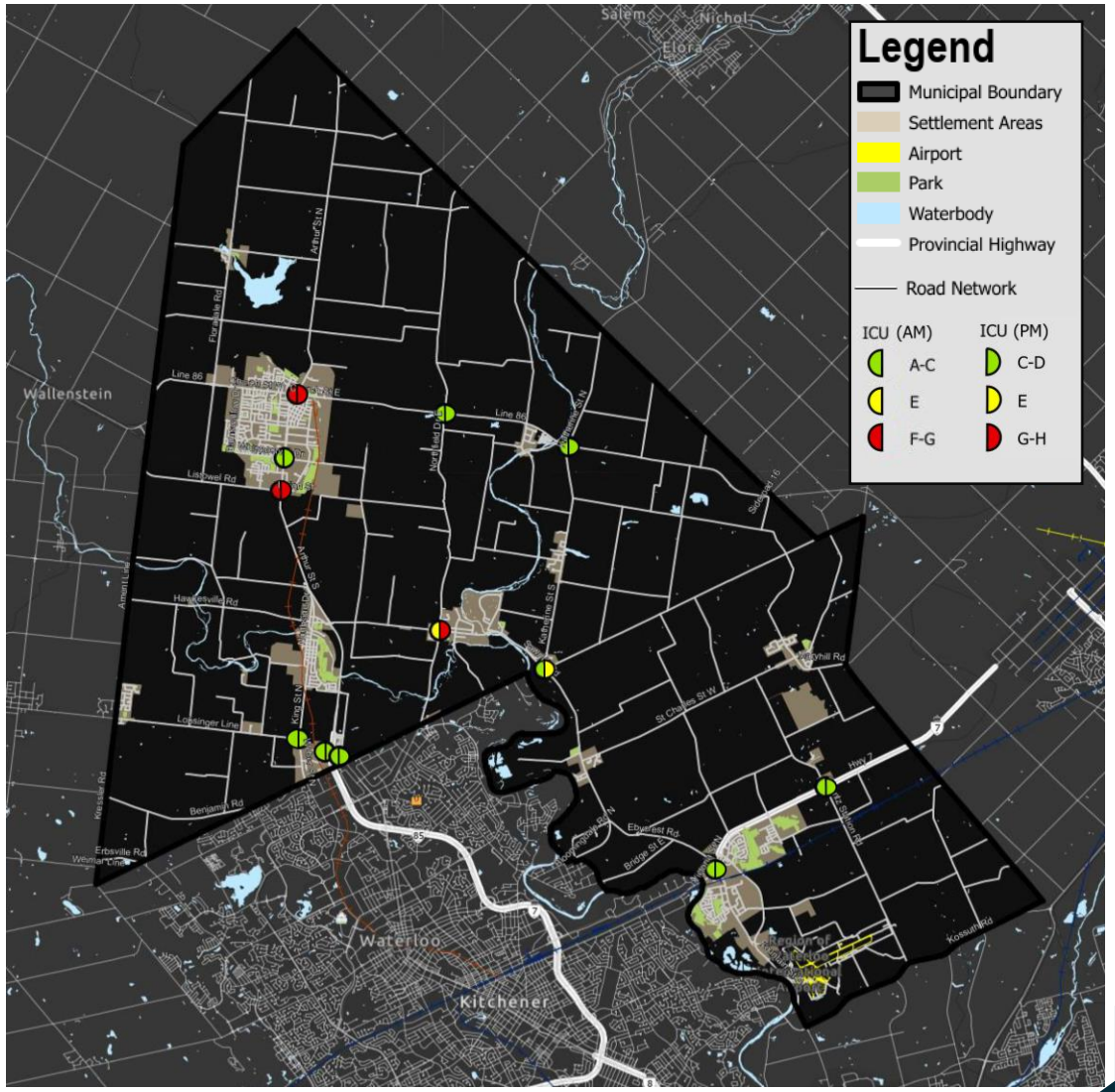
- The map to the right highlights the areas with the highest traffic volumes on Woolwich's road network
- Busiest roads (with AADT > 10,000) are:
  - Arthur St
  - Northfield Dr. East, south of Sawmill Rd
  - Victoria St N (Hwy 7) and Fountain St N (Hwy 11) in the Breslau Area
- Most arterial roads have AADT volumes ranging between 5,000 and 10,000 vehicles



Woolwich Comprehensive Transportation & Mobility Plan

Existing Capacity at Intersections

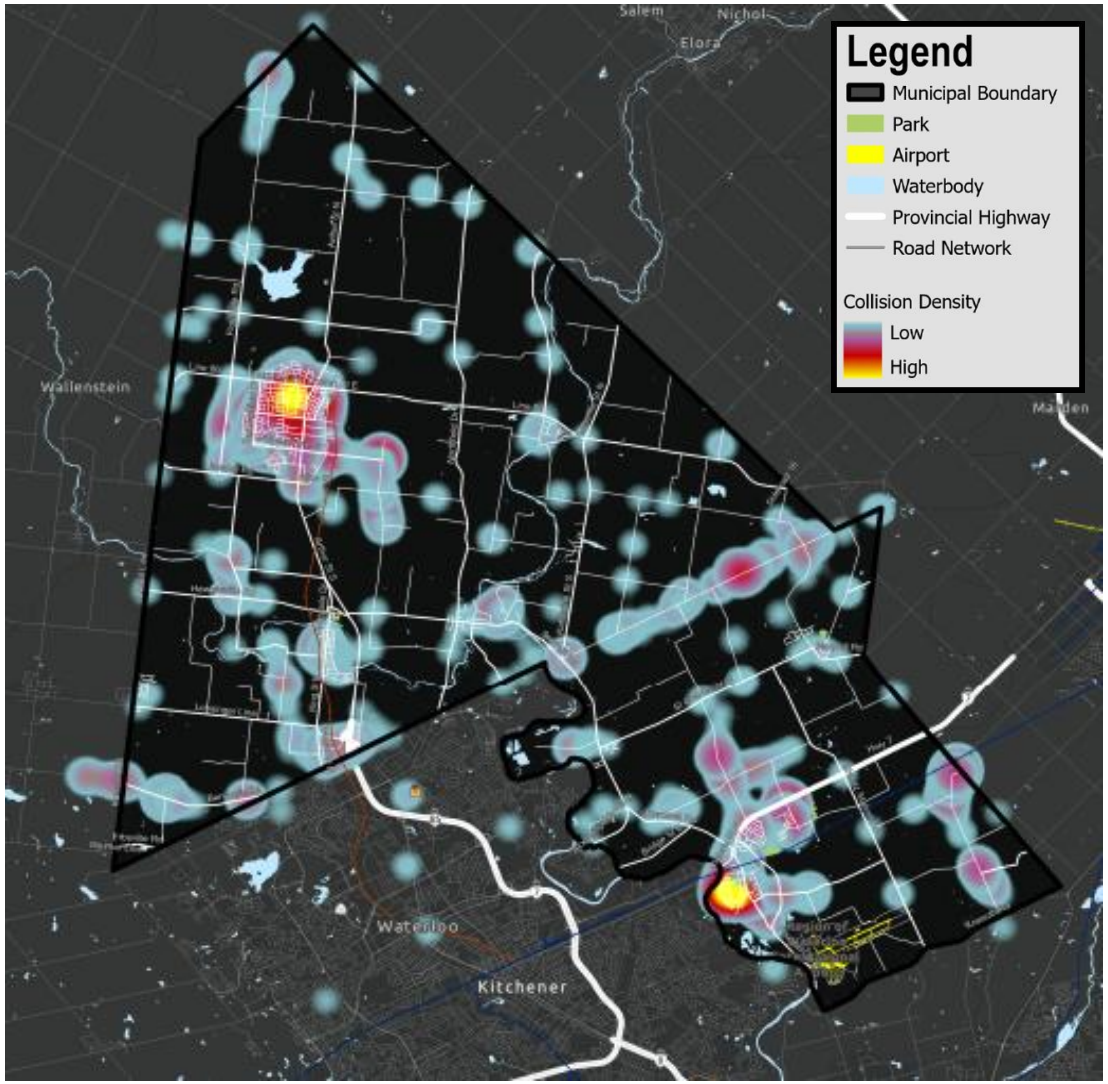
- The map to the right illustrates Intersection Capacity Utilization (ICU) during the AM and PM weekday peak hours for all major intersections in Woolwich
- It is important to note that four intersections have not yet been analyzed, as data collection is scheduled for the spring
- The intersections experiencing the most significant constraints include:
  - Arthur St at Listowel Rd and Line 86, which show high levels of congestion
  - Sawmill Road at Northfield Drive East, which also appears to be operating at capacity in the afternoon



Woolwich Comprehensive Transportation & Mobility Plan

Collision Frequency between 2019 and 2024

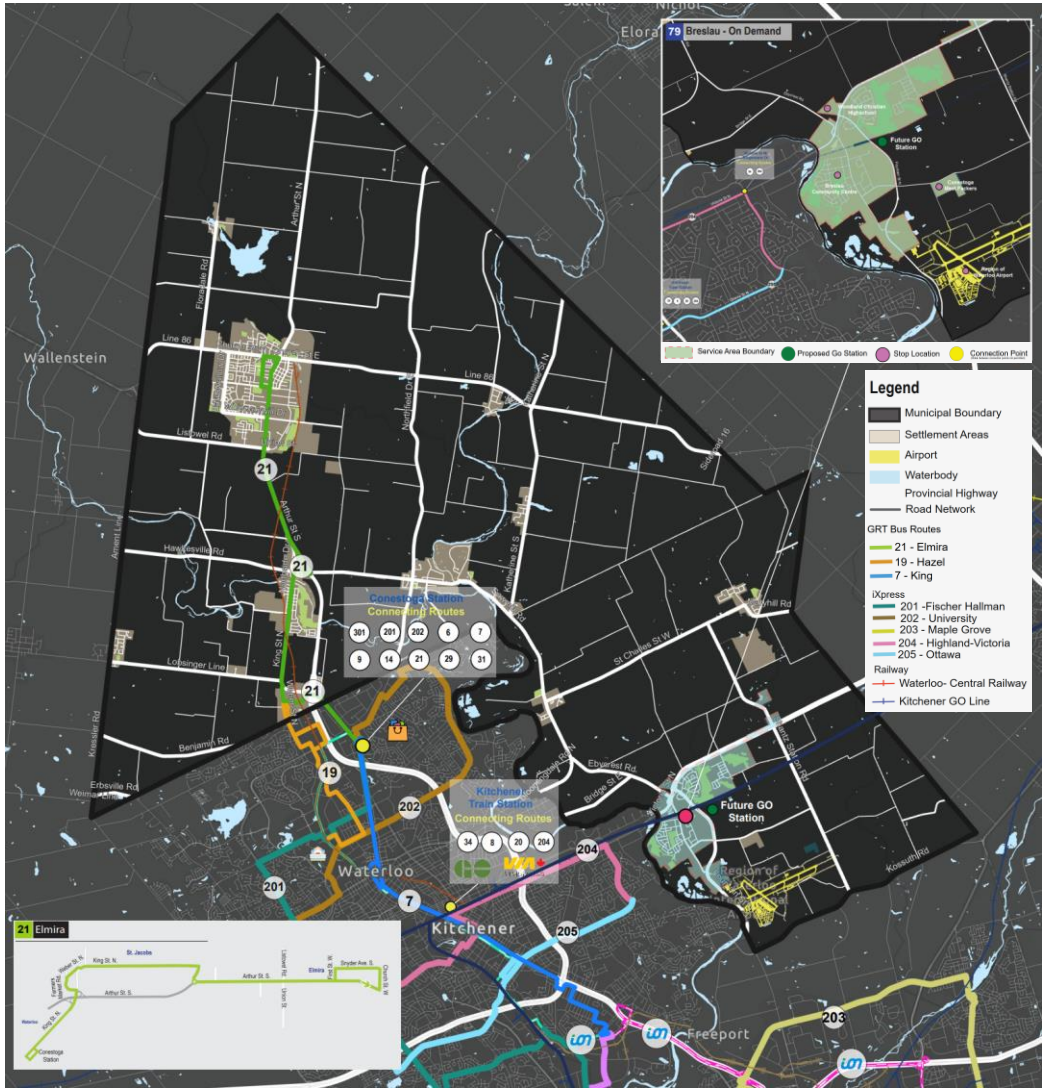
- The map to the right highlights the locations with the highest collision frequencies on Woolwich's road network between 2019 and 2024
- As expected, the majority of collisions occurred in the Elmira and Breslau communities, where traffic volumes are highest
- Further analysis will be conducted in these areas to assess the severity of the collisions



Woolwich Comprehensive Transportation & Mobility Plan

Existing Transit Network

- The map to the right shows the transit network in Woolwich
  - **Route 21 Elmira:** fixed-route service between Elmira, St. Jacobs and Conestoga Station
  - **Route 79 Breslau:** an on-demand service in Breslau that connects to Victoria/Lackner, Victoria/Bingemans Centre Drive, the Kitchener Train Station, and Central Station
- A **GO Station in Breslau** is planned, which would provide GO Transit passenger service on the Kitchener line, which connects to Brampton, Mississauga and Toronto



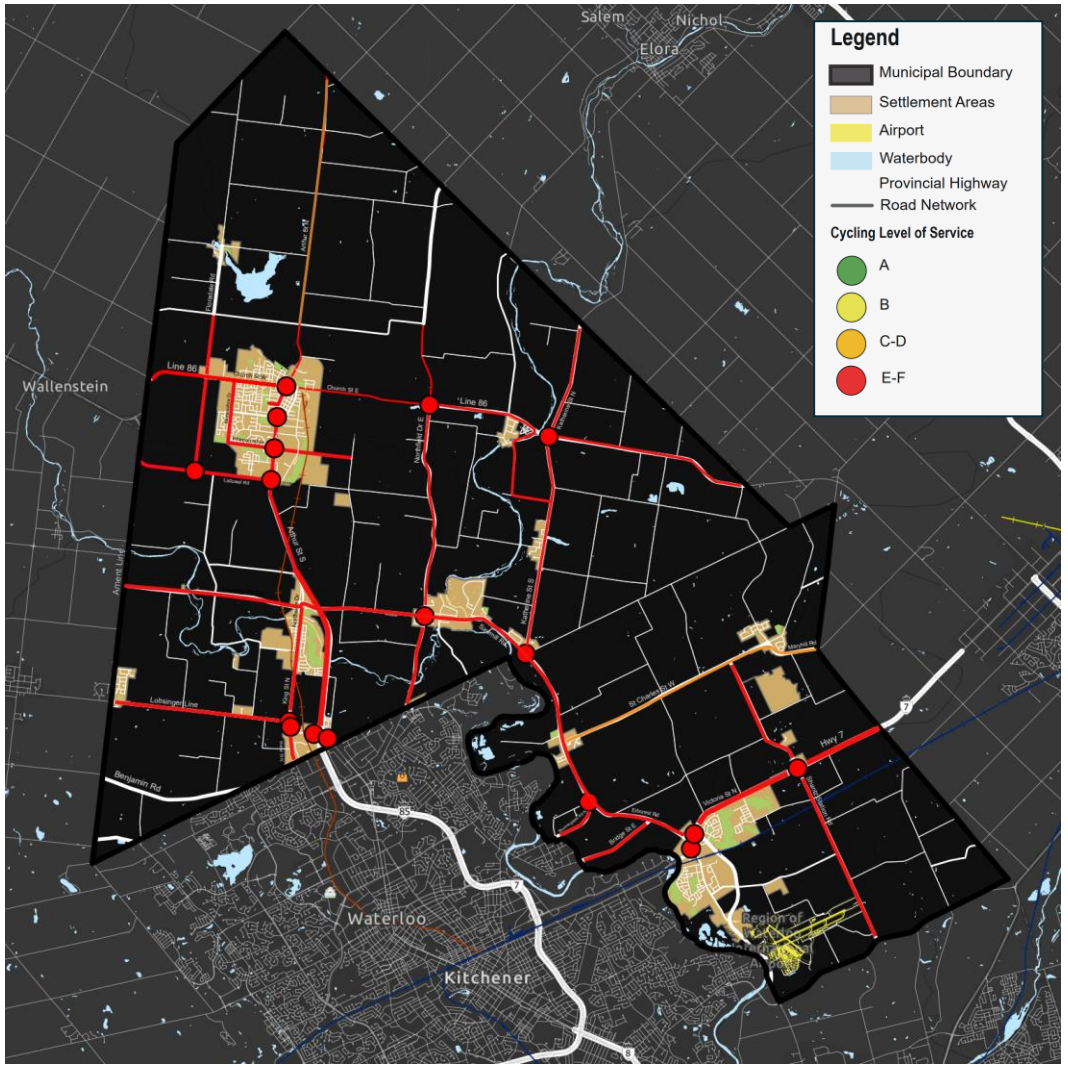
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Multimodal Level of Service (MMLOS)

Woolwich Comprehensive Transportation & Mobility Plan

Existing Bicycle LOS (BLOS)

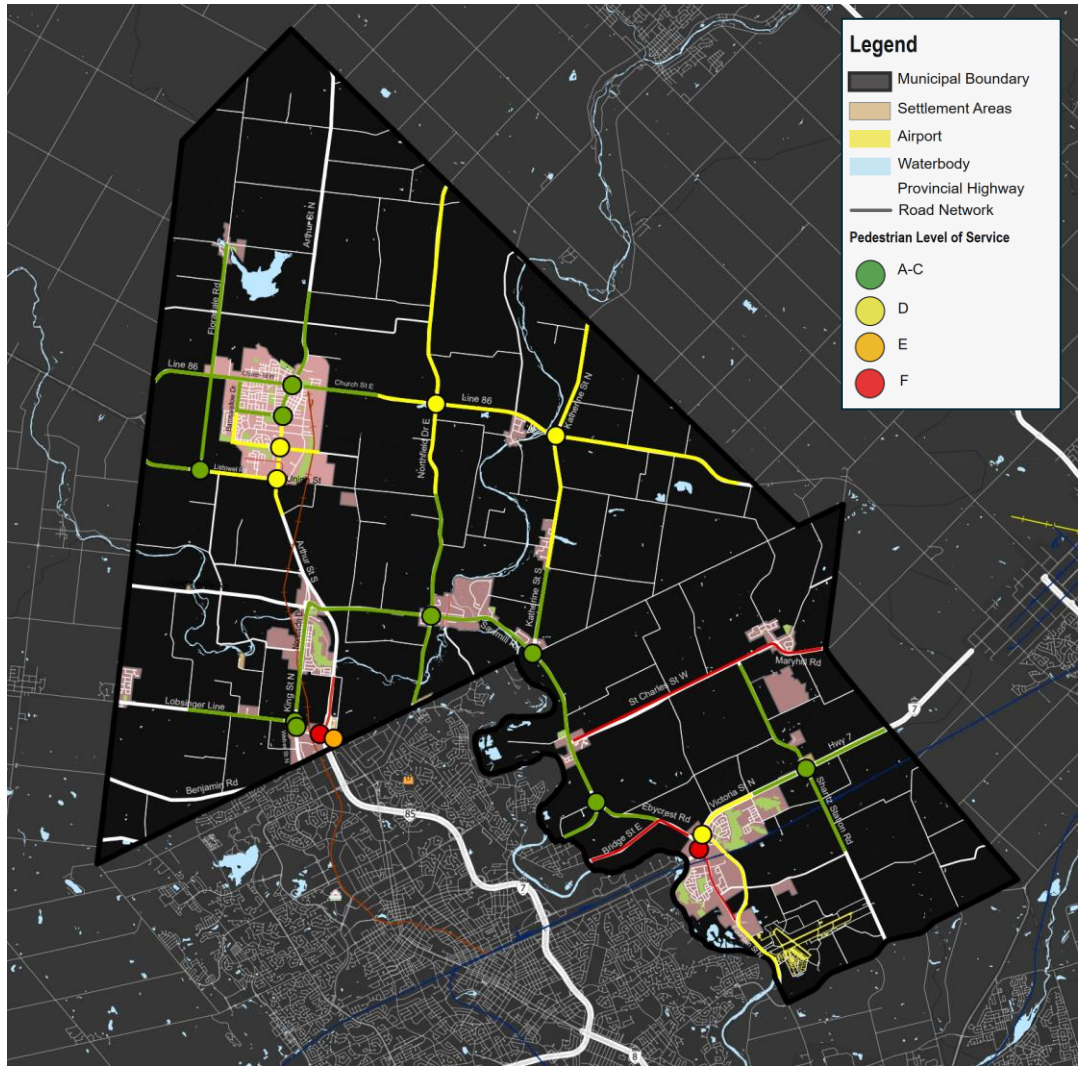
- Evaluation of existing bicycle infrastructure was assessed based on:
  - Bike lane width
  - Traffic volume
  - Travel lanes
  - Vehicular operating speed
- Average level of service is '**D**' for bike infrastructure within Woolwich
  - Existing bicycle infrastructure provides a moderately poor experience for cyclists
- Multiple arterial roads have a BLOS '**E**' or '**F**'
  - Indicates high-stress conditions. BLOS E has narrow or no bike lanes and high traffic speeds, while BLOS F is unsafe, congested, and suited only for experienced cyclists



Woolwich Comprehensive Transportation & Mobility Plan

Existing MMLOS Analysis - Pedestrians

- Evaluation of existing pedestrian infrastructure was assessed based on:
  - Sidewalk and boulevard widths
  - Annual average daily traffic
  - Presence of on-street parking
  - Crosswalk treatments
  - Vehicular operating speed
- Average level of service is '**E**' for pedestrian infrastructure within Woolwich
  - Existing pedestrian infrastructure provides a poor experience with low level of comfort and increased risk for pedestrians



4

Population, Employment & Growth

Woolwich Comprehensive Transportation & Mobility Plan

Forecasted Growth and Intensification Target



Population

The Township's population is forecast to grow to **51,200 people by 2051,** which represents an increase of **22,300 people or 78% from 2021 levels**.



Employment

Employment in the Township is forecast to grow to **33,000 jobs by 2051**, which represents an increase of **15,700 jobs or 90% from 2021 levels**.



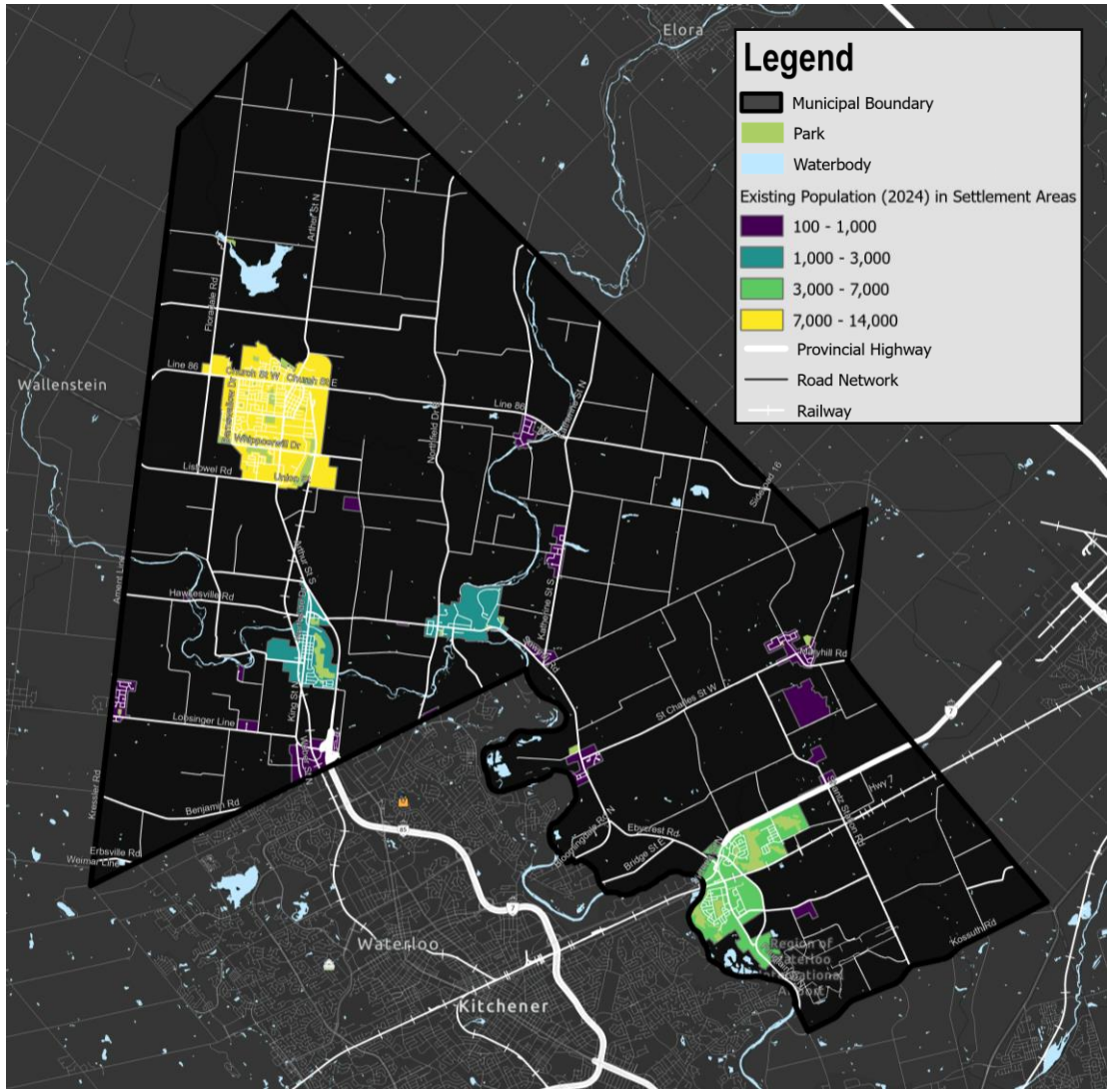
Intensification Target

The Township is to achieve a minimum **residential intensification rate of 20% annually and a total 1620 new residential units** within the Delineated Built-up Area by 2051.

Woolwich Comprehensive Transportation & Mobility Plan

Existing Population

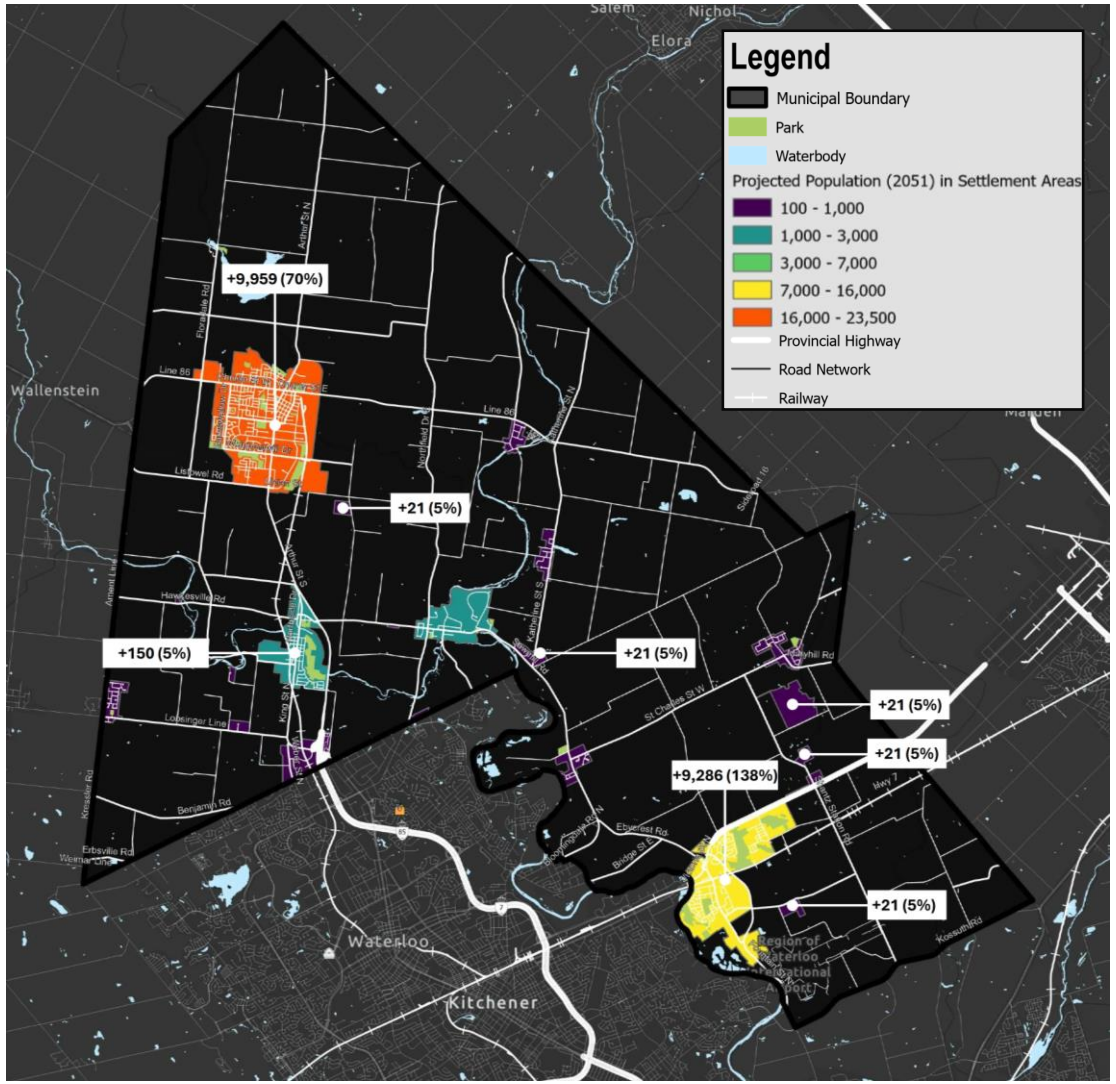
- Population data for settlement areas was provided by the Township
- Population data for some rural and other small settlements was not available. Therefore, the remaining population number was equally spread across these settlement areas
- As of 2024, the settlement areas with the highest population are:
  - Elmira
  - Breslau



Woolwich Comprehensive Transportation & Mobility Plan

Future Population by Area

- By 2051, Elmira's population is projected to grow by 70%
- Breslau's population is expected to more than double, rising from approximately 6,700 to 16,000 (+138%)
- Growth in other settlement areas is expected to be limited, with increases up to 5%, as population data was evenly distributed among them



5

Questions & Answers

Thank You

www.egis-group.com

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Minutes – Township of Woolwich Mobility Plan – Focus Group Meeting #1

Date/Time:	March 5th, 2025 @ 2:30p		
Location:	Microsoft Teams (Virtual)		
List of Attendees:	Deanne Friess	Director of Development Services	Township of Woolwich
	Ryan Tucker	Infrastructure Department	Township of Woolwich
	John Scarfone	Manager of Special projects	Township of Woolwich
	Julie Tot	Development Engineering	Township of Woolwich
	Lori Fox	Manager of development engineering	Township of Woolwich
	Dennis Aldous	Fire Chief	Township of Woolwich
	Jonathan Delli Colli	Junior Planner	Township of Woolwich
	Victor Labreche	Manager of Planning	Township of Woolwich
	Oriana Aguas	Engineering Intern, Transportation Planning	Region of Waterloo
	Leslie Maxwell	School Travel Planning Supervisor	Student Transportation Services of Waterloo Region
	Jennifer Passy	Manager of Planning	Catholic District School Board
	Paul Santos	Filling in for Jeremy	MTO
	Sarah Jewell	From MTO Project Planning Section	MTO
	Nima Farhang	Project Engineer	MTO
	François Tomeo	Project Manager	Egis
	Alina Ahmad	Transportation Planner	Egis
Subject:	Woolwich Comprehensive Transportation / Mobility Plan | Focus Group 1 Meeting		

1. Welcome and Introductions

- Introduction of project team members and stakeholders
- Brief overview of each participant's role

2. Project Overview

- Francois goes over presentation and shares existing conditions information pertaining to Woolwich via maps and completed analysis
- Purpose and objectives of the Transportation / Mobility Plan
    - Promote transit ready communities
    - Support low carbon climate resilient communities
    - Improve safety and accessibility
    - Optimize parking policies
    - Plan for future growth
- CTMP expected to be complete by end of Summer 2025
- Egis provided overview of Planning Context
    - Background review of various planning documents such as the Waterloo TMP, Woolwich Official Plan, Federal Housing Accelerator Fund. ATMP, Elmira Bypass Study, and Breslau Transportation Network Strategy documents etc were reviewed.
    - Egis reviewed the OP and Town's ATMP and identified that promoting active transportation is a very important aspect
    - Egis to ensure we strengthen transit between local and regional connectivity.
    - Egis reviewed the Federal Housing Accelerator Fund and the 2018 Waterloo TMP to identify areas to be further examined when developing the Mobility Plan.
    - A lot of growth expected for Township based on the preliminary review Egis conducted when reviewing the Federal HAF.
        - Increased housing will require improvements in transportation and infrastructure to support the growing population
    - Waterloo TMP for Breslau there were recommendations about Ottawa Street extension to Kitchener. It will be a main intensification corridor that Region highlighted and should be considered and taken into account for the Plan by Egis
    - It was identified that there has been no final decision on the Elmira By-pass. This is an on-going study
    - Current population around 27,000 for Woolwich
- Egis highlights key travel demand trends for Woolwich that illustrated where people in Woolwich travel to. Analysis was based on TTS 2016 data. Even though it is pre-pandemic data it is still relevant
- Mode choice in Woolwich
    - Which Modes of Transportation Do People Use in Woolwich?
        - 76% of trips generated in Woolwich are made by driving a car
        - 19% use other modes, which include a significant proportion of vehicle passengers
        - Transit, cycling and walking represent 5% of mode share in Woolwich
    - How Does Travel Distance Affect Mode Choice?
        - 48% of trips cover distances greater than 10km, with 80% of these trips made by driving a car
        - 26% of trips are under 5 km, where walking or cycling should be attractive options. However, in Woolwich, only 8% of these short-

distance trips use these modes

- Existing Transportation Network
    - Egis provides overview of existing network and shares maps with stakeholders
    - Information/analysis about existing road classification, traffic volumes (Busiest Roads are Arthur St and Northfield Dr etc), intersection capacity to show areas with congestion concerns, collision frequency, and transit were shown on maps
- Egis conducted Multimodal Level of Service Analysis for Bicycles and Pedestrians and used the City of Ottawa's methodology to evaluate the biking and pedestrian network.
    - Average level of service is 'D' for bike infrastructure within Woolwich
        - Multiple arterial roads have a BLOS 'E' or 'F'
    - Average level of service is 'E' for pedestrian infrastructure within Woolwich
- Breslau and Elmira two main areas where growth is anticipated significantly by 2051

3. Q&A and Open Discussion

- Leslie Maxwell comments:
    - Many of the trips made to schools township should be aware and consider partnership with them to address any issues
    - Leslie to share data around school issues with Egis team to incorporate in CTMP
- Oriana comments:
    - There might have been service changes to the existing transit in Woolwich. Oriana advised Egis to look at the GRT business plan to confirm
    - Mode sharing:
        - Oriana asks if Egis will have actual targets by 2051?
            - Francois responds saying that is the goal to have reasonable targets and look at how Township will grow and put in effective strategies to meet those goals. So this will be part of the CTMP
    - Francois asks Oriana if Region can collect counts at the roundabout?
        - Oriana to check and will get back to Egis on that. Region might have data on it
        - The roundabout on Sawmill and Arthur St , no data provided on it and John Scarfone asks if Egis can take into consideration that as well for study?
    - Oriana highlights that for LOS, in terms of the signals they are maintained by Region and they have a document that define's how the Region define's a signal as failing etc
        - Oriana to send Egis the LOS metric which is different to the one used by Egis
    - Region says that an intersection becomes a problem according to them due to delay
        - 55 secs is considered to be an LOS E
- John Scarfone comments regarding existing transportation network for Egis:
    - Do you have any plans to mention planned roads that are EA approved or not in the CTMP? – Egis will take into consideration
    - John mentions that future planned projects need to be accounted for as well as all of the EA projects
    - The roundabout on Sawmill and Arthur St , (no data provided on it to Egis) John

Scarfone asks if Egis can take into consideration that for study?

- Francois asks Oriana if Region can collect counts at the roundabout?
  - Oriana to check and will get back to Egis on that. Region might have data on it

- Victor Labreche Comments:
  - Mentions he will share updated stats on growth targets and population numbers with Egis
  - Breslau Settlement boundary has grown by 300% and need to show updated correct urban boundaries. Township to get back to egis with updated data on that as well.

- Jennifer Passy Comments:
  - Leslie highlighted the opportunity to improve trips under the 5km range. So Jennifer's question was, given that the size of the urban area, are those boundaries going to change overtime? We currently do not have an urban area that extends over 5km.
  - She also mentioned the challenge of cycling through Elmira from north to south and west to east, noting its difficulty due to lack of connectivity
  - In response, François explained how the targets will be estimated, outlining the following:
    - Roads within a 500 -1km range are considered walkable.
    - There is a need to provide good infrastructure to make cycling a more attractive option for people in Woolwich for sure
    - Trips within 3km are considered potentially shiftable to other transportation modes, such as transit

  - *After a general open discussion Egis team asks the stakeholders the following question to help with further input with the development of the CTMP* (**What do you see as the most significant transportation challenge when traveling within Woolwich or to nearby areas in the Region?):**
    - Jonathan from the Township identifies that getting from Elmira to central station in Kitchener or to Breslau is a challenge.
      - By car is faster but by transit would take long due to transfers.
      - There is a rail corridor that goes to Elmira something Region can explore with Town
    - Leslie maxwell mentions the increased volume of traffic on roads where children walk due to limited space and lack of sidewalks and connectivity issues is a issue to explore for the study
    - Oriana mentioned that the Region of Waterloo might consider incorporating green spaces into road planning and is looking to include this in their next TMP
      - Arthur Street through downtown is an example of a road lacking trees, which could benefit from incorporating green space.
    - Oriana also raised the question of how to engage the Amish and Mennonite communities, who may not have access to technology.

    - She suggested reaching out to them through their horse-drawn routes and noted that the region has a map of known Mennonite travel routes that Oriana can see if it can be shared with Egis
- Dennis Aldous highlighted that congestion on roads leading to Kitchener, Waterloo, and Guelph, especially during peak hours, causing delays for the fire department.
    - He recommended that Egis look into traffic flow in and out of the Township, particularly during peak times, and assess the volume of traffic passing through Woolwich.

4. Next Steps

- Phase 1 Report and update presentation and maps with updated stats and data
- Engagement with Indigenous Community and Mennonite Community
    - Egis to further discuss with Township of Woolwich to see how we can engage with them

Table 1: Summary of Actionable Items and Responsibilities

Item	Action
• Share data around school-related issues with the Egis team to incorporate into the CTMP	Leslie Maxwell (Student Transportation Services of Waterloo Region)
• Verify with the Region if traffic counts can be completed or if data is available for the roundabout on Sawmill and Arthur St to be shared with Egis • Send Egis the Region's LOS metric for signals, which differs from Egis' method used • Investigate whether the Region can share map of known Mennonite travel routes with Egis.	Oriana Aguas (Region of Waterloo)
• Share updated growth targets and population statistics with the Egis team. • Provide updated urban boundary data for Breslau and data for the proposed new Highway 7 path to Egis.	Township of Woolwich

Minutes – Township of Woolwich Mobility Plan – Focus Group Meeting #2 with Aaron Mennonite Community Member

Date/Time:	April 1st, 2025 @ 1:30p		
Location:	Microsoft Teams (Virtual)		
List of Attendees:	Aaron Bowman	Mailing Address: 7989 Line 86, Wallenftein N0B 2S0 T: 519-698-0176	Secretary of the Safety Committee for the Mennonite community
	Alina Ahmad	Transportation Planner	Egis
Subject:	Focus Group Stakeholder Meeting with Aaron Bowman		

1. Welcome and Introductions

- Introduction of CTMP project

2. Project Overview

- Alina from Egis shares purpose and objectives of the Transportation / Mobility Plan
    - Promote transit ready communities
    - Support low carbon climate resilient communities
    - Improve safety and accessibility
    - Optimize parking policies
    - Plan for future growth
- CTMP expected to be complete by end of Summer 2025
- Current population around 27,000 for Woolwich
- Breslau and Elmira are two main areas where growth is anticipated significantly by 2051

3. Q&A and Open Discussion

- Aaron's comments and feedback for CTMP:

    - **What are the biggest transportation challenges you see in the Township of Woolwich?**
        - The biggest transportation challenge identified by Aaron was regarding the **Peel Street Bridge Crossing**. This is located west of Winterbourne at Peel. Winterbourne is situated on Katherine St. He said it is very challenging to go across bridge with a buggy.
        - **Reedwood Drive** has been a challenge for buggy's due to potholes in the area
        - **Arthur Street at Jacobs Street** is a challenge navigating the Arthur Street corridor
        - In the near future when looking at the 2051 planning horizon, Traffic for Elmira anticipated to grow as such more local motorized vehicles to be on the road which can be a challenge when sharing the road with motorized vehicles, bikes and buggy's.

    - 100 acre farm on Southfield Rd was recently sold to potentially a developer. Truck traffic in the area is something that could potentially be looked at. There is a lot of truck traffic within Woolwich and Township should look at a By-pass for the town to manage local traffic speeds
    - Intersection of Church St and Arthur St has no signage.
- **How can we improve safety and accessibility issues in the Township of Woolwich?**
    - Provide sufficient space for buggies and horses. However, according to Aaron this is not a huge concern since the safety committee carries out enough educational awareness regarding this.
    - Horses are unpredictable but providing 1 meters of space between vehicles passing a horse is key.
    - Overall, Aaron did not have any major concerns to this and mentioned, Roads in Woolwich are well maintained and shoulders provided for buggies.
- **General Comments:**
    - There is no proper signage at the intersection of Church and Arthur St
    - The Mennonite community appreciates the Buggy Shed in Elmira. Has been there since 1800's and would appreciate to keep it there. Aaron mentioned it would be a huge loss of community if removed or something was built there and that it is very much part of the transportation picture.
    - No decent railings on the bridge near St. Jacobs. Very narrow with no sides. (Bridge seasonally closed due to water being high.. Aaron mentioned bridge could be turned into a year round transportation option)
    - Aaron mentioned having a by-pass for heavy trucks into Elmira should be considered. (Arthur St heading south that turns into Conestoga Parkway gets heavier truck traffic more so in the summer but also year round. This is the main road from Elmira into the City)
    - Aaron prefers to be kept updated via mail. (i.e. Canada Post)
    - Transit wise he appreciates the GRT coming into Elmira and very helpful since it does help them connect and reach to bigger hospitals near Woolwich for medical appointments
    - GRT used by Mennonite community to go to livestock areas and Conestoga Mall area too
        - Route 21 used heavily

EngageWR

Form Results Summary

Jul 28, 2025 - Sep 04, 2025

Project: Woolwich Transportation and Mobility Plan

Form: Transportation and Mobility Plan Survey 2: Strategic Vision and Alternative Solutions

Tool Type: Form

Activity ID: 1293

Exported: Sep 05, 2025, 03:07 PM

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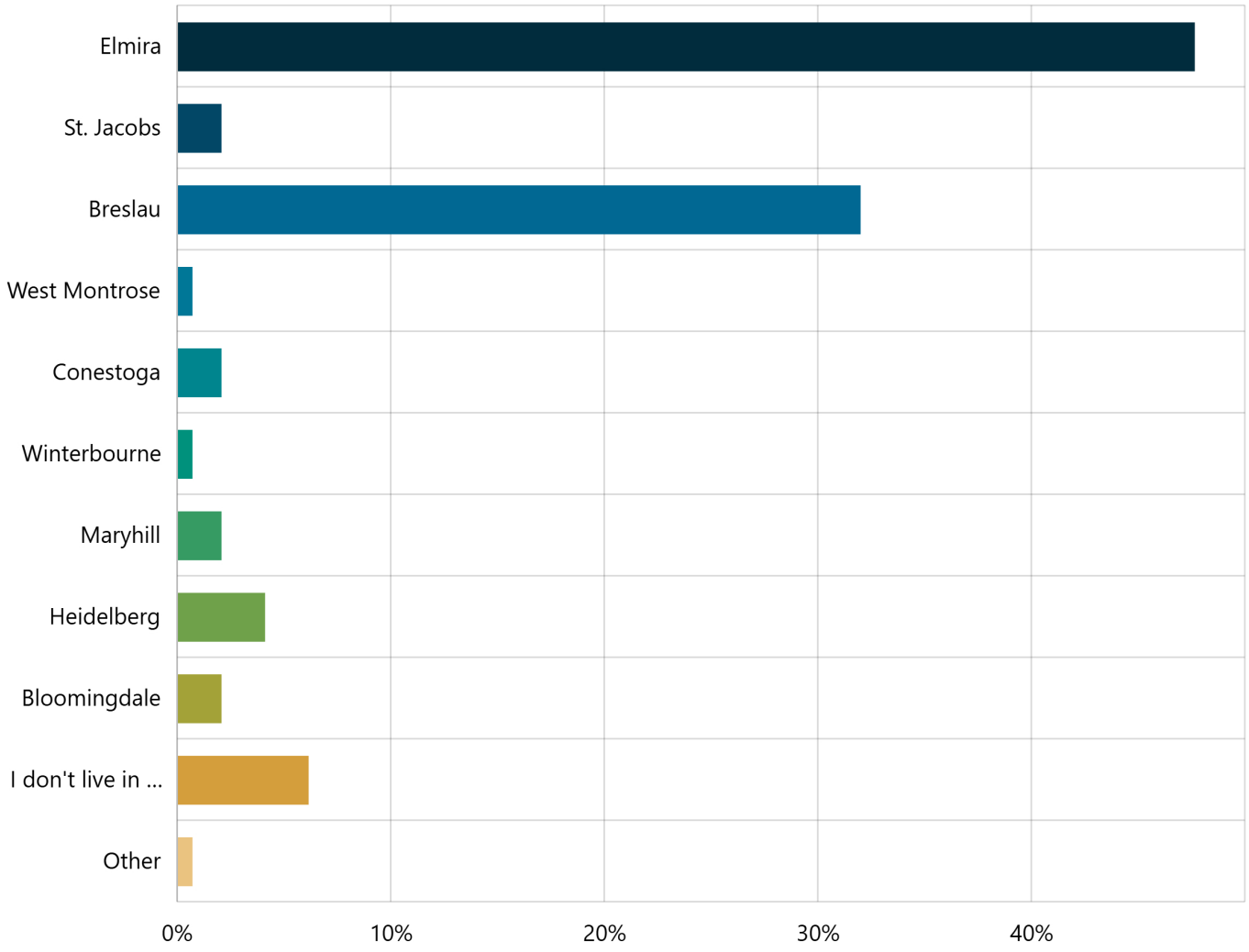
Closed

Transportation and Mobility Plan Survey 2: Strategic Vision and Alternative Solutions
Woolwich Transportation and Mobility Plan

142 Contributors	147 Contributions

Contribution Summary

1. Which community in the Township of Woolwich do you live in or most closely identify with? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)

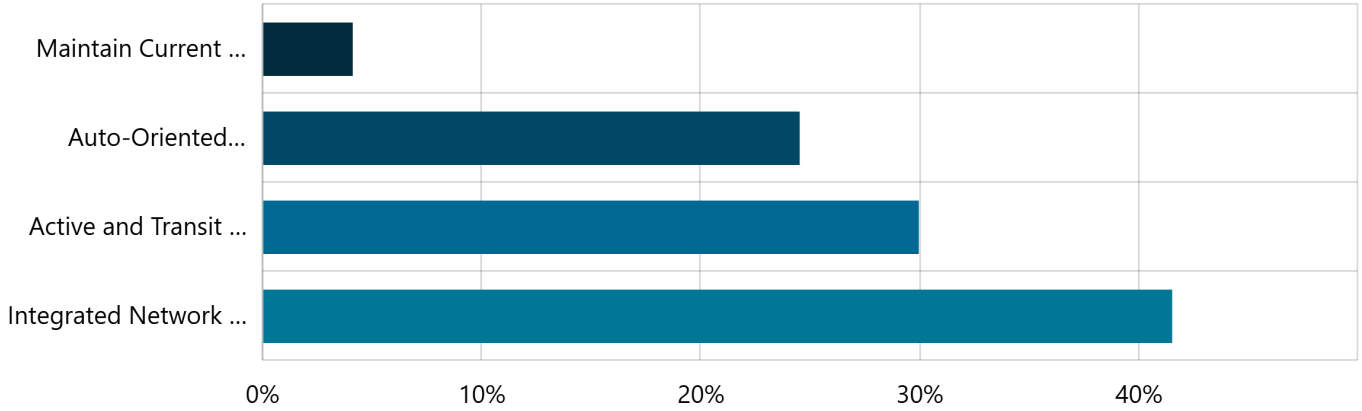


Answer choices	Percent	Count
Elmira	47.62%	70
St. Jacobs	2.04%	3
Breslau	31.97%	47
West Montrose	0.68%	1
Conestoga	2.04%	3

Winterbourne	0.68%	1
Maryhill	2.04%	3
Heidelberg	4.08%	6
Bloomingdale	2.04%	3
I don't live in Woolwich, but I work, study, or visit regularly	6.12%	9
Other	0.68%	1
Total	**100.00%**	**147**

2. Which of the following strategic vision best reflects your preferred future for transportation and mobility in Woolwich Township? Required

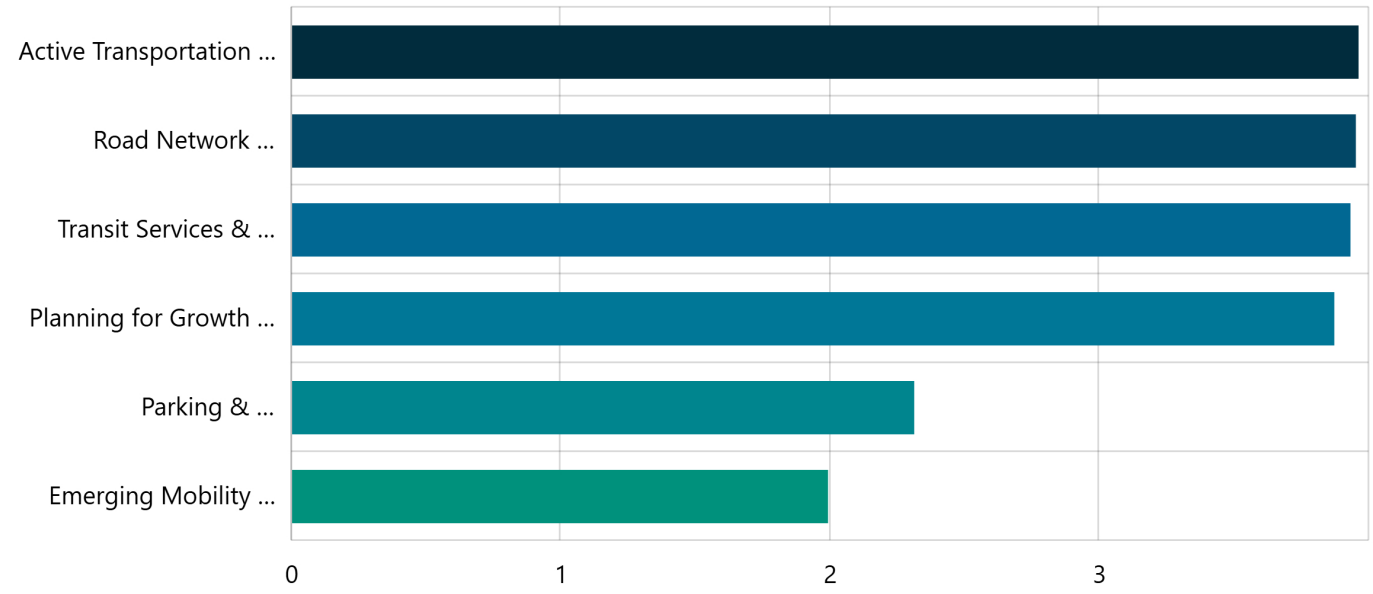
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Maintain Current System - No major changes. Keep the transportation system and programs as they are today	4.08%	6
Auto-Oriented Growth - Invest mainly in roads, road safety, and traffic improvements to support car travel	24.49%	36
Active and Transit First Strategy - Focus on walking, biking, and transit by building better sidewalks, trails, bike lanes, and transit services	29.93%	44
Integrated Network Strategy/Balanced Approach - Improve roads where needed, while also expanding walking, biking, and transit options	41.50%	61
Total	**100.00%**	**147**

3. Which of the following transportation planning initiatives do you believe are most important for the Township of Woolwich to address? Please rank them from most important (1) to least important (6). Required

Ranking | Skipped: 0 | Answered: 147 (100%)

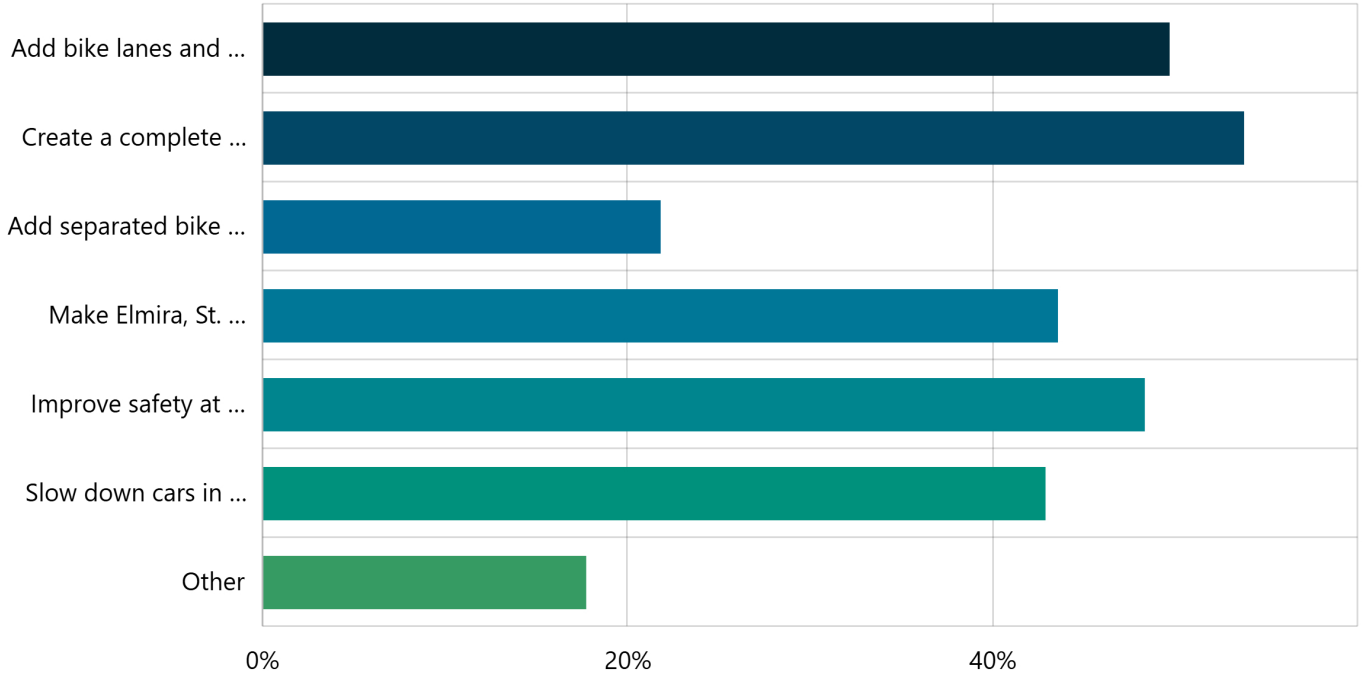


	1	2	3	4	5	6	Count	Score	Avg Rank
Active Transportation & Complete Streets (Sidewalks, bike lanes, trails, and street designs that are safe for all users, including pedestrians, cyclists, and people with disabilities)	25.74% 35	25.00% 34	18.38% 25	17.65% 24	8.82% 12	4.41% 6	136	3.96	2.72
Road Network Improvements & Traffic Flow (Widening roads, building new connections, improvin	35.00% 49	17.14% 24	12.14% 17	11.43% 16	11.43% 16	12.86% 18	140	3.95	2.86

g intersections, and reducing congestion)									
Transit Services & Regional Connections (Improving local transit, accessibility, and connections to nearby cities)	25.18% 35	21.58% 30	18.71% 26	15.83% 22	15.11% 21	3.60% 5	139	3.93	2.85
Planning for Growth (Ensuring the transportation network supports new housing, businesses, and community development)	16.31% 23	28.37% 40	21.99% 31	14.18% 20	14.18% 20	4.96% 7	141	3.87	2.96
Parking & Transportation Demand Management (Improving how parking is managed in busy areas and encouraging alternatives to driving alone)	2.24% 3	5.97% 8	16.42% 22	19.40% 26	29.85% 40	26.12% 35	134	2.31	4.47
Emerging Mobility Options (Supporting electric vehicle charging, ride-sharing, and new	1.49% 2	4.48% 6	11.94% 16	19.40% 26	18.66% 25	44.03% 59	134	1.99	4.81

transport ation tec hnologie s)
Score - Sum of the weight of each ranked position, multiplied by the response count for the position choice, divided by the total contributions. Weights are inverse to ranked positions. **Avg Rank** - Sum of the ranked position of the choice, multiplied by the response count for the position choice, divided by the total 'Count' of the choice.

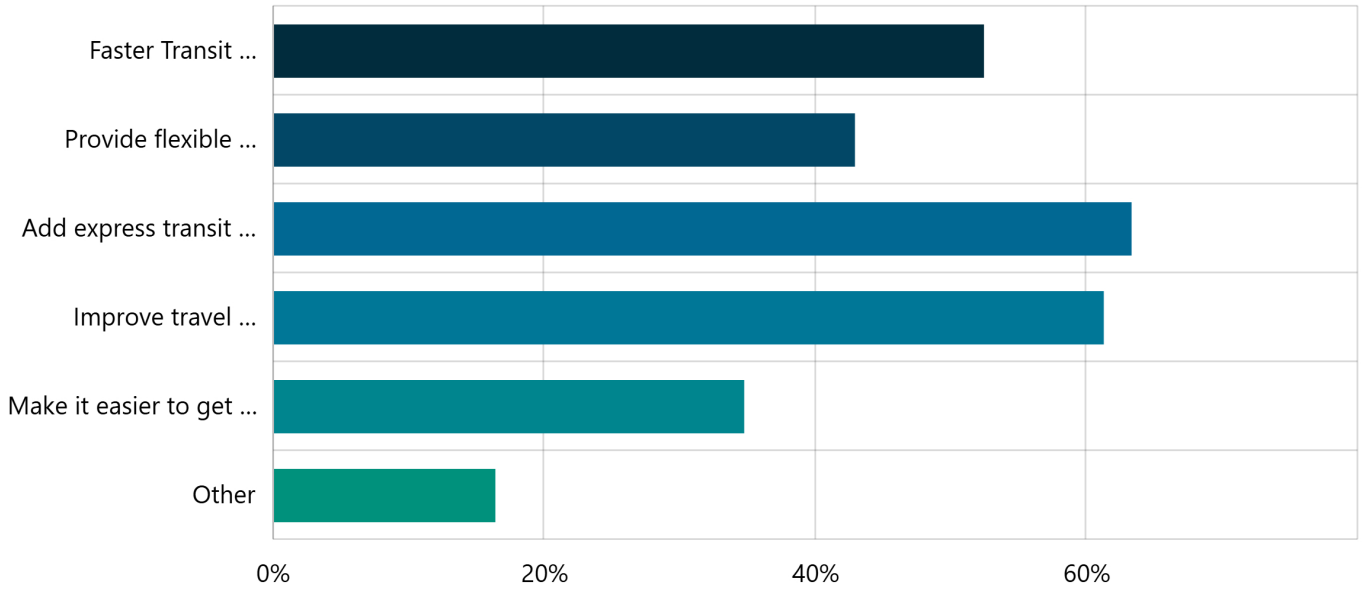
4. Which three active transportation infrastructure improvements do you support the most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Add bike lanes and trails in key areas and close gaps in the network (e.g., downtown streets, high speed roads and growing neighbourhoods)	49.66%	73
Create a complete walking and biking network that links schools, jobs, towns, and parks	53.74%	79
Add separated bike lanes along busy roads and make intersections safer for cyclists	21.77%	32
Make Elmira, St. Jacobs, and Breslau downtown areas more walkable with people-friendly streets	43.54%	64
Improve safety at busy or wide intersections with things like raised crosswalks and flashing lights	48.30%	71
Slow down cars in residential areas and near schools to make it safer for people walking and biking	42.86%	63
Other	17.69%	26

5. Which three public transit and regional connectivity options do you support most? Required

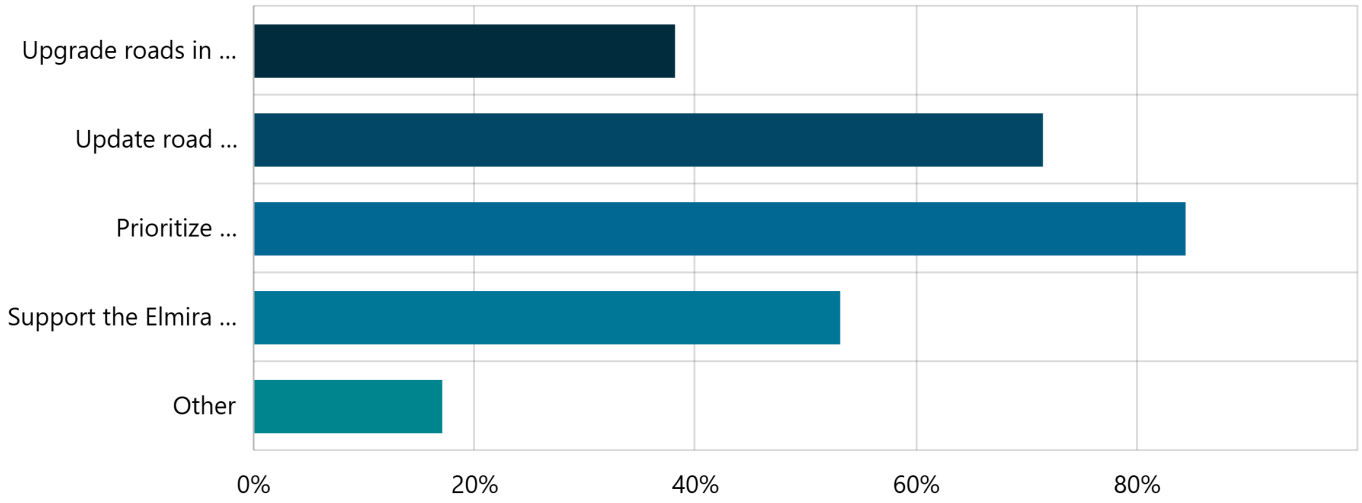
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Faster Transit Between Communities – Add a frequent bus or shuttle service to connect Elmira, Breslau, and St. Jacobs	52.38%	77
Provide flexible transit for rural areas, like on-demand shuttles or shared rides	42.86%	63
Add express transit to connect with the ION LRT and Kitchener GO Station	63.27%	93
Improve travel options from Township communities to the planned Breslau GO Station	61.22%	90
Make it easier to get to transit with safe sidewalks, bike lanes, and shelters near GO stations	34.69%	51
Other	16.33%	24

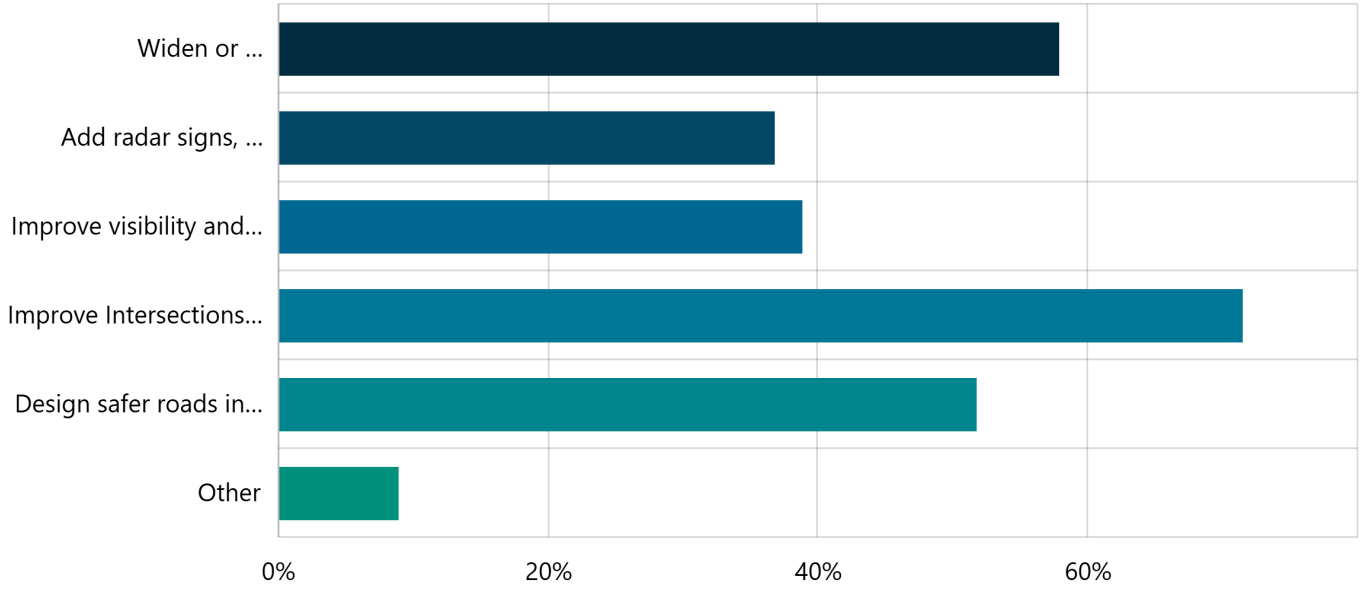
6. Which three road network enhancement options do you support most? Required

Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Upgrade roads in places where new homes and businesses are being built (e.g., Fountain Street, Shantz Station Road)	38.10%	56
Update road categories to make sure roads are designed for how they're actually being used, based on traffic and development	71.43%	105
Prioritize resurfacing and repairs on roads with heavy traffic to keep them in good condition	84.35%	124
Support the Elmira Bypass – Help reduce traffic in downtown Elmira by building a bypass route for through traffic and trucks	53.06%	78
Other	17.01%	25

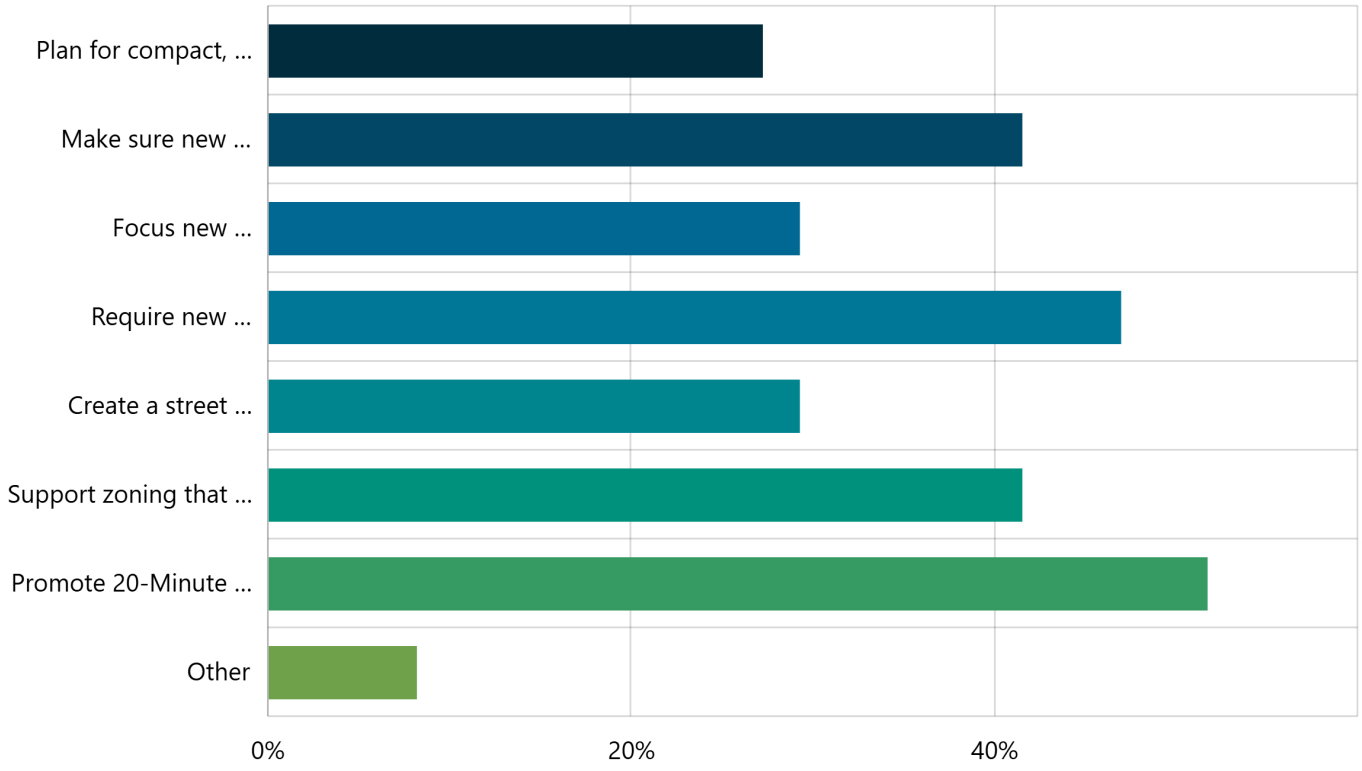
7. Which three safety and capacity Improvement options do you support most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Widen or upgrade key roads with safety or traffic issues (e.g., Arthur St, Line 86, Northfield Dr, Sawmill Rd)	57.82%	85
Add radar signs, traffic calming, and gateway features to slow down speeding on rural and suburban roads	36.73%	54
Improve visibility and signage at rural intersections (e.g., along Line 86 and Northfield Dr)	38.78%	57
Improve Intersections by adding turn lanes, roundabouts, or smart signals at busy or dangerous intersections (e.g., Shantz Station Rd & Arthur St)	71.43%	105
Design safer roads in growing areas using safety audits and strategies that aim to prevent serious injuries and deaths	51.70%	76
Other	8.84%	13

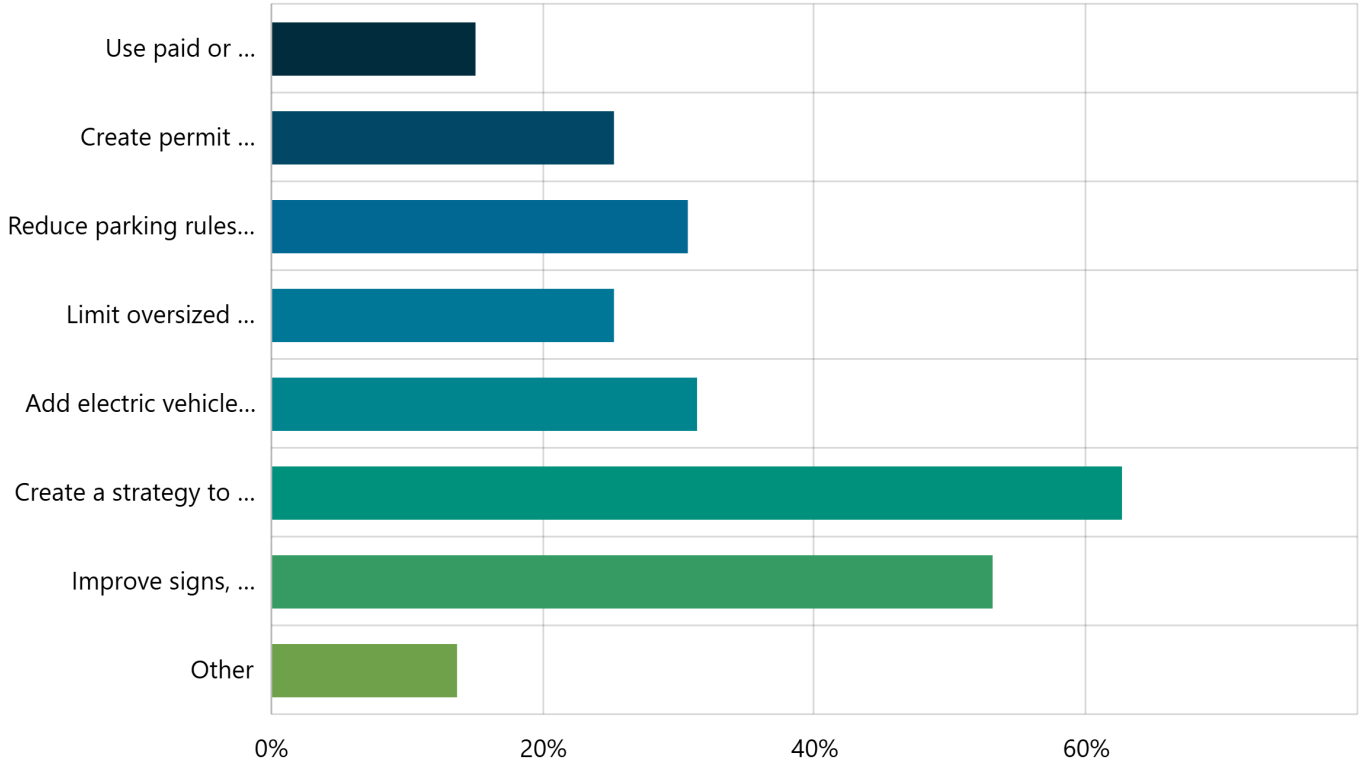
8. Which three Land Use Integration strategies do you support most? Required

Multi Choice | Skipped: 0 | Answered: 147 (100%)



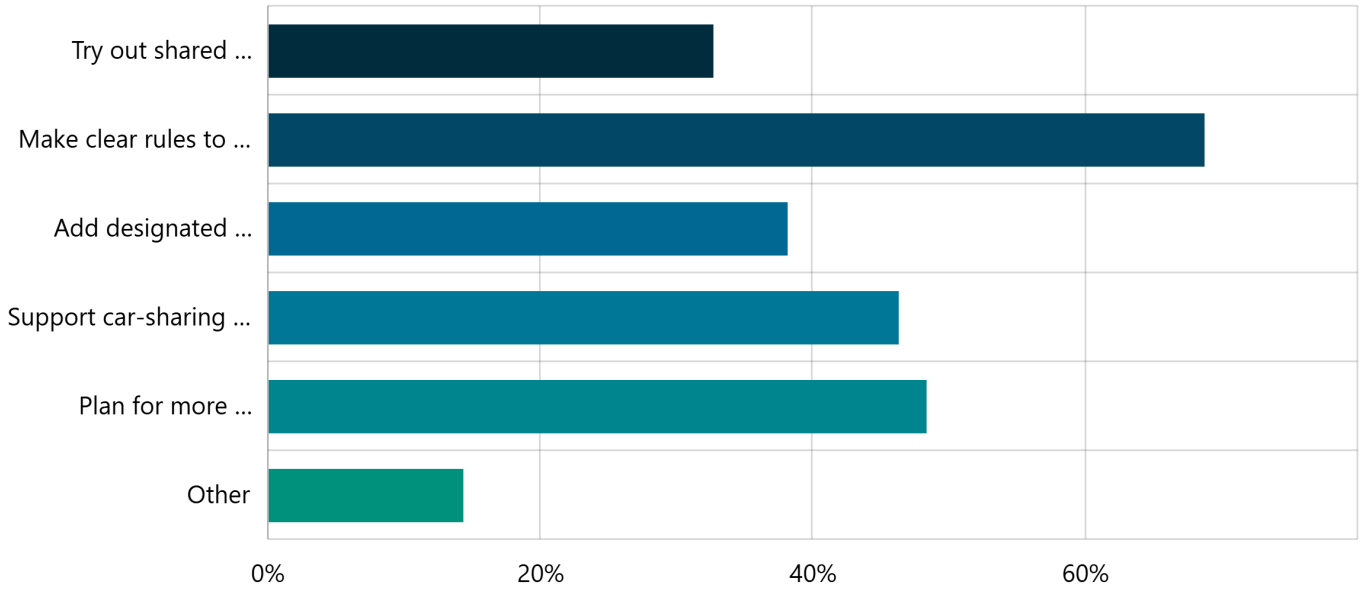
Answer choices	Percent	Count
Plan for compact, walkable communities around the future Breslau GO Station	27.21%	40
Make sure new neighbourhoods include sidewalks, trails, and traffic calming for safer streets	41.50%	61
Focus new housing and businesses in areas with good access to roads, transit, and active transportation	29.25%	43
Require new developments to include walking, biking, and transit upgrades in their plans for new developments	46.94%	69
Create a street network that links homes to the GO Station, jobs, and parks	29.25%	43
Support zoning that allows mixed-use developments which include shops, services, and homes close to the future Breslau GO station	41.50%	61
Promote 20-Minute Communities – Make it easy for people to reach daily needs (like groceries, parks, and schools) within a short walk, bike ride, or transit trip	51.70%	76
Other	8.16%	12

9. Which three Parking Management strategies do you support most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



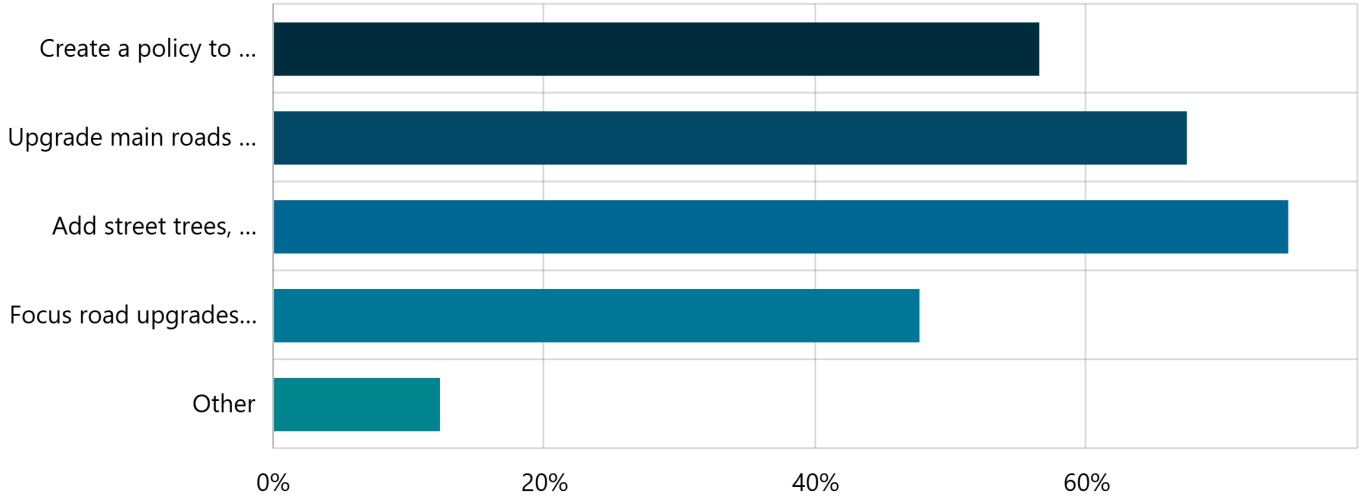
Answer choices	Percent	Count
Use paid or time-limited parking in busy areas to encourage turnover and reduce circling for spots	14.97%	22
Create permit programs to manage street parking in residential neighbourhoods near busy areas	25.17%	37
Reduce parking rules for developments near transit or with affordable housing to support walkable communities	30.61%	45
Limit oversized parking lots and encourage shared parking in mixed-use developments	25.17%	37
Add electric vehicle chargers in public parking lots and new developments	31.29%	46
Create a strategy to manage parking in places like Elmira and Breslau as they grow	62.59%	92
Improve signs, lighting, and streetscapes to make parking easier to find and more welcoming	53.06%	78
Other	13.61%	20

10. Which three Emerging Mobility options do you support most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



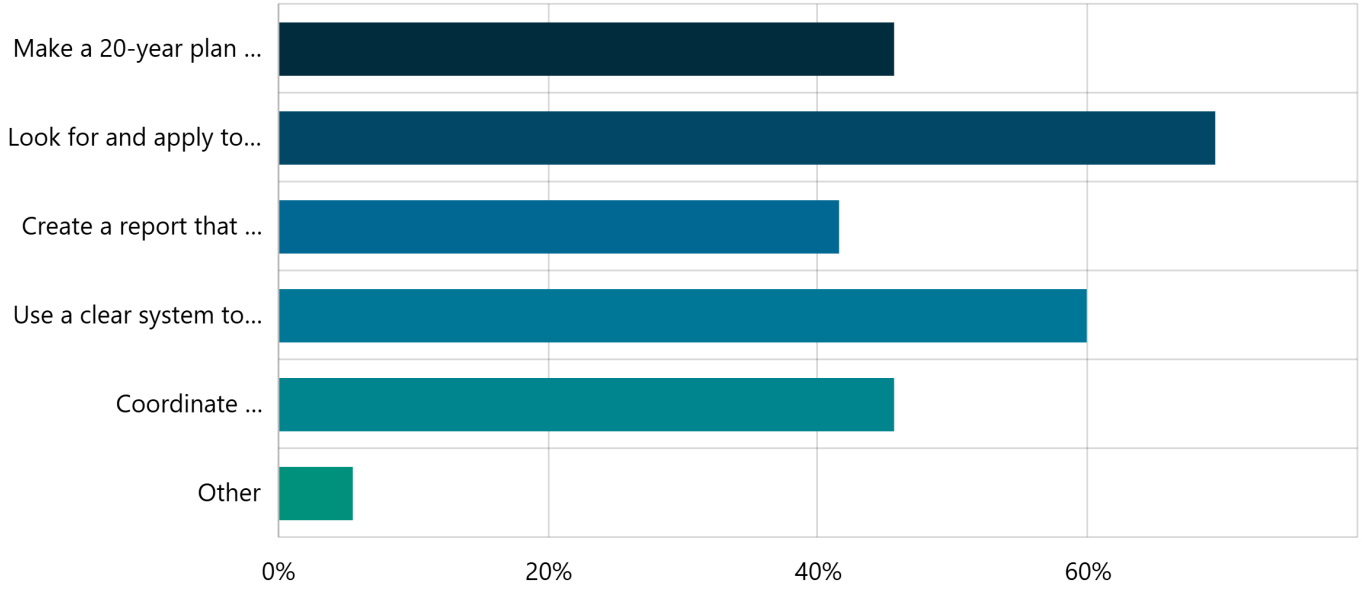
Answer choices	Percent	Count
Try out shared e-scooter and e-bike programs in busy areas	32.65%	48
Make clear rules to keep e-scooters and e-bikes safe for everyone	68.71%	101
Add designated parking spots for e-scooters and e-bikes near busy places	38.10%	56
Support car-sharing programs in new neighborhoods and city buildings	46.26%	68
Plan for more electric vehicle (EV) charging stations, especially near workplaces and transit hubs	48.30%	71
Other	14.29%	21

11. Which three street design ideas do you like most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Create a policy to make all roads safe and easy for people walking, biking, driving, and taking transit	56.46%	83
Upgrade main roads to add sidewalks, bike lanes, and transit stops where possible	67.35%	99
Add street trees, better lighting, and curb extensions when fixing roads to improve safety and comfort	74.83%	110
Focus road upgrades first near schools, downtown areas, and new neighborhoods	47.62%	70
Other	12.24%	18

12. Which three implementation and Monitoring options do you prefer most? Required
Multi Choice | Skipped: 0 | Answered: 147 (100%)



Answer choices	Percent	Count
Make a 20-year plan for transportation improvements by implementation horizon (short-, medium-, long-term) with estimated costs to help with budgeting	45.58%	67
Look for and apply to federal and provincial funding to help pay for projects	69.39%	102
Create a report that tracks how well transportation is working (like safety and how people get around)	41.50%	61
Use a clear system to decide which projects should be done first based on their costs and benefits	59.86%	88
Coordinate transportation projects with population growth plans for 2031 and 2051	45.58%	67
Other	5.44%	8

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Township of Woolwich

Comprehensive Transportation & Mobility Plan

Focus Group #2

August 21st, 2025

IMAGINE
CREATE
ACHIEVE
a sustainable future

Contents

1 . Recap: Context & Objectives of the CTMP

2 . Future Conditions

3 . Key Issues

4 . Strategy Development

5 . List of Alternative Solutions

6 . Draft Recommendations

7 . Next Steps

egis

1

Recap: Context and Objectives of the CTMP

Woolwich Comprehensive Transportation & Mobility Plan

Main Objectives

- Plan for Future Growth
- Support Low-Carbon, Climate-Resilient Communities
- Promote Transit-Ready Communities
- Improve Safety and Accessibility
- Optimize Parking Policies

Woolwich Comprehensive Transportation & Mobility Plan

Problem / Opportunity Identification

1. Background Data Collection
2. Current Infrastructure Analysis
3. Population and Employment Trends Analysis
4. Transportation Demand Forecasting
5. Problem Identification

Engagement Round #1

Identification of Alternatives and Preferred Solutions

1. Alternative Solutions Development
2. Modal Shifting Strategies
3. Integration with Land Use Planning
4. Implementation Plan Development

Engagement Round #2

Documentation and Finalization

1. Draft CTMP
2. Final CTMP

End
Summer '25

egis

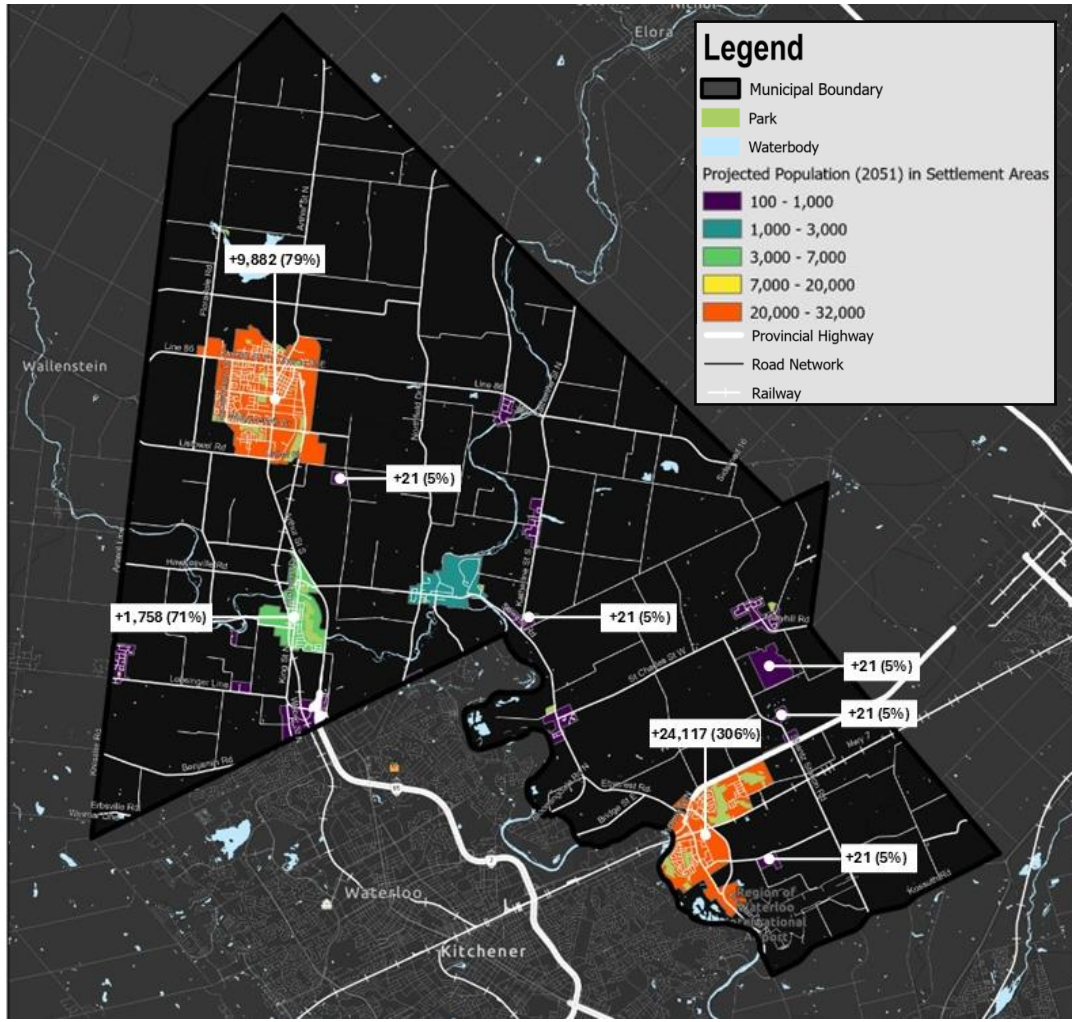
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Future Conditions

Woolwich Comprehensive Transportation & Mobility Plan

Future Population by Area

- By 2051:
  - Woolwich's population is projected to grow from 26,999 (in 2021) to 68,195 (+152%)
  - Elmira's population is projected to grow from 12,416 now to 22,298 (+79%)
  - Breslau's population is projected to increase almost four times from approximately 7,800 now to 31,900 (+306%)
  - St. Jacobs population is projected to grow from 2,477 now to 4,235 (by 71%)
  - Growth in other settlement areas is expected to be limited, with increases up to 5%

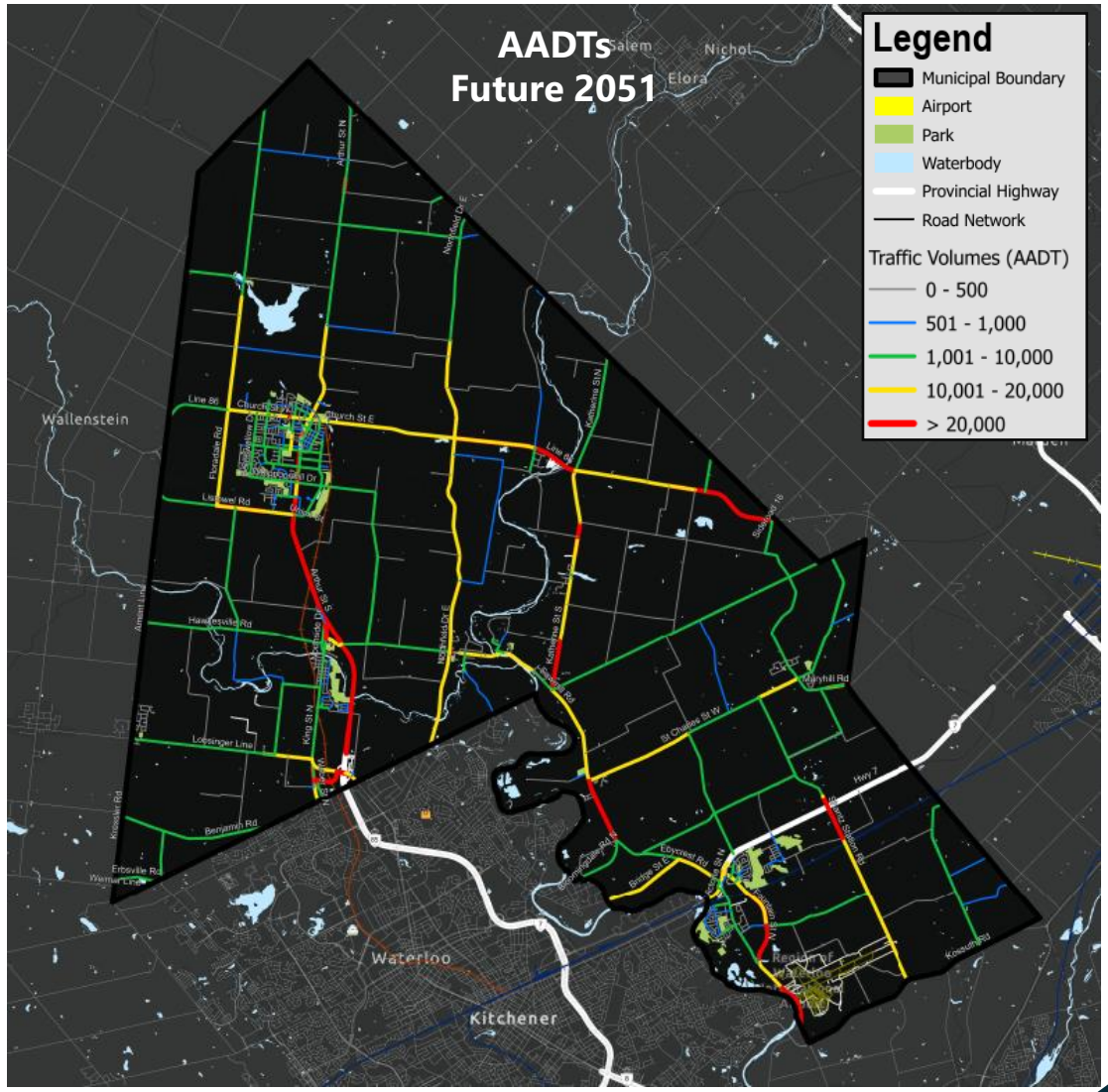


Woolwich Comprehensive Transportation & Mobility Plan

Future 2051 AADTs

- Busiest roads (with AADT > 10,000) are:

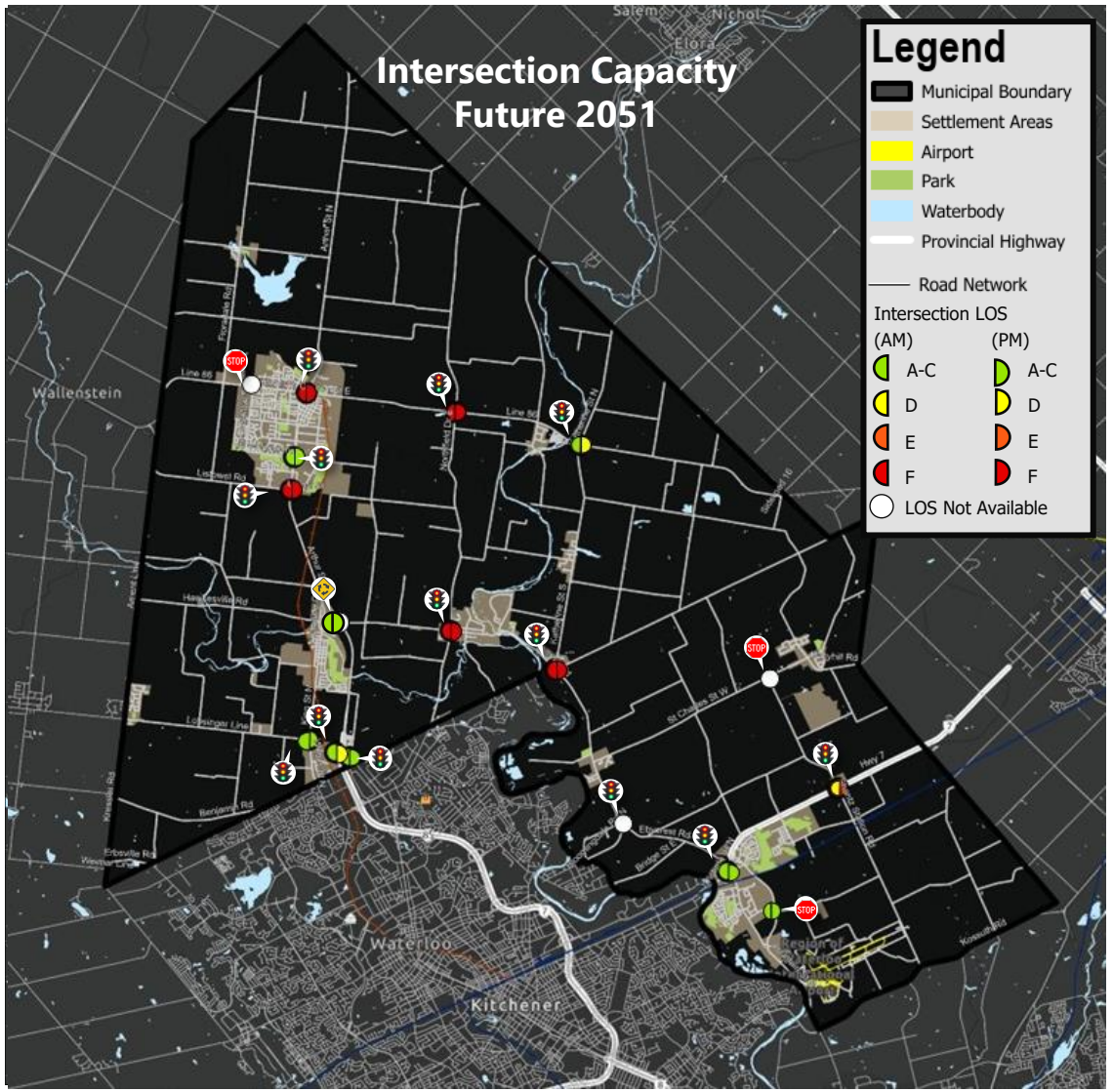
A. Arthur Street (>20,000 AADT)
B. Church Street/Line 86 (>20,000 AADT)
C. Shantz Station Road to the south of the new Highway 7
D. Farmer's Market Road (>20,000 AADT)
E. Floradale Road in the Elmira Area
F. Sawmill Rd between Northfield D and Bloomingdale Rd (>20,000 AADT)
G. St Charles Street from Sawmill Rd and Spitzig Road
H. St Charles Street from Shantz Station Road to Maryhill Road
I. Katherine Street from Line 86 to Sawmill Road (>20,000 AADT)
J. Northfield Drive East to the south of Tilman Road
K. Victoria Street North/Highway 7 and
L. Fountain Street North/Highway 11 in the Breslau Area



Woolwich Comprehensive Transportation & Mobility Plan

Future Capacity at Intersections (Do-Nothing)

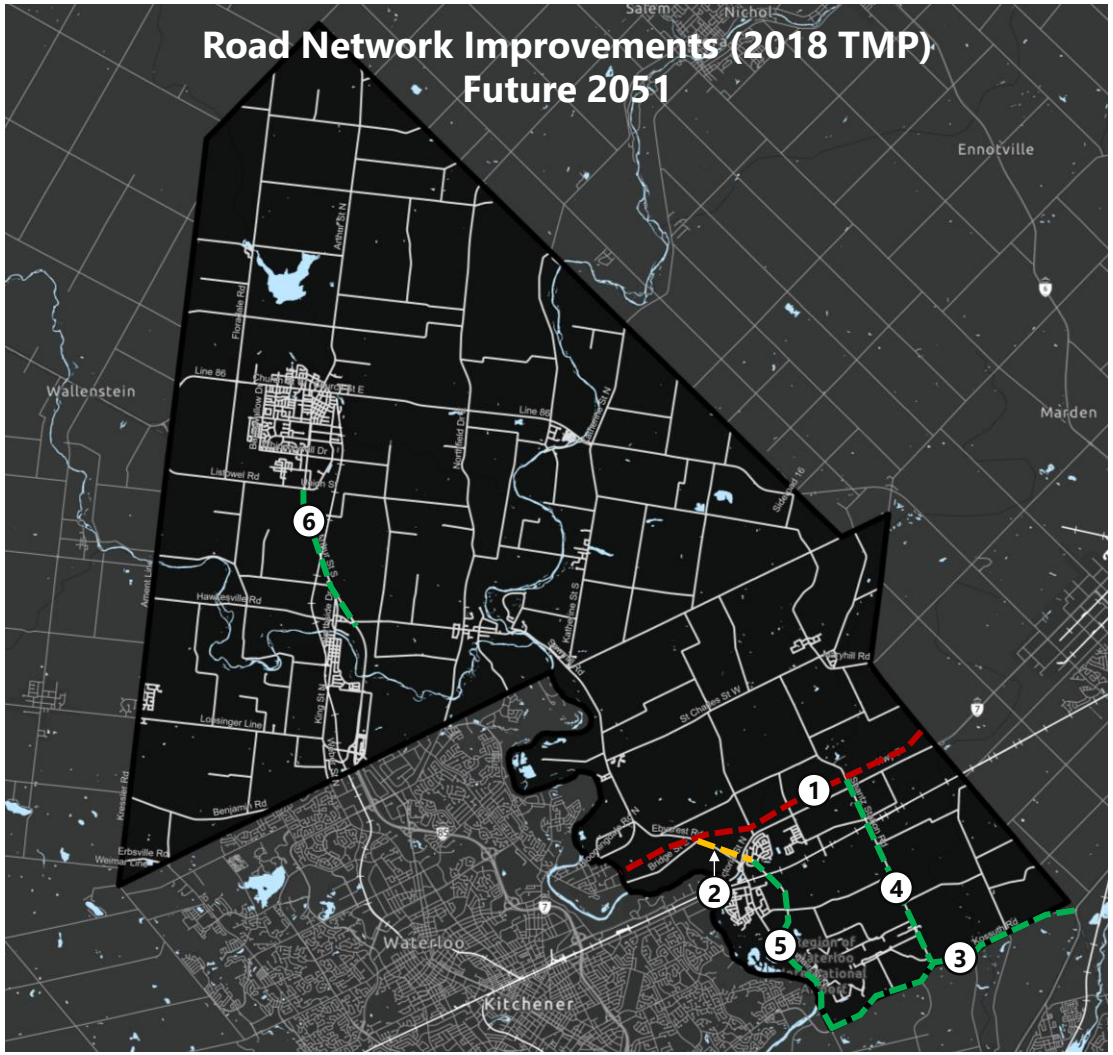
- The intersections projected to experience the most significant deterioration in operations between 2025 and 2051 are:
  - Shantz Station Road & Victoria Street North
  - Sawmill Road & Katherine Street / Crowsfoot Road
  - Northfield Drive & Line 86
- Conversely, improvements in levels of service are anticipated at the following intersections:
  - Woolwich Street / Ebycrest Road & Victoria Street N
  - Arthur Street South & Whippoorwill Drive



Woolwich Comprehensive Transportation & Mobility Plan

Future Road Network Improvements

1. New Highway 7 Alignment
2. Fountain St N extension from Victoria St to 1.0 km northerly (4 lanes)
3. Kossuth Road Widening from Fountain St to Hespeler Rd (from 2 lanes to 4 lanes)
4. Shantz Station Rd Widening from the New Highway 7 to Kossuth Rd (from 2 lanes to 4 lanes)
5. Fountain St N Widening from Kossuth Rd to Victoria St (from 2 lanes to 4 lanes)
6. Arthur St S Widening from Sawmill Rd to Listowel Rd (from 2 lanes to 4 lanes)



3

Key Issues

Woolwich Comprehensive Transportation & Mobility Plan

Key Issues

Improve Active Transportation Infrastructure

Close sidewalk and cycling gaps to support safe, 15-minute active trips across major corridors and intersections

Strengthen Transit and Connectivity to Key Nodes

Enhance local transit service and improve links to major population and activity nodes, including the future Breslau GO Station and key urban areas within Woolwich and the broader Waterloo Region

Maintain and Upgrade Road Infrastructure

Ensure roads are in good condition and ready to accommodate expected population, employment, and traffic growth

Address Safety and Capacity Issues

Implement improvements at key locations with operational or safety constraints, including; Arthur Street, Listowel Road, Line 86, Sawmill Road, Northfield Drive, Shantz Station Road

Support Transit-Oriented and Mixed-Use Development

Plan compact, integrated communities around the future GO Station in Breslau that align with urban growth strategies

Strategic Parking Management

Balance accessibility and land use efficiency, especially in growth areas and affordable housing developments

Integrate Emerging Mobility Options

Plan for integration of micromobility (e.g., e-scooters, e-bikes), car sharing, and other mobility solutions by updating infrastructure, policies, and regulations to support user adoption, equitable access, and operational safety

Advance Complete Streets Principles

Prioritize inclusive, sustainable street design to support diverse user needs across all travel modes

Focus on Implementation

Develop a prioritized, costed action plan with clear timelines, funding strategies, and performance metrics

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4

Strategy Development

Woolwich Comprehensive Transportation & Mobility Plan



Do Nothing

Maintain the Township's current transportation network and policy/programming. This alternative does not include further development of roads under the jurisdiction of the Township. An analysis of this "Do Nothing" scenario has already been completed to establish a baseline for comparison against other alternatives



Auto-Oriented Growth / Road Network Strategy

Focus investment on strategic road network improvements, such as road urbanization, local traffic operation, and safety improvements. Corresponding strategic investment will be made towards providing safer pedestrian and cycling facilities but will focus on improving the network predominately for motorists



Active and Transit-First Strategy

Emphasis on sustainable and people-centric modes of travel by prioritizing the development of high-quality active transportation and public transit infrastructure. The goal is to reduce reliance on single-occupant vehicles and promote a shift towards more sustainable, safe, and accessible transportation options

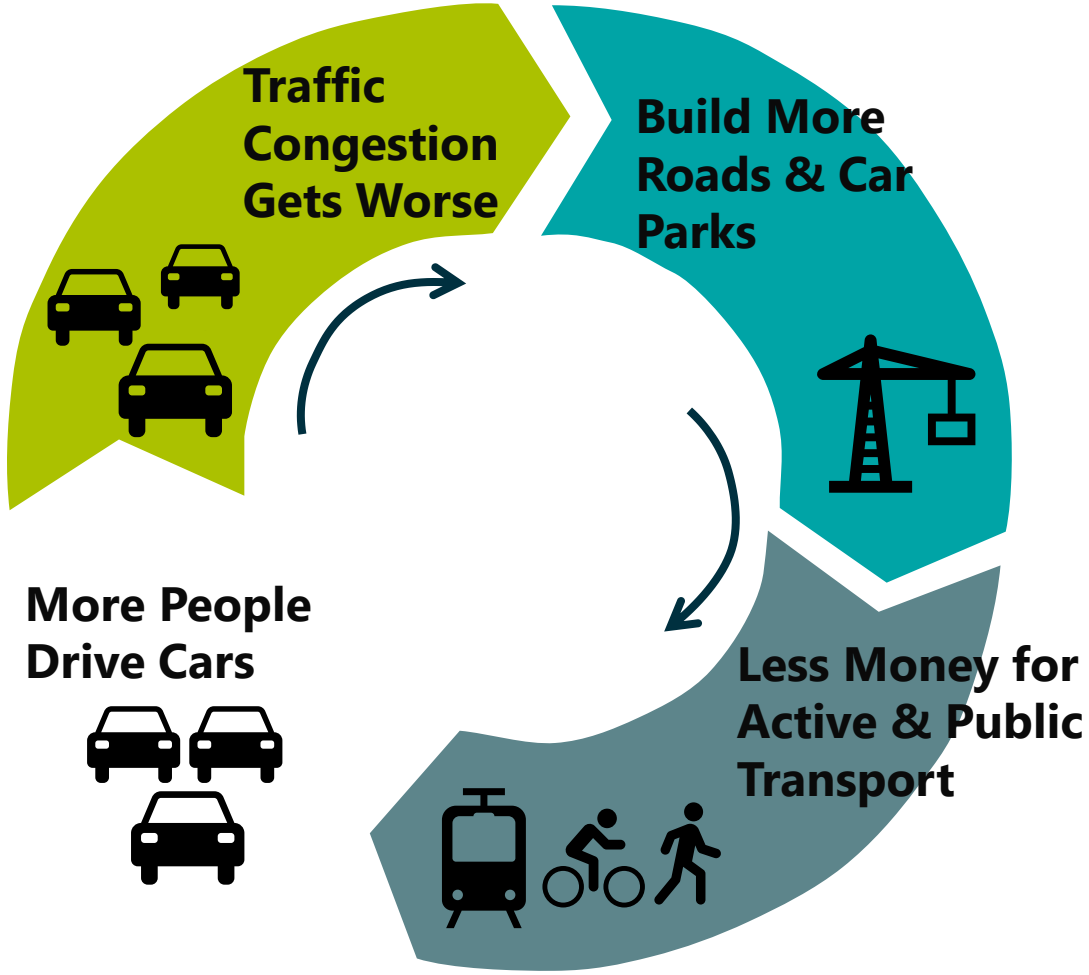


Hybrid / Integrated Network Strategy

Focus on strategic road network capacity improvements, while also promoting and enhancing the active transportation network and the public transit system. The Township will target investments to where they are needed and prepare itself to adapt to meet the changing conditions due to emerging trends and transportation technologies

Woolwich Comprehensive Transportation & Mobility Plan

The Transportation Doom Loop



Woolwich Comprehensive Transportation & Mobility Plan

Key Issue	Option 1: Do Nothing	Option 2: Road Network Strategy	Option 3: Active and Transit-First Strategy	Option 4: Integrated Network Strategy
Improve AT infrastructure	●	■	◆	◆
Strengthen Transit and Connectivity to Nodes	●	●	◆	■
Maintain and Upgrade Road Infrastructure	■	◆	●	◆
Address Safety and Capacity Issues	●	◆	■	◆
Support TOD and Mixed-Use Development	●	●	◆	■
Strategic Parking Management	●	■	■	■
Integrate Emerging Mobility Options	●	●	■	◆
Advance Complete Streets Principles	●	■	◆	◆
Focus on Implementation	●	■	■	◆

Preferred Vision

● Low ■ Medium ◆ High

Woolwich Comprehensive Transportation & Mobility Plan

Why an Integrated Network Strategy ?



Balanced Approach: Combines strategic road network upgrades with strong support for active transportation and public transit investments



Future Ready: Enables the Township to adapt to emerging trends, new technologies, and evolving travel needs



Responsive to Key Issues: Addresses congestion, safety, limited transit access, and the need for sustainable travel choices



Supports Growth: Aligns transportation improvements with land use planning to accommodate population and employment growth



Promotes Equity and Accessibility: Ensures infrastructure serves all users including drivers, cyclists, pedestrians, and transit riders



Balanced Support for Environmental Sustainability: Encourages low-emission travel, supports compact growth, and aligns with Woolwich's climate goals while accommodating essential road improvements

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List of Alternative Solutions

Woolwich Comprehensive Transportation & Mobility Plan

Alternatives Development and Prioritization Workflow



- Traffic Volumes and Congestion
- Road Safety Review
- Active Transportation and Transit Limitations
- Infrastructure Condition

- Population and Employment Forecasts (2051)
- Land Use Changes and New Developments
- Intersection Operations

- Network Capacity Constraints
- Safety and Speeding Concerns
- Connectivity Gaps (cycling, transit, pedestrians)
- Community Specific Needs

- Road Network Improvements
- Intersection and Safety Upgrades
- Active Transportation Expansion
- Transit Service Options
- Policy/Operational Measures

- Screening of Alternatives against Objectives
- Consultation with Township Staff
- Prioritized List (Very High, High, Medium, Low)
- Draft Recommendations

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Woolwich Comprehensive Transportation & Mobility Plan

Key Issue	Alternative Solution	Justification
 **Active Transportation**	Ensure that existing bike lanes comply with OTM Book 18 and current industry best practices to enhance safety and accessibility for all users. Implement protected bike lanes along higher-speed roads, with a focus on continuous segments and safety improvements at key intersections	Provides significant safety and comfort benefits, especially for less confident cyclists. Compliance with OTM Book 18 ensures consistency, while protected lanes on higher-speed roads offer critical separation. Though more complex and costly to implement, they are best prioritized on high-demand corridors where safety and connectivity gains are greatest
	Improve crossing infrastructure (e.g., raised crosswalks, pedestrian refuge islands, rapid flashing beacons)	A cost-effective and high-impact solution that directly addresses road user safety, especially at high-risk intersections in both urban and rural contexts
 **Public Transit**	Advocate for express or commuter-oriented service connecting Elmira, Breslau, and St. Jacobs to the ION LRT system and Kitchener GO Station	Strengthens regional integration and directly supports long-distance commuters. Offers a viable alternative to driving and aligns with Woolwich's vision for regional transit connectivity. Advocacy can begin immediately in collaboration with the Region and Metrolinx
	Improve connections to the future Breslau GO Station from the Township's settlement areas	A top priority for ensuring Township-wide access to regional rail and leveraging TOD opportunities around Breslau GO. Critical to long-term mode shift and economic development objectives
 **Road Network**	Revise the road classification framework to align with evolving land use, traffic volumes, and growth patterns	An updated road classification system ensures appropriate design standards, access management, and multimodal integration across the network. It is foundational for long-term planning, investment prioritization, and implementation of Complete Streets principles
 **Safety & Capacity**	Prioritize upgrades to key corridors with known capacity and safety issues (e.g., Arthur St, Listowel Rd, Line 86, etc.)	These corridors are repeatedly flagged for congestion and collisions. Widening and safety upgrades are necessary to reduce delays and improve travel reliability and safety, especially in growth areas and along major commuting routes
 **Parking**	Develop a municipal parking strategy for high-growth areas like Elmira and Breslau	Enables a proactive, coordinated response to emerging parking issues as growth accelerates. Ensures policies align with broader transportation and land use goals

Woolwich Comprehensive Transportation & Mobility Plan

Key Issue	Alternative Solution	Justification
 **Land Use & TOD**	Integrate land use and mobility planning in Breslau to support compact, walkable TOD around the GO Station	Breslau is the Township's primary growth area and site of the future GO Station. Integrating TOD principles is essential to maximize transit ridership, support mode shift, and ensure the area develops in a sustainable, compact, and efficient manner
	Revise subdivision design guidelines to ensure new developments include sidewalks, multi-use paths, and traffic calming	Critical for building walkable, safe, and connected neighbourhoods from the outset. Ensures future development is aligned with active transportation goals and avoids costly retrofits
 **Emerging Mobility**	Plan for integration of electric vehicle (EV) charging infrastructure, especially near employment and GO station areas	Directly supports climate goals, EV adoption, and future commuter travel behavior. Critical near the Breslau GO Station, Elmira industrial areas, and major trip generators. Aligns with long-term sustainability and growth plans
 **Complete Streets**	Adopt a Township-wide Complete Streets policy and update road cross-section standards accordingly	Establishes a foundational policy framework to ensure all future road projects support safe, multimodal access. Critical for integrating active transportation, transit, and accessibility into routine planning and design. Enables consistency across urban and rural contexts
	Prioritize Complete Streets upgrades in school zones, town centers, and new subdivisions	Directly improves safety for vulnerable users in high-traffic areas. Aligns with Vision Zero principles and supports Township growth areas. Targeted implementation makes this both impactful and feasible in the near term
 **Implementation & Monitoring**	Develop a 20-year capital plan that groups transportation improvements by implementation horizon (short-, medium-, long-term) and includes cost and feasibility ratings to guide budgeting and delivery	Essential for translating the CTMP vision into actionable infrastructure planning. Provides a clear roadmap for budgeting, phasing, and decision-making
	Align infrastructure phasing with growth triggers (e.g., 2031 and 2051 population targets)	Ensures that infrastructure delivery matches actual demand, avoiding overbuilding or delayed responses. Critical for Breslau GO and other intensification areas where timing is key

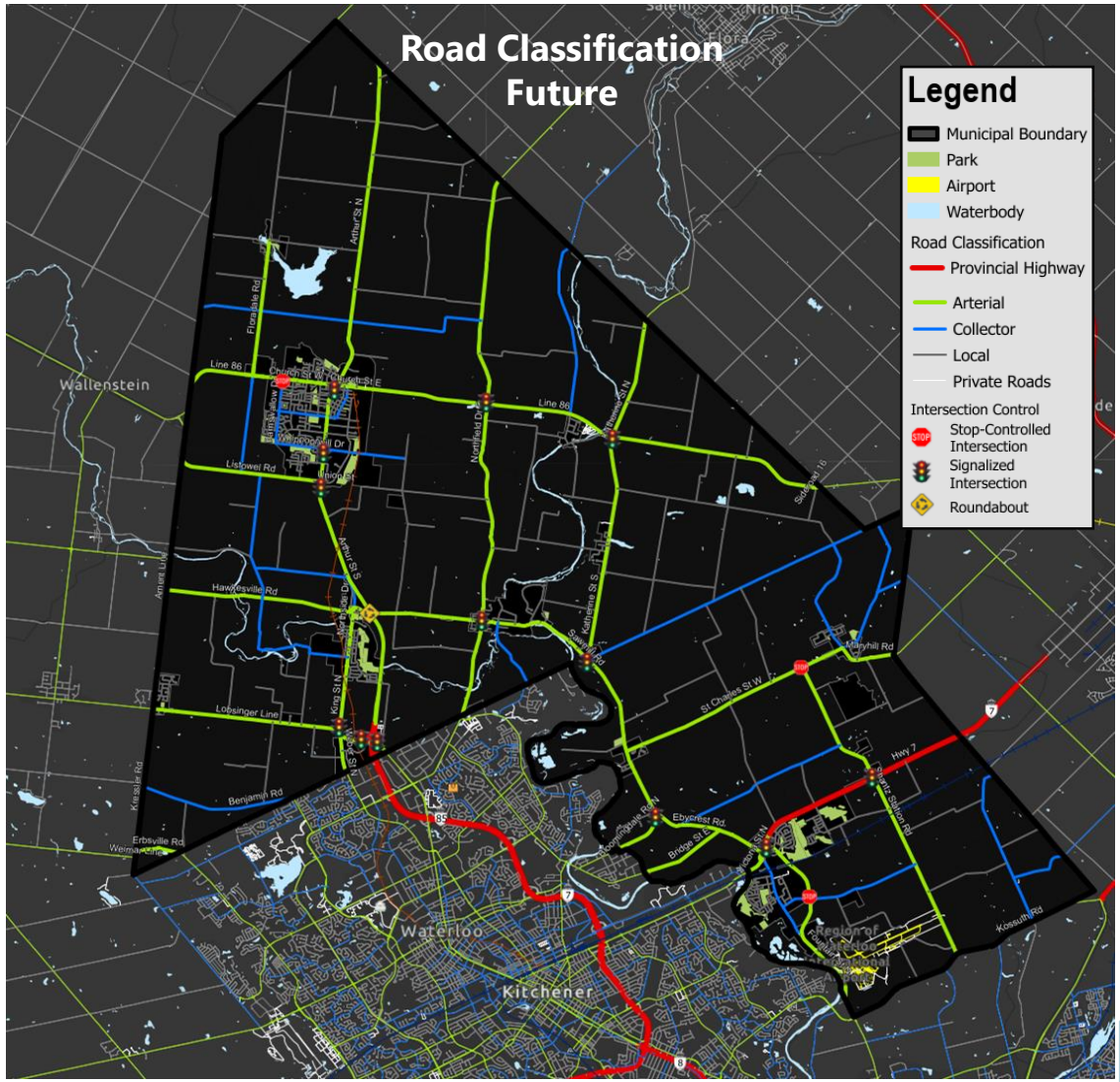
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Draft Recommendations

Woolwich Comprehensive Transportation & Mobility Plan

Road Classification Updates

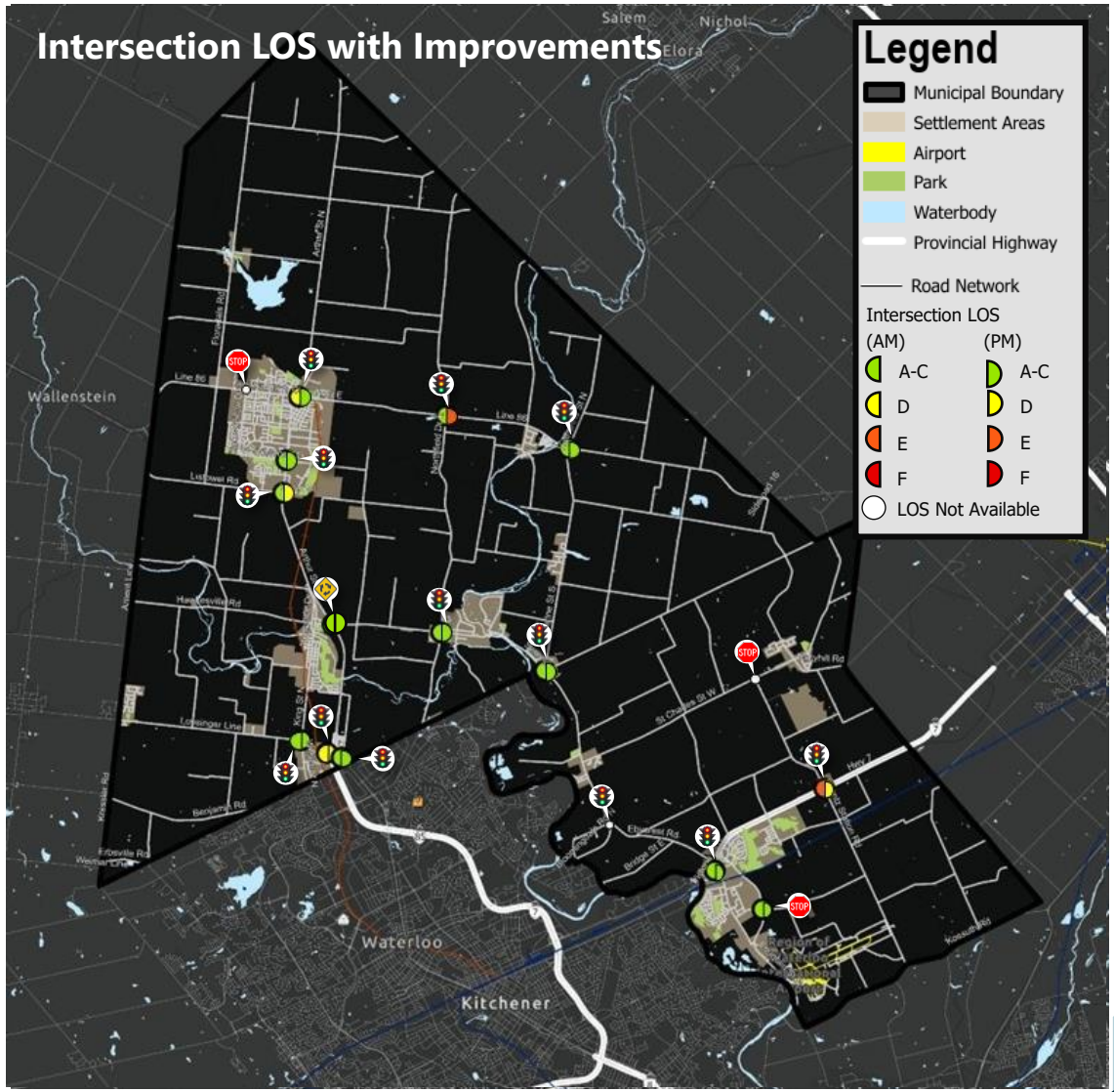
- The map to the right illustrates the updated road classifications for Woolwich based on road jurisdiction, future land use, and traffic volumes
- The following roads are recommended to be downgraded from Arterial to Collectors:
  - ✓ Benjamin Road
  - ✓ Barnswallow Drive
  - ✓ Whippoorwill Drive
- The following roads are recommended to be upgraded from Locals to Collectors:
  - ✓ Maryhill Road
  - ✓ St Charles St E
  - ✓ Crowsfoot Road
  - ✓ Hopewell Creek Road
  - ✓ Chilligo Road



Woolwich Comprehensive Transportation & Mobility Plan

Intersection LOS in 2051

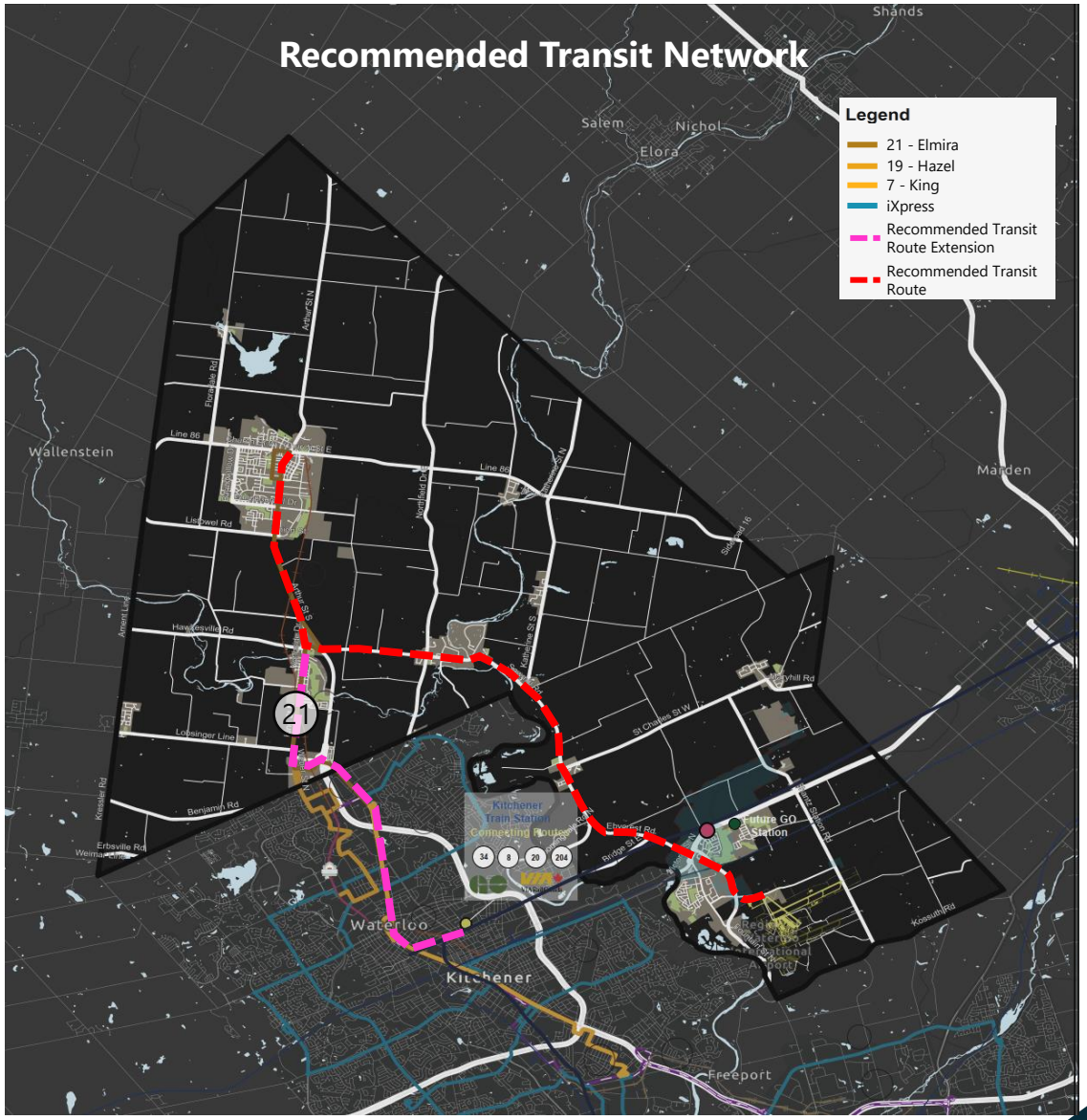
- Intersection performance was evaluated under 2051 horizon year traffic conditions, accounting for population and employment growth in Woolwich and the Region
- Planned upgrades and capacity improvements on the Regional Road network were incorporated into the analysis
- Signal timing adjustments, lane configurations, and other operational strategies were tested to improve efficiency
- With the combined improvements, most intersections are projected to operate at **LOS D or better**, which is considered acceptable for urban/suburban contexts



Woolwich Comprehensive Transportation & Mobility Plan

Recommended Transit Network

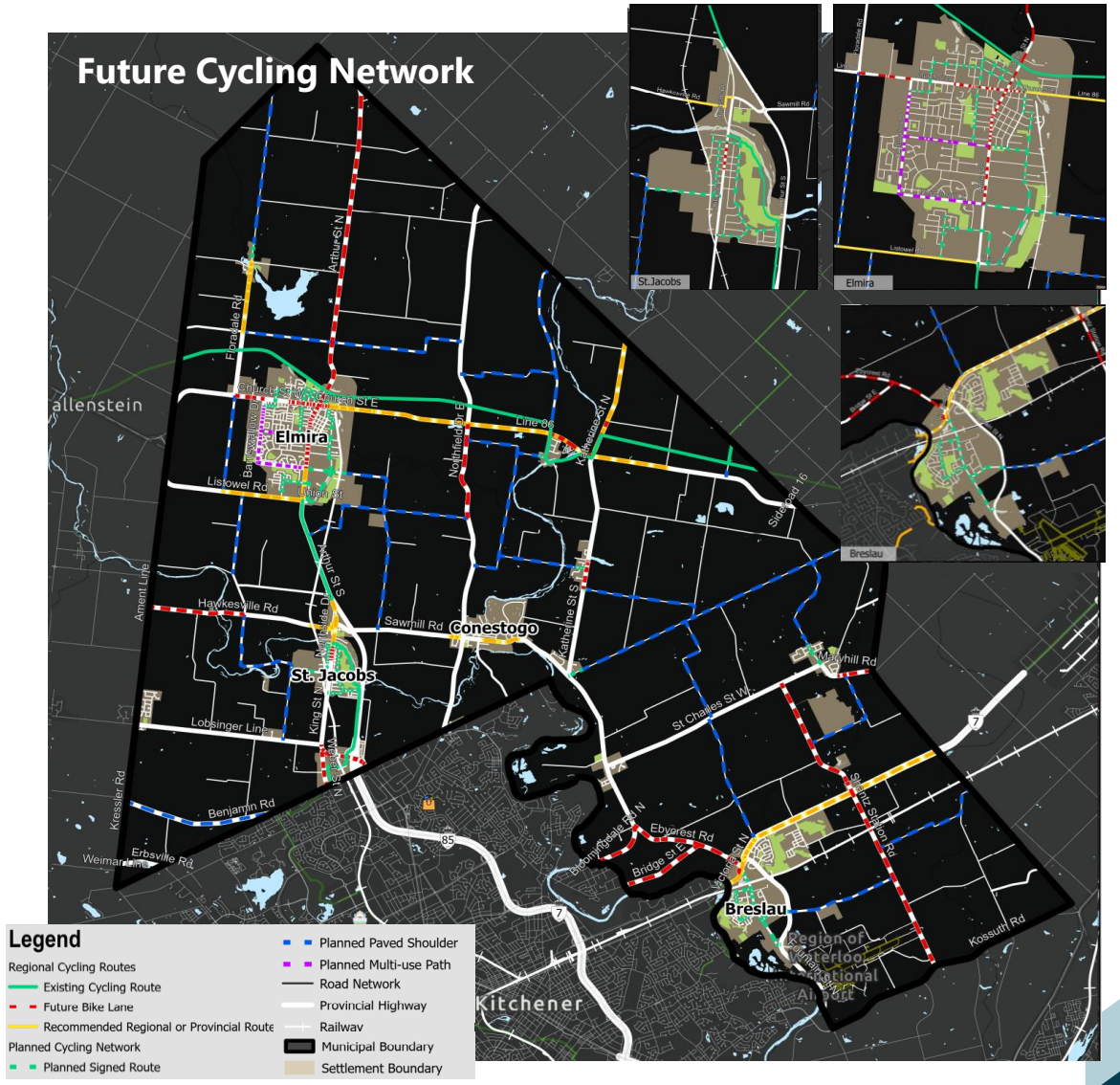
- Introduce a new transit route connecting Elmira, St. Jacobs, and Conestoga to the Breslau GO Station and the Region of Waterloo International Airport, enhancing regional connectivity and giving residents direct access to higher-order transit
- Liaise with Metrolinx to align the new transit route with GO train schedules, future network expansions, and regional transit planning initiatives
- This recommended route will service key growth areas, promote public transit use, and provide accessible transportation options for seniors, students and residents of the township
- Extend Grand River Transit Route 21 from Elmira to directly connect with the Kitchener GO Station, improving access to regional and intercity transit services
- Introduce on-demand transit service to provide coverage in less dense and rural areas, offering flexible mobility options and complementing fixed-route services within the broader transit network



Woolwich Comprehensive Transportation & Mobility Plan

Recommended Cycling Network

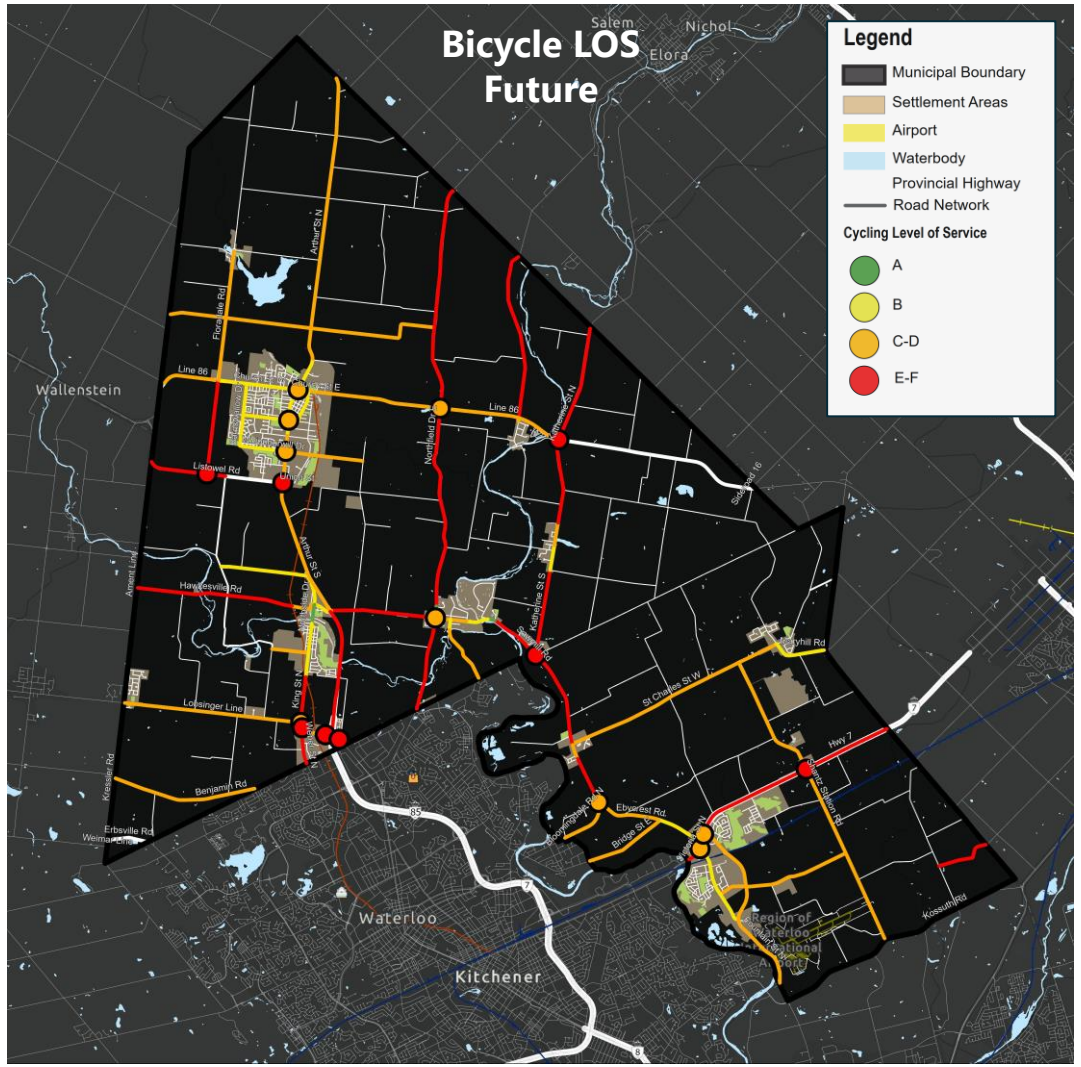
- The map on the right shows proposed cycling facilities in Woolwich, based on the ATMP and the Provincial Cycling network
- The proposed network includes shared cycling routes, multi-use paths, and dedicated bike lanes
- It aims to improve connectivity between settlement areas and surrounding regions
- However, travel between communities remains challenging due to frequent and steep elevation changes in the Township's topography



Woolwich Comprehensive Transportation & Mobility Plan

Future Bicycle LOS (BLOS)

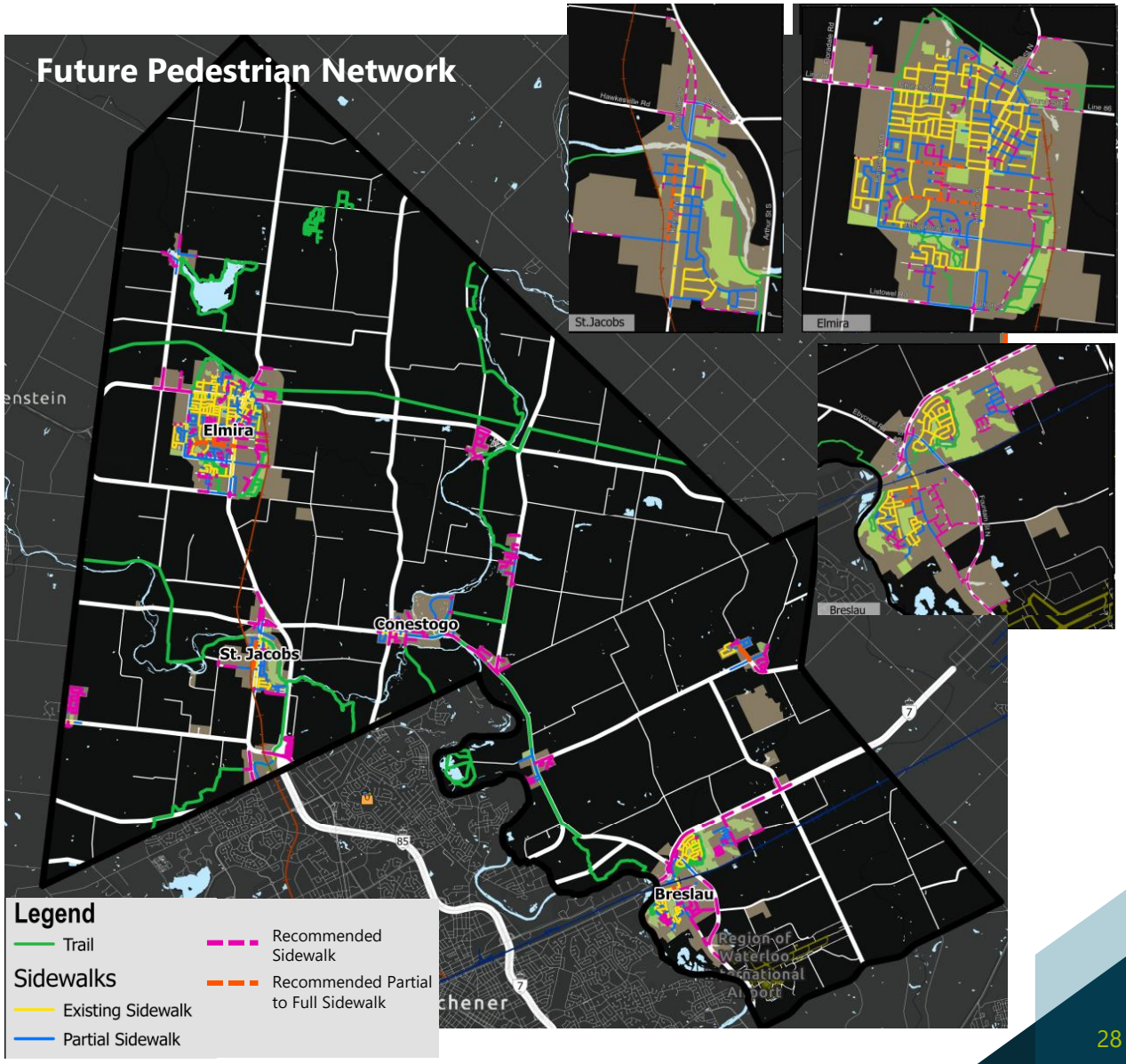
- Evaluation of future bicycle infrastructure was assessed based on:
  - Bike lane width
  - Traffic volume
  - Travel lanes
  - Vehicular operating speed
- Average level of service increased from '**D**' to **'C'** for bike infrastructure within Woolwich
  - Future bike infrastructure will be reasonably safe but may still feel uncomfortable for less experienced riders due to traffic speeds, volumes, or limited separation
- Overall, the analysis shows that cycling in Woolwich will be safer and more comfortable, leading to increased adoption of cycling as a mode of travel



Woolwich Comprehensive Transportation & Mobility Plan

Recommended Pedestrian Network

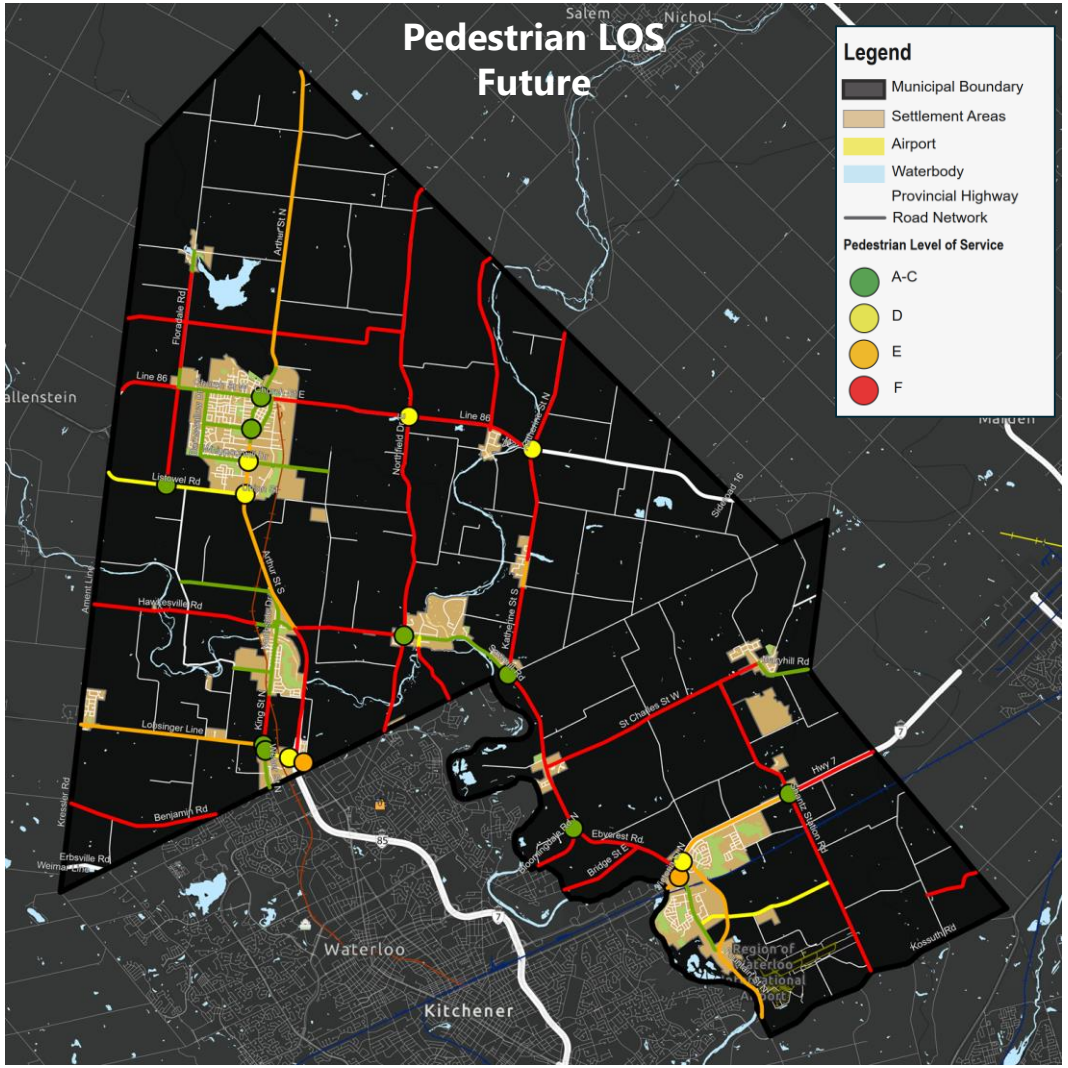
- Provide sidewalks on both sides of the street near schools, community facilities, and other high-activity areas to improve safety and accessibility
- All new developments should include sidewalks on both sides of streets to support walking as a primary mode of transportation
- Ensure that all streets in settlement areas have sidewalks on at least one side, with a long-term objective of sidewalks on both sides across the township.
- The Active Transportation Master Plan aims for continuous sidewalks on both sides of streets in all settlement areas to create a connected, safe, and accessible pedestrian network



Woolwich Comprehensive Transportation & Mobility Plan

Future Pedestrian LOS (PLOS)

- Evaluation of future pedestrian infrastructure was assessed based on:
  - Sidewalk and boulevard widths
  - Annual average daily traffic
  - Presence of on-street parking
  - Crosswalk treatments
  - Vehicular operating speed
- Average level of service increased from '**E**' to **'C'** for pedestrian infrastructure within Woolwich
  - Future pedestrian infrastructure is expected to achieve a good level of service, providing a comfortable experience for pedestrians
  - Pedestrian LOS remains poor along rural arterials and in rural areas, largely due to limited pedestrian demand and the absence of supporting infrastructure



Woolwich Comprehensive Transportation & Mobility Plan

Complete Streets Strategy

- Designing roads that safely accommodate all users: drivers, cyclists, pedestrians, transit, and horse-drawn buggies
- Complete Streets ensure safe travel for everyone, whether walking to school, cycling to work, driving, or using a buggy

Key Principles



Safety for vulnerable road users



Flexibility for rural and urban contexts



Accessibility for all ages and abilities



Balance between movement of vehicles and place-making



Provide a range of transportation choices

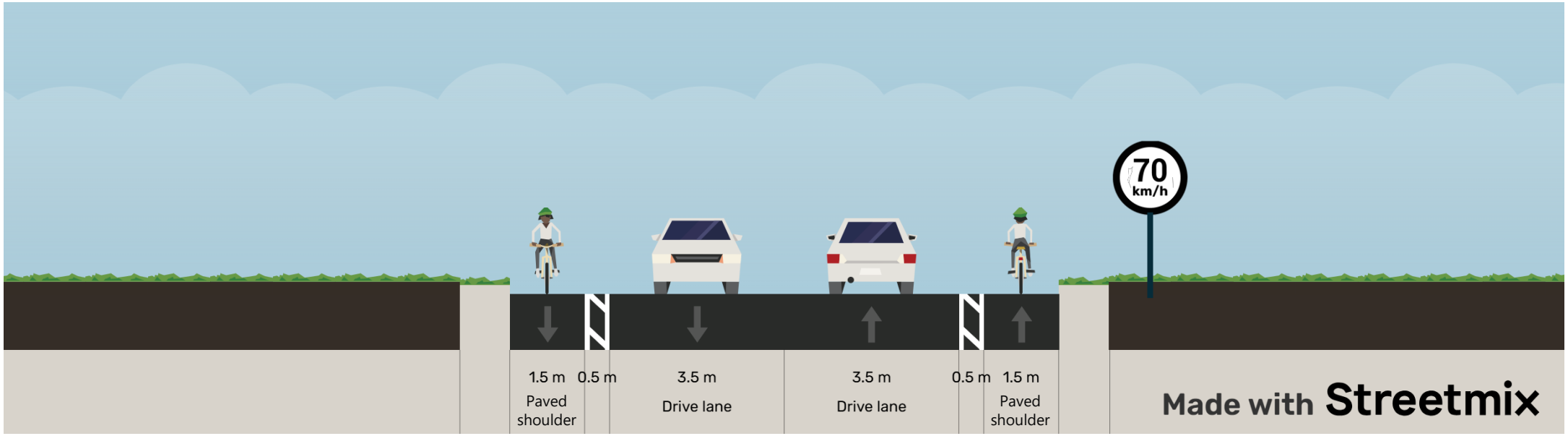


Create healthy and livable neighbourhoods

Woolwich Comprehensive Transportation & Mobility Plan

Rural Arterial

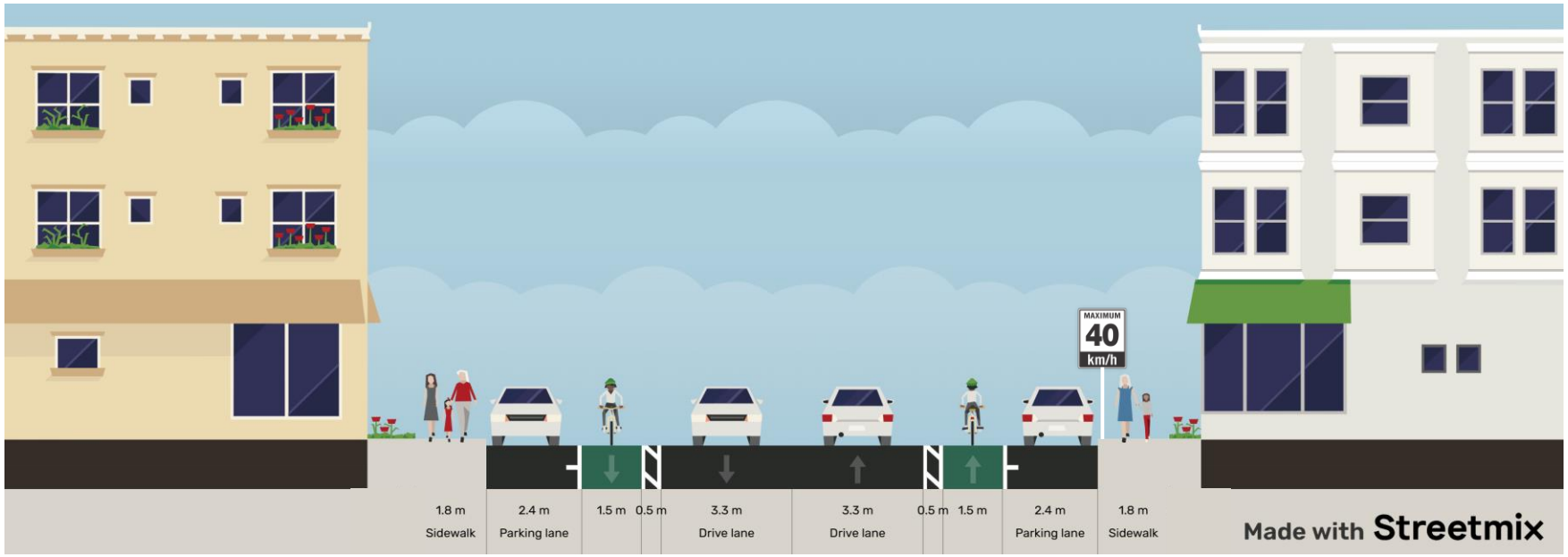
- Supports multi-modal travel by integrating cycling into a rural cross-section
- Recommended design speed between 70 km/h to 80 km/h, balancing mobility and safety in a rural context
- Buffer and shoulder widths shown are minimum standards – additional width can be provided where right-of-way allows
- Consistent with TAC Design Guidelines for rural arterials



Woolwich Comprehensive Transportation & Mobility Plan

Arterial within Settlement Area

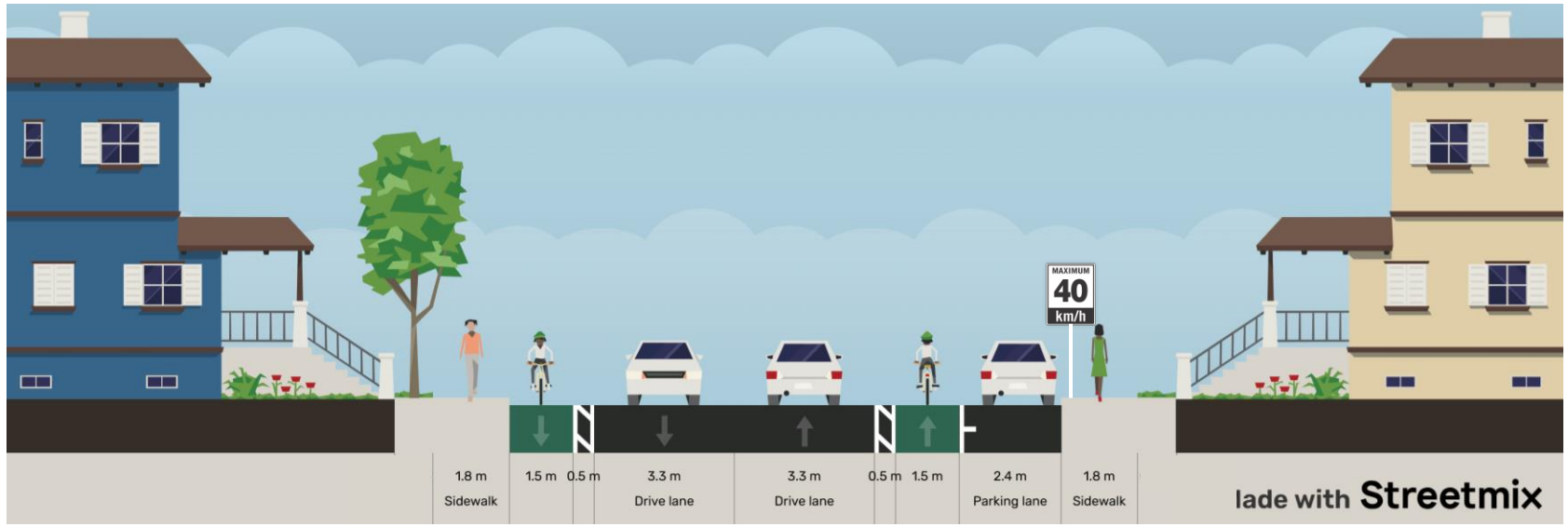
- Supports a “Complete Streets” approach, accommodating all users:
  Pedestrians, cyclists, vehicles, and local business needs
- Cross-section dimensions shown represent minimum standards; wider sidewalks or buffers can be provided where ROW permits
- Recommended design speed is 40 km/h to support safety in a pedestrian- and cycling-oriented environment



Woolwich Comprehensive Transportation & Mobility Plan

Local Street

- Cross-section is consistent with Complete Streets principles for local roads, prioritizing vulnerable users
- Design emphasizes neighbourhood livability, safety, and active transportation rather than vehicle mobility
- Recommended design speed: 40 km/h, reflecting the residential setting and need for traffic calming (recommended speed of 30 km/h in school zones)
- Dimensions shown are minimums; wider sidewalks, boulevards, or cycling buffers can be incorporated where ROW permits



Woolwich Comprehensive Transportation & Mobility Plan

Traffic Calming

- Traffic calming uses design features to reduce vehicle speeds and improve safety
- Key to addressing concerns around speeding, cut-through traffic, pedestrian safety in Woolwich
- Traffic calming makes streets safer and more comfortable, especially near schools, parks, and busy pedestrian areas

Physical Measures

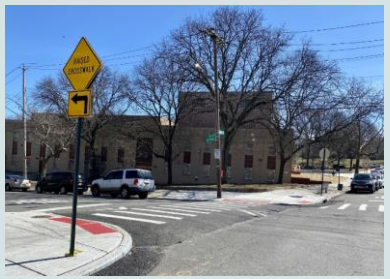
Improve conditions through physical alterations to the roadway, including:

- Horizontal deflection (i.e. curb extensions)
- Vertical deflection (i.e. speed humps, raised crosswalk)
- Signage









Societal Measures

Increase road safety through measures that lead to reduced automobile usage and safer driver habits, including:

- Speed watch programs (Existing lawn sign program in place and Region's speed camera enforcement)
- Education programs
- Newspaper ads and brochures



Picture Source: TAC Traffic Calming Guide

Woolwich Comprehensive Transportation & Mobility Plan

Policies and Strategies

Speed Limit Policy

It is recommended for the Township to adopt 40 km/h default speed limit within settlement areas with a further reduction to 30 km/h in school zones. Research shows that reducing speeds improves survival rates for pedestrians and cyclists in collisions and helps create calmer, more comfortable streets near schools, parks, and residential neighbourhoods. This policy would be supported by targeted traffic calming, enforcement, and education initiatives.



Pedestrian Crossing Guidelines

The Pedestrian Crossing Guidelines will provide guidance to the Township to select candidate locations for pedestrian crosswalks as well as the types of crosswalks to implement. This approach will ensure consistent decision-making, improved safety for vulnerable road users, and better connectivity within Woolwich's settlement areas.



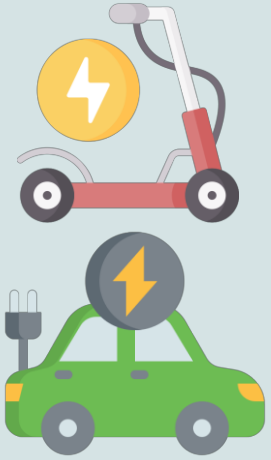
Parking Management

The parking management strategy will outline considerations for the optimal management of parking spaces, ensuring that supply is balanced with demand in settlement areas and key destinations, reduce congestion, support local businesses, and encourage the use of active and sustainable modes of travel. In Woolwich, it will also emphasize placemaking by designing parking areas that enhance the public realm, improve walkability, and create more inviting village and community spaces.



Smart Mobility

The Smart Mobility Strategy will outline how the Township can proactively prepare for emerging technologies, such as ride-hailing services, micro-mobility options, and electric vehicles, to improve mobility, sustainability, and connectivity. By anticipating future trends, the strategy will support more efficient travel choices, reduce environmental impacts, and ensure Woolwich is ready to adapt to innovative transportation solutions that meet community needs



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Icon source: flaticon.com

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Next Steps

Woolwich Comprehensive Transportation & Mobility Plan

Next Steps

- Incorporate feedback from Focus Group 2 into the recommendations
- Finalize the evaluation of alternatives, confirm priority projects, and prepare a proposed implementation plan
- Hold the second Public Information Centre (PIC) on August 27, 2025
- Continue coordination with the Township, Region of Waterloo, and other key stakeholders
- Submit the Draft Transportation & Mobility Plan Report by September 5, 2025



Thank You

www.egis-group.com

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News Release

August 5, 2024

For Immediate Release

Notice of Public Workshop 2 for Township of Woolwich's Comprehensive Transportation and Mobility Master Plan

The Township of Woolwich is developing its first Comprehensive Transportation and Mobility Plan (CTMP) with support from Egis. This strategic plan will guide transportation infrastructure investments and policies that promote sustainable, multimodal mobility options—ensuring the Township remains connected, safe, and accessible as it grows to 2051.

The CTMP focuses on improving safety, connectivity, and accessibility for pedestrians, cyclists, transit users, and drivers by promoting active transportation, supporting transit-oriented development, and addressing key mobility challenges.

Project Objectives

The CTMP will guide the Township:

- Promoting transit-ready communities by supporting GO Transit and rail expansion;
- Advancing low-carbon, climate resilient and sustainable mobility;
- Enhancing walking and cycling networks to support safe, accessible active transportation;
- Improving traffic operations, road safety and system accessibility;
- Optimizing parking management strategies;
- Planning for future growth by aligning transportation infrastructure with projected population and employment needs.

The Process

The CTMP is being prepared in accordance with the Municipal Class Environmental Assessment (MCEA) process (2023), following Approach 1. It will fulfill the requirements for Phase 1 (Problem and Opportunity) and Phase 2 (Alternative Solutions) under the MCEA and support streamlined implementation of future capital projects.

Get Involved

Community input is a vital part of this process. We invite residents, stakeholders, and agency partners to participate in shaping the future of transportation in Woolwich.

Join us for **Public Workshop 2**, where we will present the results of our technical assessments, future transportation needs, and draft recommendations, and gather feedback to help finalize the CTMP.

Details for the Public Workshop are as follows:

Public Workshop 2 Details:

- **Date:** Wednesday, August 27th, 2025
- **Time:** 5:00pm – 7:00pm
- **Location:** Virtual via Teams Platform
- **Teams Link:** **Join the meeting now**
  Meeting ID: 391 151 525 048 1 | **Passcode:** NW2vD9dh

This interactive session will include a presentation of findings and draft recommendations, followed by a Q&A and feedback session. Supporting materials such as maps and data visualizations will be shared to help guide discussion.

At any time during this study, you can provide comments, questions, and concerns to the project team on the Township of Woolwich project website: https://www.engagewr.ca/woolwich-transportation-mobility-plan

If you are unable to attend the workshop, the presentation recording will be available online on the Township's project website to download and access.

Next Steps

Following this final round of engagement, the project team will:

1. Review public feedback received and adjust draft recommendations where needed;
2. Finalize the CTMP recommendations;
3. Confirm phased implementation plan for various transportation system components;
4. Refine supporting policies and strategies; and
5. Prepare the final Comprehensive Transportation and Mobility Plan Report.

Contact us

For further information or to be added to the study's mailing list, please contact the study team:

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Township of Woolwich

Comprehensive Transportation & Mobility Plan

Public Workshop #2

August 27th, 2025

IMAGINE
CREATE
ACHIEVE
a sustainable future

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Recap: Context and Objectives of the CTMP

Woolwich Comprehensive Transportation & Mobility Plan

Main Objectives

- Plan for Future Growth
- Support Low-Carbon, Climate-Resilient Communities
- Promote Transit-Ready Communities
- Improve Safety and Accessibility
- Optimize Parking Policies

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*The material presented is subject to regional comments and will be further reviewed going forward.

Woolwich Comprehensive Transportation & Mobility Plan

Problem / Opportunity Identification

1. Background Data Collection
2. Current Infrastructure Analysis
3. Population and Employment Trends Analysis
4. Transportation Demand Forecasting
5. Problem Identification

Engagement Round #1

Identification of Alternatives and Preferred Solutions

1. Alternative Solutions Development
2. Modal Shifting Strategies
3. Integration with Land Use Planning
4. Implementation Plan Development

Engagement Round #2

Documentation and Finalization

1. Draft CTMP
2. Final CTMP

End
Summer '25

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2

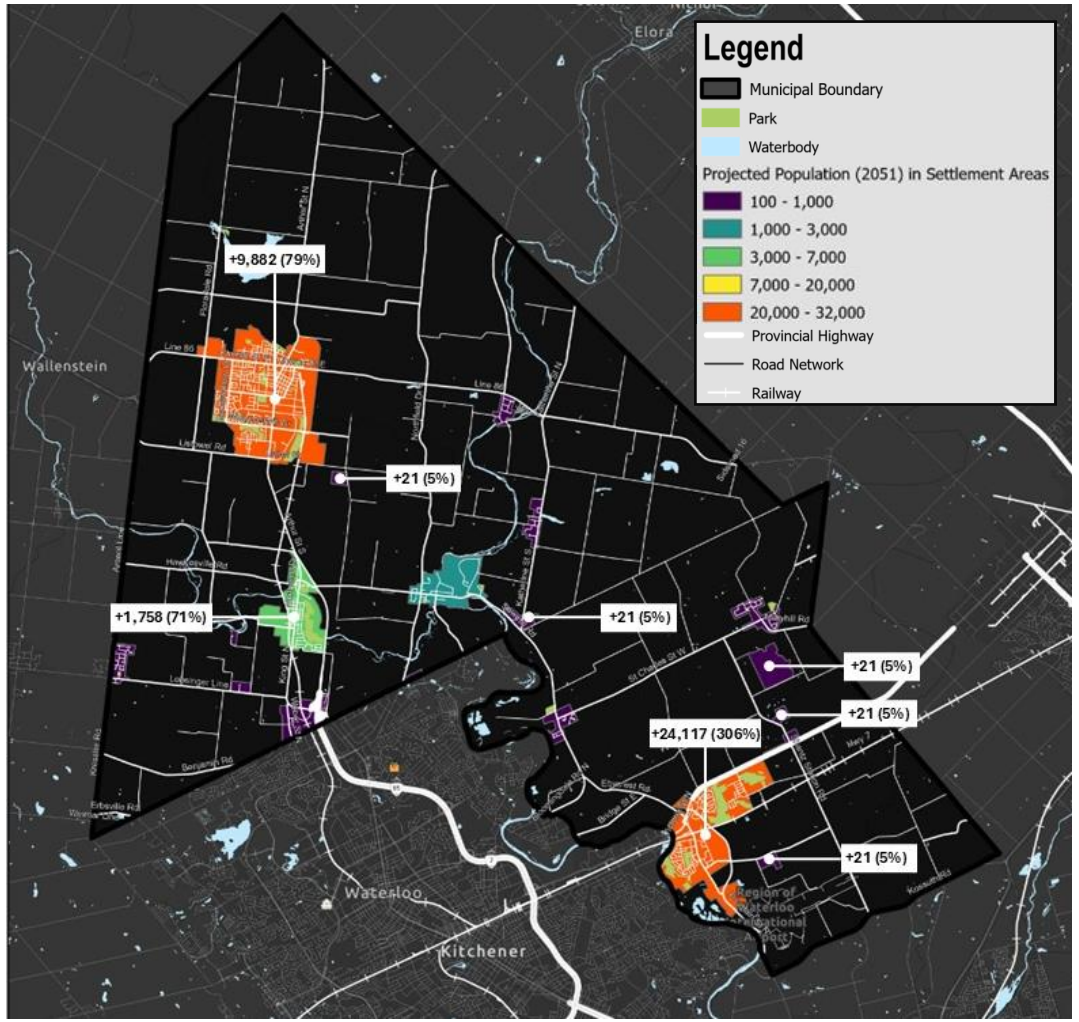
Future Conditions

Woolwich Comprehensive Transportation & Mobility Plan

Future Population by Area

- By 2051:
  - Woolwich's population is projected to grow from 26,999 (in 2021) to 68,195 (+152%)
  - Elmira's population is projected to grow from 12,416 now to 22,298 (+79%)
  - Breslau's population is projected to increase almost four times from approximately 7,800 now to 31,900 (+306%)
  - St. Jacobs population is projected to grow from 2,477 now to 4,235 (by 71%)*
  - Growth in other settlement areas is expected to be limited, with increases up to 5%

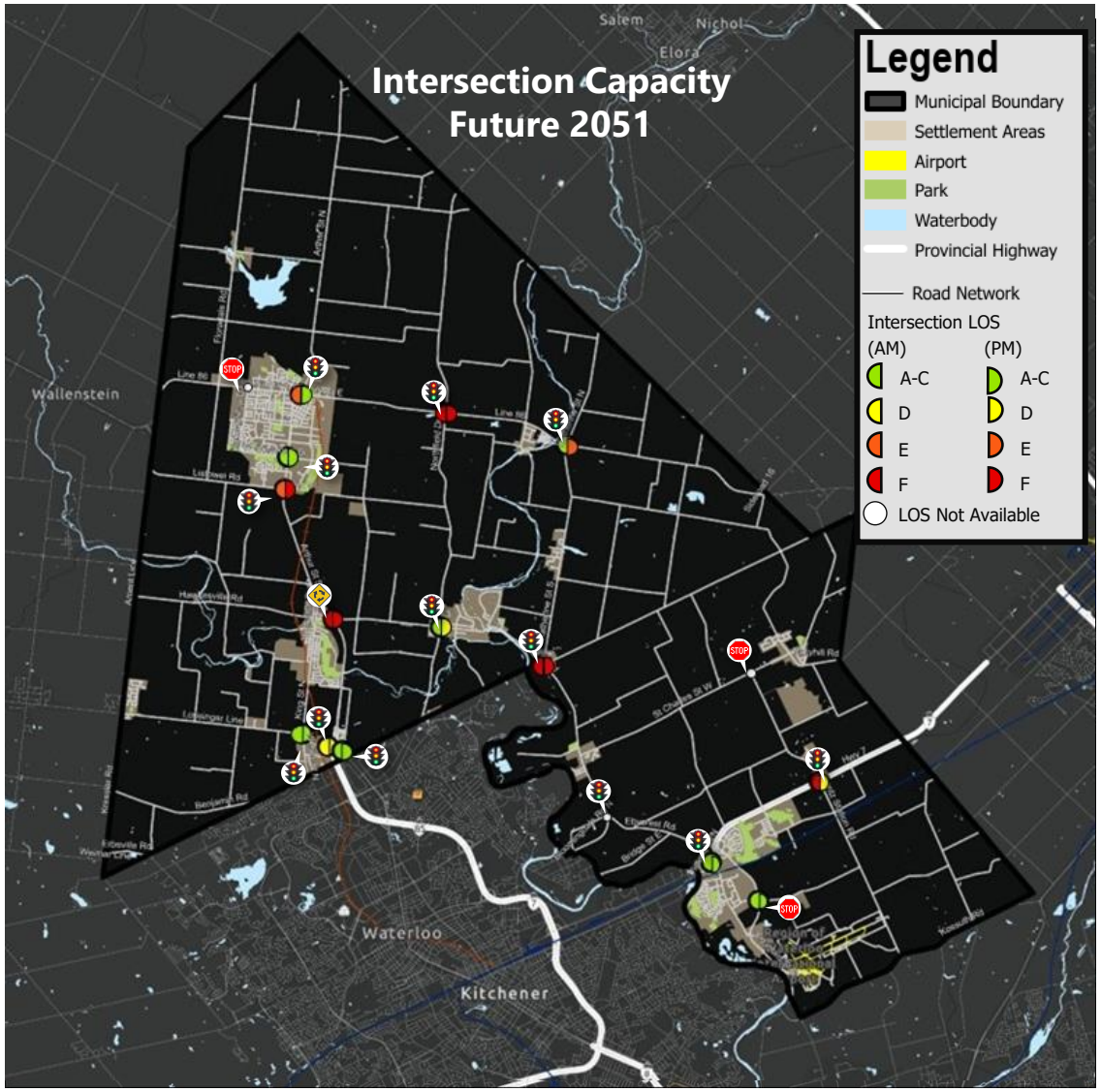
*growth for St. Jacobs is dependant on wastewater capacity and it may not reach this number if no further improvements are made



Woolwich Comprehensive Transportation & Mobility Plan

Future Capacity at Intersections (Do-Nothing)

- The analysis took into consideration regional improvements but no intersection optimizations
- The intersections projected to experience the most significant deterioration in operations between 2025 and 2051 are:
  - Sawmill Road & Katherine Street / Crowsfoot Road
  - Northfield Drive & Line 86
  - Arthur Street and Sawmill Road
- Conversely, improvements in levels of service are anticipated at the following intersections:
  - Woolwich Street / Ebycrest Road & Victoria Street N
  - Arthur Street South & Whippoorwill Drive



3

Key Issues

Woolwich Comprehensive Transportation & Mobility Plan

Key Issues

Improve Active Transportation Infrastructure

Close sidewalk and cycling gaps to support safe, 15-minute active trips across major corridors and intersections

Strengthen Transit and Connectivity to Key Nodes

Enhance local transit service and improve links to major population and activity nodes, including the future Breslau GO Station and key urban areas within Woolwich and the broader Waterloo Region

Maintain and Upgrade Road Infrastructure

Ensure roads are in good condition and ready to accommodate expected population, employment, and traffic growth

Address Safety and Capacity Issues

Implement improvements at key locations with operational or safety constraints, including; Arthur Street, Listowel Road, Line 86, Sawmill Road, Northfield Drive, Shantz Station Road

Support Transit-Oriented and Mixed-Use Development

Plan compact, integrated communities around the future GO Station in Breslau that align with urban growth strategies

Strategic Parking Management

Balance accessibility and land use efficiency, especially in growth areas and affordable housing developments

Integrate Emerging Mobility Options

Plan for integration of micromobility (e.g., e-scooters, e-bikes), car sharing, and other mobility solutions by updating infrastructure, policies, and regulations to support user adoption, equitable access, and operational safety

Advance Complete Streets Principles

Prioritize inclusive, sustainable street design to support diverse user needs across all travel modes

Focus on Implementation

Develop a prioritized, costed action plan with clear timelines, funding strategies, and performance metrics

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Strategy Development

Woolwich Comprehensive Transportation & Mobility Plan



Do Nothing

Maintain the Township's current transportation network and policy/programming. This alternative does not include further development of roads under the jurisdiction of the Township. An analysis of this "Do Nothing" scenario has already been completed to establish a baseline for comparison against other alternatives



Auto-Oriented Growth / Road Network Strategy

Focus investment on strategic road network improvements, such as road urbanization, local traffic operation, and safety improvements. Corresponding strategic investment will be made towards providing safer pedestrian and cycling facilities but will focus on improving the network predominately for motorists



Active and Transit-First Strategy

Emphasis on sustainable and people-centric modes of travel by prioritizing the development of high-quality active transportation and public transit infrastructure. The goal is to reduce reliance on single-occupant vehicles and promote a shift towards more sustainable, safe, and accessible transportation options

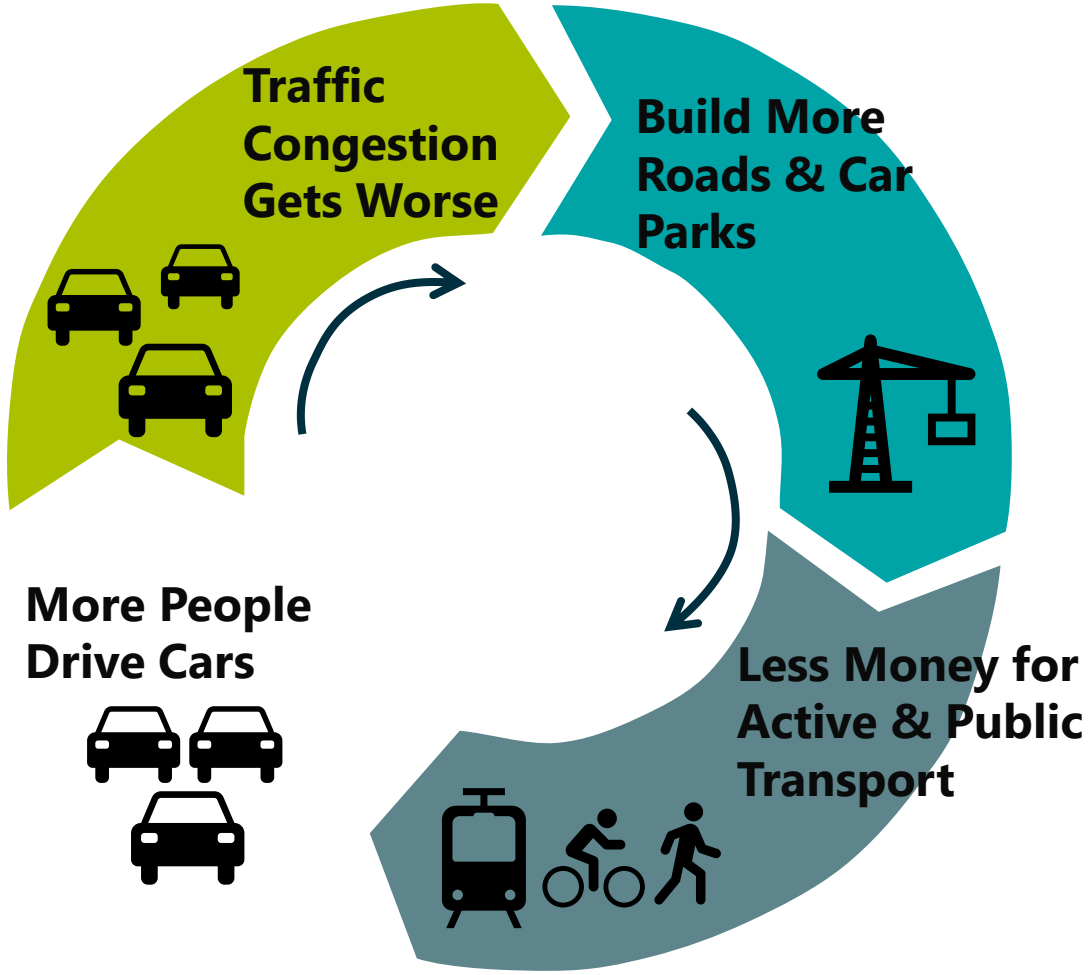


Hybrid / Integrated Network Strategy

Focus on strategic road network capacity improvements, while also promoting and enhancing the active transportation network and the public transit system. The Township will target investments to where they are needed and prepare itself to adapt to meet the changing conditions due to emerging trends and transportation technologies

Woolwich Comprehensive Transportation & Mobility Plan

The Transportation Doom Loop



Woolwich Comprehensive Transportation & Mobility Plan

Why an Integrated Network Strategy ?



Balanced Approach: Combines strategic road network upgrades with strong support for active transportation and public transit investments



Future Ready: Enables the Township to adapt to emerging trends, new technologies, and evolving travel needs



Responsive to Key Issues: Addresses congestion, safety, limited transit access, and the need for sustainable travel choices



Supports Growth: Aligns transportation improvements with land use planning to accommodate population and employment growth



Promotes Equity and Accessibility: Ensures infrastructure serves all users including drivers, cyclists, pedestrians, and transit riders



Balanced Support for Environmental Sustainability: Encourages low-emission travel, supports compact growth, and aligns with Woolwich's climate goals while accommodating essential road improvements

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List of Alternative Solutions

Woolwich Comprehensive Transportation & Mobility Plan

Active Transportation



- Ensure that existing bike lanes comply with OTM Book 18 and current industry best practices to enhance safety and accessibility for all users
- Improve crossing infrastructure (e.g., raised crosswalks, pedestrian refuge islands, rapid flashing beacons)

Public Transit



- Advocate for express or commuter-oriented service connecting Elmira, Breslau, and St. Jacobs to the ION LRT system and Kitchener GO Station
- Improve connections to the future Breslau GO Station from the Township's settlement areas

Road Network



- Revise the road classification framework to align with evolving land use, traffic volumes, and growth patterns

Safety & Capacity



- Prioritize upgrades to key corridors with known capacity issues and advocate for continual improvements to community safety while looking for operational efficiency where possible

Parking Management



- Develop a municipal parking strategy for high-growth areas like Elmira and Breslau

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Icon source: flaticon.com

Woolwich Comprehensive Transportation & Mobility Plan

Land Use and TOD



- Integrate land use and mobility planning in Breslau to support compact, walkable TOD around the GO Station
- Revise subdivision design guidelines to ensure new developments include sidewalks, multi-use paths, and traffic calming

Emerging Mobility



- Plan for integration of electric vehicle (EV) charging infrastructure, especially near employment and GO station areas

Complete Streets



- Adopt a Township-wide Complete Streets policy and update road cross-section standards accordingly
- Prioritize Complete Streets upgrades in school zones, town centers, and new subdivisions

Implementation & Monitoring



- Develop a 20-year capital plan that groups transportation improvements by implementation horizon (short-, medium-, long-term)
- Align infrastructure phasing with growth triggers (e.g., 2031 and 2051 population targets)

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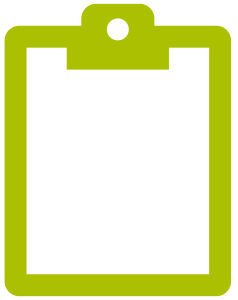
Icon source: flaticon.com

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What We Heard

Woolwich Comprehensive Transportation & Mobility Plan

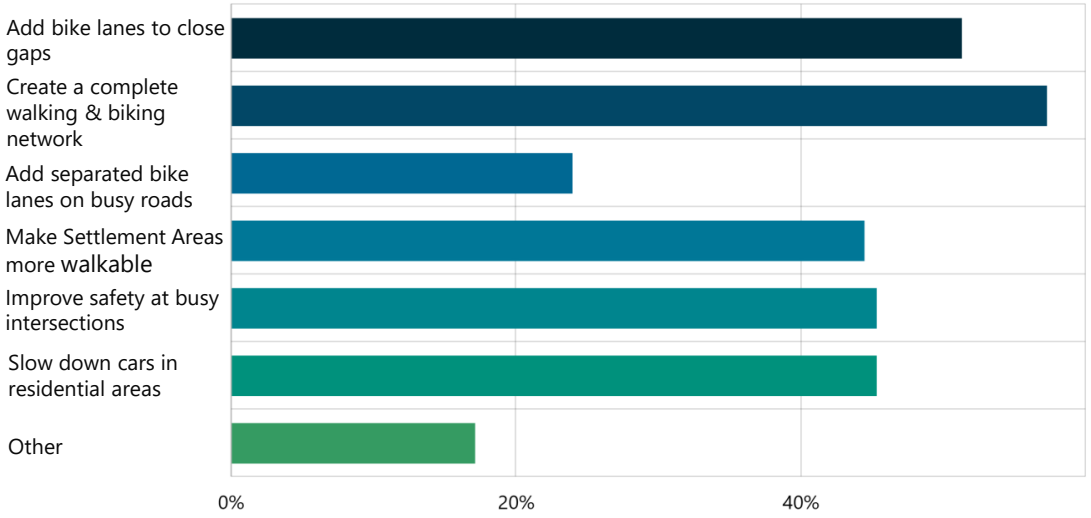
Survey 2: Strategic Vision and Alternative Solutions



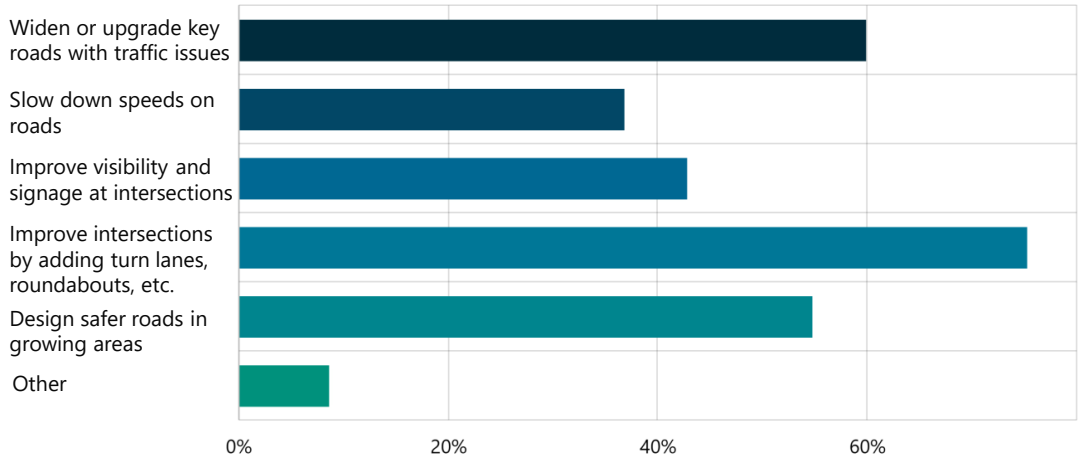
- Launched on July 28th 2025 via the Engage Woolwich Website
- Focus of the survey is on key transportation and mobility issues and their potential solutions
- 126 responses received so far
- Survey remains open until August 31st, 2025
- Community feedback will help prioritize solutions in the CTMP
- The next slide summarizes some of the responses for the survey received up to August 22nd

Woolwich Comprehensive Transportation & Mobility Plan

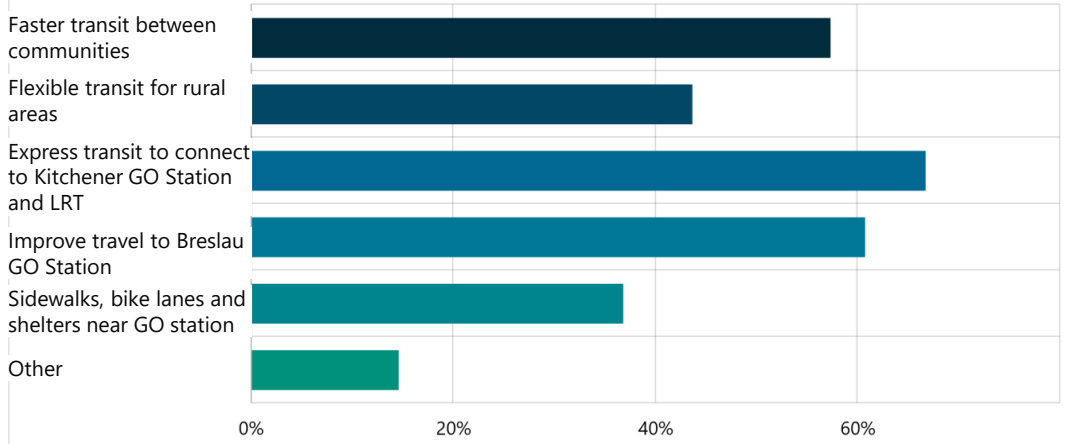
What Active Transportation improvements do you support most?



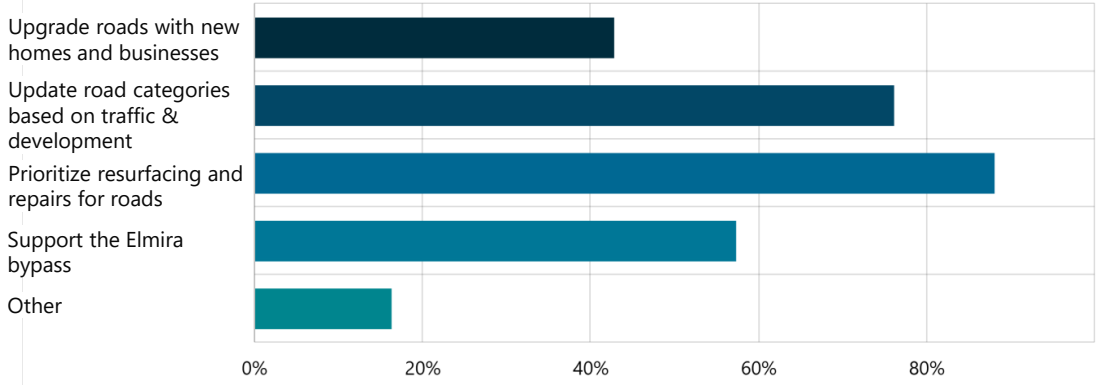
What Safety and Capacity improvements do you support most?



What Public Transit Options do you support most?



What Safety and Capacity improvements do you support most?



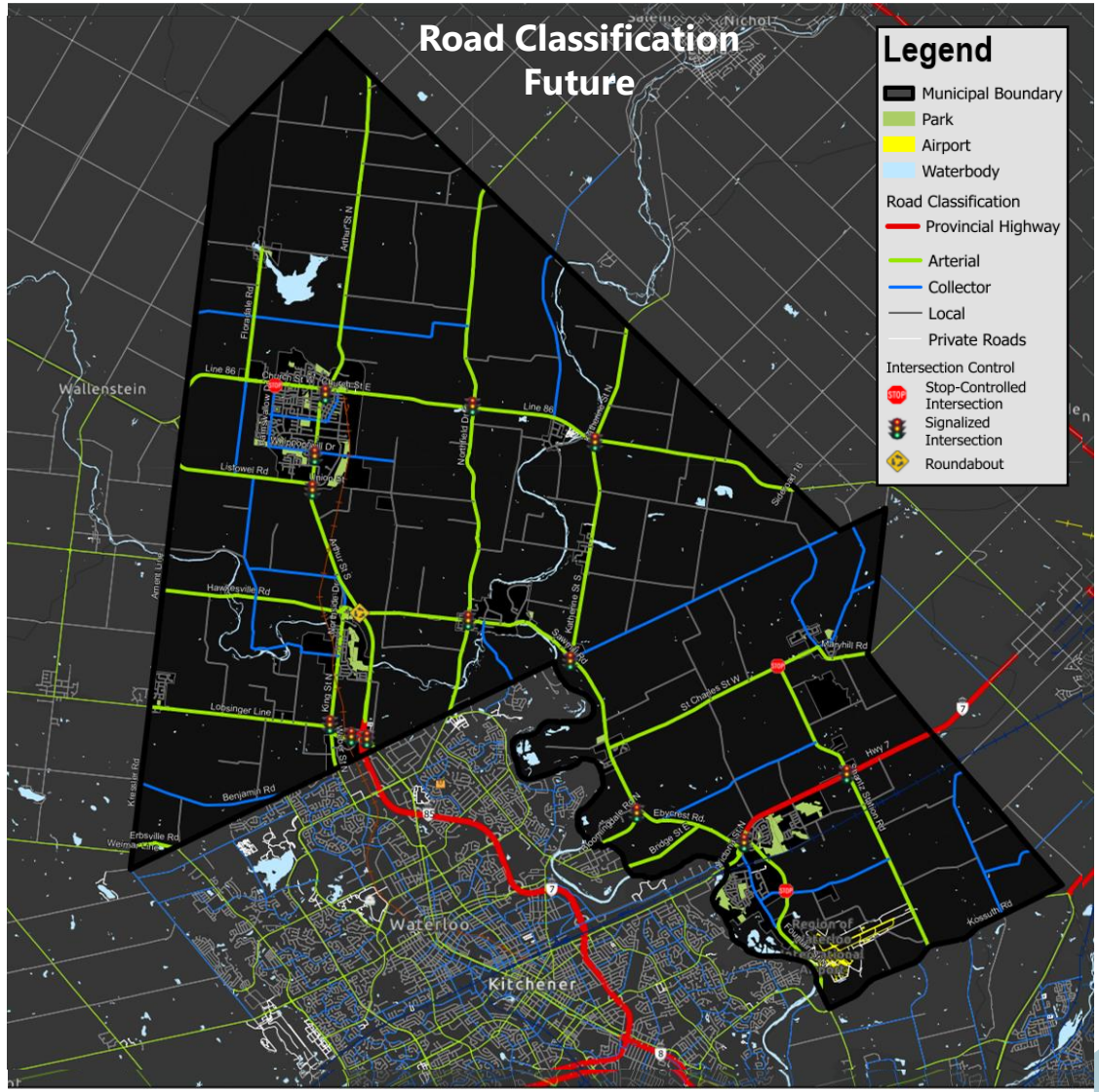
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Preliminary Recommendations

Woolwich Comprehensive Transportation & Mobility Plan

Road Classification Updates

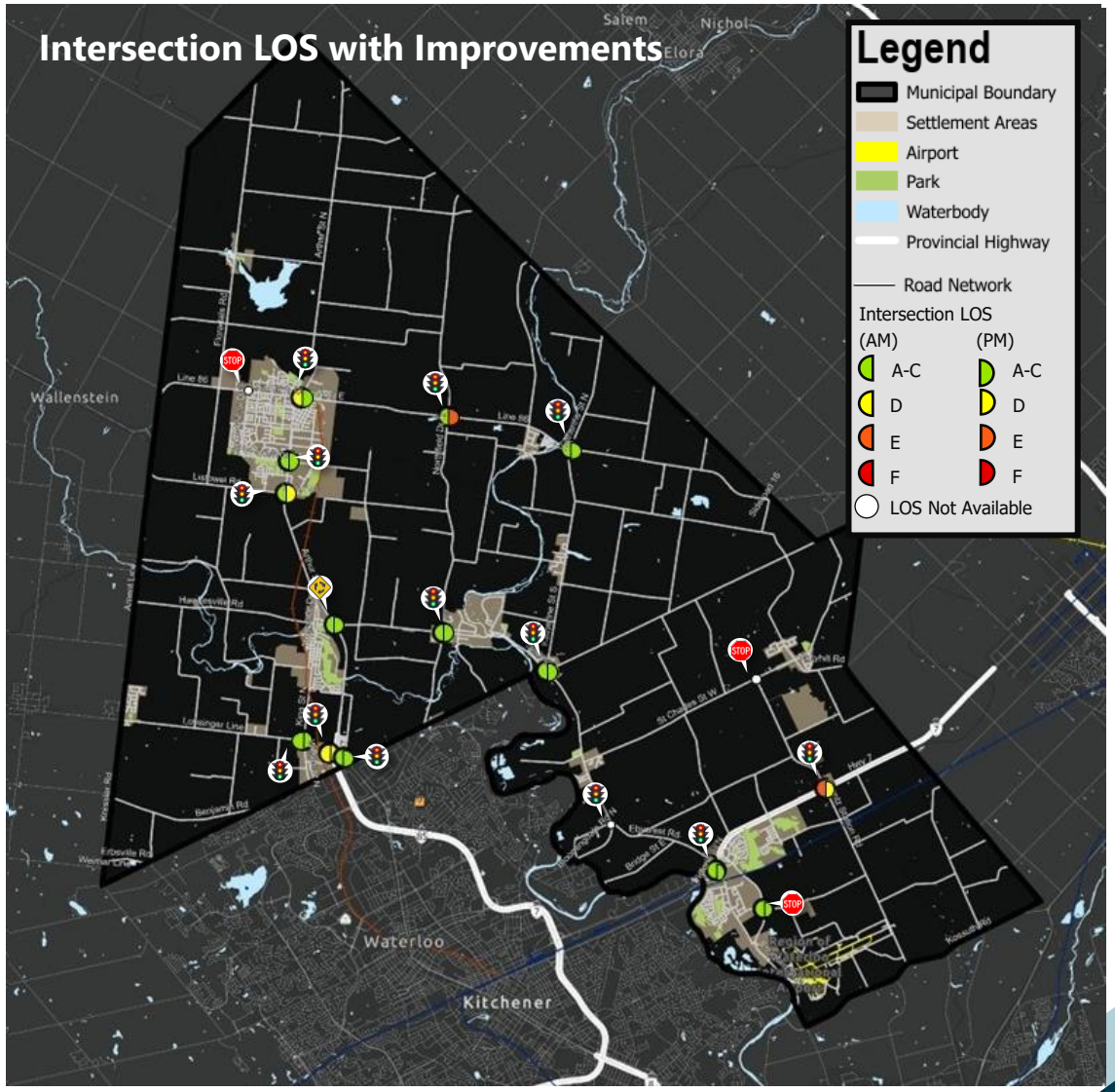
- The map to the right illustrates the updated road classifications for Woolwich based on road jurisdiction, future land use, and traffic volumes
- The following roads are recommended to be upgraded from Locals to Collectors:
  - ✓ Maryhill Road
  - ✓ St Charles St E
  - ✓ Crowsfoot Road
  - ✓ Hopewell Creek Road
  - ✓ Chilligo Road



Woolwich Comprehensive Transportation & Mobility Plan

Intersection LOS in 2051

- Intersection performance was evaluated under 2051 horizon year traffic conditions, accounting for population and employment growth in Woolwich and the Region
- Planned upgrades and capacity improvements on the Regional Road network were incorporated into the analysis*
- Signal timing adjustments, lane configurations, and other operational strategies were tested to improve efficiency
- With the combined improvements, most intersections are projected to operate at **LOS D or better**, which is considered acceptable for urban/suburban contexts



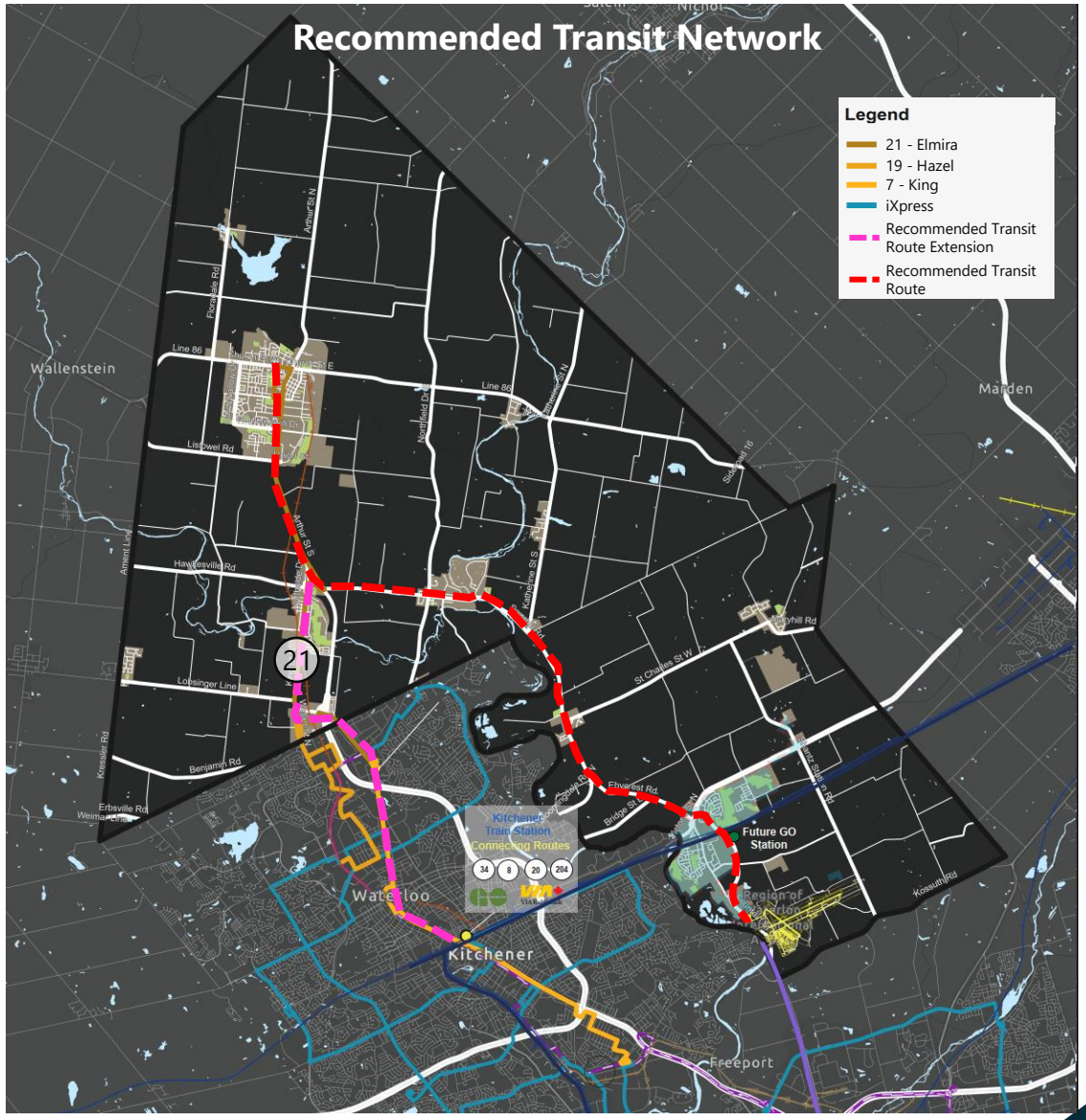
*Region's 2018 TMP are preliminary recommendations based on high-level transportation modelling and require detailed confirmation on a project-by-project basis when they get closer to potential implementation

*signalized intersections are under Regional jurisdiction and subject to Regional Studies to address issues if there are concerns

Woolwich Comprehensive Transportation & Mobility Plan

Recommended Transit Network

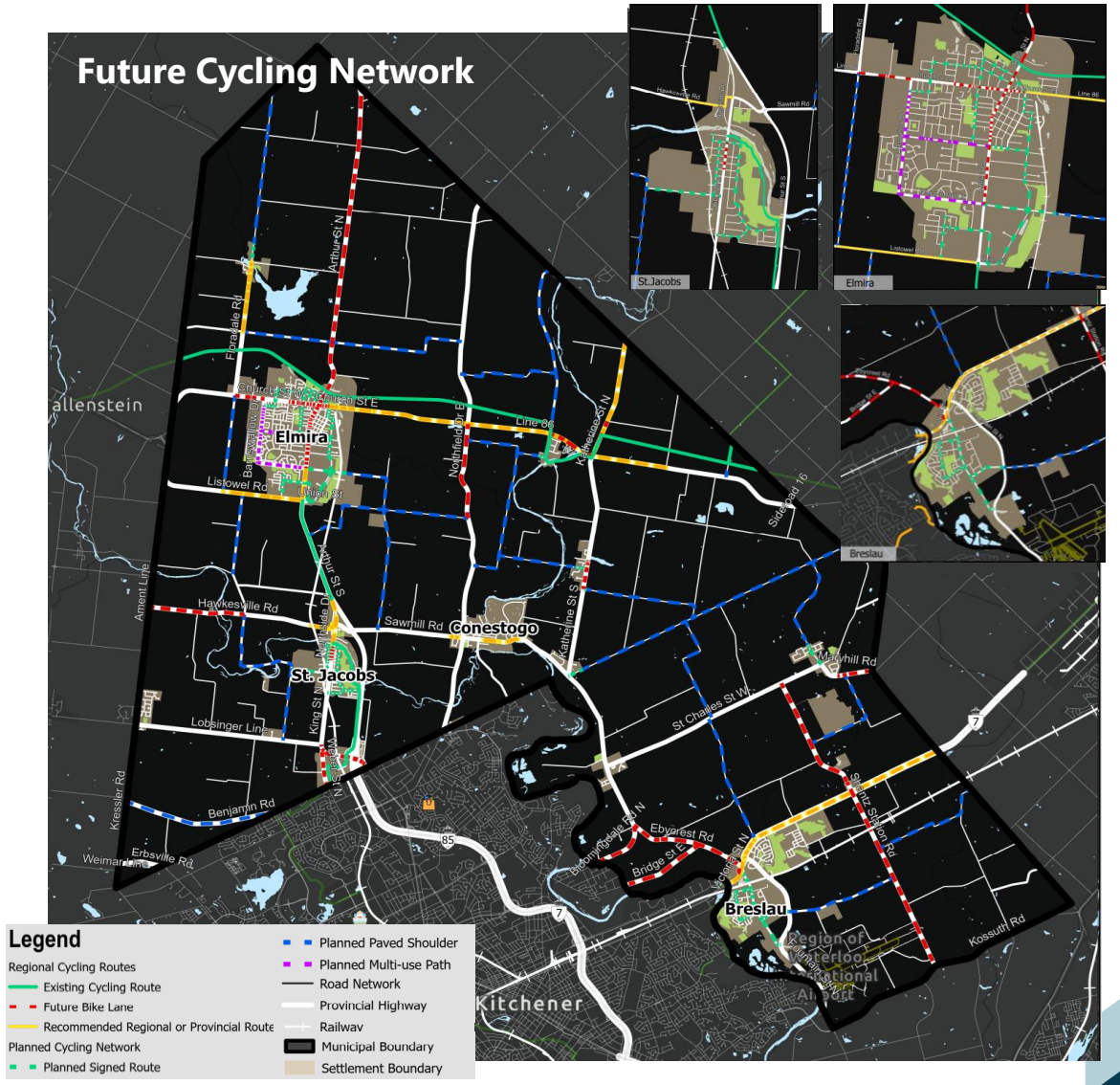
- Introduce a new transit route connecting Elmira, St. Jacobs, and Conestoga to the Breslau GO Station and the Region of Waterloo International Airport, enhancing regional connectivity and giving residents direct access to higher-order transit
- Liaise with Metrolinx to align the new transit route with GO train schedules, future network expansions, and regional transit planning initiatives
- This recommended route will service key growth areas, promote public transit use, and provide accessible transportation options for seniors, students and residents of the township
- Extend Grand River Transit Route 21 from Elmira to directly connect with the Kitchener GO Station, improving access to regional and intercity transit services
- Introduce on-demand transit service to provide coverage in less dense and rural areas, offering flexible mobility options and complementing fixed-route services within the broader transit network



Woolwich Comprehensive Transportation & Mobility Plan

Recommended Cycling Network

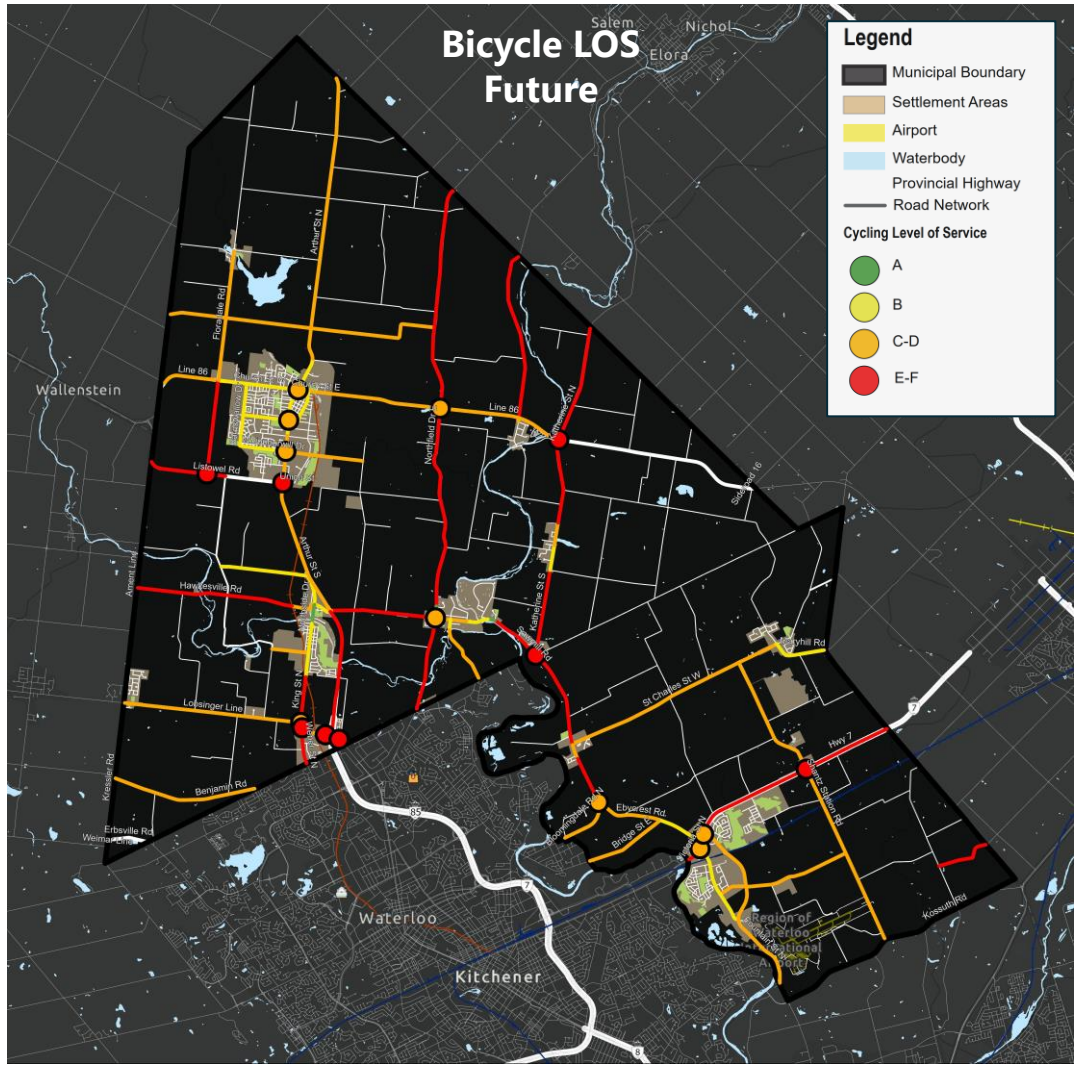
- The map on the right shows proposed cycling facilities in Woolwich, based on the ATMP and the Provincial Cycling network
- The proposed network includes shared cycling routes, multi-use paths, and dedicated bike lanes
- It aims to improve connectivity between settlement areas and surrounding regions
- However, travel between communities remains challenging due to frequent and steep elevation changes in the Township's topography



Woolwich Comprehensive Transportation & Mobility Plan

Future Bicycle LOS (BLOS)

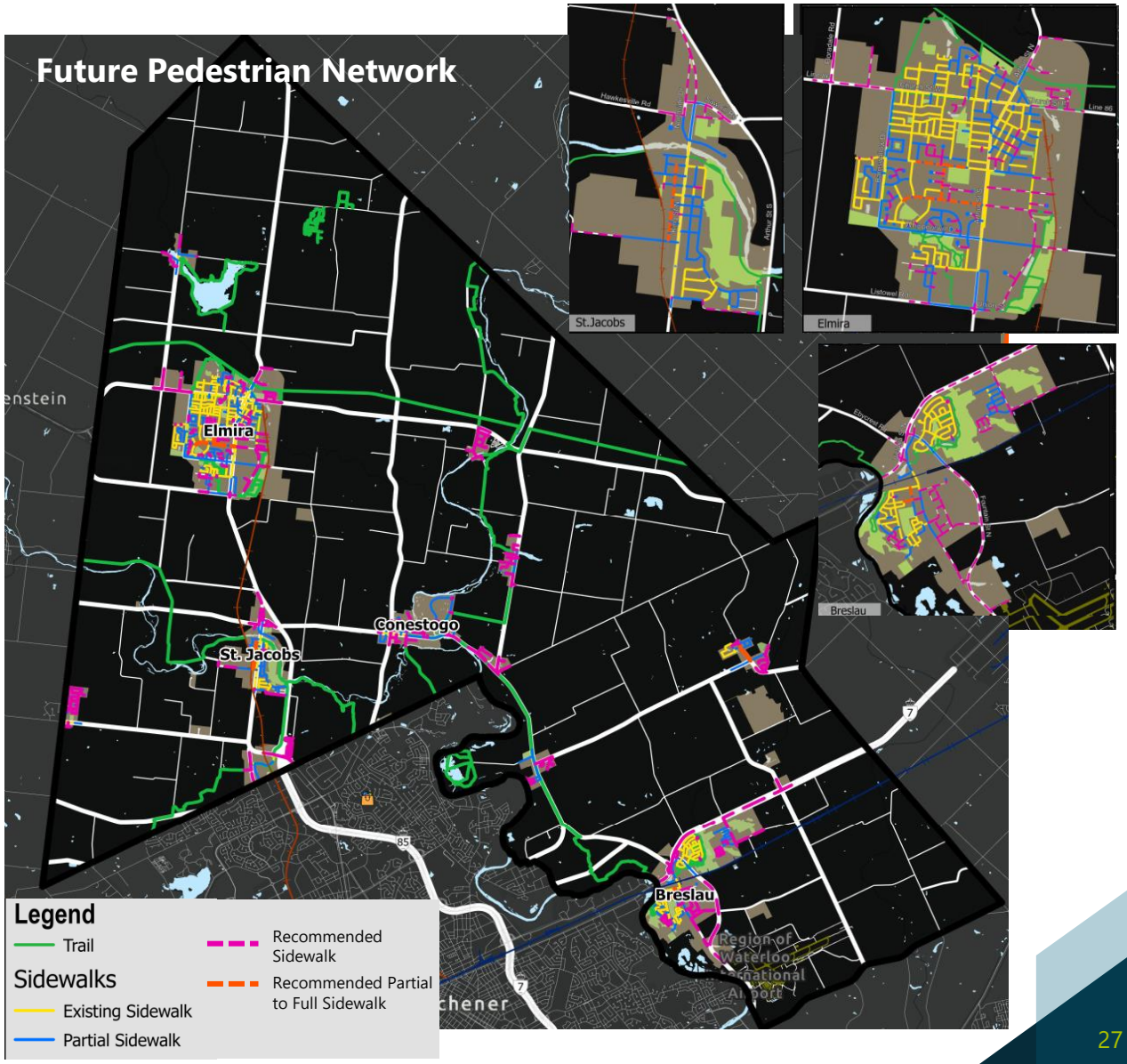
- Evaluation of future bicycle infrastructure was assessed based on:
  - Bike lane width
  - Traffic volume
  - Travel lanes
  - Vehicular operating speed
- Average level of service increased from '**D**' to **'C'** for bike infrastructure within Woolwich
  - Future bike infrastructure will be reasonably safe but may still feel uncomfortable for less experienced riders due to traffic speeds, volumes, or limited separation
- Overall, the analysis shows that cycling in Woolwich will be safer and more comfortable, leading to increased adoption of cycling as a mode of travel



Woolwich Comprehensive Transportation & Mobility Plan

Recommended Pedestrian Network

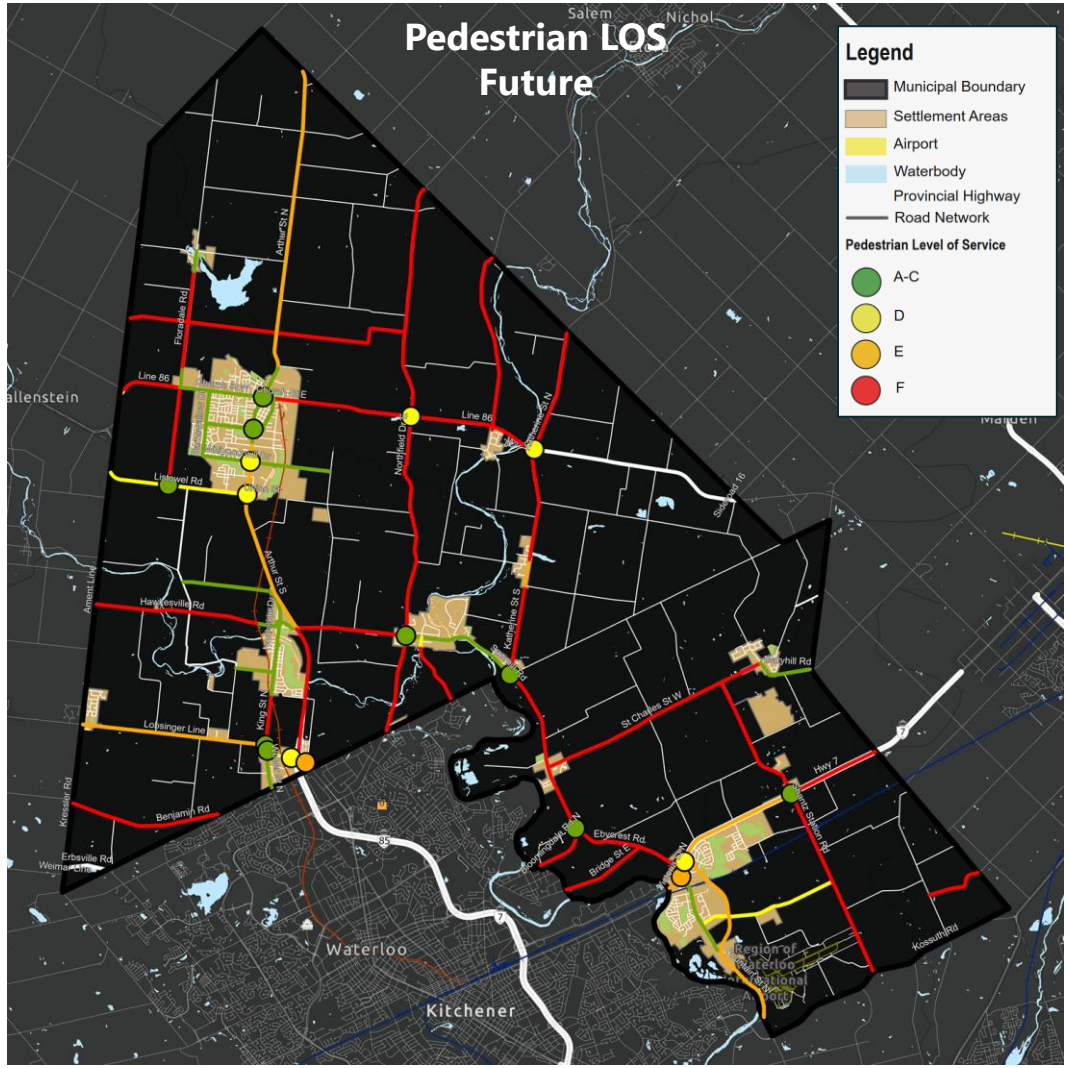
- Provide sidewalks on both sides of the street near schools, community facilities, and other high-activity areas to improve safety and accessibility
- All new developments should include sidewalks on both sides of streets to support walking as a primary mode of transportation
- Ensure that all streets in settlement areas have sidewalks on at least one side, with a long-term objective of sidewalks on both sides across the township.
- The Active Transportation Master Plan aims for continuous sidewalks on both sides of streets in all settlement areas to create a connected, safe, and accessible pedestrian network



Woolwich Comprehensive Transportation & Mobility Plan

Future Pedestrian LOS (PLOS)

- Evaluation of future pedestrian infrastructure was assessed based on:
  - Sidewalk and boulevard widths
  - Annual average daily traffic
  - Presence of on-street parking
  - Crosswalk treatments
  - Vehicular operating speed
- Average level of service increased from '**E**' to **'C'** for pedestrian infrastructure within Woolwich
  - Future pedestrian infrastructure is expected to achieve a good level of service, providing a comfortable experience for pedestrians
  - Pedestrian LOS remains poor along rural arterials and in rural areas, largely due to limited pedestrian demand and the absence of supporting infrastructure



Woolwich Comprehensive Transportation & Mobility Plan

Complete Streets Strategy

- Designing roads that safely accommodate all users: drivers, cyclists, pedestrians, transit, and horse-drawn buggies
- Complete Streets ensure safe travel for everyone, whether walking to school, cycling to work, driving, or using a buggy

Key Principles



Safety for vulnerable road users



Flexibility for rural and urban contexts



Accessibility for all ages and abilities



Balance between movement of vehicles and place-making



Provide a range of transportation choices



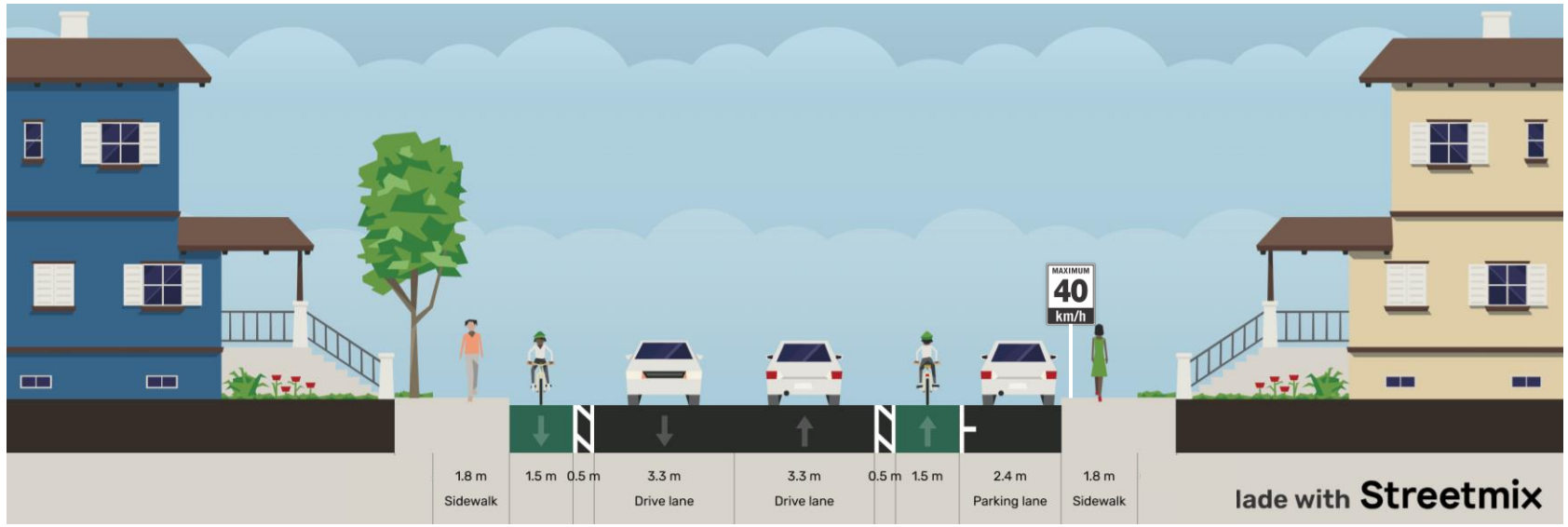
Create healthy and livable neighbourhoods

*This refers to Township roads only

Woolwich Comprehensive Transportation & Mobility Plan

Local Street

- This is what a local street could look like if it follows Complete Streets principles.
- The design focuses on the safety and comfort of everyone, especially pedestrians, cyclists, and other vulnerable users.
- The street is designed to support neighbourhood livability and active transportation, not just vehicle traffic.
- Recommended driving speed is 40 km/h to match the residential setting, with 30 km/h in school zones for extra safety.
- The dimensions shown are the minimums: sidewalks, green spaces, and cycling lanes can be made wider where space allows.



*This refers to Township roads only

Woolwich Comprehensive Transportation & Mobility Plan

Traffic Calming

- Traffic calming uses design features to reduce vehicle speeds and improve safety
- Key to addressing concerns around speeding, cut-through traffic, pedestrian safety in Woolwich
- Traffic calming makes streets safer and more comfortable, especially near schools, parks, and busy pedestrian areas

Physical Measures

Improve conditions through physical alterations to the roadway, including:

- Horizontal deflection (i.e. curb extensions)
- Vertical deflection (i.e. speed humps, raised crosswalk)
- Signage









Societal Measures

Increase road safety through measures that lead to reduced automobile usage and safer driver habits, including:

- Speed watch programs (Existing lawn sign program in place and Region's speed camera enforcement)
- Education programs
- Newspaper ads and brochures



*This refers to Township roads only

Picture Source: TAC Traffic Calming Guide

Woolwich Comprehensive Transportation & Mobility Plan

Policies and Strategies

Speed Limit Policy

It is recommended for the Township to adopt 40 km/h default speed limit within settlement areas with a further reduction to 30 km/h in school zones. Research shows that reducing speeds improves survival rates for pedestrians and cyclists in collisions and helps create calmer, more comfortable streets near schools, parks, and residential neighbourhoods. This policy would be supported by targeted traffic calming, enforcement, and education initiatives.



Pedestrian Crossing Guidelines

The Pedestrian Crossing Guidelines will provide guidance to the Township to select candidate locations for pedestrian crosswalks as well as the types of crosswalks to implement. This approach will ensure consistent decision-making, improved safety for vulnerable road users, and better connectivity within Woolwich's settlement areas.



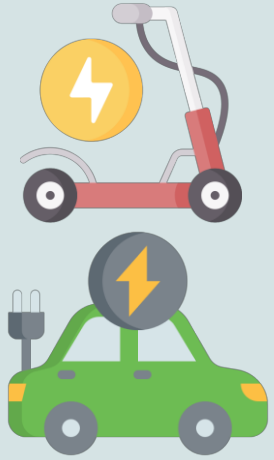
Parking Management

The parking management strategy will outline considerations for the optimal management of parking spaces, ensuring that supply is balanced with demand in settlement areas and key destinations, reduce congestion, support local businesses, and encourage the use of active and sustainable modes of travel. In Woolwich, it will also emphasize placemaking by designing parking areas that enhance the public realm, improve walkability, and create more inviting village and community spaces.



Smart Mobility

The Smart Mobility Strategy will outline how the Township can proactively prepare for emerging technologies, such as ride-hailing services, micro-mobility options, and electric vehicles, to improve mobility, sustainability, and connectivity. By anticipating future trends, the strategy will support more efficient travel choices, reduce environmental impacts, and ensure Woolwich is ready to adapt to innovative transportation solutions that meet community needs



*This refers to Township roads only

Icon source: flaticon.com

8

Next Steps

Woolwich Comprehensive Transportation & Mobility Plan

Next Steps



Following this round of consultation, we will:

1. Review your feedback to understand if any changes to the draft recommendations are needed;
2. Prepare a phased implementation plan for various transportation system components;
3. Finalize TMP supporting strategies and policies; and
4. Finalize the Comprehensive Transportation and Mobility Plan report

Contact Us

For further information, please contact the study team:

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Township of Woolwich
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jdellicolli@woolwich.ca

Thank you for attending PIC #2!

*The material presented is subject to regional comments and will be further reviewed going forward.

Thank You

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WOOLWICH
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Comprehensive Transportation & Mobility Plan

Appendix B

Woolwich Active Transportation Master Plan Maps

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Map E.1: Planned Sidewalk Network

WOOLWICH TOWNSHIP

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LURA CONSULTING — LISTEN · UNDERSTAND · RELATE · ADVANCE

June 13, 2023

Existing Sidewalk

Partial Sidewalk

No Sidewalk

0 1 2 3 4 5 6 7 km

Mapleton

Centre Wellington

Wellesley

Waterloo

Kitchener

FLORADALE

ELMIRA

WEST MONTROSE

ST. JACOBS

CONESTOGO

MARYHILL

HEIDELBERG

STOCKYARDS

BLOOMINGDALE

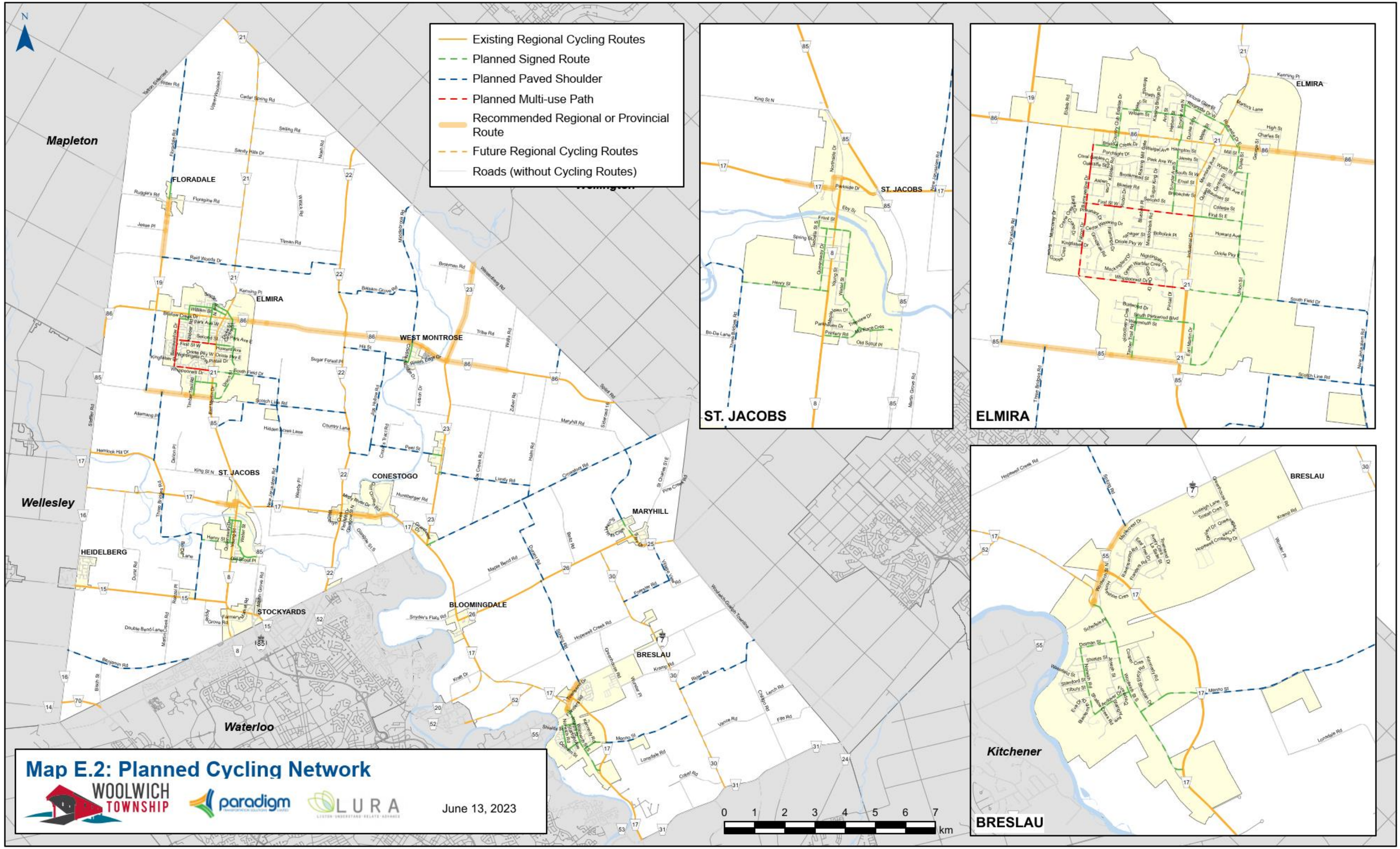
BRESLAU

ST. JACOBS

ELMIRA

BRESLAU

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Map E.2: Planned Cycling Network

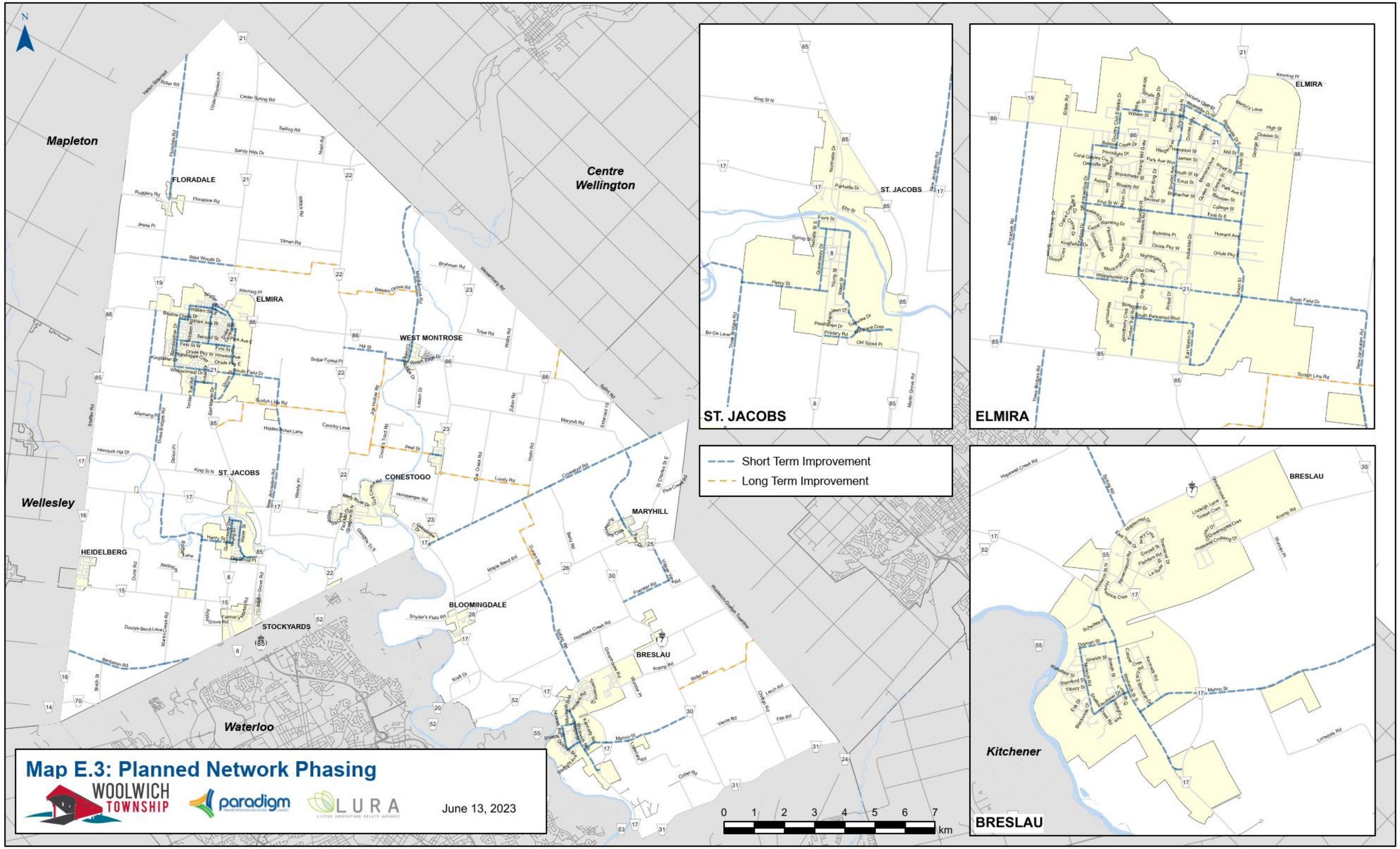
WOOLWICH TOWNSHIP

paradigm

LURA

June 13, 2023

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Map E.3: Planned Network Phasing

WOOLWICH TOWNSHIP · paradigm · LURA

June 13, 2023

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WOOLWICH
TOWNSHIP

Comprehensive Transportation & Mobility Plan

Appendix C

Turning Movement Counts

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REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Leg Total: 232
North Entering: 106
North Peds: 0
Peds Cross: ⋈

% Trks	23%	5%	4%	
Heavys	0	0	1	1
Trucks	5	3	0	8
Cars	17	56	24	97
Total	22	59	25	

Heavys	Trucks	Cars	Total
17	24	696	737

Hwy 7 (Victoria St)

% Trks	Heavys	Trucks	Cars	Total
5%	0	1	19	20
5%	16	23	762	801
4%	0	1	24	25
	16	25	805	

N
W E
S

Heavys	Trucks	Cars	Total
4	10	112	126

East Leg Total: 1,674
East Entering: 744
East Peds: 0
Peds Cross: ⧖

Shantz Station Rd

Total	Cars	Trucks	Heavys	% Trks
21	21	0	0	0%
671	639	16	16	5%
52	49	1	2	6%
	709	17	18	

Hwy 7 (Victoria St)

Cars	Trucks	Heavys	Total
882	26	22	930

Shantz Station Rd

Total	44	85	104
Cars	40	72	96
Trucks	3	9	3
Heavys	1	4	5
% Trks	9%	15%	8%

Peds Cross: ⧖
West Peds: 0
West Entering: 846
West leg Total: 1,583

Heavys	2
Trucks	5
Cars	129
Total	136

Peds Cross: ⋈
South Peds: 0
South Entering: 233
South leg Total: 369

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,929**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **846**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Leg Total: 173
North Entering: 90
North Peds: 0
Peds Cross: ⋈

% Trks	7%	10%	9%	
Heavys	0	2	1	3
Trucks	2	2	1	5
Cars	26	36	20	82
Total	28	40	22	

Heavys	Trucks	Cars	Total
27	22	478	527

Heavys	3
Trucks	3
Cars	77
Total	83

East Leg Total: 1,229
East Entering: 554
East Peds: 0
Peds Cross: ⧖

Shantz Station Rd

Total	Cars	Trucks	Heavys	% Trks
18	16	1	1	11%
476	431	19	26	9%
60	51	4	5	15%
	498	24	32	

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Hwy 7 (Victoria St)

% Trks	Heavys	Trucks	Cars	Total
6%	1	1	29	31
7%	29	12	548	589
3%	1	0	30	31
	31	13	607	

Hwy 7 (Victoria St)

Cars	Trucks	Heavys	Total
620	16	39	675

Shantz Station Rd

Peds Cross: ⧖
West Peds: 0
West Entering: 651
West leg Total: 1,178

Heavys	8
Trucks	6
Cars	117
Total	131

Total	23	34	64	
Cars	21	32	52	105
Trucks	1	1	3	5
Heavys	1	1	9	11
% Trks	9%	6%	19%	

Peds Cross: ⋈
South Peds: 0
South Entering: 121
South leg Total: 252

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,416**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **651**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:45 PM
To: 5:45 PM

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Leg Total:	383
North Entering:	207
North Peds:	0
Peds Cross:	⋈

% Trks	2%	5%	5%	
Heavys	0	3	2	5
Trucks	1	2	0	3
Cars	55	103	41	199
Total	56	108	43	

Heavys	2
Trucks	0
Cars	174
Total	176

East Leg Total:	1,777
East Entering:	954
East Peds:	0
Peds Cross:	⧖

Heavys	Trucks	Cars	Total
6	12	947	965

Shantz Station Rd

Total	Cars	Trucks	Heavys	% Trks
22	22	0	0	0%
872	855	11	6	2%
60	54	2	4	10%
	931	13	10	

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Hwy 7 (Victoria St)

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	38	38
2%	7	6	696	709
9%	0	3	32	35
	7	9	766	

Hwy 7 (Victoria St)

Cars	Trucks	Heavys	Total
800	9	14	823

Shantz Station Rd

Peds Cross:	⧖
West Peds:	0
West Entering:	782
West leg Total:	1,747

Heavys	7
Trucks	7
Cars	189
Total	203

Total	37	116	71	
Cars	37	114	63	214
Trucks	0	0	3	3
Heavys	0	2	5	7
% Trks	0%	2%	11%	

Peds Cross:	⋈
South Peds:	0
South Entering:	224
South leg Total:	427

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,167**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **782**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Leg Total:	2,028
North Entering:	979
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	3
Buggies Entering:	0

% Trks	6%	5%	4%	
Heavys	4	12	6	22
Trucks	12	14	3	29
Cars	255	465	208	928
Total	271	491	217	

Heavys	23
Trucks	39
Cars	987
Total	1,049

East Leg Total:	11,271
East Entering:	5,666
East Peds:	1
Peds Cross:	⧖
Bicycles Entering:	0
Buggies Entering:	0

Heavys	Trucks	Cars	Total
177	149	5,235	5,561

Shantz Station Rd

Total	Cars	Trucks	Heavys	% Trks
182	176	4	2	3%
5,036	4,745	127	164	6%
448	390	17	41	13%
	5,311	148	207	

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Hwy 7 (Victoria St)

% Trks	Heavys	Trucks	Cars	Total
7%	6	12	240	258
6%	150	118	4,577	4,845
5%	5	4	190	199
	161	134	5,007	

Hwy 7 (Victoria St)

Cars	Trucks	Heavys	Total
5,265	138	202	5,605

Shantz Station Rd

Peds Cross:	⧖
West Peds:	0
West Entering:	5,302
West leg Total:	10,863
Bicycles Entering:	2
Buggies Entering:	0

Heavys	58
Trucks	35
Cars	1,045
Total	1,138

Total	254	609	543	
Cars	235	571	480	1,286
Trucks	10	23	17	50
Heavys	9	15	46	70
% Trks	7%	6%	12%	

Peds Cross:	⋈
South Peds:	0
South Entering:	1,406
South leg Total:	2,544
Bicycles Entering:	1
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **13,353**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **5,302**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Leg Total: 3,529
North Entering: 1,703
North Peds: N/A
Peds Cross: ⋈

	% Trks	6%	5%	4%	
Heavys		7	21	10	38
Trucks		21	24	5	50
Cars		444	809	362	1,615
Total		472	854	378	

Heavys	Trucks	Cars	Total
308	259	9,109	9,676

Hwy 7 (Victoria St)

% Trks	Heavys	Trucks	Cars	Total
7%	10	21	418	449
6%	261	205	7,964	8,430
5%	9	7	331	346
	280	233	8,712	

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Shantz Station Rd

Heavys	40
Trucks	68
Cars	1,717
Total	1825

East Leg Total: 19,612
East Entering: 9,859
East Peds: N/A
Peds Cross: ⧖

Total	Cars	Trucks	Heavys	% Trks
317	306	7	3	3%
8,763	8,256	221	285	6%
780	679	30	71	13%
	9,241	258	360	

Hwy 7 (Victoria St)

Cars	Trucks	Heavys	Total
9,161	240	351	9,753

Shantz Station Rd

Peds Cross: ⧖
West Peds: N/A
West Entering: 9,225
West leg Total: 18,902

Heavys	101			
Trucks	61			
Cars	1,818			
Total	1,980			

Total	442	1,060	945	
Cars	409	994	835	2,238
Trucks	17	40	30	87
Heavys	16	26	80	122
% Trks	7%	6%	12%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 2,446
South leg Total: 4,427

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***23,234***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Shantz Station Rd @ Hwy 7 (Victoria St)
Control: Signalized
Major Road: Hwy 7 (Victoria St)

Weather conditions: Cloudy/Dry

Person(s) who counted: Matt

GeoID: 11920
Count Date: Monday, 27-Jun-22

North Approach PHF

AM Peak:	0.83
Mid-day Peak:	0.83
PM Peak:	0.86

	Movement		
PM	0.82	0.77	0.60
MID	0.78	0.67	0.69
AM	0.50	0.74	0.63

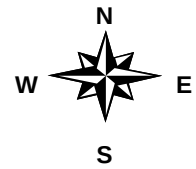
Shantz Station Rd

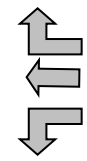
East Approach PHF

AM Peak:	0.92
Mid-day Peak:	0.85
PM Peak:	0.96

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour







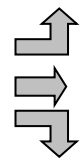
AM	MID	PM
0.66	0.64	0.55
0.93	0.83	0.94
0.65	0.88	0.88

Movement

Hwy 7 (Victoria St)

Hwy 7 (Victoria St)

Movement	PM	MID	AM
	0.56	0.86	0.56
	0.88	0.91	0.94
	0.55	0.86	0.52





Shantz Station Rd

0.73	0.79	0.65	AM
0.52	0.65	0.89	MID
0.77	0.78	0.85	PM

Movement

West Approach PHF

AM Peak:	0.94
Mid-day Peak:	0.91
PM Peak:	0.84

South Approach PHF

AM Peak:	0.71
Mid-day Peak:	0.76
PM Peak:	0.89

Comments

Intersection: Shantz Station Rd @ Hwy 7 (Victoria
GeoID: 11920
Municipality: Woolwich
Major Road: Hwy 7 (Victoria St)

Intersection Control: Signalized
Date: Monday, 27-Jun-22
Name: Matt
Weather: Cloudy/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	3	214	3	20	179	4	9	22	18	4	20	5	501	
7:45	to	8:00	9	212	4	10	181	6	15	27	40	10	11	11	536	
8:00	to	8:15	3	198	12	13	143	3	10	19	23	5	14	4	447	
8:15	to	8:30	5	177	6	9	168	8	10	17	23	6	14	2	445	1,929
8:30	to	8:45	5	159	4	12	158	6	10	13	16	8	18	6	415	1,843
8:45	to	9:00	4	160	4	12	162	11	5	18	11	7	20	7	421	1,728
9:00	to	9:15	5	108	2	17	130	8	7	15	10	7	8	9	326	1,607
9:15	to	9:30	7	130	4	8	96	4	4	14	14	4	5	7	297	1,459
9:30	to	9:45	4	143	2	13	108	5	9	5	15	8	10	8	330	1,374
9:45	to	10:00	6	129	3	10	107	4	2	9	18	1	13	6	308	1,261
10:00	to	10:15	8	106	6	9	105	5	6	12	8	4	9	7	285	1,220
10:15	to	10:30	7	132	5	8	107	5	4	7	13	4	13	4	309	1,232
AM Peak Hour																
7:30	**to**	**8:30**	**20**	**801**	**25**	**52**	**671**	**21**	**44**	**85**	**104**	**25**	**59**	**22**	**1,929**	
# of trucks in peak			1	23	1	1	16	0	3	9	3	0	3	5	65	
# of heavies in peak			0	16	0	2	16	0	1	4	5	1	0	0	45	
% heavies (Total)			5%	5%	4%	6%	5%	0%	9%	15%	8%	4%	5%	23%	6%	
12:00	to	12:15	7	117	9	8	113	2	7	13	18	6	7	8	315	
12:15	to	12:30	4	126	10	19	117	2	8	9	14	5	9	7	330	
12:30	to	12:45	9	132	2	11	108	4	7	20	24	12	7	6	342	
12:45	to	13:00	11	130	11	14	114	7	10	13	19	11	14	10	364	1,351
13:00	to	13:15	5	135	9	12	119	3	11	13	16	8	10	9	350	1,386
13:15	to	13:30	8	133	6	14	97	5	2	7	15	4	8	9	308	1,364
13:30	to	13:45	9	159	8	17	117	7	4	6	15	7	7	4	360	1,382
13:45	to	14:00	9	162	8	17	143	3	6	8	18	3	15	6	398	1,416
Midday Peak Hour																
13:00	**to**	**14:00**	**31**	**589**	**31**	**60**	**476**	**18**	**23**	**34**	**64**	**22**	**40**	**28**	**1,416**	
# of trucks in peak			1	12	0	4	19	1	1	1	3	1	2	2	47	
# of heavies in peak			1	29	1	5	26	1	1	1	9	1	2	0	77	
% heavies (Total)			6%	7%	3%	15%	9%	11%	9%	6%	19%	9%	10%	7%	9%	
15:00	to	15:15	10	128	2	16	181	6	6	14	9	9	16	3	400	
15:15	to	15:30	5	145	3	18	221	6	8	26	17	3	18	19	489	
15:30	to	15:45	13	137	7	14	191	7	12	33	14	5	16	10	459	
15:45	to	16:00	10	143	10	24	215	5	6	31	20	7	26	10	507	1,855
16:00	to	16:15	9	149	7	16	207	11	16	49	17	9	13	14	517	1,972
16:15	to	16:30	16	163	4	9	231	12	9	30	22	3	17	9	525	2,008
16:30	to	16:45	17	169	7	24	193	6	9	28	17	11	23	9	513	2,062
16:45	to	17:00	7	179	8	17	228	3	12	34	14	18	26	16	562	2,117
17:00	to	17:15	4	161	6	14	209	10	10	27	18	6	29	13	507	2,107
17:15	to	17:30	17	201	16	15	202	7	5	37	21	10	35	10	576	2,158
17:30	to	17:45	10	168	5	14	233	2	10	18	18	9	18	17	522	2,167
17:45	to	18:00	12	140	6	14	153	5	5	15	8	3	22	6	389	1,994
PM Peak Hour																
16:45	**to**	**17:45**	**38**	**709**	**35**	**60**	**872**	**22**	**37**	**116**	**71**	**43**	**108**	**56**	**2,167**	
# of trucks in peak			0	6	3	2	11	0	0	0	3	0	2	1	28	
# of heavies in peak			0	7	0	4	6	0	0	2	5	2	3	0	29	
% heavies (Total)			0%	2%	9%	10%	2%	0%	0%	2%	11%	5%	5%	2%	3%	

Intersection: Shantz Station Rd @ Hwy 7 (Victoria
GeoID: 11920
Municipality: Woolwich
Major Road: Hwy 7 (Victoria St)

Intersection Control: Signalized
Date: Monday, 27-Jun-22
Name: Matt
Weather: Cloudy/Dry

PEDESTRIAN CROSSING

Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	1	0	0	0	1	1
9:45	to	10:00	0	0	0	0	0	1
10:00	to	10:15	0	0	0	0	0	1
10:15	to	10:30	0	0	0	0	0	1
AM Peak Hour							**1**	
7:30	**to**	**8:30**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	0
16:00	to	16:15	0	0	0	0	0	0
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**0**	
16:45	**to**	**17:45**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23

North Leg Total:	335
North Entering:	194
North Peds:	0
Peds Cross:	⋈

% Trks	9%	3%	20%	
Heavys	5	3	1	9
Trucks	1	1	0	2
Cars	58	121	4	183
Total	64	125	5	

Heavys	4
Trucks	6
Cars	131
Total	141

East Leg Total:	360
East Entering:	153
East Peds:	0
Peds Cross:	⧖

Heavys	Trucks	Cars	Total
25	6	197	228

Katherine St

	Total	Cars	Trucks	Heavys	% Trks
	2	2	0	0	0%
	148	125	5	18	16%
	3	2	0	1	33%
		129	5	19	

Line 86

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% Trks	Heavys	Trucks	Cars	Total
11%	3	2	40	45
8%	16	0	177	193
3%	1	0	34	35
	20	2	251	

Line 86

Cars	Trucks	Heavys	Total
188	0	19	207

Katherine St

Total	16	94	9	
Cars	14	89	7	110
Trucks	0	4	0	4
Heavys	2	1	2	5
% Trks	13%	5%	22%	

Peds Cross:	⧖
West Peds:	0
West Entering:	273
West leg Total:	501

Heavys	5
Trucks	1
Cars	157
Total	163

Peds Cross:	⋈
South Peds:	0
South Entering:	119
South leg Total:	282

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **739**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **273**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

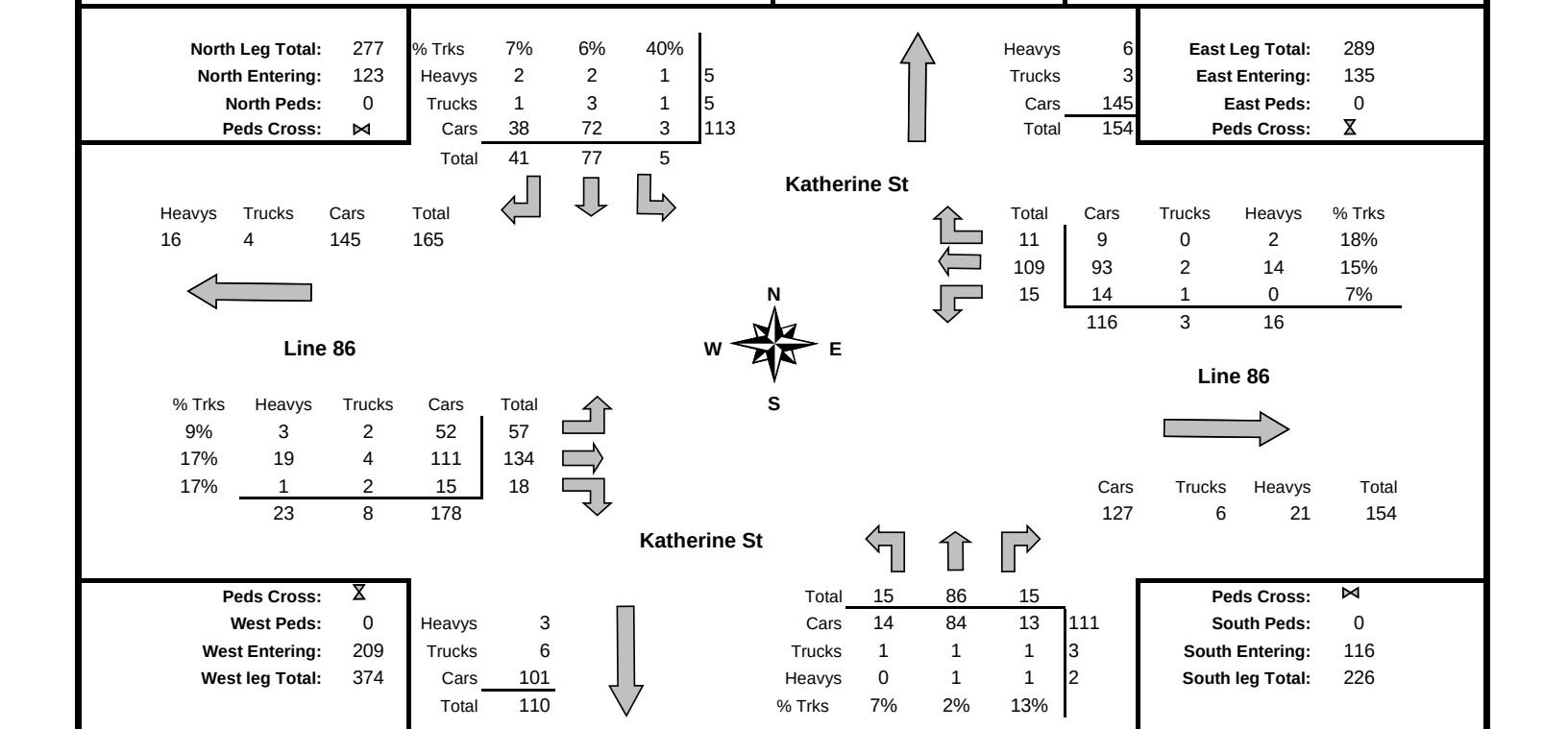
Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **583**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **209**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23

North Leg Total: 433
North Entering: 210
North Peds: 0
Peds Cross: ⋈

% Trks	5%	3%	0%	
Heavys	2	4	0	6
Trucks	1	0	0	1
Cars	59	141	3	203
Total	62	145	3	

Heavys	Trucks	Cars	Total
15	5	353	373

Heavys	9
Trucks	4
Cars	210
Total	223

East Leg Total: 502
East Entering: 297
East Peds: 0
Peds Cross: ⧖

Katherine St

Total	Cars	Trucks	Heavys	% Trks
11	10	1	0	9%
264	248	3	13	6%
22	21	0	1	5%
	279	4	14	

Line 86

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% Trks	Heavys	Trucks	Cars	Total
5%	3	1	73	77
2%	3	1	183	187
6%	2	0	34	36
	8	2	290	

Line 86

Cars	Trucks	Heavys	Total
201	1	3	205

Katherine St

Peds Cross: ⧖
West Peds: 0
West Entering: 300
West leg Total: 673

Heavys	7
Trucks	0
Cars	196
Total	203

Total	47	135	15	
Cars	46	127	15	188
Trucks	1	2	0	3
Heavys	0	6	0	6
% Trks	2%	6%	0%	

Peds Cross: ⋈
South Peds: 0
South Entering: 197
South leg Total: 400

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,004**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **300**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23

North Leg Total:	2,485
North Entering:	1,225
North Peds:	2
Peds Cross:	⋈
Bicycles Entering:	0
Buggies Entering:	6

% Trks	8%	4%	10%	
Heavys	22	19	2	43
Trucks	8	15	2	25
Cars	358	764	35	1,157
Total	388	798	39	

Heavys	41
Trucks	23
Cars	1,196
Total	1,260

East Leg Total:	2,722
East Entering:	1,403
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	0
Buggies Entering:	6

Katherine St

Heavys	Trucks	Cars	Total
153	43	1,696	1,892

Total	Cars	Trucks	Heavys	% Trks
51	43	2	6	16%
1,273	1,118	31	124	12%
79	73	2	4	8%
	1,234	35	134	

Line 86

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% Trks	Heavys	Trucks	Cars	Total
7%	20	7	384	411
11%	112	19	1,062	1,193
8%	10	9	215	234
	142	35	1,661	

Line 86

Cars	Trucks	Heavys	Total
1,176	24	119	1,319

Katherine St

Total	231	798	87	
Cars	220	769	79	1,068
Trucks	4	14	3	21
Heavys	7	15	5	27
% Trks	5%	4%	9%	

Peds Cross:	⧖
West Peds:	0
West Entering:	1,838
West leg Total:	3,730
Bicycles Entering:	0
Buggies Entering:	8

Heavys	33
Trucks	26
Cars	1,052
Total	1,111

Peds Cross:	⋈
South Peds:	0
South Entering:	1,116
South leg Total:	2,227
Bicycles Entering:	3
Buggies Entering:	11

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **5,582**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,838**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23

North Leg Total: 4,324
North Entering: 2,132
North Peds: N/A
Peds Cross: ⋈

	8%	4%	10%	
% Trks				
Heavys	38	33	3	75
Trucks	14	26	3	44
Cars	623	1,329	61	2,013
Total	675	1,389	68	

Heavys	Trucks	Cars	Total
266	75	2,951	3,292

Heavys	Trucks	Cars	Total
71	40	2,081	2192

East Leg Total: 4,736
East Entering: 2,441
East Peds: N/A
Peds Cross: ⧖

Katherine St

Total	Cars	Trucks	Heavys	% Trks
89	75	3	10	16%
2,215	1,945	54	216	12%
137	127	3	7	8%
	2,147	61	233	

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Line 86

% Trks	Heavys	Trucks	Cars	Total
7%	35	12	668	715
11%	195	33	1,848	2,076
8%	17	16	374	407
	247	61	2,890	

Line 86

Cars	Trucks	Heavys	Total
2,046	42	207	2,295

Katherine St

Total	402	1,389	151	
Cars	383	1,338	137	1,858
Trucks	7	24	5	37
Heavys	12	26	9	47
% Trks	5%	4%	9%	

Peds Cross: ⧖
West Peds: N/A
West Entering: 3,198
West leg Total: 6,490

Heavys	57
Trucks	45
Cars	1,830
Total	1,933

Peds Cross: ⋈
South Peds: N/A
South Entering: 1,942
South leg Total: 3,875

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: (West leg total + South leg total + East leg total + North leg total) / 2 ***EDT =*** ***9,713***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Line 86 @ Katherine St
Control: Signalized
Major Road: Line 86

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12327
Count Date: Thursday, 02-Mar-23

North Approach PHF

AM Peak:	0.84
Mid-day Peak:	0.83
PM Peak:	0.82

	Movement		
PM	0.74	0.70	0.75
MID	0.73	0.96	0.42
AM	0.80	0.89	0.42

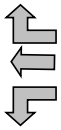
Katherine St

East Approach PHF

AM Peak:	0.87
Mid-day Peak:	0.96
PM Peak:	0.95

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour



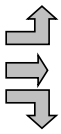


AM	MID	PM	
0.50	0.69	0.69	
0.84	0.88	0.97	
0.38	0.42	0.61	Movement

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Line 86

Movement	PM	MID	AM
	0.92	0.71	0.75
	0.90	0.86	0.85
	0.90	0.75	0.80



Line 86



0.80	0.71	0.56	AM	
0.47	0.60	0.63	MID	
0.69	0.78	0.75	PM	
	Movement			

Katherine St

West Approach PHF

AM Peak:	0.82
Mid-day Peak:	0.87
PM Peak:	0.95

South Approach PHF

AM Peak:	0.74
Mid-day Peak:	0.66
PM Peak:	0.83

Comments

Intersection: Line 86 @ Katherine St
GeoID: 12327
Municipality: Woolwich
Major Road: Line 86

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	15	57	11	0	37	1	5	33	2	1	33	17	212	
7:45	to	8:00	8	57	9	0	44	0	5	26	0	0	30	16	195	
8:00	to	8:15	12	45	7	2	30	1	2	15	3	1	27	11	156	
8:15	to	8:30	10	34	8	1	37	0	4	20	4	3	35	20	176	739
8:30	to	8:45	10	36	13	3	33	2	1	16	5	2	36	14	171	698
8:45	to	9:00	7	19	23	0	30	1	9	31	3	1	25	18	167	670
9:00	to	9:15	9	33	5	1	27	2	16	25	4	0	14	12	148	662
9:15	to	9:30	4	37	9	2	23	0	3	22	4	2	19	7	132	618
9:30	to	9:45	5	25	5	1	31	1	5	17	2	1	15	5	113	560
9:45	to	10:00	7	38	4	3	21	1	8	11	3	1	14	14	125	518
10:00	to	10:15	10	23	4	2	40	0	5	19	2	0	12	2	119	489
10:15	to	10:30	14	30	4	1	32	0	7	17	5	1	18	7	136	493
AM Peak Hour																
7:30	**to**	**8:30**	**45**	**193**	**35**	**3**	**148**	**2**	**16**	**94**	**9**	**5**	**125**	**64**	**739**	
# of trucks in peak			2	0	0	0	5	0	0	4	0	0	1	1	13	
# of heavies in peak			3	16	1	1	18	0	2	1	2	1	3	5	53	
% heavies (Total)			11%	8%	3%	33%	16%	0%	13%	5%	22%	20%	3%	9%	9%	
12:00	to	12:15	10	28	7	1	21	0	3	14	2	3	19	5	113	
12:15	to	12:30	9	22	2	0	43	4	5	20	1	0	17	8	131	
12:30	to	12:45	13	32	6	1	36	4	5	19	1	2	11	10	140	
12:45	to	13:00	11	18	2	2	27	0	4	22	1	2	11	13	113	497
13:00	to	13:15	12	35	4	2	31	1	2	22	1	1	19	11	141	525
13:15	to	13:30	11	26	3	9	24	2	3	19	4	0	19	8	128	522
13:30	to	13:45	20	34	6	2	29	4	8	9	4	1	19	8	144	526
13:45	to	14:00	14	39	5	2	25	4	2	36	6	3	20	14	170	583
Midday Peak Hour																
13:00	**to**	**14:00**	**57**	**134**	**18**	**15**	**109**	**11**	**15**	**86**	**15**	**5**	**77**	**41**	**583**	
# of trucks in peak			2	4	2	1	2	0	1	1	1	1	3	1	19	
# of heavies in peak			3	19	1	0	14	2	0	1	1	1	2	2	46	
% heavies (Total)			9%	17%	17%	7%	15%	18%	7%	2%	13%	40%	6%	7%	11%	
15:00	to	15:15	15	40	5	3	30	2	7	26	6	0	24	8	166	
15:15	to	15:30	12	36	11	1	53	0	4	29	1	2	32	19	200	
15:30	to	15:45	17	45	9	2	44	2	8	30	0	1	35	8	201	
15:45	to	16:00	15	32	9	2	57	1	13	24	0	3	23	16	195	762
16:00	to	16:15	12	50	4	4	46	2	18	26	3	2	32	14	213	809
16:15	to	16:30	14	50	7	5	43	2	17	37	2	0	44	12	233	842
16:30	to	16:45	19	40	10	5	65	3	12	43	4	0	52	12	265	906
16:45	to	17:00	18	52	9	9	66	2	9	32	2	1	37	14	251	962
17:00	to	17:15	19	46	8	2	65	2	17	28	4	1	24	15	231	980
17:15	to	17:30	21	49	9	6	68	4	9	32	5	1	32	21	257	1,004
17:30	to	17:45	24	44	10	4	65	2	7	35	3	2	28	15	239	978
17:45	to	18:00	14	41	6	1	50	1	8	43	0	1	22	14	201	928
PM Peak Hour																
16:30	**to**	**17:30**	**77**	**187**	**36**	**22**	**264**	**11**	**47**	**135**	**15**	**3**	**145**	**62**	**1,004**	
# of trucks in peak			1	1	0	0	3	1	1	2	0	0	0	1	10	
# of heavies in peak			3	3	2	1	13	0	0	6	0	0	4	2	34	
% heavies (Total)			5%	2%	6%	5%	6%	9%	2%	6%	0%	0%	3%	5%	4%	

Intersection: Line 86 @ Katherine St
GeoID: 12327
Municipality: Woolwich
Major Road: Line 86

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING

Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	2	0	2	2
9:00	to	9:15	0	0	0	0	0	2
9:15	to	9:30	0	0	0	0	0	2
9:30	to	9:45	0	0	0	0	0	2
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**2**	
7:30	**to**	**8:30**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	0
16:00	to	16:15	0	0	0	0	0	0
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**0**	
16:30	**to**	**17:30**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Leg Total: 724
North Entering: 325
North Peds: 0
Peds Cross: ⋈

	% Trks	7%	3%	12%	
	Heavys	7	1	22	30
	Trucks	0	0	0	0
	Cars	97	35	163	295
	Total	104	36	185	

Heavys	Trucks	Cars	Total
59	24	1,210	1,293

Victoria St

% Trks	Heavys	Trucks	Cars	Total
4%	2	1	68	71
7%	40	16	730	786
4%	3	4	175	182
	45	21	973	

Heavys	Trucks	Cars	Total
26	8	365	399

East Leg Total: 2,280
East Entering: 1,278
East Peds: 0
Peds Cross: ⧖

Ebycrest Rd

Total	Cars	Trucks	Heavys	% Trks
272	243	6	23	11%
981	912	23	46	7%
25	22	0	3	12%
1,177		29	72	

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Victoria St

Cars	Trucks	Heavys	Total
920	18	64	1,002

Woolwich St

Total	208	56	31	
Cars	201	54	27	282
Trucks	1	1	2	4
Heavys	6	1	2	9
% Trks	3%	4%	13%	

Peds Cross: ⧖
West Peds: 0
West Entering: 1,039
West leg Total: 2,332

Heavys	7
Trucks	4
Cars	232
Total	243

Peds Cross: ⋈
South Peds: 0
South Entering: 295
South leg Total: 538

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,937**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,039**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Leg Total: 505
North Entering: 237
North Peds: 0
Peds Cross: ⋈

% Trks	7%	10%	15%	
Heavys	2	1	20	23
Trucks	2	2	3	7
Cars	50	27	130	207
Total	54	30	153	

Heavys	Trucks	Cars	Total
37	18	727	782

Victoria St

% Trks	Heavys	Trucks	Cars	Total
6%	2	2	65	69
6%	28	21	762	811
3%	0	4	135	139
	30	27	962	

Heavys	24
Trucks	12
Cars	232
Total	268

East Leg Total: 1,785
East Entering: 800
East Peds: 0
Peds Cross: ⧖

Ebycrest Rd

Total	Cars	Trucks	Heavys	% Trks
173	143	9	21	17%
612	562	16	34	8%
15	14	1	0	7%
	719	26	55	

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Victoria St

Cars	Trucks	Heavys	Total
913	24	48	985

Woolwich St

Total	116	26	21
Cars	115	24	21	160
Trucks	0	1	0	1
Heavys	1	1	0	2
% Trks	1%	8%	0%	

Peds Cross: ⧖
West Peds: 0
West Entering: 1,019
West leg Total: 1,801

Heavys	1
Trucks	7
Cars	176
Total	184

Peds Cross: ⋈
South Peds: 0
South Entering: 163
South leg Total: 347

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,219**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,019**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Leg Total: 1,002
North Entering: 478
North Peds: 0
Peds Cross: ⋈

% Trks	5%	5%	9%	
Heavys	5	1	20	26
Trucks	2	2	6	10
Cars	121	61	260	442
Total	128	64	286	

Heavys	Trucks	Cars	Total
27	23	1,481	1,531

Victoria St

% Trks	Heavys	Trucks	Cars	Total
9%	9	3	123	135
3%	17	13	998	1,028
1%	1	1	222	224
	27	17	1,343	

Heavys	23
Trucks	5
Cars	496
Total	524

East Leg Total: 2,853
East Entering: 1,514
East Peds: 0
Peds Cross: ⋈

Ebycrest Rd

Total	Cars	Trucks	Heavys	% Trks
315	300	1	14	5%
1,176	1,133	21	22	4%
23	23	0	0	0%
	1,456	22	36	

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Victoria St

Cars	Trucks	Heavys	Total
1,283	19	37	1,339

Woolwich St

Total	227	74	25	
Cars	227	73	25	325
Trucks	0	1	0	1
Heavys	0	0	0	0
% Trks	0%	1%	0%	

Peds Cross: ⋈
South Peds: 0
South Entering: 326
South leg Total: 637

Peds Cross: ⋈
West Peds: 0
West Entering: 1,387
West leg Total: 2,918

Heavys	2
Trucks	3
Cars	306
Total	311

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **3,705**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **1,387**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Leg Total:	5,187
North Entering:	2,452
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	0

% Trks	6%	5%	13%	
Heavys	30	11	155	196
Trucks	15	5	26	46
Cars	673	307	1,230	2,210
Total	718	323	1,411	

Heavys	187
Trucks	63
Cars	2,485
Total	2,735

East Leg Total:	16,570
East Entering:	8,717
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	2
Buggies Entering:	0

Heavys	Trucks	Cars	Total
330	172	8,267	8,769

Ebycrest Rd

Total	Cars	Trucks	Heavys	% Trks
1,750	1,556	40	154	11%
6,768	6,340	142	286	6%
199	182	8	9	9%
	8,078	190	449	

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Victoria St

% Trks	Heavys	Trucks	Cars	Total
7%	27	18	617	662
6%	248	125	5,859	6,232
3%	17	21	1,264	1,302
	292	164	7,740	

Victoria St

Cars	Trucks	Heavys	Total
7,280	156	417	7,853

Woolwich St

Total	1,283	323	210	
Cars	1,254	312	191	1,757
Trucks	15	5	5	25
Heavys	14	6	14	34
% Trks	2%	3%	9%	

Peds Cross:	⧖
West Peds:	1
West Entering:	8,196
West leg Total:	16,965
Bicycles Entering:	4
Buggies Entering:	0

Heavys	37
Trucks	34
Cars	1,753
Total	1,824

Peds Cross:	⋈
South Peds:	0
South Entering:	1,816
South leg Total:	3,640
Bicycles Entering:	0
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **21,181**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **8,196**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Leg Total: 9,025
North Entering: 4,266
North Peds: N/A
Peds Cross: ⋈

% Trks	6%	5%	13%	
Heavys	52	19	270	341
Trucks	26	9	45	80
Cars	1,171	534	2,140	3,845
Total	1,249	562	2,455	

Heavys	Trucks	Cars	Total
574	299	14,385	15,258

East Leg Total: 28,832
East Entering: 15,168
East Peds: N/A
Peds Cross: ⋈

Heavys	325
Trucks	110
Cars	4,324
Total	4759

Ebycrest Rd

Total	Cars	Trucks	Heavys	% Trks
3,045	2,707	70	268	11%
11,776	11,032	247	498	6%
346	317	14	16	9%
	14,056	331	781	

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Victoria St

% Trks	Heavys	Trucks	Cars	Total
7%	47	31	1,074	1,152
6%	432	218	10,195	10,844
3%	30	37	2,199	2,265
	508	285	13,468	

Victoria St

Cars	Trucks	Heavys	Total
12,667	271	726	13,664

Woolwich St

Peds Cross: ⧖
West Peds: N/A
West Entering: 14,261
West leg Total: 29,519

Heavys	64
Trucks	59
Cars	3,050
Total	3,174

Total	2,232	562	365	
Cars	2,182	543	332	3,057
Trucks	26	9	9	44
Heavys	24	10	24	59
% Trks	2%	3%	9%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 3,160
South leg Total: 6,334

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***36,855***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Victoria St @ Ebycrest Rd/Woolwich St
Control: Signalized
Major Road: Victoria St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12372
Count Date: Wednesday, 12-Oct-22

North Approach PHF

AM Peak:	0.80
Mid-day Peak:	0.85
PM Peak:	0.90

East Approach PHF

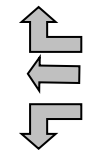
AM Peak:	0.92
Mid-day Peak:	0.93
PM Peak:	0.86

	Movement		
PM	0.70	0.84	0.87
MID	0.71	0.75	0.81
AM	0.72	0.69	0.83

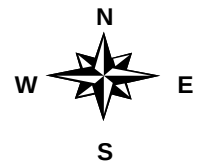
Ebycrest Rd

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour



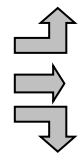


AM	MID	PM	
0.87	0.88	0.84	
0.93	0.91	0.86	
0.63	0.94	0.64	Movement



Victoria St

Movement	PM	MID	AM
	0.82	0.86	0.85
	0.82	0.94	0.97
	0.89	0.87	0.77



Victoria St



Woolwich St

0.84	0.70	0.78	AM	
0.88	0.72	0.88	MID	
0.96	0.74	0.57	PM	
	Movement			

West Approach PHF

AM Peak:	0.92
Mid-day Peak:	0.93
PM Peak:	0.88

South Approach PHF

AM Peak:	0.88
Mid-day Peak:	0.89
PM Peak:	0.93

Comments

Intersection: Victoria St @ Ebycrest Rd/Woolwich
GeoID: 12372
Municipality: Woolwich
Major Road: Victoria St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	0	266	33	7	158	51	27	8	11	60	15	17	653	
7:45	to	8:00	19	197	33	4	239	73	62	11	6	56	10	36	746	
8:00	to	8:15	13	201	59	8	263	78	48	10	10	45	7	25	767	
8:15	to	8:30	21	202	58	10	232	58	44	15	5	44	13	23	725	2,891
8:30	to	8:45	18	186	32	3	247	63	54	20	10	40	6	20	699	2,937
8:45	to	9:00	22	183	35	11	219	50	32	10	5	36	5	22	630	2,821
9:00	to	9:15	23	152	38	6	168	43	31	6	11	28	4	17	527	2,581
9:15	to	9:30	21	150	26	4	140	46	42	4	3	39	11	14	500	2,356
9:30	to	9:45	16	165	21	5	152	39	34	5	2	41	5	21	506	2,163
9:45	to	10:00	22	139	24	3	148	21	31	4	8	25	6	17	448	1,981
10:00	to	10:15	13	111	26	2	142	25	29	8	9	34	3	14	416	1,870
10:15	to	10:30	17	151	38	0	132	25	20	9	10	31	7	14	454	1,824
AM Peak Hour																
7:45	**to**	**8:45**	**71**	**786**	**182**	**25**	**981**	**272**	**208**	**56**	**31**	**185**	**36**	**104**	**2,937**	
# of trucks in peak			1	16	4	0	23	6	1	1	2	0	0	0	54	
# of heavies in peak			2	40	3	3	46	23	6	1	2	22	1	7	156	
% heavies (Total)			4%	7%	4%	12%	7%	11%	3%	4%	13%	12%	3%	7%	7%	
12:00	to	12:15	17	164	31	13	152	31	33	11	3	38	3	18	514	
12:15	to	12:30	28	161	35	10	138	30	28	10	8	38	4	27	517	
12:30	to	12:45	16	180	39	6	158	25	25	9	8	34	7	18	525	
12:45	to	13:00	12	153	47	5	153	38	36	6	4	25	17	15	511	2,067
13:00	to	13:15	18	181	39	4	122	37	27	8	6	47	6	13	508	2,061
13:15	to	13:30	13	210	32	3	154	49	27	4	6	33	8	10	549	2,093
13:30	to	13:45	18	205	28	4	169	42	29	5	5	41	10	19	575	2,143
13:45	to	14:00	20	215	40	4	167	45	33	9	4	32	6	12	587	2,219
Midday Peak Hour																
13:00	**to**	**14:00**	**69**	**811**	**139**	**15**	**612**	**173**	**116**	**26**	**21**	**153**	**30**	**54**	**2,219**	
# of trucks in peak			2	21	4	1	16	9	0	1	0	3	2	2	61	
# of heavies in peak			2	28	0	0	34	21	1	1	0	20	1	2	110	
% heavies (Total)			6%	6%	3%	7%	8%	17%	1%	8%	0%	15%	10%	7%	8%	
15:00	to	15:15	17	187	46	9	210	65	44	7	4	30	9	26	654	
15:15	to	15:30	24	199	50	3	301	48	38	4	3	37	7	22	736	
15:30	to	15:45	21	213	37	9	255	80	43	11	6	48	19	25	767	
15:45	to	16:00	15	173	47	11	306	71	51	11	8	41	11	23	768	2,925
16:00	to	16:15	24	219	50	7	279	78	52	14	10	57	15	31	836	3,107
16:15	to	16:30	38	226	52	9	267	74	57	15	10	49	11	27	835	3,206
16:30	to	16:45	32	230	59	3	262	76	55	19	11	74	13	28	862	3,301
16:45	to	17:00	31	233	52	9	273	73	59	25	4	82	15	22	878	3,411
17:00	to	17:15	41	253	63	7	300	72	54	19	8	68	19	46	950	3,525
17:15	to	17:30	31	312	50	4	341	94	59	11	2	62	17	32	1,015	3,705
17:30	to	17:45	24	214	40	5	277	66	36	10	5	55	14	43	789	3,632
17:45	to	18:00	17	201	42	11	244	84	43	5	5	41	20	21	734	3,488
PM Peak Hour																
16:30	**to**	**17:30**	**135**	**1,028**	**224**	**23**	**1,176**	**315**	**227**	**74**	**25**	**286**	**64**	**128**	**3,705**	
# of trucks in peak			3	13	1	0	21	1	0	1	0	6	2	2	50	
# of heavies in peak			9	17	1	0	22	14	0	0	0	20	1	5	89	
% heavies (Total)			9%	3%	1%	0%	4%	5%	0%	1%	0%	9%	5%	5%	4%	

Intersection: Victoria St @ Ebycrest Rd/Woolwich S
GeoID: 12372
Municipality: Woolwich
Major Road: Victoria St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**0**	
7:45	**to**	**8:45**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	0
16:00	to	16:15	0	1	0	0	1	1
16:15	to	16:30	0	0	0	0	0	1
16:30	to	16:45	0	0	0	0	0	1
16:45	to	17:00	0	0	0	0	0	1
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**1**	
16:30	**to**	**17:30**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

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

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Leg Total: 543
North Entering: 253
North Peds: 0
Peds Cross: ⋈

% Trks	0%	8%	7%	
Heavys	0	9	7	16
Trucks	0	1	2	3
Cars	0	119	115	234
Total	0	129	124	

Heavys	Trucks	Cars	Total
0	0	0	0

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% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

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Sawmill Rd

Heavys	10
Trucks	6
Cars	274
Total	290

East Leg Total: 551
East Entering: 321
East Peds: 0
Peds Cross: ⧖

Sawmill Rd

Total	Cars	Trucks	Heavys	% Trks
157	151	4	2	4%
0	0	0	0	0%
164	157	1	6	4%
	308	5	8	

Katherine St/Crowsfoot Rd

Cars	Trucks	Heavys	Total
218	4	8	230

Peds Cross: ⧖
West Peds: 0
West Entering: 0
West leg Total: 0

Heavys	15
Trucks	2
Cars	276
Total	293

Sawmill Rd

Total	0	133	106	
Cars	0	123	103	226
Trucks	0	2	2	4
Heavys	0	8	1	9
% Trks	0%	8%	3%	

Peds Cross: ⋈
South Peds: 0
South Entering: 239
South leg Total: 532

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **813**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Leg Total:	307
North Entering:	155
North Peds:	0
Peds Cross:	⋈

% Trks	0%	9%	4%	
Heavys	0	3	1	4
Trucks	0	4	2	6
Cars	0	74	71	145
Total	0	81	74	

Heavys	7
Trucks	4
Cars	141
Total	152

East Leg Total:	348
East Entering:	168
East Peds:	0
Peds Cross:	⋈

Heavys	Trucks	Cars	Total
0	0	0	0

Sawmill Rd

	Total	Cars	Trucks	Heavys	% Trks
	74	70	1	3	5%
	0	0	0	0	0%
	94	81	4	9	14%
		151	5	12	

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% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Katherine St/Crowsfoot Rd

Cars	Trucks	Heavys	Total
168	4	8	180

Sawmill Rd

Peds Cross:	⧖
West Peds:	0
West Entering:	0
West leg Total:	0

Heavys	12
Trucks	8
Cars	155
Total	175

Total	0	78	106	
Cars	0	71	97	168
Trucks	0	3	2	5
Heavys	0	4	7	11
% Trks	0%	9%	8%	

Peds Cross:	⋈
South Peds:	0
South Entering:	184
South leg Total:	359

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **507**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:15 PM
To: 5:15 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Leg Total: 816
North Entering: 450
North Peds: 0
Peds Cross: ⋈

% Trks	0%	2%	1%		
Heavys	0	2	1	3	
Trucks	0	2	1	3	
Cars	0	215	229	444	
Total	0	219	231		

Heavys	Trucks	Cars	Total
0	0	0	0

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% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Peds Cross: ⧖
West Peds: 0
West Entering: 0
West leg Total: 0

Heavys	8
Trucks	4
Cars	381
Total	393

Sawmill Rd

Total	0	177	175	
Cars	0	173	165	338
Trucks	0	0	2	2
Heavys	0	4	8	12
% Trks	0%	2%	6%	

Peds Cross: ⋈
South Peds: 0
South Entering: 352
South leg Total: 745

Heavys	6
Trucks	1
Cars	359
Total	366

East Leg Total: 769
East Entering: 363
East Peds: 0
Peds Cross: ⧖

Sawmill Rd

Total	Cars	Trucks	Heavys	% Trks
189	186	1	2	2%
0	0	0	0	0%
174	166	2	6	5%
	352	3	8	

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Katherine St/Crowsfoot Rd

Cars	Trucks	Heavys	Total
394	3	9	406

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,165**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **0**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Leg Total:	3,919
North Entering:	1,990
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	1

% Trks	0%	6%	4%	
Heavys	0	42	21	63
Trucks	0	17	18	35
Cars	0	949	943	1,892
Total	0	1,008	982	

Heavys	63
Trucks	33
Cars	1,833
Total	1,929

East Leg Total:	3,893
East Entering:	1,944
East Peds:	0
Peds Cross:	⋈
Bicycles Entering:	0
Buggies Entering:	3

Sawmill Rd

Heavys	Trucks	Cars	Total
0	0	0	0

Total	Cars	Trucks	Heavys	% Trks
953	913	17	23	4%
0	0	0	0	0%
991	926	21	44	7%
	1,839	38	67	

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% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

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Katherine St/Crowsfoot Rd

Cars	Trucks	Heavys	Total
1,856	32	61	1,949

Sawmill Rd

Total	0	976	967
Cars	0	920	913	1,833
Trucks	0	16	14	30
Heavys	0	40	40	80
% Trks	0%	6%	6%	

Peds Cross:	⧖
West Peds:	0
West Entering:	0
West leg Total:	0
Bicycles Entering:	0
Buggies Entering:	0

Heavys	86
Trucks	38
Cars	1,875
Total	1,999

Peds Cross:	⋈
South Peds:	0
South Entering:	1,943
South leg Total:	3,942
Bicycles Entering:	0
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **5,877**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **0**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Leg Total:	6,819
North Entering:	3,463
North Peds:	N/A
Peds Cross:	⋈

% Trks	0%	6%	4%	
Heavys	0	73	37	110
Trucks	0	30	31	61
Cars	0	1,651	1,641	3,292
Total	0	1,754	1,709	

Heavys	110
Trucks	57
Cars	3,189
Total	3356

East Leg Total:	6,774
East Entering:	3,383
East Peds:	N/A
Peds Cross:	⋈

Heavys	Trucks	Cars	Total
0	0	0	0

Sawmill Rd

Total	Cars	Trucks	Heavys	% Trks
1,658	1,589	30	40	4%
0	0	0	0	0%
1,724	1,611	37	77	7%
	3,200	66	117	

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% Trks	Heavys	Trucks	Cars	Total
0%	0	0	0	0
0%	0	0	0	0
0%	0	0	0	0
	0	0	0	

Katherine St/Crowsfoot Rd

Cars	Trucks	Heavys	Total
3,229	56	106	3,391

Sawmill Rd

Peds Cross:	⋈
West Peds:	N/A
West Entering:	0
West leg Total:	0

Heavys	150
Trucks	66
Cars	3,263
Total	3,478

Total	0	1,698	1,683	
Cars	0	1,601	1,589	3,189
Trucks	0	28	24	52
Heavys	0	70	70	139
% Trks	0%	6%	6%	

Peds Cross:	⋈
South Peds:	N/A
South Entering:	3,381
South leg Total:	6,859

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: (West leg total + South leg total + East leg total + North leg total) / 2 ***EDT =*** ***10,226***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Sawmill Rd @ Katherine St/Crowsfoot Rd
Control: Signalized
Major Road: Sawmill Rd

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 12550
Count Date: Thursday, 02-Mar-23

North Approach PHF

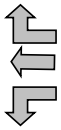
AM Peak:	0.80
Mid-day Peak:	0.84
PM Peak:	0.95

	Movement		
PM	0.00	0.87	0.90
MID	0.00	0.92	0.77
AM	0.00	0.83	0.78

Sawmill Rd

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour



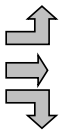


AM	MID	PM	
0.98	0.88	0.80	
0.00	0.00	0.00	
0.75	0.90	0.85	Movement



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Movement	PM	MID	AM
	0.00	0.00	0.00
	0.00	0.00	0.00
	0.00	0.00	0.00



Katherine St/Crowsfoot Rd

Sawmill Rd



0.00	0.76	0.74	AM	
0.00	0.81	0.74	MID	
0.00	0.85	0.78	PM	
	Movement			

West Approach PHF

AM Peak:	0.00
Mid-day Peak:	0.00
PM Peak:	0.00

East Approach PHF

AM Peak:	0.84
Mid-day Peak:	0.89
PM Peak:	0.83

South Approach PHF

AM Peak:	0.75
Mid-day Peak:	0.81
PM Peak:	0.94

Comments

Intersection: Sawmill Rd @ Katherine St/Crowsfo
GeoID: 12550
Municipality: Woolwich
Major Road: Sawmill Rd

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND				
Approach Control	***N/A***			***Signalized***			***Signalized***			***Signalized***			**TOTAL**	**TOTAL HOUR**
7:30 to 7:45	0	0	0	54	0	38	0	26	32	42	28	0	220	
7:45 to 8:00	0	0	0	41	0	29	0	27	22	29	35	0	183	
8:00 to 8:15	0	0	0	27	0	38	0	26	19	40	39	0	189	
8:15 to 8:30	0	0	0	42	0	39	0	36	19	28	37	0	201	793
8:30 to 8:45	0	0	0	55	0	40	0	44	36	28	33	0	236	809
8:45 to 9:00	0	0	0	40	0	40	0	27	32	28	20	0	187	813
9:00 to 9:15	0	0	0	25	0	39	0	28	28	12	19	0	151	775
9:15 to 9:30	0	0	0	23	0	21	0	23	22	23	18	0	130	704
9:30 to 9:45	0	0	0	17	0	18	0	21	14	12	15	0	97	565
9:45 to 10:00	0	0	0	18	0	20	0	24	24	12	14	0	112	490
10:00 to 10:15	0	0	0	14	0	26	0	14	21	12	27	0	114	453
10:15 to 10:30	0	0	0	20	0	11	0	25	16	17	27	0	116	439
AM Peak Hour														
8:00 to 9:00	**0**	**0**	**0**	**164**	**0**	**157**	**0**	**133**	**106**	**124**	**129**	**0**	**813**	
# of trucks in peak	0	0	0	1	0	4	0	2	2	2	1	0	12	
# of heavies in peak	0	0	0	6	0	2	0	8	1	7	9	0	33	
% heavies (Total)	0%	0%	0%	4%	0%	4%	0%	8%	3%	7%	8%	0%	6%	
12:00 to 12:15	0	0	0	25	0	14	0	27	20	20	24	0	130	
12:15 to 12:30	0	0	0	22	0	20	0	14	19	22	26	0	123	
12:30 to 12:45	0	0	0	17	0	20	0	21	19	20	25	0	122	
12:45 to 13:00	0	0	0	13	0	16	0	20	23	21	20	0	113	488
13:00 to 13:15	0	0	0	23	0	12	0	19	18	18	20	0	110	468
13:15 to 13:30	0	0	0	24	0	20	0	21	19	17	18	0	119	464
13:30 to 13:45	0	0	0	26	0	21	0	24	33	15	21	0	140	482
13:45 to 14:00	0	0	0	21	0	21	0	14	36	24	22	0	138	507
Midday Peak Hour														
13:00 to 14:00	**0**	**0**	**0**	**94**	**0**	**74**	**0**	**78**	**106**	**74**	**81**	**0**	**507**	
# of trucks in peak	0	0	0	4	0	1	0	3	2	2	4	0	16	
# of heavies in peak	0	0	0	9	0	3	0	4	7	1	3	0	27	
% heavies (Total)	0%	0%	0%	14%	0%	5%	0%	9%	8%	4%	9%	0%	8%	
15:00 to 15:15	0	0	0	33	0	21	0	32	37	29	32	0	184	
15:15 to 15:30	0	0	0	39	0	30	0	28	39	35	41	0	212	
15:30 to 15:45	0	0	0	37	0	44	0	54	31	34	29	0	229	
15:45 to 16:00	0	0	0	28	0	39	0	39	34	38	54	0	232	857
16:00 to 16:15	0	0	0	43	0	24	0	44	45	34	41	0	231	904
16:15 to 16:30	0	0	0	46	0	42	0	38	56	50	54	0	286	978
16:30 to 16:45	0	0	0	51	0	59	0	52	39	64	54	0	319	1,068
16:45 to 17:00	0	0	0	48	0	43	0	43	36	56	63	0	289	1,125
17:00 to 17:15	0	0	0	29	0	45	0	44	44	61	48	0	271	1,165
17:15 to 17:30	0	0	0	42	0	35	0	37	48	62	42	0	266	1,145
17:30 to 17:45	0	0	0	29	0	35	0	43	46	53	35	0	241	1,067
17:45 to 18:00	0	0	0	19	0	33	0	41	40	26	27	0	186	964
PM Peak Hour														
16:15 to 17:15	**0**	**0**	**0**	**174**	**0**	**189**	**0**	**177**	**175**	**231**	**219**	**0**	**1,165**	
# of trucks in peak	0	0	0	2	0	1	0	0	2	1	2	0	8	
# of heavies in peak	0	0	0	6	0	2	0	4	8	1	2	0	23	
% heavies (Total)	0%	0%	0%	5%	0%	2%	0%	2%	6%	1%	2%	0%	3%	

Intersection: Sawmill Rd @ Katherine St/Crowsfoo
GeoID: 12550
Municipality: Woolwich
Major Road: Sawmill Rd

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**0**	
8:00	**to**	**9:00**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	0
16:00	to	16:15	0	0	0	0	0	0
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**0**	
16:15	**to**	**17:15**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23

North Leg Total: 458
North Entering: 275
North Peds: 4
Peds Cross: ⋈

% Trks	28%	8%	9%	
Heavys	7	12	1	20
Trucks	0	5	2	7
Cars	18	200	30	248
Total	25	217	33	

Heavys	Trucks	Cars	Total
28	4	160	192

Church St

% Trks	Heavys	Trucks	Cars	Total
12%	3	0	23	26
11%	14	3	144	161
2%	1	0	46	47
	18	3	213	

Arthur St

	Heavys	Trucks	Cars	Total
Total	54	137	32	
Cars	43	115	30	188
Trucks	2	6	0	8
Heavys	9	16	2	27
% Trks	20%	16%	6%	

Peds Cross: ⧖
West Peds: 9
West Entering: 234
West leg Total: 426

Heavys	19
Trucks	5
Cars	285
Total	309

Peds Cross: ⋈
South Peds: 1
South Entering: 223
South leg Total: 532

Heavys	22			
Trucks	6			
Cars	155			
Total	183			

East Leg Total: 404
East Entering: 178
East Peds: 8
Peds Cross: ⧖

Arthur St

	Total	Cars	Trucks	Heavys	% Trks
	20	17	0	3	15%
	113	99	2	12	12%
	45	39	0	6	13%
		155	2	21	

Church St

Cars	Trucks	Heavys	Total
204	5	17	226

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Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **910**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **234**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

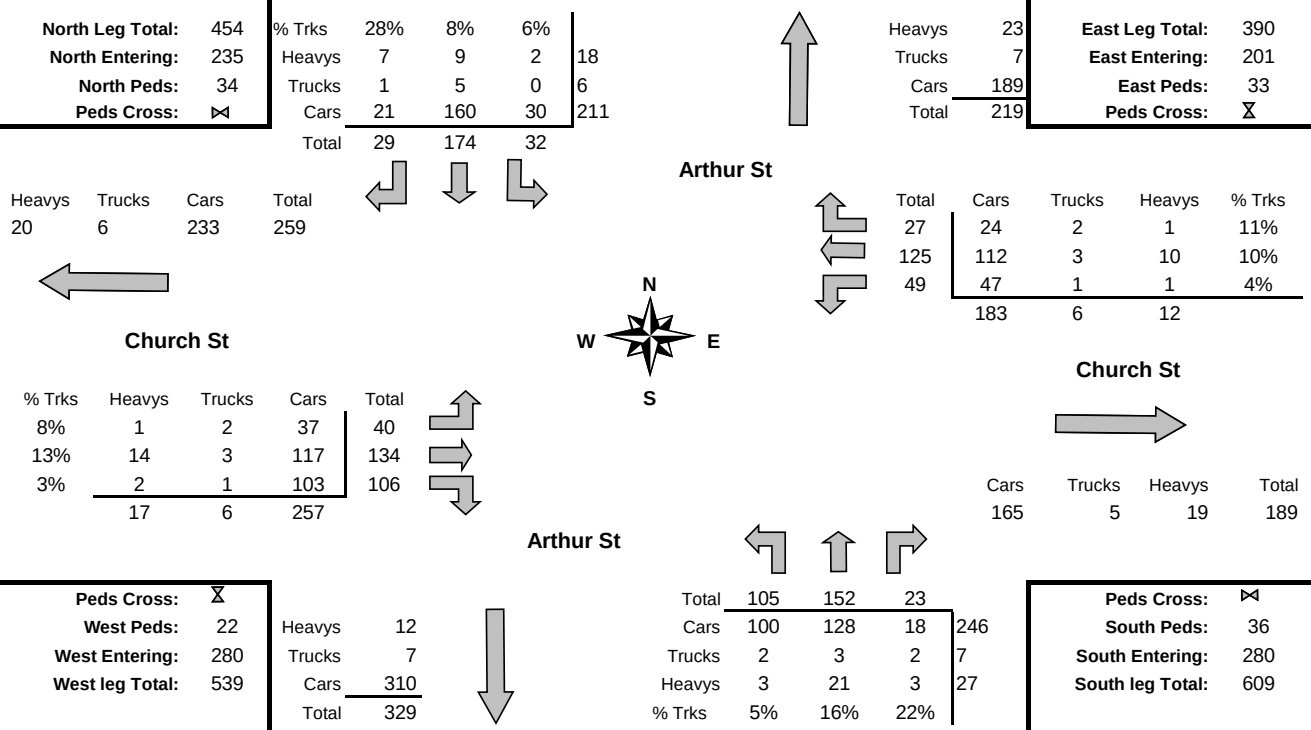
Peak Hour
From: 12:45 PM
To: 1:45 PM

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **996**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **280**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:00 PM
To: 5:00 PM

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23

North Leg

North Leg Total:	617
North Entering:	287
North Peds:	25
Peds Cross:	⋈

% Trks	8%	5%	6%	
Heavys	2	7	3	12
Trucks	1	2	0	3
Cars	34	190	48	272
Total	37	199	51	

East Leg

Heavys	18
Trucks	5
Cars	307
Total	330

East Leg Total:	564
East Entering:	301
East Peds:	28
Peds Cross:	⧖

Church St (approach)

Heavys	Trucks	Cars	Total
12	6	354	372

Arthur St (approach)

Total	Cars	Trucks	Heavys	% Trks
29	24	0	5	17%
218	209	1	8	4%
54	53	0	1	2%
	286	1	14	

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Church St (departure)

% Trks	Heavys	Trucks	Cars	Total
9%	2	2	39	43
4%	6	1	165	172
2%	1	1	95	97
	9	4	299	

Church St (departure)

Cars	Trucks	Heavys	Total
252	2	9	263

Arthur St (approach)

Total	117	258	40	
Cars	111	244	39	394
Trucks	4	3	1	8
Heavys	2	11	0	13
% Trks	5%	5%	3%	

South Leg

Peds Cross:	⧖
West Peds:	18
West Entering:	312
West leg Total:	684

Heavys	9
Trucks	3
Cars	338
Total	350

Peds Cross:	⋈
South Peds:	12
South Entering:	415
South leg Total:	765

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,315**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **312**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23

North Leg Total:	3,831
North Entering:	1,960
North Peds:	157
Peds Cross:	⋈
Bicycles Entering:	1
Buggies Entering:	6

% Trks	14%	10%	9%	
Heavys	28	114	20	162
Trucks	4	32	6	42
Cars	194	1,314	248	1,756
Total	226	1,460	274	

Heavys	157
Trucks	43
Cars	1,671
Total	1,871

East Leg Total:	3,503
East Entering:	1,844
East Peds:	210
Peds Cross:	⧖
Bicycles Entering:	0
Buggies Entering:	7

Arthur St

Heavys	Trucks	Cars	Total
138	44	2,018	2,200

Total	Cars	Trucks	Heavys	% Trks
201	175	4	22	13%
1,250	1,144	23	83	8%
393	373	4	16	5%
	1,692	31	121	

Church St

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% Trks	Heavys	Trucks	Cars	Total
10%	20	7	234	261
10%	93	18	996	1,107
3%	11	9	634	654
	124	34	1,864	

Church St

Cars	Trucks	Heavys	Total
1,505	29	125	1,659

Arthur St

Peds Cross:	⧖
West Peds:	137
West Entering:	2,022
West leg Total:	4,222
Bicycles Entering:	4
Buggies Entering:	10

Heavys	141
Trucks	45
Cars	2,321
Total	2,507

Total	724	1,409	278	
Cars	680	1,262	261	2,203
Trucks	17	32	5	54
Heavys	27	115	12	154
% Trks	6%	10%	6%	

Peds Cross:	⋈
South Peds:	155
South Entering:	2,411
South leg Total:	4,918
Bicycles Entering:	2
Buggies Entering:	2

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **8,237**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,022**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

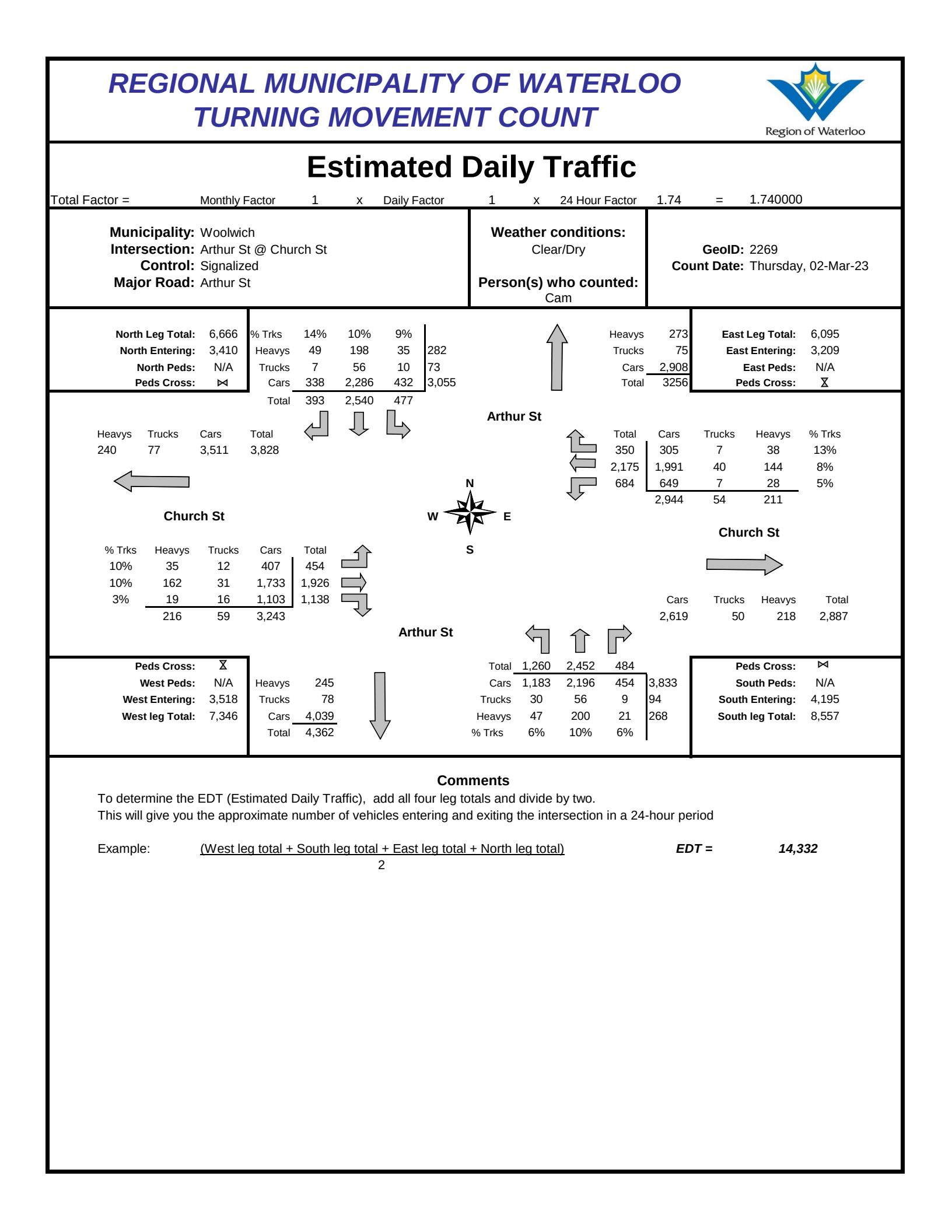
Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23



Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***14,332***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Arthur St @ Church St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2269
Count Date: Thursday, 02-Mar-23

North Approach PHF

AM Peak:	0.80
Mid-day Peak:	0.86
PM Peak:	0.88

East Approach PHF

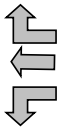
AM Peak:	0.93
Mid-day Peak:	0.80
PM Peak:	0.91

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

	Movement		
PM	0.66	0.89	0.80
MID	0.91	0.85	0.89
AM	0.78	0.70	0.75

Arthur St





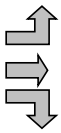
AM	MID	PM	
0.71	0.48	0.81	
0.78	0.95	0.91	Movement
0.63	0.77	0.71	

Church St



Church St

Movement	PM	MID	AM
	0.83	0.71	0.81
	0.93	0.70	0.79
	0.84	0.78	0.90



Arthur St



0.75	0.82	0.80	AM	
0.91	0.79	0.72	MID	
0.94	0.84	0.77	PM	
	Movement			

West Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.96
PM Peak:	0.91

South Approach PHF

AM Peak:	0.90
Mid-day Peak:	0.92
PM Peak:	0.89

Comments

Intersection: Arthur St @ Church St
GeoID: 2269
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	5	51	10	8	21	7	9	30	10	6	78	2	237	
7:45	to	8:00	8	43	12	18	22	6	13	42	7	11	68	7	257	
8:00	to	8:15	5	35	13	10	36	2	14	29	9	6	36	8	203	
8:15	to	8:30	8	32	12	9	34	5	18	36	6	10	35	8	213	910
8:30	to	8:45	2	34	21	16	38	3	14	25	6	9	49	8	225	898
8:45	to	9:00	5	39	17	8	28	2	15	36	10	8	47	8	223	864
9:00	to	9:15	5	34	19	9	27	4	21	28	8	7	46	2	210	871
9:15	to	9:30	4	27	23	13	32	3	17	31	6	3	48	8	215	873
9:30	to	9:45	5	32	24	9	32	5	19	36	15	10	39	7	233	881
9:45	to	10:00	9	38	24	11	30	4	19	45	6	10	38	6	240	898
10:00	to	10:15	9	22	16	13	27	5	19	26	4	5	43	6	195	883
10:15	to	10:30	6	24	16	5	32	11	21	43	10	7	37	9	221	889
AM Peak Hour																
7:30	**to**	**8:30**	**26**	**161**	**47**	**45**	**113**	**20**	**54**	**137**	**32**	**33**	**217**	**25**	**910**	
# of trucks in peak			0	3	0	0	2	0	2	6	0	2	5	0	20	
# of heavies in peak			3	14	1	6	12	3	9	16	2	1	12	7	86	
% heavies (Total)			12%	11%	2%	13%	12%	15%	20%	16%	6%	9%	8%	28%	12%	
12:00	to	12:15	14	24	19	13	40	10	27	34	11	6	36	10	244	
12:15	to	12:30	7	30	18	10	39	2	15	38	15	7	50	5	236	
12:30	to	12:45	9	29	19	11	25	4	24	50	6	8	45	6	236	
12:45	to	13:00	10	27	34	10	33	7	25	33	8	9	51	8	255	971
13:00	to	13:15	10	35	27	16	33	14	25	48	3	8	39	8	266	993
13:15	to	13:30	14	24	26	10	27	5	26	37	4	8	42	5	228	985
13:30	to	13:45	6	48	19	13	32	1	29	34	8	7	42	8	247	996
13:45	to	14:00	13	32	18	9	26	3	29	41	11	6	35	3	226	967
Midday Peak Hour																
12:45	**to**	**13:45**	**40**	**134**	**106**	**49**	**125**	**27**	**105**	**152**	**23**	**32**	**174**	**29**	**996**	
# of trucks in peak			2	3	1	1	3	2	2	3	2	0	5	1	25	
# of heavies in peak			1	14	2	1	10	1	3	21	3	2	9	7	74	
% heavies (Total)			8%	13%	3%	4%	10%	11%	5%	16%	22%	6%	8%	28%	10%	
15:00	to	15:15	4	28	24	15	42	3	24	40	9	14	41	8	252	
15:15	to	15:30	7	39	15	19	46	11	25	73	10	12	35	9	301	
15:30	to	15:45	7	32	27	12	56	12	28	51	8	11	57	6	307	
15:45	to	16:00	6	31	23	13	45	8	26	57	10	5	56	8	288	1,148
16:00	to	16:15	8	46	24	9	60	7	27	68	10	14	56	12	341	1,237
16:15	to	16:30	11	43	18	13	55	9	31	58	7	16	55	8	324	1,260
16:30	to	16:45	13	44	29	13	46	6	29	77	10	10	46	14	337	1,290
16:45	to	17:00	11	39	26	19	57	7	30	55	13	11	42	3	313	1,315
17:00	to	17:15	8	43	22	14	61	11	29	59	12	11	59	8	337	1,311
17:15	to	17:30	10	30	19	20	58	9	33	47	15	9	36	3	289	1,276
17:30	to	17:45	13	39	21	15	62	7	22	56	7	5	39	10	296	1,235
17:45	to	18:00	9	33	19	10	48	8	21	46	4	5	34	5	242	1,164
PM Peak Hour																
16:00	**to**	**17:00**	**43**	**172**	**97**	**54**	**218**	**29**	**117**	**258**	**40**	**51**	**199**	**37**	**1,315**	
# of trucks in peak			2	1	1	0	1	0	4	3	1	0	2	1	16	
# of heavies in peak			2	6	1	1	8	5	2	11	0	3	7	2	48	
% heavies (Total)			9%	4%	2%	2%	4%	17%	5%	5%	3%	6%	5%	8%	5%	

Intersection: Arthur St @ Church St
GeoID: 2269
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Thursday, 02-Mar-23
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	2	3	0	0	5	
7:45	to	8:00	2	1	2	1	6	
8:00	to	8:15	2	5	2	0	9	
8:15	to	8:30	2	0	0	0	2	22
8:30	to	8:45	2	3	3	2	10	27
8:45	to	9:00	4	4	3	1	12	33
9:00	to	9:15	6	2	0	3	11	35
9:15	to	9:30	8	3	1	3	15	48
9:30	to	9:45	5	3	5	6	19	57
9:45	to	10:00	11	5	10	0	26	71
10:00	to	10:15	12	7	1	7	27	87
10:15	to	10:30	7	4	4	5	20	92
AM Peak Hour							**162**	
7:30	**to**	**8:30**	**8**	**9**	**4**	**1**	**22**	
12:00	to	12:15	5	2	7	11	25	
12:15	to	12:30	6	9	6	11	32	
12:30	to	12:45	9	6	2	5	22	
12:45	to	13:00	8	8	6	7	29	108
13:00	to	13:15	9	4	10	8	31	114
13:15	to	13:30	7	3	11	13	34	116
13:30	to	13:45	9	7	7	8	31	125
13:45	to	14:00	5	5	8	8	26	122
Midday Peak Hour							**230**	
12:45	**to**	**13:45**	33	22	34	36	**125**	
15:00	to	15:15	3	3	6	3	15	
15:15	to	15:30	12	2	5	6	25	
15:30	to	15:45	11	4	12	8	35	
15:45	to	16:00	14	7	7	7	35	110
16:00	to	16:15	9	3	7	2	21	116
16:15	to	16:30	5	4	4	3	16	107
16:30	to	16:45	8	6	6	5	25	97
16:45	to	17:00	6	5	8	2	21	83
17:00	to	17:15	1	7	3	5	16	78
17:15	to	17:30	7	4	9	4	24	86
17:30	to	17:45	4	4	0	4	12	73
17:45	to	18:00	9	4	2	7	22	74
PM Peak Hour							**267**	
16:00	**to**	**17:00**	28	18	25	12	**83**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Leg Total: 38
North Entering: 27
North Peds: 0
Peds Cross: ⋈

% Trks	21%	0%	0%	
Heavys	3	0	0	3
Trucks	0	0	0	0
Cars	11	3	10	24
Total	14	3	10	

Heavys	Trucks	Cars	Total
43	17	423	483

King St

% Trks	Heavys	Trucks	Cars	Total
17%	1	0	5	6
5%	8	11	390	409
10%	9	0	81	90
	18	11	476	

Martin Grove Rd

Heavys	Trucks	Cars	Total
2	0	9	11

Total	Cars	Trucks	Heavys	% Trks
4	3	0	1	25%
223	202	7	14	9%
28	24	0	4	14%
	229	7	19	

East Leg Total: 872
East Entering: 255
East Peds: 0
Peds Cross: ⧖

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King St

Cars	Trucks	Heavys	Total
591	11	15	617

Hwy 85 NB Ramp

Total	246	1	198	
Cars	210	1	191	402
Trucks	10	0	0	10
Heavys	26	0	7	33
% Trks	15%	0%	4%	

Peds Cross: ⧖
West Peds: 0
West Entering: 505
West leg Total: 988

Heavys	13
Trucks	0
Cars	108
Total	121

Peds Cross: ⋈
South Peds: 0
South Entering: 445
South leg Total: 566

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,232**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **505**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:15 PM
To: 1:15 PM

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Leg Total: 61
North Entering: 27
North Peds: 1
Peds Cross: ⋈

% Trks	18%	0%	7%	
Heavys	0	0	0	0
Trucks	2	0	1	3
Cars	9	1	14	24
Total	11	1	15	

Heavys	Trucks	Cars	Total
58	15	583	656

King St

% Trks	Heavys	Trucks	Cars	Total
15%	1	1	11	13
6%	15	10	406	431
14%	8	1	57	66
	24	12	474	

Martin Grove Rd

Heavys	Trucks	Cars	Total
2	2	30	34

East Leg Total: 1,029
East Entering: 504
East Peds: 0
Peds Cross: ⧖

Total	Cars	Trucks	Heavys	% Trks
18	16	1	1	11%
424	387	9	28	9%
62	57	2	3	8%
	460	12	32	

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King St

Cars	Trucks	Heavys	Total
476	20	29	525

Hwy 85 NB Ramp

Peds Cross: ⧖
West Peds: 0
West Entering: 510
West leg Total: 1,166

Heavys	11
Trucks	3
Cars	115
Total	129

Total	221	3	79	
Cars	187	3	56	246
Trucks	4	0	9	13
Heavys	30	0	14	44
% Trks	15%	0%	29%	

Peds Cross: ⋈
South Peds: 0
South Entering: 303
South leg Total: 432

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,344**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **510**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Leg Total: 68
North Entering: 26
North Peds: 2
Peds Cross: ⋈

% Trks	7%	0%	0%	
Heavys	0	0	0	0
Trucks	1	0	0	1
Cars	14	2	9	25
Total	15	2	9	

Heavys	Trucks	Cars	Total
21	12	924	957

King St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	21	21
2%	7	6	536	549
7%	6	1	98	105
	13	7	655	

Martin Grove Rd

Heavys	Trucks	Cars	Total
0	0	42	42

East Leg Total: 1,360
East Entering: 744
East Peds: 0
Peds Cross: ⧖

Total	Cars	Trucks	Heavys	% Trks
13	13	0	0	0%
619	608	7	4	2%
112	109	2	1	3%
	730	9	5	

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King St

Cars	Trucks	Heavys	Total
602	6	8	616

Hwy 85 NB Ramp

Peds Cross: ⧖
West Peds: 0
West Entering: 675
West leg Total: 1,632

Heavys	7
Trucks	3
Cars	209
Total	219

Total	323	8	58	
Cars	302	8	57	367
Trucks	4	0	0	4
Heavys	17	0	1	18
% Trks	7%	0%	2%	

Peds Cross: ⋈
South Peds: 1
South Entering: 389
South leg Total: 608

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,834**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **675**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Leg Total:	437
North Entering:	215
North Peds:	5
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	0

% Trks	15%	6%	6%	
Heavys	10	1	3	14
Trucks	7	0	2	9
Cars	94	15	83	192
Total	111	16	88	

Heavys	15
Trucks	5
Cars	202
Total	222

East Leg Total:	7,798
East Entering:	3,746
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	9
Buggies Entering:	2

Heavys	Trucks	Cars	Total
359	125	4,846	5,330

King St

% Trks	Heavys	Trucks	Cars	Total
13%	12	1	87	100
4%	78	63	3,092	3,233
9%	51	5	591	647
	141	69	3,770	

Martin Grove Rd

Total	Cars	Trucks	Heavys	% Trks
85	79	3	3	7%
3,189	2,997	60	132	6%
472	443	12	17	6%
	3,519	75	152	

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King St

Cars	Trucks	Heavys	Total
3,808	93	151	4,052

Hwy 85 NB Ramp

Total	2,030	37	731	
Cars	1,755	36	633	2,424
Trucks	58	1	28	87
Heavys	217	0	70	287
% Trks	14%	3%	13%	

Peds Cross:	⧖
West Peds:	0
West Entering:	3,980
West leg Total:	9,310
Bicycles Entering:	6
Buggies Entering:	0

Heavys	69
Trucks	17
Cars	1,049
Total	1,135

Peds Cross:	⋈
South Peds:	3
South Entering:	2,798
South leg Total:	3,933
Bicycles Entering:	0
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **10,739**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **3,980**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Leg Total: 760
North Entering: 374
North Peds: N/A
Peds Cross: ⋈

% Trks	15%	6%	6%	
Heavys	17	2	5	24
Trucks	12	0	3	16
Cars	164	26	144	334
Total	193	28	153	

East Leg Total: 13,569
East Entering: 6,518
East Peds: N/A
Peds Cross: ⧖

Heavys	26
Trucks	9
Cars	351
Total	386

Martin Grove Rd

Heavys	Trucks	Cars	Total
625	218	8,432	9,274

Total	Cars	Trucks	Heavys	% Trks
148	137	5	5	7%
5,549	5,215	104	230	6%
821	771	21	30	6%
	6,123	131	264	

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King St

% Trks	Heavys	Trucks	Cars	Total
13%	21	2	151	174
4%	136	110	5,380	5,625
9%	89	9	1,028	1,126
	245	120	6,560	

King St

Cars	Trucks	Heavys	Total
6,626	162	263	7,050

Hwy 85 NB Ramp

Peds Cross: ⧖
West Peds: N/A
West Entering: 6,925
West leg Total: 16,199

Heavys	120
Trucks	30
Cars	1,825
Total	1,975

Total	3,532	64	1,272	
Cars	3,054	63	1,101	4,218
Trucks	101	2	49	151
Heavys	378	0	122	499
% Trks	14%	3%	13%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 4,869
South leg Total: 6,843

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***18,686***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: King St @ Hwy 85 NB Ramp/Martin Grove Rd
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 25004
Count Date: Wednesday, 12-Oct-22

North Approach PHF

AM Peak:	0.75
Mid-day Peak:	0.75
PM Peak:	0.72

East Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.94
PM Peak:	0.90

	Movement		
PM	0.75	0.50	0.45
MID	0.92	0.25	0.63
AM	0.70	0.38	0.63

Martin Grove Rd

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

N
W E
S

King St

Movement			
AM	MID	PM	
0.33	0.56	0.65	
0.93	0.95	0.89	
0.58	0.82	0.93	

King St

Movement			
PM	MID	AM	
0.58	0.65	0.75	
0.98	0.89	0.92	
0.77	0.92	0.87	

Hwy 85 NB Ramp

0.92	0.25	0.87	AM
0.85	0.75	0.82	MID
0.88	0.67	0.91	PM
	Movement		

Hwy 85 NB Ramp

West Approach PHF

AM Peak:	0.96
Mid-day Peak:	0.90
PM Peak:	0.92

South Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.84
PM Peak:	0.89

Comments

Intersection: King St @ Hwy 85 NB Ramp/Martin (
GeoID: 25004
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control	***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30 to 7:45	1	71	20	10	42	1	50	0	42	2	0	3	242	
7:45 to 8:00	0	111	21	4	57	0	62	0	53	4	1	4	317	
8:00 to 8:15	2	99	26	12	60	0	67	1	57	1	0	4	329	
8:15 to 8:30	2	90	23	6	57	3	63	0	49	3	0	1	297	1,185
8:30 to 8:45	2	109	20	6	49	1	54	0	39	2	2	5	289	1,232
8:45 to 9:00	2	96	11	9	62	1	53	1	42	5	0	6	288	1,203
9:00 to 9:15	1	81	9	8	50	1	50	1	29	4	0	5	239	1,113
9:15 to 9:30	0	74	10	5	74	0	40	0	19	1	1	1	225	1,041
9:30 to 9:45	1	65	12	18	62	0	44	0	17	1	0	2	222	974
9:45 to 10:00	1	73	19	12	62	1	62	1	21	3	0	2	257	943
10:00 to 10:15	1	79	15	6	62	2	49	2	18	1	0	5	240	944
10:15 to 10:30	4	84	9	15	74	2	45	0	28	1	0	2	264	983
AM Peak Hour														
7:45 to 8:45	**6**	**409**	**90**	**28**	**223**	**4**	**246**	**1**	**198**	**10**	**3**	**14**	**1,232**	
# of trucks in peak	0	11	0	0	7	0	10	0	0	0	0	0	28	
# of heavies in peak	1	8	9	4	14	1	26	0	7	0	0	3	73	
% heavies (Total)	17%	5%	10%	14%	9%	25%	15%	0%	4%	0%	0%	21%	8%	
12:00 to 12:15	2	90	15	14	94	2	68	1	19	2	0	1	308	
12:15 to 12:30	5	108	16	19	112	3	44	1	20	5	0	3	336	
12:30 to 12:45	1	110	18	11	102	4	55	0	16	6	0	3	326	
12:45 to 13:00	4	121	16	15	103	3	57	1	19	3	0	2	344	1,314
13:00 to 13:15	3	92	16	17	107	8	65	1	24	1	1	3	338	1,344
13:15 to 13:30	1	96	22	11	112	2	61	1	21	4	0	2	333	1,341
13:30 to 13:45	3	88	23	11	105	3	63	0	20	1	1	7	325	1,340
13:45 to 14:00	3	89	23	13	98	3	54	1	13	4	2	2	305	1,301
Midday Peak Hour														
12:15 to 13:15	**13**	**431**	**66**	**62**	**424**	**18**	**221**	**3**	**79**	**15**	**1**	**11**	**1,344**	
# of trucks in peak	1	10	1	2	9	1	4	0	9	1	0	2	40	
# of heavies in peak	1	15	8	3	28	1	30	0	14	0	0	0	100	
% heavies (Total)	15%	6%	14%	8%	9%	11%	15%	0%	29%	7%	0%	18%	10%	
15:00 to 15:15	4	107	31	18	120	6	71	2	15	5	0	5	384	
15:15 to 15:30	2	99	21	16	115	3	68	1	14	2	0	3	344	
15:30 to 15:45	7	119	33	13	149	6	79	2	15	7	2	1	433	
15:45 to 16:00	8	108	29	22	136	5	82	3	15	4	2	4	418	1,579
16:00 to 16:15	5	113	23	24	156	3	76	2	14	3	1	5	425	1,620
16:15 to 16:30	3	98	25	16	147	4	89	0	13	1	0	3	399	1,675
16:30 to 16:45	3	135	29	28	173	5	85	2	16	5	0	3	484	1,726
16:45 to 17:00	3	140	26	25	145	1	75	1	15	0	1	5	437	1,745
17:00 to 17:15	9	140	34	29	164	3	92	3	14	3	1	5	497	1,817
17:15 to 17:30	6	134	16	30	137	4	71	2	13	1	0	2	416	1,834
17:30 to 17:45	4	96	20	14	117	2	79	5	8	2	0	10	357	1,707
17:45 to 18:00	7	118	16	15	86	3	57	2	13	1	1	2	321	1,591
PM Peak Hour														
16:30 to 17:30	**21**	**549**	**105**	**112**	**619**	**13**	**323**	**8**	**58**	**9**	**2**	**15**	**1,834**	
# of trucks in peak	0	6	1	2	7	0	4	0	0	0	0	1	21	
# of heavies in peak	0	7	6	1	4	0	17	0	1	0	0	0	36	
% heavies (Total)	0%	2%	7%	3%	2%	0%	7%	0%	2%	0%	0%	7%	3%	

Intersection: King St @ Hwy 85 NB Ramp/Martin G
GeoID: 25004
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	1	0	1	1
10:00	to	10:15	0	0	0	0	0	1
10:15	to	10:30	0	0	0	0	0	1
AM Peak Hour							**1**	
7:45	**to**	**8:45**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	1	0	1	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	1	0	1	
12:45	to	13:00	0	0	0	0	0	2
13:00	to	13:15	0	0	0	0	0	1
13:15	to	13:30	0	0	0	0	0	1
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**2**	
12:15	**to**	**13:15**	0	0	1	0	**1**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	1	1	
15:45	to	16:00	0	0	0	0	0	1
16:00	to	16:15	0	0	0	0	0	1
16:15	to	16:30	0	0	0	0	0	1
16:30	to	16:45	0	0	0	1	1	1
16:45	to	17:00	0	0	2	0	2	3
17:00	to	17:15	0	0	0	0	0	3
17:15	to	17:30	0	0	0	0	0	3
17:30	to	17:45	0	0	0	0	0	2
17:45	to	18:00	0	0	0	1	1	1
PM Peak Hour							**5**	
16:30	**to**	**17:30**	0	0	2	1	**3**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

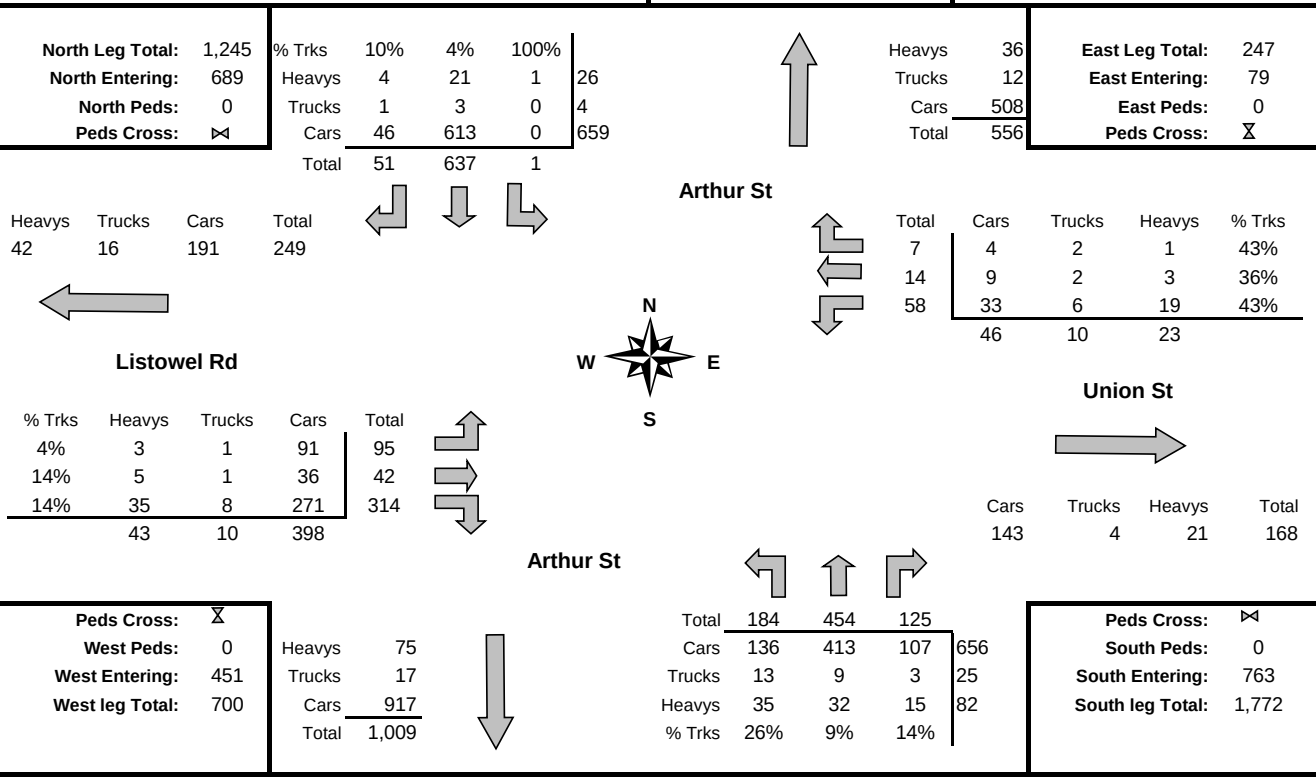
Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22



Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,982**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **451**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22

North Leg

North Leg Total:	1,021
North Entering:	478
North Peds:	0
Peds Cross:	⋈

% Trks	8%	9%	0%	
Heavys	2	22	0	24
Trucks	3	13	0	16
Cars	60	376	2	438
Total	65	411	2	

East Leg

Heavys	39
Trucks	23
Cars	481
Total	543

East Leg Total:	210
East Entering:	113
East Peds:	0
Peds Cross:	⧖

Arthur St

Heavys	Trucks	Cars	Total
44	7	210	261

Total	Cars	Trucks	Heavys	% Trks
13	10	2	1	23%
32	21	2	9	34%
68	40	7	21	41%
	71	11	31	

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W E
S

Listowel Rd

% Trks	Heavys	Trucks	Cars	Total
12%	4	4	61	69
58%	13	5	13	31
25%	33	9	127	169
	50	18	201	

Union St

Cars	Trucks	Heavys	Total
65	8	24	97

Arthur St

Total	164	461	64	
Cars	129	410	50	589
Trucks	2	17	3	22
Heavys	33	34	11	78
% Trks	21%	11%	22%	

West Leg

Peds Cross:	⧖
West Peds:	0
West Entering:	269
West leg Total:	530

Heavys	76
Trucks	29
Cars	543
Total	648

South Leg

Peds Cross:	⋈
South Peds:	0
South Entering:	689
South leg Total:	1,337

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,549**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **269**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

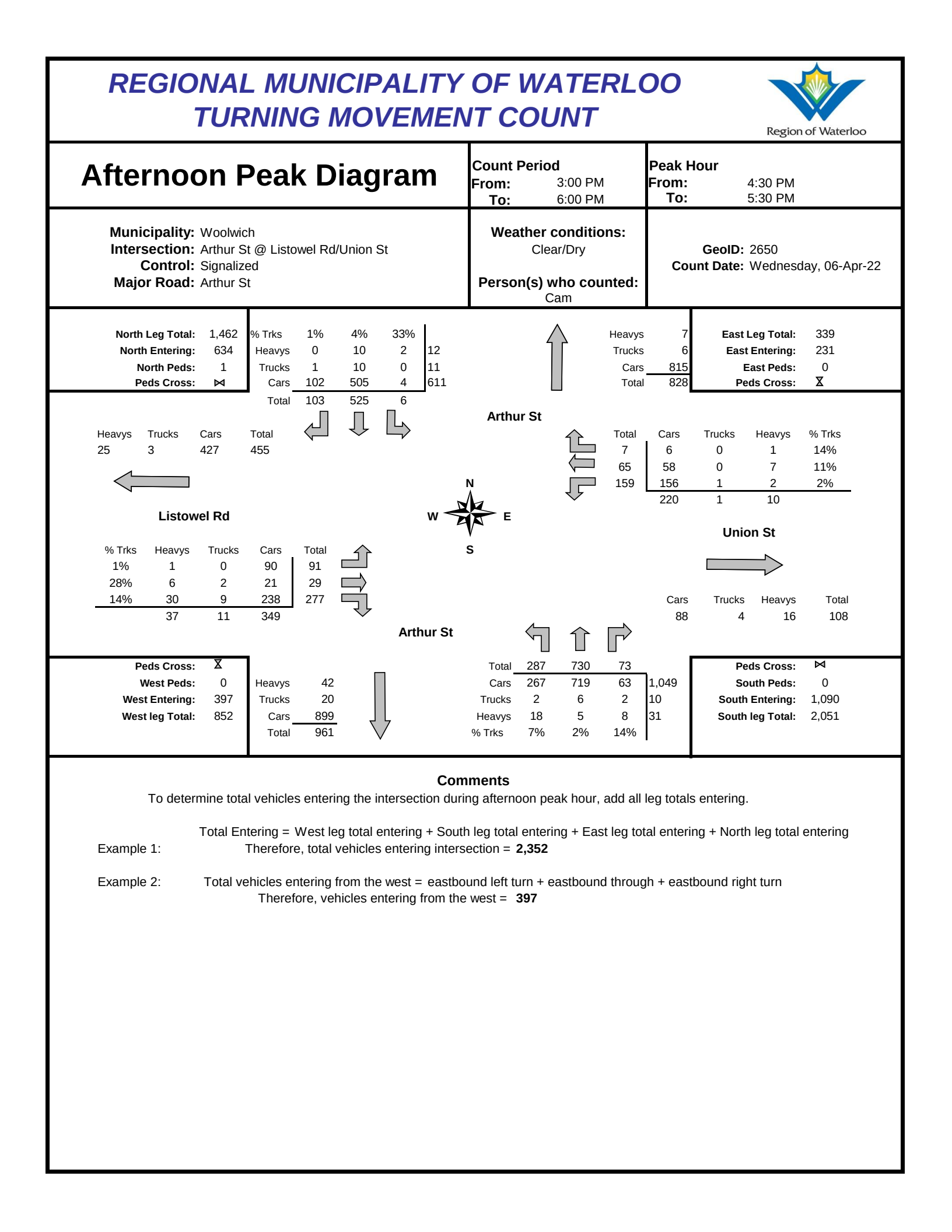
Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22



Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,352**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **397**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

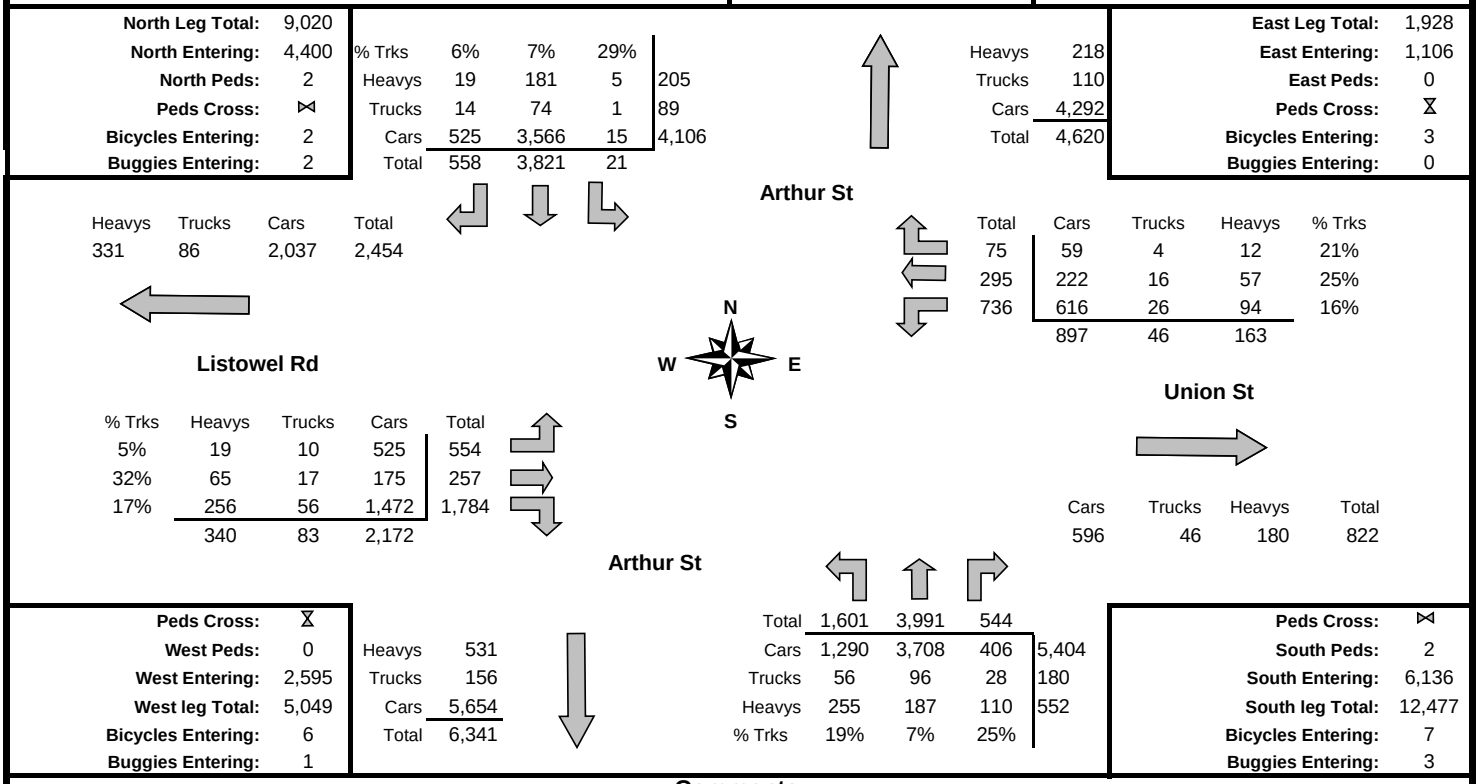
Total Count Diagram

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22



Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **14,237**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,595**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

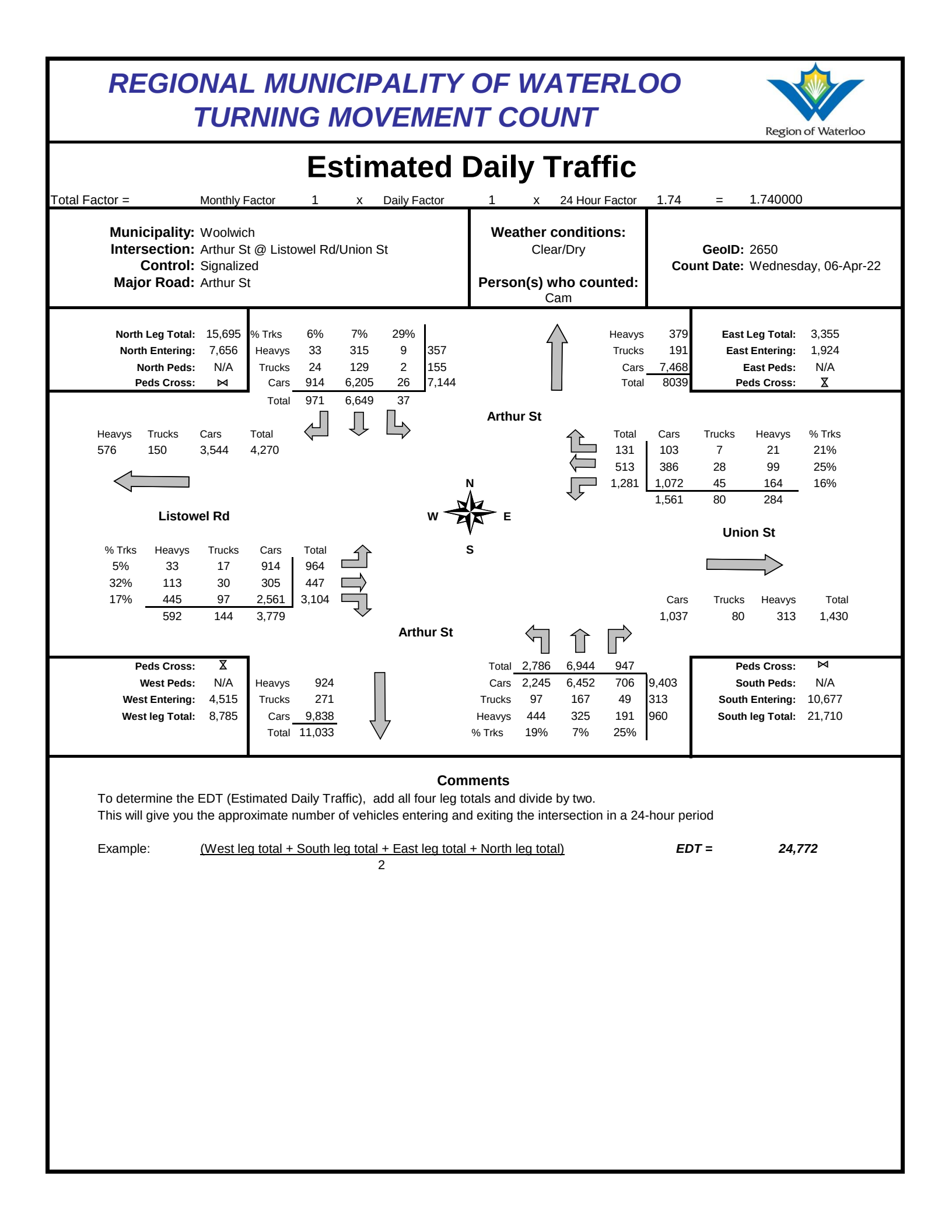
Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22



Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***24,772***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Arthur St @ Listowel Rd/Union St
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2650
Count Date: Wednesday, 06-Apr-22

North Approach PHF

AM Peak:	0.92
Mid-day Peak:	0.93
PM Peak:	0.92

East Approach PHF

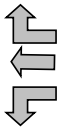
AM Peak:	0.82
Mid-day Peak:	0.88
PM Peak:	0.93

	Movement		
PM	0.74	0.95	0.75
MID	0.96	0.93	0.50
AM	0.85	0.91	0.25

Arthur St

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour





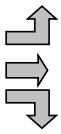
AM	MID	PM	
0.58	0.65	0.58	
0.58	0.67	0.77	
0.91	0.85	0.81	Movement

Listowel Rd

N
W E
S

Union St

Movement	PM	MID	AM
	0.78	0.78	0.72
	0.66	0.52	0.66
	0.79	0.80	0.79



Arthur St



0.81	0.74	0.80	AM	
0.91	0.88	0.67	MID	
0.90	0.92	0.65	PM	
Movement				

West Approach PHF

AM Peak:	0.86
Mid-day Peak:	0.93
PM Peak:	0.81

South Approach PHF

AM Peak:	0.76
Mid-day Peak:	0.92
PM Peak:	0.93

Comments

Intersection: Arthur St @ Listowel Rd/Union St
GeoID: 2650
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Wednesday, 06-Apr-22
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	21	11	99	16	2	2	45	100	37	0	175	13	521	
7:45	to	8:00	33	16	52	11	3	1	57	154	39	1	168	12	547	
8:00	to	8:15	24	8	85	15	6	3	29	101	24	0	142	15	452	
8:15	to	8:30	17	7	78	16	3	1	53	99	25	0	152	11	462	1,982
8:30	to	8:45	15	12	56	16	6	3	39	104	11	1	132	4	399	1,860
8:45	to	9:00	19	10	47	14	8	4	44	120	27	1	118	15	427	1,740
9:00	to	9:15	11	11	42	11	5	0	30	94	16	0	113	9	342	1,630
9:15	to	9:30	9	11	59	10	4	2	52	84	19	0	87	9	346	1,514
9:30	to	9:45	13	2	34	11	3	3	27	89	11	0	123	12	328	1,443
9:45	to	10:00	10	5	60	14	4	2	39	94	15	0	90	12	345	1,361
10:00	to	10:15	15	3	45	10	2	1	44	81	13	0	80	8	302	1,321
10:15	to	10:30	11	10	54	14	6	2	32	80	11	1	109	8	338	1,313
AM Peak Hour																
7:30	**to**	**8:30**	**95**	**42**	**314**	**58**	**14**	**7**	**184**	**454**	**125**	**1**	**637**	**51**	**1,982**	
# of trucks in peak			1	1	8	6	2	2	13	9	3	0	3	1	49	
# of heavies in peak			3	5	35	19	3	1	35	32	15	1	21	4	174	
% heavies (Total)			4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%	11%	
12:00	to	12:15	23	8	54	16	8	3	45	107	9	0	102	21	396	
12:15	to	12:30	18	10	44	14	9	6	37	110	5	1	96	21	371	
12:30	to	12:45	16	7	48	14	11	1	35	90	11	2	105	18	358	
12:45	to	13:00	7	6	43	14	6	3	41	92	15	3	90	23	343	1,468
13:00	to	13:15	22	15	35	20	3	5	45	108	12	0	95	16	376	1,448
13:15	to	13:30	17	8	46	14	12	1	41	131	15	0	106	16	407	1,484
13:30	to	13:45	11	2	53	19	9	4	36	105	24	1	111	16	391	1,517
13:45	to	14:00	19	6	35	15	8	3	42	117	13	1	99	17	375	1,549
Midday Peak Hour																
13:00	**to**	**14:00**	**69**	**31**	**169**	**68**	**32**	**13**	**164**	**461**	**64**	**2**	**411**	**65**	**1,549**	
# of trucks in peak			4	5	9	7	2	2	2	17	3	0	13	3	67	
# of heavies in peak			4	13	33	21	9	1	33	34	11	0	22	2	183	
% heavies (Total)			12%	58%	25%	41%	34%	23%	21%	11%	22%	0%	9%	8%	16%	
15:00	to	15:15	16	9	48	56	12	5	56	141	24	1	135	27	530	
15:15	to	15:30	16	7	42	26	10	0	56	120	24	0	126	22	449	
15:30	to	15:45	14	8	74	79	23	2	57	166	9	0	119	20	571	
15:45	to	16:00	13	4	44	24	11	2	61	173	20	0	122	13	487	2,037
16:00	to	16:15	27	9	59	37	15	2	72	136	11	1	130	33	532	2,039
16:15	to	16:30	18	8	64	32	16	1	69	177	14	1	141	32	573	2,163
16:30	to	16:45	18	7	64	49	12	1	63	179	8	0	138	24	563	2,155
16:45	to	17:00	29	6	88	36	19	1	80	180	15	2	134	21	611	2,279
17:00	to	17:15	22	5	62	44	13	3	76	173	22	2	136	35	593	2,340
17:15	to	17:30	22	11	63	30	21	2	68	198	28	2	117	23	585	2,352
17:30	to	17:45	16	8	58	20	15	4	60	169	10	0	119	22	501	2,290
17:45	to	18:00	12	7	49	19	10	2	70	119	7	0	111	10	416	2,095
PM Peak Hour																
16:30	**to**	**17:30**	**91**	**29**	**277**	**159**	**65**	**7**	**287**	**730**	**73**	**6**	**525**	**103**	**2,352**	
# of trucks in peak			0	2	9	1	0	0	2	6	2	0	10	1	33	
# of heavies in peak			1	6	30	2	7	1	18	5	8	2	10	0	90	
% heavies (Total)			1%	28%	14%	2%	11%	14%	7%	2%	14%	33%	4%	1%	5%	

Intersection: Arthur St @ Listowel Rd/Union St
GeoID: 2650
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Wednesday, 06-Apr-22
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING							
Time			Crossing Approach				
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	1	1	1
8:45	to	9:00	0	0	0	1	1	2
9:00	to	9:15	0	0	0	0	0	2
9:15	to	9:30	0	0	0	0	0	2
9:30	to	9:45	0	0	0	0	0	1
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**2**	
7:30	**to**	**8:30**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	1	0	1	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	1
16:00	to	16:15	0	0	0	0	0	1
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	1	0	1	1
17:30	to	17:45	0	0	0	0	0	1
17:45	to	18:00	0	0	0	0	0	1
PM Peak Hour							**2**	
16:30	**to**	**17:30**	0	0	1	0	**1**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

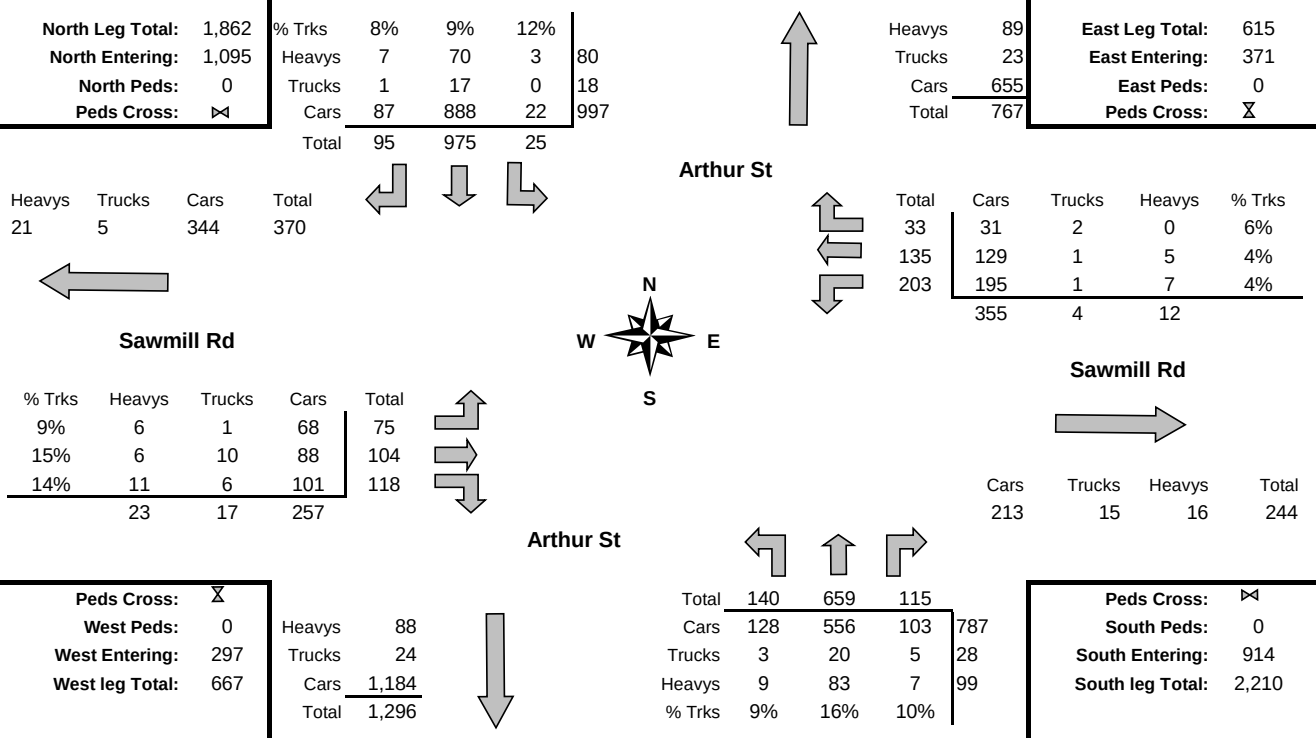
Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24



Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **2,677**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **297**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

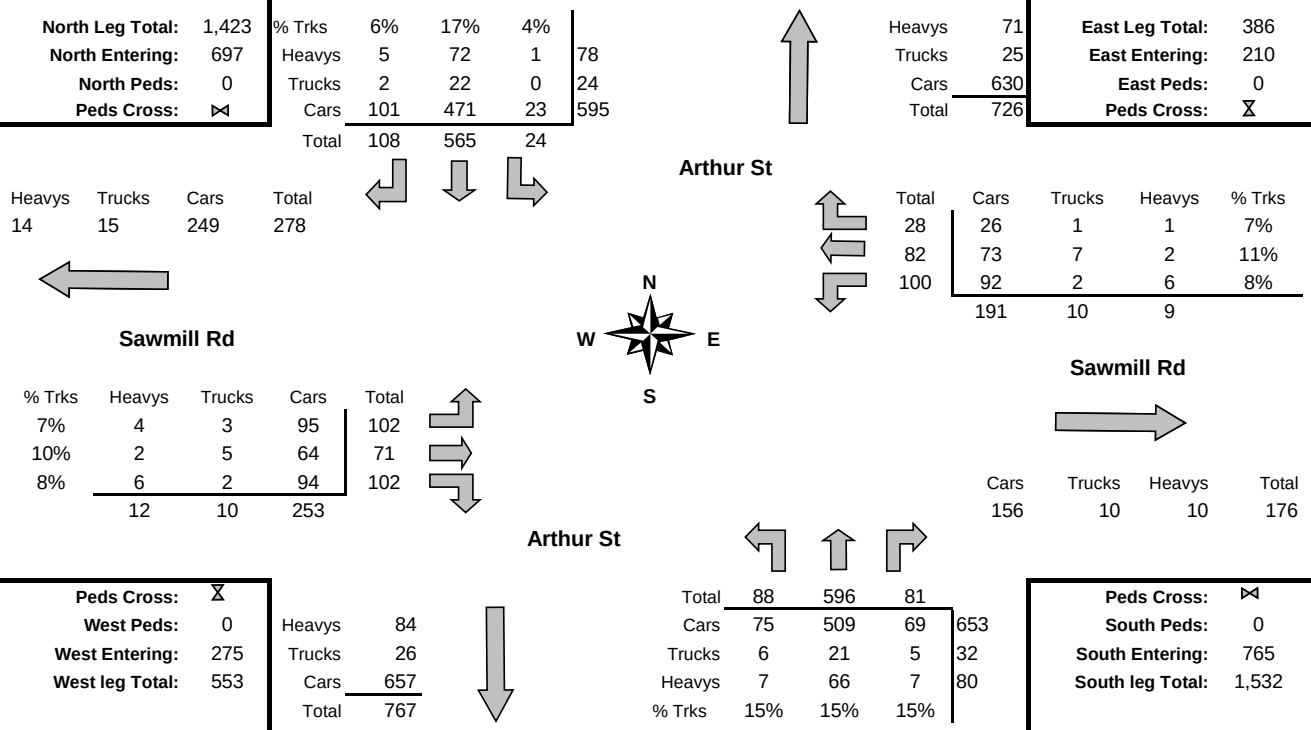
Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,947**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **275**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:00 PM
To: 5:00 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24

North Leg Total: 2,108
North Entering: 983
North Peds: 0
Peds Cross: ⋈

	5%	6%	4%	
% Trks				
Heavys	3	39	0	42
Trucks	2	12	1	15
Cars	104	796	26	926
Total	109	847	27	

East Leg Total: 667
East Entering: 236
East Peds: 0
Peds Cross: ⧖

Heavys	52
Trucks	17
Cars	1,056
Total	1,125

Arthur St

Heavys	Trucks	Cars	Total
12	8	325	345

Total	Cars	Trucks	Heavys	% Trks
23	20	1	2	13%
123	117	3	3	5%
90	89	0	1	1%
	226	4	6	

Sawmill Rd

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Sawmill Rd

% Trks	Heavys	Trucks	Cars	Total
3%	4	0	128	132
4%	4	2	163	169
7%	6	3	125	134
	14	5	416	

Cars	Trucks	Heavys	Total
414	4	13	431

Arthur St

Peds Cross: ⧖
West Peds: 0
West Entering: 435
West leg Total: 780

Heavys	46
Trucks	15
Cars	1,010
Total	1,071

Total	113	970	235	
Cars	104	908	225	1,237
Trucks	3	16	1	20
Heavys	6	46	9	61
% Trks	8%	6%	4%	

Peds Cross: ⋈
South Peds: 0
South Entering: 1,318
South leg Total: 2,389

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,972**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **435**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24

North Leg Total:	13,418
North Entering:	6,891
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	1
Buggies Entering:	0

% Trks	6%	11%	6%	
Heavys	38	510	7	555
Trucks	13	123	5	141
Cars	763	5,255	177	6,195
Total	814	5,888	189	

Heavys	580
Trucks	140
Cars	5,807
Total	6,527

East Leg Total:	4,091
East Entering:	1,990
East Peds:	1
Peds Cross:	⋈
Bicycles Entering:	0
Buggies Entering:	4

Arthur St

Heavys	Trucks	Cars	Total
143	67	2,289	2,499

Total	Cars	Trucks	Heavys	% Trks
221	200	9	12	10%
821	763	28	30	7%
948	887	15	46	6%
	1,850	52	88	

Sawmill Rd

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% Trks	Heavys	Trucks	Cars	Total
7%	45	15	752	812
6%	20	30	798	848
9%	61	25	832	918
	126	70	2,382	

Sawmill Rd

Cars	Trucks	Heavys	Total
1,960	61	80	2,101

Arthur St

Total	864	5,494	1,064	
Cars	763	4,855	985	6,603
Trucks	26	116	26	168
Heavys	75	523	53	651
% Trks	12%	12%	7%	

Peds Cross:	⧖
West Peds:	1
West Entering:	2,578
West leg Total:	5,077
Bicycles Entering:	0
Buggies Entering:	1

Heavys	617
Trucks	163
Cars	6,974
Total	7,754

Peds Cross:	⋈
South Peds:	0
South Entering:	7,422
South leg Total:	15,176
Bicycles Entering:	1
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **18,881**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,578**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24

North Leg Total: 23,347
North Entering: 11,990
North Peds: N/A
Peds Cross: ⋈

% Trks	6%	11%	6%	
Heavys	66	887	12	966
Trucks	23	214	9	245
Cars	1,328	9,144	308	10,779
Total	1,416	10,245	329	

Heavys	1,009
Trucks	244
Cars	10,104
Total	11357

East Leg Total: 7,118
East Entering: 3,463
East Peds: N/A
Peds Cross: ⧖

Heavys	Trucks	Cars	Total
249	117	3,983	4,348

Arthur St

Total	Cars	Trucks	Heavys	% Trks
385	348	16	21	10%
1,429	1,328	49	52	7%
1,650	1,543	26	80	6%
	3,219	90	153	

Sawmill Rd

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% Trks	Heavys	Trucks	Cars	Total
7%	78	26	1,308	1,413
6%	35	52	1,389	1,476
9%	106	44	1,448	1,597
	219	122	4,145	

Sawmill Rd

Cars	Trucks	Heavys	Total
3,410	106	139	3,656

Arthur St

Total	1,503	9,560	1,851	
Cars	1,328	8,448	1,714	11,489
Trucks	45	202	45	292
Heavys	131	910	92	1,133
% Trks	12%	12%	7%	

Peds Cross: ⧖
West Peds: N/A
West Entering: 4,486
West leg Total: 8,834

Heavys	1,074
Trucks	284
Cars	12,135
Total	13,492

Peds Cross: ⋈
South Peds: N/A
South Entering: 12,914
South leg Total: 26,406

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: (West leg total + South leg total + East leg total + North leg total) / 2 ***EDT =*** ***32,853***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Sawmill Rd @ Arthur St
Control: N/A
Major Road: Arthur St

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2711
Count Date: Wednesday, 24-Apr-24

North Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.89
PM Peak:	0.98

East Approach PHF

AM Peak:	0.85
Mid-day Peak:	0.88
PM Peak:	0.86

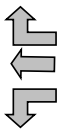
AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

	Movement		
PM	0.76	0.95	0.75
MID	0.87	0.86	0.75
AM	0.88	0.88	0.57

Arthur St



AM	MID	PM	
0.52	0.78	0.72	
0.73	0.89	0.88	Movement
0.92	0.89	0.68	

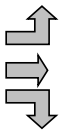


Sawmill Rd



Sawmill Rd

Movement	PM	MID	AM
	0.92	0.94	0.75
	0.75	0.93	0.70
	0.84	0.67	0.78



Arthur St



0.83	0.89	0.87	AM	
0.81	0.94	0.88	MID	
0.86	0.94	0.92	PM	
Movement				

West Approach PHF

AM Peak:	0.94
Mid-day Peak:	0.82
PM Peak:	0.86

South Approach PHF

AM Peak:	0.93
Mid-day Peak:	0.96
PM Peak:	0.96

Comments

Intersection: Sawmill Rd @ Arthur St
GeoID: 2711
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: N/A
Date: Wednesday, 24-Apr-24
Name: Cam
Weather: Cloudy/Dry

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control	***Yield Control***			***Yield Control***			***Yield Control***			***Yield Control***				
7:30 to 7:45	15	25	26	42	24	11	21	187	25	4	234	16	630	
7:45 to 8:00	25	21	33	47	46	16	26	186	33	3	276	27	739	
8:00 to 8:15	19	19	38	54	33	5	36	178	27	3	237	24	673	
8:15 to 8:30	11	37	22	47	20	5	42	141	24	11	215	24	599	2,641
8:30 to 8:45	20	27	25	55	36	7	36	154	31	8	247	20	666	2,677
8:45 to 9:00	18	35	35	39	25	8	32	145	25	1	212	35	610	2,548
9:00 to 9:15	16	14	29	32	32	5	30	137	24	5	177	16	517	2,392
9:15 to 9:30	18	7	15	40	30	2	25	141	37	4	180	28	527	2,320
9:30 to 9:45	25	23	29	28	20	6	31	103	13	4	164	20	466	2,120
9:45 to 10:00	15	14	20	28	20	8	35	126	21	5	165	21	478	1,988
10:00 to 10:15	30	15	16	13	18	3	25	134	15	7	160	16	452	1,923
10:15 to 10:30	20	14	25	18	21	4	25	145	16	3	147	27	465	1,861
AM Peak Hour														
7:45 to 8:45	**75**	**104**	**118**	**203**	**135**	**33**	**140**	**659**	**115**	**25**	**975**	**95**	**2,677**	
# of trucks in peak	1	10	6	1	1	2	3	20	5	0	17	1	67	
# of heavies in peak	6	6	11	7	5	0	9	83	7	3	70	7	214	
% heavies (Total)	9%	15%	14%	4%	4%	6%	9%	16%	10%	12%	9%	8%	10%	
12:00 to 12:15	27	19	38	28	19	5	14	154	20	5	136	28	493	
12:15 to 12:30	25	18	23	24	21	5	22	137	23	5	131	24	458	
12:30 to 12:45	25	19	25	28	23	9	27	147	22	6	165	25	521	
12:45 to 13:00	25	15	16	20	19	9	25	158	16	8	133	31	475	1,947
13:00 to 13:15	21	23	23	27	13	8	22	138	18	3	141	28	465	1,919
13:15 to 13:30	20	16	26	18	22	4	20	170	12	7	140	26	481	1,942
13:30 to 13:45	22	21	23	16	24	4	23	135	21	6	162	22	479	1,900
13:45 to 14:00	27	15	36	21	16	7	29	149	27	7	125	22	481	1,906
Midday Peak Hour														
12:00 to 13:00	**102**	**71**	**102**	**100**	**82**	**28**	**88**	**596**	**81**	**24**	**565**	**108**	**1,947**	
# of trucks in peak	3	5	2	2	7	1	6	21	5	0	22	2	76	
# of heavies in peak	4	2	6	6	2	1	7	66	7	1	72	5	179	
% heavies (Total)	7%	10%	8%	8%	11%	7%	15%	15%	15%	4%	17%	6%	13%	
15:00 to 15:15	43	38	31	20	20	3	16	160	44	4	181	23	583	
15:15 to 15:30	35	26	30	32	14	9	30	187	49	6	186	36	640	
15:30 to 15:45	29	33	25	38	22	8	26	206	33	5	215	25	665	
15:45 to 16:00	31	23	38	39	40	10	35	213	48	4	195	38	714	2,602
16:00 to 16:15	36	33	40	23	34	6	24	235	56	6	205	36	734	2,753
16:15 to 16:30	29	28	33	8	35	8	26	243	59	5	223	23	720	2,833
16:30 to 16:45	34	56	36	26	23	4	30	257	56	9	208	26	765	2,933
16:45 to 17:00	33	52	25	33	31	5	33	235	64	7	211	24	753	2,972
17:00 to 17:15	32	54	43	31	32	11	35	137	59	7	195	32	668	2,906
17:15 to 17:30	26	50	47	33	27	7	25	250	71	14	193	19	762	2,948
17:30 to 17:45	37	30	24	30	29	6	18	202	41	7	178	29	631	2,814
17:45 to 18:00	23	28	23	10	32	13	20	204	34	10	151	23	571	2,632
PM Peak Hour														
16:00 to 17:00	**132**	**169**	**134**	**90**	**123**	**23**	**113**	**970**	**235**	**27**	**847**	**109**	**2,972**	
# of trucks in peak	0	2	3	0	3	1	3	16	1	1	12	2	44	
# of heavies in peak	4	4	6	1	3	2	6	46	9	0	39	3	123	
% heavies (Total)	3%	4%	7%	1%	5%	13%	8%	6%	4%	4%	6%	5%	6%	

Intersection: Sawmill Rd @ Arthur St
GeoID: 2711
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: N/A
Date: Wednesday, 24-Apr-24
Name: Cam
Weather: Cloudy/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**0**	
7:45	**to**	**8:45**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
12:00	**to**	**13:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	1	1	0	0	2	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	2
16:00	to	16:15	0	0	0	0	0	2
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**2**	
16:00	**to**	**17:00**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22

North Leg Total: 431
North Entering: 264
North Peds: 0
Peds Cross: ⋈

	% Trks	18%	4%	6%	
	Heavys	3	5	1	9
	Trucks	1	5	0	6
	Cars	18	215	16	249
	Total	22	225	17	

Heavys	Trucks	Cars	Total
17	4	183	204

East Leg Total: 513
East Entering: 267
East Peds: 0
Peds Cross: ⧖

Heavys	10
Trucks	4
Cars	153
Total	167

Northfield Dr

Total	Cars	Trucks	Heavys	% Trks
12	7	0	5	42%
166	150	3	13	10%
89	82	3	4	8%
	239	6	22	

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Line 86

% Trks	Heavys	Trucks	Cars	Total
9%	1	0	10	11
4%	7	1	172	180
13%	1	0	7	8
	9	1	189	

Line 86

Cars	Trucks	Heavys	Total
229	1	16	246

Northfield Dr

Peds Cross: ⧖
West Peds: 0
West Entering: 199
West leg Total: 403

Heavys	10
Trucks	8
Cars	304
Total	322

Total	16	144	49	
Cars	15	136	41	192
Trucks	0	4	0	4
Heavys	1	4	8	13
% Trks	6%	6%	16%	

Peds Cross: ⋈
South Peds: 0
South Entering: 209
South leg Total: 531

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **939**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **199**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

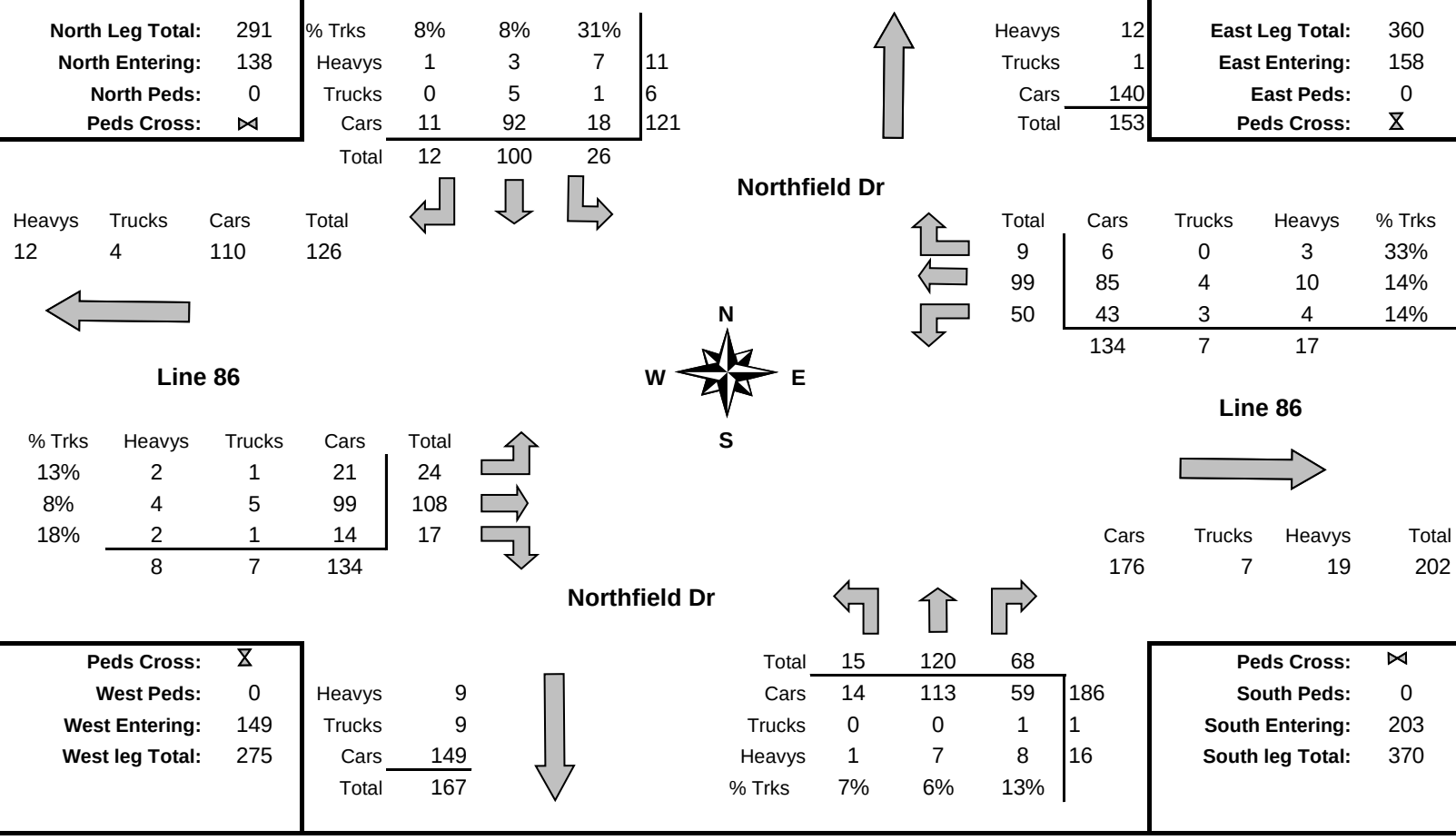
Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **648**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **149**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

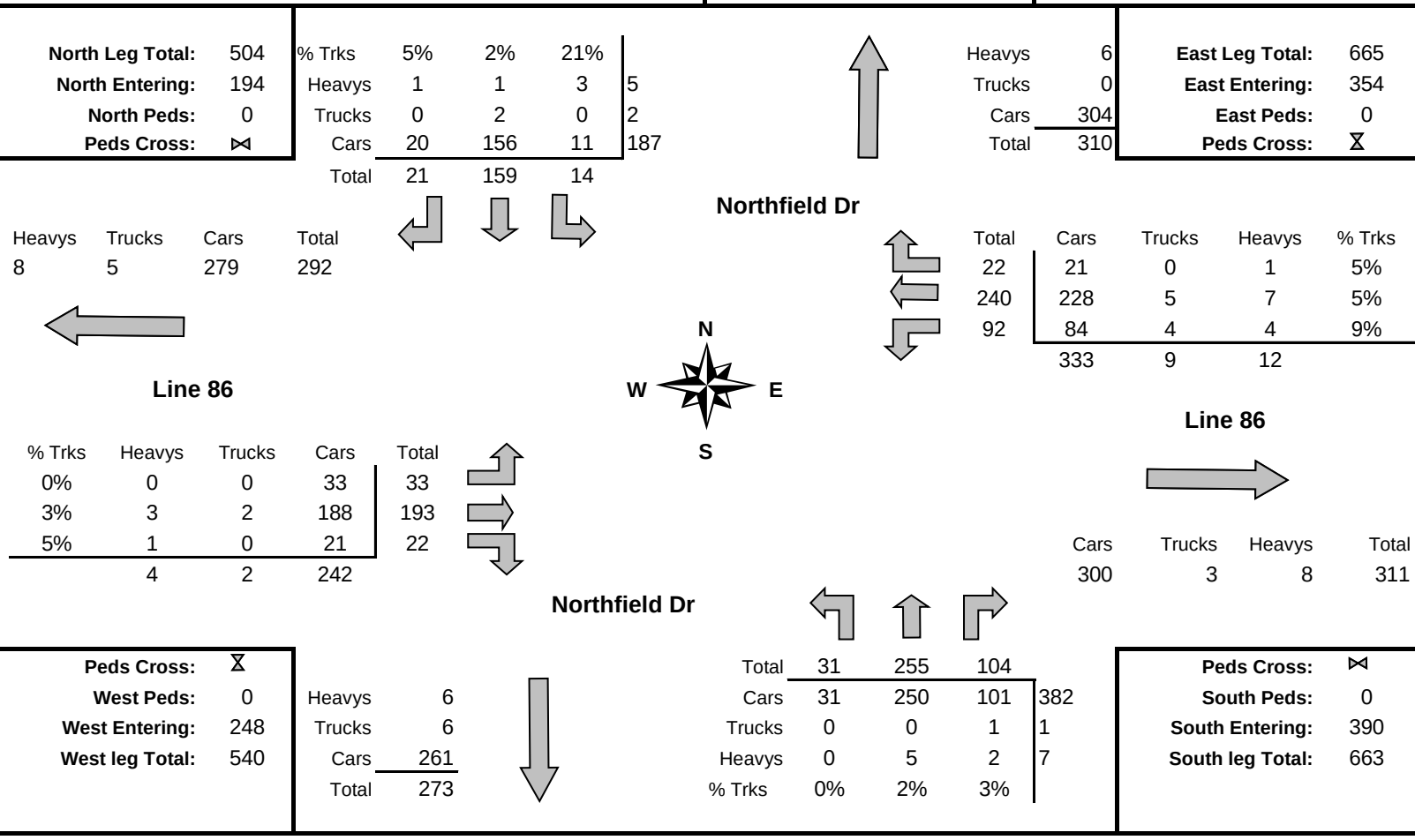
Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22



Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,186**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **248**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22

North Leg Total:	2,917
North Entering:	1,417
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	6

% Trks	12%	6%	34%	
Heavys	11	34	48	93
Trucks	6	33	6	45
Cars	127	1,046	106	1,279
Total	144	1,113	160	

Heavys	Trucks	Cars	Total
90	44	1,434	1,568

Heavys	73
Trucks	39
Cars	1,388
Total	1,500

East Leg Total:	3,782
East Entering:	1,935
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	1
Buggies Entering:	5

Northfield Dr

Total	Cars	Trucks	Heavys	% Trks
120	91	2	27	24%
1,277	1,167	36	74	9%
538	471	24	43	12%
	1,729	62	144	

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Line 86

% Trks	Heavys	Trucks	Cars	Total
7%	7	3	132	142
6%	38	25	1,061	1,124
12%	8	4	90	102
	53	32	1,283	

Line 86

Cars	Trucks	Heavys	Total
1,680	38	129	1,847

Northfield Dr

Total	147	1,238	563	
Cars	140	1,165	513	1,818
Trucks	2	34	7	43
Heavys	5	39	43	87
% Trks	5%	6%	9%	

Peds Cross:	⧖
West Peds:	0
West Entering:	1,368
West leg Total:	2,936
Bicycles Entering:	1
Buggies Entering:	4

Heavys	85
Trucks	61
Cars	1,607
Total	1,753

Peds Cross:	⋈
South Peds:	0
South Entering:	1,948
South leg Total:	3,701
Bicycles Entering:	1
Buggies Entering:	3

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **6,668**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,368**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor =	Monthly Factor	1	x	Daily Factor	1	x	24 Hour Factor	1.74	=	1.740000

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22

North Leg Total: 5,076
North Entering: 2,466
North Peds: N/A
Peds Cross: ⋈

	% Trks	12%	6%	34%	
Heavys		19	59	84	162
Trucks		10	57	10	78
Cars		221	1,820	184	2,225
Total		251	1,937	278	

Heavys	Trucks	Cars	Total
157	77	2,495	2,728

Line 86

% Trks	Heavys	Trucks	Cars	Total
7%	12	5	230	247
6%	66	44	1,846	1,956
12%	14	7	157	177
	92	56	2,232	

Northfield Dr

	Heavys	Trucks	Cars	Total
	127	68	2,415	2610

East Leg Total: 6,581
East Entering: 3,367
East Peds: N/A
Peds Cross: ⧖

Northfield Dr

	Total	Cars	Trucks	Heavys	% Trks
	209	158	3	47	24%
	2,222	2,031	63	129	9%
	936	820	42	75	12%
		3,008	108	251	

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Line 86

Cars	Trucks	Heavys	Total
2,923	66	224	3,214

Northfield Dr

Total	256	2,154	980	
Cars	244	2,027	893	3,163
Trucks	3	59	12	75
Heavys	9	68	75	151
% Trks	5%	6%	9%	

Peds Cross: ⧖
West Peds: N/A
West Entering: 2,380
West leg Total: 5,109

Heavys	148
Trucks	106
Cars	2,796
Total	3,050

Peds Cross: ⋈
South Peds: N/A
South Entering: 3,390
South leg Total: 6,440

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***11,602***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Northfield Dr @ Line 86
Control: Signalized
Major Road: Line 86

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2727
Count Date: Wednesday, 14-Sep-22

North Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.82
PM Peak:	0.77

East Approach PHF

AM Peak:	0.84
Mid-day Peak:	0.88
PM Peak:	0.81

	Movement		
PM	0.75	0.76	0.70
MID	0.75	0.71	0.72
AM	0.61	0.83	0.85

Northfield Dr

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

Line 86

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AM	MID	PM	Movement
0.75	0.56	0.61	
0.75	0.92	0.86	
0.93	0.89	0.72	

Line 86

Movement	PM	MID	AM
	0.75	0.67	0.69
	0.85	0.90	0.80
	0.79	0.71	0.50

Northfield Dr

West Approach PHF

AM Peak:	0.83
Mid-day Peak:	0.96
PM Peak:	0.91

0.57	0.90	0.94	AM
0.54	0.88	0.85	MID
0.60	0.84	0.79	PM

Movement

South Approach PHF

AM Peak:	0.93
Mid-day Peak:	0.89
PM Peak:	0.85

Comments

Intersection: Northfield Dr @ Line 86
GeoID: 2727
Municipality: Woolwich
Major Road: Line 86

Intersection Control: Signalized
Date: Wednesday, 14-Sep-22
Name: Cam
Weather: Cloudy/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	2	56	2	24	44	2	2	39	11	5	54	7	248	
7:45	to	8:00	4	46	4	22	55	2	7	36	12	3	68	3	262	
8:00	to	8:15	4	37	2	22	31	4	3	40	13	5	52	3	216	
8:15	to	8:30	1	41	0	21	36	4	4	29	13	4	51	9	213	939
8:30	to	8:45	1	38	3	25	32	6	3	33	13	7	49	6	216	907
8:45	to	9:00	3	31	3	15	31	6	2	30	14	8	44	6	193	838
9:00	to	9:15	3	30	1	9	55	8	3	22	11	5	45	6	198	820
9:15	to	9:30	4	17	0	15	28	5	3	19	19	4	36	4	154	761
9:30	to	9:45	3	27	2	20	31	4	5	39	11	3	40	7	192	737
9:45	to	10:00	6	25	3	13	20	3	8	17	6	2	21	2	126	670
10:00	to	10:15	4	36	2	13	32	3	5	20	11	3	37	2	168	640
10:15	to	10:30	2	21	3	7	23	5	2	22	12	6	24	4	131	617
AM Peak Hour																
7:30	**to**	**8:30**	**11**	**180**	**8**	**89**	**166**	**12**	**16**	**144**	**49**	**17**	**225**	**22**	**939**	
# of trucks in peak			0	1	0	3	3	0	0	4	0	0	5	1	17	
# of heavies in peak			1	7	1	4	13	5	1	4	8	1	5	3	53	
% heavies (Total)			9%	4%	13%	8%	10%	42%	6%	6%	16%	6%	4%	18%	7%	
12:00	to	12:15	3	25	2	15	27	2	5	28	16	2	24	2	151	
12:15	to	12:30	3	23	6	16	27	2	3	28	10	7	29	1	155	
12:30	to	12:45	3	28	3	14	30	1	5	30	24	7	29	4	178	
12:45	to	13:00	3	22	4	12	20	3	0	21	12	4	20	5	126	610
13:00	to	13:15	7	30	2	13	27	4	2	28	20	9	29	4	175	634
13:15	to	13:30	4	28	5	12	21	0	7	33	17	6	12	3	148	627
13:30	to	13:45	4	26	4	14	27	4	4	34	17	8	24	2	168	617
13:45	to	14:00	9	24	6	11	24	1	2	25	14	3	35	3	157	648
Midday Peak Hour																
13:00	**to**	**14:00**	**24**	**108**	**17**	**50**	**99**	**9**	**15**	**120**	**68**	**26**	**100**	**12**	**648**	
# of trucks in peak			1	5	1	3	4	0	0	0	1	1	5	0	21	
# of heavies in peak			2	4	2	4	10	3	1	7	8	7	3	1	52	
% heavies (Total)			13%	8%	18%	14%	14%	33%	7%	6%	13%	31%	8%	8%	11%	
15:00	to	15:15	4	43	1	19	37	2	2	40	12	5	24	6	195	
15:15	to	15:30	5	43	3	11	45	2	6	55	28	9	24	4	235	
15:30	to	15:45	5	38	4	19	37	3	6	45	19	8	32	6	222	
15:45	to	16:00	3	37	2	18	70	4	3	47	19	6	20	3	232	884
16:00	to	16:15	5	46	2	16	53	3	7	48	20	3	32	6	241	930
16:15	to	16:30	4	41	2	27	64	6	8	62	29	8	43	4	298	993
16:30	to	16:45	7	57	4	22	60	6	13	43	23	4	43	3	285	1,056
16:45	to	17:00	9	41	6	20	57	0	6	76	33	5	52	6	311	1,135
17:00	to	17:15	6	47	5	18	53	9	4	76	16	3	33	5	275	1,169
17:15	to	17:30	11	48	7	32	70	7	8	60	32	2	31	7	315	1,186
17:30	to	17:45	3	48	5	10	55	4	5	56	32	2	24	5	249	1,150
17:45	to	18:00	7	24	4	13	55	5	4	57	24	4	32	6	235	1,074
PM Peak Hour																
16:30	**to**	**17:30**	**33**	**193**	**22**	**92**	**240**	**22**	**31**	**255**	**104**	**14**	**159**	**21**	**1,186**	
# of trucks in peak			0	2	0	4	5	0	0	0	1	0	2	0	14	
# of heavies in peak			0	3	1	4	7	1	0	5	2	3	1	1	28	
% heavies (Total)			0%	3%	5%	9%	5%	5%	0%	2%	3%	21%	2%	5%	4%	

Intersection: Northfield Dr @ Line 86
GeoID: 2727
Municipality: Woolwich
Major Road: Line 86

Intersection Control: Signalized
Date: Wednesday, 14-Sep-22
Name: Cam
Weather: Cloudy/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**0**	
7:30	**to**	**8:30**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	0
16:00	to	16:15	0	0	0	0	0	0
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**0**	
16:30	**to**	**17:30**	0	0	0	0	**0**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23

North Leg

North Leg Total:	634
North Entering:	160
North Peds:	0
Peds Cross:	⋈

% Trks	0%	7%	8%	
Heavys	0	4	3	7
Trucks	0	2	2	4
Cars	10	83	56	149
Total	10	89	61	

East Leg

Heavys	28
Trucks	12
Cars	434
Total	474

East Leg Total:	1,181
East Entering:	585
East Peds:	1
Peds Cross:	⧖

Hwy 85 SB Ramp

Heavys	Trucks	Cars	Total
23	13	356	392

Total	Cars	Trucks	Heavys	% Trks
55	45	6	4	18%
365	334	12	19	8%
165	151	6	8	8%
530	24	31		

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King St

% Trks	Heavys	Trucks	Cars	Total
9%	21	3	233	257
7%	9	5	176	190
11%	2	0	16	18
	32	8	425	

King St

Cars	Trucks	Heavys	Total
571	9	16	596

Farmer's Market Rd

Heavys	14		
Trucks	8		
Cars	250		
Total	272		

Total	17	162	345	
Cars	12	156	339	507
Trucks	1	3	2	6
Heavys	4	3	4	11
% Trks	29%	4%	2%	

Peds Cross:	⧖
West Peds:	1
West Entering:	465
West leg Total:	857

Peds Cross:	⋈
South Peds:	0
South Entering:	524
South leg Total:	796

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,734**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **465**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

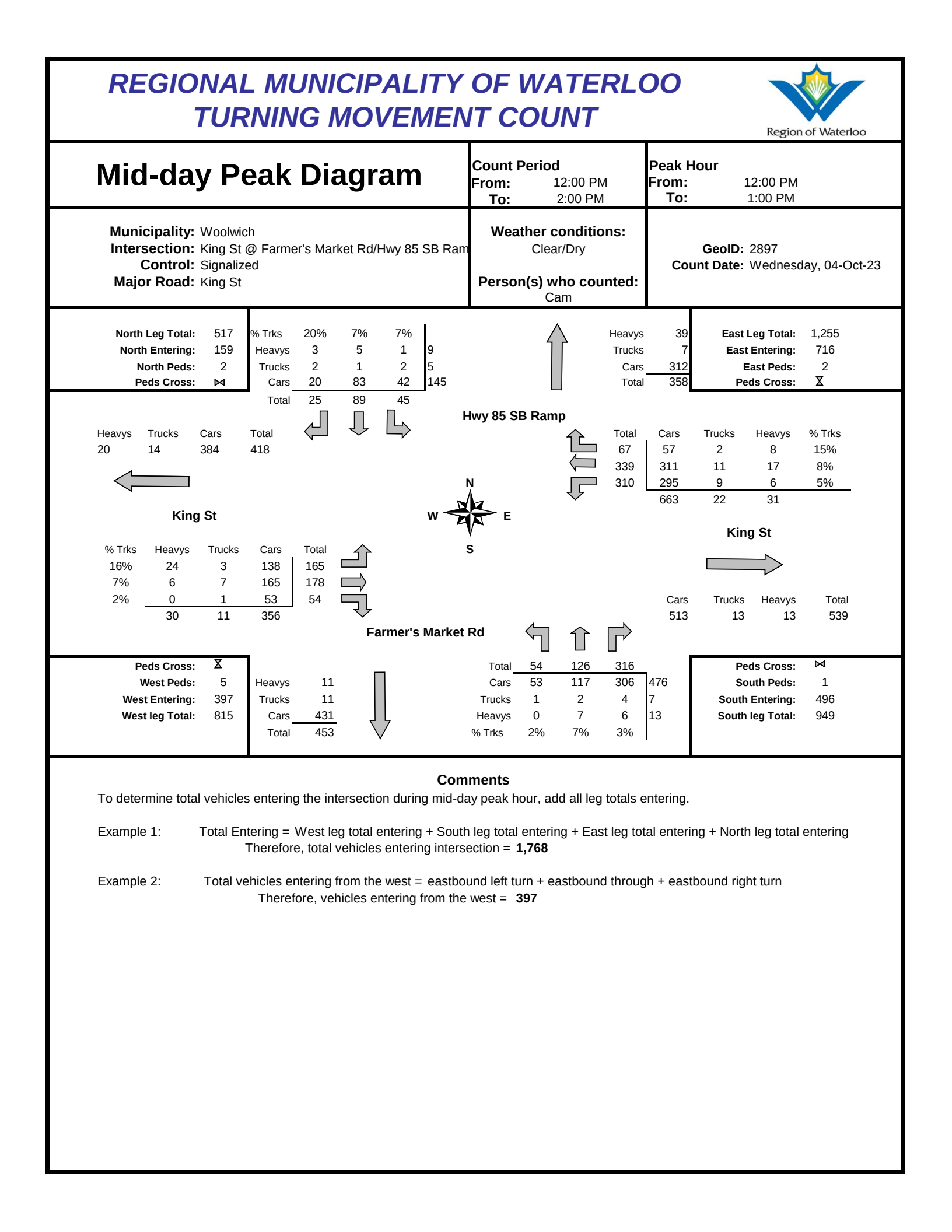
Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,768**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **397**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:00 PM
To: 5:00 PM

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23

North Leg Total: 745
North Entering: 245
North Peds: 4
Peds Cross: ⋈

% Trks	11%	1%	5%	
Heavys	1	1	4	6
Trucks	1	0	0	1
Cars	17	151	70	238
Total	19	152	74	

Heavys	16
Trucks	5
Cars	479
Total	500

East Leg Total: 1,817
East Entering: 1,127
East Peds: 9
Peds Cross: ⧖

Heavys	Trucks	Cars	Total
19	4	549	572

Hwy 85 SB Ramp

Total	Cars	Trucks	Heavys	% Trks
147	143	0	4	3%
490	469	3	18	4%
490	477	2	11	3%
	1,089	5	33	

King St

% Trks	Heavys	Trucks	Cars	Total
6%	10	2	199	211
5%	8	3	206	217
0%	0	0	65	65
	18	5	470	

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King St

Cars	Trucks	Heavys	Total
660	8	22	690

Farmer's Market Rd

Peds Cross: ⧖
West Peds: 2
West Entering: 493
West leg Total: 1,065

Heavys	12
Trucks	2
Cars	693
Total	707

Total	63	142	399	
Cars	63	137	384	584
Trucks	0	3	5	8
Heavys	0	2	10	12
% Trks	0%	4%	4%	

Peds Cross: ⋈
South Peds: 1
South Entering: 604
South leg Total: 1,311

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,469**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **493**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23

North Leg Total:	4,732
North Entering:	1,438
North Peds:	10
Peds Cross:	⋈
Bicycles Entering:	5
Buggies Entering:	0

% Trks	13%	5%	5%	
Heavys	13	33	16	62
Trucks	5	10	8	23
Cars	125	754	474	1,353
Total	143	797	498	

Heavys	221
Trucks	87
Cars	2,986
Total	3,294

East Leg Total:	10,634
East Entering:	6,101
East Peds:	19
Peds Cross:	⧖
Bicycles Entering:	14
Buggies Entering:	1

Heavys	Trucks	Cars	Total
187	96	3,248	3,531

Hwy 85 SB Ramp

Total	Cars	Trucks	Heavys	% Trks
697	624	29	44	10%
3,069	2,818	84	167	8%
2,335	2,233	30	72	4%
	5,675	143	283	

King St

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King St

% Trks	Heavys	Trucks	Cars	Total
11%	136	39	1,387	1,562
6%	56	40	1,426	1,522
2%	3	5	318	326
	195	84	3,131	

Cars	Trucks	Heavys	Total
4,321	77	135	4,533

Farmer's Market Rd

Total	319	1,035	2,513	
Cars	305	975	2,421	3,701
Trucks	7	19	29	55
Heavys	7	41	63	111
% Trks	4%	6%	4%	

Peds Cross:	⧖
West Peds:	23
West Entering:	3,410
West leg Total:	6,941
Bicycles Entering:	6
Buggies Entering:	0

Heavys	108
Trucks	45
Cars	3,305
Total	3,458

Peds Cross:	⋈
South Peds:	9
South Entering:	3,867
South leg Total:	7,325
Bicycles Entering:	20
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **14,816**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **3,410**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

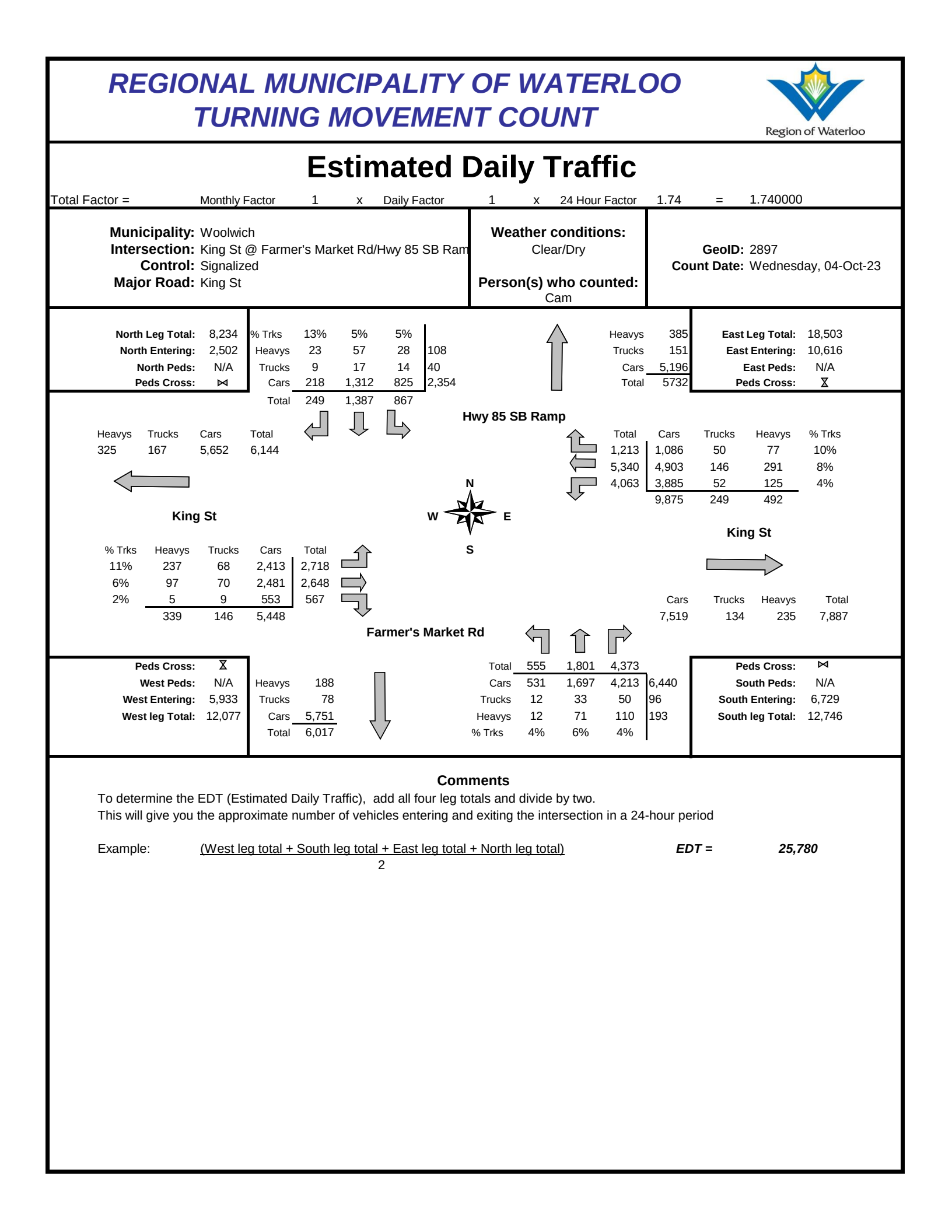
Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23



Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***25,780***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: King St @ Farmer's Market Rd/Hwy 85 SB Ram
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 2897
Count Date: Wednesday, 04-Oct-23

North Approach PHF	
AM Peak:	0.91
Mid-day Peak:	0.86
PM Peak:	0.89

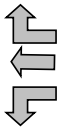
East Approach PHF	
AM Peak:	0.93
Mid-day Peak:	0.92
PM Peak:	0.88

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

	Movement		
PM	0.79	0.90	0.74
MID	0.69	0.89	0.75
AM	0.63	0.89	0.90

Hwy 85 SB Ram





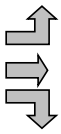
	AM	MID	PM
Movement	0.81	0.93	0.53
	0.82	0.94	0.85
	0.86	0.89	0.80

King St



King St

	PM	MID	AM
Movement	0.82	0.84	0.89
	0.92	0.93	0.85
	0.81	0.96	0.56



Farmer's Market Rd



0.85	0.90	0.90	AM
0.61	0.88	0.92	MID
0.72	0.81	0.93	PM
Movement			

West Approach PHF	
AM Peak:	0.89
Mid-day Peak:	0.90
PM Peak:	0.89

South Approach PHF	
AM Peak:	0.90
Mid-day Peak:	0.93
PM Peak:	0.92

Comments

Intersection: King St @ Farmer's Market Rd/Hwy
GeoID: 2897
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 04-Oct-23
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND				
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***			**TOTAL**	**TOTAL HOUR**
7:30	to	7:45	60	36	1	14	80	8	2	38	60	27	21	3	350	
7:45	to	8:00	65	44	3	44	104	9	4	45	96	13	19	3	449	
8:00	to	8:15	72	56	3	31	111	14	5	36	77	15	25	4	449	
8:15	to	8:30	68	45	4	48	79	15	4	39	76	16	20	2	416	1,664
8:30	to	8:45	52	45	8	42	71	17	4	42	96	17	25	1	420	1,734
8:45	to	9:00	58	41	5	37	68	33	4	21	68	22	25	4	386	1,671
9:00	to	9:15	35	42	16	50	73	23	6	32	55	15	21	8	376	1,598
9:15	to	9:30	49	32	8	38	63	11	4	29	51	19	16	5	325	1,507
9:30	to	9:45	36	48	7	42	63	16	5	21	50	14	19	5	326	1,413
9:45	to	10:00	40	54	8	43	73	16	7	22	55	14	16	4	352	1,379
10:00	to	10:15	35	42	9	30	80	16	5	22	52	16	22	1	330	1,333
10:15	to	10:30	40	31	5	52	67	14	7	22	57	14	20	6	335	1,343
AM Peak Hour																
7:45	**to**	**8:45**	**257**	**190**	**18**	**165**	**365**	**55**	**17**	**162**	**345**	**61**	**89**	**10**	**1,734**	
# of trucks in peak			3	5	0	6	12	6	1	3	2	2	2	0	42	
# of heavies in peak			21	9	2	8	19	4	4	3	4	3	4	0	81	
% heavies (Total)			9%	7%	11%	8%	8%	18%	29%	4%	2%	8%	7%	0%	7%	
12:00	to	12:15	49	48	13	87	90	18	8	36	68	12	18	6	453	
12:15	to	12:30	32	43	14	87	84	13	22	25	86	8	25	3	442	
12:30	to	12:45	47	40	14	61	78	18	15	35	77	15	22	9	431	
12:45	to	13:00	37	47	13	75	87	18	9	30	85	10	24	7	442	1,768
13:00	to	13:15	51	49	11	67	100	16	10	25	70	11	18	2	430	1,745
13:15	to	13:30	37	49	10	63	91	15	18	25	83	11	19	5	426	1,729
13:30	to	13:45	42	45	16	65	95	22	14	26	79	13	17	2	436	1,734
13:45	to	14:00	46	42	6	63	94	15	10	26	64	13	13	5	397	1,689
Midday Peak Hour																
12:00	**to**	**13:00**	**165**	**178**	**54**	**310**	**339**	**67**	**54**	**126**	**316**	**45**	**89**	**25**	**1,768**	
# of trucks in peak			3	7	1	9	11	2	1	2	4	2	1	2	45	
# of heavies in peak			24	6	0	6	17	8	0	7	6	1	5	3	83	
% heavies (Total)			16%	7%	2%	5%	8%	15%	2%	7%	3%	7%	7%	20%	7%	
15:00	to	15:15	63	69	10	78	107	48	6	57	94	15	19	5	571	
15:15	to	15:30	65	53	12	88	122	23	12	51	80	15	24	7	552	
15:30	to	15:45	55	49	12	76	104	39	6	60	84	11	19	2	517	
15:45	to	16:00	46	48	13	101	136	30	14	43	96	19	33	3	582	2,222
16:00	to	16:15	64	54	20	124	113	70	16	44	95	14	30	6	650	2,301
16:15	to	16:30	47	55	16	99	107	21	22	36	107	25	39	5	579	2,328
16:30	to	16:45	44	59	18	153	126	42	9	38	99	19	42	4	653	2,464
16:45	to	17:00	56	49	11	114	144	14	16	24	98	16	41	4	587	2,469
17:00	to	17:15	38	55	12	124	127	27	16	20	92	23	48	10	592	2,411
17:15	to	17:30	45	46	9	144	147	15	14	16	99	22	32	5	594	2,426
17:30	to	17:45	48	51	8	109	98	23	18	31	90	15	36	4	531	2,304
17:45	to	18:00	40	55	11	86	87	18	7	18	74	9	29	3	437	2,154
PM Peak Hour																
16:00	**to**	**17:00**	**211**	**217**	**65**	**490**	**490**	**147**	**63**	**142**	**399**	**74**	**152**	**19**	**2,469**	
# of trucks in peak			2	3	0	2	3	0	0	3	5	0	0	1	19	
# of heavies in peak			10	8	0	11	18	4	0	2	10	4	1	1	69	
% heavies (Total)			6%	5%	0%	3%	4%	3%	0%	4%	4%	5%	1%	11%	4%	

Intersection: King St @ Farmer's Market Rd/Hwy 8
GeoID: 2897
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 04-Oct-23
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	1	0	0	1	
8:15	to	8:30	1	0	0	0	1	2
8:30	to	8:45	0	0	0	0	0	2
8:45	to	9:00	0	0	0	0	0	2
9:00	to	9:15	0	0	0	0	0	1
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	1	0	0	1	1
9:45	to	10:00	2	0	2	0	4	5
10:00	to	10:15	0	2	0	2	4	9
10:15	to	10:30	0	2	0	1	3	12
AM Peak Hour							**14**	
7:45	**to**	**8:45**	**1**	**1**	**0**	**0**	**2**	
12:00	to	12:15	0	3	0	0	3	
12:15	to	12:30	2	0	2	1	5	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	2	0	0	2	10
13:00	to	13:15	0	1	0	0	1	8
13:15	to	13:30	0	1	0	0	1	4
13:30	to	13:45	0	0	0	0	0	4
13:45	to	14:00	0	2	0	0	2	4
Midday Peak Hour							**14**	
12:00	**to**	**13:00**	2	5	2	1	**10**	
15:00	to	15:15	1	1	0	2	4	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	1	0	0	0	1	
15:45	to	16:00	1	1	0	0	2	7
16:00	to	16:15	2	0	0	0	2	5
16:15	to	16:30	0	1	0	0	1	6
16:30	to	16:45	4	0	2	0	6	11
16:45	to	17:00	3	1	2	1	7	16
17:00	to	17:15	0	1	2	1	4	18
17:15	to	17:30	0	0	0	0	0	17
17:30	to	17:45	0	2	0	0	2	13
17:45	to	18:00	2	1	0	1	4	10
PM Peak Hour							**33**	
16:00	**to**	**17:00**	9	2	4	1	**16**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22

North Leg Total: 538
North Entering: 332
North Peds: 0
Peds Cross: ⋈

% Trks	8%	4%	12%	
Heavys	9	3	1	13
Trucks	1	4	1	6
Cars	110	188	15	313
Total	120	195	17	

East Leg Total: 771
East Entering: 404
East Peds: 2
Peds Cross: ⧖

Heavys	13
Trucks	5
Cars	188
Total	206

Heavys	Trucks	Cars	Total
16	8	311	335

Northfield Dr

Total	Cars	Trucks	Heavys	% Trks
13	12	0	1	8%
168	154	7	7	8%
223	208	7	8	7%
	374	14	16	

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Sawmill Rd

% Trks	Heavys	Trucks	Cars	Total
15%	6	3	51	60
13%	12	7	129	148
7%	2	3	62	67
	20	13	242	

Sawmill Rd

Cars	Trucks	Heavys	Total
330	16	21	367

Northfield Dr

Peds Cross: ⧖
West Peds: 1
West Entering: 275
West leg Total: 610

Heavys	13
Trucks	14
Cars	458
Total	485

Total	47	133	202	
Cars	47	125	186	358
Trucks	0	2	8	10
Heavys	0	6	8	14
% Trks	0%	6%	8%	

Peds Cross: ⋈
South Peds: 4
South Entering: 382
South leg Total: 867

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,393**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **275**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22

Northfield Dr

North Leg Total:	390
North Entering:	186
North Peds:	0
Peds Cross:	⋈

% Trks	25%	8%	25%	
Heavys	8	5	3	16
Trucks	7	4	0	11
Cars	44	106	9	159
Total	59	115	12	

Heavys	14
Trucks	5
Cars	185
Total	204

East Leg Total:	529
East Entering:	248
East Peds:	0
Peds Cross:	⧖

Heavys	Trucks	Cars	Total
18	14	181	213

Total	Cars	Trucks	Heavys	% Trks
5	5	0	0	0%
105	92	5	8	12%
138	126	6	6	9%
	223	11	14	

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Sawmill Rd

% Trks	Heavys	Trucks	Cars	Total
17%	9	2	55	66
16%	11	7	95	113
0%	0	0	26	26
	20	9	176	

Sawmill Rd

Cars	Trucks	Heavys	Total
253	11	17	281

Northfield Dr

Total	49	133	156	
Cars	45	125	149	319
Trucks	2	3	4	9
Heavys	2	5	3	10
% Trks	8%	6%	4%	

Peds Cross:	⧖
West Peds:	0
West Entering:	205
West leg Total:	418

Heavys	11
Trucks	10
Cars	258
Total	279

Peds Cross:	⋈
South Peds:	1
South Entering:	338
South leg Total:	617

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **977**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **205**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

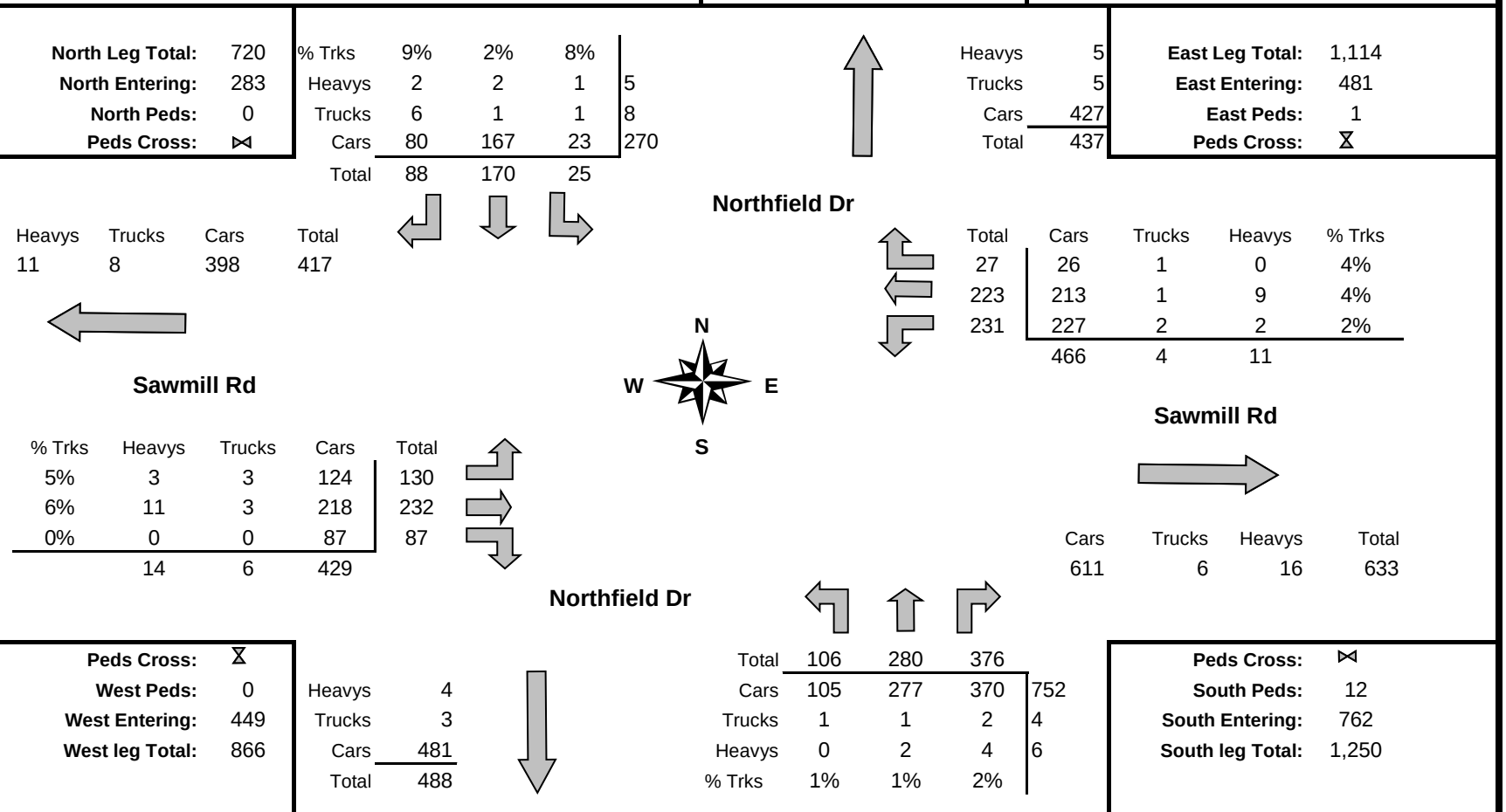
Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22



Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,975**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **449**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22

North Leg Total:	3,981
North Entering:	1,900
North Peds:	34
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	2

% Trks	14%	4%	11%	
Heavys	55	24	10	89
Trucks	34	25	4	63
Cars	530	1,103	115	1,748
Total	619	1,152	129	

Heavys	94
Trucks	52
Cars	1,935
Total	2,081

East Leg Total:	5,705
East Entering:	2,739
East Peds:	8
Peds Cross:	⧖
Bicycles Entering:	10
Buggies Entering:	2

Northfield Dr

Heavys	Trucks	Cars	Total
123	74	2,051	2,248

Total	Cars	Trucks	Heavys	% Trks
154	136	7	11	12%
1,170	1,079	30	61	8%
1,415	1,334	29	52	6%
	2,549	66	124	

Sawmill Rd

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Sawmill Rd

% Trks	Heavys	Trucks	Cars	Total
14%	57	24	507	588
9%	72	37	1,046	1,155
4%	8	7	408	423
	137	68	1,961	

Cars	Trucks	Heavys	Total
2,762	77	127	2,966

Northfield Dr

Peds Cross:	⧖
West Peds:	7
West Entering:	2,166
West leg Total:	4,414
Bicycles Entering:	16
Buggies Entering:	3

Heavys	84
Trucks	61
Cars	2,845
Total	2,990

Total	459	1,339	1,682	
Cars	442	1,292	1,601	3,335
Trucks	10	21	36	67
Heavys	7	26	45	78
% Trks	4%	4%	5%	

Peds Cross:	⋈
South Peds:	28
South Entering:	3,480
South leg Total:	6,470
Bicycles Entering:	6
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **10,285**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,166**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor =	Monthly Factor	1	x	Daily Factor	1	x	24 Hour Factor	1.74	=	1.740000

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22

North Leg Total: 6,927
North Entering: 3,306
North Peds: N/A
Peds Cross: ⋈

	Heavys	Trucks	Cars	Total
% Trks	14%	4%	11%	
	96	42	17	155
	59	44	7	110
	922	1,919	200	3,042
	1,077	2,004	224	

Heavys	Trucks	Cars	Total
214	129	3,569	3,912

Sawmill Rd

% Trks	Heavys	Trucks	Cars	Total
14%	99	42	882	1,023
9%	125	64	1,820	2,010
4%	14	12	710	736
	238	118	3,412	

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Northfield Dr

Heavys	164
Trucks	90
Cars	3,367
Total	3621

East Leg Total: 9,927
East Entering: 4,766
East Peds: N/A
Peds Cross: ⧖

Total	Cars	Trucks	Heavys	% Trks
268	237	12	19	12%
2,036	1,877	52	106	8%
2,462	2,321	50	90	6%
	4,435	115	216	

Sawmill Rd

Cars	Trucks	Heavys	Total
4,806	134	221	5,161

Northfield Dr

Total	799	2,330	2,927	
Cars	769	2,248	2,786	5,803
Trucks	17	37	63	117
Heavys	12	45	78	136
% Trks	4%	4%	5%	

Peds Cross: ⧖
West Peds: N/A
West Entering: 3,769
West leg Total: 7,680

Heavys	146
Trucks	106
Cars	4,950
Total	5,203

Peds Cross: ⋈
South Peds: N/A
South Entering: 6,055
South leg Total: 11,258

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***17,896***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Sawmill Rd @ Northfield Dr
Control: Signalized
Major Road: Northfield Dr

Weather conditions: Cloudy/Dry

Person(s) who counted: Cam

GeoID: 2929
Count Date: Wednesday, 14-Sep-22

North Approach PHF

AM Peak:	0.89
Mid-day Peak:	0.83
PM Peak:	0.88

	Movement		
PM	0.85	0.87	0.57
MID	0.64	0.82	0.60
AM	0.86	0.92	0.71

Northfield Dr

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour



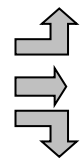


Sawmill Rd

Movement	AM	MID	PM
	0.65	0.63	0.56
	0.79	0.82	0.81
	0.83	0.86	0.83

Sawmill Rd

Movement	PM	MID	AM
	0.86	0.87	0.83
	0.89	0.94	0.80
	0.84	0.72	0.73



Northfield Dr



Northfield Dr

0.78	0.85	0.75	AM
0.61	0.88	0.89	MID
0.83	0.89	0.87	PM

Movement

West Approach PHF

AM Peak:	0.85
Mid-day Peak:	0.90
PM Peak:	0.88

South Approach PHF

AM Peak:	0.85
Mid-day Peak:	0.91
PM Peak:	0.87

Comments

Intersection: Sawmill Rd @ Northfield Dr
GeoID: 2929
Municipality: Woolwich
Major Road: Northfield Dr

Intersection Control: Signalized
Date: Wednesday, 14-Sep-22
Name: Cam
Weather: Cloudy/Dry

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control	***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30 to 7:45	21	29	9	54	34	5	6	37	56	3	54	32	340	
7:45 to 8:00	18	46	16	60	53	3	15	39	44	5	53	35	387	
8:00 to 8:15	11	37	18	43	29	3	11	35	67	2	50	21	327	
8:15 to 8:30	18	40	23	53	34	5	12	25	45	4	45	34	338	1,392
8:30 to 8:45	13	25	10	67	52	2	9	34	46	6	47	30	341	1,393
8:45 to 9:00	6	40	16	45	40	2	6	25	39	4	42	24	289	1,295
9:00 to 9:15	11	23	11	40	40	6	7	26	31	4	33	14	246	1,214
9:15 to 9:30	16	23	13	47	29	8	11	29	30	8	31	18	263	1,139
9:30 to 9:45	15	18	15	29	28	2	5	23	35	3	41	17	231	1,029
9:45 to 10:00	8	14	6	26	23	2	4	18	25	5	30	17	178	918
10:00 to 10:15	12	25	4	34	28	5	12	25	36	4	33	15	233	905
10:15 to 10:30	16	26	9	31	25	2	11	36	30	3	20	17	226	868
AM Peak Hour														
7:45 to 8:45	**60**	**148**	**67**	**223**	**168**	**13**	**47**	**133**	**202**	**17**	**195**	**120**	**1,393**	
# of trucks in peak	3	7	3	7	7	0	0	2	8	1	4	1	43	
# of heavies in peak	6	12	2	8	7	1	0	6	8	1	3	9	63	
% heavies (Total)	15%	13%	7%	7%	8%	8%	0%	6%	8%	12%	4%	8%	8%	
12:00 to 12:15	18	30	9	37	25	2	20	34	37	2	29	12	255	
12:15 to 12:30	11	27	6	36	24	0	7	38	44	5	28	23	249	
12:30 to 12:45	18	26	6	25	32	1	7	27	31	4	35	15	227	
12:45 to 13:00	19	30	5	40	24	2	15	34	44	1	23	9	246	977
13:00 to 13:15	14	17	10	27	20	0	16	50	35	2	25	18	234	956
13:15 to 13:30	10	37	10	22	26	4	12	39	32	4	25	9	230	937
13:30 to 13:45	14	26	8	35	30	6	16	24	26	3	26	14	228	938
13:45 to 14:00	13	30	15	34	16	10	10	36	43	3	40	14	264	956
Midday Peak Hour														
12:00 to 13:00	**66**	**113**	**26**	**138**	**105**	**5**	**49**	**133**	**156**	**12**	**115**	**59**	**977**	
# of trucks in peak	2	7	0	6	5	0	2	3	4	0	4	7	40	
# of heavies in peak	9	11	0	6	8	0	2	5	3	3	5	8	60	
% heavies (Total)	17%	16%	0%	9%	12%	0%	8%	6%	4%	25%	8%	25%	10%	
15:00 to 15:15	23	46	10	36	31	7	26	51	62	2	38	10	342	
15:15 to 15:30	20	51	13	41	35	5	14	50	57	7	28	18	339	
15:30 to 15:45	23	54	11	52	35	13	12	46	69	2	32	21	370	
15:45 to 16:00	18	40	20	70	57	8	23	55	48	3	28	13	383	1,434
16:00 to 16:15	24	45	22	53	48	4	16	49	84	4	41	18	408	1,500
16:15 to 16:30	28	46	24	44	38	6	18	56	79	3	41	25	408	1,569
16:30 to 16:45	26	57	16	44	45	12	21	76	99	11	49	20	476	1,675
16:45 to 17:00	37	65	26	57	54	2	25	69	94	7	41	26	503	1,795
17:00 to 17:15	29	57	22	70	69	6	32	79	108	5	37	16	530	1,917
17:15 to 17:30	38	53	23	60	55	7	28	56	75	2	43	26	466	1,975
17:30 to 17:45	19	39	9	62	52	8	15	71	72	4	32	18	401	1,900
17:45 to 18:00	21	33	8	41	39	6	17	47	59	4	32	20	327	1,724
PM Peak Hour														
16:30 to 17:30	**130**	**232**	**87**	**231**	**223**	**27**	**106**	**280**	**376**	**25**	**170**	**88**	**1,975**	
# of trucks in peak	3	3	0	2	1	1	1	1	2	1	1	6	22	
# of heavies in peak	3	11	0	2	9	0	0	2	4	1	2	2	36	
% heavies (Total)	5%	6%	0%	2%	4%	4%	1%	1%	2%	8%	2%	9%	3%	

Intersection: Sawmill Rd @ Northfield Dr
GeoID: 2929
Municipality: Woolwich
Major Road: Northfield Dr

Intersection Control: Signalized
Date: Wednesday, 14-Sep-22
Name: Cam
Weather: Cloudy/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	1	0	2	3	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	2	0	0	2	4	7
8:30	to	8:45	0	0	0	0	0	7
8:45	to	9:00	0	0	0	0	0	4
9:00	to	9:15	2	2	10	0	14	18
9:15	to	9:30	0	0	2	0	2	16
9:30	to	9:45	0	0	1	0	1	17
9:45	to	10:00	0	0	0	0	0	17
10:00	to	10:15	0	0	0	0	0	3
10:15	to	10:30	0	0	0	0	0	1
AM Peak Hour							**24**	
7:45	**to**	**8:45**	**2**	**1**	**0**	**4**	**7**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	1	1	1
13:00	to	13:15	0	0	0	1	1	2
13:15	to	13:30	0	0	0	0	0	2
13:30	to	13:45	0	0	0	0	0	2
13:45	to	14:00	0	0	0	0	0	1
Midday Peak Hour							**2**	
12:00	**to**	**13:00**	0	0	0	1	**1**	
15:00	to	15:15	0	1	1	0	2	
15:15	to	15:30	0	0	3	1	4	
15:30	to	15:45	1	1	4	2	8	
15:45	to	16:00	1	2	10	2	15	29
16:00	to	16:15	1	0	0	1	2	29
16:15	to	16:30	0	0	1	0	1	26
16:30	to	16:45	1	0	0	6	7	25
16:45	to	17:00	0	0	0	3	3	13
17:00	to	17:15	0	0	0	2	2	13
17:15	to	17:30	0	0	0	1	1	13
17:30	to	17:45	0	0	0	0	0	6
17:45	to	18:00	0	0	2	4	6	9
PM Peak Hour							**51**	
16:30	**to**	**17:30**	1	0	0	12	**13**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20

North Leg Total: 495
North Entering: 260
North Peds: 0
Peds Cross: ⋈

	Heavys	Trucks	Cars	Total
% Trks	50%	14%	16%	
	1	24	5	30
	0	7	0	7
	1	195	27	223
	2	226	32	

East Leg Total: 97
East Entering: 52
East Peds: 0
Peds Cross: ⧖

Heavys	33
Trucks	10
Cars	192
Total	235

Heavys	Trucks	Cars	Total
2	1	11	14

Fountain St

Total	Cars	Trucks	Heavys	% Trks
34	26	3	5	24%
9	7	1	1	22%
9	6	1	2	33%
	39	5	8	

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Menno St

% Trks	Heavys	Trucks	Cars	Total
100%	0	1	0	1
0%	0	0	5	5
0%	0	0	8	8
	0	1	13	

Menno St

Cars	Trucks	Heavys	Total
39	1	5	45

Fountain St

Peds Cross: ⧖
West Peds: 0
West Entering: 14
West leg Total: 28

Heavys	26
Trucks	8
Cars	209
Total	243

Total	3	200	8	
Cars	3	166	7	176
Trucks	0	6	1	7
Heavys	0	28	0	28
% Trks	0%	17%	13%	

Peds Cross: ⋈
South Peds: 0
South Entering: 211
South leg Total: 454

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **537**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **14**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

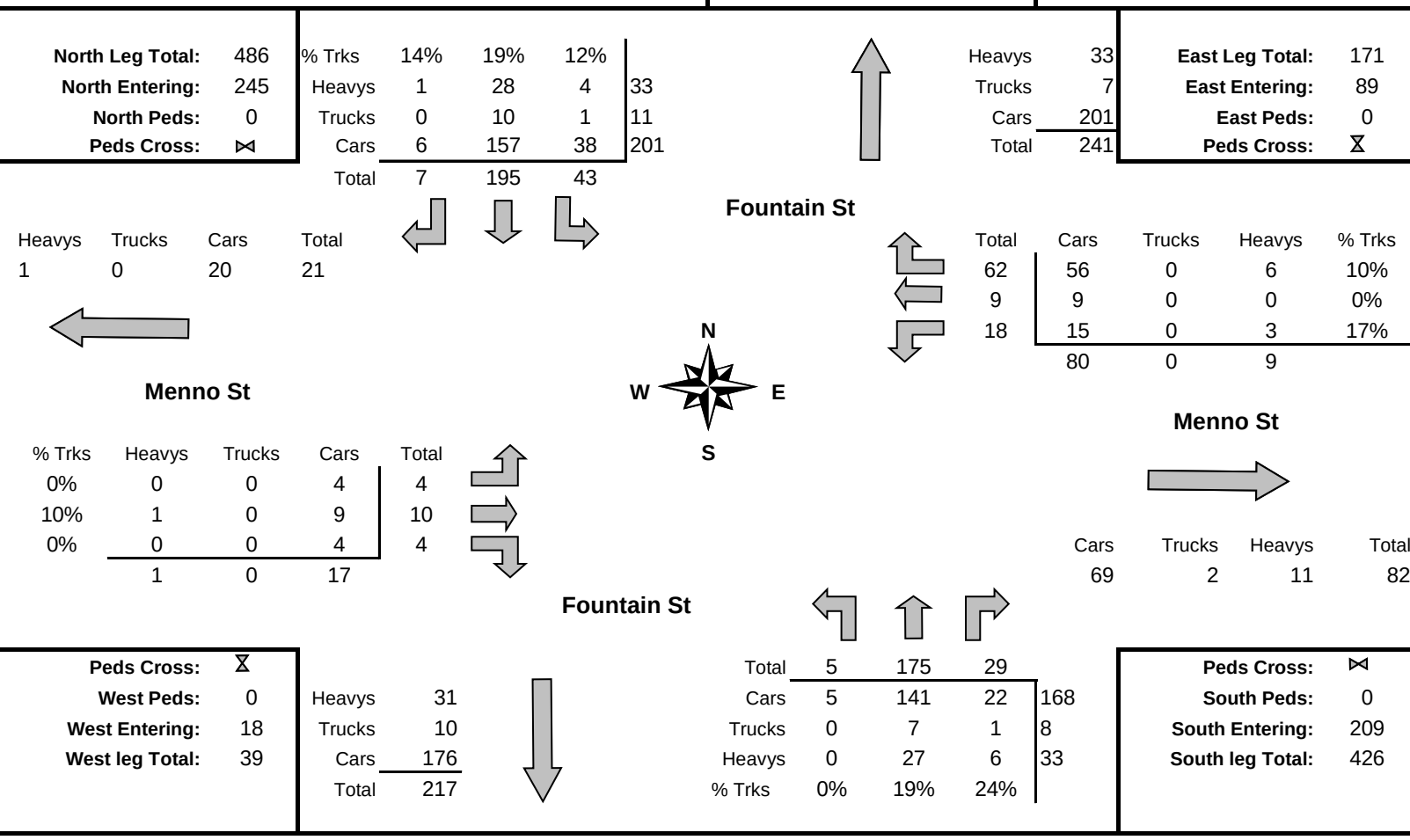
Peak Hour
From: 1:00 PM
To: 2:00 PM

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20



Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **561**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **18**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:15 PM
To: 5:15 PM

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20

North Leg Total: 775
North Entering: 369
North Peds: 0
Peds Cross: ⋈

	0%	11%	11%	
% Trks				
Heavys	0	27	3	30
Trucks	0	9	0	9
Cars	5	300	25	330
Total	5	336	28	

Heavys	Trucks	Cars	Total
1	0	28	29

Menno St

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	5	5
0%	0	0	6	6
0%	0	0	13	13
	0	0	24	

Peds Cross: ⧖
West Peds: 1
West Entering: 24
West leg Total: 53

Heavys	32
Trucks	10
Cars	326
Total	368

Heavys	Trucks	Cars	Total
24	9	373	406

East Leg Total: 122
East Entering: 77
East Peds: 0
Peds Cross: ⧖

Fountain St

Total	Cars	Trucks	Heavys	% Trks
46	42	0	4	9%
12	12	0	0	0%
19	13	1	5	32%
67	1	9		

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Menno St

Cars	Trucks	Heavys	Total
38	0	7	45

Fountain St

Total	12	355	11	
Cars	11	326	7	344
Trucks	0	9	0	9
Heavys	1	20	4	25
% Trks	8%	8%	36%	

Peds Cross: ⋈
South Peds: 0
South Entering: 378
South leg Total: 746

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **848**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **24**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20

North Leg Total:	4,290
North Entering:	2,061
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	2
Buggies Entering:	0

% Trks	14%	16%	15%	
Heavys	5	224	37	266
Trucks	1	59	5	65
Cars	36	1,454	240	1,730
Total	42	1,737	282	

Heavys	250
Trucks	72
Cars	1,907
Total	2,229

East Leg Total:	976
East Entering:	518
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	1
Buggies Entering:	0

Heavys	Trucks	Cars	Total
8	8	147	163

Fountain St

Total	Cars	Trucks	Heavys	% Trks
338	283	7	48	16%
70	61	7	2	13%
110	84	4	22	24%
	428	18	72	

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Menno St

% Trks	Heavys	Trucks	Cars	Total
28%	4	4	21	29
7%	2	2	54	58
0%	0	0	50	50
	6	6	125	

Menno St

Cars	Trucks	Heavys	Total
378	12	68	458

Fountain St

Peds Cross:	⧖
West Peds:	2
West Entering:	137
West leg Total:	300
Bicycles Entering:	1
Buggies Entering:	0

Heavys	246
Trucks	63
Cars	1,588
Total	1,897

Total	51	1,862	118	
Cars	50	1,603	84	1,737
Trucks	0	61	5	66
Heavys	1	198	29	228
% Trks	2%	14%	29%	

Peds Cross:	⋈
South Peds:	0
South Entering:	2,031
South leg Total:	3,928
Bicycles Entering:	0
Buggies Entering:	0

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **4,747**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **137**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20

North Leg Total: 7,465
North Entering: 3,586
North Peds: N/A
Peds Cross: ⋈

% Trks	14%	16%	15%	
Heavys	9	390	64	463
Trucks	2	103	9	113
Cars	63	2,530	418	3,010
Total	73	3,022	491	

East Leg Total: 1,698
East Entering: 901
East Peds: N/A
Peds Cross: ⧖

Heavys	435
Trucks	125
Cars	3,318
Total	3878

Fountain St

Heavys	Trucks	Cars	Total
14	14	256	284

Total	Cars	Trucks	Heavys	% Trks
588	492	12	84	16%
122	106	12	3	13%
191	146	7	38	24%
	745	31	125	

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Menno St

% Trks	Heavys	Trucks	Cars	Total
28%	7	7	37	50
7%	3	3	94	101
0%	0	0	87	87
	10	10	218	

Menno St

Cars	Trucks	Heavys	Total
658	21	118	797

Fountain St

Peds Cross: ⧖
West Peds: N/A
West Entering: 238
West leg Total: 522

Heavys	428
Trucks	110
Cars	2,763
Total	3,301

Total	89	3,240	205	
Cars	87	2,789	146	3,022
Trucks	0	106	9	115
Heavys	2	345	50	397
% Trks	2%	14%	29%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 3,534
South leg Total: 6,835

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***8,260***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Fountain St & Menno St
Control: Non Signalized
Major Road: Fountain St

Weather conditions: Sunny

Person(s) who counted: AT13-MJ

GeoID: 29528
Count Date: Wednesday, 28-Oct-20

North Approach PHF

AM Peak:	0.93
Mid-day Peak:	0.84
PM Peak:	0.88

East Approach PHF

AM Peak:	0.87
Mid-day Peak:	0.49
PM Peak:	0.88

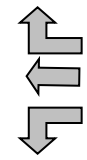
AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

Movement

PM	0.63	0.88	0.70
MID	0.58	0.86	0.67
AM	0.50	0.90	0.73

Fountain St

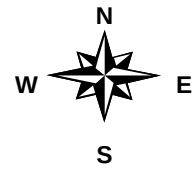




AM	MID	PM
0.71	0.50	0.82
0.75	0.75	0.75
0.75	0.41	0.79

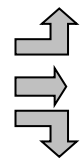
Movement

Menno St



Menno St

Movement	PM	MID	AM
	0.63	1.00	0.25
	0.50	0.63	0.63
	0.65	0.50	0.67





Fountain St

0.38	0.74	0.50	AM
0.63	0.77	0.66	MID
0.60	0.84	0.34	PM

Movement

West Approach PHF

AM Peak:	0.70
Mid-day Peak:	0.75
PM Peak:	0.75

South Approach PHF

AM Peak:	0.72
Mid-day Peak:	0.79
PM Peak:	0.79

Comments

Intersection: Fountain St & Menno St
GeoID: 29528
Municipality: Woolwich
Major Road: Fountain St

Intersection Control: Non Signalized
Date: Wednesday, 28-Oct-20
Name: AT13-MJ
Weather: Sunny

Approach Control			EASTBOUND *Stop Control*			WESTBOUND *Stop Control*			NORTHBOUND *Free Flow*			SOUTHBOUND *Free Flow*			TOTAL	TOTAL HOUR
7:30	to	7:45	0	1	1	1	2	8	0	54	1	7	43	0	118	
7:45	to	8:00	0	2	3	3	3	9	1	68	4	6	63	1	163	
8:00	to	8:15	0	2	1	2	1	12	2	44	2	11	56	1	134	
8:15	to	8:30	0	1	2	3	3	6	0	38	1	8	55	0	117	532
8:30	to	8:45	1	0	2	1	2	7	0	50	1	7	52	0	123	537
8:45	to	9:00	3	4	0	3	0	9	0	35	4	8	40	1	107	481
9:00	to	9:15	0	3	2	1	0	7	0	45	3	5	42	3	111	458
9:15	to	9:30	1	2	0	4	1	6	1	41	4	8	35	3	106	447
9:30	to	9:45	0	1	3	1	0	8	2	34	1	7	55	0	112	436
9:45	to	10:00	2	1	1	1	3	12	2	32	4	8	37	1	104	433
10:00	to	10:15	0	0	2	8	1	8	1	35	1	7	28	1	92	414
10:15	to	10:30	0	2	2	4	3	6	1	39	6	5	45	0	113	421
AM Peak Hour																
7:45	**to**	**8:45**	**1**	**5**	**8**	**9**	**9**	**34**	**3**	**200**	**8**	**32**	**226**	**2**	**537**	
# of trucks in peak			1	0	0	1	1	3	0	6	1	0	7	0	20	
# of heavies in peak			0	0	0	2	1	5	0	28	0	5	24	1	66	
% heavies (Total)			100%	0%	0%	33%	22%	24%	0%	17%	13%	16%	14%	50%	16%	
12:00	to	12:15	0	5	1	1	0	9	0	44	2	5	34	2	103	
12:15	to	12:30	2	2	0	1	1	6	1	56	1	5	36	0	111	
12:30	to	12:45	1	2	4	0	2	7	0	58	2	7	39	5	127	
12:45	to	13:00	0	2	0	3	2	4	0	47	5	10	57	3	133	474
13:00	to	13:15	1	2	2	4	3	8	1	33	4	7	42	1	108	479
13:15	to	13:30	1	2	0	1	2	12	1	57	8	7	44	1	136	504
13:30	to	13:45	1	2	1	2	1	11	1	47	6	13	57	3	145	522
13:45	to	14:00	1	4	1	11	3	31	2	38	11	16	52	2	172	561
Midday Peak Hour																
13:00	**to**	**14:00**	**4**	**10**	**4**	**18**	**9**	**62**	**5**	**175**	**29**	**43**	**195**	**7**	**561**	
# of trucks in peak			0	0	0	0	0	0	0	7	1	1	10	0	19	
# of heavies in peak			0	1	0	3	0	6	0	27	6	4	28	1	76	
% heavies (Total)			0%	10%	0%	17%	0%	10%	0%	19%	24%	12%	19%	14%	17%	
15:00	to	15:15	3	0	0	17	0	28	1	66	5	18	55	1	194	
15:15	to	15:30	0	2	1	2	4	15	5	74	11	22	55	1	192	
15:30	to	15:45	1	2	1	6	4	9	2	92	9	16	66	1	209	
15:45	to	16:00	2	4	1	3	3	11	4	95	4	10	59	3	199	794
16:00	to	16:15	0	3	1	2	3	15	3	96	2	8	73	1	207	807
16:15	to	16:30	2	1	0	4	4	6	4	90	1	6	66	1	185	800
16:30	to	16:45	2	0	4	4	4	14	5	106	8	4	95	2	248	839
16:45	to	17:00	0	3	4	6	1	13	2	74	1	8	82	0	194	834
17:00	to	17:15	1	2	5	5	3	13	1	85	1	10	93	2	221	848
17:15	to	17:30	1	1	3	1	6	12	6	69	0	10	67	1	177	840
17:30	to	17:45	2	0	2	4	2	11	2	63	2	6	68	1	163	755
17:45	to	18:00	1	0	0	1	3	5	0	57	3	7	46	0	123	684
PM Peak Hour																
16:15	**to**	**17:15**	**5**	**6**	**13**	**19**	**12**	**46**	**12**	**355**	**11**	**28**	**336**	**5**	**848**	
# of trucks in peak			0	0	0	1	0	0	0	9	0	0	9	0	19	
# of heavies in peak			0	0	0	5	0	4	1	20	4	3	27	0	64	
% heavies (Total)			0%	0%	0%	32%	0%	9%	8%	8%	36%	11%	11%	0%	10%	

Intersection: Fountain St & Menno St
GeoID: 29528
Municipality: Woolwich
Major Road: Fountain St

Intersection Control: Non Signalized
Date: Wednesday, 28-Oct-20
Name: AT13-MJ
Weather: Sunny

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	0	0	
8:15	to	8:30	0	0	0	0	0	0
8:30	to	8:45	0	0	0	0	0	0
8:45	to	9:00	0	0	0	0	0	0
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**0**	
7:45	**to**	**8:45**	**0**	**0**	**0**	**0**	**0**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
13:00	**to**	**14:00**	0	0	0	0	**0**	
15:00	to	15:15	0	1	0	0	1	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	0	0	
15:45	to	16:00	0	0	0	0	0	1
16:00	to	16:15	0	0	0	0	0	0
16:15	to	16:30	0	0	0	0	0	0
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	1	0	0	1	1
17:00	to	17:15	0	0	0	0	0	1
17:15	to	17:30	0	0	0	0	0	1
17:30	to	17:45	0	0	0	0	0	1
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**2**	
16:15	**to**	**17:15**	0	1	0	0	**1**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

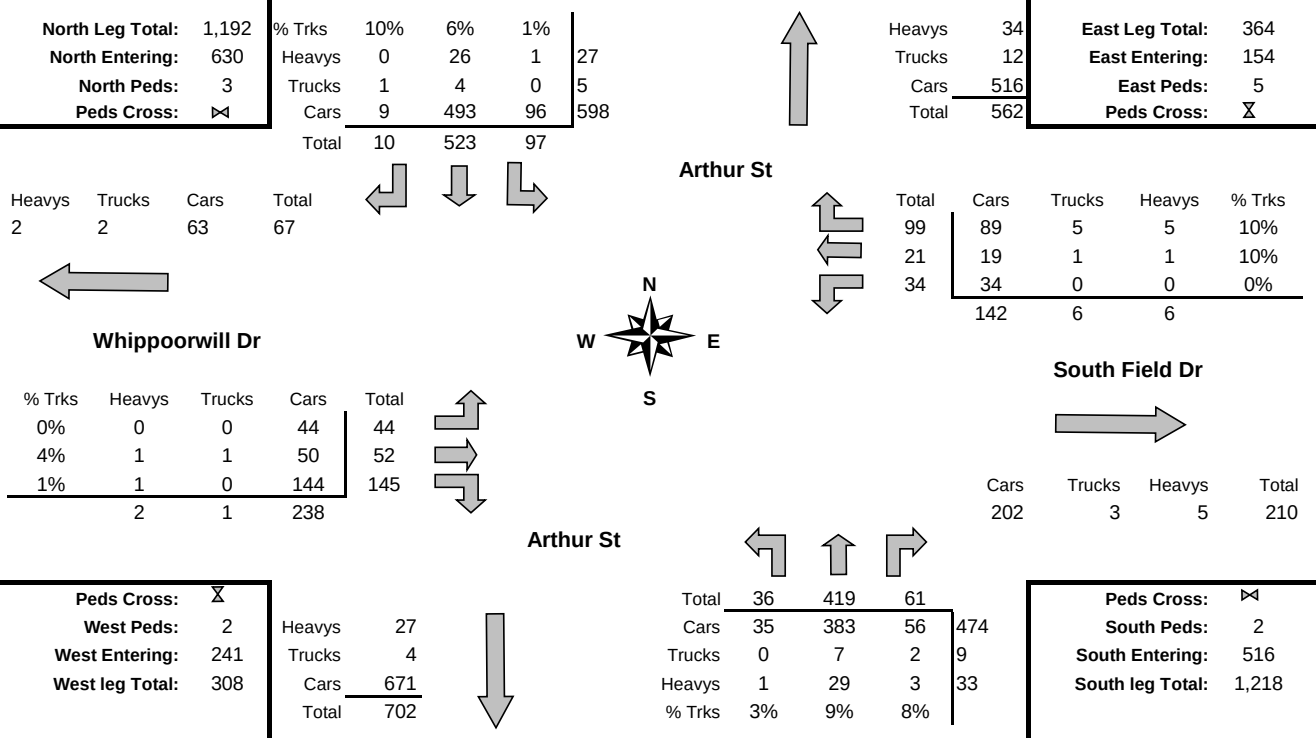
Peak Hour
From: 7:30 AM
To: 8:30 AM

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22



Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,541**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **241**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:00 PM
To: 1:00 PM

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22

North Leg Total:	1,147
North Entering:	583
North Peds:	2
Peds Cross:	⋈

% Trks	4%	9%	2%	
Heavys	0	26	2	28
Trucks	1	12	0	13
Cars	23	406	113	542
Total	24	444	115	

Heavys	18
Trucks	10
Cars	536
Total	564

East Leg Total:	425
East Entering:	230
East Peds:	7
Peds Cross:	⧖

Heavys	Trucks	Cars	Total
2	2	128	132

Arthur St

Total	Cars	Trucks	Heavys	% Trks
123	121	2	0	2%
50	48	1	1	4%
57	50	2	5	12%
	219	5	6	

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Whippoorwill Dr

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	26	26
2%	1	0	47	48
3%	1	1	59	61
	2	1	132	

South Field Dr

Cars	Trucks	Heavys	Total
184	3	8	195

Arthur St

Total	58	415	32	
Cars	57	389	24	470
Trucks	0	8	3	11
Heavys	1	18	5	24
% Trks	2%	6%	25%	

Peds Cross:	⧖
West Peds:	2
West Entering:	135
West leg Total:	267

Heavys	32
Trucks	15
Cars	515
Total	562

Peds Cross:	⋈
South Peds:	3
South Entering:	505
South leg Total:	1,067

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,453**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **135**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22

North Leg Total:	1,550
North Entering:	740
North Peds:	6
Peds Cross:	⋈

% Trks	5%	3%	4%	
Heavys	0	12	3	15
Trucks	1	6	2	9
Cars	19	573	124	716
Total	20	591	129	

Heavys	9
Trucks	5
Cars	796
Total	810

East Leg Total:	566
East Entering:	354
East Peds:	9
Peds Cross:	⧖

Heavys	Trucks	Cars	Total
0	1	254	255

Arthur St

Total	Cars	Trucks	Heavys	% Trks
173	171	1	1	1%
87	87	0	0	0%
94	91	1	2	3%
	349	2	3	

Whippoorwill Dr

% Trks	Heavys	Trucks	Cars	Total
0%	0	0	27	27
3%	1	0	34	35
2%	0	2	104	106
	1	2	165	

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South Field Dr

Cars	Trucks	Heavys	Total
206	2	4	212

Arthur St

Peds Cross:	⧖
West Peds:	4
West Entering:	168
West leg Total:	423

Heavys	14
Trucks	9
Cars	768
Total	791

Total	148	610	48	
Cars	148	598	48	794
Trucks	0	4	0	4
Heavys	0	8	0	8
% Trks	0%	2%	0%	

Peds Cross:	⋈
South Peds:	3
South Entering:	806
South leg Total:	1,597

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **2,068**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **168**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Total Count Diagram

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22

North Leg Total:	9,714
North Entering:	4,803
North Peds:	28
Peds Cross:	⋈
Bicycles Entering:	4
Buggies Entering:	4

% Trks	2%	7%	3%	
Heavys	0	186	13	199
Trucks	3	69	10	82
Cars	135	3,555	832	4,522
Total	138	3,810	855	

Heavys	203
Trucks	94
Cars	4,614
Total	4,911

East Leg Total:	3,419
East Entering:	1,921
East Peds:	48
Peds Cross:	⧖
Bicycles Entering:	3
Buggies Entering:	1

Arthur St

Heavys	Trucks	Cars	Total
8	10	1,110	1,128

	Total	Cars	Trucks	Heavys	% Trks
	1,051	1,010	22	19	4%
	395	388	3	4	2%
	475	437	11	27	8%
		1,835	36	50	

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Whippoorwill Dr

% Trks	Heavys	Trucks	Cars	Total
1%	1	1	243	245
3%	7	2	298	307
2%	8	5	709	722
	16	8	1,250	

South Field Dr

Cars	Trucks	Heavys	Total
1,438	26	34	1,498

Arthur St

Total	595	3,615	336	
Cars	587	3,361	308	4,256
Trucks	4	71	14	89
Heavys	4	183	14	201
% Trks	1%	7%	8%	

Peds Cross:	⧖
West Peds:	26
West Entering:	1,274
West leg Total:	2,402
Bicycles Entering:	7
Buggies Entering:	0

Heavys	221
Trucks	85
Cars	4,701
Total	5,007

Peds Cross:	⋈
South Peds:	22
South Entering:	4,546
South leg Total:	9,553
Bicycles Entering:	7
Buggies Entering:	3

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **12,544**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **1,274**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22

Arthur St

		% Trks	2%	7%	3%	
North Leg Total:	16,902	Heavys	0	324	23	346
North Entering:	8,357	Trucks	5	120	17	143
North Peds:	N/A	Cars	235	6,186	1,448	7,868
Peds Cross:	⋈	Total	240	6,629	1,488	

Heavys	353	**East Leg Total:**	5,949
Trucks	164	**East Entering:**	3,343
Cars	8,028	**East Peds:**	N/A
Total	8545	**Peds Cross:**	⧖

Heavys	Trucks	Cars	Total
14	17	1,931	1,963

	Total	Cars	Trucks	Heavys	% Trks
	1,829	1,757	38	33	4%
	687	675	5	7	2%
	827	760	19	47	8%
		3,193	63	87	

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Whippoorwill Dr

% Trks	Heavys	Trucks	Cars	Total
1%	2	2	423	426
3%	12	3	519	534
2%	14	9	1,234	1,256
	28	14	2,175	

South Field Dr

Cars	Trucks	Heavys	Total
2,502	45	59	2,607

Arthur St

Total	1,035	6,290	585	
Cars	1,021	5,848	536	7,405
Trucks	7	124	24	155
Heavys	7	318	24	350
% Trks	1%	7%	8%	

Peds Cross:	⧖	Heavys	385
West Peds:	N/A	Trucks	148
West Entering:	2,217	Cars	8,180
West leg Total:	4,179	Total	8,712

Peds Cross:	⋈
South Peds:	N/A
South Entering:	7,910
South leg Total:	16,622

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***21,827***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: Arthur St @ South Field Dr/Whippoorwill Dr
Control: Signalized
Major Road: Arthur St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 3180
Count Date: Wednesday, 06-Apr-22

North Approach PHF

AM Peak:	0.97
Mid-day Peak:	0.92
PM Peak:	0.89

East Approach PHF

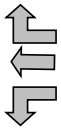
AM Peak:	0.86
Mid-day Peak:	0.87
PM Peak:	0.91

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour

	Movement		
PM	0.71	0.88	0.83
MID	0.75	0.92	0.93
AM	0.50	0.95	0.90

Arthur St





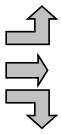
	AM	MID	PM
	0.83	0.85	0.88
	0.66	0.89	0.84
	0.77	0.79	0.81

Movement

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Whippoorwill Dr

Movement	PM	MID	AM
	0.75	0.65	0.69
	0.80	0.75	0.76
	0.88	0.85	0.84



South Field Dr



Arthur St

0.82	0.71	0.76	AM
0.81	0.87	0.80	MID
0.97	0.94	0.60	PM

Movement

West Approach PHF

AM Peak:	0.91
Mid-day Peak:	0.91
PM Peak:	0.89

South Approach PHF

AM Peak:	0.73
Mid-day Peak:	0.90
PM Peak:	0.97

Comments

Intersection: Arthur St @ South Field Dr/Whippoc
GeoID: 3180
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Wednesday, 06-Apr-22
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***Signalized***			***Signalized***			***Signalized***				
7:30	to	7:45	5	10	43	4	6	14	5	83	13	24	138	1	346	
7:45	to	8:00	12	12	42	10	2	30	10	147	20	27	130	1	443	
8:00	to	8:15	11	17	29	11	5	29	10	91	17	23	131	5	379	
8:15	to	8:30	16	13	31	9	8	26	11	98	11	23	124	3	373	1,541
8:30	to	8:45	12	12	25	7	5	19	13	94	14	19	108	5	333	1,528
8:45	to	9:00	17	13	26	14	4	27	7	108	6	24	127	3	376	1,461
9:00	to	9:15	9	13	21	10	10	28	11	98	18	24	92	2	336	1,418
9:15	to	9:30	5	12	13	11	4	30	9	80	9	24	87	3	287	1,332
9:30	to	9:45	6	3	25	14	7	31	10	92	9	20	101	3	321	1,320
9:45	to	10:00	5	7	12	14	4	23	5	76	8	26	88	2	270	1,214
10:00	to	10:15	11	5	16	9	9	25	6	79	13	28	82	4	287	1,165
10:15	to	10:30	8	6	18	7	10	21	13	64	12	19	103	3	284	1,162
AM Peak Hour																
7:30	**to**	**8:30**	**44**	**52**	**145**	**34**	**21**	**99**	**36**	**419**	**61**	**97**	**523**	**10**	**1,541**	
# of trucks in peak			0	1	0	0	1	5	0	7	2	0	4	1	21	
# of heavies in peak			0	1	1	0	1	5	1	29	3	1	26	0	68	
% heavies (Total)			0%	4%	1%	0%	10%	10%	3%	9%	8%	1%	6%	10%	6%	
12:00	to	12:15	10	7	18	18	12	36	18	98	10	31	105	5	368	
12:15	to	12:30	3	16	18	11	13	32	11	119	10	30	121	7	391	
12:30	to	12:45	5	10	14	13	11	28	11	101	7	30	112	4	346	
12:45	to	13:00	8	15	11	15	14	27	18	97	5	24	106	8	348	1,453
13:00	to	13:15	4	6	22	14	14	32	18	99	12	23	112	3	359	1,444
13:15	to	13:30	1	5	19	11	9	29	19	132	8	30	104	6	373	1,426
13:30	to	13:45	9	8	15	15	5	21	15	91	7	32	111	3	332	1,412
13:45	to	14:00	8	10	18	10	14	29	19	112	11	21	105	5	362	1,426
Midday Peak Hour																
12:00	**to**	**13:00**	**26**	**48**	**61**	**57**	**50**	**123**	**58**	**415**	**32**	**115**	**444**	**24**	**1,453**	
# of trucks in peak			0	0	1	2	1	2	0	8	3	0	12	1	30	
# of heavies in peak			0	1	1	5	1	0	1	18	5	2	26	0	60	
% heavies (Total)			0%	2%	3%	12%	4%	2%	2%	6%	25%	2%	9%	4%	6%	
15:00	to	15:15	8	10	19	36	17	47	26	132	8	26	130	4	463	
15:15	to	15:30	10	8	18	15	11	23	16	114	7	26	118	8	374	
15:30	to	15:45	0	15	25	24	10	55	24	126	3	25	123	1	431	
15:45	to	16:00	7	4	16	10	17	37	30	138	5	25	110	3	402	1,670
16:00	to	16:15	8	9	26	24	23	41	20	134	5	34	149	9	482	1,689
16:15	to	16:30	10	13	21	21	21	42	31	143	8	33	142	2	487	1,802
16:30	to	16:45	4	4	30	29	21	37	37	162	5	30	168	5	532	1,903
16:45	to	17:00	8	11	27	17	17	41	38	147	11	25	132	7	481	1,982
17:00	to	17:15	9	9	29	26	23	46	35	151	12	39	167	3	549	2,049
17:15	to	17:30	6	11	20	22	26	49	38	150	20	35	124	5	506	2,068
17:30	to	17:45	3	7	29	18	24	54	33	145	22	33	134	7	509	2,045
17:45	to	18:00	7	6	26	6	19	42	28	114	10	22	126	8	414	1,978
PM Peak Hour																
16:30	**to**	**17:30**	**27**	**35**	**106**	**94**	**87**	**173**	**148**	**610**	**48**	**129**	**591**	**20**	**2,068**	
# of trucks in peak			0	0	2	1	0	1	0	4	0	2	6	1	17	
# of heavies in peak			0	1	0	2	0	1	0	8	0	3	12	0	27	
% heavies (Total)			0%	3%	2%	3%	0%	1%	0%	2%	0%	4%	3%	5%	2%	

Intersection: Arthur St @ South Field Dr/Whippoor
GeoID: 3180
Municipality: Woolwich
Major Road: Arthur St

Intersection Control: Signalized
Date: Wednesday, 06-Apr-22
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	1	0	0	1	2	
7:45	to	8:00	1	0	0	0	1	
8:00	to	8:15	1	1	2	0	4	
8:15	to	8:30	2	1	1	1	5	12
8:30	to	8:45	2	0	2	0	4	14
8:45	to	9:00	1	3	0	0	4	17
9:00	to	9:15	0	0	1	0	1	14
9:15	to	9:30	2	0	0	0	2	11
9:30	to	9:45	2	0	0	1	3	10
9:45	to	10:00	0	1	1	0	2	8
10:00	to	10:15	1	1	0	0	2	9
10:15	to	10:30	0	2	0	0	2	9
AM Peak Hour							**32**	
7:30	**to**	**8:30**	**5**	**2**	**3**	**2**	**12**	
12:00	to	12:15	2	0	1	0	3	
12:15	to	12:30	3	0	0	1	4	
12:30	to	12:45	2	1	0	1	4	
12:45	to	13:00	0	1	1	1	3	14
13:00	to	13:15	2	0	0	0	2	13
13:15	to	13:30	1	1	1	0	3	12
13:30	to	13:45	1	0	0	0	1	9
13:45	to	14:00	0	3	0	3	6	12
Midday Peak Hour							**26**	
12:00	**to**	**13:00**	7	2	2	3	**14**	
15:00	to	15:15	1	1	1	2	5	
15:15	to	15:30	0	3	1	0	4	
15:30	to	15:45	2	1	1	1	5	
15:45	to	16:00	5	1	4	3	13	27
16:00	to	16:15	0	0	1	1	2	24
16:15	to	16:30	2	1	2	2	7	27
16:30	to	16:45	1	0	1	0	2	24
16:45	to	17:00	1	1	1	0	3	14
17:00	to	17:15	2	3	1	3	9	21
17:15	to	17:30	5	0	3	0	8	22
17:30	to	17:45	3	0	0	1	4	24
17:45	to	18:00	2	0	2	0	4	25
PM Peak Hour							**66**	
16:30	**to**	**17:30**	9	4	6	3	**22**	

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Morning Peak Diagram

Count Period
From: 7:30 AM
To: 10:30 AM

Peak Hour
From: 7:45 AM
To: 8:45 AM

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Leg Total: 621
North Entering: 314
North Peds: 0
Peds Cross: ⋈

% Trks	13%	11%	0%	
Heavys	5	17	0	22
Trucks	1	12	0	13
Cars	42	237	0	279
Total	48	266	0	

Heavys	Trucks	Cars	Total
38	14	217	269

Heavys	17	**East Leg Total:**	0
Trucks	10	**East Entering:**	0
Cars	280	**East Peds:**	0
Total	307	**Peds Cross:**	⋈

King St

Total	Cars	Trucks	Heavys	% Trks
0	0	0	0	0%
0	0	0	0	0%
0	0	0	0	0%
	0	0	0	

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Lobsinger Line

% Trks	Heavys	Trucks	Cars	Total
31%	7	6	29	42
0%	0	0	0	0
15%	45	6	279	330
	52	12	308	

na

Cars	Trucks	Heavys	Total
0	0	0	0

King St

Peds Cross: ⧖
West Peds: 0
West Entering: 372
West leg Total: 641

Heavys	62
Trucks	18
Cars	516
Total	596

Total	221	265	0	
Cars	175	251	0	426
Trucks	13	4	0	17
Heavys	33	10	0	43
% Trks	21%	5%	0%	

Peds Cross: ⋈
South Peds: 1
South Entering: 486
South leg Total: 1,082

Comments

To determine total vehicles entering the intersection during morning peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,172**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **372**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Mid-day Peak Diagram

Count Period
From: 12:00 PM
To: 2:00 PM

Peak Hour
From: 12:45 PM
To: 1:45 PM

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Leg Total: 645
North Entering: 344
North Peds: 0
Peds Cross: ⋈

% Trks	7%	6%	0%	
Heavys	1	9	0	10
Trucks	2	8	0	10
Cars	39	285	0	324
Total	42	302	0	

Heavys	Trucks	Cars	Total
38	11	232	281

Lobsinger Line

% Trks	Heavys	Trucks	Cars	Total
9%	2	1	30	33
0%	0	0	0	0
20%	36	13	192	241
	38	14	222	

Heavys	12
Trucks	8
Cars	281
Total	301

East Leg Total: 0
East Entering: 0
East Peds: 0
Peds Cross: ⧖

King St

Total	Cars	Trucks	Heavys	% Trks
0	0	0	0	0%
0	0	0	0	0%
0	0	0	0	0%
	0	0	0	

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Cars	Trucks	Heavys	Total
0	0	0	0

King St

Total	239	268	0
Cars	193	251	0	444
Trucks	9	7	0	16
Heavys	37	10	0	47
% Trks	19%	6%	0%	

Peds Cross: ⧖
West Peds: 0
West Entering: 274
West leg Total: 555

Heavys	45
Trucks	21
Cars	477
Total	543

Peds Cross: ⋈
South Peds: 0
South Entering: 507
South leg Total: 1,050

Comments

To determine total vehicles entering the intersection during mid-day peak hour, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **1,125**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **274**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Afternoon Peak Diagram

Count Period
From: 3:00 PM
To: 6:00 PM

Peak Hour
From: 4:30 PM
To: 5:30 PM

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Leg Total: 779
North Entering: 423
North Peds: 0
Peds Cross: ⋈

% Trks	14%	2%	0%	
Heavys	2	5	0	7
Trucks	5	4	0	9
Cars	42	365	0	407
Total	49	374	0	

Heavys	Trucks	Cars	Total
27	10	419	456

Lobsinger Line

% Trks	Heavys	Trucks	Cars	Total
6%	1	1	30	32
0%	0	0	0	0
5%	10	4	287	301
	11	5	317	

Heavys	Trucks	Cars	Total
7	4	345	356

East Leg Total: 0
East Entering: 0
East Peds: 0
Peds Cross: ⋈

King St

Total	Cars	Trucks	Heavys	% Trks
0	0	0	0	0%
0	0	0	0	0%
0	0	0	0	0%
	0	0	0	

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Cars	Trucks	Heavys	Total
0	0	0	0

King St

Peds Cross: ⋈
West Peds: 0
West Entering: 333
West leg Total: 789

Heavys	15
Trucks	8
Cars	652
Total	675

Total	407	324	0	
Cars	377	315	0	692
Trucks	5	3	0	8
Heavys	25	6	0	31
% Trks	7%	3%	0%	

Peds Cross: ⋈
South Peds: 0
South Entering: 731
South leg Total: 1,406

Comments

To determine total vehicles entering the intersection during afternoon peak hour, add all leg totals entering.

Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering

Example 1: Therefore, total vehicles entering intersection = **1,487**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn

Therefore, vehicles entering from the west = **333**

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Total Count Diagram

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Leg Total:	5,122
North Entering:	2,652
North Peds:	0
Peds Cross:	⋈
Bicycles Entering:	7
Buggies Entering:	2

% Trks	14%	6%	0%	
Heavys	32	88	0	120
Trucks	17	45	0	62
Cars	305	2,165	0	2,470
Total	354	2,298	0	

Heavys	Trucks	Cars	Total
304	81	2,132	2,517

Heavys	Trucks	Cars	Total
93	61	2,316	2,470

East Leg Total:	0
East Entering:	0
East Peds:	0
Peds Cross:	⧖
Bicycles Entering:	0
Buggies Entering:	0

King St

Total	Cars	Trucks	Heavys	% Trks
0	0	0	0	0%
0	0	0	0	0%
0	0	0	0	0%
	0	0	0	

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Lobsinger Line

% Trks	Heavys	Trucks	Cars	Total
16%	26	18	232	276
0%	0	0	0	0
14%	243	63	1,822	2,128
	269	81	2,054	

na

Cars	Trucks	Heavys	Total
0	0	0	0

King St

Peds Cross:	⧖
West Peds:	0
West Entering:	2,404
West leg Total:	4,921
Bicycles Entering:	2
Buggies Entering:	4

Heavys	331
Trucks	108
Cars	3,987
Total	4,426

Total	2,163	2,194	0	
Cars	1,827	2,084	0	3,911
Trucks	64	43	0	107
Heavys	272	67	0	339
% Trks	16%	5%	0%	

Peds Cross:	⋈
South Peds:	2
South Entering:	4,357
South leg Total:	8,783
Bicycles Entering:	4
Buggies Entering:	6

Comments

To determine total vehicles entering the intersection, add all leg totals entering.

Example 1: Total Entering = West leg total entering + South leg total entering + East leg total entering + North leg total entering
Therefore, total vehicles entering intersection = **9,413**

Example 2: Total vehicles entering from the west = eastbound left turn + eastbound through + eastbound right turn
Therefore, vehicles entering from the west = **2,404**

Notes: None

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Estimated Daily Traffic

Total Factor = Monthly Factor 1 x Daily Factor 1 x 24 Hour Factor 1.74 = 1.740000

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Leg Total: 8,912
North Entering: 4,614
North Peds: N/A
Peds Cross: ⋈

% Trks	14%	6%	0%	
Heavys	56	153	0	209
Trucks	30	78	0	108
Cars	531	3,767	0	4,298
Total	616	3,999	0	

Heavys	Trucks	Cars	Total
529	141	3,710	4,380

Heavys	Trucks	Cars	Total
162	106	4,030	4298

East Leg Total: 0
East Entering: 0
East Peds: N/A
Peds Cross: ⋈

King St

Total	Cars	Trucks	Heavys	% Trks
0	0	0	0	0%
0	0	0	0	0%
0	0	0	0	0%
	0	0	0	

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Lobsinger Line

% Trks	Heavys	Trucks	Cars	Total
16%	45	31	404	480
0%	0	0	0	0
14%	423	110	3,170	3,703
	468	141	3,574	

na

Cars	Trucks	Heavys	Total
0	0	0	0

King St

Peds Cross: ⋈
West Peds: N/A
West Entering: 4,183
West leg Total: 8,563

Heavys	576
Trucks	188
Cars	6,937
Total	7,701

Total	3,764	3,818	0	
Cars	3,179	3,626	0	6,805
Trucks	111	75	0	186
Heavys	473	117	0	590
% Trks	16%	5%	0%	

Peds Cross: ⋈
South Peds: N/A
South Entering: 7,581
South leg Total: 15,282

Comments

To determine the EDT (Estimated Daily Traffic), add all four leg totals and divide by two.
This will give you the approximate number of vehicles entering and exiting the intersection in a 24-hour period

Example: $\frac{\text{(West leg total + South leg total + East leg total + North leg total)}}{2}$ ***EDT =*** ***16,379***

REGIONAL MUNICIPALITY OF WATERLOO
TURNING MOVEMENT COUNT

Region of Waterloo

Peak Hour Factor By Movement

Municipality: Woolwich
Intersection: King St @ Lobsinger Line
Control: Signalized
Major Road: King St

Weather conditions: Clear/Dry

Person(s) who counted: Cam

GeoID: 4053
Count Date: Wednesday, 12-Oct-22

North Approach PHF

AM Peak:	0.88
Mid-day Peak:	0.93
PM Peak:	0.84

East Approach PHF

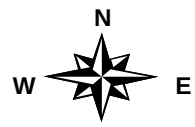
AM Peak:	0.00
Mid-day Peak:	0.00
PM Peak:	0.00

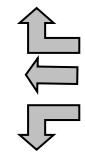
	Movement		
PM	0.68	0.87	0.00
MID	0.62	0.91	0.00
AM	0.75	0.88	0.00

King St

AM AM Peak Hour
MID Mid-day Peak Hour
PM PM Peak Hour





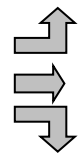


AM	MID	PM	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	

Movement

Lobsinger Line

Movement	PM	MID	AM
	0.80	0.83	0.62
	0.00	0.00	0.00
	0.93	0.75	0.90



na



King St

0.94	0.90	0.00	AM
0.92	0.91	0.00	MID
0.88	0.89	0.00	PM

Movement

West Approach PHF

AM Peak:	0.91
Mid-day Peak:	0.76
PM Peak:	0.96

South Approach PHF

AM Peak:	0.93
Mid-day Peak:	0.91
PM Peak:	0.93

Comments

Intersection: King St @ Lobsinger Line
GeoID: 4053
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

			EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL	TOTAL HOUR
Approach Control			***Signalized***			***N/A***			***Signalized***			***Signalized***				
7:30	to	7:45	9	0	68	0	0	0	46	62	0	0	61	6	252	
7:45	to	8:00	17	0	85	0	0	0	54	74	0	0	65	16	311	
8:00	to	8:15	9	0	69	0	0	0	59	72	0	0	76	13	298	
8:15	to	8:30	10	0	84	0	0	0	58	62	0	0	59	11	284	1,145
8:30	to	8:45	6	0	92	0	0	0	50	57	0	0	66	8	279	1,172
8:45	to	9:00	8	0	66	0	0	0	46	57	0	0	59	11	247	1,108
9:00	to	9:15	10	0	67	0	0	0	39	51	0	0	56	10	233	1,043
9:15	to	9:30	9	0	74	0	0	0	47	57	0	0	57	14	258	1,017
9:30	to	9:45	12	0	60	0	0	0	46	45	0	0	49	10	222	960
9:45	to	10:00	18	0	72	0	0	0	42	69	0	0	36	9	246	959
10:00	to	10:15	6	0	51	0	0	0	43	67	0	0	47	10	224	950
10:15	to	10:30	13	0	53	0	0	0	49	49	0	0	47	4	215	907
AM Peak Hour																
7:45	**to**	**8:45**	**42**	**0**	**330**	**0**	**0**	**0**	**221**	**265**	**0**	**0**	**266**	**48**	**1,172**	
# of trucks in peak			6	0	6	0	0	0	13	4	0	0	12	1	42	
# of heavies in peak			7	0	45	0	0	0	33	10	0	0	17	5	117	
% heavies (Total)			31%	0%	15%	0%	0%	0%	21%	5%	0%	0%	11%	13%	14%	
12:00	to	12:15	4	0	51	0	0	0	66	59	0	0	73	17	270	
12:15	to	12:30	10	0	64	0	0	0	55	76	0	0	63	14	282	
12:30	to	12:45	7	0	53	0	0	0	60	66	0	0	73	12	271	
12:45	to	13:00	10	0	80	0	0	0	54	57	0	0	72	6	279	1,102
13:00	to	13:15	5	0	53	0	0	0	59	70	0	0	73	10	270	1,102
13:15	to	13:30	9	0	50	0	0	0	65	74	0	0	83	9	290	1,110
13:30	to	13:45	9	0	58	0	0	0	61	67	0	0	74	17	286	1,125
13:45	to	14:00	6	0	50	0	0	0	57	65	0	0	62	12	252	1,098
Midday Peak Hour																
12:45	**to**	**13:45**	**33**	**0**	**241**	**0**	**0**	**0**	**239**	**268**	**0**	**0**	**302**	**42**	**1,125**	
# of trucks in peak			1	0	13	0	0	0	9	7	0	0	8	2	40	
# of heavies in peak			2	0	36	0	0	0	37	10	0	0	9	1	95	
% heavies (Total)			9%	0%	20%	0%	0%	0%	19%	6%	0%	0%	6%	7%	12%	
15:00	to	15:15	8	0	62	0	0	0	76	73	0	0	134	10	363	
15:15	to	15:30	7	0	52	0	0	0	84	81	0	0	81	7	312	
15:30	to	15:45	8	0	80	0	0	0	99	77	0	0	80	16	360	
15:45	to	16:00	9	0	77	0	0	0	112	89	0	0	74	10	371	1,406
16:00	to	16:15	3	0	74	0	0	0	83	84	0	0	80	17	341	1,384
16:15	to	16:30	5	0	49	0	0	0	99	89	0	0	80	9	331	1,403
16:30	to	16:45	6	0	81	0	0	0	115	80	0	0	93	8	383	1,426
16:45	to	17:00	6	0	79	0	0	0	97	83	0	0	81	12	358	1,413
17:00	to	17:15	10	0	66	0	0	0	106	91	0	0	108	18	399	1,471
17:15	to	17:30	10	0	75	0	0	0	89	70	0	0	92	11	347	1,487
17:30	to	17:45	6	0	58	0	0	0	82	61	0	0	79	8	294	1,398
17:45	to	18:00	11	0	75	0	0	0	65	60	0	0	65	9	285	1,325
PM Peak Hour																
16:30	**to**	**17:30**	**32**	**0**	**301**	**0**	**0**	**0**	**407**	**324**	**0**	**0**	**374**	**49**	**1,487**	
# of trucks in peak			1	0	4	0	0	0	5	3	0	0	4	5	22	
# of heavies in peak			1	0	10	0	0	0	25	6	0	0	5	2	49	
% heavies (Total)			6%	0%	5%	0%	0%	0%	7%	3%	0%	0%	2%	14%	5%	

Intersection: King St @ Lobsinger Line
GeoID: 4053
Municipality: Woolwich
Major Road: King St

Intersection Control: Signalized
Date: Wednesday, 12-Oct-22
Name: Cam
Weather: Clear/Dry

PEDESTRIAN CROSSING								
Time			Crossing Approach					
			East App.	West App.	North App.	South App.	TOTAL	TOTAL HOUR
7:30	to	7:45	0	0	0	0	0	
7:45	to	8:00	0	0	0	0	0	
8:00	to	8:15	0	0	0	1	1	
8:15	to	8:30	0	0	0	0	0	1
8:30	to	8:45	0	0	0	0	0	1
8:45	to	9:00	0	0	0	0	0	1
9:00	to	9:15	0	0	0	0	0	0
9:15	to	9:30	0	0	0	0	0	0
9:30	to	9:45	0	0	0	0	0	0
9:45	to	10:00	0	0	0	0	0	0
10:00	to	10:15	0	0	0	0	0	0
10:15	to	10:30	0	0	0	0	0	0
AM Peak Hour							**1**	
7:45	**to**	**8:45**	**0**	**0**	**0**	**1**	**1**	
12:00	to	12:15	0	0	0	0	0	
12:15	to	12:30	0	0	0	0	0	
12:30	to	12:45	0	0	0	0	0	
12:45	to	13:00	0	0	0	0	0	0
13:00	to	13:15	0	0	0	0	0	0
13:15	to	13:30	0	0	0	0	0	0
13:30	to	13:45	0	0	0	0	0	0
13:45	to	14:00	0	0	0	0	0	0
Midday Peak Hour							**0**	
12:45	**to**	**13:45**	0	0	0	0	**0**	
15:00	to	15:15	0	0	0	0	0	
15:15	to	15:30	0	0	0	0	0	
15:30	to	15:45	0	0	0	1	1	
15:45	to	16:00	0	0	0	0	0	1
16:00	to	16:15	0	0	0	0	0	1
16:15	to	16:30	0	0	0	0	0	1
16:30	to	16:45	0	0	0	0	0	0
16:45	to	17:00	0	0	0	0	0	0
17:00	to	17:15	0	0	0	0	0	0
17:15	to	17:30	0	0	0	0	0	0
17:30	to	17:45	0	0	0	0	0	0
17:45	to	18:00	0	0	0	0	0	0
PM Peak Hour							**1**	
16:30	**to**	**17:30**	0	0	0	0	**0**	



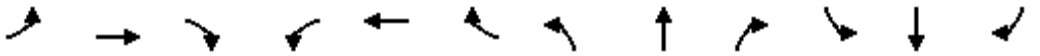
WOOLWICH TOWNSHIP

Comprehensive Transportation & Mobility Plan

Appendix D

Existing and Future Synchro Reports

egis



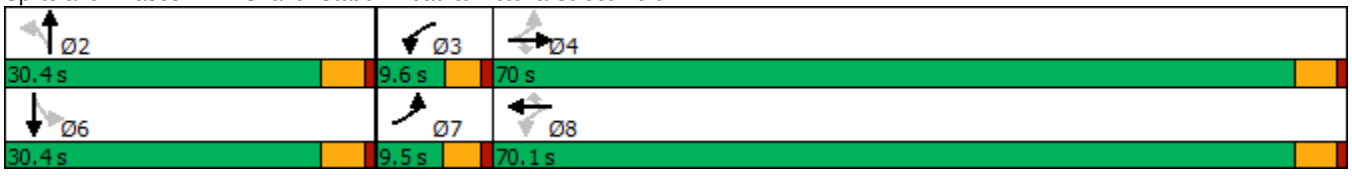
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	801	25	52	671	21	44	85	104	25	59	22
Future Volume (vph)	20	801	25	52	671	21	44	85	104	25	59	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	90.0		100.0	100.0		0.0	80.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.910			0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1830	1570	1722	1830	1633	1674	1578	0	1755	1633	0
Flt Permitted	0.208			0.095			0.667			0.438		
Satd. Flow (perm)	381	1830	1570	172	1830	1633	1176	1578	0	809	1633	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			55		63			24	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		364.7			395.3			305.6			253.6	
Travel Time (s)		27.4			29.6			22.9			19.0	
Peak Hour Factor	0.56	0.94	0.52	0.65	0.93	0.66	0.73	0.79	0.65	0.63	0.74	0.50
Heavy Vehicles (%)	5%	5%	4%	6%	5%	0%	9%	15%	8%	4%	5%	23%
Adj. Flow (vph)	36	852	48	80	722	32	60	108	160	40	80	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	852	48	80	722	32	60	268	0	40	124	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	

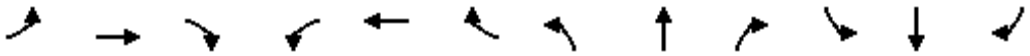
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	9.5	70.0	70.0	9.6	70.1	70.1	30.4	30.4		30.4	30.4	
Total Split (%)	8.6%	63.6%	63.6%	8.7%	63.7%	63.7%	27.6%	27.6%		27.6%	27.6%	
Maximum Green (s)	5.5	65.5	65.5	5.6	65.6	65.6	25.9	25.9		25.9	25.9	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.0	4.5	4.5	4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	52.8	48.2	48.2	53.8	50.3	50.3	27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.58	0.53	0.53	0.59	0.55	0.55	0.29	0.29		0.29	0.29	
v/c Ratio	0.12	0.89	0.06	0.40	0.72	0.03	0.17	0.53		0.17	0.25	
Control Delay	6.8	31.1	2.4	12.4	20.1	1.0	32.2	28.9		33.1	26.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.8	31.1	2.4	12.4	20.1	1.0	32.2	28.9		33.1	26.6	
LOS	A	C	A	B	C	A	C	C		C	C	
Approach Delay		28.7			18.6			29.5			28.2	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 91.7
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 25.1 Intersection LOS: C
Intersection Capacity Utilization 69.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Shantz Station Road & Victoria Street North





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	5	8	9	9	34	3	200	8	32	226	2
Future Volume (vph)	1	5	8	9	9	34	3	200	8	32	226	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		0.0	75.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.932			0.910			0.992			0.998	
Flt Protected		0.992			0.992		0.950			0.950	0.999	
Satd. Flow (prot)	0	1522	0	0	1386	0	1825	1632	0	1495	1588	0
Flt Permitted		0.992			0.992		0.950			0.950	0.999	
Satd. Flow (perm)	0	1522	0	0	1386	0	1825	1632	0	1495	1588	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		288.3			336.9			408.6			247.1	
Travel Time (s)		21.6			25.3			30.6			18.5	
Peak Hour Factor	0.25	0.63	0.67	0.75	0.75	0.71	0.38	0.74	0.50	0.73	0.90	0.50
Heavy Vehicles (%)	100%	0%	0%	33%	22%	24%	0%	17%	13%	16%	14%	50%
Adj. Flow (vph)	4	8	12	12	12	48	8	270	16	44	251	4
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	24	0	0	72	0	8	286	0	40	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.7%		ICU Level of Service A	
Analysis Period (min) 15			



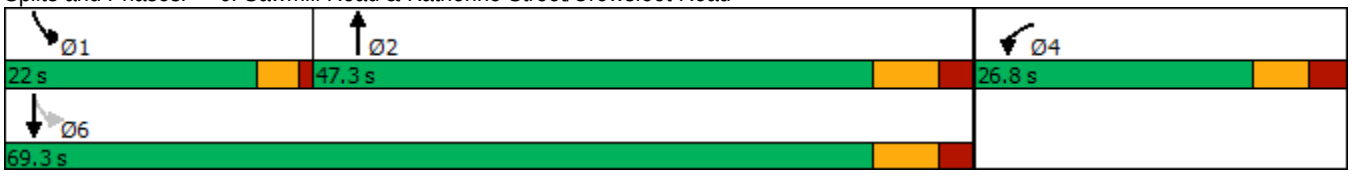
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	164	157	133	106	124	129
Future Volume (vph)	164	157	133	106	124	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.943		0.939			
Flt Protected	0.972					0.975
Satd. Flow (prot)	1693	0	1706	0	0	1743
Flt Permitted	0.972					0.681
Satd. Flow (perm)	1693	0	1706	0	0	1217
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	35		52			
Link Speed (k/h)	60		60			60
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	13.8		19.8			15.5
Peak Hour Factor	0.75	0.98	0.76	0.74	0.78	0.83
Heavy Vehicles (%)	4%	4%	8%	3%	7%	8%
Adj. Flow (vph)	219	160	175	143	159	155
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	0	318	0	0	314
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Detector Phase	4		2		1	6
Switch Phase						

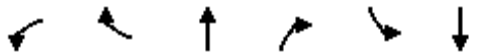


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Initial (s)	3.5		20.0		10.0	20.0
Minimum Split (s)	14.8		27.3		14.0	27.3
Total Split (s)	26.8		47.3		22.0	69.3
Total Split (%)	27.9%		49.2%		22.9%	72.1%
Maximum Green (s)	20.0		40.0		18.0	62.0
Yellow Time (s)	3.9		4.8		3.0	4.8
All-Red Time (s)	2.9		2.5		1.0	2.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		7.3			7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		5.0		3.0	5.0
Recall Mode	Max		None		None	None
Walk Time (s)			10.0			
Flash Dont Walk (s)			8.0			
Pedestrian Calls (#/hr)			0			
Act Effct Green (s)	20.3		26.7			26.7
Actuated g/C Ratio	0.33		0.44			0.44
v/c Ratio	0.65		0.41			0.59
Control Delay	24.7		11.0			17.8
Queue Delay	0.0		0.0			0.0
Total Delay	24.7		11.0			17.8
LOS	C		B			B
Approach Delay	24.7		11.0			17.8
Approach LOS	C		B			B

Intersection Summary			
Area Type:	Other		
Cycle Length: 96.1			
Actuated Cycle Length: 61.3			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			

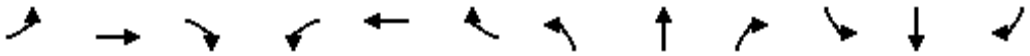
Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	164	157	133	106	124	129
Future Volume (vph)	164	157	133	106	124	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8		7.3			7.3
Lane Util. Factor	1.00		1.00			1.00
Frt	0.94		0.94			1.00
Flt Protected	0.97		1.00			0.98
Satd. Flow (prot)	1693		1706			1743
Flt Permitted	0.97		1.00			0.68
Satd. Flow (perm)	1693		1706			1217
Peak-hour factor, PHF	0.75	0.98	0.76	0.74	0.78	0.83
Adj. Flow (vph)	219	160	175	143	159	155
RTOR Reduction (vph)	23	0	29	0	0	0
Lane Group Flow (vph)	356	0	289	0	0	314
Heavy Vehicles (%)	4%	4%	8%	3%	7%	8%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	20.3		26.7			26.7
Effective Green, g (s)	20.3		26.7			26.7
Actuated g/C Ratio	0.33		0.44			0.44
Clearance Time (s)	6.8		7.3			7.3
Vehicle Extension (s)	4.0		5.0			5.0
Lane Grp Cap (vph)	562		745			531
v/s Ratio Prot	c0.21		0.17			
v/s Ratio Perm						c0.26
v/c Ratio	0.63		0.39			0.59
Uniform Delay, d1	17.2		11.7			13.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	5.3		0.7			2.7
Delay (s)	22.6		12.4			15.7
Level of Service	C		B			B
Approach Delay (s)	22.6		12.4			15.7
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	18.1
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

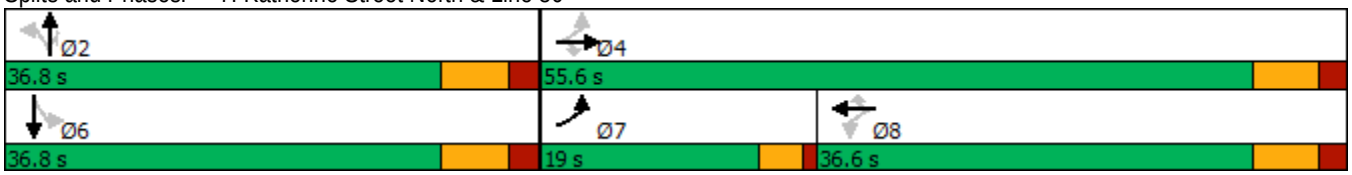


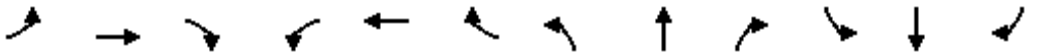
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	193	35	3	148	2	16	94	9	5	125	64
Future Volume (vph)	45	193	35	3	148	2	16	94	9	5	125	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.953	
Flt Protected	0.950			0.950				0.993			0.997	
Satd. Flow (prot)	1644	1779	1585	1372	1656	1633	0	1799	1338	0	1723	0
Flt Permitted	0.498			0.617				0.947			0.984	
Satd. Flow (perm)	862	1779	1585	891	1656	1633	0	1715	1338	0	1700	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			92			90		30	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.75	0.85	0.80	0.38	0.84	0.50	0.80	0.71	0.56	0.42	0.89	0.80
Heavy Vehicles (%)	11%	8%	3%	33%	16%	0%	13%	5%	22%	20%	3%	9%
Adj. Flow (vph)	60	227	44	8	176	4	20	132	16	12	140	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	227	44	8	176	4	0	152	16	0	232	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	19.0	55.6	55.6	36.6	36.6	36.6	36.8	36.8	36.8	36.8	36.8	
Total Split (%)	20.6%	60.2%	60.2%	39.6%	39.6%	39.6%	39.8%	39.8%	39.8%	39.8%	39.8%	
Maximum Green (s)	15.0	49.0	49.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		15.0	15.0	15.0	15.0	15.0	13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0	0	0	0	
Act Effct Green (s)	22.9	20.2	20.2	13.4	13.4	13.4		30.6	30.6		30.6	
Actuated g/C Ratio	0.36	0.31	0.31	0.21	0.21	0.21		0.47	0.47		0.47	
v/c Ratio	0.15	0.41	0.08	0.04	0.51	0.01		0.19	0.02		0.28	
Control Delay	13.3	18.5	4.9	23.0	29.6	0.0		13.3	0.1		12.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	13.3	18.5	4.9	23.0	29.6	0.0		13.3	0.1		12.4	
LOS	B	B	A	C	C	A		B	A		B	
Approach Delay		15.8			28.7			12.1			12.4	
Approach LOS		B			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92.4			
Actuated Cycle Length: 64.5			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

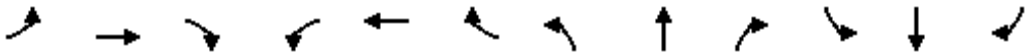
Splits and Phases: 7: Katherine Street North & Line 86





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	193	35	3	148	2	16	94	9	5	125	64
Future Volume (vph)	45	193	35	3	148	2	16	94	9	5	125	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	1644	1779	1585	1372	1656	1633		1800	1338		1724	
Flt Permitted	0.50	1.00	1.00	0.62	1.00	1.00		0.95	1.00		0.98	
Satd. Flow (perm)	861	1779	1585	891	1656	1633		1715	1338		1702	
Peak-hour factor, PHF	0.75	0.85	0.80	0.38	0.84	0.50	0.80	0.71	0.56	0.42	0.89	0.80
Adj. Flow (vph)	60	227	44	8	176	4	20	132	16	12	140	80
RTOR Reduction (vph)	0	0	29	0	0	3	0	0	9	0	16	0
Lane Group Flow (vph)	60	227	15	8	176	1	0	152	7	0	216	0
Heavy Vehicles (%)	11%	8%	3%	33%	16%	0%	13%	5%	22%	20%	3%	9%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	22.0	22.0	22.0	13.4	13.4	13.4		30.6	30.6		30.6	
Effective Green, g (s)	22.0	22.0	22.0	13.4	13.4	13.4		30.6	30.6		30.6	
Actuated g/C Ratio	0.33	0.33	0.33	0.20	0.20	0.20		0.46	0.46		0.46	
Clearance Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)	341	593	528	180	336	331		795	620		789	
v/s Ratio Prot	0.01	c0.13			c0.11							
v/s Ratio Perm	0.05		0.01	0.01		0.00		0.09	0.01		c0.13	
v/c Ratio	0.18	0.38	0.03	0.04	0.52	0.00		0.19	0.01		0.27	
Uniform Delay, d1	15.4	16.8	14.8	21.2	23.5	21.0		10.4	9.5		10.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6	0.0	0.1	1.9	0.0		0.5	0.0		0.9	
Delay (s)	15.6	17.4	14.8	21.3	25.4	21.0		11.0	9.6		11.7	
Level of Service	B	B	B	C	C	C		B	A		B	
Approach Delay (s)		16.7			25.1			10.8			11.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

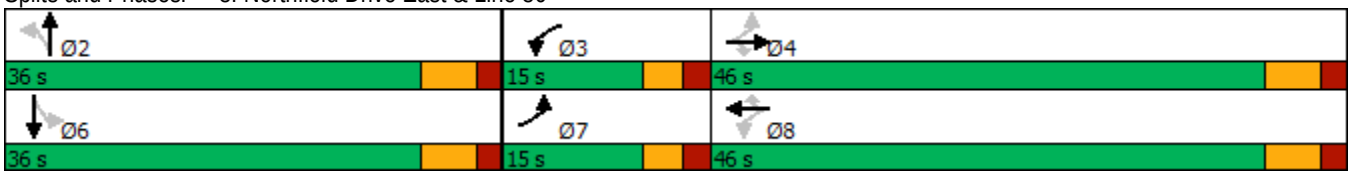


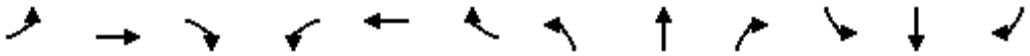
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	180	8	89	166	12	16	144	49	17	225	22
Future Volume (vph)	11	180	8	89	166	12	16	144	49	17	225	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.971			0.985	
Flt Protected	0.950			0.950				0.994			0.997	
Satd. Flow (prot)	1674	1847	1445	1690	1746	1150	0	1714	0	0	1785	0
Flt Permitted	0.636			0.490				0.933			0.972	
Satd. Flow (perm)	1121	1847	1445	872	1746	1150	0	1609	0	0	1741	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		15			7	
Link Speed (k/h)		70			70			70			70	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		15.4			18.7			11.7			15.9	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	9%	4%	13%	8%	10%	42%	6%	6%	16%	6%	4%	18%
Adj. Flow (vph)	16	225	16	146	193	17	28	160	52	20	271	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	225	16	146	193	17	0	240	0	0	327	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0		31.0	31.0	
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	36.0	36.0		36.0	36.0	
Total Split (%)	15.5%	47.4%	47.4%	15.5%	47.4%	47.4%	37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	10.0	40.0	40.0	10.0	40.0	40.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0	18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	32.9	25.0	25.0	39.9	36.9	36.9		30.0			30.0	
Actuated g/C Ratio	0.40	0.31	0.31	0.49	0.45	0.45		0.37			0.37	
v/c Ratio	0.03	0.40	0.03	0.28	0.24	0.03		0.40			0.51	
Control Delay	11.0	25.0	0.1	12.9	16.1	0.1		20.4			23.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	11.0	25.0	0.1	12.9	16.1	0.1		20.4			23.0	
LOS	B	C	A	B	B	A		C			C	
Approach Delay		22.6			14.0			20.4			23.0	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 81.4			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 19.7		Intersection LOS: B	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

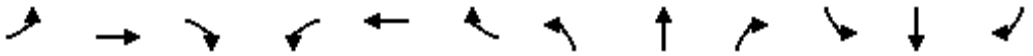
Splits and Phases: 8: Northfield Drive East & Line 86





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	180	8	89	166	12	16	144	49	17	225	22
Future Volume (vph)	11	180	8	89	166	12	16	144	49	17	225	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99			1.00	
Satd. Flow (prot)	1674	1847	1445	1690	1746	1150		1714			1786	
Flt Permitted	0.64	1.00	1.00	0.49	1.00	1.00		0.93			0.97	
Satd. Flow (perm)	1121	1847	1445	871	1746	1150		1608			1742	
Peak-hour factor, PHF	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Adj. Flow (vph)	16	225	16	146	193	17	28	160	52	20	271	36
RTOR Reduction (vph)	0	0	11	0	0	10	0	10	0	0	5	0
Lane Group Flow (vph)	16	225	5	146	193	7	0	230	0	0	322	0
Heavy Vehicles (%)	9%	4%	13%	8%	10%	42%	6%	6%	16%	6%	4%	18%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	30.5	29.0	29.0	43.4	36.9	36.9		30.0			30.0	
Effective Green, g (s)	30.5	29.0	29.0	43.4	36.9	36.9		30.0			30.0	
Actuated g/C Ratio	0.36	0.34	0.34	0.51	0.43	0.43		0.35			0.35	
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	410	627	490	532	754	496		564			611	
v/s Ratio Prot	0.00	c0.12		c0.03	0.11							
v/s Ratio Perm	0.01		0.00	0.11		0.01		0.14			c0.19	
v/c Ratio	0.04	0.36	0.01	0.27	0.26	0.01		0.41			0.53	
Uniform Delay, d1	17.8	21.2	18.7	11.6	15.5	13.9		21.0			22.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.5	0.0	0.4	0.2	0.0		2.2			3.2	
Delay (s)	17.9	21.7	18.7	12.0	15.7	13.9		23.2			25.3	
Level of Service	B	C	B	B	B	B		C			C	
Approach Delay (s)		21.3			14.1			23.2			25.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

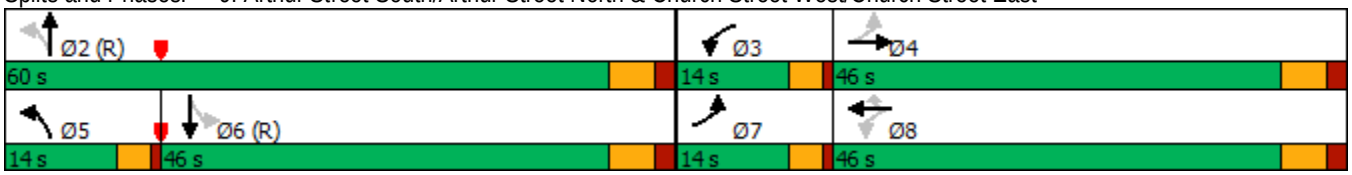


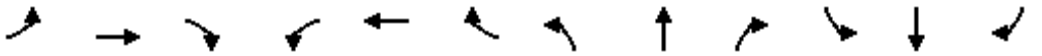
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	161	47	45	113	20	54	137	32	33	217	25
Future Volume (vph)	26	161	47	45	113	20	54	137	32	33	217	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970				0.850		0.971			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1707	0	1615	1715	1420	1521	1635	0	1674	1724	0
Flt Permitted	0.648			0.492			0.344			0.628		
Satd. Flow (perm)	1112	1707	0	836	1715	1420	551	1635	0	1107	1724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				100		13			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.81	0.79	0.90	0.63	0.78	0.71	0.75	0.82	0.80	0.75	0.70	0.78
Heavy Vehicles (%)	12%	11%	2%	13%	12%	15%	20%	16%	6%	9%	8%	28%
Adj. Flow (vph)	32	204	52	71	145	28	72	167	40	44	310	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	256	0	71	145	28	72	207	0	44	342	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0		46.0	46.0	
Total Split (s)	14.0	46.0		14.0	46.0	46.0	14.0	60.0		46.0	46.0	
Total Split (%)	11.7%	38.3%		11.7%	38.3%	38.3%	11.7%	50.0%		38.3%	38.3%	
Maximum Green (s)	10.0	40.0		10.0	40.0	40.0	10.0	54.0		40.0	40.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	
Walk Time (s)		25.0			25.0	25.0		29.0		29.0	29.0	
Flash Dont Walk (s)		15.0			15.0	15.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	52.0	40.0		52.0	40.0	40.0	56.0	54.0		40.0	40.0	
Actuated g/C Ratio	0.43	0.33		0.43	0.33	0.33	0.47	0.45		0.33	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.06	0.44		0.17	0.25	0.05	0.21	0.28		0.12	0.59	
Control Delay	17.9	32.9		19.0	30.6	0.2	19.6	20.6		29.0	37.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.9	32.9		19.0	30.6	0.2	19.6	20.6		29.0	37.8	
LOS	B	C		B	C	A	B	C		C	D	
Approach Delay		31.2			23.8			20.4			36.8	
Approach LOS		C			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East

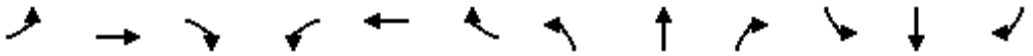




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	161	47	45	113	20	54	137	32	33	217	25
Future Volume (vph)	26	161	47	45	113	20	54	137	32	33	217	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1706		1615	1715	1420	1521	1635		1674	1724	
Flt Permitted	0.65	1.00		0.49	1.00	1.00	0.34	1.00		0.63	1.00	
Satd. Flow (perm)	1111	1706		836	1715	1420	550	1635		1107	1724	
Peak-hour factor, PHF	0.81	0.79	0.90	0.63	0.78	0.71	0.75	0.82	0.80	0.75	0.70	0.78
Adj. Flow (vph)	32	204	52	71	145	28	72	167	40	44	310	32
RTOR Reduction (vph)	0	7	0	0	0	19	0	7	0	0	3	0
Lane Group Flow (vph)	32	249	0	71	145	9	72	200	0	44	339	0
Heavy Vehicles (%)	12%	11%	2%	13%	12%	15%	20%	16%	6%	9%	8%	28%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	50.0	40.0		50.0	40.0	40.0	54.0	54.0		40.0	40.0	
Effective Green, g (s)	50.0	40.0		50.0	40.0	40.0	54.0	54.0		40.0	40.0	
Actuated g/C Ratio	0.42	0.33		0.42	0.33	0.33	0.45	0.45		0.33	0.33	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	506	568		413	571	473	328	735		369	574	
v/s Ratio Prot	0.01	c0.15		c0.01	0.08		0.02	c0.12			c0.20	
v/s Ratio Perm	0.02			0.06		0.01	0.08			0.04		
v/c Ratio	0.06	0.44		0.17	0.25	0.02	0.22	0.27		0.12	0.59	
Uniform Delay, d1	20.8	31.2		21.6	29.1	26.8	20.3	20.7		27.8	33.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.4		0.9	1.1	0.1	1.5	0.9		0.7	4.4	
Delay (s)	21.1	33.7		22.5	30.2	26.9	21.9	21.6		28.4	37.6	
Level of Service	C	C		C	C	C	C	C		C	D	
Approach Delay (s)		32.3			27.6			21.7			36.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



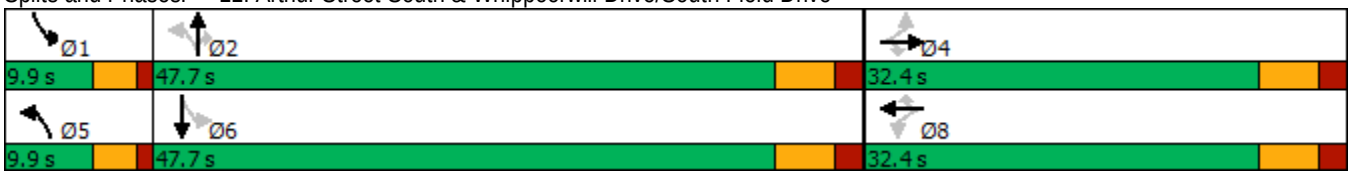
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	52	145	34	21	99	36	419	61	97	523	10
Future Volume (vph)	44	52	145	34	21	99	36	419	61	97	523	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		40.0	30.0		25.0	45.0		45.0	45.0		5.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	40.0			50.0			5.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1847	1617	1825	1746	1484	1772	1762	1512	1807	3422	0
Flt Permitted	0.736			0.713			0.437			0.332		
Satd. Flow (perm)	1414	1847	1617	1370	1746	1484	815	1762	1512	631	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			173			129			85		5	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		238.4			306.2			185.0			215.7	
Travel Time (s)		17.2			22.0			11.1			12.9	
Peak Hour Factor	0.69	0.76	0.84	0.83	0.66	0.77	0.82	0.71	0.76	0.90	0.95	0.50
Heavy Vehicles (%)	0%	4%	1%	0%	10%	10%	3%	9%	8%	1%	6%	10%
Adj. Flow (vph)	64	68	173	41	32	129	44	590	80	108	551	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	68	173	41	32	129	44	590	80	108	571	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane								Yes				
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

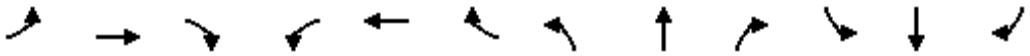
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	5.0	41.7	41.7	5.0	41.7	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	9.5	47.7	47.7	9.5	47.7	
Total Split (s)	32.4	32.4	32.4	32.4	32.4	32.4	9.9	47.7	47.7	9.9	47.7	
Total Split (%)	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	11.0%	53.0%	53.0%	11.0%	53.0%	
Maximum Green (s)	26.4	26.4	26.4	26.4	26.4	26.4	5.9	41.7	41.7	5.9	41.7	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	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	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	
Flash Dont Walk (s)	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0		16.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effct Green (s)	12.2	12.2	12.2	12.2	12.2	12.2	49.3	42.6	42.6	50.1	44.6	
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.66	0.57	0.57	0.67	0.60	
v/c Ratio	0.28	0.23	0.42	0.18	0.11	0.37	0.07	0.59	0.09	0.21	0.28	
Control Delay	31.5	29.9	8.6	29.8	28.3	9.2	3.8	14.1	2.3	4.6	8.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	31.5	29.9	8.6	29.8	28.3	9.2	3.8	14.1	2.3	4.6	8.4	
LOS	C	C	A	C	C	A	A	B	A	A	A	
Approach Delay		18.1			16.4			12.2			7.8	
Approach LOS		B			B			B			A	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 74.7
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 12.0 Intersection LOS: B
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15

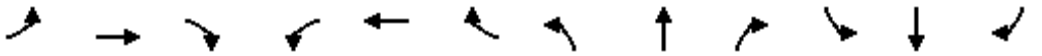
Splits and Phases: 11: Arthur Street South & Whippoorwill Drive/South Field Drive





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	52	145	34	21	99	36	419	61	97	523	10
Future Volume (vph)	44	52	145	34	21	99	36	419	61	97	523	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1847	1617	1825	1746	1484	1772	1762	1512	1807	3421	
Flt Permitted	0.74	1.00	1.00	0.71	1.00	1.00	0.44	1.00	1.00	0.33	1.00	
Satd. Flow (perm)	1415	1847	1617	1369	1746	1484	816	1762	1512	631	3421	
Peak-hour factor, PHF	0.69	0.76	0.84	0.83	0.66	0.77	0.82	0.71	0.76	0.90	0.95	0.50
Adj. Flow (vph)	64	68	173	41	32	129	44	590	80	108	551	20
RTOR Reduction (vph)	0	0	145	0	0	108	0	0	34	0	2	0
Lane Group Flow (vph)	64	68	28	41	32	21	44	590	46	108	569	0
Heavy Vehicles (%)	0%	4%	1%	0%	10%	10%	3%	9%	8%	1%	6%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2	12.2	47.0	43.5	43.5	49.2	44.6	
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2	12.2	47.0	43.5	43.5	49.2	44.6	
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.62	0.57	0.57	0.64	0.58	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	226	295	258	218	279	237	546	1004	862	477	1999	
v/s Ratio Prot		0.04			0.02		0.00	c0.33		c0.01	0.17	
v/s Ratio Perm	c0.05		0.02	0.03		0.01	0.05		0.03	0.13		
v/c Ratio	0.28	0.23	0.11	0.19	0.11	0.09	0.08	0.59	0.05	0.23	0.28	
Uniform Delay, d1	28.2	28.0	27.4	27.8	27.4	27.3	5.8	10.6	7.3	6.0	7.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.2	0.4	0.2	0.2	0.1	2.5	0.1	0.2	0.4	
Delay (s)	28.9	28.4	27.6	28.2	27.6	27.5	5.8	13.1	7.4	6.3	8.3	
Level of Service	C	C	C	C	C	C	A	B	A	A	A	
Approach Delay (s)		28.0			27.6			12.0			7.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

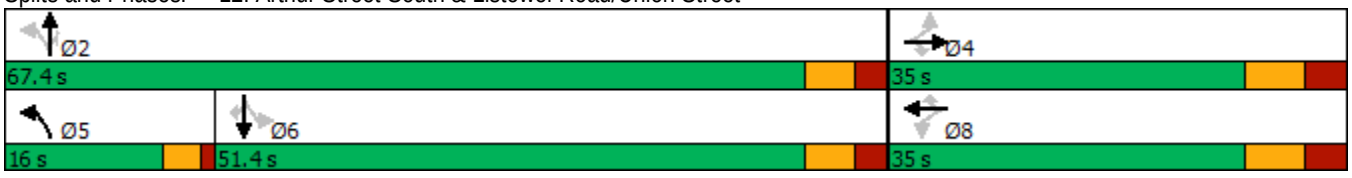


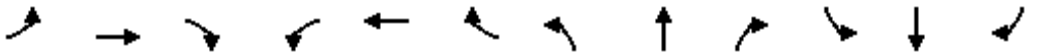
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	42	314	58	14	7	184	454	125	1	637	51
Future Volume (vph)	95	42	314	58	14	7	184	454	125	1	637	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	35.0		35.0	100.0		100.0	45.0		45.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	1847	1484
Flt Permitted	0.742			0.715			0.180			0.432		
Satd. Flow (perm)	1371	1685	1432	961	1413	1142	274	1762	1432	415	1847	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			335			79			156			96
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			171.5	
Travel Time (s)		16.0			12.2			13.7			10.3	
Peak Hour Factor	0.72	0.66	0.79	0.91	0.58	0.58	0.81	0.74	0.80	0.25	0.91	0.85
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Adj. Flow (vph)	132	64	397	64	24	12	227	614	156	4	700	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	64	397	64	24	12	227	614	156	4	700	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	45.0	45.0	45.0	45.0	45.0
Minimum Split (s)	34.0	34.0	34.0	34.0	34.0	34.0	11.5	51.4	51.4	51.4	51.4	51.4
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	16.0	67.4	67.4	51.4	51.4	51.4
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	15.6%	65.8%	65.8%	50.2%	50.2%	50.2%
Maximum Green (s)	27.0	27.0	27.0	27.0	27.0	27.0	12.0	61.0	61.0	45.0	45.0	45.0
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	1.0	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		25.0	25.0	25.0	25.0	25.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0	0	0	0
Act Effct Green (s)	15.9	15.9	15.9	15.9	15.9	15.9	63.7	61.3	61.3	45.3	45.3	45.3
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.69	0.67	0.67	0.49	0.49	0.49
v/c Ratio	0.55	0.22	0.76	0.38	0.10	0.05	0.66	0.52	0.15	0.02	0.77	0.08
Control Delay	43.2	33.2	16.7	39.6	31.2	0.3	18.5	10.8	1.8	15.0	27.4	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	33.2	16.7	39.6	31.2	0.3	18.5	10.8	1.8	15.0	27.4	1.5
LOS	D	C	B	D	C	A	B	B	A	B	C	A
Approach Delay		24.4			32.8			11.2			25.3	
Approach LOS		C			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 102.4			
Actuated Cycle Length: 91.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 19.7		Intersection LOS: B	
Intersection Capacity Utilization 104.3%		ICU Level of Service G	
Analysis Period (min) 15			

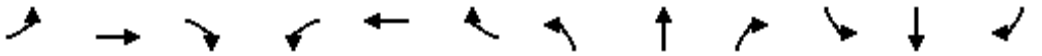
Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	42	314	58	14	7	184	454	125	1	637	51
Future Volume (vph)	95	42	314	58	14	7	184	454	125	1	637	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	1847	1484
Flt Permitted	0.74	1.00	1.00	0.72	1.00	1.00	0.18	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	1370	1685	1432	961	1413	1142	274	1762	1432	415	1847	1484
Peak-hour factor, PHF	0.72	0.66	0.79	0.91	0.58	0.58	0.81	0.74	0.80	0.25	0.91	0.85
Adj. Flow (vph)	132	64	397	64	24	12	227	614	156	4	700	60
RTOR Reduction (vph)	0	0	277	0	0	10	0	0	52	0	0	30
Lane Group Flow (vph)	132	64	120	64	24	2	227	614	104	4	700	30
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	15.9	15.9	15.9	15.9	15.9	15.9	61.3	61.3	61.3	45.3	45.3	45.3
Effective Green, g (s)	15.9	15.9	15.9	15.9	15.9	15.9	61.3	61.3	61.3	45.3	45.3	45.3
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.67	0.67	0.67	0.49	0.49	0.49
Clearance Time (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237	292	248	166	245	198	337	1179	958	205	913	733
v/s Ratio Prot		0.04			0.02		c0.09	0.35			c0.38	
v/s Ratio Perm	c0.10		0.08	0.07		0.00	0.36		0.07	0.01		0.02
v/c Ratio	0.56	0.22	0.48	0.39	0.10	0.01	0.67	0.52	0.11	0.02	0.77	0.04
Uniform Delay, d1	34.6	32.5	34.2	33.5	31.8	31.3	12.3	7.7	5.4	11.8	18.8	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.4	1.5	1.5	0.2	0.0	6.8	1.6	0.2	0.2	6.1	0.1
Delay (s)	37.5	32.9	35.6	35.0	32.0	31.4	19.1	9.3	5.6	12.0	25.0	12.0
Level of Service	D	C	D	D	C	C	B	A	A	B	C	B
Approach Delay (s)		35.7			33.9			11.0			23.9	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	18.4
Intersection Capacity Utilization	104.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

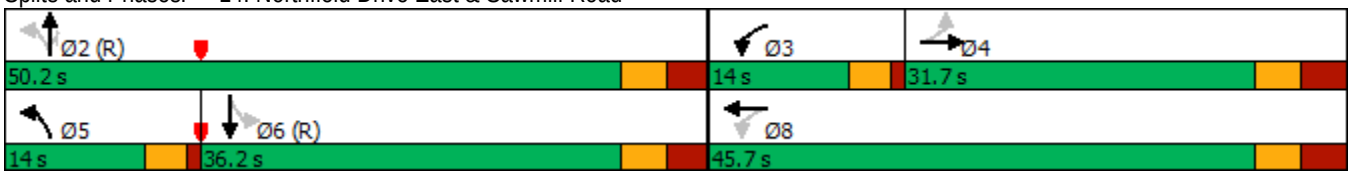


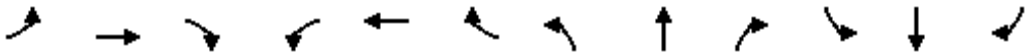
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	148	67	223	168	13	47	133	202	17	195	120
Future Volume (vph)	60	148	67	223	168	13	47	133	202	17	195	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.987				0.850		0.950	
Flt Protected	0.950			0.950				0.986			0.997	
Satd. Flow (prot)	1587	1644	0	1706	1756	0	0	1816	1512	0	1717	0
Flt Permitted	0.613			0.382				0.760			0.970	
Satd. Flow (perm)	1024	1644	0	686	1756	0	0	1399	1512	0	1670	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			6				269		32	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.83	0.80	0.73	0.83	0.79	0.65	0.78	0.85	0.75	0.71	0.92	0.86
Heavy Vehicles (%)	15%	13%	7%	7%	8%	8%	0%	6%	8%	12%	4%	8%
Adj. Flow (vph)	72	185	92	269	213	20	60	156	269	24	212	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	277	0	269	233	0	0	216	269	0	376	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	
Total Split (s)	31.7	31.7		14.0	45.7		14.0	50.2	50.2	36.2	36.2	
Total Split (%)	33.1%	33.1%		14.6%	47.7%		14.6%	52.3%	52.3%	37.7%	37.7%	
Maximum Green (s)	25.0	25.0		10.0	39.0		10.0	44.0	44.0	30.0	30.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Walk Time (s)	14.0	14.0			14.0			25.0	25.0	25.0	25.0	
Flash Dont Walk (s)	11.0	11.0			11.0			5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)	0	0			0			0	0	0	0	
Act Effct Green (s)	25.0	25.0		41.7	39.0			44.0	44.0		30.0	
Actuated g/C Ratio	0.26	0.26		0.43	0.41			0.46	0.46		0.31	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.27	0.62		0.67	0.32			0.32	0.32		0.69	
Control Delay	31.6	35.3		27.9	20.5			17.6	3.1		34.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	31.6	35.3		27.9	20.5			17.6	3.1		34.1	
LOS	C	D		C	C			B	A		C	
Approach Delay		34.6			24.5			9.5			34.1	
Approach LOS		C			C			A			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95.9			
Actuated Cycle Length: 95.9			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 14: Northfield Drive East & Sawmill Road

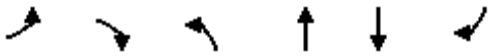




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	148	67	223	168	13	47	133	202	17	195	120
Future Volume (vph)	60	148	67	223	168	13	47	133	202	17	195	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.95		1.00	0.99			1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1587	1644		1706	1756			1816	1512		1716	
Flt Permitted	0.61	1.00		0.38	1.00			0.76	1.00		0.97	
Satd. Flow (perm)	1025	1644		686	1756			1400	1512		1669	
Peak-hour factor, PHF	0.83	0.80	0.73	0.83	0.79	0.65	0.78	0.85	0.75	0.71	0.92	0.86
Adj. Flow (vph)	72	185	92	269	213	20	60	156	269	24	212	140
RTOR Reduction (vph)	0	18	0	0	4	0	0	0	146	0	22	0
Lane Group Flow (vph)	72	259	0	269	229	0	0	216	123	0	354	0
Heavy Vehicles (%)	15%	13%	7%	7%	8%	8%	0%	6%	8%	12%	4%	8%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	25.0	25.0		39.0	39.0			44.0	44.0		30.0	
Effective Green, g (s)	25.0	25.0		39.0	39.0			44.0	44.0		30.0	
Actuated g/C Ratio	0.26	0.26		0.41	0.41			0.46	0.46		0.31	
Clearance Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lane Grp Cap (vph)	267	428		385	714			685	693		522	
v/s Ratio Prot		0.16		c0.07	0.13			c0.03				
v/s Ratio Perm	0.07			c0.21				0.11	0.08		c0.21	
v/c Ratio	0.27	0.60		0.70	0.32			0.32	0.18		0.68	
Uniform Delay, d1	28.2	31.1		21.3	19.4			16.4	15.3		28.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	2.5	6.2		10.1	1.2			1.2	0.6		6.9	
Delay (s)	30.7	37.3		31.4	20.6			17.6	15.9		35.7	
Level of Service	C	D		C	C			B	B		D	
Approach Delay (s)		35.9			26.4			16.6			35.7	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	20.9
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

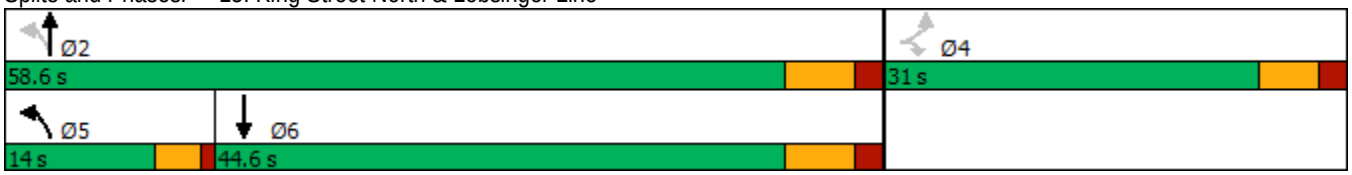


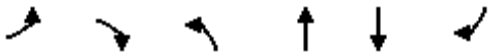
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	330	221	265	266	48
Future Volume (vph)	42	330	221	265	266	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.975	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1393	1420	1508	1830	1682	0
Flt Permitted	0.950		0.443			
Satd. Flow (perm)	1393	1420	703	1830	1682	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		367			16	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.62	0.90	0.94	0.90	0.87	0.68
Heavy Vehicles (%)	31%	15%	21%	5%	11%	13%
Adj. Flow (vph)	68	367	235	294	306	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	367	235	294	377	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	58.6	44.6	
Total Split (%)	34.6%	34.6%	15.6%	65.4%	49.8%	
Maximum Green (s)	25.0	25.0	10.0	52.0	38.0	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	7.0	7.0		27.0	27.0	
Flash Dont Walk (s)	9.0	9.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	11.4	11.4	54.7	52.1	38.3	
Actuated g/C Ratio	0.15	0.15	0.72	0.68	0.50	
v/c Ratio	0.33	0.70	0.39	0.24	0.44	
Control Delay	33.2	11.4	5.9	5.4	14.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.2	11.4	5.9	5.4	14.1	
LOS	C	B	A	A	B	
Approach Delay	14.8			5.6	14.1	
Approach LOS	B			A	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 89.6			
Actuated Cycle Length: 76.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 63.6%		ICU Level of Service B	
Analysis Period (min) 15			

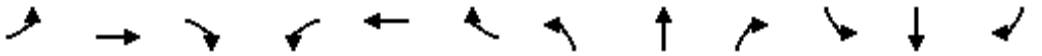
Splits and Phases: 15: King Street North & Lobsinger Line





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	330	221	265	266	48
Future Volume (vph)	42	330	221	265	266	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.6	6.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1393	1420	1508	1830	1681	
Flt Permitted	0.95	1.00	0.44	1.00	1.00	
Satd. Flow (perm)	1393	1420	704	1830	1681	
Peak-hour factor, PHF	0.62	0.90	0.94	0.90	0.87	0.68
Adj. Flow (vph)	68	367	235	294	306	71
RTOR Reduction (vph)	0	312	0	0	8	0
Lane Group Flow (vph)	68	55	235	294	369	0
Heavy Vehicles (%)	31%	15%	21%	5%	11%	13%
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	11.4	11.4	52.1	52.1	38.3	
Effective Green, g (s)	11.4	11.4	52.1	52.1	38.3	
Actuated g/C Ratio	0.15	0.15	0.68	0.68	0.50	
Clearance Time (s)	6.0	6.0	4.0	6.6	6.6	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Lane Grp Cap (vph)	208	212	585	1252	846	
v/s Ratio Prot			c0.05	0.16	c0.22	
v/s Ratio Perm	c0.05	0.04	0.22			
v/c Ratio	0.33	0.26	0.40	0.23	0.44	
Uniform Delay, d1	28.9	28.6	5.0	4.5	12.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.7	0.9	0.4	1.6	
Delay (s)	29.8	29.3	5.9	5.0	13.7	
Level of Service	C	C	A	A	B	
Approach Delay (s)	29.4			5.4	13.7	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	16.6
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

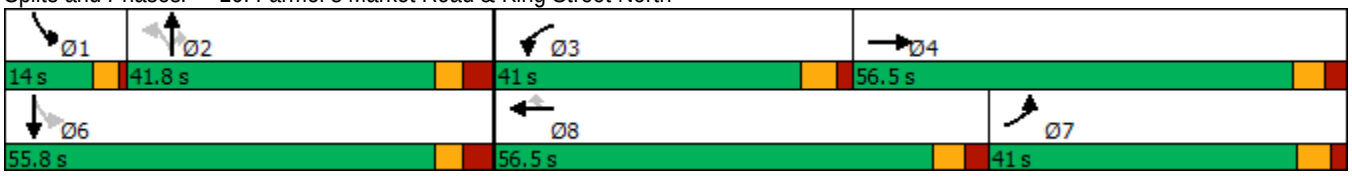


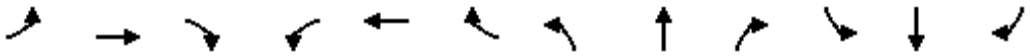
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	190	8	165	365	55	17	162	345	61	89	10
Future Volume (vph)	257	190	8	165	365	55	17	162	345	61	89	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3373	0	3278	1779	1384	1415	1847	1601	1690	1774	0
Flt Permitted	0.950			0.950			0.682			0.399		
Satd. Flow (perm)	1674	3373	0	3278	1779	1384	1016	1847	1601	710	1774	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				102			383		6	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.89	0.85	0.56	0.86	0.82	0.81	0.85	0.90	0.90	0.90	0.89	0.63
Heavy Vehicles (%)	9%	7%	11%	8%	8%	18%	29%	4%	2%	8%	7%	0%
Adj. Flow (vph)	289	224	14	192	445	68	20	180	383	68	100	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	289	238	0	192	445	68	20	180	383	68	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Maximum Green (s)	35.0	50.0		35.0	50.0	50.0	35.0	35.0	35.0	10.0	49.0	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)		18.0			18.0	18.0	18.0	18.0	18.0		18.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	27.6	64.6		14.1	51.1	51.1	20.6	20.6	20.6	33.9	31.1	
Actuated g/C Ratio	0.21	0.50		0.11	0.39	0.39	0.16	0.16	0.16	0.26	0.24	
v/c Ratio	0.81	0.14		0.54	0.63	0.11	0.12	0.61	0.66	0.27	0.27	
Control Delay	68.0	19.8		62.8	40.6	2.2	50.7	61.4	10.8	39.1	39.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	68.0	19.8		62.8	40.6	2.2	50.7	61.4	10.8	39.1	39.1	
LOS	E	B		E	D	A	D	E	B	D	D	
Approach Delay		46.2			43.0			27.8			39.1	
Approach LOS		D			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 129.5			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 39.0		Intersection LOS: D	
Intersection Capacity Utilization 71.9%		ICU Level of Service C	
Analysis Period (min) 15			

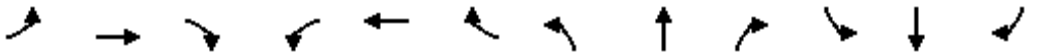
Splits and Phases: 16: Farmer's Market Road & King Street North





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	190	8	165	365	55	17	162	345	61	89	10
Future Volume (vph)	257	190	8	165	365	55	17	162	345	61	89	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		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)	1674	3374		3278	1779	1384	1415	1847	1601	1690	1774	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.68	1.00	1.00	0.40	1.00	
Satd. Flow (perm)	1674	3374		3278	1779	1384	1016	1847	1601	710	1774	
Peak-hour factor, PHF	0.89	0.85	0.56	0.86	0.82	0.81	0.85	0.90	0.90	0.90	0.89	0.63
Adj. Flow (vph)	289	224	14	192	445	68	20	180	383	68	100	16
RTOR Reduction (vph)	0	2	0	0	0	41	0	0	322	0	5	0
Lane Group Flow (vph)	289	236	0	192	445	27	20	180	61	68	111	0
Heavy Vehicles (%)	9%	7%	11%	8%	8%	18%	29%	4%	2%	8%	7%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	27.6	64.6		14.1	51.1	51.1	20.6	20.6	20.6	32.0	32.0	
Effective Green, g (s)	27.6	64.6		14.1	51.1	51.1	20.6	20.6	20.6	32.0	32.0	
Actuated g/C Ratio	0.21	0.50		0.11	0.39	0.39	0.16	0.16	0.16	0.25	0.25	
Clearance Time (s)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	355	1676		355	699	544	160	292	253	230	436	
v/s Ratio Prot	c0.17	0.07		0.06	c0.25			c0.10		c0.02	0.06	
v/s Ratio Perm						0.02	0.02		0.04	0.06		
v/c Ratio	0.81	0.14		0.54	0.64	0.05	0.12	0.62	0.24	0.30	0.26	
Uniform Delay, d1	48.8	17.7		54.9	31.9	24.4	47.0	51.0	47.9	38.8	39.4	
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	14.0	0.2		2.1	4.4	0.2	0.5	4.4	0.7	1.0	0.4	
Delay (s)	62.7	17.9		57.0	36.3	24.6	47.4	55.4	48.5	39.8	39.8	
Level of Service	E	B		E	D	C	D	E	D	D	D	
Approach Delay (s)		42.5			40.8			50.6			39.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	23.3
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

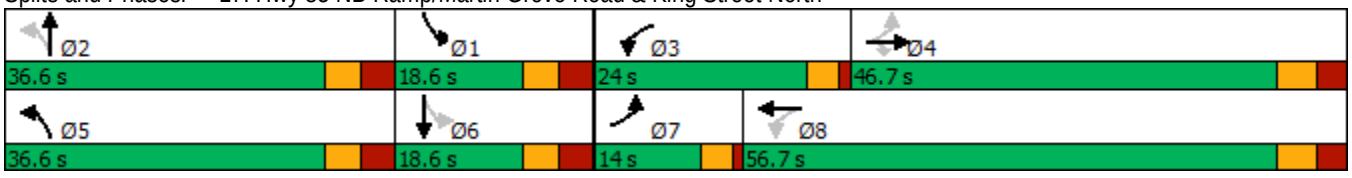


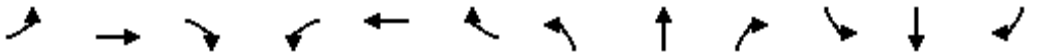
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	409	90	28	223	4	246	1	198	10	3	14
Future Volume (vph)	6	409	90	28	223	4	246	1	198	10	3	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993			0.853			0.893	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	1830	1484	1601	3302	0	3079	1577	0	1825	1560	0
Flt Permitted	0.596			0.392								
Satd. Flow (perm)	979	1830	1484	661	3302	0	3241	1577	0	1921	1560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		5			228			20	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.75	0.92	0.87	0.58	0.93	0.33	0.92	0.25	0.87	0.63	0.38	0.70
Heavy Vehicles (%)	17%	5%	10%	14%	9%	25%	15%	0%	4%	0%	0%	14%
Adj. Flow (vph)	8	445	103	48	240	12	267	4	228	16	8	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	445	103	48	252	0	267	232	0	16	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			10.0			5.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Maximum Green (s)	10.0	40.0	40.0	20.0	50.0		30.0	30.0		12.0	12.0	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Walk Time (s)		25.0	25.0		25.0			10.0			10.0	
Flash Dont Walk (s)		15.0	15.0		15.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	53.7	46.9	46.9	56.1	51.9		15.9	15.2		10.1	8.3	
Actuated g/C Ratio	0.63	0.55	0.55	0.66	0.61		0.19	0.18		0.12	0.10	
v/c Ratio	0.01	0.44	0.12	0.09	0.13		0.44	0.50		0.07	0.17	
Control Delay	8.3	17.2	1.0	7.9	9.8		34.3	9.6		39.0	25.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.3	17.2	1.0	7.9	9.8		34.3	9.6		39.0	25.5	
LOS	A	B	A	A	A		C	A		D	C	
Approach Delay		14.1			9.5			22.8			30.4	
Approach LOS		B			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.9			
Actuated Cycle Length: 85.6			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 60.3%		ICU Level of Service B	
Analysis Period (min) 15			

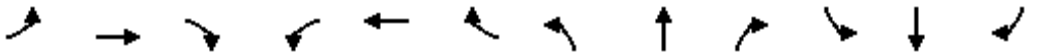
Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	409	90	28	223	4	246	1	198	10	3	14
Future Volume (vph)	6	409	90	28	223	4	246	1	198	10	3	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1560	1830	1484	1601	3302		3079	1576		1825	1559	
Flt Permitted	0.60	1.00	1.00	0.39	1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)	978	1830	1484	661	3302		3241	1576		1921	1559	
Peak-hour factor, PHF	0.75	0.92	0.87	0.58	0.93	0.33	0.92	0.25	0.87	0.63	0.38	0.70
Adj. Flow (vph)	8	445	103	48	240	12	267	4	228	16	8	20
RTOR Reduction (vph)	0	0	50	0	2	0	0	191	0	0	19	0
Lane Group Flow (vph)	8	445	53	48	250	0	267	41	0	16	9	0
Heavy Vehicles (%)	17%	5%	10%	14%	9%	25%	15%	0%	4%	0%	0%	14%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	49.8	48.6	48.6	56.4	51.9		15.2	15.2		3.9	3.9	
Effective Green, g (s)	49.8	48.6	48.6	56.4	51.9		15.2	15.2		3.9	3.9	
Actuated g/C Ratio	0.53	0.52	0.52	0.60	0.55		0.16	0.16		0.04	0.04	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	524	944	765	440	1819		522	254		79	64	
v/s Ratio Prot	0.00	c0.24		c0.01	0.08		0.07	0.03		0.00	0.01	
v/s Ratio Perm	0.01		0.04	0.06			c0.01			c0.00		
v/c Ratio	0.02	0.47	0.07	0.11	0.14		0.51	0.16		0.20	0.14	
Uniform Delay, d1	10.5	14.6	11.4	8.6	10.3		36.3	34.0		42.0	43.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	1.7	0.2	0.2	0.2		0.8	0.3		1.3	1.0	
Delay (s)	10.5	16.3	11.6	8.7	10.4		37.1	34.3		43.3	44.5	
Level of Service	B	B	B	A	B		D	C		D	D	
Approach Delay (s)		15.3			10.2			35.8			44.1	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	23.9
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

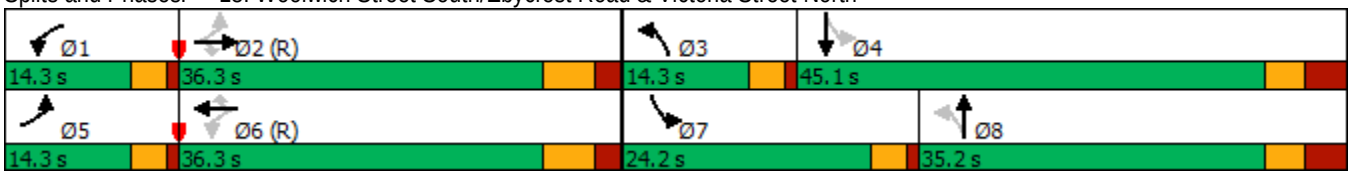


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	786	182	25	981	272	208	56	31	185	36	104
Future Volume (vph)	71	786	182	25	981	272	208	56	31	185	36	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.950			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	3411	1570	1630	3411	1471	1772	1706	0	1630	1614	0
Flt Permitted	0.158			0.286			0.634			0.521		
Satd. Flow (perm)	292	3411	1570	491	3411	1471	1183	1706	0	894	1614	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			278		22			139	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.63	0.93	0.87	0.84	0.70	0.78	0.83	0.69	0.72
Heavy Vehicles (%)	4%	7%	4%	12%	7%	11%	3%	4%	13%	12%	3%	7%
Adj. Flow (vph)	84	810	236	40	1055	313	248	80	40	223	52	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	810	236	40	1055	313	248	120	0	223	196	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	34.9	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	14.3	35.2		24.2	45.1	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	13.0%	32.0%		22.0%	41.0%	
Maximum Green (s)	10.3	29.8	29.8	10.3	29.8	29.8	10.3	28.3		20.2	38.2	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	Min	
Walk Time (s)		18.8	18.8		18.8	18.8		10.0			10.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		18.0			18.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	62.7	54.7	54.7	59.8	51.6	51.6	26.4	13.2		37.6	20.7	
Actuated g/C Ratio	0.57	0.50	0.50	0.54	0.47	0.47	0.24	0.12		0.34	0.19	
v/c Ratio	0.31	0.48	0.26	0.12	0.66	0.37	0.73	0.54		0.53	0.47	
Control Delay	14.7	21.7	3.6	12.7	27.3	5.6	43.2	45.4		31.1	15.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.7	21.7	3.6	12.7	27.3	5.6	43.2	45.4		31.1	15.8	
LOS	B	C	A	B	C	A	D	D		C	B	
Approach Delay		17.4			22.0			43.9			23.9	
Approach LOS		B			C			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 104.5 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 69.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	786	182	25	981	272	208	56	31	185	36	104
Future Volume (vph)	71	786	182	25	981	272	208	56	31	185	36	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3411	1570	1630	3411	1471	1772	1706		1630	1614	
Flt Permitted	0.16	1.00	1.00	0.29	1.00	1.00	0.63	1.00		0.52	1.00	
Satd. Flow (perm)	292	3411	1570	490	3411	1471	1183	1706		894	1614	
Peak-hour factor, PHF	0.85	0.97	0.77	0.63	0.93	0.87	0.84	0.70	0.78	0.83	0.69	0.72
Adj. Flow (vph)	84	810	236	40	1055	313	248	80	40	223	52	144
RTOR Reduction (vph)	0	0	122	0	0	150	0	19	0	0	113	0
Lane Group Flow (vph)	84	810	114	40	1055	163	248	101	0	223	83	0
Heavy Vehicles (%)	4%	7%	4%	12%	7%	11%	3%	4%	13%	12%	3%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	59.9	53.1	53.1	55.3	50.8	50.8	23.5	13.2		35.0	20.7	
Effective Green, g (s)	59.9	53.1	53.1	55.3	50.8	50.8	23.5	13.2		35.0	20.7	
Actuated g/C Ratio	0.54	0.48	0.48	0.50	0.46	0.46	0.21	0.12		0.32	0.19	
Clearance Time (s)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	249	1646	757	292	1575	679	307	204		403	303	
v/s Ratio Prot	c0.02	0.24		0.01	c0.31		c0.08	0.06		c0.09	0.05	
v/s Ratio Perm	0.16		0.07	0.06		0.11	c0.10			0.09		
v/c Ratio	0.34	0.49	0.15	0.14	0.67	0.24	0.81	0.49		0.55	0.27	
Uniform Delay, d1	14.7	19.3	15.9	14.3	23.1	17.9	39.8	45.3		29.7	38.2	
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	0.8	1.1	0.4	0.2	2.3	0.8	14.4	2.5		2.0	0.7	
Delay (s)	15.5	20.4	16.3	14.5	25.3	18.8	54.2	47.8		31.7	38.9	
Level of Service	B	C	B	B	C	B	D	D		C	D	
Approach Delay (s)		19.1			23.6			52.1			35.1	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.4
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



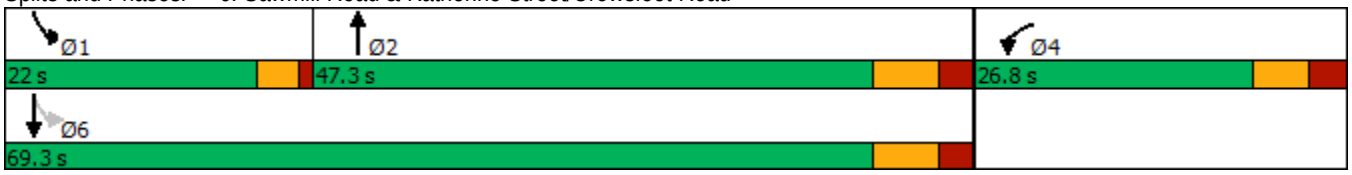
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	174	189	177	175	231	219
Future Volume (vph)	174	189	177	175	231	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.930			
Flt Protected	0.977					0.974
Satd. Flow (prot)	1685	0	1717	0	0	1844
Flt Permitted	0.977					0.585
Satd. Flow (perm)	1685	0	1717	0	0	1108
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	54		69			
Link Speed (k/h)	48		48			48
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	17.3		24.8			19.4
Peak Hour Factor	0.85	0.80	0.85	0.78	0.78	0.83
Heavy Vehicles (%)	5%	2%	2%	6%	1%	2%
Adj. Flow (vph)	205	236	208	224	296	264
Shared Lane Traffic (%)						
Lane Group Flow (vph)	441	0	432	0	0	560
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Detector Phase	4		2		1	6
Switch Phase						

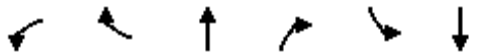


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Initial (s)	3.5		20.0		10.0	20.0
Minimum Split (s)	14.8		27.3		14.0	27.3
Total Split (s)	26.8		47.3		22.0	69.3
Total Split (%)	27.9%		49.2%		22.9%	72.1%
Maximum Green (s)	20.0		40.0		18.0	62.0
Yellow Time (s)	3.9		4.8		3.0	4.8
All-Red Time (s)	2.9		2.5		1.0	2.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		7.3			7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		5.0		3.0	5.0
Recall Mode	Max		None		None	None
Walk Time (s)			10.0			
Flash Dont Walk (s)			8.0			
Pedestrian Calls (#/hr)			0			
Act Effct Green (s)	20.1		58.5			58.5
Actuated g/C Ratio	0.22		0.63			0.63
v/c Ratio	1.08		0.39			0.80
Control Delay	102.0		7.9			23.5
Queue Delay	0.0		0.0			0.0
Total Delay	102.0		7.9			23.5
LOS	F		A			C
Approach Delay	102.0		7.9			23.5
Approach LOS	F		A			C

Intersection Summary			
Area Type:	Other		
Cycle Length: 96.1			
Actuated Cycle Length: 92.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 42.9		Intersection LOS: D	
Intersection Capacity Utilization 83.4%		ICU Level of Service E	
Analysis Period (min) 15			

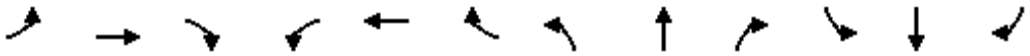
Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	174	189	177	175	231	219
Future Volume (vph)	174	189	177	175	231	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8		7.3			7.3
Lane Util. Factor	1.00		1.00			1.00
Frt	0.93		0.93			1.00
Flt Protected	0.98		1.00			0.97
Satd. Flow (prot)	1685		1717			1845
Flt Permitted	0.98		1.00			0.58
Satd. Flow (perm)	1685		1717			1107
Peak-hour factor, PHF	0.85	0.80	0.85	0.78	0.78	0.83
Adj. Flow (vph)	205	236	208	224	296	264
RTOR Reduction (vph)	42	0	25	0	0	0
Lane Group Flow (vph)	399	0	407	0	0	560
Heavy Vehicles (%)	5%	2%	2%	6%	1%	2%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	20.1		58.5			58.5
Effective Green, g (s)	20.1		58.5			58.5
Actuated g/C Ratio	0.22		0.63			0.63
Clearance Time (s)	6.8		7.3			7.3
Vehicle Extension (s)	4.0		5.0			5.0
Lane Grp Cap (vph)	365		1083			698
v/s Ratio Prot	c0.24		0.24			
v/s Ratio Perm						c0.51
v/c Ratio	1.09		0.38			0.80
Uniform Delay, d1	36.3		8.3			12.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	74.2		0.5			7.5
Delay (s)	110.5		8.7			20.3
Level of Service	F		A			C
Approach Delay (s)	110.5		8.7			20.3
Approach LOS	F		A			C

Intersection Summary			
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	18.1
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



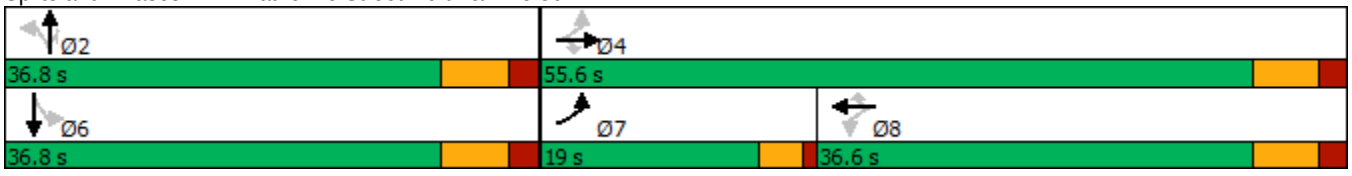
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	187	36	22	264	11	47	135	15	3	145	62
Future Volume (vph)	77	187	36	22	264	11	47	135	15	3	145	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.962	
Flt Protected	0.950			0.950				0.986			0.999	
Satd. Flow (prot)	1738	1883	1541	1738	1812	1498	0	1806	1633	0	1783	0
Flt Permitted	0.389			0.628				0.828			0.996	
Satd. Flow (perm)	712	1883	1541	1149	1812	1498	0	1517	1633	0	1778	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			92			90		23	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.92	0.90	0.90	0.61	0.97	0.69	0.69	0.78	0.75	0.75	0.70	0.74
Heavy Vehicles (%)	5%	2%	6%	5%	6%	9%	2%	6%	0%	0%	3%	5%
Adj. Flow (vph)	84	208	40	36	272	16	68	173	20	4	207	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	208	40	36	272	16	0	241	20	0	295	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	19.0	55.6	55.6	36.6	36.6	36.6	36.8	36.8	36.8	36.8	36.8	
Total Split (%)	20.6%	60.2%	60.2%	39.6%	39.6%	39.6%	39.8%	39.8%	39.8%	39.8%	39.8%	
Maximum Green (s)	15.0	49.0	49.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		15.0	15.0	15.0	15.0	15.0	13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0	0	0	0	
Act Effct Green (s)	29.6	27.0	27.0	17.0	17.0	17.0		30.7	30.7		30.7	
Actuated g/C Ratio	0.41	0.38	0.38	0.24	0.24	0.24		0.43	0.43		0.43	
v/c Ratio	0.20	0.29	0.07	0.13	0.63	0.04		0.37	0.03		0.38	
Control Delay	12.5	15.4	3.9	23.2	32.1	0.2		19.0	0.1		17.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	12.5	15.4	3.9	23.2	32.1	0.2		19.0	0.1		17.2	
LOS	B	B	A	C	C	A		B	A		B	
Approach Delay		13.3			29.6			17.5			17.2	
Approach LOS		B			C			B			B	

Intersection Summary

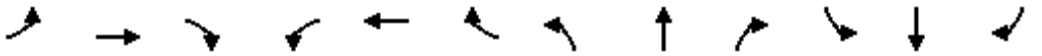
Area Type: Other
Cycle Length: 92.4
Actuated Cycle Length: 71.4
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 19.5 Intersection LOS: B
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 7: Katherine Street North & Line 86



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	187	36	22	264	11	47	135	15	3	145	62
Future Volume (vph)	77	187	36	22	264	11	47	135	15	3	145	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	1738	1883	1541	1738	1812	1498		1806	1633		1783	
Flt Permitted	0.39	1.00	1.00	0.63	1.00	1.00		0.83	1.00		1.00	
Satd. Flow (perm)	711	1883	1541	1148	1812	1498		1517	1633		1777	
Peak-hour factor, PHF	0.92	0.90	0.90	0.61	0.97	0.69	0.69	0.78	0.75	0.75	0.70	0.74
Adj. Flow (vph)	84	208	40	36	272	16	68	173	20	4	207	84
RTOR Reduction (vph)	0	0	24	0	0	12	0	0	11	0	13	0
Lane Group Flow (vph)	84	208	16	36	272	4	0	241	9	0	282	0
Heavy Vehicles (%)	5%	2%	6%	5%	6%	9%	2%	6%	0%	0%	3%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	28.0	28.0	28.0	17.0	17.0	17.0		30.7	30.7		30.7	
Effective Green, g (s)	28.0	28.0	28.0	17.0	17.0	17.0		30.7	30.7		30.7	
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.43	0.43		0.43	
Clearance Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	
Lane Grp Cap (vph)	375	731	598	270	427	353		645	695		756	
v/s Ratio Prot	0.02	c0.11			c0.15							
v/s Ratio Perm	0.07		0.01	0.03		0.00		c0.16	0.01		0.16	
v/c Ratio	0.22	0.28	0.03	0.13	0.64	0.01		0.37	0.01		0.37	
Uniform Delay, d1	14.6	15.2	13.6	21.7	24.8	21.1		14.1	11.9		14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.3	0.0	0.3	3.5	0.0		1.7	0.0		1.4	
Delay (s)	14.9	15.5	13.6	22.0	28.3	21.1		15.8	12.0		15.5	
Level of Service	B	B	B	C	C	C		B	B		B	
Approach Delay (s)		15.1			27.2			15.5			15.5	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	72.1	Sum of lost time (s)	17.4
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

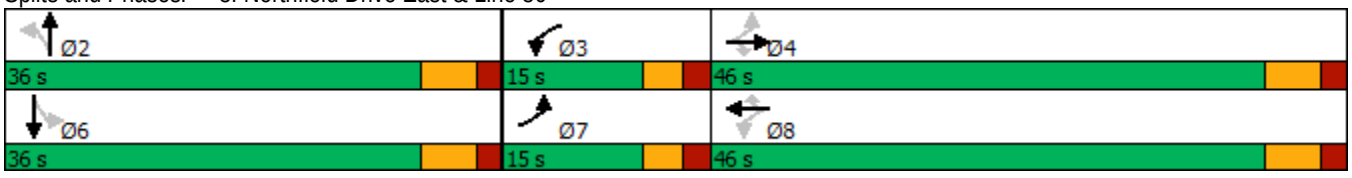


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	193	22	92	240	22	31	255	104	14	159	21
Future Volume (vph)	33	193	22	92	240	22	31	255	104	14	159	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.967			0.981	
Flt Protected	0.950			0.950				0.994			0.997	
Satd. Flow (prot)	1825	1865	1555	1674	1830	1555	0	1810	0	0	1812	0
Flt Permitted	0.588			0.470				0.932			0.959	
Satd. Flow (perm)	1130	1865	1555	828	1830	1555	0	1697	0	0	1743	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		18			9	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		22.5			27.3			17.1			23.2	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	0%	3%	5%	9%	5%	5%	0%	2%	3%	21%	2%	5%
Adj. Flow (vph)	48	241	44	151	279	31	54	283	111	16	192	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	241	44	151	279	31	0	448	0	0	242	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0		31.0	31.0	
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	36.0	36.0		36.0	36.0	
Total Split (%)	15.5%	47.4%	47.4%	15.5%	47.4%	47.4%	37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	10.0	40.0	40.0	10.0	40.0	40.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0	18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	33.6	25.0	25.0	38.5	31.6	31.6		30.0			30.0	
Actuated g/C Ratio	0.41	0.31	0.31	0.47	0.39	0.39		0.37			0.37	
v/c Ratio	0.09	0.42	0.08	0.31	0.39	0.05		0.70			0.37	
Control Delay	11.3	25.4	1.1	13.3	22.0	0.1		28.3			20.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	11.3	25.4	1.1	13.3	22.0	0.1		28.3			20.3	
LOS	B	C	A	B	C	A		C			C	
Approach Delay		20.2			17.7			28.3			20.3	
Approach LOS		C			B			C			C	

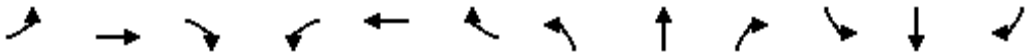
Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 81.4			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 8: Northfield Drive East & Line 86



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	193	22	92	240	22	31	255	104	14	159	21
Future Volume (vph)	33	193	22	92	240	22	31	255	104	14	159	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99			1.00	
Satd. Flow (prot)	1825	1865	1555	1674	1830	1555		1809			1812	
Flt Permitted	0.59	1.00	1.00	0.47	1.00	1.00		0.93			0.96	
Satd. Flow (perm)	1130	1865	1555	828	1830	1555		1696			1743	
Peak-hour factor, PHF	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Adj. Flow (vph)	48	241	44	151	279	31	54	283	111	16	192	34
RTOR Reduction (vph)	0	0	30	0	0	19	0	12	0	0	6	0
Lane Group Flow (vph)	48	241	14	151	279	12	0	436	0	0	236	0
Heavy Vehicles (%)	0%	3%	5%	9%	5%	5%	0%	2%	3%	21%	2%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	32.0	27.1	27.1	41.0	31.6	31.6		30.0			30.0	
Effective Green, g (s)	32.0	27.1	27.1	41.0	31.6	31.6		30.0			30.0	
Actuated g/C Ratio	0.38	0.32	0.32	0.49	0.38	0.38		0.36			0.36	
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	473	605	504	501	692	588		609			626	
v/s Ratio Prot	0.01	0.13		c0.03	c0.15							
v/s Ratio Perm	0.03		0.01	0.11		0.01		c0.26			0.14	
v/c Ratio	0.10	0.40	0.03	0.30	0.40	0.02		0.72			0.38	
Uniform Delay, d1	16.3	21.9	19.2	12.3	19.0	16.3		23.1			19.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.6	0.0	0.5	0.5	0.0		7.1			1.7	
Delay (s)	16.4	22.5	19.3	12.7	19.6	16.3		30.2			21.6	
Level of Service	B	C	B	B	B	B		C			C	
Approach Delay (s)		21.2			17.1			30.2			21.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

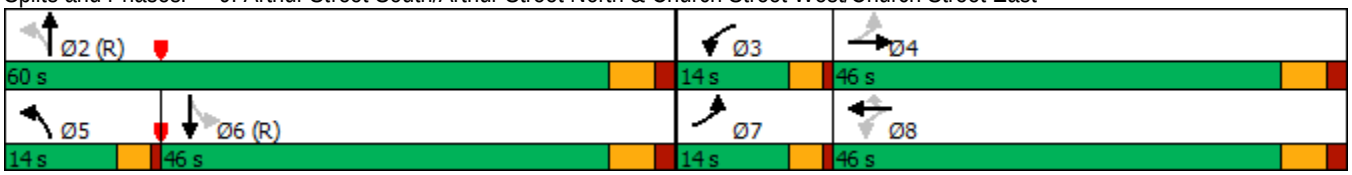


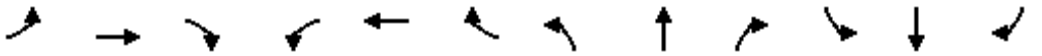
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	172	97	54	218	29	117	258	40	51	199	37
Future Volume (vph)	43	172	97	54	218	29	117	258	40	51	199	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942				0.850		0.978			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1753	0	1789	1847	1396	1738	1794	0	1722	1765	0
Flt Permitted	0.513			0.433			0.418			0.547		
Satd. Flow (perm)	904	1753	0	816	1847	1396	765	1794	0	991	1765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28				100		9			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.83	0.93	0.84	0.71	0.91	0.81	0.94	0.84	0.77	0.80	0.89	0.66
Heavy Vehicles (%)	9%	4%	2%	2%	4%	17%	5%	5%	3%	6%	5%	8%
Adj. Flow (vph)	52	185	115	76	240	36	124	307	52	64	224	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	300	0	76	240	36	124	359	0	64	280	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0		46.0	46.0	
Total Split (s)	14.0	46.0		14.0	46.0	46.0	14.0	60.0		46.0	46.0	
Total Split (%)	11.7%	38.3%		11.7%	38.3%	38.3%	11.7%	50.0%		38.3%	38.3%	
Maximum Green (s)	10.0	40.0		10.0	40.0	40.0	10.0	54.0		40.0	40.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	
Walk Time (s)		25.0			25.0	25.0		29.0		29.0	29.0	
Flash Dont Walk (s)		15.0			15.0	15.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	52.0	40.0		52.0	40.0	40.0	56.0	54.0		40.0	40.0	
Actuated g/C Ratio	0.43	0.33		0.43	0.33	0.33	0.47	0.45		0.33	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.11	0.50		0.18	0.39	0.07	0.28	0.44		0.19	0.47	
Control Delay	18.4	32.2		19.0	33.0	0.2	20.3	24.2		30.5	33.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.4	32.2		19.0	33.0	0.2	20.3	24.2		30.5	33.5	
LOS	B	C		B	C	A	C	C		C	C	
Approach Delay		30.2			26.6			23.2			32.9	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 122.5%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East

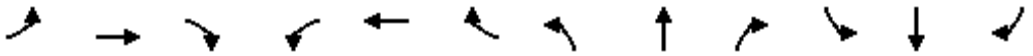




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	172	97	54	218	29	117	258	40	51	199	37
Future Volume (vph)	43	172	97	54	218	29	117	258	40	51	199	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lane Util. Factor	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	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	1754		1789	1847	1396	1738	1795		1722	1765	
Flt Permitted	0.51	1.00		0.43	1.00	1.00	0.42	1.00		0.55	1.00	
Satd. Flow (perm)	905	1754		815	1847	1396	764	1795		991	1765	
Peak-hour factor, PHF	0.83	0.93	0.84	0.71	0.91	0.81	0.94	0.84	0.77	0.80	0.89	0.66
Adj. Flow (vph)	52	185	115	76	240	36	124	307	52	64	224	56
RTOR Reduction (vph)	0	19	0	0	0	24	0	5	0	0	7	0
Lane Group Flow (vph)	52	281	0	76	240	12	124	354	0	64	273	0
Heavy Vehicles (%)	9%	4%	2%	2%	4%	17%	5%	5%	3%	6%	5%	8%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	50.0	40.0		50.0	40.0	40.0	54.0	54.0		40.0	40.0	
Effective Green, g (s)	50.0	40.0		50.0	40.0	40.0	54.0	54.0		40.0	40.0	
Actuated g/C Ratio	0.42	0.33		0.42	0.33	0.33	0.45	0.45		0.33	0.33	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	441	584		420	615	465	424	807		330	588	
v/s Ratio Prot	0.01	c0.16		c0.02	0.13		0.02	c0.20			0.15	
v/s Ratio Perm	0.04			0.06		0.01	0.11			0.06		
v/c Ratio	0.12	0.48		0.18	0.39	0.03	0.29	0.44		0.19	0.46	
Uniform Delay, d1	21.2	31.8		21.8	30.7	26.9	20.3	22.6		28.5	31.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.8		0.9	1.9	0.1	1.7	1.7		1.3	2.6	
Delay (s)	21.8	34.6		22.7	32.5	27.0	22.1	24.3		29.8	34.2	
Level of Service	C	C		C	C	C	C	C		C	C	
Approach Delay (s)		32.7			29.8			23.8			33.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

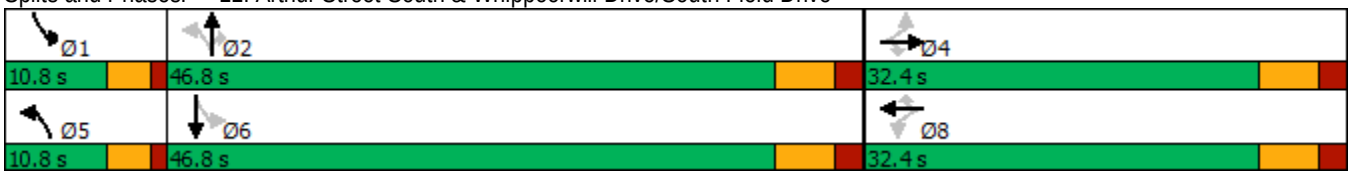


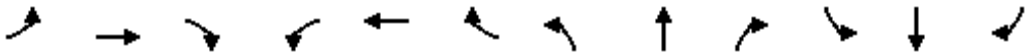
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	35	106	94	87	173	148	610	48	129	591	20
Future Volume (vph)	27	35	106	94	87	173	148	610	48	129	591	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0		40.0	30.0		25.0	45.0		45.0	45.0		5.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	40.0			50.0			5.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1865	1601	1772	1921	1617	1825	1883	1633	1755	3520	0
Flt Permitted	0.690			0.728			0.353			0.269		
Satd. Flow (perm)	1326	1865	1601	1358	1921	1617	678	1883	1633	497	3520	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			120			197			85		6	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		238.4			306.2			185.0			215.7	
Travel Time (s)		17.2			22.0			11.1			12.9	
Peak Hour Factor	0.75	0.80	0.88	0.81	0.84	0.88	0.97	0.94	0.60	0.83	0.88	0.71
Heavy Vehicles (%)	0%	3%	2%	3%	0%	1%	0%	2%	0%	4%	3%	5%
Adj. Flow (vph)	36	44	120	116	104	197	153	649	80	155	672	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	44	120	116	104	197	153	649	80	155	700	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane								Yes				
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	5.0	40.8	40.8	5.0	40.8	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	9.5	46.8	46.8	9.5	46.8	
Total Split (s)	32.4	32.4	32.4	32.4	32.4	32.4	10.8	46.8	46.8	10.8	46.8	
Total Split (%)	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	12.0%	52.0%	52.0%	12.0%	52.0%	
Maximum Green (s)	26.4	26.4	26.4	26.4	26.4	26.4	6.8	40.8	40.8	6.8	40.8	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	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	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		15.0	15.0		15.0	
Flash Dont Walk (s)	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0		16.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effct Green (s)	13.9	13.9	13.9	13.9	13.9	13.9	49.5	40.8	40.8	49.5	40.8	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.64	0.53	0.53	0.64	0.53	
v/c Ratio	0.15	0.13	0.31	0.48	0.30	0.44	0.29	0.65	0.09	0.36	0.38	
Control Delay	28.0	27.3	7.9	35.4	29.8	7.7	6.0	17.7	2.8	7.1	11.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.0	27.3	7.9	35.4	29.8	7.7	6.0	17.7	2.8	7.1	11.8	
LOS	C	C	A	D	C	A	A	B	A	A	B	
Approach Delay		15.8			20.9			14.3			11.0	
Approach LOS		B			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 77.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 69.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Arthur Street South & Whippoorwill Drive/South Field Drive





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	35	106	94	87	173	148	610	48	129	591	20
Future Volume (vph)	27	35	106	94	87	173	148	610	48	129	591	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1865	1601	1772	1921	1617	1825	1883	1633	1755	3520	
Flt Permitted	0.69	1.00	1.00	0.73	1.00	1.00	0.35	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1325	1865	1601	1358	1921	1617	679	1883	1633	496	3520	
Peak-hour factor, PHF	0.75	0.80	0.88	0.81	0.84	0.88	0.97	0.94	0.60	0.83	0.88	0.71
Adj. Flow (vph)	36	44	120	116	104	197	153	649	80	155	672	28
RTOR Reduction (vph)	0	0	98	0	0	162	0	0	38	0	3	0
Lane Group Flow (vph)	36	44	22	116	104	35	153	649	42	155	697	0
Heavy Vehicles (%)	0%	3%	2%	3%	0%	1%	0%	2%	0%	4%	3%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	13.9	13.9	13.9	13.9	13.9	13.9	47.6	40.9	40.9	47.6	40.9	
Effective Green, g (s)	13.9	13.9	13.9	13.9	13.9	13.9	47.6	40.9	40.9	47.6	40.9	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.61	0.53	0.53	0.61	0.53	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	237	334	287	243	344	290	516	993	861	413	1857	
v/s Ratio Prot		0.02			0.05		0.03	c0.34		c0.03	0.20	
v/s Ratio Perm	0.03		0.01	c0.09		0.02	0.16		0.03	0.20		
v/c Ratio	0.15	0.13	0.07	0.48	0.30	0.12	0.30	0.65	0.05	0.38	0.38	
Uniform Delay, d1	26.8	26.7	26.5	28.5	27.6	26.7	6.4	13.2	8.9	8.1	10.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	1.5	0.5	0.2	0.3	3.3	0.1	0.6	0.6	
Delay (s)	27.1	26.9	26.6	30.0	28.1	26.9	6.7	16.5	9.0	8.6	11.4	
Level of Service	C	C	C	C	C	C	A	B	A	A	B	
Approach Delay (s)		26.7			28.0			14.2			10.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

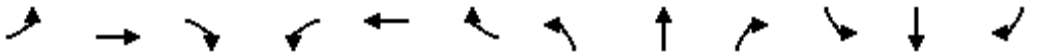
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	29	277	159	65	7	287	730	73	6	525	103
Future Volume (vph)	91	29	277	159	65	7	287	730	73	6	525	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	35.0		35.0	100.0		100.0	45.0		45.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	1847	1484
Flt Permitted	0.702			0.586			0.128			0.330		
Satd. Flow (perm)	1297	1685	1432	787	1413	1142	195	1762	1432	317	1847	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			351			63			112			111
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			171.5	
Travel Time (s)		16.0			12.2			13.7			10.3	
Peak Hour Factor	0.78	0.66	0.79	0.81	0.77	0.58	0.90	0.92	0.65	0.78	0.95	0.74
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Adj. Flow (vph)	117	44	351	196	84	12	319	793	112	8	553	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	44	351	196	84	12	319	793	112	8	553	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	34.0	34.0	34.0	11.0	34.0	34.0	11.0	51.4	51.4	46.4	46.4	46.4
Total Split (s)	33.0	33.0	33.0	19.0	52.0	52.0	29.0	75.4	75.4	46.4	46.4	46.4
Total Split (%)	25.9%	25.9%	25.9%	14.9%	40.8%	40.8%	22.8%	59.2%	59.2%	36.4%	36.4%	36.4%
Maximum Green (s)	25.0	25.0	25.0	15.0	44.0	44.0	25.0	69.0	69.0	40.0	40.0	40.0
Yellow Time (s)	4.6	4.6	4.6	3.0	4.6	4.6	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	1.0	3.4	3.4	1.0	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	4.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		20.0	20.0	20.0	20.0	20.0
Flash Dont Walk (s)	19.0	19.0	19.0		19.0	19.0		20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0		0	0	0	0	0
Act Effct Green (s)	16.5	16.5	16.5	39.0	35.0	35.0	71.6	69.2	69.2	40.7	40.7	40.7
Actuated g/C Ratio	0.14	0.14	0.14	0.33	0.30	0.30	0.60	0.58	0.58	0.34	0.34	0.34
v/c Ratio	0.65	0.19	0.70	0.62	0.20	0.03	0.85	0.77	0.13	0.07	0.87	0.24
Control Delay	64.9	46.2	12.7	40.5	32.0	0.1	47.7	26.5	2.8	32.0	53.7	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	46.2	12.7	40.5	32.0	0.1	47.7	26.5	2.8	32.0	53.7	9.8
LOS	E	D	B	D	C	A	D	C	A	C	D	A
Approach Delay		27.5			36.4			29.8			44.8	
Approach LOS		C			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 127.4			
Actuated Cycle Length: 118.6			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 33.9		Intersection LOS: C	
Intersection Capacity Utilization 104.6%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	29	277	159	65	7	287	730	73	6	525	103
Future Volume (vph)	91	29	277	159	65	7	287	730	73	6	525	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	8.0	8.0	4.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	1847	1484
Flt Permitted	0.70	1.00	1.00	0.59	1.00	1.00	0.13	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	1298	1685	1432	788	1413	1142	196	1762	1432	317	1847	1484
Peak-hour factor, PHF	0.78	0.66	0.79	0.81	0.77	0.58	0.90	0.92	0.65	0.78	0.95	0.74
Adj. Flow (vph)	117	44	351	196	84	12	319	793	112	8	553	139
RTOR Reduction (vph)	0	0	302	0	0	8	0	0	47	0	0	73
Lane Group Flow (vph)	117	44	49	196	84	4	319	793	65	8	553	66
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	16.5	16.5	16.5	35.0	35.0	35.0	69.2	69.2	69.2	40.7	40.7	40.7
Effective Green, g (s)	16.5	16.5	16.5	35.0	35.0	35.0	69.2	69.2	69.2	40.7	40.7	40.7
Actuated g/C Ratio	0.14	0.14	0.14	0.30	0.30	0.30	0.58	0.58	0.58	0.34	0.34	0.34
Clearance Time (s)	8.0	8.0	8.0	4.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	234	199	292	416	337	372	1028	835	108	633	509
v/s Ratio Prot		0.03		c0.08	0.06		c0.18	0.45			0.30	
v/s Ratio Perm	0.09		0.03	c0.12		0.00	c0.32		0.05	0.03		0.04
v/c Ratio	0.65	0.19	0.25	0.67	0.20	0.01	0.86	0.77	0.08	0.07	0.87	0.13
Uniform Delay, d1	48.3	45.1	45.5	35.1	31.3	29.6	29.7	18.7	10.8	26.3	36.5	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.1	0.4	0.6	6.0	0.2	0.0	18.9	5.6	0.2	1.3	15.5	0.5
Delay (s)	56.4	45.5	46.1	41.0	31.6	29.6	48.6	24.3	11.0	27.6	52.0	27.3
Level of Service	E	D	D	D	C	C	D	C	B	C	D	C
Approach Delay (s)		48.4			37.8			29.4			46.8	
Approach LOS		D			D			C			D	

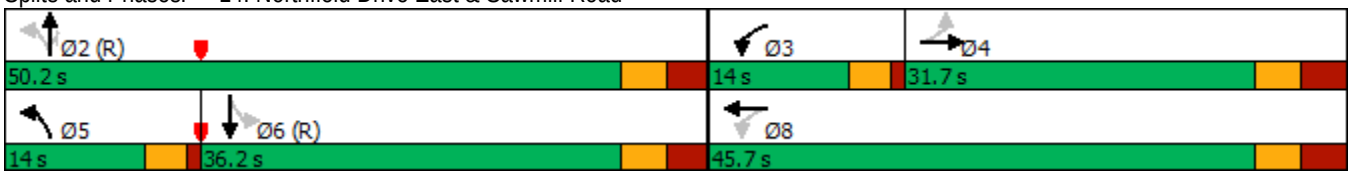
Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	118.6	Sum of lost time (s)	22.4
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

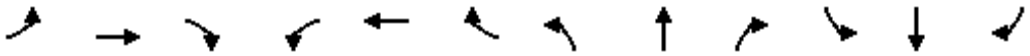
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	232	87	231	223	27	106	280	376	25	170	88
Future Volume (vph)	130	232	87	231	223	27	106	280	376	25	170	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.978				0.850		0.959	
Flt Protected	0.950			0.950				0.986			0.994	
Satd. Flow (prot)	1738	1763	0	1789	1807	0	0	1875	1601	0	1746	0
Flt Permitted	0.565			0.256				0.644			0.893	
Satd. Flow (perm)	1034	1763	0	482	1807	0	0	1225	1601	0	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			11				335		24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.86	0.89	0.84	0.83	0.81	0.56	0.83	0.89	0.87	0.57	0.87	0.85
Heavy Vehicles (%)	5%	6%	0%	2%	4%	4%	1%	1%	2%	8%	2%	9%
Adj. Flow (vph)	151	261	104	278	275	48	128	315	432	44	195	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	365	0	278	323	0	0	443	432	0	343	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	
Total Split (s)	31.7	31.7		14.0	45.7		14.0	50.2	50.2	36.2	36.2	
Total Split (%)	33.1%	33.1%		14.6%	47.7%		14.6%	52.3%	52.3%	37.7%	37.7%	
Maximum Green (s)	25.0	25.0		10.0	39.0		10.0	44.0	44.0	30.0	30.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Walk Time (s)	14.0	14.0			14.0			25.0	25.0	25.0	25.0	
Flash Dont Walk (s)	11.0	11.0			11.0			5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)	0	0			0			0	0	0	0	
Act Effct Green (s)	25.0	25.0		41.7	39.0			44.0	44.0		30.0	
Actuated g/C Ratio	0.26	0.26		0.43	0.41			0.46	0.46		0.31	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.56	0.77		0.81	0.44			0.72	0.47		0.68	
Control Delay	40.1	43.4		38.8	22.1			27.6	6.0		34.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	40.1	43.4		38.8	22.1			27.6	6.0		34.5	
LOS	D	D		D	C			C	A		C	
Approach Delay		42.4			29.8			16.9			34.5	
Approach LOS		D			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95.9			
Actuated Cycle Length: 95.9			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 28.5		Intersection LOS: C	
Intersection Capacity Utilization 103.1%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 14: Northfield Drive East & Sawmill Road

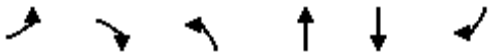




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	232	87	231	223	27	106	280	376	25	170	88
Future Volume (vph)	130	232	87	231	223	27	106	280	376	25	170	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.98			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1738	1763		1789	1806			1875	1601		1745	
Flt Permitted	0.57	1.00		0.26	1.00			0.64	1.00		0.89	
Satd. Flow (perm)	1034	1763		483	1806			1226	1601		1568	
Peak-hour factor, PHF	0.86	0.89	0.84	0.83	0.81	0.56	0.83	0.89	0.87	0.57	0.87	0.85
Adj. Flow (vph)	151	261	104	278	275	48	128	315	432	44	195	104
RTOR Reduction (vph)	0	15	0	0	7	0	0	0	181	0	16	0
Lane Group Flow (vph)	151	350	0	278	316	0	0	443	251	0	327	0
Heavy Vehicles (%)	5%	6%	0%	2%	4%	4%	1%	1%	2%	8%	2%	9%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	25.0	25.0		39.0	39.0			44.0	44.0		30.0	
Effective Green, g (s)	25.0	25.0		39.0	39.0			44.0	44.0		30.0	
Actuated g/C Ratio	0.26	0.26		0.41	0.41			0.46	0.46		0.31	
Clearance Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lane Grp Cap (vph)	269	459		332	734			630	734		490	
v/s Ratio Prot		0.20		c0.09	0.18			c0.07				
v/s Ratio Perm	0.15			c0.25				c0.25	0.16		0.21	
v/c Ratio	0.56	0.76		0.84	0.43			0.70	0.34		0.67	
Uniform Delay, d1	30.7	32.7		22.2	20.5			20.7	16.7		28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.2	11.4		21.6	1.8			6.5	1.3		7.0	
Delay (s)	38.9	44.1		43.8	22.3			27.2	17.9		35.6	
Level of Service	D	D		D	C			C	B		D	
Approach Delay (s)		42.6			32.2			22.6			35.6	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	20.9
Intersection Capacity Utilization	103.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



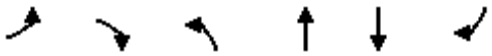
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	301	407	324	374	49
Future Volume (vph)	32	301	407	324	374	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.981	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1722	1555	1706	1865	1817	0
Flt Permitted	0.950		0.333			
Satd. Flow (perm)	1722	1555	598	1865	1817	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		324			12	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.80	0.93	0.88	0.89	0.87	0.68
Heavy Vehicles (%)	6%	5%	7%	3%	2%	14%
Adj. Flow (vph)	40	324	463	364	430	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	324	463	364	502	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	55.6	41.6	
Total Split (%)	35.8%	35.8%	16.2%	64.2%	48.0%	
Maximum Green (s)	25.0	25.0	10.0	49.0	35.0	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	7.0	7.0		25.3	25.3	
Flash Dont Walk (s)	9.0	9.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	10.8	10.8	51.7	49.1	35.0	
Actuated g/C Ratio	0.15	0.15	0.71	0.68	0.48	
v/c Ratio	0.16	0.64	0.80	0.29	0.57	
Control Delay	28.2	10.0	18.0	5.6	16.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.2	10.0	18.0	5.6	16.4	
LOS	C	B	B	A	B	
Approach Delay	12.0			12.6	16.4	
Approach LOS	B			B	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 86.6			
Actuated Cycle Length: 72.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

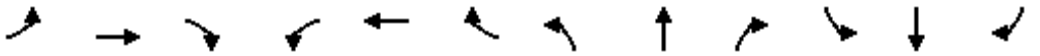
Splits and Phases: 15: King Street North & Lobsinger Line





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	301	407	324	374	49
Future Volume (vph)	32	301	407	324	374	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.6	6.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1722	1555	1706	1865	1816	
Flt Permitted	0.95	1.00	0.33	1.00	1.00	
Satd. Flow (perm)	1722	1555	599	1865	1816	
Peak-hour factor, PHF	0.80	0.93	0.88	0.89	0.87	0.68
Adj. Flow (vph)	40	324	462	364	430	72
RTOR Reduction (vph)	0	276	0	0	6	0
Lane Group Flow (vph)	40	48	463	364	496	0
Heavy Vehicles (%)	6%	5%	7%	3%	2%	14%
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	10.8	10.8	49.0	49.0	35.0	
Effective Green, g (s)	10.8	10.8	49.0	49.0	35.0	
Actuated g/C Ratio	0.15	0.15	0.68	0.68	0.48	
Clearance Time (s)	6.0	6.0	4.0	6.6	6.6	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Lane Grp Cap (vph)	256	231	558	1262	877	
v/s Ratio Prot			c0.11	0.20	0.27	
v/s Ratio Perm	0.02	c0.03	c0.45			
v/c Ratio	0.16	0.21	0.83	0.29	0.57	
Uniform Delay, d1	26.8	27.0	7.3	4.7	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5	11.0	0.6	2.6	
Delay (s)	27.1	27.5	18.3	5.3	15.9	
Level of Service	C	C	B	A	B	
Approach Delay (s)	27.5			12.6	15.9	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	16.6
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

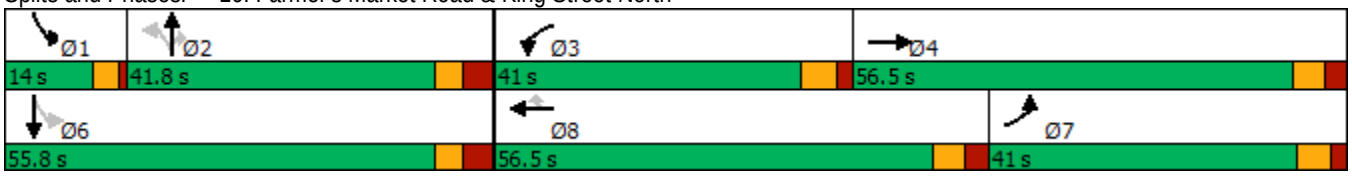


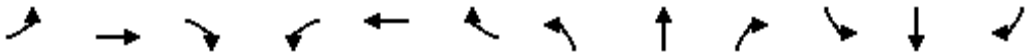
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	217	65	490	490	147	63	142	399	74	152	19
Future Volume (vph)	211	217	65	490	490	147	63	142	399	74	152	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962				0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	3385	0	3437	1847	1585	1825	1847	1570	1738	1842	0
Flt Permitted	0.950			0.950			0.640			0.413		
Satd. Flow (perm)	1722	3385	0	3437	1847	1585	1230	1847	1570	756	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				184			429		5	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.82	0.92	0.81	0.80	0.85	0.53	0.72	0.81	0.93	0.74	0.94	0.79
Heavy Vehicles (%)	6%	5%	0%	3%	4%	3%	0%	4%	4%	5%	1%	11%
Adj. Flow (vph)	257	236	80	613	576	277	88	175	429	100	162	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	257	316	0	613	576	277	88	175	429	100	186	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Maximum Green (s)	35.0	50.0		35.0	50.0	50.0	35.0	35.0	35.0	10.0	49.0	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)		18.0			18.0	18.0	18.0	18.0	18.0		18.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	29.5	50.4		29.5	50.4	50.4	21.9	21.9	21.9	38.4	35.6	
Actuated g/C Ratio	0.22	0.37		0.22	0.37	0.37	0.16	0.16	0.16	0.28	0.26	
v/c Ratio	0.68	0.25		0.82	0.84	0.39	0.44	0.59	0.70	0.35	0.38	
Control Delay	59.4	28.5		60.4	52.4	13.5	59.0	61.0	11.0	40.5	42.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.4	28.5		60.4	52.4	13.5	59.0	61.0	11.0	40.5	42.2	
LOS	E	C		E	D	B	E	E	B	D	D	
Approach Delay		42.3			48.4			29.8			41.6	
Approach LOS		D			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 135			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 42.3		Intersection LOS: D	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

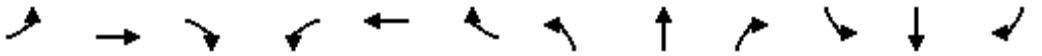
Splits and Phases: 16: Farmer's Market Road & King Street North





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	217	65	490	490	147	63	142	399	74	152	19
Future Volume (vph)	211	217	65	490	490	147	63	142	399	74	152	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lane Util. Factor	1.00	0.95		0.97	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)	1722	3385		3437	1847	1585	1825	1847	1570	1738	1842	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.64	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	1722	3385		3437	1847	1585	1230	1847	1570	756	1842	
Peak-hour factor, PHF	0.82	0.92	0.81	0.80	0.85	0.53	0.72	0.81	0.93	0.74	0.94	0.79
Adj. Flow (vph)	257	236	80	612	576	277	88	175	429	100	162	24
RTOR Reduction (vph)	0	20	0	0	0	115	0	0	359	0	4	0
Lane Group Flow (vph)	257	296	0	613	576	162	88	175	70	100	182	0
Heavy Vehicles (%)	6%	5%	0%	3%	4%	3%	0%	4%	4%	5%	1%	11%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	29.5	50.4		29.5	50.4	50.4	21.9	21.9	21.9	35.6	35.6	
Effective Green, g (s)	29.5	50.4		29.5	50.4	50.4	21.9	21.9	21.9	35.6	35.6	
Actuated g/C Ratio	0.22	0.37		0.22	0.37	0.37	0.16	0.16	0.16	0.26	0.26	
Clearance Time (s)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	376	1265		752	690	592	199	300	255	270	486	
v/s Ratio Prot	c0.15	0.09		0.18	c0.31			c0.09		0.03	c0.10	
v/s Ratio Perm						0.10	0.07		0.04	0.07		
v/c Ratio	0.68	0.23		0.82	0.83	0.27	0.44	0.58	0.27	0.37	0.38	
Uniform Delay, d1	48.4	29.0		50.1	38.4	29.4	50.9	52.2	49.5	39.1	40.5	
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	5.5	0.4		7.1	11.4	1.1	2.1	3.4	0.8	1.2	0.7	
Delay (s)	53.9	29.4		57.2	49.8	30.6	53.1	55.6	50.3	40.3	41.2	
Level of Service	D	C		E	D	C	D	E	D	D	D	
Approach Delay (s)		40.4			49.3			52.0			40.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	134.8	Sum of lost time (s)	23.3
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



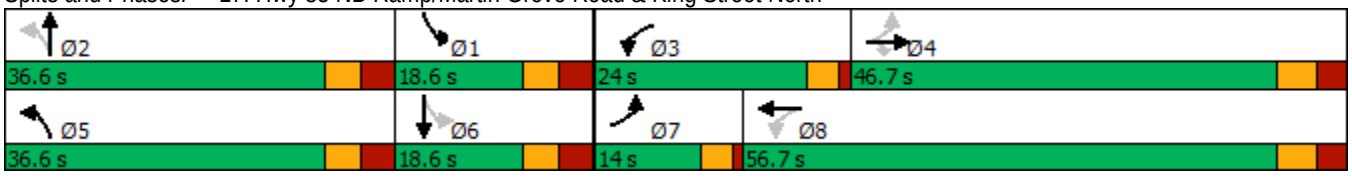
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	549	105	112	619	13	323	8	58	9	2	15
Future Volume (vph)	21	549	105	112	619	13	323	8	58	9	2	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.874			0.875	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1883	1526	1772	3566	0	3309	1651	0	1825	1588	0
Flt Permitted	0.374			0.270			0.000			0.000		
Satd. Flow (perm)	718	1883	1526	504	3566	0	0	1651	0	0	1588	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		3			64			20	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.58	0.98	0.77	0.93	0.89	0.65	0.88	0.67	0.91	0.45	0.50	0.75
Heavy Vehicles (%)	0%	2%	7%	3%	2%	0%	7%	0%	2%	0%	0%	7%
Adj. Flow (vph)	36	560	136	120	696	20	367	12	64	20	4	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	560	136	120	716	0	367	76	0	20	24	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			10.0			5.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

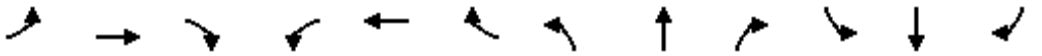
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Maximum Green (s)	10.0	40.0	40.0	20.0	50.0		30.0	30.0		12.0	12.0	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Walk Time (s)		25.0	25.0		25.0			10.0			10.0	
Flash Dont Walk (s)		15.0	15.0		15.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	55.7	45.1	45.1	60.5	52.1		15.9	12.2		12.0	8.2	
Actuated g/C Ratio	0.60	0.48	0.48	0.65	0.56		0.17	0.13		0.13	0.09	
v/c Ratio	0.07	0.61	0.17	0.26	0.36		0.65	0.28		0.09	0.15	
Control Delay	8.8	24.1	2.8	9.4	15.0		43.1	18.7		39.3	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.8	24.1	2.8	9.4	15.0		43.1	18.7		39.3	25.4	
LOS	A	C	A	A	B		D	B		D	C	
Approach Delay		19.4			14.2			39.0			31.7	
Approach LOS		B			B			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 125.9
Actuated Cycle Length: 93.1
Natural Cycle: 130
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 69.8% ICU Level of Service C
Analysis Period (min) 15

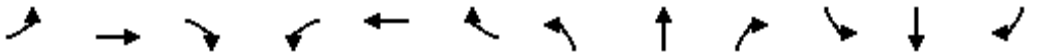
Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	549	105	112	619	13	323	8	58	9	2	15
Future Volume (vph)	21	549	105	112	619	13	323	8	58	9	2	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1883	1526	1772	3565		3309	1651		1825	1588	
Flt Permitted	0.37	1.00	1.00	0.27	1.00		0.00	1.00		0.00	1.00	
Satd. Flow (perm)	718	1883	1526	503	3565		0	1651		0	1588	
Peak-hour factor, PHF	0.58	0.98	0.77	0.93	0.89	0.65	0.88	0.67	0.91	0.45	0.50	0.75
Adj. Flow (vph)	36	560	136	120	696	20	367	12	64	20	4	20
RTOR Reduction (vph)	0	0	71	0	1	0	0	56	0	0	19	0
Lane Group Flow (vph)	36	560	65	120	715	0	367	20	0	20	5	0
Heavy Vehicles (%)	0%	2%	7%	3%	2%	0%	7%	0%	2%	0%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	51.4	47.1	47.1	60.4	52.1		15.9	12.2		6.5	2.8	
Effective Green, g (s)	51.4	47.1	47.1	60.4	52.1		15.9	12.2		6.5	2.8	
Actuated g/C Ratio	0.52	0.48	0.48	0.61	0.53		0.16	0.12		0.07	0.03	
Clearance Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	420	895	726	426	1876		531	203		119	44	
v/s Ratio Prot	0.00	c0.30		c0.03	0.20		c0.11	0.01		c0.01	0.00	
v/s Ratio Perm	0.04		0.04	0.15								
v/c Ratio	0.09	0.63	0.09	0.28	0.38		0.69	0.10		0.17	0.10	
Uniform Delay, d1	11.7	19.4	14.2	10.6	13.9		39.2	38.5		43.7	46.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.3	0.2	0.5	0.6		3.9	0.2		0.7	1.0	
Delay (s)	11.8	22.7	14.4	11.1	14.5		43.1	38.7		44.4	47.9	
Level of Service	B	C	B	B	B		D	D		D	D	
Approach Delay (s)		20.6			14.0			42.3			46.3	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	23.9
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



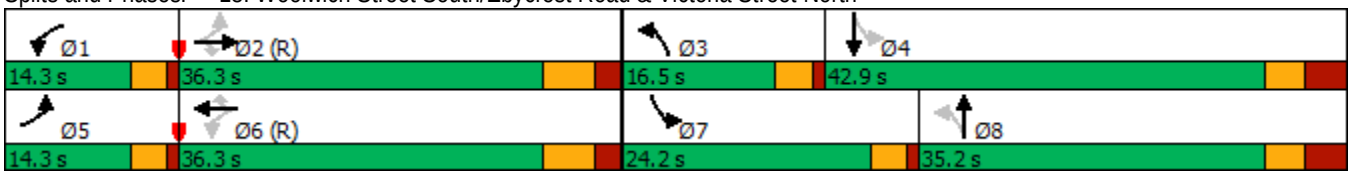
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1028	224	23	1176	315	227	74	25	286	64	128
Future Volume (vph)	135	1028	224	23	1176	315	227	74	25	286	64	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.954			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3544	1617	1825	3510	1555	1825	1820	0	1674	1636	0
Flt Permitted	0.084			0.188			0.576			0.467		
Satd. Flow (perm)	148	3544	1617	361	3510	1555	1107	1820	0	823	1636	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			258			258		19			117	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.64	0.86	0.84	0.96	0.74	0.57	0.87	0.84	0.70
Heavy Vehicles (%)	9%	3%	1%	0%	4%	5%	0%	1%	0%	9%	5%	5%
Adj. Flow (vph)	159	1060	291	36	1367	375	236	100	44	329	76	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	1060	291	36	1367	375	236	144	0	329	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

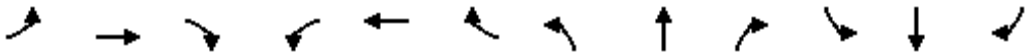
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	36.7	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	16.5	35.2		24.2	42.9	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	15.0%	32.0%		22.0%	39.0%	
Maximum Green (s)	10.3	29.8	29.8	10.3	29.8	29.8	12.5	28.3		20.2	36.0	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		18.0	18.0		18.0	18.0		10.0			10.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		18.0			18.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	61.3	52.1	52.1	52.6	43.5	43.5	29.3	14.2		40.7	21.6	
Actuated g/C Ratio	0.56	0.47	0.47	0.48	0.40	0.40	0.27	0.13		0.37	0.20	
v/c Ratio	0.67	0.63	0.32	0.14	0.98	0.49	0.63	0.57		0.72	0.63	
Control Delay	33.6	25.8	5.2	14.3	55.0	11.2	33.7	47.6		36.4	28.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.6	25.8	5.2	14.3	55.0	11.2	33.7	47.6		36.4	28.2	
LOS	C	C	A	B	E	B	C	D		D	C	
Approach Delay		22.7			45.0			38.9			32.8	
Approach LOS		C			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 89.1 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 34.8 Intersection LOS: C
Intersection Capacity Utilization 82.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North

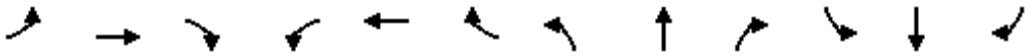




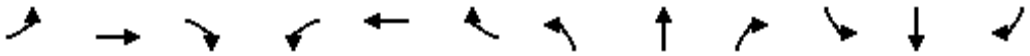
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1028	224	23	1176	315	227	74	25	286	64	128
Future Volume (vph)	135	1028	224	23	1176	315	227	74	25	286	64	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	3544	1617	1825	3510	1555	1825	1820		1674	1636	
Flt Permitted	0.08	1.00	1.00	0.19	1.00	1.00	0.58	1.00		0.47	1.00	
Satd. Flow (perm)	148	3544	1617	361	3510	1555	1106	1820		823	1636	
Peak-hour factor, PHF	0.85	0.97	0.77	0.64	0.86	0.84	0.96	0.74	0.57	0.87	0.84	0.70
Adj. Flow (vph)	159	1060	291	36	1367	375	236	100	44	329	76	183
RTOR Reduction (vph)	0	0	140	0	0	156	0	17	0	0	94	0
Lane Group Flow (vph)	159	1060	151	36	1367	219	236	127	0	329	165	0
Heavy Vehicles (%)	9%	3%	1%	0%	4%	5%	0%	1%	0%	9%	5%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	58.8	50.5	50.5	47.8	43.5	43.5	26.4	14.2		37.8	21.6	
Effective Green, g (s)	58.8	50.5	50.5	47.8	43.5	43.5	26.4	14.2		37.8	21.6	
Actuated g/C Ratio	0.53	0.46	0.46	0.43	0.40	0.40	0.24	0.13		0.34	0.20	
Clearance Time (s)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	235	1627	742	214	1388	614	345	234		434	321	
v/s Ratio Prot	c0.07	0.30		0.01	c0.39		0.08	0.07		c0.13	0.10	
v/s Ratio Perm	0.29		0.09	0.07		0.14	0.09			c0.13		
v/c Ratio	0.68	0.65	0.20	0.17	0.98	0.36	0.68	0.54		0.76	0.51	
Uniform Delay, d1	23.9	23.0	17.8	18.8	32.9	23.4	36.5	44.9		29.7	39.5	
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	7.5	2.0	0.6	0.4	20.8	1.6	5.5	3.2		7.9	1.8	
Delay (s)	31.4	25.0	18.4	19.2	53.7	25.0	42.0	48.1		37.6	41.4	
Level of Service	C	C	B	B	D	C	D	D		D	D	
Approach Delay (s)		24.4			47.0			44.3			39.2	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.4
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Future 2051 Do Nothing Scenario (Regional Improvements)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	775	24	34	439	14	223	432	528	127	300	112
Future Volume (vph)	19	775	24	34	439	14	223	432	528	127	300	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	90.0		100.0	100.0		0.0	80.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.910			0.947	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1830	1570	1722	1830	1633	1674	2997	0	1755	3103	0
Flt Permitted	0.376			0.107			0.271			0.147		
Satd. Flow (perm)	688	1830	1570	194	1830	1633	478	2997	0	272	3103	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			55		248			90	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		364.7			395.3			305.6			253.6	
Travel Time (s)		27.4			29.6			22.9			19.0	
Peak Hour Factor	0.56	0.94	0.52	0.65	0.93	0.66	0.73	0.79	0.65	0.63	0.74	0.50
Heavy Vehicles (%)	5%	5%	4%	6%	5%	0%	9%	15%	8%	4%	5%	23%
Adj. Flow (vph)	34	824	46	52	472	21	305	547	812	202	405	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	824	46	52	472	21	305	1359	0	202	629	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	9.5	70.0	70.0	9.6	70.1	70.1	30.4	30.4		30.4	30.4	
Total Split (%)	8.6%	63.6%	63.6%	8.7%	63.7%	63.7%	27.6%	27.6%		27.6%	27.6%	
Maximum Green (s)	5.5	65.5	65.5	5.6	65.6	65.6	25.9	25.9		25.9	25.9	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.0	4.5	4.5	4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	49.0	45.6	45.6	49.1	45.7	45.7	27.1	27.1		27.1	27.1	
Actuated g/C Ratio	0.56	0.52	0.52	0.56	0.52	0.52	0.31	0.31		0.31	0.31	
v/c Ratio	0.07	0.86	0.05	0.25	0.49	0.02	2.06	1.27dr		2.38	0.61	
Control Delay	6.5	28.2	2.3	9.1	14.9	0.1	519.8	137.7		679.4	28.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.5	28.2	2.3	9.1	14.9	0.1	519.8	137.7		679.4	28.4	
LOS	A	C	A	A	B	A	F	F		F	C	
Approach Delay		26.1			13.8			207.7			186.7	
Approach LOS		C			B			F			F	
Queue Length 50th (m)	2.1	121.9	0.0	3.2	51.6	0.0	~87.6	~147.7		~60.4	43.9	
Queue Length 95th (m)	3.1	173.5	0.2	4.9	73.9	0.0	#128.0	#191.0		#80.6	59.4	
Internal Link Dist (m)		340.7			371.3			281.6			229.6	
Turn Bay Length (m)	90.0		90.0	90.0		100.0	100.0			80.0		
Base Capacity (vph)	455	1408	1221	212	1410	1271	148	1103		85	1028	
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	0.07	0.59	0.04	0.25	0.33	0.02	2.06	1.23		2.38	0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 87.2			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 2.38			
Intersection Signal Delay: 134.9		Intersection LOS: F	
Intersection Capacity Utilization 88.0%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

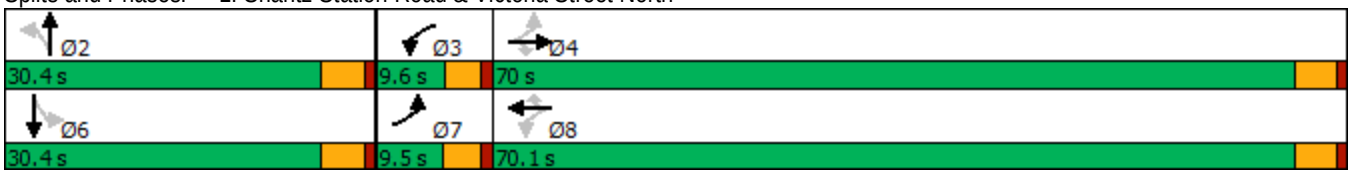
Queue shown is maximum after two cycles.

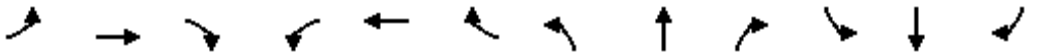
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Shantz Station Road & Victoria Street North





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	5	8	19	19	70	5	304	12	89	631	6
Future Volume (vph)	1	5	8	19	19	70	5	304	12	89	631	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		0.0	75.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.910			0.992			0.997	
Flt Protected		0.992			0.992		0.950			0.950		
Satd. Flow (prot)	0	1522	0	0	1385	0	1825	3101	0	1573	3175	0
Flt Permitted		0.992			0.992		0.950			0.950		
Satd. Flow (perm)	0	1522	0	0	1385	0	1825	3101	0	1573	3175	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		288.3			336.9			408.6			247.1	
Travel Time (s)		21.6			25.3			30.6			18.5	
Peak Hour Factor	0.25	0.63	0.67	0.75	0.75	0.71	0.38	0.74	0.50	0.73	0.90	0.50
Heavy Vehicles (%)	100%	0%	0%	33%	22%	24%	0%	17%	13%	16%	14%	50%
Adj. Flow (vph)	4	8	12	25	25	99	13	411	24	122	701	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	149	0	13	435	0	122	713	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	270	293	216	173	183	190
Future Volume (vph)	270	293	216	173	183	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.939		0.939			
Flt Protected	0.973					0.975
Satd. Flow (prot)	1688	0	1706	0	0	1743
Flt Permitted	0.973					0.530
Satd. Flow (perm)	1688	0	1706	0	0	947
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	39		53			
Link Speed (k/h)	60		60			60
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	13.8		19.8			15.5
Peak Hour Factor	0.75	0.98	0.76	0.74	0.78	0.83
Heavy Vehicles (%)	4%	4%	8%	3%	7%	8%
Adj. Flow (vph)	360	299	284	234	235	229
Shared Lane Traffic (%)						
Lane Group Flow (vph)	659	0	518	0	0	464
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Detector Phase	4		2		1	6
Switch Phase						



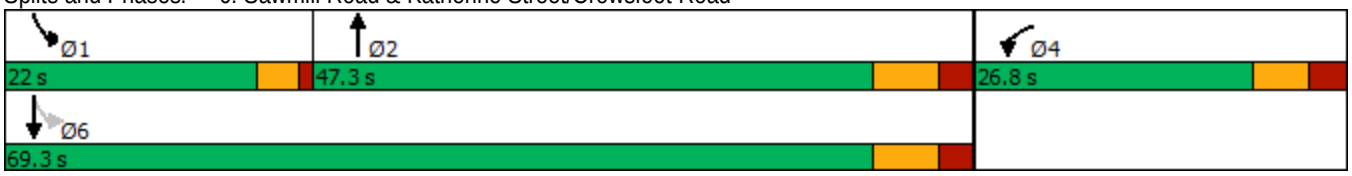
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Initial (s)	3.5		20.0		10.0	20.0
Minimum Split (s)	14.8		27.3		14.0	27.3
Total Split (s)	26.8		47.3		22.0	69.3
Total Split (%)	27.9%		49.2%		22.9%	72.1%
Maximum Green (s)	20.0		40.0		18.0	62.0
Yellow Time (s)	3.9		4.8		3.0	4.8
All-Red Time (s)	2.9		2.5		1.0	2.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		7.3			7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		5.0		3.0	5.0
Recall Mode	Max		None		None	None
Walk Time (s)			10.0			
Flash Dont Walk (s)			8.0			
Pedestrian Calls (#/hr)			0			
Act Effct Green (s)	20.1		59.4			59.4
Actuated g/C Ratio	0.21		0.63			0.63
v/c Ratio	1.68		0.47			0.77
Control Delay	343.2		9.4			23.0
Queue Delay	0.0		0.0			0.0
Total Delay	343.2		9.4			23.0
LOS	F		A			C
Approach Delay	343.2		9.4			23.0
Approach LOS	F		A			C
Queue Length 50th (m)	~178.1		38.7			54.0
Queue Length 95th (m)	#189.6		44.8			83.2
Internal Link Dist (m)	206.2		306.8			234.5
Turn Bay Length (m)						
Base Capacity (vph)	392		1101			629
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	1.68		0.47			0.74

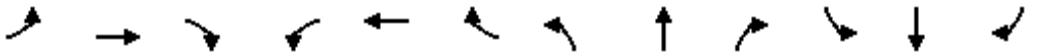
Intersection Summary			
Area Type:	Other		
Cycle Length: 96.1			
Actuated Cycle Length: 93.6			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.68			
Intersection Signal Delay: 147.3		Intersection LOS: F	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

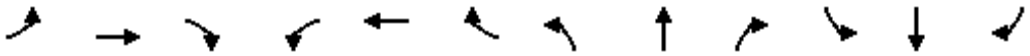
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	377	68	12	593	8	15	89	9	8	189	97
Future Volume (vph)	88	377	68	12	593	8	15	89	9	8	189	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.954	
Flt Protected	0.950			0.950				0.993			0.997	
Satd. Flow (prot)	1644	1779	1585	1372	1656	1633	0	1799	1338	0	1724	0
Flt Permitted	0.153			0.506				0.917			0.978	
Satd. Flow (perm)	265	1779	1585	731	1656	1633	0	1661	1338	0	1691	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85			95			92		28	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.75	0.85	0.80	0.38	0.84	0.50	0.80	0.71	0.56	0.42	0.89	0.80
Heavy Vehicles (%)	11%	8%	3%	33%	16%	0%	13%	5%	22%	20%	3%	9%
Adj. Flow (vph)	117	444	85	32	706	16	19	125	16	19	212	121
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	444	85	32	706	16	0	144	16	0	352	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	



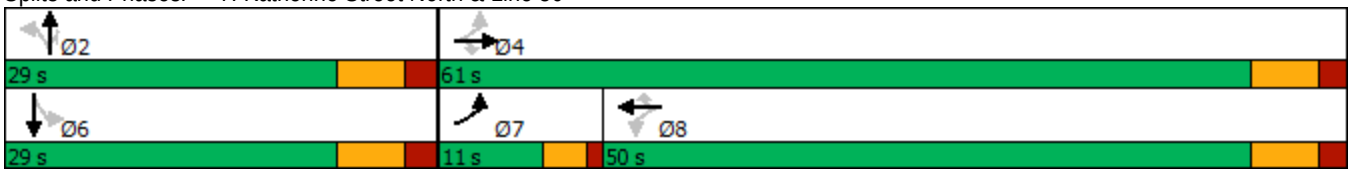
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	11.0	61.0	61.0	50.0	50.0	50.0	29.0	29.0	29.0	29.0	29.0	
Total Split (%)	12.2%	67.8%	67.8%	55.6%	55.6%	55.6%	32.2%	32.2%	32.2%	32.2%	32.2%	
Maximum Green (s)	7.0	54.4	54.4	43.4	43.4	43.4	22.2	22.2	22.2	22.2	22.2	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		15.0	15.0	15.0	15.0	15.0	13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0	0	0	0	
Act Effct Green (s)	50.3	47.6	47.6	39.4	39.4	39.4		22.7	22.7		22.7	
Actuated g/C Ratio	0.60	0.57	0.57	0.47	0.47	0.47		0.27	0.27		0.27	
v/c Ratio	0.42	0.44	0.09	0.09	0.91	0.02		0.32	0.04		0.74	
Control Delay	11.5	11.5	2.1	13.7	38.9	0.0		29.8	0.1		39.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	11.5	11.5	2.1	13.7	38.9	0.0		29.8	0.1		39.1	
LOS	B	B	A	B	D	A		C	A		D	
Approach Delay		10.3			37.0			26.9			39.1	
Approach LOS		B			D			C			D	
Queue Length 50th (m)	7.2	37.0	0.0	2.9	105.6	0.0		20.6	0.0		53.0	
Queue Length 95th (m)	11.0	51.6	3.9	3.2	#154.7	0.0		28.2	0.0		#93.7	
Internal Link Dist (m)		412.4			361.1			245.9			268.1	
Turn Bay Length (m)	30.0		35.0	40.0		50.0			15.0			
Base Capacity (vph)	276	1177	1077	385	874	906		448	428		477	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.42	0.38	0.08	0.08	0.81	0.02		0.32	0.04		0.74	

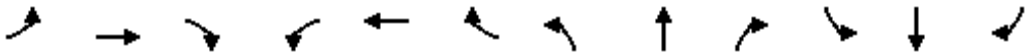
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 27.5		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

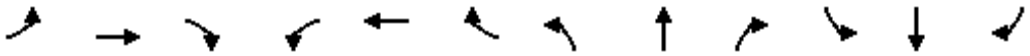
Queue shown is maximum after two cycles.

Splits and Phases: 7: Katherine Street North & Line 86





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	317	14	226	422	31	62	556	189	34	455	45
Future Volume (vph)	19	317	14	226	422	31	62	556	189	34	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.971			0.985	
Flt Protected	0.950			0.950				0.994			0.997	
Satd. Flow (prot)	1674	1847	1445	1690	1746	1150	0	1714	0	0	1785	0
Flt Permitted	0.397			0.314				0.637			0.814	
Satd. Flow (perm)	700	1847	1445	559	1746	1150	0	1099	0	0	1457	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		15			7	
Link Speed (k/h)		70			70			70			70	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		15.4			18.7			11.7			15.9	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	9%	4%	13%	8%	10%	42%	6%	6%	16%	6%	4%	18%
Adj. Flow (vph)	28	396	28	370	491	43	109	618	201	40	548	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	396	28	370	491	43	0	928	0	0	662	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0		31.0	31.0	
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	36.0	36.0		36.0	36.0	
Total Split (%)	15.5%	47.4%	47.4%	15.5%	47.4%	47.4%	37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	10.0	40.0	40.0	10.0	40.0	40.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0	18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	37.4	29.1	29.1	44.1	39.3	39.3		30.1			30.1	
Actuated g/C Ratio	0.43	0.34	0.34	0.51	0.45	0.45		0.35			0.35	
v/c Ratio	0.07	0.64	0.05	0.89	0.62	0.08		2.37			1.29	
Control Delay	10.3	29.1	0.1	40.5	23.4	0.6		641.5			173.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	10.3	29.1	0.1	40.5	23.4	0.6		641.5			173.0	
LOS	B	C	A	D	C	A		F			F	
Approach Delay		26.1			29.3			641.5			173.0	
Approach LOS		C			C			F			F	
Queue Length 50th (m)	2.1	54.3	0.0	35.0	52.0	0.0		~240.7			~129.9	
Queue Length 95th (m)	4.3	69.5	0.0	32.0	99.1	0.0		#364.9			#207.6	
Internal Link Dist (m)		276.2			340.4			203.4			284.9	
Turn Bay Length (m)	30.0		30.0	35.0		35.0						
Base Capacity (vph)	439	858	719	416	811	583		392			512	
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	0.06	0.46	0.04	0.89	0.61	0.07		2.37			1.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 86.4			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 2.37			
Intersection Signal Delay: 254.0		Intersection LOS: F	
Intersection Capacity Utilization 107.4%		ICU Level of Service G	
Analysis Period (min) 15			

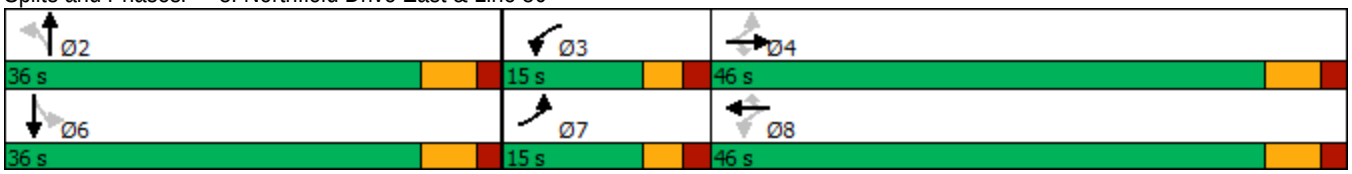
~ Volume exceeds capacity, queue is theoretically infinite.

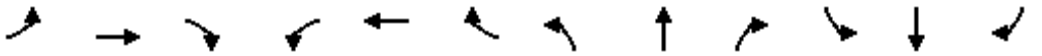
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: Northfield Drive East & Line 86





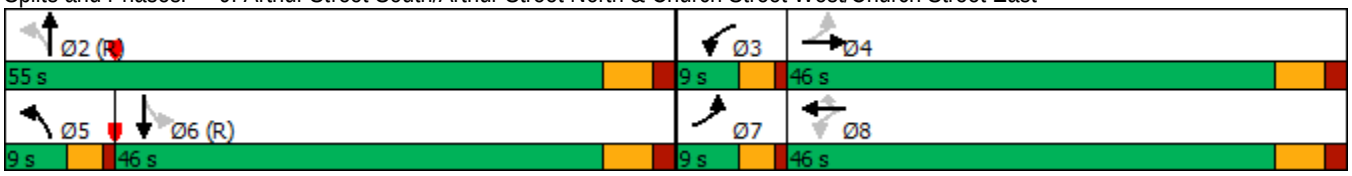
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	278	81	96	240	42	81	205	48	34	455	45
Future Volume (vph)	45	278	81	96	240	42	81	205	48	34	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969				0.850		0.971			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1705	0	1615	1715	1420	1521	1635	0	1674	1731	0
Flt Permitted	0.452			0.294			0.091			0.572		
Satd. Flow (perm)	775	1705	0	500	1715	1420	146	1635	0	1008	1731	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				109		14			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.81	0.79	0.90	0.63	0.78	0.71	0.75	0.82	0.80	0.75	0.70	0.78
Heavy Vehicles (%)	12%	11%	2%	13%	12%	15%	20%	16%	6%	9%	8%	28%
Adj. Flow (vph)	56	352	90	152	308	59	108	250	60	45	650	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	442	0	152	308	59	108	310	0	45	708	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0		46.0	46.0	
Total Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	55.0		46.0	46.0	
Total Split (%)	8.2%	41.8%		8.2%	41.8%	41.8%	8.2%	50.0%		41.8%	41.8%	
Maximum Green (s)	5.0	40.0		5.0	40.0	40.0	5.0	49.0		40.0	40.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	
Walk Time (s)		25.0			25.0	25.0		29.0		29.0	29.0	
Flash Dont Walk (s)		15.0			15.0	15.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	47.0	40.0		47.0	40.0	40.0	51.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.43	0.36		0.43	0.36	0.36	0.46	0.45		0.36	0.36	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.15	0.70		0.58	0.49	0.10	0.83	0.42		0.12	1.12	
Control Delay	17.6	36.2		29.2	30.5	0.8	65.9	22.0		24.6	107.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.6	36.2		29.2	30.5	0.8	65.9	22.0		24.6	107.3	
LOS	B	D		C	C	A	E	C		C	F	
Approach Delay		34.1			26.7			33.3			102.4	
Approach LOS		C			C			C			F	
Queue Length 50th (m)	6.5	78.0		18.8	50.8	0.0	13.0	42.2		6.4	~175.3	
Queue Length 95th (m)	12.2	94.5		21.1	63.5	0.0	#26.3	57.1		11.9	#158.4	
Internal Link Dist (m)		121.1			165.0			97.2			158.5	
Turn Bay Length (m)	25.0			10.0		10.0	30.0			15.0		
Base Capacity (vph)	370	628		264	623	585	130	736		366	632	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.70		0.58	0.49	0.10	0.83	0.42		0.12	1.12	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Pretimed
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 55.7 Intersection LOS: E
Intersection Capacity Utilization 119.3% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

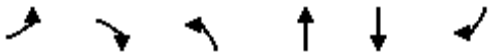
Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East



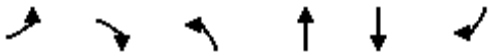


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	1883	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	1883	1883	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	231.8			189.7	160.2	
Travel Time (s)	17.4			14.2	12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



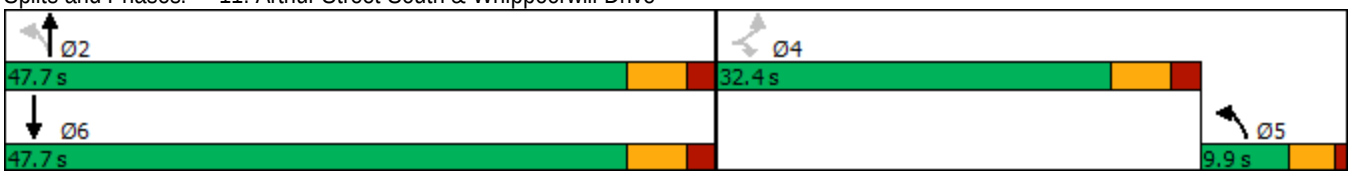
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	44	145	41	475	528	10
Future Volume (vph)	44	145	41	475	528	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0	40.0	45.0			5.0
Storage Lanes	1	0	1			1
Taper Length (m)	40.0		5.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1617	1772	1762	3422	0
Flt Permitted	0.950		0.396			
Satd. Flow (perm)	1825	1617	739	1762	3422	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		173			5	
Link Speed (k/h)	50			60	60	
Link Distance (m)	238.4			185.0	215.7	
Travel Time (s)	17.2			11.1	12.9	
Peak Hour Factor	0.69	0.84	0.82	0.71	0.95	0.50
Heavy Vehicles (%)	0%	1%	3%	9%	6%	10%
Adj. Flow (vph)	64	173	50	669	556	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	173	50	669	576	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane				Yes		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	

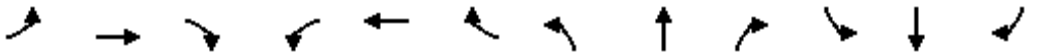


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	12.0	12.0	5.0	41.7	41.7	
Minimum Split (s)	32.0	32.0	9.5	47.7	47.7	
Total Split (s)	32.4	32.4	9.9	47.7	47.7	
Total Split (%)	36.0%	36.0%	11.0%	53.0%	53.0%	
Maximum Green (s)	26.4	26.4	5.9	41.7	41.7	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	12.0	12.0	52.5	50.5	44.6	
Actuated g/C Ratio	0.16	0.16	0.70	0.68	0.60	
v/c Ratio	0.22	0.43	0.08	0.56	0.28	
Control Delay	29.5	8.7	3.7	8.5	8.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.5	8.7	3.7	8.5	8.3	
LOS	C	A	A	A	A	
Approach Delay	14.3			8.2	8.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	8.1	0.0	1.8	41.0	21.3	
Queue Length 95th (m)	13.8	12.5	3.9	42.5	30.2	
Internal Link Dist (m)	214.4			161.0	191.7	
Turn Bay Length (m)	40.0	40.0	45.0			
Base Capacity (vph)	648	686	602	1192	2049	
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	0.10	0.25	0.08	0.56	0.28	

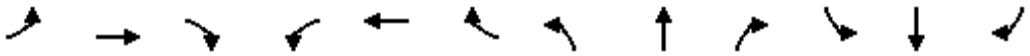
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 11: Arthur Street South & Whippoorwill Drive





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	40	298	127	31	15	222	548	151	1	946	76
Future Volume (vph)	90	40	298	127	31	15	222	548	151	1	946	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	35.0		35.0	100.0		100.0	45.0		45.0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.970				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	3218	0	913	1847	1484
Flt Permitted	0.722			0.717			0.081			0.307		
Satd. Flow (perm)	1334	1685	1432	963	1413	1142	123	3218	0	295	1847	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			265			79		55				96
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			171.5	
Travel Time (s)		16.0			12.2			13.7			10.3	
Peak Hour Factor	0.72	0.66	0.79	0.91	0.58	0.58	0.81	0.74	0.80	0.25	0.91	0.85
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Adj. Flow (vph)	125	61	377	140	53	26	274	741	189	4	1040	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	61	377	140	53	26	274	930	0	4	1040	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		6
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	45.0		45.0	45.0	45.0
Minimum Split (s)	34.0	34.0	34.0	34.0	34.0	34.0	11.5	51.4		51.4	51.4	51.4
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	16.0	67.4		51.4	51.4	51.4
Total Split (%)	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%	15.6%	65.8%		50.2%	50.2%	50.2%
Maximum Green (s)	27.0	27.0	27.0	27.0	27.0	27.0	12.0	61.0		45.0	45.0	45.0
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	3.0	3.7		3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	1.0	2.7		2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0	6.4		6.4	6.4	6.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		25.0		25.0	25.0	25.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0		20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0		0	0	0
Act Effct Green (s)	18.4	18.4	18.4	18.4	18.4	18.4	63.7	61.2		45.2	45.2	45.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.68	0.65		0.48	0.48	0.48
v/c Ratio	0.48	0.19	0.77	0.74	0.19	0.09	1.09	0.44		0.03	1.17	0.12
Control Delay	39.4	31.8	21.8	59.0	32.2	0.6	108.8	9.0		16.0	115.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	39.4	31.8	21.8	59.0	32.2	0.6	108.8	9.0		16.0	115.8	3.6
LOS	D	C	C	E	C	A	F	A		B	F	A
Approach Delay		26.8			45.6			31.8			106.7	
Approach LOS		C			D			C			F	
Queue Length 50th (m)	20.2	9.3	17.8	24.0	8.1	0.0	~43.2	36.5		0.4	~227.8	0.0
Queue Length 95th (m)	28.1	13.9	33.9	44.3	11.1	0.0	#85.9	46.2		0.7	#338.4	6.6
Internal Link Dist (m)		242.0			178.5			205.1			147.5	
Turn Bay Length (m)	60.0		60.0	35.0		35.0	100.0			45.0		45.0
Base Capacity (vph)	384	485	601	277	406	385	252	2113		141	886	762
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.33	0.13	0.63	0.51	0.13	0.07	1.09	0.44		0.03	1.17	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 102.4			
Actuated Cycle Length: 94.1			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.17			
Intersection Signal Delay: 59.0		Intersection LOS: E	
Intersection Capacity Utilization 106.0%		ICU Level of Service G	
Analysis Period (min) 15			

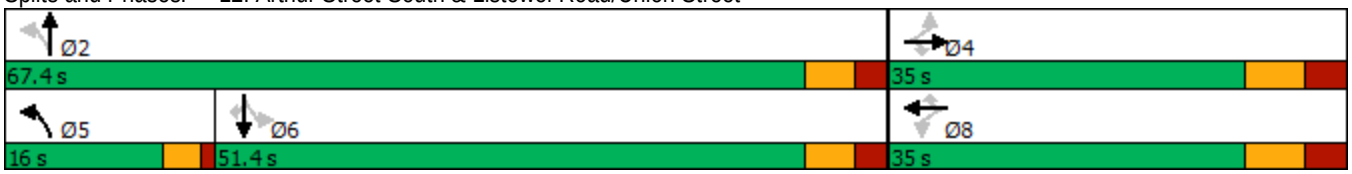
~ Volume exceeds capacity, queue is theoretically infinite.

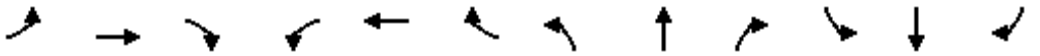
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	191	86	127	31	17	63	178	271	28	324	200
Future Volume (vph)	77	191	86	127	31	17	63	178	271	28	324	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.940				0.850		0.950	
Flt Protected	0.950			0.950				0.986			0.997	
Satd. Flow (prot)	1587	1644	0	1706	1672	0	0	1816	1512	0	1717	0
Flt Permitted	0.715			0.295				0.596			0.961	
Satd. Flow (perm)	1194	1644	0	530	1672	0	0	1098	1512	0	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			26				361		38	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.83	0.80	0.73	0.83	0.79	0.65	0.78	0.85	0.75	0.71	0.92	0.86
Heavy Vehicles (%)	15%	13%	7%	7%	8%	8%	0%	6%	8%	12%	4%	8%
Adj. Flow (vph)	93	239	118	153	39	26	81	209	361	39	352	233
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	357	0	153	65	0	0	290	361	0	624	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	
Total Split (s)	31.7	31.7		9.0	40.7		9.0	49.3	49.3	40.3	40.3	
Total Split (%)	35.2%	35.2%		10.0%	45.2%		10.0%	54.8%	54.8%	44.8%	44.8%	
Maximum Green (s)	25.0	25.0		5.0	34.0		5.0	43.1	43.1	34.1	34.1	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Walk Time (s)	14.0	14.0			14.0			25.0	25.0	25.0	25.0	
Flash Dont Walk (s)	11.0	11.0			11.0			5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)	0	0			0			0	0	0	0	
Act Effct Green (s)	25.0	25.0		36.7	34.0			43.1	43.1		34.1	
Actuated g/C Ratio	0.28	0.28		0.41	0.38			0.48	0.48		0.38	

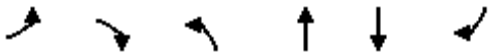
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.28	0.75		0.54	0.10			0.53	0.40		0.96	
Control Delay	28.3	38.8		26.0	12.7			19.9	2.9		54.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	28.3	38.8		26.0	12.7			19.9	2.9		54.2	
LOS	C	D		C	B			B	A		D	
Approach Delay		36.6			22.1			10.5			54.2	
Approach LOS		D			C			B			D	
Queue Length 50th (m)	12.6	52.1		16.8	4.2			29.9	0.0		98.4	
Queue Length 95th (m)	23.0	70.5		27.1	10.3			44.0	5.2		#167.7	
Internal Link Dist (m)		148.6			116.6			81.4			79.7	
Turn Bay Length (m)	20.0			50.0					30.0			
Base Capacity (vph)	331	476		281	647			548	912		650	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.28	0.75		0.54	0.10			0.53	0.40		0.96	

Intersection Summary

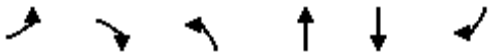
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 111.3% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Northfield Drive East & Sawmill Road





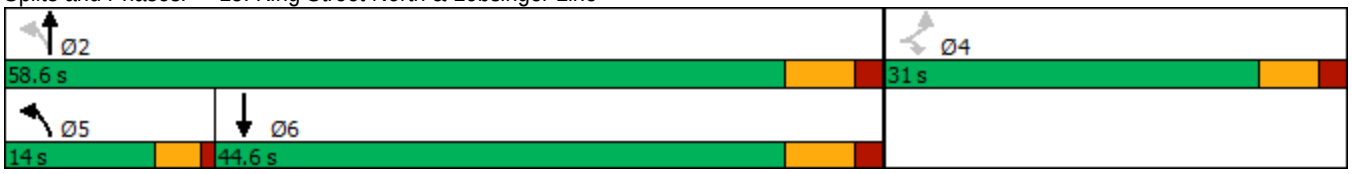
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	330	188	226	291	53
Future Volume (vph)	42	330	188	226	291	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.974	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1393	1420	1508	1830	1680	0
Flt Permitted	0.950		0.415			
Satd. Flow (perm)	1393	1420	659	1830	1680	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		367			16	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.62	0.90	0.94	0.90	0.87	0.68
Heavy Vehicles (%)	31%	15%	21%	5%	11%	13%
Adj. Flow (vph)	68	367	200	251	334	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	367	200	251	412	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	

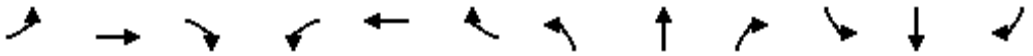


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	58.6	44.6	
Total Split (%)	34.6%	34.6%	15.6%	65.4%	49.8%	
Maximum Green (s)	25.0	25.0	10.0	52.0	38.0	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	7.0	7.0		27.0	27.0	
Flash Dont Walk (s)	9.0	9.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	11.4	11.4	54.7	52.1	38.4	
Actuated g/C Ratio	0.15	0.15	0.72	0.68	0.50	
v/c Ratio	0.33	0.70	0.34	0.20	0.48	
Control Delay	33.2	11.4	5.6	5.2	14.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.2	11.4	5.6	5.2	14.8	
LOS	C	B	A	A	B	
Approach Delay	14.8			5.4	14.8	
Approach LOS	B			A	B	
Queue Length 50th (m)	8.9	0.0	6.8	10.2	33.7	
Queue Length 95th (m)	13.0	22.2	18.0	24.2	63.3	
Internal Link Dist (m)	173.9			110.5	150.4	
Turn Bay Length (m)	20.0		100.0			
Base Capacity (vph)	458	713	585	1251	855	
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	0.15	0.51	0.34	0.20	0.48	

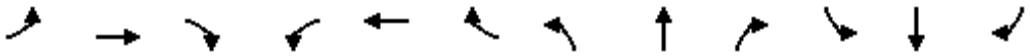
Intersection Summary			
Area Type:	Other		
Cycle Length: 89.6			
Actuated Cycle Length: 76.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: King Street North & Lobsinger Line





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	215	9	156	344	52	26	244	519	70	102	11
Future Volume (vph)	291	215	9	156	344	52	26	244	519	70	102	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3373	0	3278	1779	1384	1415	1847	1601	1690	1776	0
Flt Permitted	0.950			0.950			0.673			0.282		
Satd. Flow (perm)	1674	3373	0	3278	1779	1384	1002	1847	1601	502	1776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				102			577		5	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.89	0.85	0.56	0.86	0.82	0.81	0.85	0.90	0.90	0.90	0.89	0.63
Heavy Vehicles (%)	9%	7%	11%	8%	8%	18%	29%	4%	2%	8%	7%	0%
Adj. Flow (vph)	327	253	16	181	420	64	31	271	577	78	115	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	327	269	0	181	420	64	31	271	577	78	132	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	



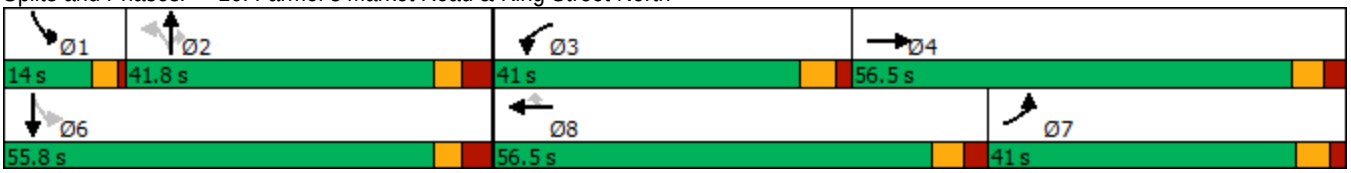
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Maximum Green (s)	35.0	50.0		35.0	50.0	50.0	35.0	35.0	35.0	10.0	49.0	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)		18.0			18.0	18.0	18.0	18.0	18.0		18.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	31.7	67.7		14.3	50.3	50.3	29.5	29.5	29.5	45.8	43.0	
Actuated g/C Ratio	0.22	0.47		0.10	0.35	0.35	0.20	0.20	0.20	0.32	0.30	
v/c Ratio	0.89	0.17		0.56	0.68	0.12	0.15	0.72	0.73	0.33	0.25	
Control Delay	81.3	23.5		70.0	48.7	1.8	49.7	65.5	9.8	39.4	38.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	81.3	23.5		70.0	48.7	1.8	49.7	65.5	9.8	39.4	38.4	
LOS	F	C		E	D	A	D	E	A	D	D	
Approach Delay		55.2			50.0			28.4			38.8	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	94.0	23.6		27.1	109.7	0.0	7.6	75.3	0.0	16.5	28.4	
Queue Length 95th (m)	#143.7	33.5		37.5	134.3	0.4	16.2	106.8	34.8	29.1	45.3	
Internal Link Dist (m)		238.1			393.7			114.8			122.4	
Turn Bay Length (m)				215.0			45.0			45.0		
Base Capacity (vph)	408	1583		799	619	548	244	450	826	242	609	
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	0.80	0.17		0.23	0.68	0.12	0.13	0.60	0.70	0.32	0.22	

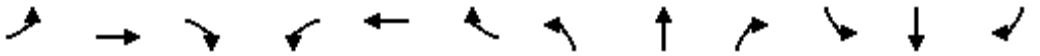
Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 144.5			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 42.2		Intersection LOS: D	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

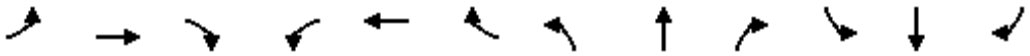
Queue shown is maximum after two cycles.

Splits and Phases: 16: Farmer's Market Road & King Street North





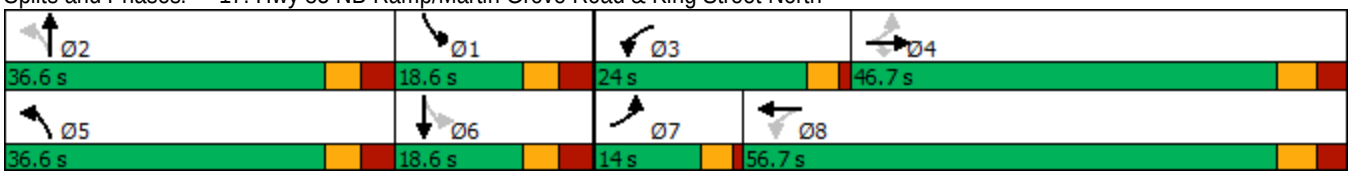
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	503	111	33	263	5	227	1	183	11	3	16
Future Volume (vph)	7	503	111	33	263	5	227	1	183	11	3	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.853			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	1830	1484	1601	3298	0	3079	1577	0	1825	1547	0
Flt Permitted	0.570			0.288			0.833			0.833		
Satd. Flow (perm)	936	1830	1484	485	3298	0	2700	1577	0	1600	1547	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		5			210			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.75	0.92	0.87	0.58	0.93	0.33	0.92	0.25	0.87	0.63	0.38	0.70
Heavy Vehicles (%)	17%	5%	10%	14%	9%	25%	15%	0%	4%	0%	0%	14%
Adj. Flow (vph)	9	547	128	57	283	15	247	4	210	17	8	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	547	128	57	298	0	247	214	0	17	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			10.0			5.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

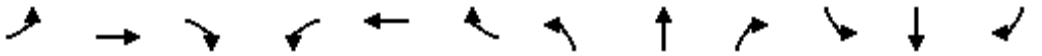


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Maximum Green (s)	10.0	40.0	40.0	20.0	50.0		30.0	30.0		12.0	12.0	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Walk Time (s)		25.0	25.0		25.0			10.0			10.0	
Flash Dont Walk (s)		15.0	15.0		15.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	52.9	44.6	44.6	56.5	52.1		18.3	17.6		10.9	8.3	
Actuated g/C Ratio	0.60	0.50	0.50	0.64	0.59		0.21	0.20		0.12	0.09	
v/c Ratio	0.01	0.59	0.15	0.14	0.15		0.40	0.44		0.08	0.19	
Control Delay	8.7	22.3	2.1	8.9	10.7		33.4	9.0		39.5	24.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.7	22.3	2.1	8.9	10.7		33.4	9.0		39.5	24.9	
LOS	A	C	A	A	B		C	A		D	C	
Approach Delay		18.3			10.4			22.1			30.1	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.6	76.3	0.0	4.0	12.3		17.2	0.5		2.7	1.3	
Queue Length 95th (m)	2.3	126.3	5.5	6.2	26.8		36.9	0.0		6.7	1.8	
Internal Link Dist (m)		393.7			152.0			206.8			176.4	
Turn Bay Length (m)	55.0			25.0						15.0		
Base Capacity (vph)	656	922	826	569	1947		1067	683		262	234	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.59	0.15	0.10	0.15		0.23	0.31		0.06	0.13	

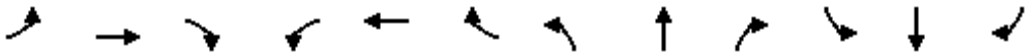
Intersection Summary			
Area Type:	Other		
Cycle Length: 125.9			
Actuated Cycle Length: 88.4			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 60.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North





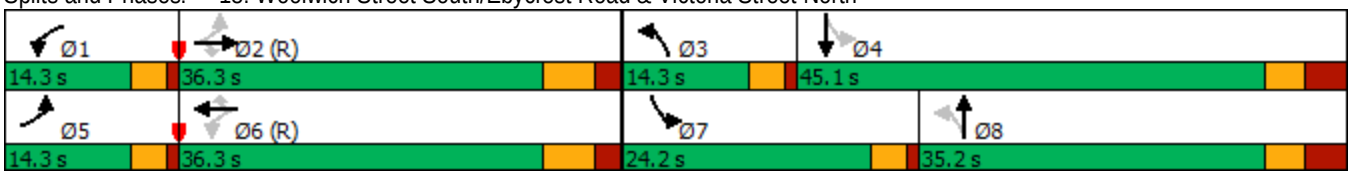
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	415	96	8	308	86	88	24	13	113	22	63
Future Volume (vph)	38	415	96	8	308	86	88	24	13	113	22	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.950			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	3411	1570	1630	3411	1471	1772	1706	0	1630	1614	0
Flt Permitted	0.525			0.503			0.680			0.490		
Satd. Flow (perm)	970	3411	1570	863	3411	1471	1268	1706	0	840	1614	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			158		17			88	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.63	0.93	0.87	0.84	0.70	0.78	0.83	0.69	0.72
Heavy Vehicles (%)	4%	7%	4%	12%	7%	11%	3%	4%	13%	12%	3%	7%
Adj. Flow (vph)	45	428	125	13	331	99	105	34	17	136	32	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	428	125	13	331	99	105	51	0	136	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	



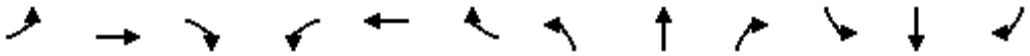
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	34.9	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	14.3	35.2		24.2	45.1	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	13.0%	32.0%		22.0%	41.0%	
Maximum Green (s)	10.3	29.8	29.8	10.3	29.8	29.8	10.3	28.3		20.2	38.2	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	Min	
Walk Time (s)		18.8	18.8		18.8	18.8		10.0			10.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		18.0			18.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	69.9	64.4	64.4	67.2	59.9	59.9	20.2	10.4		30.6	14.6	
Actuated g/C Ratio	0.64	0.59	0.59	0.61	0.54	0.54	0.18	0.09		0.28	0.13	
v/c Ratio	0.07	0.21	0.13	0.02	0.18	0.11	0.38	0.29		0.38	0.42	
Control Delay	8.6	12.7	1.6	8.8	14.5	0.7	34.3	38.2		33.1	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.6	12.7	1.6	8.8	14.5	0.7	34.3	38.2		33.1	18.5	
LOS	A	B	A	A	B	A	C	D		C	B	
Approach Delay		10.1			11.3			35.6			26.3	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	3.2	19.3	0.0	0.9	18.6	0.0	17.2	6.9		22.9	6.2	
Queue Length 95th (m)	8.2	39.3	2.1	2.6	31.3	1.2	26.2	13.4		32.7	12.1	
Internal Link Dist (m)		296.5			213.7			304.6			251.4	
Turn Bay Length (m)	50.0			55.0		55.0	40.0			50.0		
Base Capacity (vph)	699	1998	985	625	1856	872	289	451		386	617	
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	0.06	0.21	0.13	0.02	0.18	0.11	0.36	0.11		0.35	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 104.5 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 55.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	464	23	58	844	21	188	590	361	218	548	284
Future Volume (vph)	25	464	23	58	844	21	188	590	361	218	548	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	90.0		100.0	100.0		0.0	80.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.946			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1883	1498	1659	1883	1633	1825	3281	0	1738	3337	0
Flt Permitted	0.082			0.326			0.148			0.148		
Satd. Flow (perm)	158	1883	1498	569	1883	1633	284	3281	0	271	3337	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			60			60		92			70	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		364.7			395.3			305.6			253.6	
Travel Time (s)		27.4			29.6			22.9			19.0	
Peak Hour Factor	0.56	0.88	0.55	0.88	0.94	0.55	0.77	0.78	0.85	0.60	0.77	0.82
Heavy Vehicles (%)	0%	2%	9%	10%	2%	0%	0%	2%	11%	5%	5%	2%
Adj. Flow (vph)	45	527	42	66	898	38	244	756	425	363	712	346
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	527	42	66	898	38	244	1181	0	363	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	9.6	70.0	70.0	9.6	70.0	70.0	30.4	30.4		30.4	30.4	
Total Split (%)	8.7%	63.6%	63.6%	8.7%	63.6%	63.6%	27.6%	27.6%		27.6%	27.6%	
Maximum Green (s)	5.1	65.5	65.5	5.1	65.5	65.5	25.9	25.9		25.9	25.9	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	51.3	47.4	47.4	52.3	49.7	49.7	27.0	27.0		27.0	27.0	
Actuated g/C Ratio	0.56	0.52	0.52	0.57	0.55	0.55	0.30	0.30		0.30	0.30	
v/c Ratio	0.24	0.54	0.05	0.17	0.88	0.04	2.90	1.14		4.54	1.02	
Control Delay	9.4	16.2	1.5	7.4	28.7	1.2	912.2	105.0		1637.1	66.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.4	16.2	1.5	7.4	28.7	1.2	912.2	105.0		1637.1	66.2	
LOS	A	B	A	A	C	A	F	F		F	E	
Approach Delay		14.7			26.3			243.2			467.5	
Approach LOS		B			C			F			F	
Queue Length 50th (m)	2.8	59.5	0.0	4.2	139.6	0.0	~80.8	~139.9		~118.0	~115.8	
Queue Length 95th (m)	3.8	81.4	0.0	8.3	198.3	0.0	#108.6	#170.0		#120.9	#142.9	
Internal Link Dist (m)		340.7			371.3			281.6			229.6	
Turn Bay Length (m)	90.0		90.0	90.0		100.0	100.0			80.0		
Base Capacity (vph)	186	1400	1129	390	1400	1229	84	1037		80	1039	
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	0.24	0.38	0.04	0.17	0.64	0.03	2.90	1.14		4.54	1.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 91.1			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 4.54			
Intersection Signal Delay: 234.5		Intersection LOS: F	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			

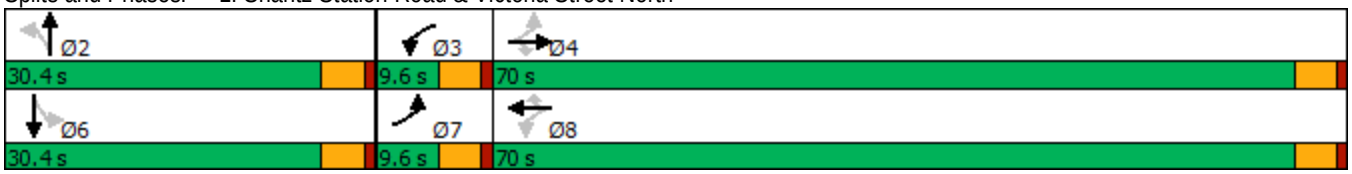
~ Volume exceeds capacity, queue is theoretically infinite.

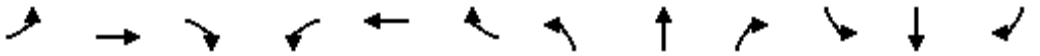
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Shantz Station Road & Victoria Street North





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	12	27	19	12	45	34	992	31	43	511	8
Future Volume (vph)	10	12	27	19	12	45	34	992	31	43	511	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		0.0	75.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.931			0.922			0.989			0.997	
Flt Protected		0.990			0.988		0.950			0.950		
Satd. Flow (prot)	0	1771	0	0	1545	0	1690	3282	0	1644	3286	0
Flt Permitted		0.990			0.988		0.950			0.950		
Satd. Flow (perm)	0	1771	0	0	1545	0	1690	3282	0	1644	3286	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		288.3			336.9			408.6			247.1	
Travel Time (s)		21.6			25.3			30.6			18.5	
Peak Hour Factor	0.63	0.50	0.65	0.79	0.75	0.82	0.60	0.84	0.34	0.70	0.88	0.63
Heavy Vehicles (%)	0%	0%	0%	32%	0%	9%	8%	8%	36%	11%	11%	0%
Adj. Flow (vph)	16	24	42	24	16	55	57	1181	91	61	581	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	82	0	0	95	0	57	1272	0	61	594	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	270	293	237	235	308	292
Future Volume (vph)	270	293	237	235	308	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.930			
Flt Protected	0.977					0.974
Satd. Flow (prot)	1685	0	1717	0	0	1844
Flt Permitted	0.977					0.479
Satd. Flow (perm)	1685	0	1717	0	0	907
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	54		69			
Link Speed (k/h)	48		48			48
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	17.3		24.8			19.4
Peak Hour Factor	0.85	0.80	0.85	0.78	0.78	0.83
Heavy Vehicles (%)	5%	2%	2%	6%	1%	2%
Adj. Flow (vph)	318	366	279	301	395	352
Shared Lane Traffic (%)						
Lane Group Flow (vph)	684	0	580	0	0	747
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases					6	
Detector Phase	4		2		1	6
Switch Phase						



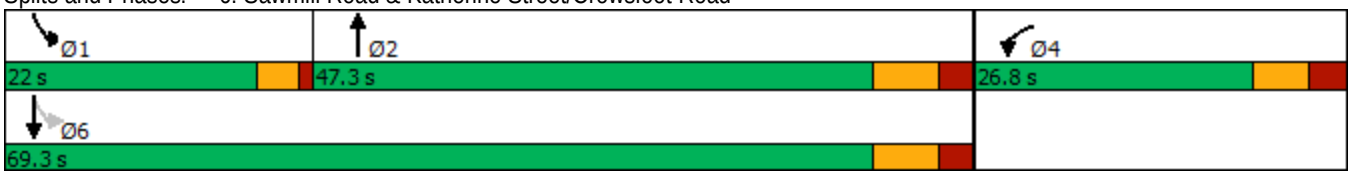
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Initial (s)	3.5		20.0		10.0	20.0
Minimum Split (s)	14.8		27.3		14.0	27.3
Total Split (s)	26.8		47.3		22.0	69.3
Total Split (%)	27.9%		49.2%		22.9%	72.1%
Maximum Green (s)	20.0		40.0		18.0	62.0
Yellow Time (s)	3.9		4.8		3.0	4.8
All-Red Time (s)	2.9		2.5		1.0	2.5
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.8		7.3			7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		5.0		3.0	5.0
Recall Mode	Max		None		None	None
Walk Time (s)			10.0			
Flash Dont Walk (s)			8.0			
Pedestrian Calls (#/hr)			0			
Act Effct Green (s)	20.0		62.0			62.0
Actuated g/C Ratio	0.21		0.65			0.65
v/c Ratio	1.74		0.51			1.28
Control Delay	369.1		9.7			158.3
Queue Delay	0.0		0.0			0.0
Total Delay	369.1		9.7			158.3
LOS	F		A			F
Approach Delay	369.1		9.7			158.3
Approach LOS	F		A			F
Queue Length 50th (m)	~183.3		44.6			~176.8
Queue Length 95th (m)	#231.4		61.7			#216.1
Internal Link Dist (m)	206.2		306.8			234.5
Turn Bay Length (m)						
Base Capacity (vph)	393		1132			585
Starvation Cap Reductn	0		0			0
Spillback Cap Reductn	0		0			0
Storage Cap Reductn	0		0			0
Reduced v/c Ratio	1.74		0.51			1.28

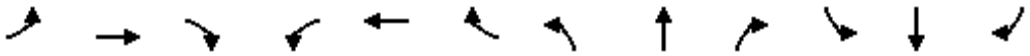
Intersection Summary			
Area Type:	Other		
Cycle Length: 96.1			
Actuated Cycle Length: 96.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.74			
Intersection Signal Delay: 187.2		Intersection LOS: F	
Intersection Capacity Utilization 110.0%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

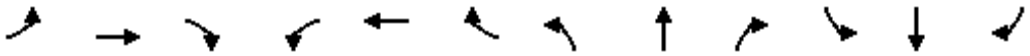
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	474	91	43	516	21	71	204	23	3	138	59
Future Volume (vph)	195	474	91	43	516	21	71	204	23	3	138	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.962	
Flt Protected	0.950			0.950				0.986			0.999	
Satd. Flow (prot)	1738	1883	1541	1738	1812	1498	0	1806	1633	0	1783	0
Flt Permitted	0.123			0.278				0.822			0.995	
Satd. Flow (perm)	225	1883	1541	509	1812	1498	0	1506	1633	0	1776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50			71			69		26	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.92	0.90	0.90	0.61	0.97	0.69	0.69	0.78	0.75	0.75	0.70	0.74
Heavy Vehicles (%)	5%	2%	6%	5%	6%	9%	2%	6%	0%	0%	3%	5%
Adj. Flow (vph)	212	527	101	70	532	30	103	262	31	4	197	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	527	101	70	532	30	0	365	31	0	281	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	14.0	49.0	49.0	35.0	35.0	35.0	71.0	71.0	71.0	71.0	71.0	
Total Split (%)	11.7%	40.8%	40.8%	29.2%	29.2%	29.2%	59.2%	59.2%	59.2%	59.2%	59.2%	
Maximum Green (s)	10.0	42.4	42.4	28.4	28.4	28.4	64.2	64.2	64.2	64.2	64.2	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		15.0	15.0	15.0	15.0	15.0	13.0	13.0	13.0	13.0	13.0	
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0	0	0	0	
Act Effct Green (s)	45.0	42.4	42.4	28.4	28.4	28.4		64.2	64.2		64.2	
Actuated g/C Ratio	0.38	0.35	0.35	0.24	0.24	0.24		0.54	0.54		0.54	
v/c Ratio	1.01	0.79	0.18	0.58	1.24	0.07		0.45	0.03		0.29	
Control Delay	95.6	45.0	15.2	62.1	166.9	0.3		19.4	0.1		14.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	95.6	45.0	15.2	62.1	166.9	0.3		19.4	0.1		14.8	
LOS	F	D	B	E	F	A		B	A		B	
Approach Delay		54.2			147.3			17.9			14.8	
Approach LOS		D			F			B			B	
Queue Length 50th (m)	~35.6	110.7	8.0	14.7	~155.6	0.0		50.7	0.0		31.5	
Queue Length 95th (m)	#84.0	154.0	20.3	19.3	#221.3	0.0		61.1	0.0		34.6	
Internal Link Dist (m)		412.4			361.1			245.9			268.1	
Turn Bay Length (m)	30.0		35.0	40.0		50.0			15.0			
Base Capacity (vph)	210	665	576	120	428	408		805	905		962	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	1.01	0.79	0.18	0.58	1.24	0.07		0.45	0.03		0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 69.8		Intersection LOS: E	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

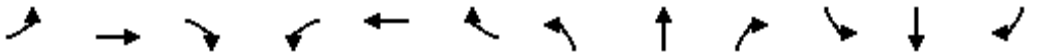
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

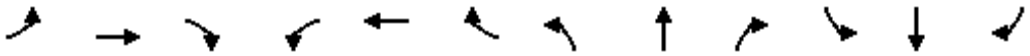
Queue shown is maximum after two cycles.

Splits and Phases: 7: Katherine Street North & Line 86





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	491	56	162	423	39	63	516	210	54	614	81
Future Volume (vph)	84	491	56	162	423	39	63	516	210	54	614	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.967			0.981	
Flt Protected	0.950			0.950				0.994			0.997	
Satd. Flow (prot)	1825	1865	1555	1674	1830	1555	0	1810	0	0	1812	0
Flt Permitted	0.291			0.141				0.487			0.751	
Satd. Flow (perm)	559	1865	1555	249	1830	1555	0	887	0	0	1365	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90			90		18			9	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		22.5			27.3			17.1			23.2	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	0%	3%	5%	9%	5%	5%	0%	2%	3%	21%	2%	5%
Adj. Flow (vph)	122	614	112	266	492	54	111	573	223	64	740	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	614	112	266	492	54	0	907	0	0	937	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0		31.0	31.0	
Total Split (s)	15.0	46.0	46.0	15.0	46.0	46.0	36.0	36.0		36.0	36.0	
Total Split (%)	15.5%	47.4%	47.4%	15.5%	47.4%	47.4%	37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	10.0	40.0	40.0	10.0	40.0	40.0	30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0			6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		14.0	14.0		14.0	14.0	18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	45.4	35.4	35.4	47.4	36.4	36.4		30.1			30.1	
Actuated g/C Ratio	0.49	0.38	0.38	0.51	0.39	0.39		0.33			0.33	
v/c Ratio	0.31	0.86	0.17	0.94	0.68	0.08		3.02			2.08	
Control Delay	11.8	39.9	6.4	62.1	29.0	1.5		934.9			517.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	11.8	39.9	6.4	62.1	29.0	1.5		934.9			517.4	
LOS	B	D	A	E	C	A		F			F	
Approach Delay		31.4			38.0			934.9			517.4	
Approach LOS		C			D			F			F	
Queue Length 50th (m)	9.7	98.6	2.4	28.1	71.6	0.0		~251.6			~284.6	
Queue Length 95th (m)	13.0	117.9	2.1	27.6	99.5	0.2		#326.5			#325.5	
Internal Link Dist (m)		276.2			340.4			203.4			284.9	
Turn Bay Length (m)	30.0		30.0	35.0		35.0						
Base Capacity (vph)	417	809	725	282	793	725		300			450	
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	0.29	0.76	0.15	0.94	0.62	0.07		3.02			2.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 92.6			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 3.02			
Intersection Signal Delay: 396.8		Intersection LOS: F	
Intersection Capacity Utilization 107.0%		ICU Level of Service G	
Analysis Period (min) 15			

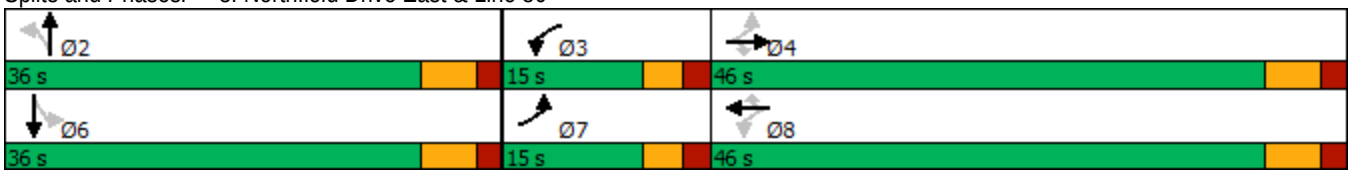
~ Volume exceeds capacity, queue is theoretically infinite.

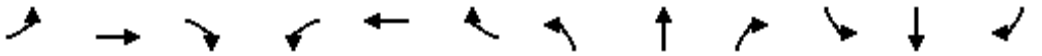
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: Northfield Drive East & Line 86



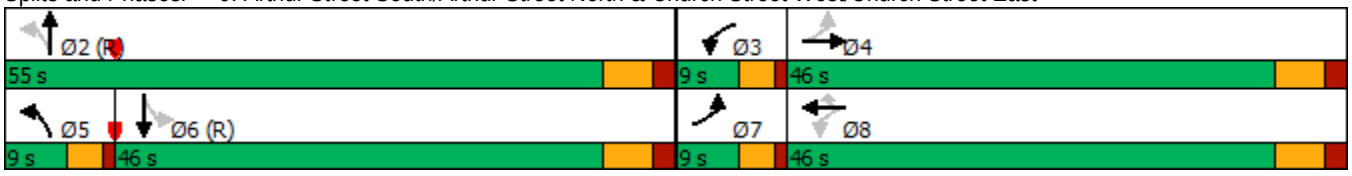


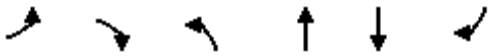
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	282	159	84	341	45	140	308	48	71	275	51
Future Volume (vph)	71	282	159	84	341	45	140	308	48	71	275	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942				0.850		0.978			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1753	0	1789	1847	1396	1738	1794	0	1722	1765	0
Flt Permitted	0.371			0.238			0.326			0.460		
Satd. Flow (perm)	654	1753	0	448	1847	1396	596	1794	0	834	1765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				109		10			13	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.83	0.93	0.84	0.71	0.91	0.81	0.94	0.84	0.77	0.80	0.89	0.66
Heavy Vehicles (%)	9%	4%	2%	2%	4%	17%	5%	5%	3%	6%	5%	8%
Adj. Flow (vph)	86	303	189	118	375	56	149	367	62	89	309	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	492	0	118	375	56	149	429	0	89	386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0		46.0	46.0	
Total Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	55.0		46.0	46.0	
Total Split (%)	8.2%	41.8%		8.2%	41.8%	41.8%	8.2%	50.0%		41.8%	41.8%	
Maximum Green (s)	5.0	40.0		5.0	40.0	40.0	5.0	49.0		40.0	40.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	
Walk Time (s)		25.0			25.0	25.0		29.0		29.0	29.0	
Flash Dont Walk (s)		15.0			15.0	15.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	47.0	40.0		47.0	40.0	40.0	51.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.43	0.36		0.43	0.36	0.36	0.46	0.45		0.36	0.36	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.26	0.75		0.47	0.56	0.10	0.45	0.53		0.29	0.59	
Control Delay	19.2	36.9		24.3	31.9	0.5	22.8	24.7		28.3	32.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.2	36.9		24.3	31.9	0.5	22.8	24.7		28.3	32.0	
LOS	B	D		C	C	A	C	C		C	C	
Approach Delay		34.3			27.1			24.2			31.3	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	10.2	85.9		14.2	63.6	0.0	18.3	63.8		13.5	64.3	
Queue Length 95th (m)	17.7	125.9		19.2	92.9	0.0	30.9	84.2		23.1	93.7	
Internal Link Dist (m)		121.1			165.0			97.2			158.5	
Turn Bay Length (m)	25.0			10.0		10.0	30.0			15.0		
Base Capacity (vph)	325	657		252	671	577	328	804		303	650	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.26	0.75		0.47	0.56	0.10	0.45	0.53		0.29	0.59	

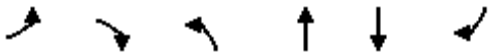
Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 29.1		Intersection LOS: C	
Intersection Capacity Utilization 123.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East





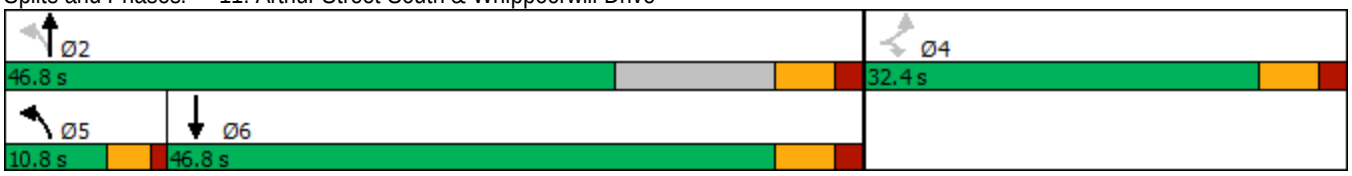
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	47	186	149	616	671	23
Future Volume (vph)	47	186	149	616	671	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0	40.0	45.0			5.0
Storage Lanes	1	0	1			1
Taper Length (m)	40.0		5.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1825	1883	3520	0
Flt Permitted	0.950		0.284			
Satd. Flow (perm)	1825	1601	546	1883	3520	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		211			6	
Link Speed (k/h)	50			60	60	
Link Distance (m)	238.4			185.0	215.7	
Travel Time (s)	17.2			11.1	12.9	
Peak Hour Factor	0.75	0.88	0.97	0.94	0.88	0.71
Heavy Vehicles (%)	0%	2%	0%	2%	3%	5%
Adj. Flow (vph)	63	211	154	655	763	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	211	154	655	795	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane				Yes		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	

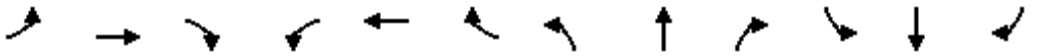


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	12.0	12.0	5.0	40.8	40.8	
Minimum Split (s)	32.0	32.0	9.5	46.8	46.8	
Total Split (s)	32.4	32.4	10.8	46.8	46.8	
Total Split (%)	36.0%	36.0%	12.0%	52.0%	52.0%	
Maximum Green (s)	26.4	26.4	6.8	40.8	40.8	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	10.0	10.0		15.0	15.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	12.0	12.0	53.5	51.5	40.8	
Actuated g/C Ratio	0.16	0.16	0.71	0.68	0.54	
v/c Ratio	0.22	0.49	0.31	0.51	0.42	
Control Delay	30.0	8.9	5.2	7.6	11.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.0	8.9	5.2	7.6	11.1	
LOS	C	A	A	A	B	
Approach Delay	13.8			7.1	11.1	
Approach LOS	B			A	B	
Queue Length 50th (m)	7.9	0.0	5.7	38.2	32.5	
Queue Length 95th (m)	14.9	15.8	10.5	59.0	43.2	
Internal Link Dist (m)	214.4			161.0	191.7	
Turn Bay Length (m)	40.0	40.0	45.0			
Base Capacity (vph)	638	696	502	1286	1904	
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	0.10	0.30	0.31	0.51	0.42	

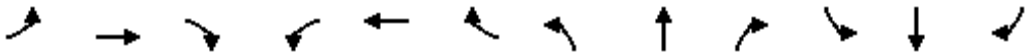
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 75.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 65.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Arthur Street South & Whippoorwill Drive





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	63	606	151	62	7	426	1084	371	7	634	124
Future Volume (vph)	199	63	606	151	62	7	426	1084	371	7	634	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	35.0		35.0	100.0		100.0	45.0		45.0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	3138	0	913	1847	1484
Flt Permitted	0.704			0.600			0.091			0.100		
Satd. Flow (perm)	1300	1685	1432	806	1413	1142	139	3138	0	96	1847	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			460			63		101				111
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			171.5	
Travel Time (s)		16.0			12.2			13.7			10.3	
Peak Hour Factor	0.78	0.66	0.79	0.81	0.77	0.58	0.90	0.92	0.65	0.78	0.95	0.74
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Adj. Flow (vph)	255	95	767	186	81	12	473	1178	571	9	667	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	95	767	186	81	12	473	1749	0	9	667	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		6
Detector Phase	4	4	4	3	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	40.0		40.0	40.0	40.0
Minimum Split (s)	34.0	34.0	34.0	11.0	34.0	34.0	11.0	51.4		46.4	46.4	46.4
Total Split (s)	33.0	33.0	33.0	19.0	52.0	52.0	29.0	75.4		46.4	46.4	46.4
Total Split (%)	25.9%	25.9%	25.9%	14.9%	40.8%	40.8%	22.8%	59.2%		36.4%	36.4%	36.4%
Maximum Green (s)	25.0	25.0	25.0	15.0	44.0	44.0	25.0	69.0		40.0	40.0	40.0
Yellow Time (s)	4.6	4.6	4.6	3.0	4.6	4.6	3.0	3.7		3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	1.0	3.4	3.4	1.0	2.7		2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	4.0	8.0	8.0	4.0	6.4		6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		Max	Max	Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		20.0		20.0	20.0	20.0
Flash Dont Walk (s)	19.0	19.0	19.0		19.0	19.0		20.0		20.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0		0		0	0	0
Act Effct Green (s)	25.0	25.0	25.0	47.3	43.3	43.3	71.4	69.0		40.0	40.0	40.0
Actuated g/C Ratio	0.20	0.20	0.20	0.37	0.34	0.34	0.56	0.54		0.32	0.32	0.32
v/c Ratio	1.00	0.29	1.18	0.53	0.17	0.03	1.41	1.00		0.30	1.15	0.31
Control Delay	106.2	46.3	114.0	35.4	30.2	0.1	231.8	48.3		63.0	124.2	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	106.2	46.3	114.0	35.4	30.2	0.1	231.8	48.3		63.0	124.2	13.7
LOS	F	D	F	D	C	A	F	D		E	F	B
Approach Delay		106.5			32.4			87.4			101.5	
Approach LOS		F			C			F			F	
Queue Length 50th (m)	64.6	20.5	~131.7	33.8	14.0	0.0	~146.9	~216.5		1.7	~196.5	10.2
Queue Length 95th (m)	#94.1	26.1	#147.6	47.5	22.0	0.0	#212.5	#277.0		6.5	#267.9	17.9
Internal Link Dist (m)		242.0			178.5			205.1			147.5	
Turn Bay Length (m)	60.0		60.0	35.0		35.0	100.0			45.0		45.0
Base Capacity (vph)	256	332	651	357	490	437	336	1754		30	582	544
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.00	0.29	1.18	0.52	0.17	0.03	1.41	1.00		0.30	1.15	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 127.4			
Actuated Cycle Length: 126.7			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.41			
Intersection Signal Delay: 91.4		Intersection LOS: F	
Intersection Capacity Utilization 110.2%		ICU Level of Service H	
Analysis Period (min) 15			

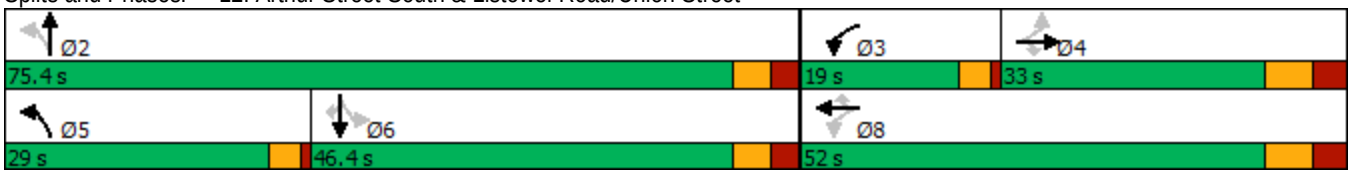
~ Volume exceeds capacity, queue is theoretically infinite.

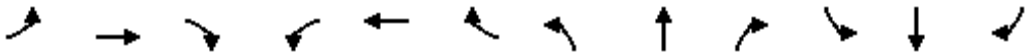
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	263	99	269	260	31	137	361	485	36	248	128
Future Volume (vph)	147	263	99	269	260	31	137	361	485	36	248	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	0.0		30.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.978				0.850		0.959	
Flt Protected	0.950			0.950				0.986			0.994	
Satd. Flow (prot)	1738	1763	0	1789	1807	0	0	1875	1601	0	1746	0
Flt Permitted	0.538			0.128				0.603			0.763	
Satd. Flow (perm)	984	1763	0	241	1807	0	0	1147	1601	0	1340	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			8				289		23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.86	0.89	0.84	0.83	0.81	0.56	0.83	0.89	0.87	0.57	0.87	0.85
Heavy Vehicles (%)	5%	6%	0%	2%	4%	4%	1%	1%	2%	8%	2%	9%
Adj. Flow (vph)	171	296	118	324	321	55	165	406	557	63	285	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	414	0	324	376	0	0	571	557	0	499	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	
Total Split (s)	34.0	34.0		20.0	54.0		9.0	66.0	66.0	57.0	57.0	
Total Split (%)	28.3%	28.3%		16.7%	45.0%		7.5%	55.0%	55.0%	47.5%	47.5%	
Maximum Green (s)	27.3	27.3		16.0	47.3		5.0	59.8	59.8	50.8	50.8	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.7	6.7		4.0	6.7			6.2	6.2		6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Walk Time (s)	14.0	14.0			14.0			25.0	25.0	25.0	25.0	
Flash Dont Walk (s)	11.0	11.0			11.0			5.0	5.0	5.0	5.0	
Pedestrian Calls (#/hr)	0	0			0			0	0	0	0	
Act Effct Green (s)	27.3	27.3		50.0	47.3			59.8	59.8		50.8	
Actuated g/C Ratio	0.23	0.23		0.42	0.39			0.50	0.50		0.42	

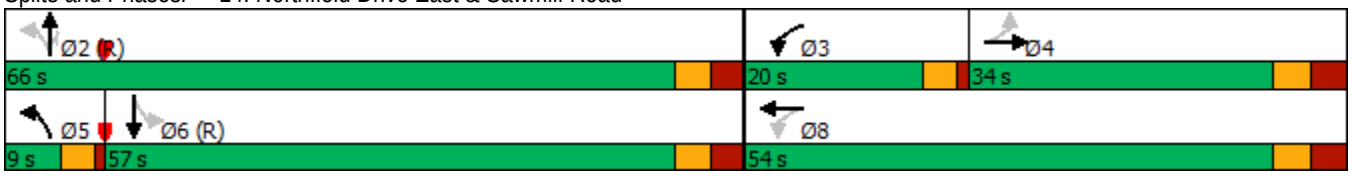
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.77	1.00		1.06	0.52			0.97	0.59		0.86	
Control Delay	66.6	90.5		99.4	30.4			60.2	12.4		46.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	66.6	90.5		99.4	30.4			60.2	12.4		46.3	
LOS	E	F		F	C			E	B		D	
Approach Delay		83.5			62.3			36.6			46.3	
Approach LOS		F			E			D			D	
Queue Length 50th (m)	37.9	~95.7		~66.5	65.3			94.0	41.5		100.8	
Queue Length 95th (m)	#67.2	#157.1		#105.8	81.8			#168.6	68.7		#153.1	
Internal Link Dist (m)		148.6			116.6			81.4			79.7	
Turn Bay Length (m)	20.0			50.0					30.0			
Base Capacity (vph)	223	412		306	717			588	942		580	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.77	1.00		1.06	0.52			0.97	0.59		0.86	

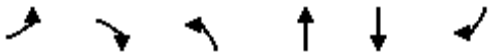
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Pretimed
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 53.9 Intersection LOS: D
Intersection Capacity Utilization 114.7% ICU Level of Service H
Analysis Period (min) 15

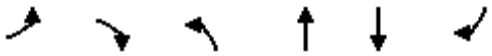
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 14: Northfield Drive East & Sawmill Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	39	362	446	355	318	42
Future Volume (vph)	39	362	446	355	318	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.980	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1722	1555	1706	1865	1815	0
Flt Permitted	0.950		0.393			
Satd. Flow (perm)	1722	1555	706	1865	1815	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		389			12	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.80	0.93	0.88	0.89	0.87	0.68
Heavy Vehicles (%)	6%	5%	7%	3%	2%	14%
Adj. Flow (vph)	49	389	507	399	366	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	389	507	399	428	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	



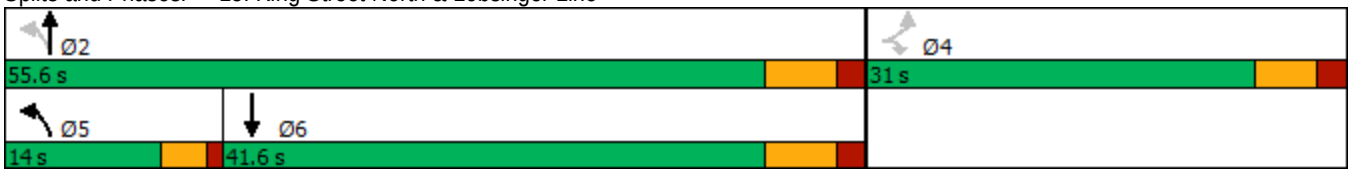
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	55.6	41.6	
Total Split (%)	35.8%	35.8%	16.2%	64.2%	48.0%	
Maximum Green (s)	25.0	25.0	10.0	49.0	35.0	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	5.0	3.0	3.0	
Recall Mode	None	None	None	Max	Max	
Walk Time (s)	7.0	7.0		25.3	25.3	
Flash Dont Walk (s)	9.0	9.0		8.0	8.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	11.1	11.1	51.7	49.1	35.0	
Actuated g/C Ratio	0.15	0.15	0.71	0.67	0.48	
v/c Ratio	0.19	0.69	0.79	0.32	0.49	
Control Delay	28.4	10.3	17.2	6.0	15.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.4	10.3	17.2	6.0	15.1	
LOS	C	B	B	A	B	
Approach Delay	12.3			12.3	15.1	
Approach LOS	B			B	B	
Queue Length 50th (m)	5.9	0.0	21.4	17.8	35.0	
Queue Length 95th (m)	12.7	21.5	#60.5	37.5	63.1	
Internal Link Dist (m)	173.9			110.5	150.4	
Turn Bay Length (m)	20.0		100.0			
Base Capacity (vph)	592	790	638	1257	880	
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	0.08	0.49	0.79	0.32	0.49	

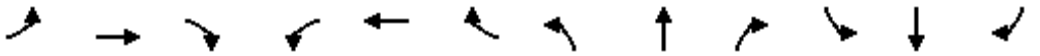
Intersection Summary			
Area Type:	Other		
Cycle Length: 86.6			
Actuated Cycle Length: 72.8			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

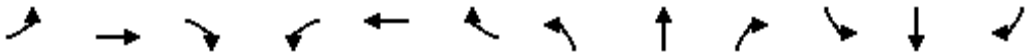
Queue shown is maximum after two cycles.

Splits and Phases: 15: King Street North & Lobsinger Line





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	205	61	555	555	166	72	163	457	111	229	29
Future Volume (vph)	199	205	61	555	555	166	72	163	457	111	229	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962				0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	3385	0	3437	1847	1585	1825	1847	1570	1738	1840	0
Flt Permitted	0.950			0.950			0.587			0.372		
Satd. Flow (perm)	1722	3385	0	3437	1847	1585	1128	1847	1570	681	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				184			491		5	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.82	0.92	0.81	0.80	0.85	0.53	0.72	0.81	0.93	0.74	0.94	0.79
Heavy Vehicles (%)	6%	5%	0%	3%	4%	3%	0%	4%	4%	5%	1%	11%
Adj. Flow (vph)	243	223	75	694	653	313	100	201	491	150	244	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	243	298	0	694	653	313	100	201	491	150	281	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Maximum Green (s)	35.0	50.0		35.0	50.0	50.0	35.0	35.0	35.0	10.0	49.0	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	4.0	6.0		4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Walk Time (s)		10.0			10.0	10.0	10.0	10.0	10.0		10.0	
Flash Dont Walk (s)		18.0			18.0	18.0	18.0	18.0	18.0		18.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	32.6	50.3		32.6	50.3	50.3	24.8	24.8	24.8	41.7	38.9	
Actuated g/C Ratio	0.23	0.36		0.23	0.36	0.36	0.18	0.18	0.18	0.30	0.28	
v/c Ratio	0.61	0.24		0.88	0.99	0.46	0.51	0.62	0.72	0.54	0.55	
Control Delay	57.0	30.5		65.8	79.1	17.2	61.9	62.5	10.7	46.5	47.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	57.0	30.5		65.8	79.1	17.2	61.9	62.5	10.7	46.5	47.3	
LOS	E	C		E	E	B	E	E	B	D	D	
Approach Delay		42.4			61.9			30.3			47.0	
Approach LOS		D			E			C			D	
Queue Length 50th (m)	61.2	28.1		97.0	~191.0	26.8	26.0	53.5	0.0	33.1	67.5	
Queue Length 95th (m)	86.5	43.7		111.9	#269.1	12.2	34.9	69.9	32.2	41.5	96.1	
Internal Link Dist (m)		238.1			393.7			114.8			122.4	
Turn Bay Length (m)				215.0			45.0			45.0		
Base Capacity (vph)	429	1226		857	658	683	281	460	760	276	645	
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	0.57	0.24		0.81	0.99	0.46	0.36	0.44	0.65	0.54	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 141.1			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 49.6		Intersection LOS: D	
Intersection Capacity Utilization 84.1%		ICU Level of Service E	
Analysis Period (min) 15			

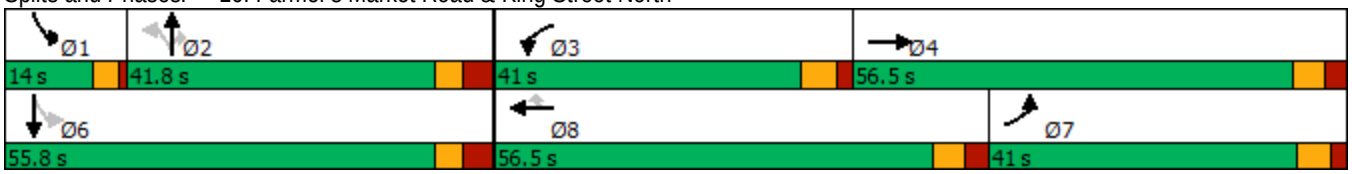
~ Volume exceeds capacity, queue is theoretically infinite.

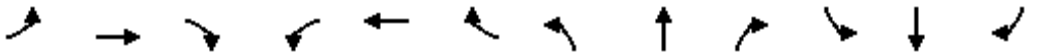
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

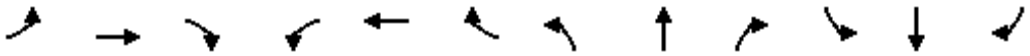
Queue shown is maximum after two cycles.

Splits and Phases: 16: Farmer's Market Road & King Street North





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	648	124	138	762	16	359	9	64	8	2	14
Future Volume (vph)	25	648	124	138	762	16	359	9	64	8	2	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.873			0.876	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1883	1526	1772	3566	0	3309	1649	0	1825	1591	0
Flt Permitted	0.294			0.174			0.000			0.000		
Satd. Flow (perm)	565	1883	1526	325	3566	0	0	1649	0	0	1591	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		3			70			19	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.58	0.98	0.77	0.93	0.89	0.65	0.88	0.67	0.91	0.45	0.50	0.75
Heavy Vehicles (%)	0%	2%	7%	3%	2%	0%	7%	0%	2%	0%	0%	7%
Adj. Flow (vph)	43	661	161	148	856	25	408	13	70	18	4	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	661	161	148	881	0	408	83	0	18	23	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			10.0			5.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	



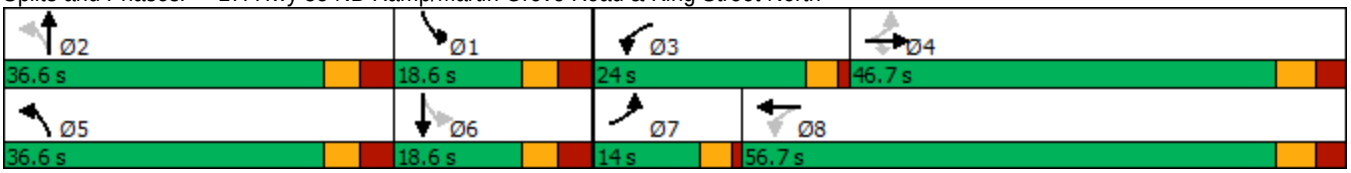
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Maximum Green (s)	10.0	40.0	40.0	20.0	50.0		30.0	30.0		12.0	12.0	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	3.0	3.0	4.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Walk Time (s)		25.0	25.0		25.0			10.0			10.0	
Flash Dont Walk (s)		15.0	15.0		15.0			19.0			19.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	54.9	44.2	44.2	61.4	52.3		17.6	13.2		12.6	8.2	
Actuated g/C Ratio	0.58	0.46	0.46	0.65	0.55		0.19	0.14		0.13	0.09	
v/c Ratio	0.10	0.76	0.20	0.40	0.45		0.67	0.29		0.07	0.15	
Control Delay	9.6	31.0	4.6	11.8	17.0		43.2	18.2		39.1	26.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.6	31.0	4.6	11.8	17.0		43.2	18.2		39.1	26.1	
LOS	A	C	A	B	B		D	B		D	C	
Approach Delay		25.0			16.3			39.0			31.8	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	2.2	85.6	0.3	7.9	48.3		34.9	1.9		3.1	0.7	
Queue Length 95th (m)	5.7	#212.9	8.1	24.7	94.5		57.6	9.0		4.9	3.3	
Internal Link Dist (m)		393.7			152.0			206.8			176.4	
Turn Bay Length (m)	55.0			25.0						15.0		
Base Capacity (vph)	476	875	794	523	1960		1073	582		294	222	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.76	0.20	0.28	0.45		0.38	0.14		0.06	0.10	

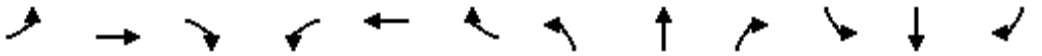
Intersection Summary			
Area Type:	Other		
Cycle Length: 125.9			
Actuated Cycle Length: 95.1			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 24.2		Intersection LOS: C	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

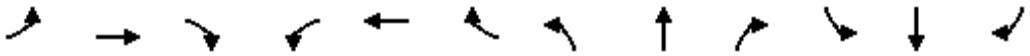
Queue shown is maximum after two cycles.

Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North





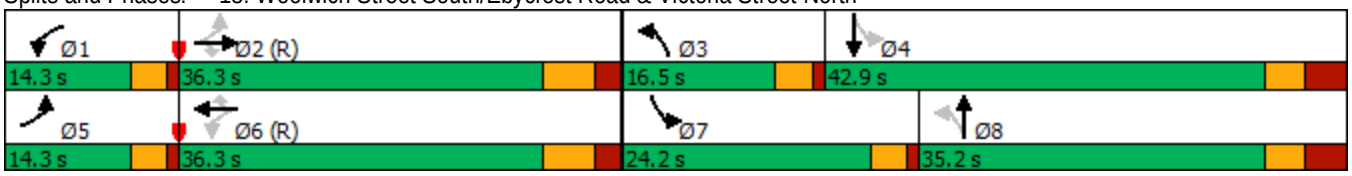
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	323	70	12	621	166	139	45	15	121	27	54
Future Volume (vph)	42	323	70	12	621	166	139	45	15	121	27	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.955			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3544	1617	1825	3510	1555	1825	1822	0	1674	1636	0
Flt Permitted	0.308			0.551			0.687			0.491		
Satd. Flow (perm)	543	3544	1617	1059	3510	1555	1320	1822	0	865	1636	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			198		19			77	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.64	0.86	0.84	0.96	0.74	0.57	0.87	0.84	0.70
Heavy Vehicles (%)	9%	3%	1%	0%	4%	5%	0%	1%	0%	9%	5%	5%
Adj. Flow (vph)	49	333	91	19	722	198	145	61	26	139	32	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	333	91	19	722	198	145	87	0	139	109	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	



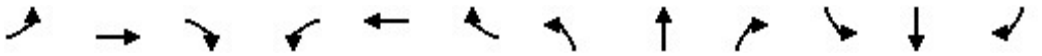
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	36.7	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	16.5	35.2		24.2	42.9	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	15.0%	32.0%		22.0%	39.0%	
Maximum Green (s)	10.3	29.8	29.8	10.3	29.8	29.8	12.5	28.3		20.2	36.0	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)		18.0	18.0		18.0	18.0		10.0			10.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		18.0			18.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	68.9	63.3	63.3	66.0	58.6	58.6	23.1	11.4		30.7	13.7	
Actuated g/C Ratio	0.63	0.58	0.58	0.60	0.53	0.53	0.21	0.10		0.28	0.12	
v/c Ratio	0.12	0.16	0.09	0.03	0.39	0.22	0.44	0.42		0.38	0.40	
Control Delay	9.7	13.1	0.3	9.3	17.5	3.2	34.6	42.0		32.0	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.7	13.1	0.3	9.3	17.5	3.2	34.6	42.0		32.0	19.9	
LOS	A	B	A	A	B	A	C	D		C	B	
Approach Delay		10.3			14.3			37.4			26.7	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	3.5	14.5	0.0	1.3	46.7	0.0	24.3	13.9		23.4	6.4	
Queue Length 95th (m)	9.2	31.9	0.0	3.4	69.5	10.0	36.0	22.3		34.0	18.2	
Internal Link Dist (m)		296.5			213.7			304.6			251.4	
Turn Bay Length (m)	50.0			55.0		55.0	40.0			50.0		
Base Capacity (vph)	450	2038	997	738	1869	920	348	482		408	587	
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	0.11	0.16	0.09	0.03	0.39	0.22	0.42	0.18		0.34	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 89.1 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North



Future 2051 (Regional Improvements + Intersection Optimizations)



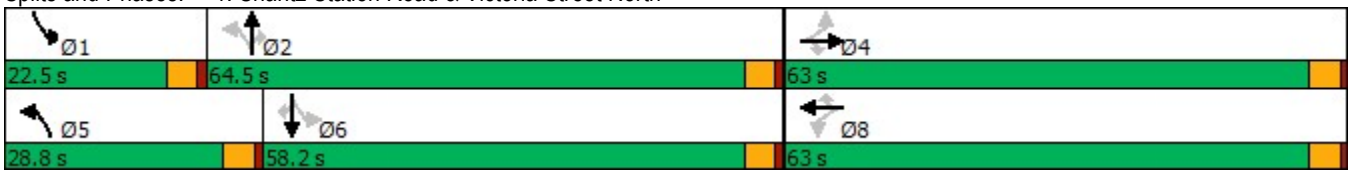
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	775	24	34	439	14	223	432	528	127	300	112
Future Volume (vph)	19	775	24	34	439	14	223	432	528	127	300	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	90.0		100.0	100.0		100.0	100.0		100.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1830	1570	1722	1830	1633	1674	3174	1512	1755	3476	1328
Flt Permitted	0.257			0.068			0.428			0.366		
Satd. Flow (perm)	470	1830	1570	123	1830	1633	754	3174	1512	676	3476	1328
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76			76			143			224
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		364.7			395.3			305.6			253.6	
Travel Time (s)		27.4			29.6			22.9			19.0	
Peak Hour Factor	0.56	0.94	0.52	0.65	0.93	0.66	0.73	0.79	0.65	0.63	0.74	0.50
Heavy Vehicles (%)	5%	5%	4%	6%	5%	0%	9%	15%	8%	4%	5%	23%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	824	46	52	472	21	305	547	812	202	405	224
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	63.0	63.0	63.0	63.0	63.0	63.0	28.8	64.5	64.5	22.5	58.2	58.2
Total Split (%)	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	19.2%	43.0%	43.0%	15.0%	38.8%	38.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	58.5	58.5	58.5	58.5	58.5	58.5	79.5	60.0	60.0	75.9	57.9	57.9
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.53	0.40	0.40	0.51	0.39	0.39
v/c Ratio	0.19	1.16	0.07	1.11	0.66	0.03	0.58	0.43	1.18	0.43	0.30	0.34
Control Delay	33.6	126.5	1.8	207.8	43.1	0.1	23.6	34.0	127.5	20.6	33.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	126.5	1.8	207.8	43.1	0.1	23.6	34.0	127.5	20.6	33.4	5.3
LOS	C	F	A	F	D	A	C	C	F	C	C	A
Approach Delay		116.7			57.1			77.7			22.7	
Approach LOS		F			E			E			C	
Queue Length 50th (m)	6.6	~288.1	0.0	~17.3	114.9	0.0	48.5	61.7	~261.7	29.6	44.0	0.0
Queue Length 95th (m)	9.0	#365.8	0.0	#29.6	154.0	0.0	52.6	66.4	168.3	29.3	47.9	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		340.7			371.3			281.6			229.6	
Turn Bay Length (m)	90.0		90.0	90.0		100.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	183	713	658	47	713	683	563	1269	690	471	1342	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	1.16	0.07	1.11	0.66	0.03	0.54	0.43	1.18	0.43	0.30	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 72.2		Intersection LOS: E	
Intersection Capacity Utilization 91.8%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 1: Shantz Station Road & Victoria Street North



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	5	8	19	19	70	5	304	12	89	631	6
Future Volume (vph)	1	5	8	19	19	70	5	304	12	89	631	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		0.0	75.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.910			0.992			0.997	
Flt Protected		0.992			0.992		0.950			0.950		
Satd. Flow (prot)	0	1522	0	0	1385	0	1825	3101	0	1573	3175	0
Flt Permitted		0.992			0.992		0.950			0.950		
Satd. Flow (perm)	0	1522	0	0	1385	0	1825	3101	0	1573	3175	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		288.3			336.9			408.6			247.1	
Travel Time (s)		21.6			25.3			30.6			18.5	
Peak Hour Factor	0.25	0.63	0.67	0.75	0.75	0.71	0.38	0.74	0.50	0.73	0.90	0.50
Heavy Vehicles (%)	100%	0%	0%	33%	22%	24%	0%	17%	13%	16%	14%	50%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	149	0	13	435	0	122	713	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	1883	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	1883	0	0	1883	0	0	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		168.7			299.0			278.0			309.7	
Travel Time (s)		10.1			17.9			16.7			18.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		34.3	34.3		34.3	34.3	
Total Split (s)	26.0	26.0		26.0	26.0		46.3	46.3		46.3	46.3	
Total Split (%)	36.0%	36.0%		36.0%	36.0%		64.0%	64.0%		64.0%	64.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)												
Actuated g/C Ratio												
v/c Ratio												
Control Delay												
Queue Delay												
Total Delay												
LOS												
Approach Delay												
Approach LOS												
Queue Length 50th (m)												
Queue Length 95th (m)												
Internal Link Dist (m)		144.7			275.0			254.0			285.7	
Turn Bay Length (m)												
Base Capacity (vph)												
Starvation Cap Reductn												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn												
Storage Cap Reductn												
Reduced v/c Ratio												

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.3			
Actuated Cycle Length: 61.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Bloomingdale Road North/Sawmill Road & Kraft Drive/Ebycrest Road





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	301.4			305.4	308.6	
Travel Time (s)	22.6			22.9	23.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



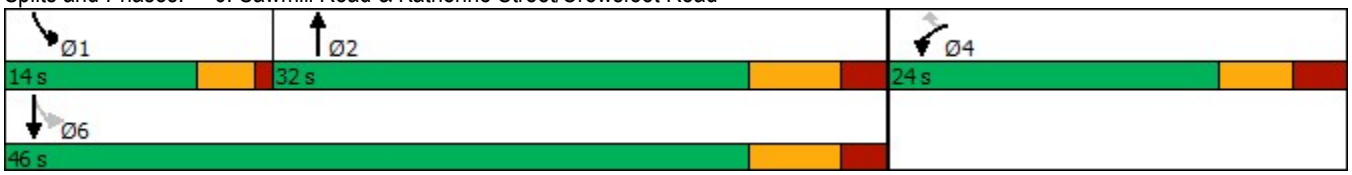
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	270	293	216	173	183	190
Future Volume (vph)	270	293	216	173	183	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0	0.0		50.0	50.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.939			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1755	1570	1706	0	1706	1779
Flt Permitted	0.950				0.215	
Satd. Flow (perm)	1755	1570	1706	0	386	1779
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		299	65			
Link Speed (k/h)	60		60			60
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	13.8		19.8			15.5
Peak Hour Factor	0.75	0.98	0.76	0.74	0.78	0.83
Heavy Vehicles (%)	4%	4%	8%	3%	7%	8%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	360	299	518	0	235	229
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	3.5	3.5	20.0		10.0	20.0
Minimum Split (s)	14.8	14.8	27.3		14.0	27.3
Total Split (s)	24.0	24.0	32.0		14.0	46.0
Total Split (%)	34.3%	34.3%	45.7%		20.0%	65.7%
Yellow Time (s)	3.9	3.9	4.8		3.0	4.8
All-Red Time (s)	2.9	2.9	2.5		1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	7.3		4.0	7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	Max	Max	None		None	None
Act Effct Green (s)	17.2	17.2	23.5		40.8	37.5
Actuated g/C Ratio	0.25	0.25	0.34		0.59	0.55
v/c Ratio	0.82	0.48	0.83		0.56	0.24
Control Delay	42.5	6.1	31.6		12.0	8.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	42.5	6.1	31.6		12.0	8.9
LOS	D	A	C		B	A
Approach Delay	26.0		31.6			10.5
Approach LOS	C		C			B
Queue Length 50th (m)	44.8	0.0	52.8		12.7	14.1
Queue Length 95th (m)	#58.9	16.9	66.7		18.6	22.4

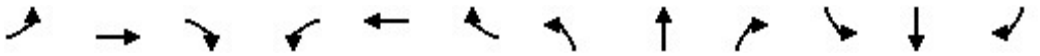


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Internal Link Dist (m)	206.2		306.8			234.5
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	439	617	654		420	1001
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.82	0.48	0.79		0.56	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 68.8			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 23.4		Intersection LOS: C	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road



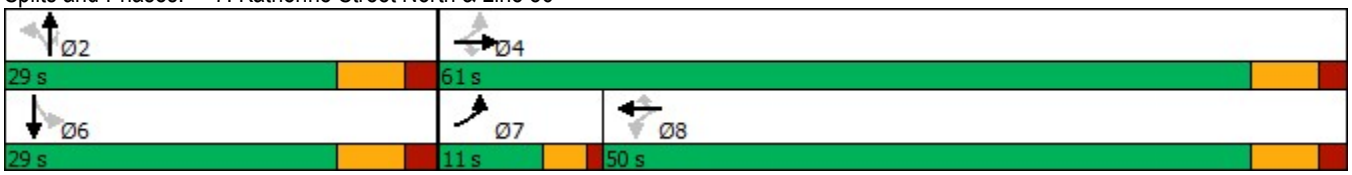


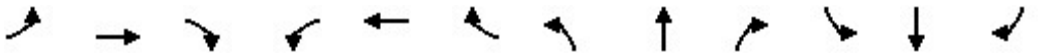
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	377	68	12	593	8	15	89	9	8	189	97
Future Volume (vph)	88	377	68	12	593	8	15	89	9	8	189	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.954	
Flt Protected	0.950			0.950				0.993			0.997	
Satd. Flow (prot)	1644	1779	1585	1372	1656	1633	0	1799	1338	0	1724	0
Flt Permitted	0.153			0.506				0.917			0.978	
Satd. Flow (perm)	265	1779	1585	731	1656	1633	0	1661	1338	0	1691	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85			95			92		28	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.75	0.85	0.80	0.38	0.84	0.50	0.80	0.71	0.56	0.42	0.89	0.80
Heavy Vehicles (%)	11%	8%	3%	33%	16%	0%	13%	5%	22%	20%	3%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	444	85	32	706	16	0	144	16	0	352	0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	11.0	61.0	61.0	50.0	50.0	50.0	29.0	29.0	29.0	29.0	29.0	
Total Split (%)	12.2%	67.8%	67.8%	55.6%	55.6%	55.6%	32.2%	32.2%	32.2%	32.2%	32.2%	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Act Effct Green (s)	50.3	47.6	47.6	39.4	39.4	39.4		22.7	22.7		22.7	
Actuated g/C Ratio	0.60	0.57	0.57	0.47	0.47	0.47		0.27	0.27		0.27	
v/c Ratio	0.42	0.44	0.09	0.09	0.91	0.02		0.32	0.04		0.74	
Control Delay	11.5	11.5	2.1	13.7	38.9	0.0		29.8	0.1		39.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	11.5	11.5	2.1	13.7	38.9	0.0		29.8	0.1		39.1	
LOS	B	B	A	B	D	A		C	A		D	
Approach Delay		10.3			37.0			26.9			39.1	
Approach LOS		B			D			C			D	
Queue Length 50th (m)	7.2	37.0	0.0	2.9	105.6	0.0		20.6	0.0		53.0	
Queue Length 95th (m)	11.0	51.6	3.9	3.2	#154.7	0.0		28.2	0.0		#93.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		412.4			361.1			245.9			268.1	
Turn Bay Length (m)	30.0		35.0	40.0		50.0			15.0			
Base Capacity (vph)	276	1177	1077	385	874	906		448	428		477	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.42	0.38	0.08	0.08	0.81	0.02		0.32	0.04		0.74	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 27.5		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Katherine Street North & Line 86



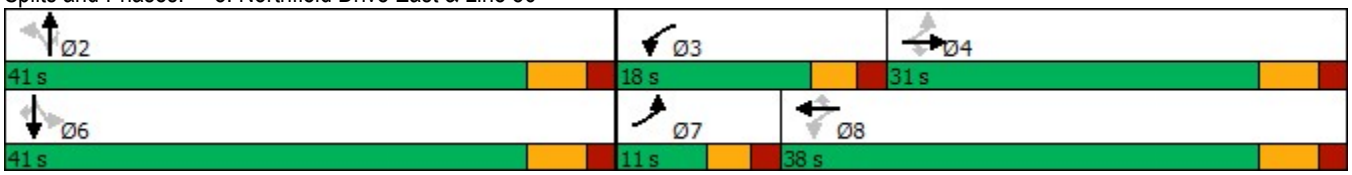


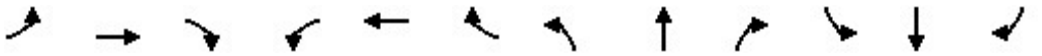
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	317	14	226	422	31	62	556	189	34	455	45
Future Volume (vph)	19	317	14	226	422	31	62	556	189	34	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	35.0		35.0	35.0		35.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1847	1445	1690	1746	1150	1722	1812	1408	1722	1847	1384
Flt Permitted	0.418			0.251			0.205			0.131		
Satd. Flow (perm)	737	1847	1445	446	1746	1150	372	1812	1408	237	1847	1384
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			97			158			158
Link Speed (k/h)		70			70			70			70	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		15.4			18.7			11.7			15.9	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	9%	4%	13%	8%	10%	42%	6%	6%	16%	6%	4%	18%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	396	28	370	491	43	109	618	201	40	548	74
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	11.0	31.0	31.0	18.0	38.0	38.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	12.2%	34.4%	34.4%	20.0%	42.2%	42.2%	45.6%	45.6%	45.6%	45.6%	45.6%	45.6%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	32.0	25.0	25.0	44.0	38.6	38.6	35.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.36	0.28	0.28	0.49	0.43	0.43	0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.09	0.77	0.05	0.93	0.66	0.08	0.76	0.88	0.31	0.43	0.76	0.12
Control Delay	13.5	41.7	0.2	50.1	27.4	0.3	58.8	41.4	6.7	38.0	32.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	41.7	0.2	50.1	27.4	0.3	58.8	41.4	6.7	38.0	32.3	0.4
LOS	B	D	A	D	C	A	E	D	A	D	C	A
Approach Delay		37.4			35.4			35.9			29.1	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	2.4	62.8	0.0	40.0	59.1	0.0	15.9	97.0	4.6	5.0	80.7	0.0
Queue Length 95th (m)	5.0	81.3	0.0	37.1	#106.0	0.0	19.3	#158.7	18.2	15.0	105.5	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		276.2			340.4			203.4			284.9	
Turn Bay Length (m)	30.0		30.0	35.0		35.0	35.0		35.0	35.0		35.0
Base Capacity (vph)	324	513	515	397	748	548	144	704	644	92	718	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.77	0.05	0.93	0.66	0.08	0.76	0.88	0.31	0.43	0.76	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 34.5		Intersection LOS: C	
Intersection Capacity Utilization 94.3%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Northfield Drive East & Line 86



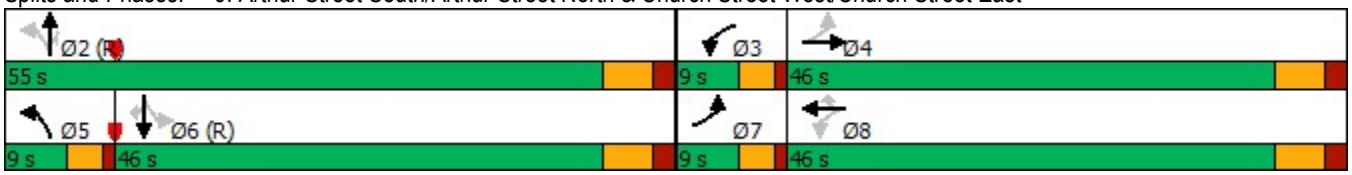


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	278	81	96	240	42	81	205	48	34	455	45
Future Volume (vph)	45	278	81	96	240	42	81	205	48	34	455	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		30.0	15.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1705	0	1615	1715	1420	1521	1656	1541	1674	1779	1276
Flt Permitted	0.452			0.294			0.091			0.604		
Satd. Flow (perm)	775	1705	0	500	1715	1420	146	1656	1541	1065	1779	1276
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				109			69			109
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.81	0.79	0.90	0.63	0.78	0.71	0.75	0.82	0.80	0.75	0.70	0.78
Heavy Vehicles (%)	12%	11%	2%	13%	12%	15%	20%	16%	6%	9%	8%	28%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	442	0	152	308	59	108	250	60	45	650	58
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2		2	6		6
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	55.0	55.0	46.0	46.0	46.0
Total Split (%)	8.2%	41.8%		8.2%	41.8%	41.8%	8.2%	50.0%	50.0%	41.8%	41.8%	41.8%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes
Act Effct Green (s)	47.0	40.0		47.0	40.0	40.0	51.0	49.0	49.0	40.0	40.0	40.0
Actuated g/C Ratio	0.43	0.36		0.43	0.36	0.36	0.46	0.45	0.45	0.36	0.36	0.36
v/c Ratio	0.15	0.70		0.58	0.49	0.10	0.83	0.34	0.08	0.12	1.01	0.11
Control Delay	17.6	36.2		29.2	30.5	0.8	65.9	21.6	3.8	24.4	72.7	0.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	36.2		29.2	30.5	0.8	65.9	21.6	3.8	24.4	72.7	0.8
LOS	B	D		C	C	A	E	C	A	C	E	A
Approach Delay		34.1			26.7			30.5			64.3	
Approach LOS		C			C			C			E	
Queue Length 50th (m)	6.5	78.0		18.8	50.8	0.0	13.0	34.2	0.0	6.3	~139.6	0.0
Queue Length 95th (m)	12.2	94.5		21.1	63.5	0.0	#26.3	47.3	4.4	11.8	129.6	0.0
Internal Link Dist (m)		121.1			165.0			97.2			158.5	
Turn Bay Length (m)	25.0			10.0		10.0	30.0		30.0	15.0		15.0
Base Capacity (vph)	370	628		264	623	585	130	737	724	387	646	533
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.70		0.58	0.49	0.10	0.83	0.34	0.08	0.12	1.01	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 42.1		Intersection LOS: D	
Intersection Capacity Utilization 119.3%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	1883	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	1883	1883	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	231.8			189.7	160.2	
Travel Time (s)	17.4			14.2	12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

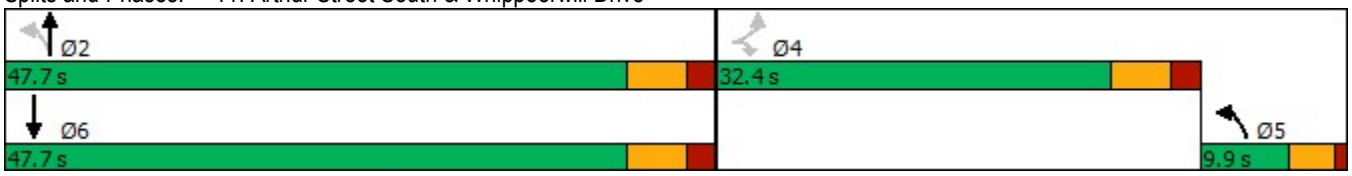


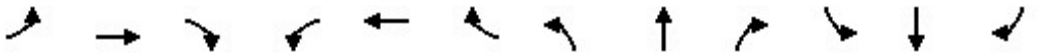
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	44	145	41	475	528	10
Future Volume (vph)	44	145	41	475	528	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0	40.0	45.0			5.0
Storage Lanes	1	0	1			1
Taper Length (m)	40.0		5.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1617	1772	1762	3422	0
Flt Permitted	0.950		0.396			
Satd. Flow (perm)	1825	1617	739	1762	3422	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		173			5	
Link Speed (k/h)	50			60	60	
Link Distance (m)	238.4			185.0	215.7	
Travel Time (s)	17.2			11.1	12.9	
Peak Hour Factor	0.69	0.84	0.82	0.71	0.95	0.50
Heavy Vehicles (%)	0%	1%	3%	9%	6%	10%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	64	173	50	669	576	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	12.0	12.0	5.0	41.7	41.7	
Minimum Split (s)	32.0	32.0	9.5	47.7	47.7	
Total Split (s)	32.4	32.4	9.9	47.7	47.7	
Total Split (%)	36.0%	36.0%	11.0%	53.0%	53.0%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
Act Effct Green (s)	12.0	12.0	52.5	50.5	44.6	
Actuated g/C Ratio	0.16	0.16	0.70	0.68	0.60	
v/c Ratio	0.22	0.43	0.08	0.56	0.28	
Control Delay	29.5	8.7	3.7	8.5	8.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.5	8.7	3.7	8.5	8.3	
LOS	C	A	A	A	A	
Approach Delay	14.3			8.2	8.3	
Approach LOS	B			A	A	
Queue Length 50th (m)	8.1	0.0	1.8	41.0	21.3	
Queue Length 95th (m)	13.8	12.5	3.9	42.5	30.2	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Internal Link Dist (m)	214.4			161.0	191.7	
Turn Bay Length (m)	40.0	40.0	45.0			
Base Capacity (vph)	648	686	602	1192	2049	
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	0.10	0.25	0.08	0.56	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 54.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 11: Arthur Street South & Whippoorwill Drive



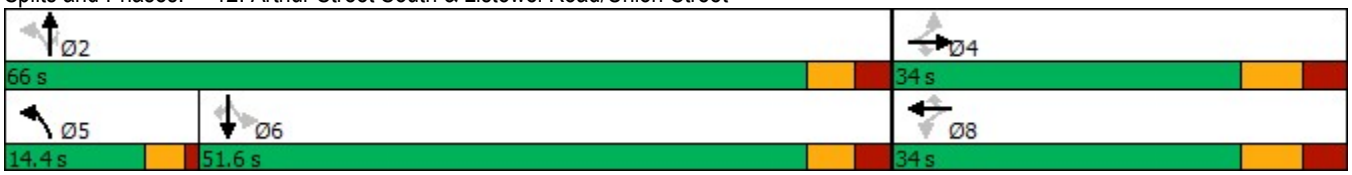


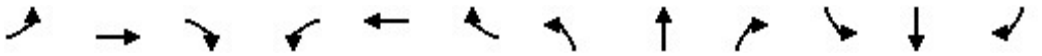
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	40	298	127	31	15	222	548	151	1	946	76
Future Volume (vph)	90	40	298	127	31	15	222	548	151	1	946	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	100.0		0.0	45.0		45.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	3510	1484
Flt Permitted	0.722			0.717			0.175			0.368		
Satd. Flow (perm)	1334	1685	1432	963	1413	1142	267	1762	1432	353	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			244			81			189			98
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			138.1	
Travel Time (s)		16.0			12.2			13.7			8.3	
Peak Hour Factor	0.72	0.66	0.79	0.91	0.58	0.58	0.81	0.74	0.80	0.25	0.91	0.85
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	61	377	140	53	26	274	741	189	4	1040	89
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	45.0	45.0	45.0	45.0	45.0
Minimum Split (s)	34.0	34.0	34.0	34.0	34.0	34.0	11.5	51.4	51.4	51.4	51.4	51.4
Total Split (s)	34.0	34.0	34.0	34.0	34.0	34.0	14.4	66.0	66.0	51.6	51.6	51.6
Total Split (%)	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	14.4%	66.0%	66.0%	51.6%	51.6%	51.6%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	1.0	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	8.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	18.1	18.1	18.1	18.1	18.1	18.1	62.3	59.9	59.9	45.4	45.4	45.4
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.67	0.65	0.65	0.49	0.49	0.49
v/c Ratio	0.48	0.19	0.79	0.74	0.19	0.09	0.88	0.65	0.19	0.02	0.60	0.11
Control Delay	38.8	31.3	25.2	58.3	31.7	0.6	41.1	14.5	1.8	15.0	19.7	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
Total Delay	38.8	31.3	25.2	58.3	31.7	0.6	41.1	14.5	1.8	15.0	20.5	3.3
LOS	D	C	C	E	C	A	D	B	A	B	C	A
Approach Delay		28.9			45.0			18.6			19.1	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	19.8	9.1	21.8	23.5	7.9	0.0	18.4	72.7	0.0	0.4	67.8	0.0
Queue Length 95th (m)	27.8	13.8	38.7	43.6	11.1	0.0	#47.2	94.2	5.5	0.6	101.6	6.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		242.0			178.5			205.1			114.1	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	100.0			45.0		45.0
Base Capacity (vph)	376	476	579	272	399	380	313	1141	994	173	1724	778
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	363	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.13	0.65	0.51	0.13	0.07	0.88	0.65	0.19	0.02	0.76	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 92.4			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 106.0%		ICU Level of Service G	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street



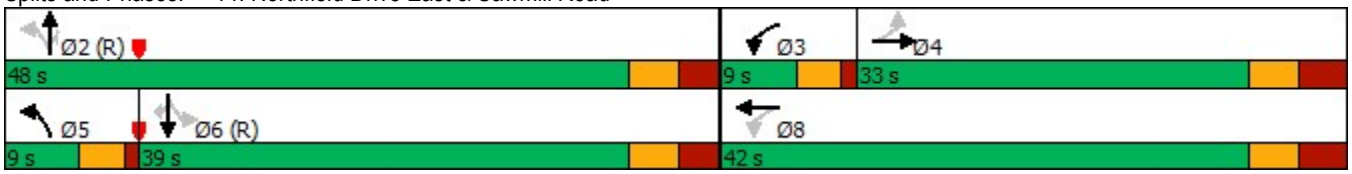


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	191	86	127	31	17	63	178	271	28	324	200
Future Volume (vph)	77	191	86	127	31	17	63	178	271	28	324	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	30.0		30.0	30.0		30.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.940				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1587	1644	0	1706	1672	0	1825	1812	1512	1630	1847	1512
Flt Permitted	0.715			0.312			0.375			0.627		
Satd. Flow (perm)	1194	1644	0	560	1672	0	720	1812	1512	1075	1847	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			26				361			206
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.83	0.80	0.73	0.83	0.79	0.65	0.78	0.85	0.75	0.71	0.92	0.86
Heavy Vehicles (%)	15%	13%	7%	7%	8%	8%	0%	6%	8%	12%	4%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	357	0	153	65	0	81	209	361	39	352	233
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	36.2
Total Split (s)	33.0	33.0		9.0	42.0		9.0	48.0	48.0	39.0	39.0	39.0
Total Split (%)	36.7%	36.7%		10.0%	46.7%		10.0%	53.3%	53.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	2.9
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)	6.7	6.7		4.0	6.7		4.0	6.2	6.2	6.2	6.2	6.2
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	Yes
Act Effct Green (s)	26.3	26.3		38.0	35.3		44.0	41.8	41.8	32.8	32.8	32.8
Actuated g/C Ratio	0.29	0.29		0.42	0.39		0.49	0.46	0.46	0.36	0.36	0.36
v/c Ratio	0.27	0.71		0.51	0.10		0.20	0.25	0.40	0.10	0.52	0.34
Control Delay	27.0	35.4		23.7	12.1		13.6	15.6	3.1	19.9	25.9	5.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	35.4		23.7	12.1		13.6	15.6	3.1	19.9	25.9	5.8
LOS	C	D		C	B		B	B	A	B	C	A
Approach Delay		33.7			20.2			8.4			18.0	
Approach LOS		C			C			A			B	
Queue Length 50th (m)	12.3	50.8		16.3	4.1		7.2	21.0	0.0	4.4	47.0	3.0
Queue Length 95th (m)	22.5	68.8		26.4	10.0		12.5	32.7	5.4	8.6	72.5	15.5
Internal Link Dist (m)		148.6			116.6			81.4			79.7	
Turn Bay Length (m)	20.0			50.0			30.0		30.0	30.0		30.0
Base Capacity (vph)	348	500		300	671		413	841	895	391	673	681
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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	0.27	0.71		0.51	0.10		0.20	0.25	0.40	0.10	0.52	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 110.4%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 14: Northfield Drive East & Sawmill Road





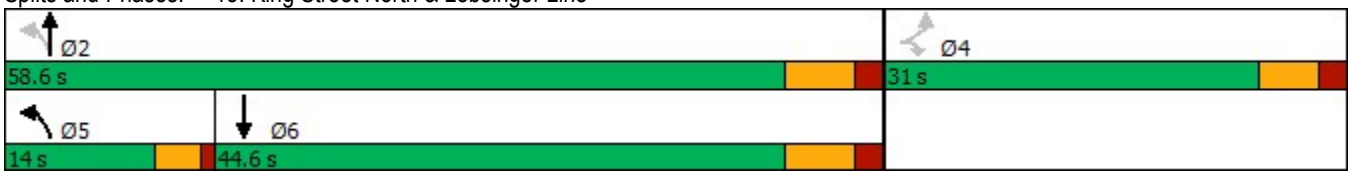
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	330	188	226	291	53
Future Volume (vph)	42	330	188	226	291	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.974	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1393	1420	1508	1830	1680	0
Flt Permitted	0.950		0.415			
Satd. Flow (perm)	1393	1420	659	1830	1680	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		367			16	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.62	0.90	0.94	0.90	0.87	0.68
Heavy Vehicles (%)	31%	15%	21%	5%	11%	13%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	68	367	200	251	412	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	58.6	44.6	
Total Split (%)	34.6%	34.6%	15.6%	65.4%	49.8%	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
Act Effct Green (s)	11.4	11.4	54.7	52.1	38.4	
Actuated g/C Ratio	0.15	0.15	0.72	0.68	0.50	
v/c Ratio	0.33	0.70	0.34	0.20	0.48	
Control Delay	33.2	11.4	5.6	5.2	14.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.2	11.4	5.6	5.2	14.8	
LOS	C	B	A	A	B	
Approach Delay	14.8			5.4	14.8	
Approach LOS	B			A	B	
Queue Length 50th (m)	8.9	0.0	6.8	10.2	33.7	
Queue Length 95th (m)	13.0	22.2	18.0	24.2	63.3	



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Internal Link Dist (m)	173.9			110.5	150.4	
Turn Bay Length (m)	20.0		100.0			
Base Capacity (vph)	458	713	585	1251	855	
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	0.15	0.51	0.34	0.20	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 89.6			
Actuated Cycle Length: 76.1			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 15: King Street North & Lobsinger Line

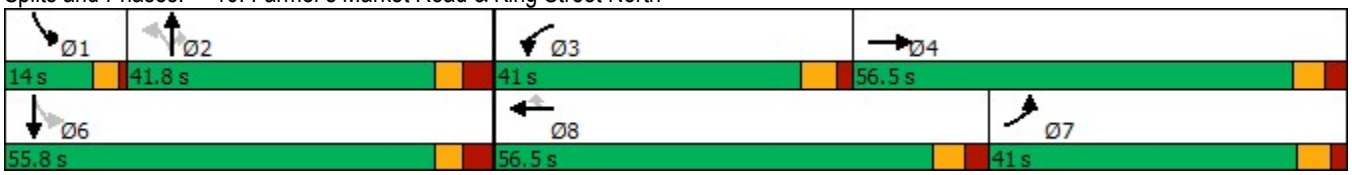


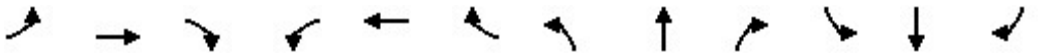
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	291	215	9	156	344	52	26	244	519	70	102	11
Future Volume (vph)	291	215	9	156	344	52	26	244	519	70	102	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3373	0	3278	1779	1384	1415	1847	1601	1690	1776	0
Flt Permitted	0.950			0.950			0.673			0.282		
Satd. Flow (perm)	1674	3373	0	3278	1779	1384	1002	1847	1601	502	1776	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				102			577		5	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.89	0.85	0.56	0.86	0.82	0.81	0.85	0.90	0.90	0.90	0.89	0.63
Heavy Vehicles (%)	9%	7%	11%	8%	8%	18%	29%	4%	2%	8%	7%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	327	269	0	181	420	64	31	271	577	78	132	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Act Effct Green (s)	31.7	67.7		14.3	50.3	50.3	29.5	29.5	29.5	45.8	43.0	
Actuated g/C Ratio	0.22	0.47		0.10	0.35	0.35	0.20	0.20	0.20	0.32	0.30	
v/c Ratio	0.89	0.17		0.56	0.68	0.12	0.15	0.72	0.73	0.33	0.25	
Control Delay	81.3	23.5		70.0	48.7	1.8	49.7	65.5	9.8	39.4	38.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	81.3	23.5		70.0	48.7	1.8	49.7	65.5	9.8	39.4	38.4	
LOS	F	C		E	D	A	D	E	A	D	D	
Approach Delay		55.2			50.0			28.4			38.8	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	94.0	23.6		27.1	109.7	0.0	7.6	75.3	0.0	16.5	28.4	
Queue Length 95th (m)	#143.7	33.5		37.5	134.3	0.4	16.2	106.8	34.8	29.1	45.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		238.1			393.7			114.8			122.4	
Turn Bay Length (m)				215.0			45.0			45.0		
Base Capacity (vph)	408	1583		799	619	548	244	450	826	242	609	
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	0.80	0.17		0.23	0.68	0.12	0.13	0.60	0.70	0.32	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 144.5			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 42.2		Intersection LOS: D	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 16: Farmer's Market Road & King Street North



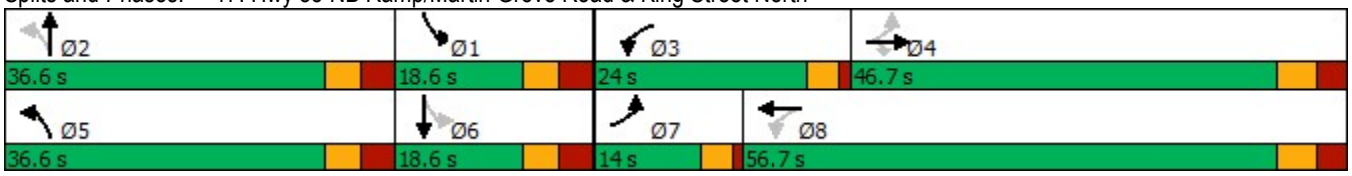


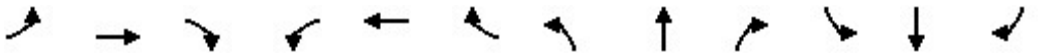
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	503	111	33	263	5	227	1	183	11	3	16
Future Volume (vph)	7	503	111	33	263	5	227	1	183	11	3	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.853			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1560	1830	1484	1601	3298	0	3079	1577	0	1825	1547	0
Flt Permitted	0.570			0.288			0.833			0.833		
Satd. Flow (perm)	936	1830	1484	485	3298	0	2700	1577	0	1600	1547	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		5			210			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.75	0.92	0.87	0.58	0.93	0.33	0.92	0.25	0.87	0.63	0.38	0.70
Heavy Vehicles (%)	17%	5%	10%	14%	9%	25%	15%	0%	4%	0%	0%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	547	128	57	298	0	247	214	0	17	31	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Act Effct Green (s)	52.9	44.6	44.6	56.5	52.1		18.3	17.6		10.9	8.3	
Actuated g/C Ratio	0.60	0.50	0.50	0.64	0.59		0.21	0.20		0.12	0.09	
v/c Ratio	0.01	0.59	0.15	0.14	0.15		0.40	0.44		0.08	0.19	
Control Delay	8.7	22.3	2.1	8.9	10.7		33.4	9.0		39.5	24.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.7	22.3	2.1	8.9	10.7		33.4	9.0		39.5	24.9	
LOS	A	C	A	A	B		C	A		D	C	
Approach Delay		18.3			10.4			22.1			30.1	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.6	76.3	0.0	4.0	12.3		17.2	0.5		2.7	1.3	
Queue Length 95th (m)	2.3	126.3	5.5	6.2	26.8		36.9	0.0		6.7	1.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		393.7			152.0			206.8			176.4	
Turn Bay Length (m)	55.0			25.0						15.0		
Base Capacity (vph)	656	922	826	569	1947		1067	683		262	234	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.59	0.15	0.10	0.15		0.23	0.31		0.06	0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.9			
Actuated Cycle Length: 88.4			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 60.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North



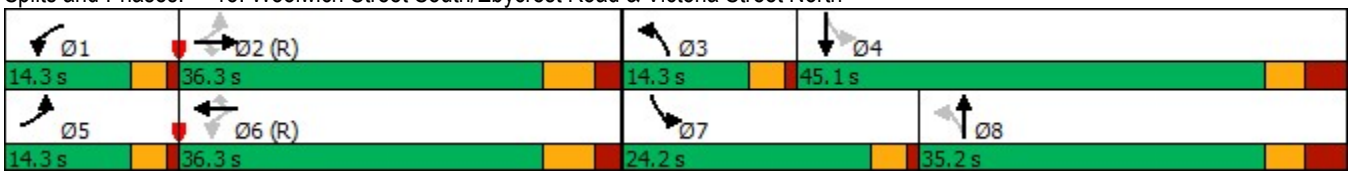


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	415	96	8	308	86	88	24	13	113	22	63
Future Volume (vph)	38	415	96	8	308	86	88	24	13	113	22	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.950			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	3411	1570	1630	3411	1471	1772	1706	0	1630	1614	0
Flt Permitted	0.525			0.503			0.680			0.490		
Satd. Flow (perm)	970	3411	1570	863	3411	1471	1268	1706	0	840	1614	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			158		17			88	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.63	0.93	0.87	0.84	0.70	0.78	0.83	0.69	0.72
Heavy Vehicles (%)	4%	7%	4%	12%	7%	11%	3%	4%	13%	12%	3%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	428	125	13	331	99	105	51	0	136	120	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	34.9	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	14.3	35.2		24.2	45.1	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	13.0%	32.0%		22.0%	41.0%	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	Min	
Act Effct Green (s)	69.9	64.4	64.4	67.2	59.9	59.9	20.2	10.4		30.6	14.6	
Actuated g/C Ratio	0.64	0.59	0.59	0.61	0.54	0.54	0.18	0.09		0.28	0.13	
v/c Ratio	0.07	0.21	0.13	0.02	0.18	0.11	0.38	0.29		0.38	0.42	
Control Delay	8.6	12.7	1.6	8.8	14.5	0.7	34.3	38.2		33.1	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.6	12.7	1.6	8.8	14.5	0.7	34.3	38.2		33.1	18.5	
LOS	A	B	A	A	B	A	C	D		C	B	
Approach Delay		10.1			11.3			35.6			26.3	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	3.2	19.3	0.0	0.9	18.6	0.0	17.2	6.9		22.9	6.2	
Queue Length 95th (m)	8.2	39.3	2.1	2.6	31.3	1.2	26.2	13.4		32.7	12.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		296.5			213.7			304.6			251.4	
Turn Bay Length (m)	50.0			55.0		55.0	40.0			50.0		
Base Capacity (vph)	699	1998	985	625	1856	872	289	451		386	617	
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	0.06	0.21	0.13	0.02	0.18	0.11	0.36	0.11		0.35	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 104.5 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 55.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North





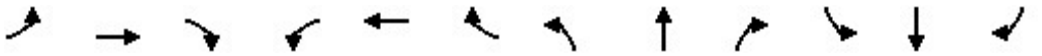
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	0	0	0	1883	1883	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						
Link Speed (k/h)	48			48	48	
Link Distance (m)	46.7			138.1	106.7	
Travel Time (s)	3.5			10.4	8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type						
Protected Phases				2	6	
Permitted Phases						
Minimum Split (s)				22.5	22.5	
Total Split (s)				22.5	22.5	
Total Split (%)				28.1%	28.1%	
Yellow Time (s)				3.5	3.5	
All-Red Time (s)				1.0	1.0	
Lost Time Adjust (s)				0.0	0.0	
Total Lost Time (s)				4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)	22.7			114.1	82.7	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 40			
Control Type: Pretimed			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 53: Arthur Street South





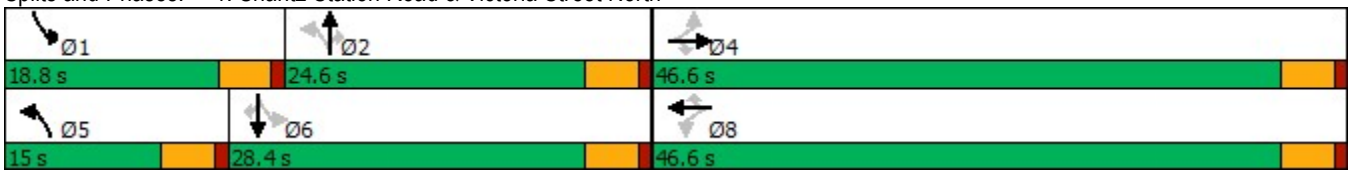
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	464	23	58	844	21	188	590	361	218	548	284
Future Volume (vph)	25	464	23	58	844	21	188	590	361	218	548	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	90.0		100.0	100.0		100.0	100.0		100.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1883	1498	1659	1883	1633	1825	3579	1471	1738	3476	1601
Flt Permitted	0.095			0.298			0.211			0.167		
Satd. Flow (perm)	183	1883	1498	520	1883	1633	405	3579	1471	306	3476	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			73			222			99
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		364.7			395.3			305.6			253.6	
Travel Time (s)		27.4			29.6			22.9			19.0	
Peak Hour Factor	0.56	0.88	0.55	0.88	0.94	0.55	0.77	0.78	0.85	0.60	0.77	0.82
Heavy Vehicles (%)	0%	2%	9%	10%	2%	0%	0%	2%	11%	5%	5%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	527	42	66	898	38	244	756	425	363	712	346
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	46.6	46.6	46.6	46.6	46.6	46.6	15.0	24.6	24.6	18.8	28.4	28.4
Total Split (%)	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	16.7%	27.3%	27.3%	20.9%	31.6%	31.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	42.1	42.1	42.1	42.1	42.1	42.1	30.5	20.1	20.1	38.3	24.0	24.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.34	0.22	0.22	0.43	0.27	0.27
v/c Ratio	0.53	0.60	0.06	0.27	1.02	0.05	0.81	0.95	0.85	1.02	0.77	0.69
Control Delay	44.3	21.2	1.4	18.5	61.2	1.0	41.2	56.8	33.5	76.9	37.0	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	21.2	1.4	18.5	61.2	1.0	41.2	56.8	33.5	76.9	37.0	29.3
LOS	D	C	A	B	E	A	D	E	C	E	D	C
Approach Delay		21.6			56.1			47.2			45.3	
Approach LOS		C			E			D			D	
Queue Length 50th (m)	5.3	64.8	0.0	6.7	~157.8	0.0	26.8	68.1	34.6	~49.4	59.8	38.5
Queue Length 95th (m)	8.7	93.0	0.0	15.8	#235.7	0.0	#41.3	#76.3	#73.9	42.4	65.1	58.6

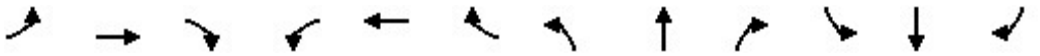
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		340.7			371.3			281.6			229.6	
Turn Bay Length (m)	90.0		90.0	90.0		100.0	100.0		100.0	100.0		100.0
Base Capacity (vph)	85	880	739	243	880	802	303	799	500	357	926	498
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.60	0.06	0.27	1.02	0.05	0.81	0.95	0.85	1.02	0.77	0.69

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 45.1		Intersection LOS: D	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 1: Shantz Station Road & Victoria Street North





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	12	27	19	12	45	34	992	31	43	511	8
Future Volume (vph)	10	12	27	19	12	45	34	992	31	43	511	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		0.0	75.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	2.5			2.5			100.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.931			0.922			0.989			0.997	
Flt Protected		0.990			0.988		0.950			0.950		
Satd. Flow (prot)	0	1771	0	0	1545	0	1690	3282	0	1644	3286	0
Flt Permitted		0.990			0.988		0.950			0.950		
Satd. Flow (perm)	0	1771	0	0	1545	0	1690	3282	0	1644	3286	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		288.3			336.9			408.6			247.1	
Travel Time (s)		21.6			25.3			30.6			18.5	
Peak Hour Factor	0.63	0.50	0.65	0.79	0.75	0.82	0.60	0.84	0.34	0.70	0.88	0.63
Heavy Vehicles (%)	0%	0%	0%	32%	0%	9%	8%	8%	36%	11%	11%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	82	0	0	95	0	57	1272	0	61	594	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	1883	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	1883	0	0	1883	0	0	1883	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		168.7			299.0			278.0			309.7	
Travel Time (s)		10.1			17.9			16.7			18.6	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		26.3	26.3		26.3	26.3	
Total Split (s)	26.0	26.0		26.0	26.0		46.3	46.3		46.3	46.3	
Total Split (%)	36.0%	36.0%		36.0%	36.0%		64.0%	64.0%		64.0%	64.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.6	4.6		4.6	4.6	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.7	1.7		1.7	1.7	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)												
Actuated g/C Ratio												
v/c Ratio												
Control Delay												
Queue Delay												
Total Delay												
LOS												
Approach Delay												
Approach LOS												
Queue Length 50th (m)												
Queue Length 95th (m)												
Internal Link Dist (m)		144.7			275.0			254.0			285.7	
Turn Bay Length (m)												
Base Capacity (vph)												
Starvation Cap Reductn												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn												
Storage Cap Reductn												
Reduced v/c Ratio												

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.3			
Actuated Cycle Length: 61.3			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Bloomingdale Road North/Sawmill Road & Kraft Drive/Ebycrest Road





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	0	1883	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	301.4			305.4	308.6	
Travel Time (s)	22.6			22.9	23.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			



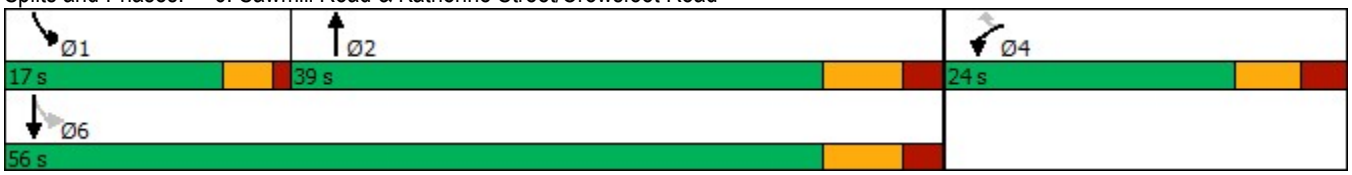
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	270	293	237	235	308	292
Future Volume (vph)	270	293	237	235	308	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0	0.0		50.0	50.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.930			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1738	1601	1717	0	1807	1883
Flt Permitted	0.950				0.178	
Satd. Flow (perm)	1738	1601	1717	0	339	1883
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		366	80			
Link Speed (k/h)	48		48			48
Link Distance (m)	230.2		330.8			258.5
Travel Time (s)	17.3		24.8			19.4
Peak Hour Factor	0.85	0.80	0.85	0.78	0.78	0.83
Heavy Vehicles (%)	5%	2%	2%	6%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	318	366	580	0	395	352
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	4		2		1	6
Permitted Phases		4			6	
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	3.5	3.5	20.0		10.0	20.0
Minimum Split (s)	14.8	14.8	27.3		14.0	27.3
Total Split (s)	24.0	24.0	39.0		17.0	56.0
Total Split (%)	30.0%	30.0%	48.8%		21.3%	70.0%
Yellow Time (s)	3.9	3.9	4.8		3.0	4.8
All-Red Time (s)	2.9	2.9	2.5		1.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	7.3		4.0	7.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	Max	Max	None		None	None
Act Effct Green (s)	17.3	17.3	28.4		48.2	44.9
Actuated g/C Ratio	0.23	0.23	0.37		0.63	0.59
v/c Ratio	0.81	0.57	0.84		0.87	0.32
Control Delay	47.5	7.1	31.8		33.7	8.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	47.5	7.1	31.8		33.7	8.7
LOS	D	A	C		C	A
Approach Delay	25.9		31.8			21.9
Approach LOS	C		C			C
Queue Length 50th (m)	46.7	0.0	66.0		29.4	23.2
Queue Length 95th (m)	#80.7	12.3	96.7		#52.4	33.0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Internal Link Dist (m)	206.2		306.8			234.5
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	393	645	763		465	1207
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	0.81	0.57	0.76		0.85	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 76.4			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Sawmill Road & Katherine Street/Crowsfoot Road

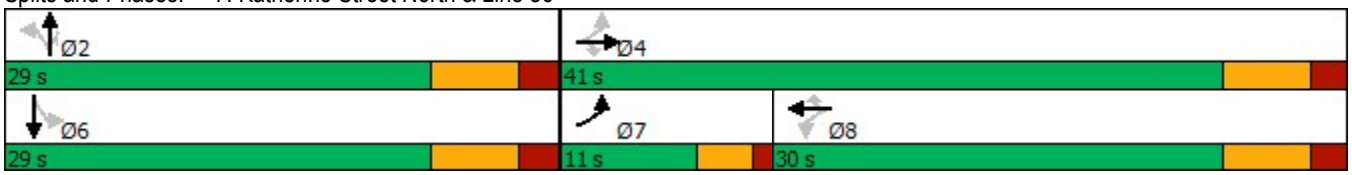


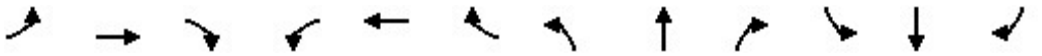
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	474	91	43	516	21	71	204	23	3	138	59
Future Volume (vph)	195	474	91	43	516	21	71	204	23	3	138	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		35.0	40.0		50.0	0.0		15.0	0.0		0.0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (m)	65.0			100.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.962	
Flt Protected	0.950			0.950				0.986			0.999	
Satd. Flow (prot)	1738	1883	1541	1738	1812	1498	0	1806	1633	0	1783	0
Flt Permitted	0.169			0.468				0.783			0.993	
Satd. Flow (perm)	309	1883	1541	856	1812	1498	0	1434	1633	0	1773	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			122			118		30	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		436.4			385.1			269.9			292.1	
Travel Time (s)		32.7			28.9			20.2			21.9	
Peak Hour Factor	0.92	0.90	0.90	0.61	0.97	0.69	0.69	0.78	0.75	0.75	0.70	0.74
Heavy Vehicles (%)	5%	2%	6%	5%	6%	9%	2%	6%	0%	0%	3%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	527	101	70	532	30	0	365	31	0	281	0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	11.0	28.6	28.6	28.6	28.6	28.6	26.8	26.8	26.8	26.8	26.8	
Total Split (s)	11.0	41.0	41.0	30.0	30.0	30.0	29.0	29.0	29.0	29.0	29.0	
Total Split (%)	15.7%	58.6%	58.6%	42.9%	42.9%	42.9%	41.4%	41.4%	41.4%	41.4%	41.4%	
Yellow Time (s)	3.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.6	6.6	6.6	6.6	6.6		6.8	6.8		6.8	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	
Act Effct Green (s)	36.2	33.6	33.6	22.6	22.6	22.6		22.2	22.2		22.2	
Actuated g/C Ratio	0.52	0.49	0.49	0.33	0.33	0.33		0.32	0.32		0.32	
v/c Ratio	0.69	0.58	0.13	0.25	0.90	0.05		0.79	0.05		0.48	
Control Delay	23.2	15.8	2.8	19.9	43.6	0.2		37.0	0.2		20.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	23.2	15.8	2.8	19.9	43.6	0.2		37.0	0.2		20.2	
LOS	C	B	A	B	D	A		D	A		C	
Approach Delay		16.1			38.9			34.2			20.2	
Approach LOS		B			D			C			C	
Queue Length 50th (m)	13.8	45.8	0.0	6.5	64.6	0.0		43.3	0.0		25.9	
Queue Length 95th (m)	#34.6	72.5	6.5	10.0	#117.5	0.0		#60.9	0.0		32.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		412.4			361.1			245.9			268.1	
Turn Bay Length (m)	30.0		35.0	40.0		50.0			15.0			
Base Capacity (vph)	306	936	817	289	612	587		460	604		589	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.69	0.56	0.12	0.24	0.87	0.05		0.79	0.05		0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 69.2			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 7: Katherine Street North & Line 86





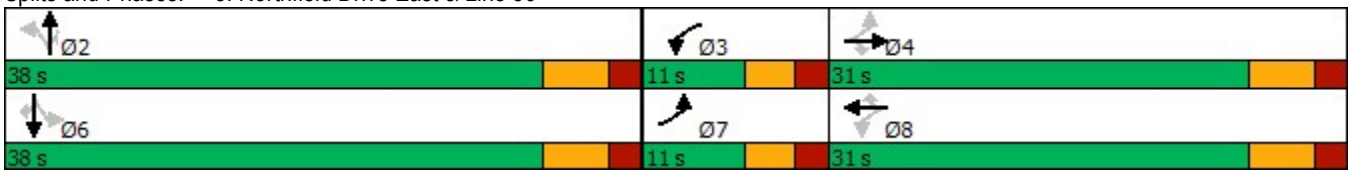
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	491	56	162	423	39	63	516	210	54	614	81
Future Volume (vph)	84	491	56	162	423	39	63	516	210	54	614	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		30.0	35.0		35.0	35.0		35.0	35.0		35.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	75.0			75.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1865	1555	1674	1830	1555	1825	1883	1585	1508	1883	1555
Flt Permitted	0.241			0.147			0.125			0.212		
Satd. Flow (perm)	463	1865	1555	259	1830	1555	240	1883	1585	337	1883	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			109			164			109
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		300.2			364.4			227.4			308.9	
Travel Time (s)		22.5			27.3			17.1			23.2	
Peak Hour Factor	0.69	0.80	0.50	0.61	0.86	0.72	0.57	0.90	0.94	0.85	0.83	0.61
Heavy Vehicles (%)	0%	3%	5%	9%	5%	5%	0%	2%	3%	21%	2%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	614	112	266	492	54	111	573	223	64	740	133
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	25.0	25.0	6.0	25.0	25.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	11.0	31.0	31.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	13.8%	38.8%	38.8%	13.8%	38.8%	38.8%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	32.0	25.0	25.0	33.0	27.2	27.2	32.0	32.0	32.0	32.0	32.0	32.0
Actuated g/C Ratio	0.40	0.31	0.31	0.41	0.34	0.34	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.43	1.05	0.20	1.25	0.79	0.09	1.16	0.76	0.30	0.48	0.98	0.19
Control Delay	17.4	82.0	5.7	168.1	36.5	0.8	169.8	28.8	6.3	32.3	54.8	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	82.0	5.7	168.1	36.5	0.8	169.8	28.8	6.3	32.3	54.8	5.5
LOS	B	F	A	F	D	A	F	C	A	C	D	A
Approach Delay		62.7			77.2			40.5			46.3	
Approach LOS		E			E			D			D	
Queue Length 50th (m)	10.2	~103.6	0.3	~38.0	69.7	0.0	~20.2	73.0	5.4	7.0	108.2	2.2
Queue Length 95th (m)	14.5	#134.4	0.6	#40.0	#111.8	0.0	#26.0	111.2	18.6	18.5	#156.2	4.6

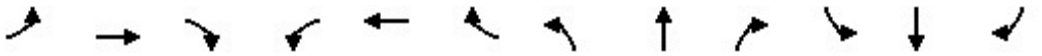
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		276.2			340.4			203.4			284.9	
Turn Bay Length (m)	30.0		30.0	35.0		35.0	35.0		35.0	35.0		35.0
Base Capacity (vph)	287	582	560	212	621	600	96	753	732	134	753	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	1.05	0.20	1.25	0.79	0.09	1.16	0.76	0.30	0.48	0.98	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.25			
Intersection Signal Delay: 55.9		Intersection LOS: E	
Intersection Capacity Utilization 98.8%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 8: Northfield Drive East & Line 86



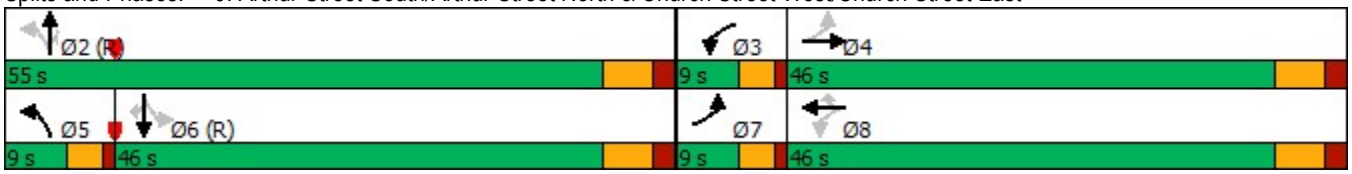


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	282	159	84	341	45	140	308	48	71	275	51
Future Volume (vph)	71	282	159	84	341	45	140	308	48	71	275	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	10.0		10.0	30.0		30.0	15.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	40.0			20.0			15.0			35.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1753	0	1789	1847	1396	1738	1830	1585	1722	1830	1512
Flt Permitted	0.371			0.238			0.410			0.534		
Satd. Flow (perm)	654	1753	0	448	1847	1396	750	1830	1585	968	1830	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				109			69			109
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		145.1			189.0			121.2			182.5	
Travel Time (s)		10.4			13.6			8.7			13.1	
Peak Hour Factor	0.83	0.93	0.84	0.71	0.91	0.81	0.94	0.84	0.77	0.80	0.89	0.66
Heavy Vehicles (%)	9%	4%	2%	2%	4%	17%	5%	5%	3%	6%	5%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	492	0	118	375	56	149	367	62	89	309	77
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8		8	2		2	6		6
Minimum Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	46.0	46.0	46.0	46.0	46.0
Total Split (s)	9.0	46.0		9.0	46.0	46.0	9.0	55.0	55.0	46.0	46.0	46.0
Total Split (%)	8.2%	41.8%		8.2%	41.8%	41.8%	8.2%	50.0%	50.0%	41.8%	41.8%	41.8%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes
Act Effct Green (s)	47.0	40.0		47.0	40.0	40.0	51.0	49.0	49.0	40.0	40.0	40.0
Actuated g/C Ratio	0.43	0.36		0.43	0.36	0.36	0.46	0.45	0.45	0.36	0.36	0.36
v/c Ratio	0.26	0.75		0.47	0.56	0.10	0.38	0.45	0.08	0.25	0.46	0.12
Control Delay	19.2	36.9		24.3	31.9	0.5	20.8	23.4	4.0	27.0	29.6	2.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	36.9		24.3	31.9	0.5	20.8	23.4	4.0	27.0	29.6	2.3
LOS	B	D		C	C	A	C	C	A	C	C	A
Approach Delay		34.3			27.1			20.7			24.7	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	10.2	85.9		14.2	63.6	0.0	18.3	53.4	0.0	13.2	50.3	0.0
Queue Length 95th (m)	17.7	125.9		19.2	92.9	0.0	30.9	71.2	4.3	22.5	74.1	0.0
Internal Link Dist (m)		121.1			165.0			97.2			158.5	
Turn Bay Length (m)	25.0			10.0		10.0	30.0		30.0	15.0		15.0
Base Capacity (vph)	325	657		252	671	577	392	815	744	352	665	619
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.75		0.47	0.56	0.10	0.38	0.45	0.08	0.25	0.46	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 110			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 26.8		Intersection LOS: C	
Intersection Capacity Utilization 123.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 9: Arthur Street South/Arthur Street North & Church Street West/Church Street East





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	30.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			40.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1883	0	1883	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	1883	0	1883	1883	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	231.8			189.7	160.2	
Travel Time (s)	17.4			14.2	12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

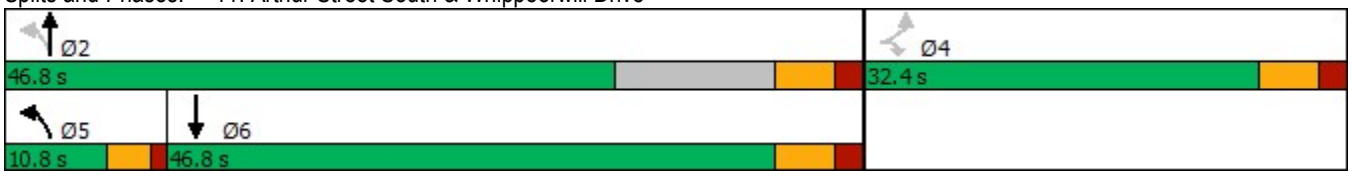


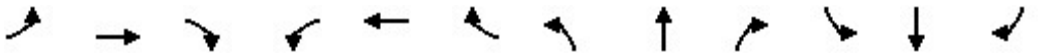
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	47	186	149	616	671	23
Future Volume (vph)	47	186	149	616	671	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	40.0	40.0	45.0			5.0
Storage Lanes	1	0	1			1
Taper Length (m)	40.0		5.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1825	1883	3520	0
Flt Permitted	0.950		0.284			
Satd. Flow (perm)	1825	1601	546	1883	3520	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		211			6	
Link Speed (k/h)	50			60	60	
Link Distance (m)	238.4			185.0	215.7	
Travel Time (s)	17.2			11.1	12.9	
Peak Hour Factor	0.75	0.88	0.97	0.94	0.88	0.71
Heavy Vehicles (%)	0%	2%	0%	2%	3%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	211	154	655	795	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	12.0	12.0	5.0	40.8	40.8	
Minimum Split (s)	32.0	32.0	9.5	46.8	46.8	
Total Split (s)	32.4	32.4	10.8	46.8	46.8	
Total Split (%)	36.0%	36.0%	12.0%	52.0%	52.0%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
Act Effct Green (s)	12.0	12.0	53.5	51.5	40.8	
Actuated g/C Ratio	0.16	0.16	0.71	0.68	0.54	
v/c Ratio	0.22	0.49	0.31	0.51	0.42	
Control Delay	30.0	8.9	5.2	7.6	11.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.0	8.9	5.2	7.6	11.1	
LOS	C	A	A	A	B	
Approach Delay	13.8			7.1	11.1	
Approach LOS	B			A	B	
Queue Length 50th (m)	7.9	0.0	5.7	38.2	32.5	
Queue Length 95th (m)	14.9	15.8	10.5	59.0	43.2	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Internal Link Dist (m)	214.4			161.0	191.7	
Turn Bay Length (m)	40.0	40.0	45.0			
Base Capacity (vph)	638	696	502	1286	1904	
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	0.10	0.30	0.31	0.51	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 75.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 65.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 11: Arthur Street South & Whippoorwill Drive





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	63	606	151	62	7	426	1084	371	7	634	124
Future Volume (vph)	199	63	606	151	62	7	426	1084	371	7	634	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		60.0	60.0		60.0	100.0		0.0	45.0		45.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	50.0			30.0			70.0			75.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1685	1432	1276	1413	1142	1448	1762	1432	913	3510	1484
Flt Permitted	0.704			0.611			0.238			0.083		
Satd. Flow (perm)	1300	1685	1432	821	1413	1142	363	1762	1432	80	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			553			56			353			118
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		266.0			202.5			229.1			138.1	
Travel Time (s)		16.0			12.2			13.7			8.3	
Peak Hour Factor	0.78	0.66	0.79	0.81	0.77	0.58	0.90	0.92	0.65	0.78	0.95	0.74
Heavy Vehicles (%)	4%	14%	14%	43%	36%	43%	26%	9%	14%	100%	4%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	95	767	186	81	12	473	1178	571	9	667	168
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	3	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	40.0	40.0	40.0	40.0	40.0
Minimum Split (s)	34.0	34.0	34.0	11.0	34.0	34.0	11.0	51.4	51.4	46.4	46.4	46.4
Total Split (s)	37.0	37.0	37.0	11.0	48.0	48.0	47.0	97.0	97.0	50.0	50.0	50.0
Total Split (%)	25.5%	25.5%	25.5%	7.6%	33.1%	33.1%	32.4%	66.9%	66.9%	34.5%	34.5%	34.5%
Yellow Time (s)	4.6	4.6	4.6	3.0	4.6	4.6	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.4	1.0	3.4	3.4	1.0	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0	8.0	4.0	8.0	8.0	4.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	44.0	40.0	40.0	93.0	90.6	90.6	48.3	48.3	48.3
Actuated g/C Ratio	0.20	0.20	0.20	0.30	0.28	0.28	0.64	0.62	0.62	0.33	0.33	0.33
v/c Ratio	0.98	0.28	1.05	0.69	0.21	0.03	0.91	1.07	0.56	0.35	0.57	0.29
Control Delay	108.2	51.9	63.7	57.6	42.1	0.1	46.3	75.6	7.4	79.3	43.3	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Total Delay	108.2	51.9	63.7	57.6	42.1	0.1	46.3	75.6	7.4	79.3	44.2	14.1
LOS	F	D	E	E	D	A	D	E	A	E	D	B
Approach Delay		72.9			50.6			51.9			38.6	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	73.7	23.4	~104.7	43.7	18.0	0.0	85.5	~373.7	29.7	2.1	87.2	10.4
Queue Length 95th (m)	#101.8	28.9	#115.5	59.6	27.2	0.0	#145.8	#454.1	16.6	#8.9	108.2	18.2

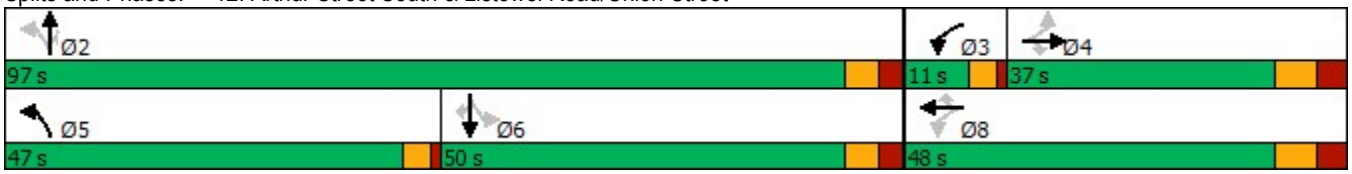
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		242.0			178.5			205.1			114.1	
Turn Bay Length (m)	60.0		60.0	60.0		60.0	100.0			45.0		45.0
Base Capacity (vph)	260	337	728	271	389	355	554	1100	1027	26	1168	572
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	246	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.28	1.05	0.69	0.21	0.03	0.85	1.07	0.56	0.35	0.72	0.29

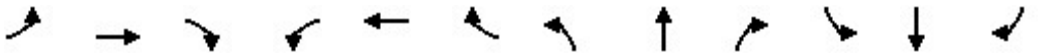
Intersection Summary			
Area Type:	Other		
Cycle Length: 145			
Actuated Cycle Length: 145			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 54.5		Intersection LOS: D	
Intersection Capacity Utilization 125.4%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 12: Arthur Street South & Listowel Road/Union Street



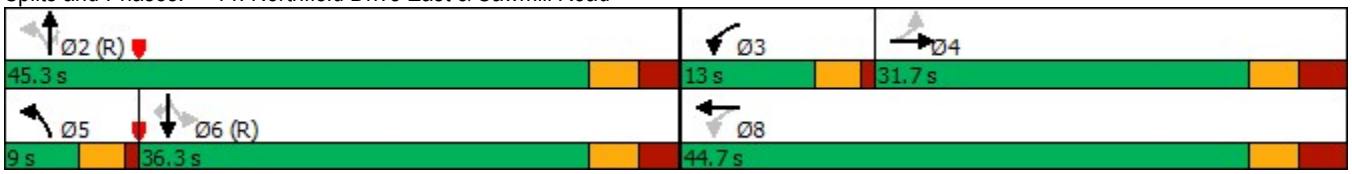


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	263	99	269	260	31	137	361	485	36	248	128
Future Volume (vph)	147	263	99	269	260	31	137	361	485	36	248	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0		0.0	50.0		0.0	30.0		30.0	30.0		30.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	45.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.978				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1763	0	1789	1807	0	1807	1902	1601	1690	1883	1498
Flt Permitted	0.538			0.220			0.429			0.524		
Satd. Flow (perm)	984	1763	0	414	1807	0	816	1902	1601	932	1883	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			12				480			151
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		172.6			140.6			105.4			103.7	
Travel Time (s)		12.4			10.1			7.6			7.5	
Peak Hour Factor	0.86	0.89	0.84	0.83	0.81	0.56	0.83	0.89	0.87	0.57	0.87	0.85
Heavy Vehicles (%)	5%	6%	0%	2%	4%	4%	1%	1%	2%	8%	2%	9%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	414	0	324	376	0	165	406	557	63	285	151
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	31.7	31.7		9.0	31.7		9.0	36.2	36.2	36.2	36.2	36.2
Total Split (s)	31.7	31.7		13.0	44.7		9.0	45.3	45.3	36.3	36.3	36.3
Total Split (%)	35.2%	35.2%		14.4%	49.7%		10.0%	50.3%	50.3%	40.3%	40.3%	40.3%
Yellow Time (s)	3.3	3.3		3.0	3.3		3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.4	3.4		1.0	3.4		1.0	2.9	2.9	2.9	2.9	2.9
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)	6.7	6.7		4.0	6.7		4.0	6.2	6.2	6.2	6.2	6.2
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	Yes
Act Effct Green (s)	25.0	25.0		40.7	38.0		41.3	39.1	39.1	30.1	30.1	30.1
Actuated g/C Ratio	0.28	0.28		0.45	0.42		0.46	0.43	0.43	0.33	0.33	0.33
v/c Ratio	0.63	0.82		1.00	0.49		0.38	0.49	0.58	0.20	0.45	0.25
Control Delay	40.2	43.9		72.6	21.0		17.6	20.9	5.7	23.6	26.4	5.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	43.9		72.6	21.0		17.6	20.9	5.7	23.6	26.4	5.0
LOS	D	D		E	C		B	C	A	C	C	A
Approach Delay		42.8			44.9			12.9			19.5	
Approach LOS		D			D			B			B	
Queue Length 50th (m)	25.8	63.5		36.2	44.5		16.4	49.0	7.7	7.7	38.2	0.0
Queue Length 95th (m)	45.0	#107.9		#72.6	59.6		26.0	73.1	26.1	10.4	58.0	10.4
Internal Link Dist (m)		148.6			116.6			81.4			79.7	
Turn Bay Length (m)	20.0			50.0			30.0		30.0	30.0		30.0
Base Capacity (vph)	273	505		324	769		429	826	967	311	629	601
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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	0.63	0.82		1.00	0.49		0.38	0.49	0.58	0.20	0.45	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Pretimed			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 27.7		Intersection LOS: C	
Intersection Capacity Utilization 113.2%		ICU Level of Service H	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 14: Northfield Drive East & Sawmill Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	39	362	446	355	318	42
Future Volume (vph)	39	362	446	355	318	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	20.0	0.0	100.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	40.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.980	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1722	1555	1706	1865	1815	0
Flt Permitted	0.950		0.393			
Satd. Flow (perm)	1722	1555	706	1865	1815	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		389			12	
Link Speed (k/h)	60			60	60	
Link Distance (m)	197.9			134.5	174.4	
Travel Time (s)	11.9			8.1	10.5	
Peak Hour Factor	0.80	0.93	0.88	0.89	0.87	0.68
Heavy Vehicles (%)	6%	5%	7%	3%	2%	14%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	389	507	399	428	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	35.0	35.0	
Minimum Split (s)	22.0	22.0	9.0	41.6	41.6	
Total Split (s)	31.0	31.0	14.0	55.6	41.6	
Total Split (%)	35.8%	35.8%	16.2%	64.2%	48.0%	
Yellow Time (s)	4.0	4.0	3.0	4.6	4.6	
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	4.0	6.6	6.6	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Max	Max	
Act Effct Green (s)	11.1	11.1	51.7	49.1	35.0	
Actuated g/C Ratio	0.15	0.15	0.71	0.67	0.48	
v/c Ratio	0.19	0.69	0.79	0.32	0.49	
Control Delay	28.4	10.3	17.2	6.0	15.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.4	10.3	17.2	6.0	15.1	
LOS	C	B	B	A	B	
Approach Delay	12.3			12.3	15.1	
Approach LOS	B			B	B	
Queue Length 50th (m)	5.9	0.0	21.4	17.8	35.0	
Queue Length 95th (m)	12.7	21.5	#60.5	37.5	63.1	

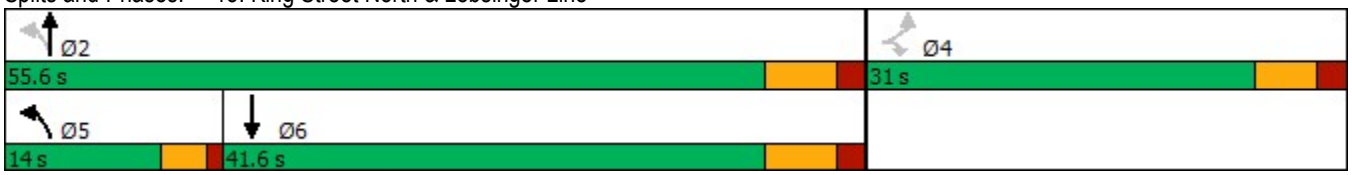


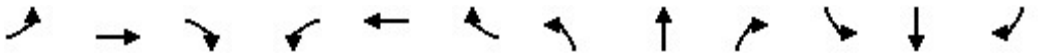
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Internal Link Dist (m)	173.9			110.5	150.4	
Turn Bay Length (m)	20.0		100.0			
Base Capacity (vph)	592	790	638	1257	880	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.49	0.79	0.32	0.49	

Intersection Summary			
Area Type:	Other		
Cycle Length: 86.6			
Actuated Cycle Length: 72.8			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

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

Splits and Phases: 15: King Street North & Lobsinger Line





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	205	61	555	555	166	72	163	457	111	229	29
Future Volume (vph)	199	205	61	555	555	166	72	163	457	111	229	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		75.0	215.0		0.0	45.0		0.0	45.0		0.0
Storage Lanes	1		1	2		1	1		1	1		0
Taper Length (m)	2.5			45.0			55.0			45.0		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962				0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	3385	0	3437	1847	1585	1825	1847	1570	1738	1840	0
Flt Permitted	0.950			0.950			0.587			0.372		
Satd. Flow (perm)	1722	3385	0	3437	1847	1585	1128	1847	1570	681	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				184			491		5	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		262.1			417.7			138.8			146.4	
Travel Time (s)		15.7			25.1			10.0			10.5	
Peak Hour Factor	0.82	0.92	0.81	0.80	0.85	0.53	0.72	0.81	0.93	0.74	0.94	0.79
Heavy Vehicles (%)	6%	5%	0%	3%	4%	3%	0%	4%	4%	5%	1%	11%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	243	298	0	694	653	313	100	201	491	150	281	0
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	15.0		5.0	15.0	15.0	10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	14.0	34.5		11.0	34.5	34.5	34.8	34.8	34.8	9.0	34.8	
Total Split (s)	41.0	56.5		41.0	56.5	56.5	41.8	41.8	41.8	14.0	55.8	
Total Split (%)	26.7%	36.9%		26.7%	36.9%	36.9%	27.3%	27.3%	27.3%	9.1%	36.4%	
Yellow Time (s)	4.0	3.7		4.0	3.7	3.7	3.3	3.3	3.3	3.0	3.3	
All-Red Time (s)	2.0	2.8		2.0	2.8	2.8	3.5	3.5	3.5	1.0	3.5	
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)	6.0	6.5		6.0	6.5	6.5	6.8	6.8	6.8	4.0	6.8	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?		Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	None	Max		None	Max	Max	None	None	None	None	None	
Act Effct Green (s)	32.6	50.3		32.6	50.3	50.3	24.8	24.8	24.8	41.7	38.9	
Actuated g/C Ratio	0.23	0.36		0.23	0.36	0.36	0.18	0.18	0.18	0.30	0.28	
v/c Ratio	0.61	0.24		0.88	0.99	0.46	0.51	0.62	0.72	0.54	0.55	
Control Delay	57.0	30.5		65.8	79.1	17.2	61.9	62.5	10.7	46.5	47.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	57.0	30.5		65.8	79.1	17.2	61.9	62.5	10.7	46.5	47.3	
LOS	E	C		E	E	B	E	E	B	D	D	
Approach Delay		42.4			61.9			30.3			47.0	
Approach LOS		D			E			C			D	
Queue Length 50th (m)	61.2	28.1		97.0	~191.0	26.8	26.0	53.5	0.0	33.1	67.5	
Queue Length 95th (m)	86.5	43.7		111.9	#269.1	12.2	34.9	69.9	32.2	41.5	96.1	

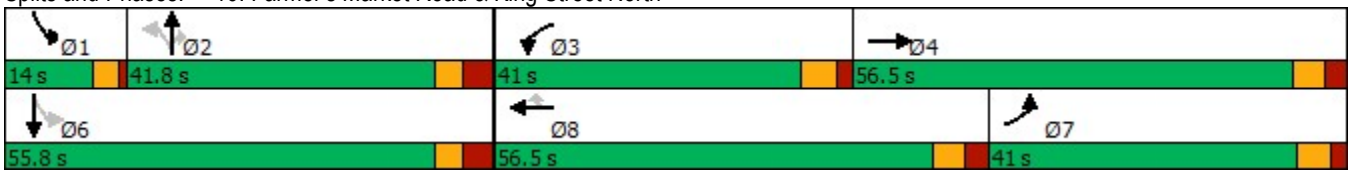
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		238.1			393.7			114.8			122.4	
Turn Bay Length (m)				215.0			45.0			45.0		
Base Capacity (vph)	429	1226		857	658	683	281	460	760	276	645	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.57	0.24		0.81	0.99	0.46	0.36	0.44	0.65	0.54	0.44	

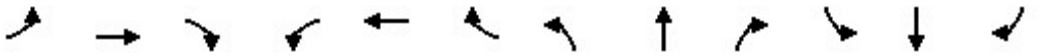
Intersection Summary			
Area Type:	Other		
Cycle Length: 153.3			
Actuated Cycle Length: 141.1			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 49.6		Intersection LOS: D	
Intersection Capacity Utilization 84.1%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 16: Farmer's Market Road & King Street North



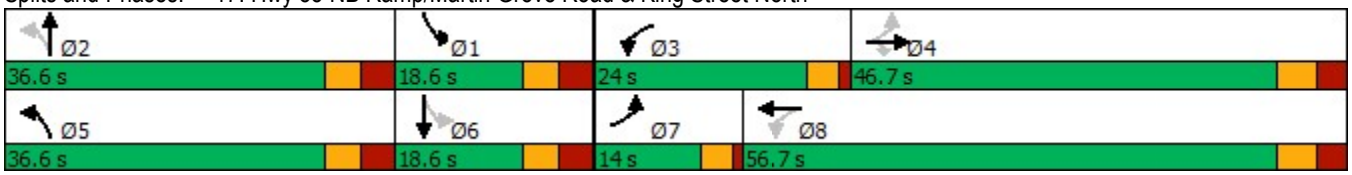


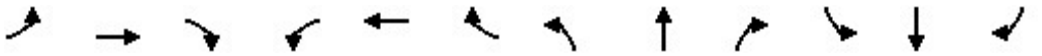
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	648	124	138	762	16	359	9	64	8	2	14
Future Volume (vph)	25	648	124	138	762	16	359	9	64	8	2	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	25.0		40.0	0.0		0.0	15.0		0.0
Storage Lanes	1		1	1		1	2		0	1		0
Taper Length (m)	70.0			70.0			2.5			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.996			0.873			0.876	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1883	1526	1772	3566	0	3309	1649	0	1825	1591	0
Flt Permitted	0.294			0.174			0.000			0.000		
Satd. Flow (perm)	565	1883	1526	325	3566	0	0	1649	0	0	1591	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158		3			70			19	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		417.7			176.0			230.8			200.4	
Travel Time (s)		25.1			10.6			16.6			14.4	
Peak Hour Factor	0.58	0.98	0.77	0.93	0.89	0.65	0.88	0.67	0.91	0.45	0.50	0.75
Heavy Vehicles (%)	0%	2%	7%	3%	2%	0%	7%	0%	2%	0%	0%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	661	161	148	881	0	408	83	0	18	23	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	40.0	40.0	7.0	40.0		10.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	46.7	46.7	11.0	46.7		35.6	35.6		18.6	35.6	
Total Split (s)	14.0	46.7	46.7	24.0	56.7		36.6	36.6		18.6	18.6	
Total Split (%)	11.1%	37.1%	37.1%	19.1%	45.0%		29.1%	29.1%		14.8%	14.8%	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.7	6.7	4.0	6.7		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	Max	Max	None	Max		None	None		None	None	
Act Effct Green (s)	54.9	44.2	44.2	61.4	52.3		17.6	13.2		12.6	8.2	
Actuated g/C Ratio	0.58	0.46	0.46	0.65	0.55		0.19	0.14		0.13	0.09	
v/c Ratio	0.10	0.76	0.20	0.40	0.45		0.67	0.29		0.07	0.15	
Control Delay	9.6	31.0	4.6	11.8	17.0		43.2	18.2		39.1	26.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.6	31.0	4.6	11.8	17.0		43.2	18.2		39.1	26.1	
LOS	A	C	A	B	B		D	B		D	C	
Approach Delay		25.0			16.3			39.0			31.8	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	2.2	85.6	0.3	7.9	48.3		34.9	1.9		3.1	0.7	
Queue Length 95th (m)	5.7	#212.9	8.1	24.7	94.5		57.6	9.0		4.9	3.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		393.7			152.0			206.8			176.4	
Turn Bay Length (m)	55.0			25.0						15.0		
Base Capacity (vph)	476	875	794	523	1960		1073	582		294	222	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.76	0.20	0.28	0.45		0.38	0.14		0.06	0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.9			
Actuated Cycle Length: 95.1			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 24.2		Intersection LOS: C	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 17: Hwy 85 NB Ramp/Martin Grove Road & King Street North



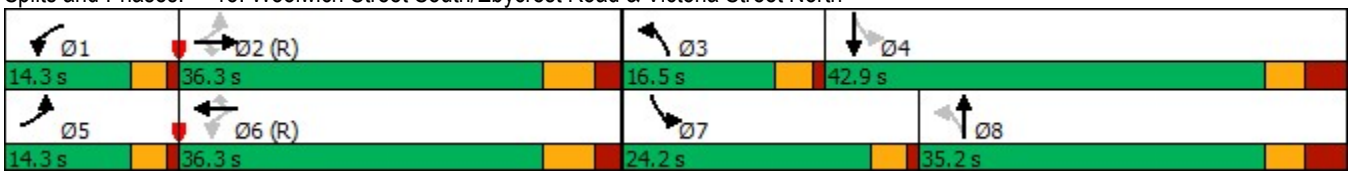


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	323	70	12	621	166	139	45	15	121	27	54
Future Volume (vph)	42	323	70	12	621	166	139	45	15	121	27	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	55.0		55.0	40.0		0.0	50.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			80.0			45.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.955			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	3544	1617	1825	3510	1555	1825	1822	0	1674	1636	0
Flt Permitted	0.308			0.551			0.687			0.491		
Satd. Flow (perm)	543	3544	1617	1059	3510	1555	1320	1822	0	865	1636	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			198		19			77	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		320.5			237.7			328.6			275.4	
Travel Time (s)		19.2			14.3			23.7			19.8	
Peak Hour Factor	0.85	0.97	0.77	0.64	0.86	0.84	0.96	0.74	0.57	0.87	0.84	0.70
Heavy Vehicles (%)	9%	3%	1%	0%	4%	5%	0%	1%	0%	9%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	333	91	19	722	198	145	87	0	139	109	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	29.8	29.8	5.0	29.8	29.8	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	36.3	36.3	9.0	36.3	36.3	9.0	35.2		9.0	36.7	
Total Split (s)	14.3	36.3	36.3	14.3	36.3	36.3	16.5	35.2		24.2	42.9	
Total Split (%)	13.0%	33.0%	33.0%	13.0%	33.0%	33.0%	15.0%	32.0%		22.0%	39.0%	
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	3.3		3.0	3.3	
All-Red Time (s)	1.0	2.3	2.3	1.0	2.3	2.3	1.0	3.6		1.0	3.6	
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)	4.0	6.5	6.5	4.0	6.5	6.5	4.0	6.9		4.0	6.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	68.9	63.3	63.3	66.0	58.6	58.6	23.1	11.4		30.7	13.7	
Actuated g/C Ratio	0.63	0.58	0.58	0.60	0.53	0.53	0.21	0.10		0.28	0.12	
v/c Ratio	0.12	0.16	0.09	0.03	0.39	0.22	0.44	0.42		0.38	0.40	
Control Delay	9.7	13.1	0.3	9.3	17.5	3.2	34.6	42.0		32.0	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.7	13.1	0.3	9.3	17.5	3.2	34.6	42.0		32.0	19.9	
LOS	A	B	A	A	B	A	C	D		C	B	
Approach Delay		10.3			14.3			37.4			26.7	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	3.5	14.5	0.0	1.3	46.7	0.0	24.3	13.9		23.4	6.4	
Queue Length 95th (m)	9.2	31.9	0.0	3.4	69.5	10.0	36.0	22.3		34.0	18.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		296.5			213.7			304.6			251.4	
Turn Bay Length (m)	50.0			55.0		55.0	40.0			50.0		
Base Capacity (vph)	450	2038	997	738	1869	920	348	482		408	587	
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	0.11	0.16	0.09	0.03	0.39	0.22	0.42	0.18		0.34	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 89.1 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 57.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Woolwich Street South/Ebycrest Road & Victoria Street North



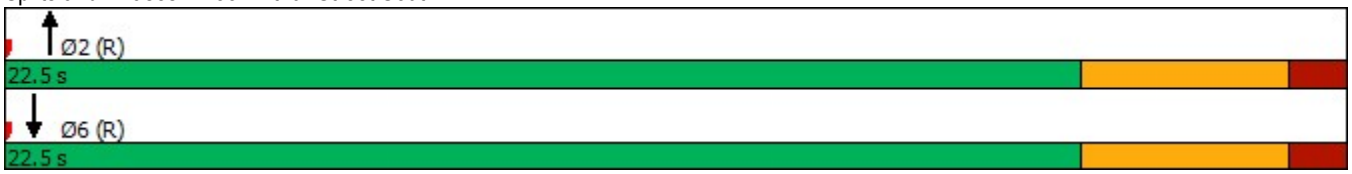


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	0	0	1883	1883	0
Flt Permitted						
Satd. Flow (perm)	0	0	0	1883	1883	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						
Link Speed (k/h)	48			48	60	
Link Distance (m)	46.7			138.1	106.7	
Travel Time (s)	3.5			10.4	6.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type						
Protected Phases				2	6	
Permitted Phases						
Minimum Split (s)				22.5	22.5	
Total Split (s)				22.5	22.5	
Total Split (%)				100.0%	100.0%	
Yellow Time (s)				3.5	3.5	
All-Red Time (s)				1.0	1.0	
Lost Time Adjust (s)				0.0	0.0	
Total Lost Time (s)				4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)	22.7			114.1	82.7	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary

Area Type:	Other		
Cycle Length: 22.5			
Actuated Cycle Length: 22.5			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 40			
Control Type: Pretimed			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 53: Arthur Street South





WOOLWICH TOWNSHIP

Comprehensive Transportation & Mobility Plan

Appendix E

Evaluation of Alternative Solutions

egis

Active Transportation Infrastructure

Alternative Solution	Priority	Justification
Ensure that existing bike lanes comply with OTM Book 18 and current industry best practices to enhance safety and accessibility for all users. Implement protected bike lanes along higher-speed roads, with a focus on continuous segments and safety improvements at key intersections.	**Very High**	Provides significant safety and comfort benefits, especially for less confident cyclists. Compliance with OTM Book 18 ensures consistency, while protected lanes on higher-speed roads offer critical separation. Though more complex and costly to implement, they are best prioritized on high-demand corridors where safety and connectivity gains are greatest.
Improve crossing infrastructure (e.g., raised crosswalks, pedestrian refuge islands, rapid flashing beacons)	**Very High**	A cost-effective and high-impact solution that directly addresses road user safety, especially at high-risk intersections in both urban and rural contexts.
Implement traffic calming in residential and school zones	**High**	Promotes safety for vulnerable road users, especially children and older adults. Widely supported by the public and essential for walkability in settlement areas. Easy to phase and scale.
Implement ATMP Recommendations – Build new cycling routes to close network gaps along key corridors (e.g., Line 86, Sawmill Rd, Shantz Station Rd, and high-growth areas) and develop a connected township-wide walking and biking network linking schools, jobs, towns, and recreation areas.	**High**	Completing the network will improve safety, encourage active travel, reduce reliance on cars, and provide convenient, direct connections to key destinations, supporting both community health and environmental goals.
Create pedestrian priority zones in Elmira, St. Jacobs, and Breslau	**Medium**	Aligns with placemaking, tourism, and complete community goals. However, requires buy-in from local businesses, potential curb space reallocation, and enforcement. Good candidate for phased pilots.
Adopt a township wide winter maintenance program for key cycling and walking routes	**Low**	Supports year-round mobility and mode shift but may be difficult to justify short-term given budget constraints and limited current winter cycling uptake. Can be reconsidered after initial network build-out and demand growth.

Public Transit and Regional Connectivity

Alternative Solution	Priority	Justification
Advocate for express or commuter-oriented service connecting Elmira, Breslau, and St. Jacobs to the ION LRT system and Kitchener GO Station	**Very High**	Strengthens regional integration and directly supports long-distance commuters. Offers a viable alternative to driving and aligns with Woolwich's vision for regional transit connectivity. Advocacy can begin immediately in collaboration with the Region and Metrolinx.
Improve connections to the future Breslau GO Station from the Township's settlement areas	**Very High**	A top priority for ensuring Township-wide access to regional rail and leveraging TOD opportunities around Breslau GO. Critical to long-term mode shift and economic development objectives.
Address the mobility needs of low-density rural areas through flexible solutions like on-demand shuttles or shared ride services	**High**	Important for equity and accessibility in rural areas, but ridership and cost-effectiveness remain uncertain. Best approached as a pilot or partnership initiative with clear evaluation metrics. Could evolve based on community uptake and funding availability.
Introduce a frequent and rapid transit connection between Breslau, Elmira, and St. Jacobs	**Medium**	Enhances inter-settlement mobility, reduces car dependence, and supports mode shift within Woolwich. As population grows and travel demand increases, particularly in Elmira and Breslau, reliable transit between key communities will be essential for both access and sustainability.
Enhance first/last-mile infrastructure to GO Station (bike lanes, walking paths, transit shelters)	**Low**	Makes regional transit more accessible and attractive for a broader range of users. Supports active transportation, climate goals, and transit ridership. Relatively low-cost, with scalable implementation options.

Road Network Enhancements

Alternative Solution	Priority	Justification
Revise the road classification framework to align with evolving land use, traffic volumes, and growth patterns	**Very High**	An updated road classification system ensures appropriate design standards, access management, and multimodal integration across the network. It is foundational for long-term planning, investment prioritization, and implementation of Complete Streets principles.
Adopt standardized cross-sections for new and reconstructed roads, designed using Complete Streets principles to accommodate all users and support future growth.	**High**	Standardized cross-sections will guide the design of roads to safely and comfortably accommodate motorists, pedestrians, cyclists, transit vehicles, and horse-drawn buggies where applicable. Designs will be context-sensitive, reflecting rural, village, and urban settings, and will ensure that roads in areas of anticipated growth are built to a consistent standard that supports safety, accessibility, and efficient movement for all modes.
Apply asset management strategies to prioritize resurfacing and pavement rehabilitation on key corridors with increasing traffic loads	**Medium**	Maintaining road conditions is essential, but many resurfacing needs may already be covered through existing asset management plans. It is less transformative than the other options and may not directly address capacity or safety concerns in growth areas. Best implemented through routine capital planning with flexibility for reprioritization.
Support the Region in the planning and implementation of the Elmira Bypass	**Low**	Although a Regional initiative, Township support is critical. The bypass will alleviate congestion in Elmira's urban core, improve goods movement, and enhance safety. It has broad benefits for mobility, livability, and regional economic competitiveness.

Safety and Capacity Improvements

Alternative Solution	Priority	Justification
Prioritize upgrades to key corridors with known capacity and safety issues (e.g., Arthur St, Listowel Rd, Line 86, etc.)	**Very High**	These corridors are repeatedly flagged for congestion and collisions. Widening and safety upgrades are necessary to reduce delays and improve travel reliability and safety, especially in growth areas and along major commuting routes.
Implement speed management measures (e.g., radar signs, calming, gateway treatments) on rural and suburban roads	**High**	Speeding is a major contributor to collisions in rural and transition zones. These measures are low-cost, quick to implement, and critical for protecting vulnerable road users and reducing crash severity.
Install operational upgrades (e.g., left-turn lanes or roundabouts) at intersections with congestion or collisions	**High**	Intersections are major conflict points. Operational upgrades are cost-effective and proven to improve traffic flow and reduce the likelihood and severity of collisions, especially at high-volume locations like Shantz Station Rd and Arthur St.
Enhance rural intersection safety (e.g., signage, vegetation clearing, lane realignment)	**Medium**	Important for rural travel safety, especially along Line 86 and Northfield Dr. These upgrades offer moderate benefits but may be limited in impact unless combined with broader corridor improvements or enforcement strategies. Prioritization should focus on intersections with collision history or visibility concerns.
Conduct Road Safety Audits and implement Vision Zero-aligned strategies in growth areas	**Low**	While Vision Zero is an important long-term goal, conducting full road safety audits and developing broad safety strategies may not yield immediate improvements in Woolwich's current context. The Township can still adopt safety principles through targeted design updates and intersection improvements already identified as high priority. This initiative is better phased in gradually or incorporated within other planning efforts, rather than pursued as a standalone, near-term priority.

Land Use Integration (TOD and Mixed-Use Development)

Alternative Solution	Priority	Justification
Integrate land use and mobility planning in Breslau to support compact, walkable TOD around the GO Station	**Very High**	Breslau is the Township's primary growth area and site of the future GO Station. Integrating TOD principles is essential to maximize transit ridership, support mode shift, and ensure the area develops in a sustainable, compact, and efficient manner.
Revise subdivision design guidelines to ensure new developments include sidewalks, multi-use paths, and traffic calming	**Very High**	Critical for building walkable, safe, and connected neighbourhoods from the outset. Ensures future development is aligned with active transportation goals and avoids costly retrofits.
Introduce a local street grid that connects new residential areas to the station, employment nodes, and parks	**High**	A connected street network reduces travel distances, improves walkability, and supports the 20-minute community concept. Particularly vital in greenfield areas like Breslau to prevent disconnected, car-dependent subdivisions.
Ensure transportation impact assessments (TIAs) for new developments prioritize multi-modal infrastructure upgrades	**Medium**	Important for aligning private development with TMP goals, but largely procedural and dependent on enforcement and development review processes. Can be phased into planning policy updates.
Prioritize mixed-use zoning within walking distance of the station	**Medium**	Mixed-use zoning is important to reduce trip lengths and support a vibrant station area. However, success depends on market demand and development interest. It's a strong planning tool but requires integration with broader land use strategy and incentives.
Promote 20-Minute Community Principles in Settlement Areas	**Low**	While an aspirational and progressive concept, its full application may be difficult in low-density, rural, and car-oriented contexts like much of Woolwich. Could be integrated gradually through other high-priority actions (e.g., subdivision design, TOD in Breslau) rather than as a standalone focus in the near term.
Identify and prioritize infill and intensification areas with strong transportation access	**Low**	Infill development helps optimize existing infrastructure and reduce sprawl. However, uptake may be limited in some areas due to market demand or existing zoning. Requires alignment with regional intensification targets and land use planning.

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Parking Management

Alternative Solution	Priority	Justification
Develop a municipal parking strategy for high-growth areas like Elmira and Breslau	**Very High**	Enables a proactive, coordinated response to emerging parking issues as growth accelerates. Ensures policies align with broader transportation and land use goals.
Implement parking maximums and shared parking requirements in new developments	**High**	Prevents over-parking in new developments, particularly mixed-use. Supports efficient land use and aligns with intensification and sustainability goals.
Reduce or eliminate minimum parking requirements in TOD zones and affordable housing projects	**High**	Strongly supports compact, walkable development and aligns with TOD goals for Breslau. Reduces development costs and encourages sustainable travel behavior.
Provide EV charging infrastructure in public lots and new developments	**Medium**	Promotes sustainability and future-proofs infrastructure. Demand is currently modest but expected to grow. Should be included in new developments and municipal lots in high-growth areas.
Enhance wayfinding and placemaking, including signage and streetscape improvements	**Medium**	Improves the user experience and supports tourism and accessibility, particularly in St. Jacobs and Elmira. While valuable, it's not as critical as structural policy changes for long-term mobility goals.
Introduce residential parking permit programs near high-demand areas	**Medium**	Useful to manage spillover parking near attractions or future high-demand areas (e.g., Breslau GO). Important for neighborhood livability but only needed in specific locations at this stage.
Implement paid parking or time-limited zones in township centers	**Low**	Helps reduce cruising and increase turnover in busy areas like Elmira and St. Jacobs. However, current demand may not justify widespread paid parking, and public resistance is possible without clear communication of benefits.

Emerging Mobility

Alternative Solution	Priority	Justification
Plan for integration of electric vehicle (EV) charging infrastructure, especially near employment and GO station areas	**Very High**	Directly supports climate goals, EV adoption, and future commuter travel behavior. Critical near the Breslau GO Station, Elmira industrial areas, and major trip generators. Aligns with long-term sustainability and growth plans.
Develop a regulatory framework and by-laws for safe micromobility operation	**High**	Essential first step to ensure safe, legal use of e-scooters, e-bikes, and other devices. Critical for managing risks and aligning with provincial regulations before broader deployment or pilot projects.
Establish micromobility pilot zones for shared e-scooters/e-bikes	**Medium**	Pilot programs can test feasibility in places like Elmira, St. Jacobs, or near the future Breslau GO Station. However, success depends on population density, demand, and supportive infrastructure. Best suited as a phased initiative.
Install micromobility parking corrals near high-traffic destinations	**Medium**	Supports organized use of shared micromobility and prevents clutter. Useful around downtown Elmira, Breslau station area, and key tourist spots. Should follow or accompany pilot projects.
Facilitate carshare programs in new developments or municipal facilities	**Low**	While carsharing can reduce vehicle ownership in dense areas, Woolwich's rural context and low population density outside Elmira and Breslau limit its near-term viability. Without strong transit integration or a critical mass of users, uptake would be minimal. Resources are better focused on foundational initiatives like EV readiness, micromobility policies, and transit-supportive planning. Carshare could be revisited as a medium priority if future intensification around Breslau GO increases demand.

Complete Streets and Design Standards

Alternative Solution	Priority	Justification
Adopt a Township-wide Complete Streets policy and update road cross-section standards accordingly	**Very High**	Establishes a foundational policy framework to ensure all future road projects support safe, multimodal access. Critical for integrating active transportation, transit, and accessibility into routine planning and design. Enables consistency across urban and rural contexts.
Prioritize Complete Streets upgrades in school zones, town centers, and new subdivisions	**Very High**	Directly improves safety for vulnerable users in high-traffic areas. Aligns with Vision Zero principles and supports Township growth areas. Targeted implementation makes this both impactful and feasible in the near term.
Retrofit township roads to include sidewalks, bike lanes, and transit amenities (where applicable)	**High**	Improves safety and access on key corridors with higher volumes and multimodal needs, especially in Elmira and around future Breslau GO. Aligns with ATMP recommendations and supports growth and mode shift objectives.
Include street trees, pedestrian-scale lighting, and curb extensions in street reconstructions	**Medium**	Enhances walkability, safety, and public realm quality. Important for town centers and new developments but typically tied to reconstruction cycles or redevelopment areas. Valuable but not as urgent as network-level multimodal infrastructure.

Implementation and Monitoring

Alternative Solution	Priority	Justification
Develop a 20-year capital plan that groups transportation improvements by implementation horizon (short-, medium-, long-term) and includes cost and feasibility ratings to guide budgeting and delivery.	**Very High**	Essential for translating the CTMP vision into actionable infrastructure planning. Provides a clear roadmap for budgeting, phasing, and decision-making.
Align infrastructure phasing with growth triggers (e.g., 2031 and 2051 population targets)	**Very High**	Ensures that infrastructure delivery matches actual demand, avoiding overbuilding or delayed responses. Critical for Breslau GO and other intensification areas where timing is key.
Identify and apply for applicable federal and provincial funding programs	**High**	Critical to securing external funding and accelerating implementation of priority projects. Aligns with Township budget constraints and infrastructure ambitions.
Develop a cost-benefit-based project evaluation framework for prioritizing infrastructure investments	**High**	Supports transparent, evidence-based decision-making and ensures the most impactful projects are prioritized. Helps align investments with community goals and limited resources.
Create a Transportation Performance Dashboard tracking KPIs (e.g., mode share, safety, connectivity)	**Medium**	Valuable for ongoing performance monitoring and public transparency. Useful for adjusting priorities over time, though not required in the early implementation phase.