



BA Group

CLAIR - MALTBY SECONDARY PLAN

Transportation Master Plan Study
City of Guelph

Prepared For: City of Guelph

March 6th, 2019



**MOVEMENT
IN URBAN
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1.0 TRANSPORTATION REPORT SUMMARY

This Transportation Master Plan Study is prepared in support of the Clair-Maltby Secondary Plan and Master Environmental Servicing Plan (MESP) Study being undertaken by the City of Guelph. This report firstly comprises Phase 1 Mobility Study documentation, including a review of existing transportation conditions and planning context for the Clair-Maltby study area. The remaining sections of this report review the Preferred Community Structure Plan, supportive transportation policies and objectives, and future conditions transportation analysis to inform potential transportation network improvements and high-level transportation infrastructure requirements and options.

The Mobility Study Transportation Report specifically includes:

1. an introduction and overview of the transportation study, including the objective of the Phase 1 study (June 2018), and subsequent transportation direction and analysis included herein;
2. an overview of the existing Secondary Plan area context and transportation elements;
3. a review of existing travel patterns, traffic operations, and collision history based on available data within the study area;
4. a review of relevant standards, active development applications, policies, and general planning framework based on available planning and transportation studies and reports;
5. a summary of key challenges and opportunities for the Secondary Plan, from a transportation perspective, which highlights key objectives sought through directive policies;
6. an overview of the planning processes and events undertaken over the course of the MESP study to review community structure options and achieve a Preferred Community Structure plan;
7. a review of the Clair-Maltby Secondary Plan Preferred Community Structure and associated transportation network elements and attributes;
8. an overview of general parking standards and best practice policies;
9. an overview of general transportation demand management (TDM) standards, policy objectives, and best practices;
10. a discussion of traffic calming measures most applicable to collector streets planned as part of Secondary Plan development;
11. multi-modal travel demand forecasting for development associated with the Clair-Maltby Secondary Plan, based on the highest (most dense) land use budget developed in support of the MESP;
12. an assessment of forecast transit rider demands associated with development of the Secondary Plan; and
13. an assessment of forecast traffic resulting from development of the Secondary Plan, and summary of potential transportation improvements to accommodate anticipated traffic demands.

Background and Objectives

The Clair-Maltby Secondary Planning Area is located in the south end of the City of Guelph. It is bounded generally by Clair Road, Poppy Drive, development lands, and existing neighbourhoods to the north, Victoria Road (City Boundary) to the east, Maltby Road (City Boundary) to the south and the eastern limits of the Southgate Business Park to the west. It has an area of approximately 520 hectares which is currently comprised primarily of rural and agricultural land uses.

The study process for these lands in preparation of the Clair-Maltby Secondary Plan and Master Environmental Servicing Plan (MESP) Study, includes:

- Phase 1: includes the preparation of a background report outlining the results of the above-noted review of existing conditions, background documents, and opportunities/challenges for the study area. This background document also includes a technical work plan for the Phase 2 study.
- Phase 2: includes a Community Visioning Exercise, technical analysis work, design matters, and determining an appropriate street network.
- Phase 3: includes finalizing the Transportation Master Plan Study once a preferred Community Structure alternative is determined through the Design Charrette at the end of Phase 2. Additional refinement in support of Secondary Plan will also be dealt with in Phase 3, as required. The final study will meet the requirements of a Phase 1 and 2 Transportation Master Plan study under the Municipal Engineers Association Class EA process.

All material from the above-noted phases are comprehensively included herein as part of this final Transportation Master Plan Study.

Existing Transportation Facilities

The Clair-Maltby Secondary Plan area is served by a series of rural and urbanized roads. The area road system, under existing conditions is generally defined by three north-south routes: Gordon Street, Victoria Road, and Southgate Drive; and two east-west routes: Clair Road and Maltby Road. Additionally, Highway 6 (the Hanlon Parkway) operates in a north-south direction west of the secondary plan area.

Gordon Street is a major north-south corridor linking the City of Guelph with Highway 401 in the south, providing an important alternative (Highway 6 being the primary route) link for commuters connecting between Highway 401 and the City of Guelph.

Existing transit routes do not serve the Secondary Plan area except along a section of Clair Road west of Gordon Street. There are currently no transit services along Gordon Street (south of Clair Road), Victoria Road, Maltby Road, or Clair Road (east of Gordon Street). A number of transit routes located just north Clair Road provide connections to Guelph Central Station, which is located approximately 7 kilometres north of the subject lands. Frequency of buses along these routes varies from two to four vehicles per hour during peak morning activity.

The City of Guelph has actively pursued plans detailing future active transportation networks. A city-wide cycling network plan was established as part of the City's Transportation Master Plan.

Pedestrian sidewalks and bicycle lanes are currently provided along Clair Road and Gordon Street within the Secondary Plan area. Sidewalks are also provided along sections of new streets southeast of the Gordon Street / Clair Road intersection.

Existing Travel Patterns and Traffic Conditions

Weekday peak period trips to / from the South Guelph Area are predominately made by automobile (72% driver; 10% passenger), while small proportions are made by school bus, transit, or active means. The most common orientation for all trips to / from the South Guelph area are made within the City of Guelph (70% to 75%). Travel behaviour, by orientation, related to existing trips during the weekday peak hours in the South Guelph area is summarized in the following:

- 54% of trips are made within the local area - generally south of the Eramosa and Speed Rivers.
- Excluding of the aforementioned “local area”, another 20% of trips to / from the South Guelph Area are made within the City of Guelph – including 5% to / from the Downtown
- 10% of trips to / from the South Guelph Area are oriented / destined for Waterloo Region.
- 7% of trips to / from the South Guelph Area are oriented / destined for Halton / Peel Regions.
- 4% of trips to / from the South Guelph Area are oriented / destined for Wellington County.
- 1% of trips to / from the South Guelph Area are oriented / destined for the City of Toronto.

Existing trips to / from the South Guelph Area are made using the following modes of transportation during weekday peak travel periods:

- 21% of local trips within the local area are undertaken using transit and active transportation modes, most notably by transit (10%); 8% and 3% of trips are made by walking or cycling, respectively.
- For trips within Guelph, but outside the local area, approximately 94% of trips are made by car (81% driver; 13% vehicle passenger), and only 3% are made by transit.
- Trips made between the South Guelph Area and Halton, Peel and Waterloo Regions, are made by automobile to a greater extent than trips to other areas. Virtually all travel to / from Halton, Peel and Waterloo is undertaken within an automobile.
- The City of Toronto comprises a small proportion of overall travel (1%) to / from the South Guelph Area. These trips are predominately undertaken by car; however, transit mode share is greater for these trips than for trips between the South Guelph Area and other areas analyzed herein.

Existing traffic conditions were reviewed for the weekday afternoon peak hour. The signalized intersection traffic analysis indicates that all study area intersections perform acceptably, and without any traffic capacity constraints for any individual traffic movements. Overall signalized intersection traffic operations are good under existing conditions, and are generally reflective of new infrastructure (updated and widened roads) and limited area development.

A total of 134 collisions were reported at study area intersections within a 63 month period from 2012 to 2017. Of the total volume of collisions, 21 (16%) resulted in a non-fatal injury, while 42 collisions (31%) report property damage only (no injury). All other collisions were non-reported or “non-reportable”. No “fatal” collisions were reported. A total of 3 collisions involved vulnerable road users – in all instances, a cyclist.

Policy and Planning Framework and Active Applications

A number of policies and plans were reviewed to inform the existing transportation planning framework for the Clair-Maltby Secondary Plan area. These policies and plans establish direction for planning work to be undertaken in future phases, and provide a foundation for defining a Secondary Plan area transportation structure and multi-modal network. Specifically, the set of polices reviewed include:

- Provincial Policy Statement
- Places to Grow: Growth Plan for the Greater Golden Horseshoe
- City of Guelph Official Plan
- Official Plan Amendment 48
- City of Guelph Official Plan – Section 8: Transportation
- South Guelph Secondary Plan
- South Gordon Secondary Plan
- Guelph – Wellington Transportation Study (Transportation Master Plan)
- Gordon Street (Wellington Road 46) Class EA Environmental Study Report
- Clair Road Class EA Environmental Study Report
- Victoria Road (Clair Road to York Road) Class EA Study
- City of Guelph Transit Growth Strategy
- Moving Guelph Forward: Guelph Transit Growth Opportunities
- Guelph Trails Master Plan
- City of Guelph Cycling Master Plan
- City of Guelph Active Transportation Network Study
- Wellington County Active Transportation Plan

Summaries of planned road, transit, trail, cycling and pedestrian infrastructure, are detailed as part of this review. These plans provide an understanding of future infrastructure provisions for assessing future transportation impacts.

The overview of existing transportation plans, policies, and standards, as detailed in the documents noted above, provide a foundation on which to establish an area transportation plan, and to inform a future transportation structure and network for the study area lands.

Design Guidelines

City of Guelph Engineering and Capital Infrastructure Services prepared their Development Engineering Manual (DEM, Fall 2016) to guide engineering related aspects of development related work, including established Engineering Design Criteria and Standards intended to be used by developers, residents and the City to inform engineering design and related review and discussion. The DEM recognizes that the outlined standards may not be compatible to all scenarios, and engineering judgement should be used in such cases.

The DEM establishes geometric road standards, subdivision road standards, sight triangles, parking standards, and access design standards. It should be noted that road standards do not differentiate the use of pavement for passenger vehicles, transit, cyclists or otherwise and should be updated for the Clair-Maltby Secondary Plan area to include multi-modal uses where appropriate.

Review of Existing Transportation Network: Key Challenges and Opportunities

There are a series of challenges and opportunities for the Clair-Maltby Secondary Plan area. Challenges and opportunities are derived from the review of existing conditions, and informed by a review of various policies, standards, and plans.

Roadways

- The City of Guelph has a set of standard road cross-sections that guides design of the right-of-way, boulevard, and pavement width standards for municipal roadways. There is potential to update the road / design standards specifically for the Clair-Maltby Secondary Plan area to permit further programming within the pavement or boulevard spaces to include multi-modal uses where appropriate or to account for variations in natural landscape where a context sensitive standard may be most suitable.
- The Clair Maltby Secondary Plan area is challenged by natural heritage and land use constraints that are barriers to providing a 'grid like' network of local and collector roadways. The Secondary Plan develops a fine grained network within the geographical limits of the study to support suitable access, reasonable traffic capacity, and reasonably developable parcels to facilitate future development.
- Existing travel mode splits are heavily auto-oriented. Achieving a balance of successful development and adequate roadway capacity for this study area will require thoughtful integration of non-auto methods of travel – via infrastructure planning as well as programming and maintenance.

Cycling and Trails

- While achieving lower auto-mode shares will be a challenge, there is opportunity to provide strong connections within the Secondary Plan area through the provision of on and off-street bicycle facilities and trail system.
- Improving accessibility and connectivity within the study area and to / from major community nodes for non-auto modes of transportation (i.e. walking and cycling) will help to ensure mobility choice.
- Improving first and last mile active transportation connections to public transit will increase the ease of access and encourage multi-modal trips.

Transit

- Transit is limited under existing conditions within the study area. Providing frequent and efficient transit routing opportunities through the Secondary Plan area will provide mobility choice and could logically feed into the intensification corridor along Gordon Street and community node planned for the Gordon Street / Clair Road intersection.
- The Secondary Plan appropriately spaces collector streets so as to support the location of transit stops within a short distance of typical start / end of trip locations, and allows transit stops to be integrated with the trail network and / or sidewalk system to ensure pedestrian connectivity to transit facilities.
- There are opportunities to plan and accommodate “*first / last mile*” connections from future transit services. There is a substantial opportunity create links between multi-modal trip making, including the use of active transportation modes to connect transit service provisions to origins and destinations within the Secondary Plan area.

The Clair-Maltby Secondary Plan “Preferred Community Structure”

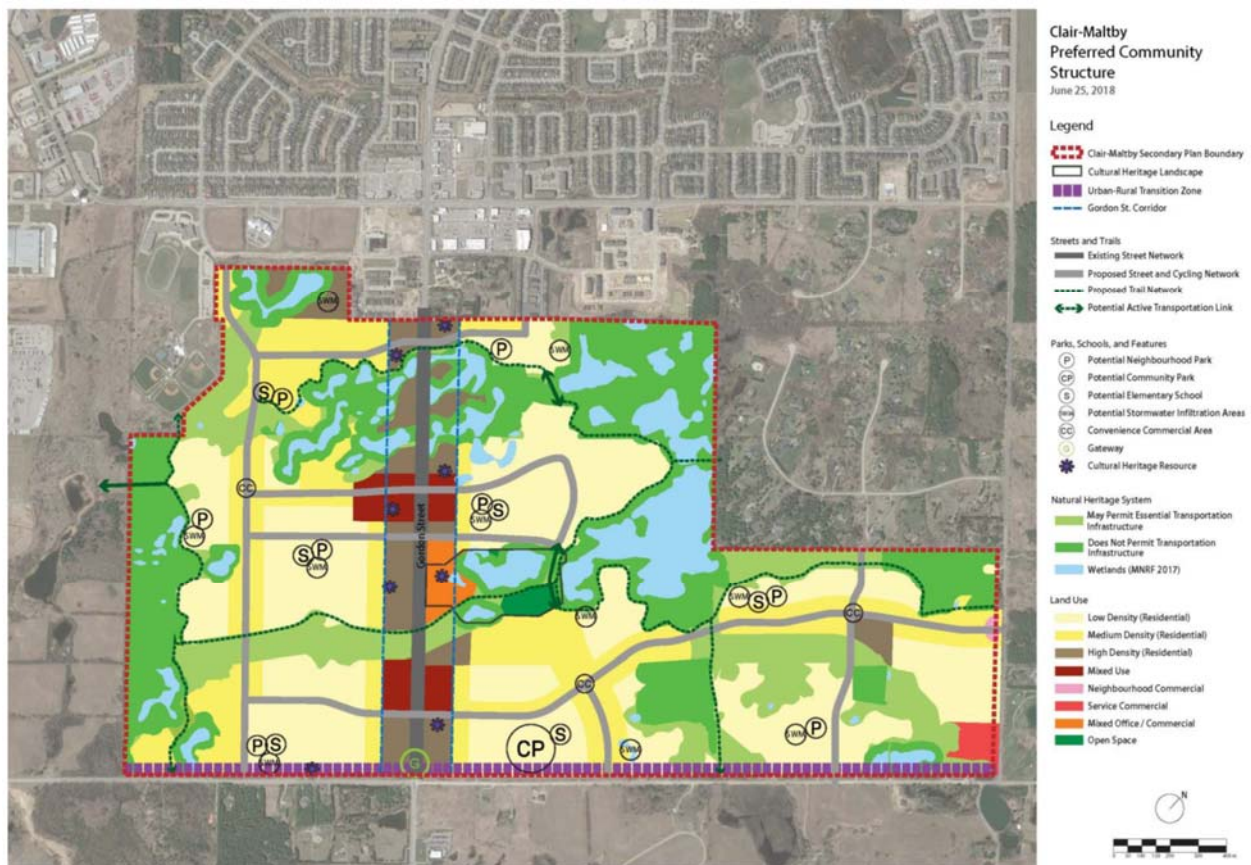
The Planning Process:

A Community Visioning Workshop was undertaken in September 2017 to assist in establishing a Conceptual Community Structure, which was carried-forward as part of meetings with a Community Working Group and Technical Advisory Group.

The Conceptual Community Structure was used in the development of three (3) Community Structure Alternatives, which formed the discussion of a 5-day planning and design charrette held in April 2018. The charrette was undertaken in order to develop a Preliminary Preferred Community Structure.

A “Preferred Community Structure” was developed as a planning objective for the future development of the Clair-Maltby Secondary Plan, and utilized as a basis for detailed technical analysis – including the transportation analysis prepared herein.

The Preferred Community Structure provides a general layout of land use, connective elements (arterial / collector streets and trails), community facilities, potential locations for storm water management facilities, existing cultural heritage resources, and wetlands. The Preferred Community Structure is illustrated below.



Street Network:

A system of connected arterial and collector streets was advanced as part of the Preferred Community Structure, to support development of the Secondary Plan area, while respecting the Natural Heritage System and existing topography. The street network represents a modified grid system, which is intended to allow for frequent and robust routing for all street users, while respecting the important environmental features of the area.

A total of four (4) east-west oriented collector streets are proposed to cross Gordon Street between Gosling Gardens in the north and Maltby Road in the south. One (1) north-south oriented collector street is proposed to extend between Poppy Road in the north and Maltby Road in the south (west of Gordon Street). Two (2) additional north-south collector streets are illustrated in the south-eastern portions of the Secondary Plan area in order to establish a robust street-network grid in this location. The planned network of streets (and trails) are intended to achieve safe, convenient and comfortable travel and access for all street-users, with priority given to pedestrians, cyclists, and transit operations, to provide mobility choice and support city policy and modal-split objectives. Vehicular movement will be accommodated, but is not prioritized, and will be subject to levels-of-service which are more constrained than typical in new-build areas within the City.

The City of Guelph undertook a transportation modelling assessment of the anticipated future traffic conditions within the Secondary Plan area pending the introduction of a second north-south oriented collector street extending between Clair Road and Maltby Road (located east of Gordon Street). This assessment demonstrated that Gordon Street would be able to accommodate future traffic demands without a north-south collector street on the easterly side of Gordon Street. This modelling allowed a general understanding of the potential impacts that a collector street would have on the existing Natural Heritage System in two locations, as well as on an identified Cultural Heritage Landscape, and resulted in the removal of this collector road where it crosses these features, as part of the Secondary Plan.

The design of all collector streets and existing arterial streets is intended to allow for the operation of buses, to provide several opportunities and flexibility for transit vehicle routing throughout the Clair-Maltby Secondary Plan.

Gordon Street Main Street:

The Gordon Street corridor is a central element in the local transportation network, connects the area with the wider City and County, provides an opportunity for transit priority, and is envisioned as a main street / village core destination.

The Gordon Street right-of-way is intended to accommodate all street users through the delivery of multi-modal infrastructure. Its design will support the efficient and effective routing of transit services, the comfortable movement of cyclists and pedestrians, and accommodate for automobile travel.

A 4-lane Gordon Street cross-section is anticipated to appropriately accommodate traffic demands along the corridor given optimized signal timing and coordination, and the inclusion of ancillary turn lanes where necessary. Separate left-turn lanes should be provided at all junctions where left-turns are permitted, which may further support the introduction of a continuous left-turn / centre median lane along the extent of Gordon Street within the Secondary Plan area.

The Clair-Maltby Secondary Plan encourages dense, mixed-use development along the Gordon Street corridor to support the deployment of transit services. Transit priority measures can be potentially introduced along the Gordon Street corridor to increase the proportional uptake of transit use, and can include physical design elements to reduce transit vehicle delays and provide amenity and convenience to perspective riders, and policy measures to make transit more appealing, affordable and competitive with other travel modes.

Trail Network:

Trail locations are identified within the Master Environmental Service Plan for the Clair-Maltby Secondary Plan area, and are generally located along the edges of the Natural Heritage System. The function of the Trail Network is to provide additional pedestrian and cycling facilities throughout the Secondary Plan area in order to accommodate commuter and utilitarian pedestrian and cycling circulation and connectivity; provide recreational amenity and active transportation use; and augment the wider pedestrian and cycling networks in the southern parts of the City of Guelph.

Trail links are strategically located to compensate for limitations in the Secondary Plan street network (understanding the limitations of new road construction on the Natural Heritage System), and to provide the most direct and convenient pedestrian and cycling connections between residential areas and community facilities and commercial developments.

Opportunities for Transportation Demand Management

A Transportation Demand Management (TDM) framework will be pursued to establish a foundation for managing future travel demands upon development of the secondary plan area, to ensure that measures to promote transit and active transportation are implemented by way of the transportation amenities provided, as well as the built form of the community.

Upon review of existing policy statements in the Guelph Official Plan and the Guelph-Wellington Transportation Study relating to TDM, and a review of best practices in TDM policy in Ontario, it is recommended that the Clair-Maltby Secondary Plan incorporate a robust TDM framework requiring future development to pursue TDM measures.

Vehicle Parking Considerations

The Clair-Maltby Secondary Plan has the opportunity to develop vehicle parking standards that would provide parking supply to meet demands, where appropriate, and still encourage active transportation to support transit, the Gordon Street Main Street concept, and public realm.

There are a variety of factors influencing the development of parking requirements and standards, which are affected by population density, layout of the municipality, transit accessibility, location of the development and adjacent land uses.

Parking demands and supply can be managed through a combination of strategies implemented to guide overall development through the Clair-Maltby Secondary Plan area. The parking review and assessment provided herein includes a review of the in-force City of Guelph parking standards, a comparative review of other municipal parking standards, and various parking management strategies to affect supply and demand.

A number of policies can be implemented in support of reducing parking demands, and would provide a positive contribution towards the City's approach to parking management, including flexible area based parking standards, maximum and minimum parking standards, shared parking guidelines, parking reduction permissions, cash-in-lieu of parking policies, consolidated public parking strategies, on-street parking provisions, car-share parking provisions, TDM policies, public realm improvements, and unbundling of parking from the sale of residential units.

Traffic Calming Considerations

Particular attention may be directed to street segments in adjacency to schools or high-pedestrian areas, as well as other street segments where the propensity of vulnerable road users is more acute.

Community traffic calming strategies are primarily intended to address problems that include excessive speed, infiltration and congestion. A variety of measures are summarized herein, that are identified as Level I or Level II measures. Level I measures include minor changes to the roadway, that are generally lower cost and relatively straightforward, such as pavement markings, textures pavement/crossings and signage. Level II measures are generally more significant, more costly and require physical changes to the roadway.

Consultation with the various City stakeholders including Emergency Services, Guelph Transit, and Transportation Engineering is essential in reviewing and approving any mitigation solution. Community involvement is also a key part in determining the type of measures, if any, that should be installed.

Multi-Modal Travel Demand Forecasting

Travel demand forecasts have been developed for residential and office land uses, understanding that new development is anticipated to be prominently residential, and that other retail and mixed-use development would result in relatively small travel demands, would often be internal to the Secondary Plan area, and could be considered ancillary to overall development travel demands.

Travel demand forecasts for development anticipated within the Clair-Maltby Secondary Plan have been developed for all travel modes based on existing area travel characteristics and those of proxy area developments, and to the extent that transit services and active transportation infrastructure is pursued as part of the Secondary Plan.

Travel demands for the Secondary Plan have been developed based on the most conservative (highest density) assumptions outlined in the "Land Development Budget" prepared by the project team. For the purposes of the analysis herein, a total of 10,125 residential units and 333 jobs were assessed.

The Clair-Maltby Secondary Plan would be anticipated to result in the order of 5,155 and 6,935 two-way trips during the weekday morning and weekday afternoon peak hours, respectively. Total trips include those trips that utilize "other" travel modes, including those using school buses, taxis, or ride-share services.

Approximately 3,770 and 5,785 two-way person trips are anticipated to be undertaken in a personal vehicle (as a driver or passenger), comprising approximately 73% to 83% of all trips during weekday morning and afternoon peak hours.

In the order of 455 and 555 two-way person trips are anticipated to be undertaken as a transit rider, comprising approximately 8% of all trips during weekday peak hours.

In the order of 615 and 345 two-way person trips are anticipated to be undertaken as a pedestrian or cyclists during the weekday morning and afternoon peak hours, respectively, comprising approximately 12% and 5% of all trips during the respective weekday peak hours.

Future Conditions Transit Assessment

A transit assessment was undertaken assuming improved transit provisions within the planning horizon (year 2031) of this study. It is anticipated that the local transit network will continue to evolve in sequence with development of the Secondary Plan area.

The Preferred Community Structure Plan has been advanced anticipating the introduction of frequent transit provisions on Gordon Street between Clair Road and Maltby Road, and the option for additional or expanded services routing along arterial and collector streets within the Secondary Plan area.

Person-based transit trips have been forecast and assigned to the area transit network in order to evaluate future transit demands.

A total of 455 and 555 new transit trips are forecast during the weekday morning and weekday afternoon peak hours, respectively. The majority of these transit trips are anticipated to route outbound during the weekday morning peak hour, and inbound during the weekday afternoon peak hour given the prevailing residential-related travel demands associated with the Secondary Plan.

It is expected that most transit trips to the Clair-Maltby Secondary Plan area will be captured by local transit services. Clair-Maltby Secondary Plan transit trips are predominantly anticipated to be oriented north of the Secondary Plan area, as transit riders tend to route to / from the downtown area, the University area, and central GO Transit Station. In the order of 370 and 450 two-way transit trips are anticipated to route to / from these areas during the weekday morning and weekday afternoon peak hours respectively.

Development contemplated as part of the Clair-Maltby Secondary Plan can be reasonably accommodated by transit services, given the introduction of new transit routes or the expansion of existing services operating within the Secondary Plan area, over the course of weekday peak hours.

Future Conditions Traffic Analysis

Future Background Traffic Scenario:

- Revisions to the local street network are planned within the 2031 planning year horizon, including planned improvements to Gordon Street and the extension of Southgate Drive to Maltby Road.
- Future background traffic operations analyses assess forecast future traffic demands resulting from general traffic growth and other site-specific background developments.

- Traffic patterns in the study area were reviewed over the past 10 years to provide an understanding of overall traffic growth trends on key street segments within the Secondary Plan area. Understanding the prevailing traffic growth trends associated with key arterial roads within the Secondary Plan area, traffic growth was applied to the 2031 planning horizon year.
- Area background developments provide an understanding of current changes within the vicinity of the Clair-Maltby Secondary Plan area. Traffic volumes associated with each of the identified background developments is assigned to the area road network.

Future Background Traffic Analysis:

- Overall signalized intersection traffic operations are generally acceptable under future background traffic conditions and are similar to those observed under existing traffic conditions, although longer delays and higher volume-to-capacity ratios are observed at the key Gordon Street / Clair Road and Victoria Road / Clair Road intersections relative to the existing conditions.
- The key Gordon Street / Clair Road intersection is anticipated to operate acceptably under future background traffic conditions, with an overall intersection v/c ratio 0.87 during the weekday afternoon peak hour. Relative to the existing condition, overall intersection v/c ratios increase by 32% during the weekday afternoon peak hour, which is generally the result of anticipated increases in through traffic volumes along Gordon Street and Clair Road, site-specific development traffic, and an increase in eastbound left-turn traffic volumes resulting from specific area developments.
- The future background traffic analysis indicates that the Victoria Road / Clair Road intersection generally operates acceptably, despite an increase in traffic delay and volume-to-capacity ratios. Relative to the existing condition, overall intersection v/c ratios increase by 25% during the weekday afternoon peak hour, which is generally the result of anticipated increases in southbound right-turn and eastbound left-turn traffic volumes resulting from area-specific background developments.
- Traffic operations at unsignalized intersections within the study area are anticipated to continue to operate similar to existing conditions.

Future Total Traffic Scenario:

- Revisions to the local street network are planned within the 2031 planning year horizon, as identified within the future background traffic scenario. Additionally, new streets contemplated as part of the Clair-Maltby Secondary Plan are included as part of the future total analysis scenario.
- Future Total traffic volumes are the sum of future background traffic volumes and traffic volumes resulting from development of the Clair-Maltby Secondary Plan area. Future Total traffic volumes have been forecast for existing study area intersections, as well as future collector road intersections as outlined within the Preferred Community Structure plan.
- Traffic forecast for Clair-Maltby Secondary Plan area development is based on the most conservative (highest density) Land Use Budget circulated for the purposes of this analysis.

Future Total Traffic Analysis:

- Future total traffic analysis is undertaken for a “base” scenario without improvements to existing intersections, and with a “recommended” scenario with suggested improvements to existing intersections.
- It is important to understand that the recommended intersection improvements are based on the modelling exercise undertaken herein, and that changes to the wider street network, improvements to regional corridors, and changes to travel behaviour and patterns can alter these recommendations.
- Traffic signal adjustments have been made as part of the analysis herein to accommodate for changes in traffic demands and patterns.

Traffic signal timing along the Gordon Street corridor has been set to 110 second cycle lengths during the weekday afternoon peak hour. Signal timing cycle lengths have been made consistent along the Gordon Street corridor to allow for optimization of traffic signal off-sets and permit signal timing synchronization in order to best limit traffic delays, reduce transit vehicle delays, and manage vehicle queuing.

- A total of eleven (11) new traffic signals are considered as part of the analysis herein, to accommodate future traffic demands and facilitate pedestrian movement across busy traffic corridors.

It is further recommended that two (2) existing STOP-controlled intersections be considered for signalization as development occurs within the Secondary Plan area.

- Recommended improvements are not intended to retain existing levels-of-service for motorists. However, improvements are intended to accommodate new traffic resulting from background traffic growth, current developments planned and under construction, and new traffic resulting from the development of the Clair-Maltby Secondary Plan.
- The improvements outlined in the following are in addition to signal timing adjustments. Improvements identified below relate to changes in the intersection lane configurations.

Gordon Street / Clair Road Intersection:

- Introduction of a northbound separate right-turn lane
- Introduction of a southbound separate right-turn lane
- Introduction of an eastbound separate right-turn lane

Clair Road / Clairfields Drive Intersection

- Introduction of a northbound separate left-turn lane
- Introduction of an eastbound separate right-turn lane
- Pavement restriping to accommodate a southbound separate left-turn lane

Gordon Street / Poppy Road Intersection

- Introduction of an eastbound separate left-turn lane
- Introduction of an westbound separate left-turn lane

Laird Road / Clair Road West Intersection

- Introduction of a northbound separate right-turn lane

Future Victoria Road / Street E Intersection

- Introduction of a southbound separate right-turn lane

- The signalized intersection traffic analysis indicates that most study area intersections perform acceptably during the prevailing weekday afternoon peak hour, and without any traffic capacity constraints for any individual traffic movements, except for certain movements at the key Gordon Street / Clair Road, Victoria Road / Clair Road, and Clairfields Drive / Clairfields Extension / Clair Road intersections. Assuming the introduction of the recommended intersection improvements, the following movements are anticipated to operate with longer delays and near theoretical capacity during the weekday afternoon peak hour.

Gordon Street / Clair Road

- | | |
|----------------------------------|------|
| • Eastbound left-turn | 0.95 |
| • Westbound left turn | 1.02 |
| • Westbound through / right-turn | 0.95 |
| • Northbound left-turn | 0.99 |
| • Southbound through | 0.94 |

Victoria Road / Clair Road

- | | |
|------------------------|------|
| • Eastbound left-turn | 0.96 |
| • Northbound left-turn | 0.92 |
| • Southbound through | 0.93 |

Clairfields Drive / Clair Road

- | | |
|------------------------|------|
| • Northbound left-turn | 0.93 |
|------------------------|------|

The above noted intersections are anticipated to operate with overall intersections v/c ratios of 0.92 to 1.01 during the weekday afternoon peak hour.

- Traffic operations at the Gordon Street / Clair Road intersection may be further mitigated through improvements to the Hanlon Parkway corridor, on-going improvements to the street network in the vicinity of the Gordon Street / Clair Road intersection, and the ability for motorists to respond to traffic delays at this intersection and utilize other streets in the local vicinity.
- Overall signalized intersection traffic operations within the Secondary Plan area are anticipated to be acceptable under future conditions, and are accommodated by the Preferred Community Structure street network plan.
- Traffic operations at the Gordon Street / Maltby Road and Clair Road West / Laird Road unsignalized intersections are anticipated to operate poorly under future total traffic conditions, and as such may warrant signalization.

- Five (5) new unsignalized intersections were reviewed within the future total traffic analysis scenario. These intersections are identified as new junctions within the Preferred Community Structure street network plan, and are recommended to operate under STOP-control.
- All other movements at unsignalized intersections within the study area are shown to operate at LOS C or better during the weekday afternoon peak hour, which is acceptable.
- A typical 4-lane street section is anticipated to sufficiently accommodate forecast traffic demands along the Gordon Street corridor, understanding the need for ancillary turn lanes – specifically separate left-turn lanes at all intersections where left-turns are permitted. Pending the frequency of separate left-turn lanes, a continuous left-turn / centre median lane along the extent, or portions of, Gordon Street within the Secondary Plan area may be warranted.

Gordon Street / Maltby Road Roundabout Analysis:

- The intersection of Gordon Street and Maltby Road is considered for the introduction of a roundabout. A roundabout, at this junction, may be appropriate considering:
 - its location as a gateway to / from the City of Guelph,
 - its boundary character between urban Guelph and rural Wellington County, and
 - the opportunity provided by a roundabout to accommodate transit vehicle loop functions as an alternative to an off-street transit terminal facility.
- Understanding the opportunity for a roundabout at the junction of Gordon Street and Maltby Road, roundabout traffic analysis was completed under the future total traffic scenario, assuming typical roundabout geometry for a 2-lane traffic circle.
- Should a traffic roundabout be pursued for the junction of Gordon Street and Maltby Road, traffic operations are anticipated to be acceptable. Further consideration would be required as to its functional design and ability to appropriately accommodate pedestrian crossings and transit vehicle and articulated truck routing.

2.0 INTRODUCTION

2.1 CLAIR-MALTBY SECONDARY PLAN AND MESP STUDY

The City of Guelph is undertaking the Clair-Maltby Secondary Plan and Master Environmental Servicing Plan (MESP) Study to comprehensively plan for the development of the area of Guelph located south of Clair Road and north of Maltby Road - the Clair-Maltby Secondary Planning Area. The lands are being considered for development to accommodate population and employment growth for the City in accordance with the requirements of Provincial policy, in particular Places to Grow: Growth Plan for the Greater Golden Horseshoe.

The MESP and Secondary Plan are being undertaken concurrently as part of the process approved by City Council which is designed to address the complexity of planning for development in the Clair-Maltby Secondary Planning Area. The MESP offers an integrated approach that coordinates the requirements of both the *Environmental Assessment Act* and the *Planning Act*.

2.1.1 Study Process

The Study Process will be undertaken in three phases:

- Phase 1 – Background;
- Phase 2 – Community Structure; and,
- Phase 3 – Secondary Plan and MESP.

2.2 PRIOR SUBMISSION: PHASE 1 MOBILITY STUDY BACKGROUND REPORT

A Mobility Study Background Report was prepared and submitted to the City of Guelph in June 2018. The background reporting and findings of that study are further incorporated into this current report to provide a comprehensive review of transportation considerations related to the Secondary Plan.

The purpose of the Phase 1 Mobility Study Background Report was to review available background information, as well as the details and conditions of supporting studies as part of the basis for the Secondary Plan. The Background Report was compiled to provide an overview of existing transportation conditions, plans, policies, and standards on which to establish an area transportation plan, and to inform a future transportation structure and network for the study area lands. Specifically this report considered the following.

Technical Overview of Phase 2 Analysis Work

A discussion of the final transportation study including community consultation and visioning exercises, detailed technical analysis, and considering multi-modal transportation networks for the secondary plan area. Phase 2 analysis work is included herein as part of this comprehensive Transportation Master Plan Study.

Review of Background Studies

A review of relevant existing background planning and transportation studies and reports, as well as any other documents determined to be relevant to informing the planning of development within the subject lands. For example, a review of existing City of Guelph road standards were included, with a view to identifying options for dealing with multi-modal transportation needs.

A review of background studies also provides a basis for documentation of the planned transportation network, and a summary of the transportation planning context and key policy objectives.

Review of Available Data

Available traffic data in the vicinity of the Clair-Maltby Secondary Plan area in the southern part of Guelph was obtained and reviewed. This data includes road network utilization counts (traffic counts), traffic accident data, and data from the most recent (2016) Transportation Tomorrow Survey (TTS). Existing travel data is summarized herein to document existing travel patterns and traffic operations, and to review collision frequency and trends.

A Summary of Challenges and Opportunities

A summary of area challenges and opportunities, from a transportation perspective, have been made available to provide direction on meeting performance measures – such as target travel mode splits, walkability, cycling connectivity and traffic operations.

2.3 PHASE 2 MOBILITY STUDY TRANSPORTATION REPORT

A work plan was established for Phase 2 of the Mobility Study, which included a community visioning exercise, technical analysis work, design matters, and determining an appropriate street network. Key components of Phase 2 of the Mobility Study are included herein and described briefly in the following.

Community Visioning Exercise

Information from the Phase 1 Background Report was provided to inform a community visioning exercise. Key inputs to this exercise were to include an overview of the existing and planned transportation network (including roads, transit, and active transportation infrastructure), the identification of existing transportation network constraints (related to natural features and/or capacity), and existing road standards that are available to address multi-modal mobility objectives. A Conceptual Community Structure was derived from the community visioning exercise to provide the basis for the development of three (3) community structure alternatives.

Close attention was paid to special designations and considerations derived from the community visioning exercise, including such concepts as a Main Street / Transit Spine designation for Gordon Street, street cross-sections supportive of multi-modal travel, traffic management and safety, and vehicle parking considerations.

Preferred Transportation Network

Using input from the CEIS and the parallel MESP studies, the constraints to developing an internal (collector) road network were identified and documented. Alternative conceptual transportation networks were prepared understanding the need to minimize impacts to the natural heritage system while providing an appropriate level of mobility for future residents, employees and visitors of the Secondary Plan area. A key priority of the preferred transportation network is to prioritize the needs of active transportation and transit users so as to create a transportation network that promotes these alternative modes.

Plans were developed to illustrate the alternative conceptual internal community road networks, and their connectivity with external transportation elements, adjacent neighborhoods and communities, and existing and proposed community services (such as recreational facilities and schools). All travel modes addressed in these plans, namely roadways, transit routing and nodes, cycling routes and trails, and pedestrian facilities.

The preferred transportation network formed the basis of transportation planning and analysis work undertaken herein.

Technical Analysis

On the basis of the preferred transportation network, and in consultation with City staff, a multi-modal Transportation Impact Study (TIS) was undertaken. This work was undertaken in conformity with the City of Guelph's "Traffic Impact Study Guidelines", and comprised a standard four-step analysis (trip generation, distribution, mode choice, and assignment). The scope and horizon years for this work was developed in coordination with City staff.

Upon establishing an analysis scope and planning horizon, analyses was conducted by BA Group with supporting data provided by the City to establish base future background travel demands on an existing and planned transportation network. A multi-modal travel demand forecasting exercise and subsequent distribution and assessment of various travel modes was undertaken. Directional distribution information was extracted from the Transportation Tomorrow Survey (2016 TTD Data Set).

The results of the technical analyses is used to compile a specific set of recommendations as they relate to the preferred transportation network, with respect to road widenings, intersection control (signalized or unsignalized), intersection turn lane configurations, and roundabout configurations (if appropriate).

A quantitative and qualitative assessment of the intersections within the scope of the Clair-Maltby Secondary Plan was undertaken with a view to ensuring that the following are provided for:

- adequate vehicular capacity,
- appropriate and safe active transportation features and facilities; and,
- transit priority where feasible.

This assessment included a review of the potential for the implementation of a roundabout located at junction of Gordon Street and Maltby Road. This pragmatic review accounts for the needs of all travel modes, particularly transit and emergency vehicles, cyclists, and pedestrians.

School Zones

Special consideration was given to traffic management elements and features in the vicinity of schools so as to ensure that the needs of pedestrians are prioritized. Traffic calming measures and processes are identified, and may be considered as part of future development of the lands and in consultation with stakeholders.

Vehicle and Bicycle Parking

A review of City of Guelph parking standards was undertaken, and a parking plan was developed for the community. This plan provides direction for addressing on street and off street parking provisions, and strategies to effectively reduce overall parking demands and efficiently accommodate resulting parking demands through consolidated and shared parking supplies.

Consideration is given to flexible design of parking facilities so that they can be adapted to other uses or combined with other uses if demand evolves over time.

Recreational Trails

The community transportation network concept includes a concept trail plan. This trail plan was developed in concert with the CEIS work so as to ensure that the trail system does not impinge on natural heritage features. The system is conceptually arranged with a view to connecting with, expanding and enhancing the active transportation elements in street rights-of-way. Off road trail standards are designated so as to meet appropriate standards (AODA and FADM), and are developed in conjunction with the parallel MESP studies so as to ensure that environmental and storm water considerations are dealt with.

Transportation Demand Management Framework

A Transportation Demand Management (TDM) framework is pursued to establish a foundation for managing future travel demands upon development of the Secondary Plan area, to ensure that measures to promote transit and active transportation are implemented by way of the transportation amenities provided, as well as the built form of the community. Target mode shares and viable options for achieving these targets are established for future development.

2.3.1 Report Format

The Transportation Master Plan Study is intended to address the requirements of the Secondary Plan process, appropriately suggest transportation policy directions for future development of Clair-Maltby Secondary Plan area, and advise on the technical specifications of planned development.

This report combines elements of the June 2018 Mobility Study with transportation analysis and discussion of various transportation design and policy considerations.

It should be noted that material from the June 2018 Mobility Study has been updated herein to account for changes in background documents and travel behaviour data where appropriate. Derived from the June 2018 Mobility Study, and included herein is:

- an overview of the existing transportation network;
- a review of existing travel behaviours and prevailing travel demands on the area transportation network;
- a summary of historical collision data;
- an overview of the area planning context from a transportation perspective; and
- a review and summary of relevant transportation policies, plans, and design guidelines.

This report builds upon the existing context description and relevant transportation data, policies, and guidelines outlined in the June 2018 Mobility Study to inform and guide the development of a preferred community structure plan for the Clair-Maltby Secondary Plan area and then test the plan through technical analysis. In addition to the elements listed above, this report:

- summarizes the planning process and community engagement undertaken in deriving a “Preferred Community Structure” plan for the subject lands;
- outlines the Preferred Community Structure mobility network, conceptual street plan and trail plan, and the role of Gordon Street within this network;
- provides an outline of Transportation Demand Management (TDM) measures and strategies that that can be pursued to support mobility choice for perspective residents, employees, and visitors of new development with the Clair-Maltby Secondary Plan area;
- a summary of vehicle parking requirements and parking management strategies that can be implemented to efficiently accommodate, and reduce to the extent practical, vehicle parking demands;
- a summary of traffic calming objectives and strategies to be implemented, if warranted, in appropriate locations of the Clair-Maltby Secondary Plan street network;
- forecasting of multi-modal travel demands resulting from conservative (most dense) land use budgets prepared to estimate development potential of Clair-Maltby Secondary Plan area;
- an assessment of resulting transit rider demands resulting from conservative (most dense) land use budgets prepared to estimate development potential of Clair-Maltby Secondary Plan area;
- an assessment of resulting traffic operations on the study area street network as a result of conservative (most dense) land use budgets prepared to estimate development potential of Clair-Maltby Secondary Plan area; and
- a summary of street network improvements recommended to accommodate potential traffic demands within a future total development scenario.

3.0 EXISTING TRANSPORTATION CONTEXT

3.1.1 The Clair-Maltby Secondary Plan Area

The Secondary Planning Area is located in the south end of the City of Guelph. It is bounded by Clair Road to the north, Victoria Road (City Boundary) to the east, Maltby Road (City Boundary) to the south and the eastern limits of the Southgate Business Park to the west. It has an area of more than 520 hectares which is currently primarily rural and agricultural in nature. The study area is illustrated in Figure 1.

3.1.2 Existing Transportation Elements

3.1.2.1 Existing Road Network

The secondary plan area is served by a series of rural and urbanized roads. Clair Road to the north of the study area, and Gordon Street north of Poppy Drive have been urbanized and widened to accommodate 2 to 4 travel lanes (plus auxiliary turn lanes), curbs and sidewalks. Other major roads in the area, including Gordon Street south of Poppy Drive have typical rural cross-sections and are have 2 travel lanes.

The area road system, under existing conditions is generally defined by three north-south routes: Gordon Street, Victoria Road, and Southgate Drive; and two east-west routes: Clair Road and Maltby Road. Additionally, Highway 6 (the Hanlon Parkway) operates in a north-south direction just west of the secondary plan area.

Gordon Street is a major north-south corridor that becomes Brock Road beyond the City boundary and I the City of Guelph with Highway 401 in the south, providing an important alternative (Highway 6 being the primary route) link for commuters connecting between Highway 401 and the City.

The existing local street network, including intersection lane configuration and traffic controls, is illustrated in Figure 21.

An overview of the surrounding municipal street network highways and key roadways is provided below.

Highway 6 (Hanlon Parkway) is a provincially-owned and maintained limited access highway (in the Guelph area) operating in a north-south direction west of the Secondary Plan area. Although the highway has limited access, and operates with a fully grade-separated interchange at Laird Road, it intersects with Maltby Road at an unsignalized intersection (east-west STOP-control). The highway operates with an 80 km/h. posted speed limit and two travel lanes in both the northbound and southbound directions. Northbound and southbound travel lanes are generally separated by a grassed median.

Highway 6 is a major traffic route linking the City of Guelph with the wider region and specifically with Highway 401 in the south. The highway begins at Highway 403 in the City of Hamilton (Dundurn) in the south and extends north through the City of Guelph to Tobermory at the northern end of the Bruce Peninsula.

Highway 6 includes a full interchange at its crossing with Laird Drive, which becomes Clair Road through the study area. The highway also intersects at an unsignalized intersection with Maltby Road, whereby eastbound / westbound traffic movements on Maltby Road operate under STOP-control.

Gordon Street is a two-way arterial road running north-south through the City of Guelph. Gordon Street becomes Brock Road south of the City Boundary at Maltby Road. The street extends south of Highway 401 as Highway 6, and north of Waterloo Avenue in Downtown Guelph as Norfolk Street, Woolwich Street, and then Highway 6 north of Woodlawn Road.

In the site vicinity, it has a 4-lane urban cross-section north of Poppy Drive and a 2-lane rural cross-section south of Poppy Drive. The roadway includes separate left-turn lanes at signalized intersections and bicycle lanes in both directions within the City limits. The street has an existing speed limit of 60 km/h. in its urban section, and a 70 km/h. speed limit in its rural section south of Poppy Drive.

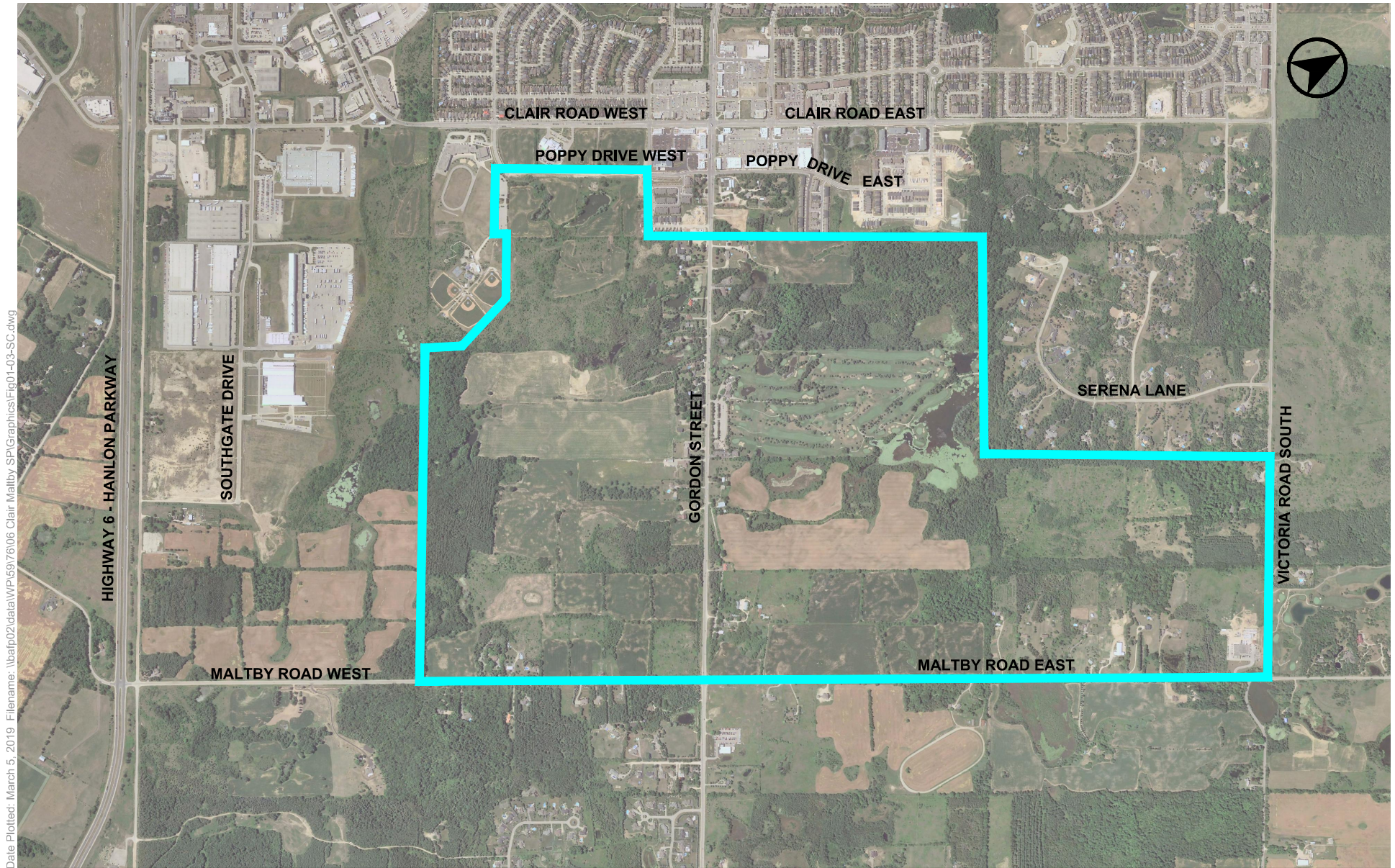
Victoria Road is a north-south direction roadway stretching through the City of Guelph from Wellington County Road 36 in the south (at Highway 401) to Highway 6 in the north. In the site vicinity, Victoria Road has a basic 2-lane rural cross section, with a separate north left-turn lane at Clair Road. Victoria Road intersects with Maltby Road in two separate T-intersections, with the section of Victoria Road north of Maltby Road extends from a point approximately 55 metres east of where the section of Victoria Road south of Maltby Road terminates.

Southgate Drive services industrial and employment areas in the southwest area of Guelph east of Highway 6 and north and south of Laird Road. Southgate Drive is a two-way roadway with a 50 km/h. speed limit and a basic 2-lane cross section and auxiliary left-turn lanes at its intersections with Laird Road and Clair Road. The street loops north of Laird Road, intersecting with Laird Road at two points, and extends south of Laird Road (at its western intersection) before terminating in a cul-de-sac approximately 1.4 kilometres south of Clair Road.

Clair Road is a two-way road running east-west between Hanlon Road / Crawley Road in the west (just east of Highway 6) and Victoria Road in the east. It generally operates with a 2-lane cross section except for the “urbanized” portion of the street which extends from 225 metres east of Laird Road to approximately 140 metres east of Beaver Meadow Drive – where the street generally has a 4-lane urban cross section. Within the street’s urban portion, auxiliary left-turn lanes are provided at all intersections, as well as bicycle lanes in both directions adjacent to the curb. Clair Road has a speed limit of 60 km/h.

Laird Road is a two-way road oriented generally in an east-west direction between Clair Road in the east and the street’s termination approximately 175 metres west of Quaterman Road. It generally operates with a 4-lane cross section west of the street’s signalized intersection with Southgate Drive, and a 2-lane cross section between this point and Clair Road in the east. West of the street’s signalized intersection with Southgate Drive to Cooper Drive, bicycle lanes are also provided in both directions adjacent to the curb. The street intersects with Highway 6 as a grade-separated interchange, providing a high-capacity traffic connection to Highway 6 in the Secondary Plan area. Laird Road has a speed limit of 50 km/h.

Maltby Road is a two-way rural road oriented generally in an east-west direction between Nassagaweya-Puslinch Townline in the east and Highway 6 in the west. West of Highway 6, Maltby Road continues as Concession Road 4 to Roszell Road near the Town of Hespeler. It operates with a 2-lane cross section and has a speed limit of 50 km/h.



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STUDY SCOPE LOCATION AND CONTEXT

3.1.2.2 Planned Road Network Improvements

A planned future public road network for the south Guelph area is discussed further in Section 4.3.2, while previously conducted environmental assessments for road widenings and improvements is detailed in Section 5.0 of this report.

3.1.3 Existing Transit Services

Guelph Transit is responsible for transit service in the vicinity of the Secondary Plan area, and provides services within the City of Guelph generally. Guelph Transit also connects the City of Guelph with major transit terminals in the Downtown area, including the University of Guelph and Guelph Central Station which provide connections to regional and inter-city transit services – including GO Transit, Greyhound and VIA Rail.

Transit routes do not currently service the Secondary Plan area except for a section of Clair Road west of Gordon Street, as the existing land uses are predominately rural and sections of Clair Road and Gordon Street were recently urbanized. There are currently no Guelph Transit services on Gordon Street, Victoria Road or Maltby Road. With build-out of the Secondary Plan area, it is anticipated that transit services will be introduced southwards within the City of Guelph.

A number of service transit bus routes currently operate north and west of the Secondary Plan area on Clair Road, Laird Road and Southgate Drive to service existing residential areas north of Clair Road and employment areas along Southgate Drive. These routes operate north of Clair Road serving Hanlon Industrial Park (Route 16), the University of Guelph (Routes 5 and 99), and the Guelph Central Station (Route 99) – which is located approximately 7.2 kilometres north of the subject lands. These routes are identified in Table 1, and may be revised to extend or reroute to the subject site area.

TABLE 1 EXISTING TRANSIT SERVICE FREQUENCY – MONDAY TO FRIDAY

Transit Route	Transit Type	Serviced Road	Morning Peak Hour	Afternoon Peak Hour
Route 5	Bus	Gordon St. / Farley Dr. / Goodwin Dr. / Victoria Rd.	20 min headway	2 to 3 buses in pk. hr. (variable headways)
Route 16	Bus	Gordon St. / Clairfields Dr. / Clair Rd. / Laird Rd. / Southgate Dr.	30 min headway	30 min headway
Route 99 (Mainline)	Bus	Gordon St. / Clair Rd. / Gosling Gdns. / Clairfields Dr.	10 min headway	10 min headway

Notes:
Bus route and schedule information effective January 7th, 2018.

Details related to future plans and transit-related policies, that will impact the future transit network in the Secondary Plan area, are summarized in Sections 4.6 and 7.0 of this report.

3.1.4 Pedestrians and Cyclists

Cycling and pedestrian facilities in the Secondary Plan area are limited under existing conditions, owing to the rural character of existing lands.

However, pedestrian sidewalks and bicycle lanes are currently provided along urbanized sections of Clair Road and Gordon Street within the Secondary Plan area. Bicycle lanes are provided on Gordon Street to the City limit, including within the rural section of the street south of Poppy Drive. Sidewalks are also provided along sections of new streets southeast of the Gordon Street / Clair Road intersection.

The City of Guelph has actively pursued plans detailing future active transportation networks. A city-wide cycling network plan was established as part of the City's Transportation Master Plan – detailed in Section 4.6, while additional trail and active transportation plans are summarized in Section 8 of this report.

3.2 EXISTING AREA TRAVEL CHARACTERISTICS

The Secondary Plan area is located in the south portion of the City of Guelph in a largely rural area with few existing transit and cycling / pedestrian facilities. These facilities will be pursued as part of the Clair-Maltby Secondary Plan, and would be anticipated to build on the sustainable transportation infrastructure and services made available to more established and recently developed areas in the south portion of the City.

A review of the travel characteristics information provided by the Transportation Tomorrow Survey (TTS) for trips made in the areas immediately north of the Secondary Plan area (herein referred to as the “South Guelph Area”) confirms, unsurprisingly given the site location, that a majority of trips are undertaken in a private automobile either as a driver or passenger. However, a proportion of travel is undertaken using non-auto means, specifically for peak direction travel during peak travel periods.

A review of the TTS travel characteristics of trips being made to / from the South Guelph Area during the weekday peak periods is provided in the following sections. The weekday peak travel periods analyzed include trips starting during the weekday morning peak period from 7:00 a.m. to 9:00 a.m. and during the weekday afternoon peak period from 4:00 p.m. to 6:00 p.m. The study area reviewed generally consists of the residential neighbourhoods east and west of Gordon Street between Kortright Road in the north and Clair Road in the south (2006 TTS Zones 8062, 8064, 8067-8076, 8078-8081). TTS data is reflective of the 2016 survey set, and has been updated relative to the June 2018 Mobility Study prepared as part of the Phase 1 work plan.

TTS data collection efforts have not, to date, surveyed travel patterns for weekend trips, limiting available data for the weekday periods.

3.2.1 Modal Share

Travel behaviour characteristics for trips to from the South Guelph Area during the weekday morning and afternoon peak periods are summarized in Table 2. Detailed TTS data calculations are included in **Appendix A**.

TABLE 2 MODAL SPLIT (TTS – 2016, SOUTH GUELPH AREA)

Mode	Morning Peak Period Inbound	Morning Peak Period Outbound	Afternoon Peak Period Inbound	Afternoon Peak Period Outbound	Total Peak Period Travel
Auto Driver ⁴	67%	67%	76%	76%	72%
Auto Passenger ⁵	7%	8%	9%	21%	10%
Transit	2%	8%	9%	2%	6%
Walk	17%	6%	1%	1%	5%
Cycle	3%	2%	2%	0%	2%
Other ⁶	4%	9%	3%	0%	5%
Total	100%	100%	100%	100%	100%

Notes:

1. Based on 2016 TTS results for morning (7:00 a.m. – 9:00 a.m.) and afternoon (4:00 p.m. – 6:00 p.m.) peak traffic periods.
2. Statistics specific to 2006 GTA Zones 8062, 8064, 8067-8076, and 8078-8081.
3. Trips represent an expanded value based on a sample of persons surveyed in the study area.
4. Auto driver trips (includes auto drivers and motorcycles).
5. Auto passenger trips (includes auto passenger trips only).
6. Other trips include school bus and taxi trips, consistent with The City's model document.

The proportion of people in the South Guelph Area who chose to drive a car during the morning and afternoon peak weekday periods is in the order of 70% to 75%. The balance of travel is undertaken, significantly, as a vehicle passenger (10%), while a small portion of travel is undertaken using transit or by walking / cycling (approximately 2% to 6%).

It should be noted that “other” trips during the weekday peak periods comprise of school bus trips – and that these represent approximately 4% to 9% of trips during the morning peak period. School bus trips comprise a smaller proportion of weekday afternoon peak period trips as they tend to occur before the afternoon peak travel period (before 4:00 p.m.).

The proportion of travel undertaken as a pedestrian, using a bicycle and by transit generally represents 7% of all trips, which is a small proportion of all trips and should be improved as part of new development planned within the Secondary Plan area.

It should be noted that the South Guelph Area (as reviewed in the above) comprises a low-density, suburban residential typology characterized by single detached dwelling units, considerable vehicle parking provisions and amenities, and a fragmented curvilinear street patterns. These features effectively discourage active transportation options, reduce transit efficiency and supportive densities, and prioritize automotive travel.

3.2.2 Trip Distribution Patterns

To understand the current travel distribution patterns of persons oriented to / from the South Guelph Area, TTS data was reviewed for weekday morning and afternoon peak period trips for all modes of travel. The study area reviewed consists of the South Guelph Area previously defined and illustrated in **Appendix A**.

The TTS data reveals that trips to / from the South Guelph Area during the weekday peak periods are predominately (74%) undertaken within the City of Guelph boundaries, and that many of these trips (54% of all trips) are “local” – south of the Eramosa and Speed Rivers. It is also important to note that a notable portion of trips are also oriented to / from Waterloo Region (10%), Halton and Peel Regions (7%), Wellington County (4%), and the City of Toronto (1%). Another 4% of trips were dispersed to other areas – notably the City of Hamilton and surrounding area.

A summary of existing resident travel characteristics including travel mode by certain areas of distribution is provided in Table 3. Detailed TTS data calculations are included in **Appendix A**.

TABLE 3 SOUTH GUELPH AREA: PEAK PERIOD TRIP DISTRIBUTION BY TRAVEL MODE

Destination Area	Proportion of All Trips	Mode Split	Legend
Local Area ¹	54%		<p><u>Travel Mode</u></p> <ul style="list-style-type: none"> Auto Driver Auto Passenger Transit Walk Cycle Other
Rest of Guelph	20% (5% Downtown)		
Waterloo Region	10%		
Halton / Peel Regions	7%		
Wellington County	4%		
City of Toronto	1%		

Note:

1. "Local area" consists of areas within the City of Guelph south of the Eramosa and Speed Rivers.
2. Another 4% of trips are oriented to "other" areas in the region.

A summary of weekday peak period (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.) travel behaviour and distribution to / from the South Guelph Area is derived from Table 3, and is provided in the following.

- It is notable that approximately 54% of existing peak period trips to / from the South Guelph Area are made “locally”. The majority of these trips are undertaken in a private automobile as a driver (59%) or passenger (11%). Many of these trips are also undertaken on a school bus, which one can conclude are “school trips” (7%). Approximately 21% of trips to / from the South Guelph Area are undertaken by transit and active transportation modes, most notably as transit riders (10%) or pedestrians (8%).
- Most commonly, trips to / from the South Guelph Area are made from within the City of Guelph itself. Approximately 74% of trips to / from the South Guelph Area during the weekday peak periods are made within Guelph, including approximately 50% locally (noted above), approximately 5% to the Downtown, and 19% in the rest of Guelph (north of the Eramosa and Speed Rivers). For trips within Guelph, but outside the local area as defined above, approximately 94% of trips are made by car (81% driver; 13% vehicle passenger), and only 3% are made by transit.
- After the City of Guelph itself, Waterloo Region represents the second largest jurisdiction for trips to / from the South Guelph Area. Approximately 10% of trips to / from the South Guelph Area are to / from Waterloo Region. TTS data indicates that trips are made by automobile (94% driver; 5% passenger; 1% school bus or taxi / rideshare).
- Approximately 7% of trips to / from the South Guelph Area are to / from Halton / Peel Regions. Trips between the South Guelph Area and Halton and Peel Regions are made by automobile (89% driver; 10% passenger; 1% school bus or taxi / rideshare).
- Approximately 4% of trips to / from the South Guelph Area are to / from Wellington County. Trips between the South Guelph Area and Wellington County are made predominately by automobile (86% driver; 13% passenger; 1% school bus or taxi / rideshare).
- A small proportion - approximately 1% of trips to / from the South Guelph Area are made to / from the City of Toronto. Relative to trips to / from other areas, trips to / from Toronto are more likely to be made by transit. A greater proportion of all trips to / from Toronto are taken by transit (37%), but it is still predominantly car-based travel (63%).
- In summary, trips made “local” to the South Guelph Area are more likely to be undertaken by sustainable transportation means (transit, walking, cycling) relative to trips made within the City of Guelph generally, or to trips made between the South Guelph Area and neighbouring Waterloo, Halton, and Peel Regions. During weekday peak travel periods, approximately 11% of “local” trips are made by walking or cycling, while another 10% is made by transit.

During weekday peak travel periods, trips oriented within the City of Guelph (outside of the “local” area) and to neighbouring regions (Halton, Peel, Waterloo, Wellington County) are predominately and overwhelming undertaken in a private vehicle (see Table 3). During weekday peak travel periods, trips to / from the City of Toronto comprise a small proportion of overall travel (1%). Although trips to / from Toronto are still predominately undertaken by car, the transit mode share is greater than trips between the South Guelph Area and other areas analyzed herein.

3.3 COLLISION HISTORY

Collision data was made available for the 5-year time period from January 1st 2012 to March 31st, 2017, at a number of intersections within the study area, including:

- Clair Road at Gordon Street
- Clair Road West at Laird Road
- Clair Road West at Clairfields Drive West
- Clair Road East at Farley Drive
- Clair Road East at Beaver Meadow Drive
- Clair Road East at Victoria Road South
- Gordon Street at Maltby Road
- Gordon Street at Poppy Drive
- Victoria Road South at Maltby Road

Detailed collision reports are included in **Appendix B**.

A brief summary of collisions for the 2012 to 2017 (end March 2017) period, for each of the above-mentioned intersections, is provided in Table 4.

3.3.1 Collision Data Summary

A total of 134 collisions were reported at the above-mentioned intersections within the identified time frame (63 month period from 2012 to 2017). Of the total volume of collisions, 21 (16%) resulted in a non-fatal injury, while 42 collisions (31%) report property damage only (no injury). All other collisions were non-reported or “non-reportable”. No “fatal” collisions were reported.

Within the collision data scope, approximately 51% of the collisions recorded have occurred at the Gordon Street and Clair Road intersection. Most (greater than half) of these collisions were either “rear-end” collisions often resulting from following too closely or improper speed for road conditions, or “turning movement” collisions often resulting from left-turn traffic not yielding to on-coming traffic. Measures to reduce rear-end collisions include safety campaigns targeted at poor-weather vehicle operation, and greater enforcement. The introduction of protected left-turn phases at this intersection may have an impact on reducing turning movement collisions.

A total of 3 collisions involving vulnerable road users were recorded – in all instances involving cyclists. Two of these collisions occurred at the Gordon Street and Clair Road intersection, and one other at the Clair Road and Farley Drive intersection. Cycling facilities and pavement markings (including pedestrian crossings) should be highly visible and well-marked. Consideration may be made to reducing vehicle speeds given the lack of physical separation (bollards / buffers) between cycling facilities and vehicle travel lanes.

It should be noted that a total of 15 collisions were recorded at the Victoria Road South and Maltby Road intersection. This intersection is currently configured as two separate intersections (back to back T-intersections). This unusual configuration, which requires northbound / southbound traffic to conduct a right-turn then left-turn in short succession to continue in the same direction, may explain the rate of rear-end collisions at this intersection.

TABLE 4 COLLISION DATA SUMMARY

Intersection	Total Collisions (2012 to 2017) ¹	Average Collisions per Month	Impact Type	Classification	Collisions Involving Vulnerable Road Users
Clair Road / Gordon Street	69	1.1	<ul style="list-style-type: none"> • 31 rear-end • 12 turning movement • 8 angle • 10 single motor vehicle • 6 sideswipe • 1 approaching • 1 other 	<ul style="list-style-type: none"> • 12 non-fatal injury • 22 property damage only • 35 non-reportable 	<ul style="list-style-type: none"> • 2 involving cyclists
Clair Road West / Laird Road	4	0.1	<ul style="list-style-type: none"> • 2 rear-end • 1 single motor vehicle • 1 sideswipe 	<ul style="list-style-type: none"> • 2 property damage only • 2 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
Clair Road West / Clairfields Drive West	13	0.2	<ul style="list-style-type: none"> • 7 rear-end • 1 turning movement • 2 angle • 3 sideswipe 	<ul style="list-style-type: none"> • 13 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
Clair Road East / Farley Drive	13	0.2	<ul style="list-style-type: none"> • 1 rear-end • 7 turning movement (primarily east-west left turns) • 3 angle • 2 single motor vehicle 	<ul style="list-style-type: none"> • 3 non-fatal injury • 5 property damage only • 5 non-reportable 	<ul style="list-style-type: none"> • 1 involving cyclists
Clair Road East / Beaver Meadow Dr.	1	-	<ul style="list-style-type: none"> • 1 single motor vehicle 	<ul style="list-style-type: none"> • 1 non-fatal injury 	<ul style="list-style-type: none"> • 0 vulnerable road users
Clair Road East / Victoria Road South	12	0.2	<ul style="list-style-type: none"> • 3 rear-end • 5 angle • 3 single motor vehicle • 1 approaching 	<ul style="list-style-type: none"> • 1 non-fatal injury • 6 property damage only • 5 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
Gordon Street / Maltby Road	5	0.1	<ul style="list-style-type: none"> • 2 angle • 3 single motor vehicle 	<ul style="list-style-type: none"> • 2 non-fatal injury • 2 property damage only • 1 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
Gordon St. / Poppy Dr.	2	-	<ul style="list-style-type: none"> • 2 angle 	<ul style="list-style-type: none"> • 1 non-fatal injury • 1 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
Victoria Road South / Maltby Road	15	0.2	<ul style="list-style-type: none"> • 7 rear-end • 2 turning movement • 6 single motor vehicle 	<ul style="list-style-type: none"> • 1 non-fatal injury • 5 property damage only • 9 non-reportable 	<ul style="list-style-type: none"> • 0 vulnerable road users
All Locations	134	2.1	<ul style="list-style-type: none"> • 51 rear-end • 22 turning movement • 22 angle • 26 single motor vehicle • 10 sideswipe • 2 approaching • 1 other 	<ul style="list-style-type: none"> • 21 non-fatal injury • 42 property damage • 71 non-reportable 	<ul style="list-style-type: none"> • 3 involving vulnerable road users

Notes:
1. Data collection to end of March 2017

4.0 POLICY AND REGULATORY PLANNING FRAMEWORK

The Clair-Maltby Secondary Plan transportation elements are guided by the policies and plans set out in the policies outlined below.

4.1 THE PROVINCIAL POLICY STATEMENT (PPS)

The Provincial Policy Statement (PPS) came into effect on March 31, 2005. The PPS provides policy direction on land use planning, development and transportation matters. All planning decisions must be consistent with the PPS. The PPS is based on the principles of “maintaining strong communities, a clean and healthy environment and a strong economy” (Part IV Vision).

The PPS indicates that different modes and transportation systems are to be connected, including across jurisdictional boundaries. It encourages density and mix of uses to support the planning and development of alternative transportation modes and limit the length and need of vehicle trips. It states that public streets should meet the needs of pedestrians and facilitate non-motorized movements.

In addition, the PPS promotes planning decisions including intensification, redevelopment, accounting for existing building stock, promoting various types of housings, making efficient use of existing infrastructure, etc...

4.2 PLACES TO GROW

“Places to Grow” - the Growth Plan for the Greater Golden Horseshoe was initially prepared by the provincial government in 2006 and should be read in conjunction with the PPS. All decisions made by municipalities with respect to planning matters must conform to the Growth Plan.

The Places to Grow Growth Plan has been recently updated following a two-year consultation period. The Government of Ontario has released the Growth Plan for the Greater Golden Horseshoe, 2017. Effective July 1, 2017, this plan will replace the Growth Plan for the Greater Golden Horseshoe, 2006 that initially took effect on June 16, 2006. The plan works to support the achievement of complete communities, curb sprawl, protect the natural environment, support economic development, and ensure that land to accommodate forecasted population and employment growth will be available when needed, now and in the future.

The Growth Plan provides a vision and a framework for managing growth. It requires all municipalities to implement policies to achieve intensification and higher-densities to make efficient use of land and infrastructure and support transit viability, and directs growth to *urban growth centres* and *transit corridors and stations areas*. The plan also calls for the consideration of climate change in planning for future growth that supports moving towards low-carbon communities and approaches to reduce greenhouse gas emissions.

In these areas, the Growth Plan demands increased residential and employment densities to support existing and planned transit services, a mix of land uses, and designed access for various transportation modes to the transit facility including pedestrian and cycling infrastructure.

The Growth Plan requires land use planning to be coordinated with transportation planning and investment. The Plan states that transportation investments and the wider transportation system:

1. provide connectivity among transportation modes for moving people and for moving goods;
2. offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and *active transportation*;
3. be sustainable and reduce greenhouse gas emissions by encouraging the most financially and environmentally appropriate mode for trip-making and supporting the use of zero- and low-emission vehicles;
4. offer *multimodal* access to jobs, housing, schools, cultural and recreational opportunities, and goods and services;
5. accommodate agricultural vehicles and equipment, as appropriate; and
6. provide for the safety of system users.

The Growth Plan indicates that the design of new facilities and redesign of existing streets will adopt a complete-streets approach that will ensure the needs of all street users are accommodated; however, public transit will be the first priority for transportation infrastructure planning and major transportation investments. Supported by the implementation of complete street policies, municipalities will ensure that active transportation networks are comprehensive and integrated into transportation planning.

The Growth Plan also speaks to accommodating goods movement, through linking international gateways and employment areas by appropriate transportation facilities / infrastructure, and that municipalities establish priority routes for goods movement.

4.3 CITY OF GUELPH OFFICIAL PLAN

The City of Guelph Official Plan is currently undergoing a statutory five year review. The Plan was established in 2001. The current Plan is a consolidation of the Official Plan policies in effect as of December 2014.

4.3.1 Official Plan Amendment 48

The City of Guelph Official Plan Amendment 48 was approved by City Council in June 2012, as the third and final phase in updating the City's Official Plan to ensure that its goals, objectives and policies conform and are consistent with provincial plans, polices and legislation.

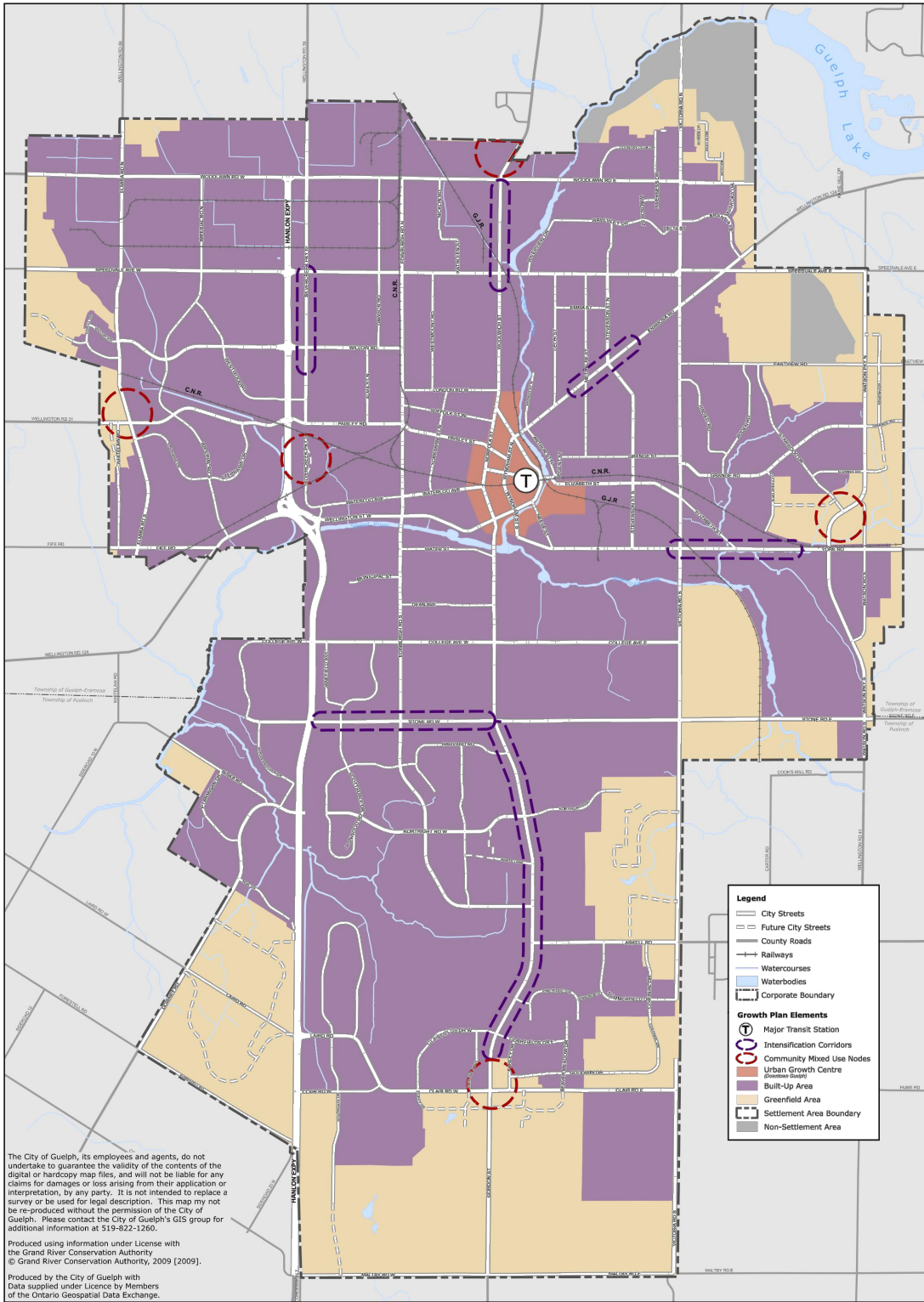
Transportation policies and objectives outlined in Amendment 48 are generally consistent with the initial Official Plan policies, and are described as part of the Current Official Plan in the following.

The City of Guelph Official Plan follows the policies laid out in the PPS and Growth Plan, and establishes a strategic vision, policies, actions and framework to support a healthy natural ecosystem, community services and facilities, education and employment opportunities, infrastructure that is supportive of alternative forms of transportation, community safety, and vibrant neighbourhoods and downtown.

Emphasis in the City of Guelph Official Plan is on maintaining quality of life, safety and stability of the community, and accommodating compact future development that avoids sprawl and is supported by existing infrastructure and services that can be supported by the efficient use of public expenditures. These objectives include developing a ***safe, efficient and convenient transportation system that provides for all modes of travel and supports the land use patterns of the City.***

The Official Plan identifies (in Figure 2) the Clair-Maltby Secondary Plan area as predominately a “greenfield area”, while the Clair Road / Gordon Street junction is identified as a “community mixed-use node” (OP Schedule 1B). These areas are further noted as “reserve”, “industrial” and “commercial” lands in OP Amendment 48 Schedule 2 (Figure 3).

In regards to development in new “greenfield” areas, the Official Pan directs new development to provide for a diverse mix of land uses at transit supportive densities (50 residents / jobs per hectare) that supports a multi-modal transportation network and efficient public transit that links to the City’s Urban Growth Centre and surrounding communities. Transit, along with walking and cycling, are to be supported by new development for everyday travel. The identified community mixed-use node at Clair Road / Gordon Street, is an area identified for higher density and mixed-use development that serve the wider community. The node is intended to be well served by transit and facilitate pedestrian and cycling travel.



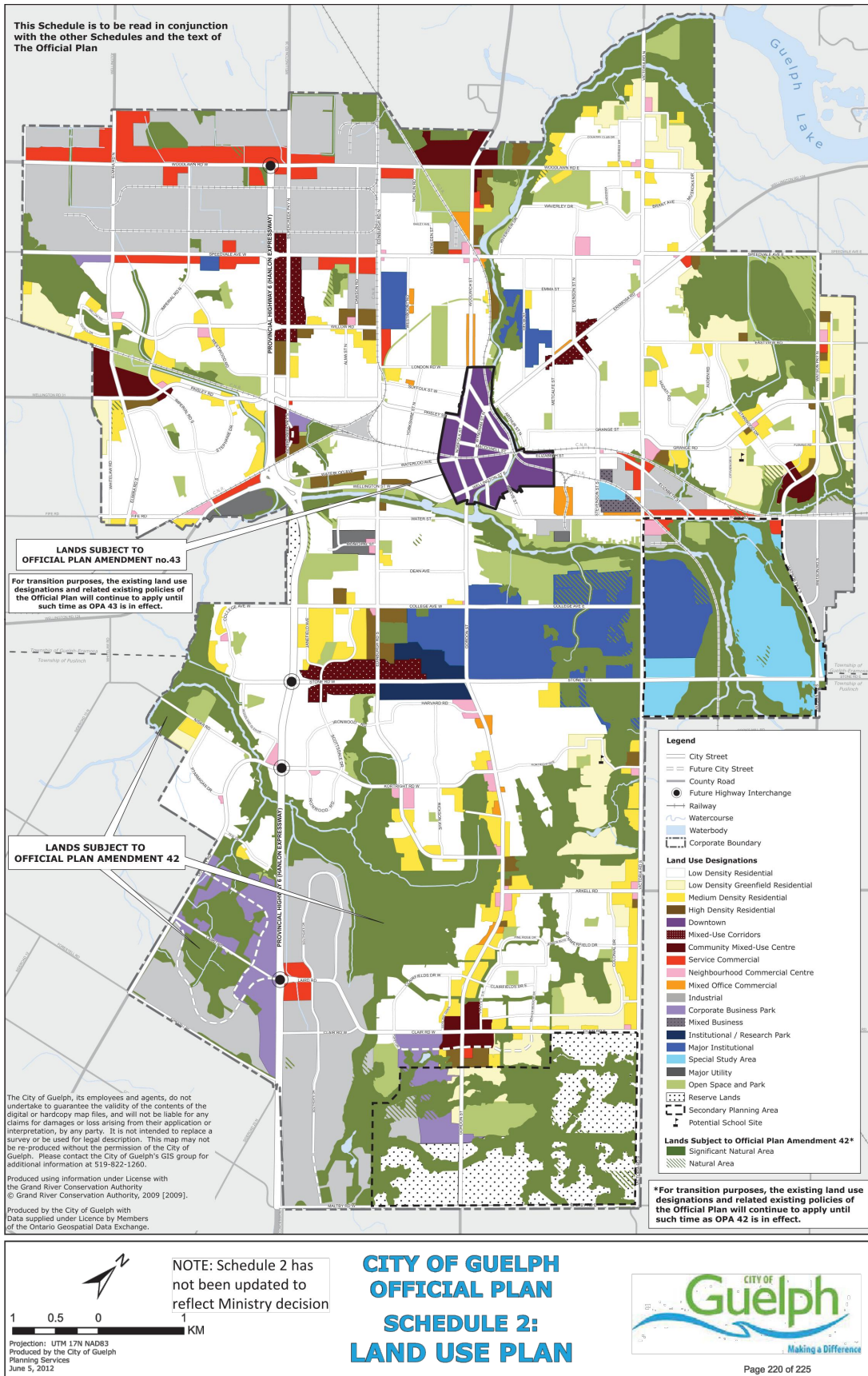
December 2012 Consolidation

**CITY OF GUELPH
OFFICIAL PLAN
SCHEDULE 1B:
GROWTH PLAN ELEMENTS**

1 0.5 0 1 KM

Produced by the City of Guelph
Community Design and Development Services, Planning Services
As Modified by the Ontario Municipal Board March 17, 2019

SCHEDULE 1B CITY OF GUELPH OFFICIAL PLAN - GROWTH PLAN ELEMENTS



**SCHEDULE 2
CITY OF GUELPH OFFICIAL PLAN AMENDMENT 48
- LAND USE PLAN**

Transportation policies are established within the Official Plan, which plans and manages the City's transportation system to accommodate the following:

- a) provide connectivity among transportation modes for moving people and goods;
- b) offer a balance of transportation choices that reduces reliance upon any single mode and promotes transit, cycling and walking;
- c) be sustainable, by encouraging the most financially and environmentally appropriate mode for trip-making;
- d) offer *multi-modal* access to jobs, housing, schools, cultural and recreational opportunities, and goods and services;
- e) provide for the safety of system users; and
- f) ensure coordination between transportation system planning, land use planning, and transportation investment.

In planning for new - or reconfiguring existing - transportation infrastructure, the Official Plan dictates that proponents consider separation of travel modes within transportation corridors, use transit infrastructure to shape growth, place priority on increasing the capacity of existing transit systems, expand transit services to areas that are planned to achieved transit supportive densities, facilitate improved linages to / from Downtown Guelph and other intensification areas, and increase mode share of transit. In all cases, and consistent with provincial directives, public transit will be the first priority for transportation infrastructure planning.

In addition to prioritizing transit, the City is directed to develop transportation demand management (TDM) policies, and pedestrian and cycling networks to be utilized by planned new development.

4.3.2 City of Guelph Official Plan: Transportation

This section of the Official Plan generally defines the transportation policy for the City. The planning and design of the City Transportation system should meet the following objectives:

- a) To derive a transportation system, involving all forms of transport modes, to move people and goods in an environmentally efficient and effective manner.
- b) To ensure that the transportation system is financially feasible and has received an acceptable level of public approval.
- c) To implement programs to facilitate and encourage greater and safer use of the bicycle as a mode of transport.
- d) To support measures to improve the pedestrian environment and system.
- e) To encourage the use and expansion of the public transit system to all parts of the City.

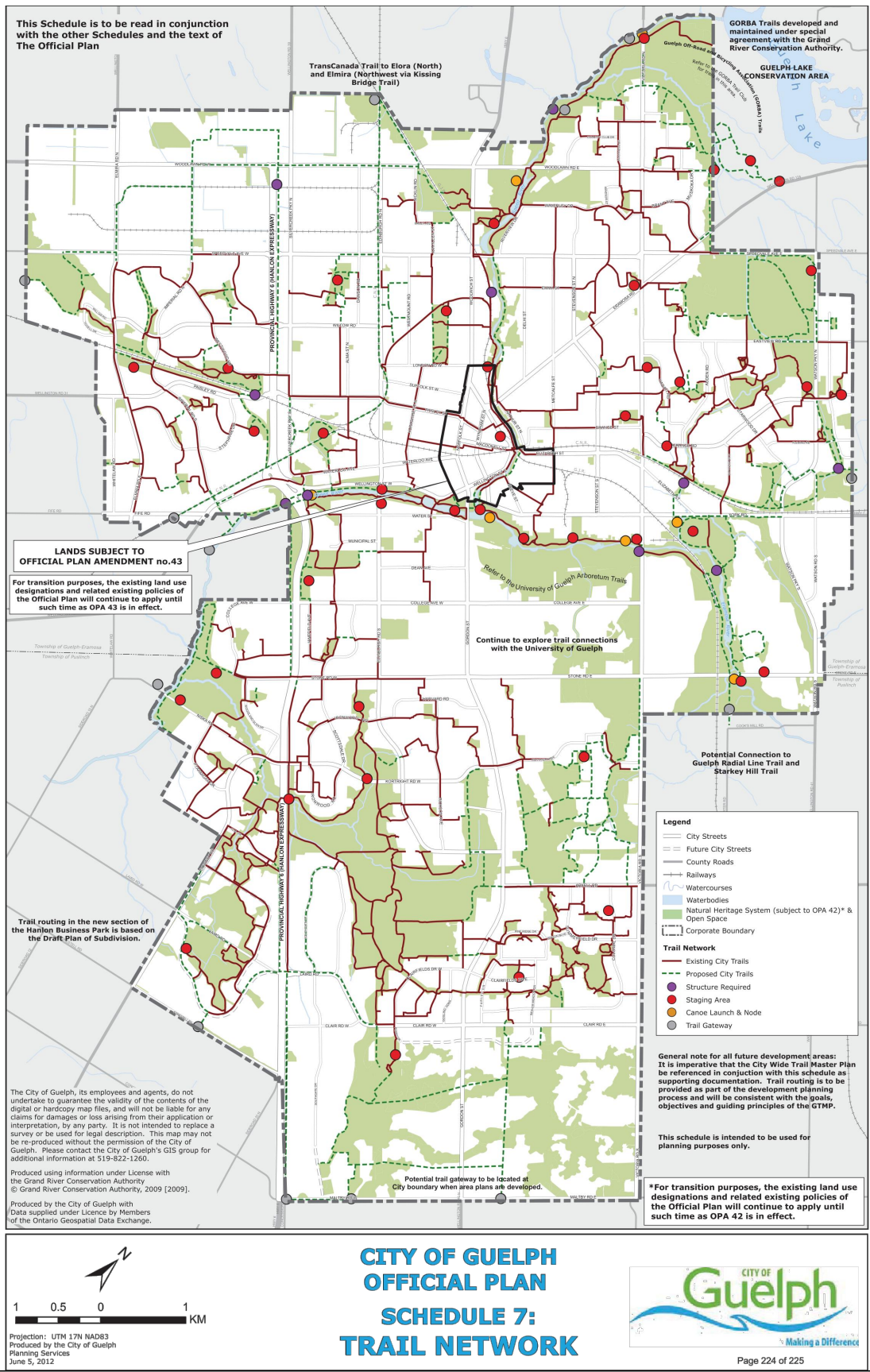
- f) To work towards achieving a transit "*modal split*" of at least 10 per cent of the average daily City trips which represents more than a doubling of the existing transit ridership in the community.
- g) To develop an appropriate hierarchy of roads to ensure the desired movement of residential, commercial, industrial and institutional traffic within and through the City.
- h) To outline a proposed road network that will be subject to environmental review processes, either through the City's *development* planning approval process and/or through the Environmental Assessment Act.
- i) To work in co-operation with the Provincial Ministry of Transportation and other local governments, to create a road network that can accommodate current and anticipated traffic movement volumes.
- j) To work towards minimizing road/rail conflicts by relocating minor or underutilized railway lines and removal of at-grade railroad crossings where feasible.
- k) To encourage the maintenance of adequate passenger and freight rail services.
- l) To ensure that adequate parking facilities are provided throughout the City.
- m) To develop a transportation system that minimizes impact on the environment and aesthetic character of the City.

Furthermore, the Official Plan establishes plans and objects related to pedestrian and bicycle movement (bicycle network plan – Schedule 9C), public transport, roads, new / reconfigured road design, transportation and related urban environment, railways, and parking.

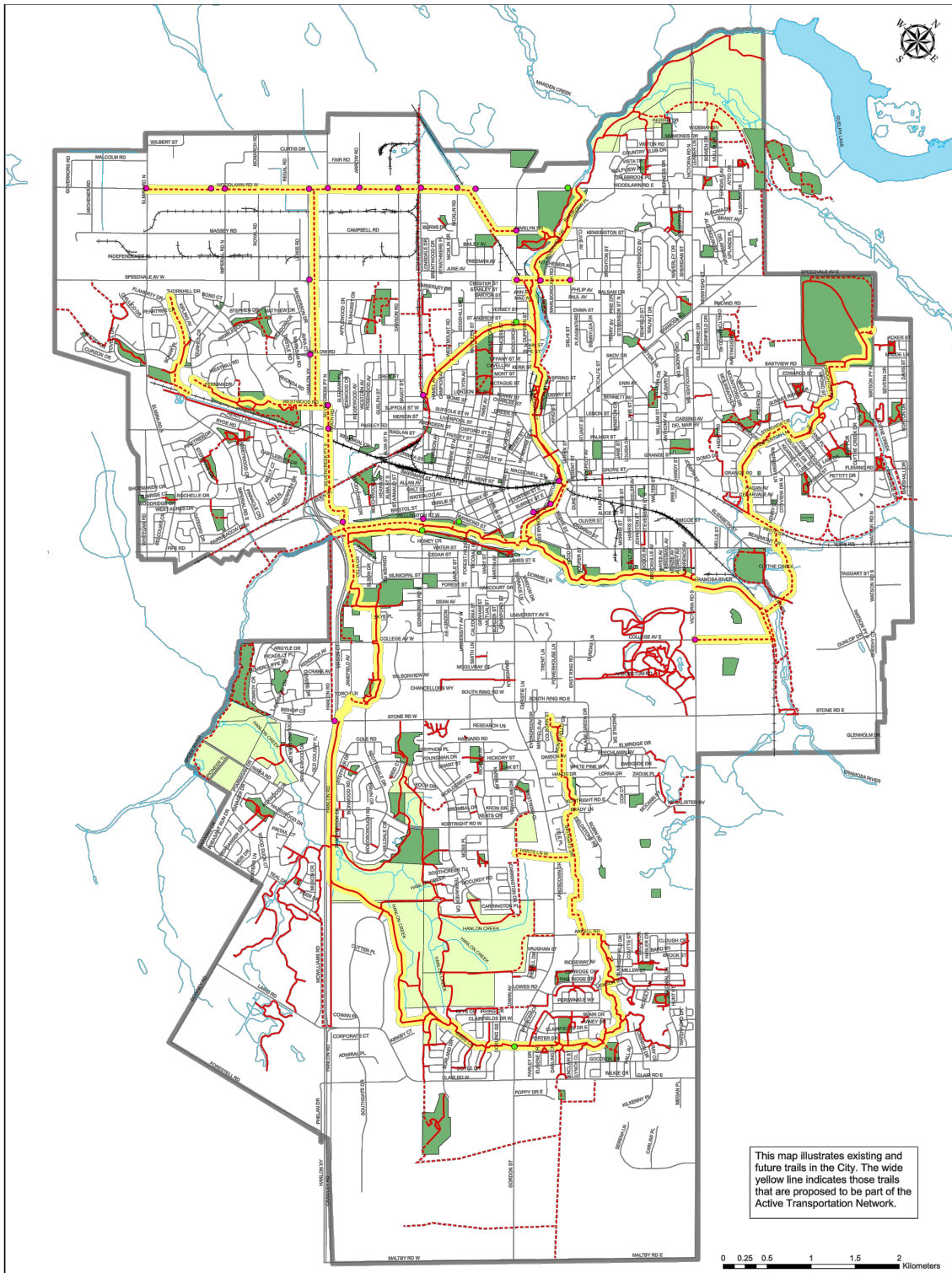
Key Pedestrian and Bicycle Policies

The City, through policies and standards, will support the creation of programs and facilities that will encourage walk and greater use of bicycles, through the integration of safe and convenient bike and pedestrian components into the design of new streets including shade trees, street furniture, lighting, street crossing and other traffic control. Additionally, all new development will provide for bicycle / pedestrian linages and street sidewalks, and adequate bicycle parking facilities at major employment / shopping nodes and transportation terminals.

The City, through policies established in the Official Plan, developed a Bicycle Network Plan that directs expansion of bicycle facilities in Guelph, including the Clair-Maltby Secondary Plan area. This network plan was updated as part of OPA 48 – Schedule 7 – and is complemented by the City Trail Network Plan, which is illustrated in Figure 4, and by the City of Guelph Active Transportation Network, 2017 (Figure 5).



**SCHEDULE 7
 CITY OF GUELPH OFFICIAL PLAN AMENDMENT 48
 - TRAIL NETWORK PLAN**



PROPOSED ACTIVE TRANSPORTATION NETWORK (JUNE 2015)

- Legend**
- Off Road Trail Network
 - - - Existing Trail
 - - - Proposed Trail
 - Proposed Active Transportation Network
 - Roads
 - Rivers and Streams
 - Railway
 - Parks
 - Conservation Lands
 - Guelph Lake
 - City Boundary
 - Active Transportation Network Crossings
 - Signalized Mid-Block Trail Crossings
 - Fully Signalized Intersections

CITY OF GUELPH PROPOSED ACTIVE TRANSPORTATION NETWORK, JUNE 2015



Key Transit Policies

Important in maintaining and expanding transit services in the City of Guelph, the Official Plan cites developing a compact urban form with a mix of land uses, ensuring the creation of a street network that permits the location of transit stops within a reasonable walking distance of a significant majority of residents, jobs and other activities, and staging urban expansion to include the provision of transit service.

Within new development, transit facilities should be detailed in land use / development plans, and bus stops should be provided at regular intervals.

Roads and Road Design

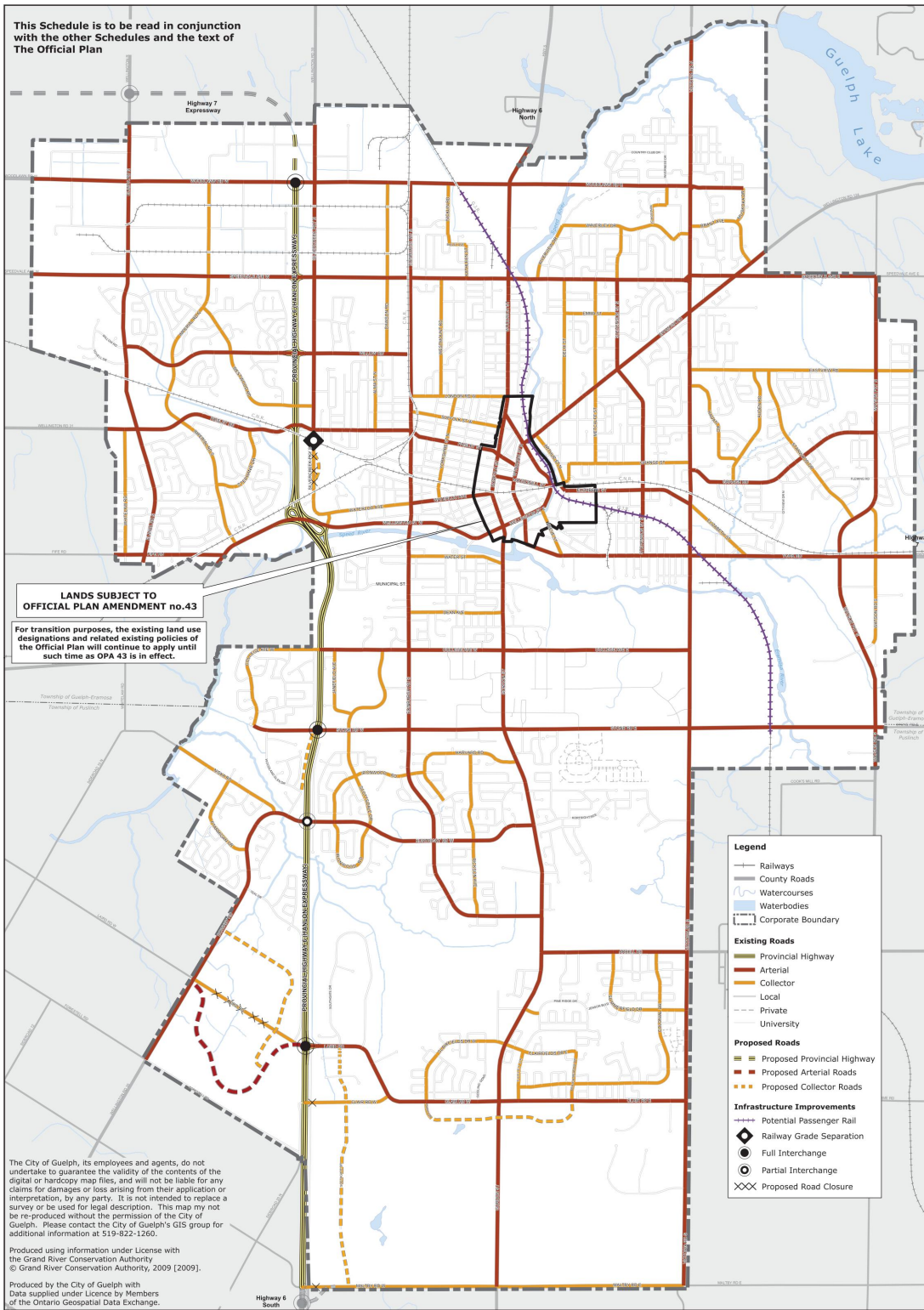
The City of Guelph Official Plan recognizes that private automobiles will continue to represent the primary mode in meeting the travel need of residents and businesses in the City, and lays out a hierarchy of public street facilities and their intended purposes / permissions: expressways, arterials, collects and locals.

The main elements of the road network are identified in Schedule 7 of OP Amendment 48, which is included in Figure 6.

In regards to new public streets and street design, the Official Plan promotes the creation of an arterial – collector grid system in new development areas to assist in the dispersion of traffic and to provide a reasonable walking distance to transit services. A series of public street widenings and “Ultimate Widths” are also identified in the Official Plan (Tables 8.1 and 8.2).

Key street widenings as they related to the Clair-Maltby Secondary Plan area include:

- Clair Road – 30 metre “ultimate width” (5 metre widening on both sides)
- Gordon Street - 30 metre “ultimate width” between Clair Road and Maltby Road (5 metre widening on both sides)
- Maltby Road – 30 metre “ultimate width” (5 metre widening on both sides)
- Victoria Road - 36 metre “ultimate width” between Stone Road and South City Limit (8 metre widening on both sides)
- Clair Road and Laird Road (potential widening to accommodate intersections improvements)
- Clair Road and Crawley Road (potential widening to accommodate intersections improvements)
- Gordon Street and Maltby Road (potential widening to accommodate intersections improvements)
- Maltby Road and Crawley Road (potential widening to accommodate intersections improvements)
- Victoria Road and Clair Road (potential widening to accommodate intersections improvements)
- Victoria Road and Maltby Road (potential widening to accommodate intersections improvements)



1 0.5 0 1 KM

Projection: UTM 17N NAD83
 Produced by the City of Guelph
 Planning Services
 June 5, 2012

**CITY OF GUELPH
 OFFICIAL PLAN
 SCHEDULE 6:
 ROAD & RAIL NETWORK**

Page 223 of 225

**SCHEDULE 6
 CITY OF GUELPH OFFICIAL PLAN AMENDMENT 48
 - ROAD AND RAIL NETWORK**

Urban Environment

The City of Guelph Official Plan establishes policies as they relate to the impact of transportation facilities on urban neighbourhoods and design. These policies include minimizing the impact of trucks upon residential areas, maintain and enhance the streetscape (tree planting), minimize land use conflicts between major transportation routes and residential areas, and noise and vibration mitigation.

Railways

The City recognizes the importance of rail facilities to support freight service and passenger rail service, and to minimize road / rail conflicts through a program of grade-separated under / over passes.

Parking

The City of Guelph, through the application of the City Zoning By-law, establishes parking requirements for all types of land uses to ensure parking demands are met off-street. However, the City may, where the property owner enters into an agreement with the City to ensure continued availability of an off-street parking area, permit the provision of requirement parking spaces on another site that is within convenient and reasonable walking distance.

Key Transportation Demand Management (TDM) Policies

The City has established, within the Official Plan, that transportation demand management (TDM) is an essential part of an integrated and sustainable transportation system. TDM policies will be developed and implemented to reduce trip distance and time, and to increase the modal share of alternatives to the automobile. Suggested TDM measures include the following:

- including provisions for active transportation in association with development and capital projects including secure bicycle storage facilities and pedestrian and cycling access to the road network;
- supporting transit through reduced parking standards for some land uses or locations, where appropriate, and making provisions for parking spaces for car share vehicles through the development approval process where appropriate; and
- encouraging carpooling programs, preferential parking for carpoolers, transit pass initiatives and flexible working hours.

In addition, a Transportation Demand Management Plan is listed among the type of transportation studies that the City may require as part of a development application.

4.4 SOUTH GUELPH SECONDARY PLAN

The purpose of the South Guelph Secondary Plan is to introduce new planning policies for southern areas that were annexed by the City of Guelph, to establish planning direction for the guidance of City Council and Staff, and to provide information for the public, landowners, development and other stakeholders.

The South Guelph plan was complete in 1998 and comprised a new section to the City of Guelph Official Plan that contains Secondary Plan policies that introduce goals, objectives and policies for lands in the South Guelph area including transportation policies. The South Guelph Secondary Plan comprises the areas

generally south of Stone Road, north of Maltby Road, west of Victoria Road, and east of Downey Road / Forestell Road.

The plan identifies the “Gateway” character of the South Guelph area, and identifies Gordon Street and the Hanlon Expressway corridors as key locations to express this character. The plan specifies that development along the Gordon Street corridor should provide detailed planting and landscaping plans, and accommodate setbacks and built form such that new building are located behind the parkway belt of required landscaping and planting. Design controls on entrances off Gordon Street and on parking and loading within the Gordon Street corridor should be developed.

For the Clair-Maltby Secondary Plan area, the South Guelph plan specifies that a system of arterial and collector roads be planned to serve the study area. This road network is enhanced through the road widenings protected for under the City of Guelph OPA 48 document and previously described.

4.5 SOUTH GORDON SECONDARY PLAN

The South Gordon Secondary Plan does not include the lands defined within this study, but rather the lands immediately north of the Clair-Maltby Secondary Plan area (north of Clair Road). However, this 1999 document may provide some policy direction for the development of the subject lands.

Consistent with the South Guelph Secondary Plan, the South Gordon Secondary Plan identifies Gordon Street as a “Gateway” corridor into the City, and describes treating Gordon Street with appropriate landscaping,

From a transportation perspective the South Gordon Secondary Plan specifies that neighbourhoods should be connected to each other and to the rest of the city by roads, pedestrian paths, bicycle linkages, and transit routes to create a more accessible, convenient, safe and energy efficient environment. This objective includes measures to promote pedestrian safety and comfort (providing clearly defined public realm and reducing walking distances between origins and destinations) and the introduction of walking and bicycle paths that are visible, accessible, and aligned along routinely used public spaces. New trails are encouraged to be provided within trail corridors up to 15 metres in width. Bicycle lanes, routes and trails are intended to provide for utilitarian and recreational travel within the community and along the arterial road network.

The South Gordon Secondary Plan specifies that internal road networks should be designed to evenly distribute traffic throughout the neighbourhood along collector roads while discouraging through-traffic on local streets. Collector roads should also be designed to accommodate public transit bus routing – that would be routed to provide transit stops within 400 metres of 90% of residents. Roadways should also include special control measures to reduce vehicle speeds in appropriate locations, including locations that accommodate wildlife crossings.

Of note, the plan specifies that new development in the area provide for both on-street and off-street parking adjacent to parks with active recreational facilities, and to make use of shared parking arrangements between school sites and neighbouring parks.

4.6 GUELPH – WELLINGTON TRANSPORTATION STUDY (TRANSPORTATION MASTER PLAN)

The Guelph – Wellington Transportation Study was undertaken by a consortium of planning and engineering consultants on behalf of the City of Guelph and finalized in July 2005, in an effort to address long-term transportation needs and improvements in accordance with the Official Plan policies and City's Transportation Strategy and SmartGuelph Principles. The study has 5 main objectives:

1. Identify transportation needs and recommend practical improvements;
2. Recommend Transportation Demand Management (TDM) measures;
3. Identify improvements to City and County roadways;
4. Review Provincial highway initiatives affecting Guelph and Wellington County; and
5. Review inter-regional travel between Guelph, the Region of Waterloo, and the GTA and identify opportunities for transit initiatives to serve this need.

The Master Plan provides direction on the City's existing and planned cycling network, truck route network (Figure 7), and transit node and corridor framework which is intended to support transit routes and the potential removal of reduced / removed parking standards. These planned networks include components related to existing road facilities in the Clair-Maltby Secondary Plan area.

The Guelph – Wellington Transportation Study also reviews existing transportation behavior and forecasts future travel demands based on existing travel and demographic trends. The study concludes that travel demands are 2 to 3 times higher during weekday peak periods than typical weekday midday periods and that 83% of trips within the study area are undertaken in a private automobile, and since the mid-1990s - travel demands have generally increased and average persons per vehicle have reduced. It is also important to note that a significant and increase amount of work travel is occurring between the Waterloo Region and Guelph areas.

Given the aforementioned trends, there is anticipated to be considerable road network deficiencies and traffic congestion in the long term, assuming no new infrastructure improvements, particularly in the South Guelph area. To accommodate increased traffic demand in the South Guelph area, the study identifies a number of improvements, including:

- Widening of Gordon Street from 2 to 4 lanes (approved 2001 EA) from Kortright Road to Wellington Road 34;
- Widening of Clair Road from 2 to 4 lanes (approved 2003 EA) - COMPLETE
- Southerly extension of Southgate Drive to Maltby Road; and
- Development of an internal collector road system within the Clair-Maltby Secondary Plan area connecting to Gordon Street and Maltby Road.

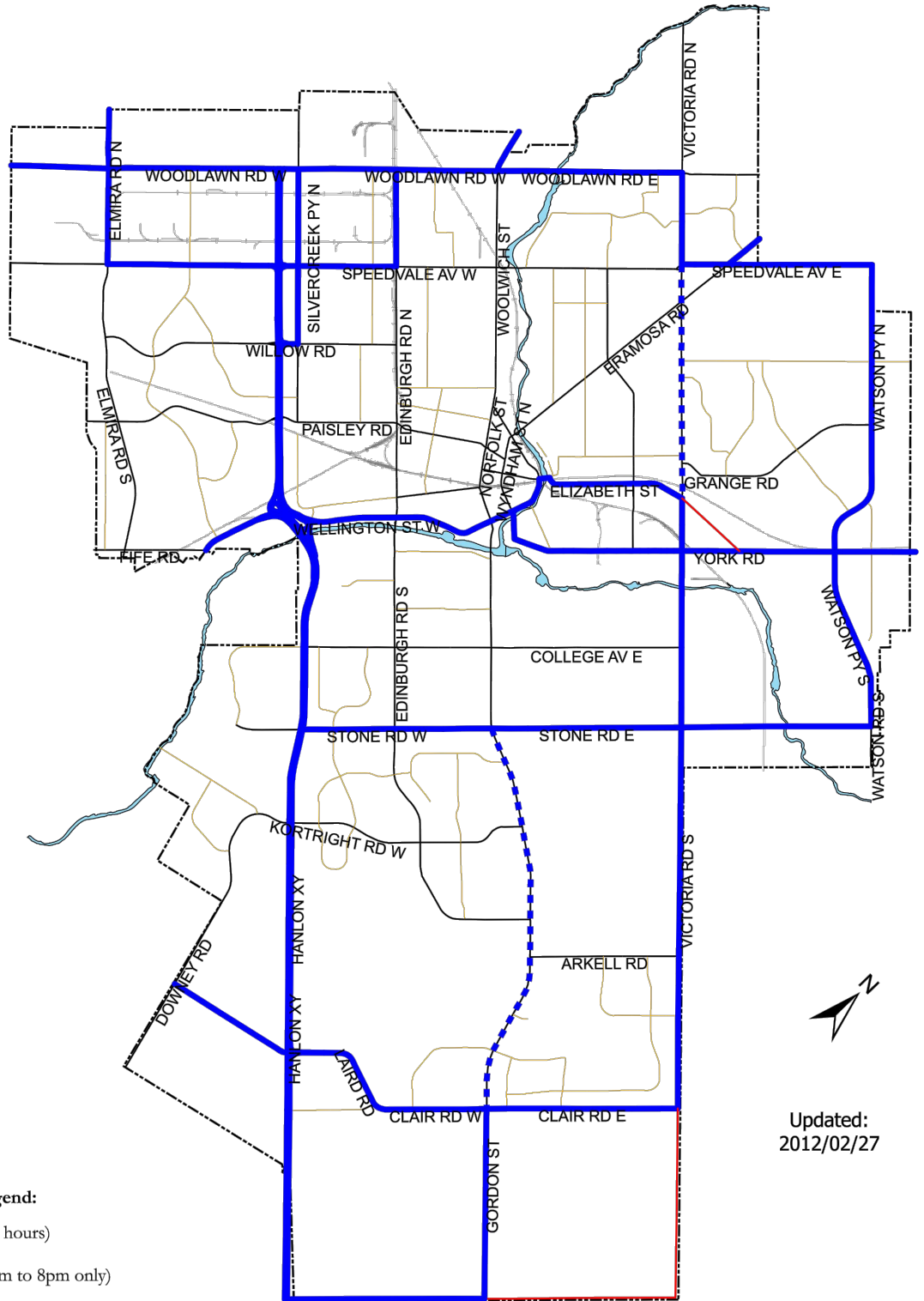
Of note, the forecasting model does not indicate the need to widen Victoria Road south of Clair Road, or widen Maltby Road between Victoria Road and the Hanlon Express to be widened; however, both roads require upgrading.

The recommendation of TDM measures to reduce automobile use and increase use of alternative modes of transportation is identified as one of five primary study objectives in the Guelph-Wellington Transportation Study. The Study makes a connection between land use, urban form, density, neighbourhood design, and the transportation choices made by people making use of the network.

Ultimately, the document assesses an assortment of TDM measures and their practicality in Guelph; the following table (Table 4.1 in the Guelph-Wellington Transportation Study) is included identifying TDM measures that either encourage alternative transportation modes or discourage automobile use:

	Strategy	Practical	Limitations/Barriers
Encourage Walking, Cycling, Transit and Ridesharing	Urban Form	Yes	Long term effectiveness, market barriers
	Increased Density	Yes	Community acceptance, political commitment
	Mixed Uses	Yes	Development specialization, economics
	Neighbourhood Design	Yes	Some increase in private and public cost
	Car Pool/Van Pool Programs	Yes	Large employers, longer distance trips
	Guaranteed Ride Home	Yes	Part of a TDM program - not stand alone
	Parking Supply Management	Yes	Large employers and downtown
	HOV Lanes	No	Road right of way restrictions
	Cycling Routes and Facilities	Yes	Climate, fitness level, cost, trip length
	Pedestrian Trails and Walkways	Yes	Climate, fitness level, cost, trip length
	Increased Transit Service and Routes	Yes	Budget constraints, bus shelters, traffic congestion
	Transit Fare Strategies	Yes	Lack of tax incentives, cost
	Preferential Transit Facilities	Yes	Right of way constraints, traffic congestion
Improved Inter-City Transit	Yes	Inter-city licensing, reduced fare	
Programs to Discourage Auto Use	Telecommuting	Yes	Type of work, lack of supervision, security issues
	Alternative Work Schedules	Yes	Many in use - benefits may be minimal
	Vehicle Use Restrictions	No	Public acceptance and economic development issues
	Increasing Traffic Congestion	No	Emissions, emergency service, neighbourhood infiltration
	Congestion Pricing	No	Public acceptance and economic development issues
	Increase Driving Cost	No	Legislation changes, economic development issues
	Parking Pricing and Supply Management	Yes	Limited to downtown and University, economic development issues

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Updated:
2012/02/27

GUELPH-WELLINGTON TRANSPORTATION STUDY TRUCK ROUTE NETWORK

4.7 ADDITIONAL GUELPH TRANSPORTATION DEMAND MANAGEMENT POLICY

Additional policy documents in the City of Guelph provide basis for the advancement of TDM.

The Downtown Guelph Secondary Plan includes TDM policy in support of the promotion of alternatives to automobile use. Policy tools that are mandated or suggested include working with transit providers, developers, and businesses to promote TDM, requiring large-scale developments to complete a TDM plan describing facilities and programs intended to reduce single occupancy vehicle trips, minimize parking and promote alternative travel modes, and finally, suggests the City may permit reduced parking supplies if a TDM plan proves that reduced parking is appropriate.

The Guelph Innovation District Secondary Plan promoted the implementation of TDM measures, through working with developers and businesses to reduce vehicular trips and to promote alternative travel modes.

The City of Guelph Community Energy Plan makes the connection between environmental and energy related goals and the need to reduce energy use and greenhouse gas emissions generated by transportation. A stated goal is to reduce transportation energy use by 25% (while accommodating Guelph's growing transport requirements) using sensitive urban design, effective alternative transport options (i.e. through TDM and a focused attention on competitive mass transit), and encouraging vehicle efficiencies.

5.0 AREA ROAD ENVIRONMENTAL ASSESSMENTS

5.1 GORDON STREET (WELLINGTON ROAD 46) CLASS EA ENVIRONMENTAL STUDY REPORT

The Gordon Street Class EA was undertaken by the City of Guelph and County of Wellington in December 2000 for the section of Gordon Street between Wellington Road 34 in the south and Lansdown Drive in the north.

The EA study utilizes three other previous transportation reports to judge the transportation impacts of new residential and commercial development along the Gordon Street corridor, and reconfirms the need for traffic capacity within this section of the street. In addition to traffic capacity and operation issues, the EA also identified other public concerns related to truck traffic volumes and roadway deficiencies, including a lack of sidewalks, bicycle lanes, and transit-related infrastructure.

At the time of the study, Gordon Street had a basic two-lane cross-section within the study area. The resulting EA concluded that Alternative 4 (basic improvements plus the widening of Gordon Street) was the preferred solution, and that widening of Gordon Street north of Clair Road would begin by 2002, while widening between Clair Road and Maltby Road would be dependent on the occurrence of development activity.

Upon the adoption of the Gordon Street EA, road widening has been undertaken from just south of Clair Road to Lansdown Drive. Gordon Street has not been widened from just south of Poppy Drive to Wellington Road 34 under existing conditions. This section is planned to be widened symmetrically from the road centreline except for a 500 metre section in the vicinity of the Mill Creek crossing where widening will occur on the west side only. The EA specified that rural drainage (ditches) be provided on both sides of the road, but did not specify sidewalk / bicycle lane provisions.

5.2 CLAIR ROAD CLASS EA ENVIRONMENTAL STUDY REPORT

The Clair Road Class EA was undertaken on behalf of the City of Guelph in September 2003 for the section of Clair Road and Laird Road between Southgate Drive in the west and Victoria Road in the east.

The EA concluded that Clair Road (at the time of study) will not provide the level of service necessary to avoid traffic congestion, frequent delays, and unsafe driving conditions, given the predicated traffic volumes, and that the road itself is in poor physical condition and lacks sidewalk and bicycle facilities to accommodate these travel modes. Given the prevailing conditions, the EA advanced four alternative planning solutions:

1. Do nothing.
2. Non-structural solutions (increase use of alternative modes; traffic diversion).
3. Construct a new road.
4. Improve the existing road.

In summary, from transportation, natural, social and physical environment perspective, the preferred alternative was the improvement of Clair Road from Victoria Road in the east to the Hanlon Business Park in the west. Improvements include the introduction of an “urban” cross-section with curbs and sidewalks, a landscaped median in the South Guelph District and adjacent to Bishop Macdonell High School and South End Community Park, provision of sidewalks on both sides of the street, and bicycle lanes within the road surface area.

The EA considered 2 and 4 traffic lane cross-sections, and determined that the western portion of the street (west of Beaver Meadow Drive) would include 4 travel lanes, while the eastern section (east of Beaver Meadow Drive) would include 2 travel lanes – one in either direction. This lane configuration has been implemented from Victoria Road in the east to approximately 200 metres west of Poppy Drive in the west. Bicycle lanes have also been introduced along this section of the street. Sidewalks are provided on both sides of the street west of Hawkins Drive, but are often interrupted (discontinuous) in sections east of this point.

5.3 VICTORIA ROAD (CLAIR ROAD TO YORK ROAD) CLASS EA STUDY

The Victoria Road Class EA was undertaken on behalf of the City of Guelph in December 2005 for the section of Victoria Road between York Road in the north and Clair Road in the south. The extent of the study area is generally north of Clair Road and does not include the section of Victoria Road adjacent to the Clair-Maltby Secondary Plan area (south of Clair Road).

The outcomes of the EA provided cross-section alignments of the street within the study area, including for Victoria Road immediately north of Clair Road. In this location, the EA identified a 3-lane cross-section with one travel lane in either direction and a continuous left-turn / median lane, bicycle lanes, and improvements at the Clair Road / Victoria Road intersection. These intersection improvements include installing traffic signal control and separate eastbound turn lanes and a northbound left-turn lane that have already been implemented.

6.0 ENGINEERING DESIGN CRITERIA AND STANDARDS

6.1 DEVELOPMENT ENGINEERING MANUAL, VERSION 1.0 (2016)

City of Guelph Engineering and Capital Infrastructure Services prepared their Development Engineering Manual (DEM, Fall 2016) to guide engineering related aspects of development related work, including established Engineering Design Criteria and Standards intended to be used by developers, residents and the City to inform engineering design and related review and discussion. The DEM recognizes that the outlined standards may not be compatible to all scenarios, and engineering judgement should be used in such cases.

The key objectives of the DEM are to:

- *Document existing process information related to the engineering submission of a development application;*
- *Outline requirements and standards for the engineering design of new developments within the City;*
- *Provide guidance and framework for applicants submitting engineering designs and reports in support of development applications;*
- *Provide guidance to City staff when reviewing and commenting on engineering aspects of a development application; and*
- *Identify the role and involvement of City departments and external agencies as part of the development engineering review and approval process.*

The DEM is complemented by Part B Specs (Linear Infrastructure Standards, 2017) that provides, in detail the City's standard specifications.

6.1.1 Road Standards

The DEM, outlines a range of pavement widths, typical AADT volumes, right-of-way widths, and maximum allowable grades for local and collector roadways. Subdivision Geometric Design Criteria for local and collector roadways are presented in Table 5.

TABLE 5 SUBDIVISION GEOMETRIC DESIGN CRITERIA, PART 1

Road Classification	AADT	Pavement Width (m)	Right-of-Way Width (m)
Local	<1,000	8.4, 8.8, 10	17, 18, 20
Collector	<12,000	10	20

Notes:

1. Detailed notes provided in DEM Table 2, page 46.

TABLE 6 SUBDIVISION GEOMETRIC DESIGN CRITERIA, PART 2

Road Classification	Allowable Grade	Minimum Centreline Radius (m)	Minimum SSD	Minimum Tangent @ Intersection	Minimum Tangent Between Curves	Property Line Radius @ Intersection
Local	<1,000	8.4, 8.8, 10	17, 18, 20	10	15	8
Collector	<12,000	10	20	25	30	8

Notes:

1. Detailed notes provided in DEM Table 2, page 46.

6.1.2 Sight Triangles

The use of Transportation Association of Canada (TAC) Stopping Sight Distance (3-second rule) for evaluation of sight triangles at intersections and access points for new developments is adopted by the City of Guelph. The DEM notes that reduction of a sight triangle may be considered for areas located in an “Urban Growth Centre” and the specific locations identified in the Clair Maltby study area below. Reductions to sight triangles still need to be reviewed by a professional engineer for the recommended design and should not create a condition prone to collisions. Adequate space should also continue to be provided for utility/traffic signal equipment and the final dimensions are also subject to minimum requirements set out in the City’s bylaw.

Intersections subject to further consideration for sight triangle in the Secondary Plan area include:

- Victoria Road and Clair Road
- Gordon Street and Clair Road
- Gordon and Poppy Drive

6.1.3 Parking

Off-street parking is outlined in the City’s comprehensive bylaw and repeated in the DEM for surface parking.

According to the DEM, on-street parallel parking should have a minimum of 15 m setback from the near side of an intersection, and a minimum of 9 m setback from the far side of the intersection (measured from the end of curb return), unless the minimum setback needs to be increased to address sight distance or operating speed.

6.1.4 Access Design

The DEM outlines design guidelines for throat width, lane width, radius, and spacing for access to/from residential/commercial/institutional areas and the public road network as summarized in Table 7 and Table 8.

TABLE 7 LAYOUT OF ACCESSES

Access Classification	Roadway Classification	Throat Width, W or Land Width, LW (m)	Radius, R (m)	Distance Between Accesses, S (m)
Multi-Residential	Local/Collector	6.0	6.0	7
	Arterial	7.5		25
Low Volume Commercial and Institutional	Local/Collector	7.5	9.0	23-30
	Arterial	8.0		60
High Volume Commercial and Institutional	Collector	8.0	12.0	60
	Collector (divided access)	3.0 m left 3.6 m through 3.6 m right 1.2 m island	12.0	60
	Arterial	9.0	12.0	100
	Arterial (divided access)	3.0 m left 3.6 m through 3.6 m right 1.2 m island	12.0	100
Industrial	Collector	9.0 (max 15.0)	12.0	40-60
	Arterial			

TABLE 8 NUMBER AND LOCATION OF ACCESSES

Access Classification	Roadway Classification	Distance from Non-Signalized Intersection (m)	Distance from Signalized Intersection (m)
Multi-Residential	Local / Collector	15	30 ¹
	Arterial	30	60 ²
Low Volume Commercial and Institutional (2-way access)	Local / Collector	30	30
	Arterial	60	60 ³
High Volume Commercial and Institutional	Collector / Arterial	60	60 ³
Industrial	Collector / Arterial	30	60 ³

Notes:

1. Multi-Residential of up to 30 units
2. Multi-Residential of over 30 units
3. Full movement accesses will not be allowed within 100 m of a signalized intersection on arterial roadways. Site specific turning movement restrictions will be determined by City staff upon application.
4. Should a site require a right in/out access, the layout shall be approved by traffic engineering staff and conform to the most current TAC specifications.

The City’s Access Details Figures from the DEM are attached in **Appendix C**.

7.0 EXISTING TRANSIT FRAMEWORK

7.1 TRANSIT GROWTH STRATEGY AND PLAN

The “Guelph Transit Growth Strategy and Plan and Mobility Service Review” was prepared in 2010, and was prepared to assess the transit market, estimate future travel demand (ridership forecasts), outline mobility service and higher-order transit opportunities, and detail associated capital and revenue implications associated with service recommendations. It should be noted that the plan is now seven years old and, at the time of the study, did not forecast any substantial development within the Clair-Maltby Secondary Plan area within the 2031 horizon year period.

Of the report’s key recommendations, that implicates development of the South Guelph area, include:

1. Establish the Gordon / Norfolk / Woolwich spine as a Bus Rapid Transit priority corridor, starting with the implementation of queue jump lanes, traffic signal priority, and express bus services, and additional infrastructure as demand increases (dedicated bus / HOV lanes). Specifically, the report recommends that as transit demand increases, a dedicated transit / HOV lane be provided in each direction of Gordon Street, firstly between Stone Road and Clair Road, and eventually on Gordon Street south of Clair Road. Transit service improvements along the Gordon Street corridor should include improved passenger amenities at transit stops.
2. Introduction of train service on the Guelph Junction Railway, including the introduction of up to 4 stations including a station servicing the Guelph Innovation District (northeast of the Clair-Maltby area) and the downtown.
3. Establish new inter-city / inter-regional bus and rail transit connections, most notably to Kitchener, Waterloo, Cambridge, and potentially, Georgetown, Brampton, Milton, Mississauga, and Hamilton.
4. Work with property owners to establish a 4 to 6 bay bus terminal within the South End Node (Gordon Street and Clair Road).

Recommendations 1 and 2 above establish a transit structure for the City by connecting key existing and emerging nodes via priority corridors.

7.2 MOVING GUELPH FORWARD: GUELPH TRANSIT GROWTH OPPORTUNITIES

This report identifies immediate and recommended route service changes while highlighting potential long-term areas of growth related to service enhancements and infrastructure. The report was released in 2016 and outlines existing trends and service standards, and potential opportunities to make transit more attractive and increase ridership.

The report includes a summary of rider survey data, which indicates among other items, that transit riders are evenly satisfied / dissatisfied with service frequency and on-time arrival, and generally dissatisfied with local service connections to GO (regional service) facilities.

Moving Guelph Forward also describes recommended service changes and future measures that are intended to increase ridership and achieve a 15% transit mode share – consistent with policy objectives of OPA 48 and the Guelph – Wellington Transportation Study. Recommended service changes, in the vicinity of the Clair-Maltby Secondary Plan area include minor alterations to the #5 Clair and #56 Victoria Express bus routes, which will potentially be altered again given the development of the Clair-Maltby precinct. Transit priority measures, to be potentially integrated within the Maltby Secondary Plan area to increase ridership, include:

- Queue jump lanes,
- Reversible lanes,
- Roundabouts,
- Transit signal priority, and
- Reserved bus lanes.

8.0 EXISTING CYCLING AND TRAILS FRAMEWORK

8.1 GUELPH TRAILS MASTER PLAN (2005)

The Guelph Trail Master Plan (GTMP, Fall 2005) was established to provide an overall vision to the developing trail system.

The Goal of the GTMP is to:

“develop a cohesive city wide trail system that will connect people and places through a network that is off-road wherever possible and supported by on-road links where necessary”

The GTMP outlines the following areas of recommendations:

- Establishing the Need for Trails;
- Understanding the Resources;
- Planning for Trails;
- Building Trails; and,
- Supporting Trails.

The GTMP outlines a hierarchy of trail types: Primary, Secondary, Tertiary, and Water Routes for canoeists and kayakers.

8.1.1 The GTMP Trail Network

The GTMP Trail Network, outlining the hierarchy of trail routes including desire lines for the Clair Maltby study area is presented in Figure 8.

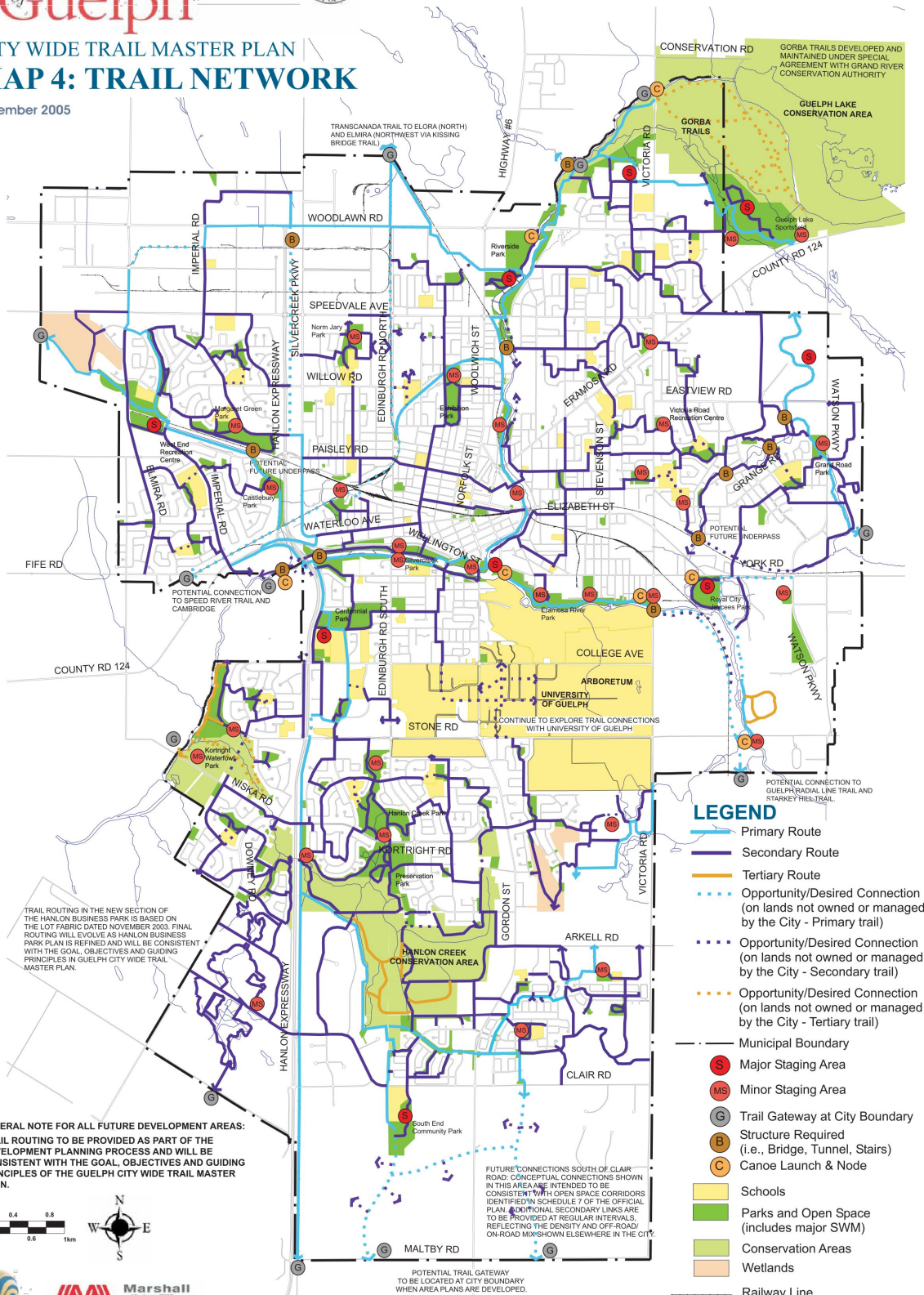
The GTMP Trail Network identifies conceptual connections through the Clair Maltby study area that are generally consistent with the Open Space Corridors outlined in the City's Official Plan. There are two north-south Primary conceptual connections through the Clair Maltby study area and one east-west Primary conceptual connection crossing Gordon Street midblock between Clair Road and Maltby Road. The north-south connections provide an opportunity to connect to the primary trail network north of Clair Road and also to connect with potential Trail Gateways at the Maltby Road City Boundary. Conceptual secondary connections are shown at regular intervals south of Clair Road.

8.1.2 The GTMP Trail Network – On and Off-Road

The GTMP Trail Network, outlining the On and Off-Road Breakdown of trails, is presented in Figure 9. The primary trails identified in the Clair Maltby study area are largely intended to be off-road routes, with some local connections secondary connections intended to be on and off-road and located at regular intervals.

CITY WIDE TRAIL MASTER PLAN
MAP 4: TRAIL NETWORK

November 2005

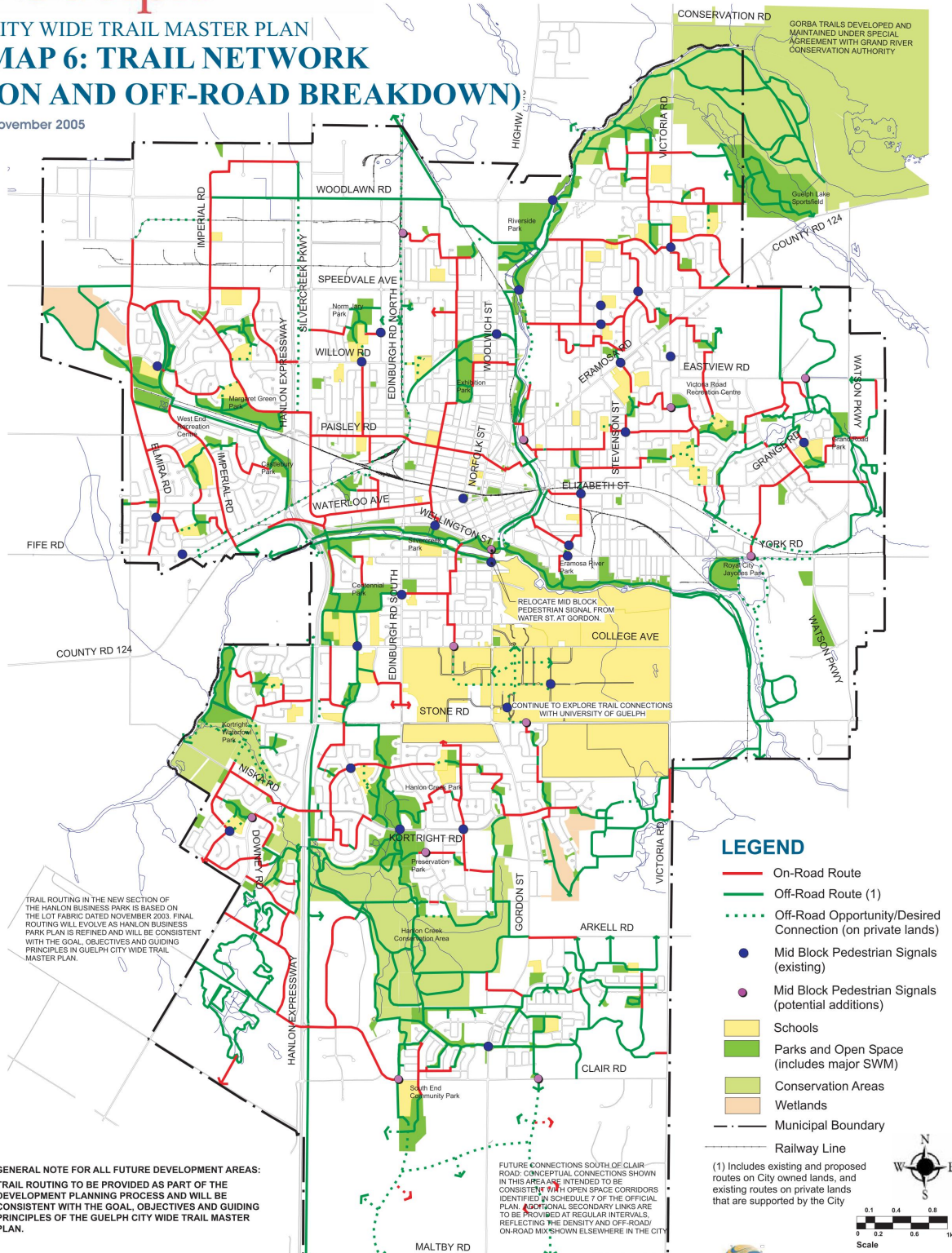


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CITY WIDE TRAIL MASTER PLAN:
TRAIL NETWORK

CITY WIDE TRAIL MASTER PLAN MAP 6: TRAIL NETWORK (ON AND OFF-ROAD BREAKDOWN)

November 2005



TRAIL ROUTING IN THE NEW SECTION OF THE HANLON BUSINESS PARK IS BASED ON THE LOT FABRIC DATED NOVEMBER 2003. FINAL ROUTING WILL EVOLVE AS HANLON BUSINESS PARK PLAN IS REFINED AND WILL BE CONSISTENT WITH THE GOAL, OBJECTIVES AND GUIDING PRINCIPLES IN GUELPH CITY WIDE TRAIL MASTER PLAN.

GENERAL NOTE FOR ALL FUTURE DEVELOPMENT AREAS:
TRAIL ROUTING TO BE PROVIDED AS PART OF THE DEVELOPMENT PLANNING PROCESS AND WILL BE CONSISTENT WITH THE GOAL, OBJECTIVES AND GUIDING PRINCIPLES OF THE GUELPH CITY WIDE TRAIL MASTER PLAN.

FUTURE CONNECTIONS SOUTH OF CLAIR ROAD: CONCEPTUAL CONNECTIONS SHOWN IN THIS AREA ARE INTENDED TO BE CONSISTENT WITH OPEN SPACE CORRIDORS IDENTIFIED IN SCHEDULE 7 OF THE OFFICIAL PLAN. ADDITIONAL SECONDARY LINKS ARE TO BE PROVIDED AT REGULAR INTERVALS, REFLECTING THE DENSITY AND OFF-ROAD ON-ROAD MIX SHOWN ELSEWHERE IN THE CITY.

This map is to be used as a planning tool. Background information depicted (e.g. land use designations) is included for illustrative purposes only. Please consult the appropriate official documents for further details. The location and exact alignment of trail routes will evolve through more detailed technical studies and/or community consultation as required. At the same time, it is important to note that the extensive community consultation that established the direction for this plan must be respected, therefore changes to the routing will be evaluated in the context of the overall network.



CITY WIDE TRAIL MASTER PLAN: TRAIL NETWORK (ON AND OFF-ROAD BREAKDOWN)

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8.1.3 The GTMP Trail Network – On-Road Cycling Linkages

The GTMP Trail Network, outlining the potential On -Road Cycling Linkages, is presented in Figure 10. The arterial roadways in the Clair Maltby study area, including Clair Road, Maltby Road, Gordon Street, and Victoria Road are all identified as On-Road Bicycle Network linkages. A potential connection south of the City is also identified on this figure at Maltby Road / Victoria Road.

8.1.4 The GTMP Trail Network – Timing of Priorities

The GTMP Trail Network recommends three timeline phases:

- Short Term (0 to 5 years - 2005-2010)
- Medium Term (5 to 15 years – 2011 to 2021)
- Long Term (beyond year 15 – beyond 2021)

The trail network proposed for the Clair Maltby study area is identified as a “Medium Term” priority, as illustrated in Figure 11.

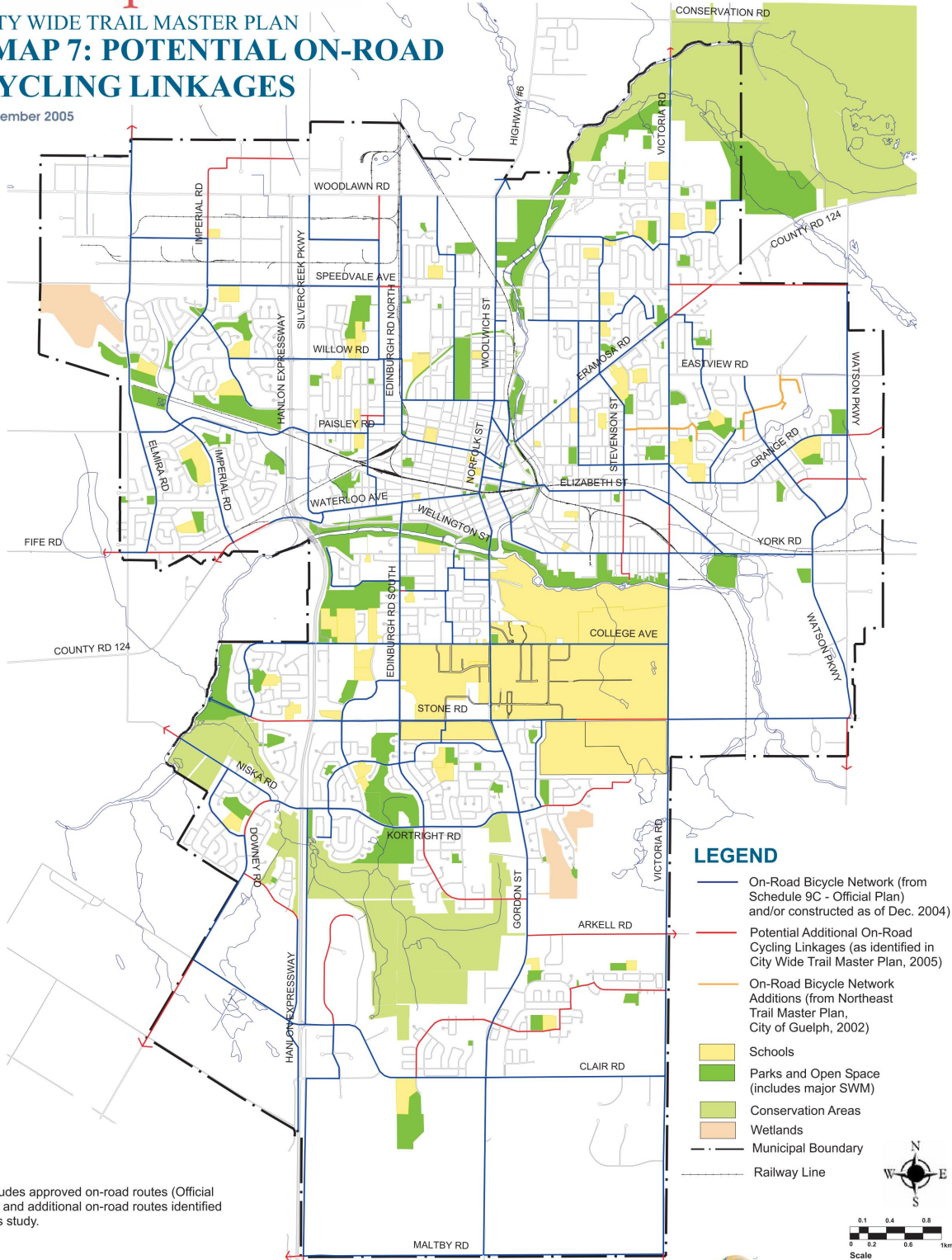
8.1.5 Building and Supporting Trails

The GTMP outlines available resources for design guidelines and construction details applicable to the trail network. Recommendations are also made for promoting, encouraging trail use, educating users, maintaining, managing, and monitoring trails.



CITY WIDE TRAIL MASTER PLAN
***MAP 7: POTENTIAL ON-ROAD CYCLING LINKAGES**

November 2005



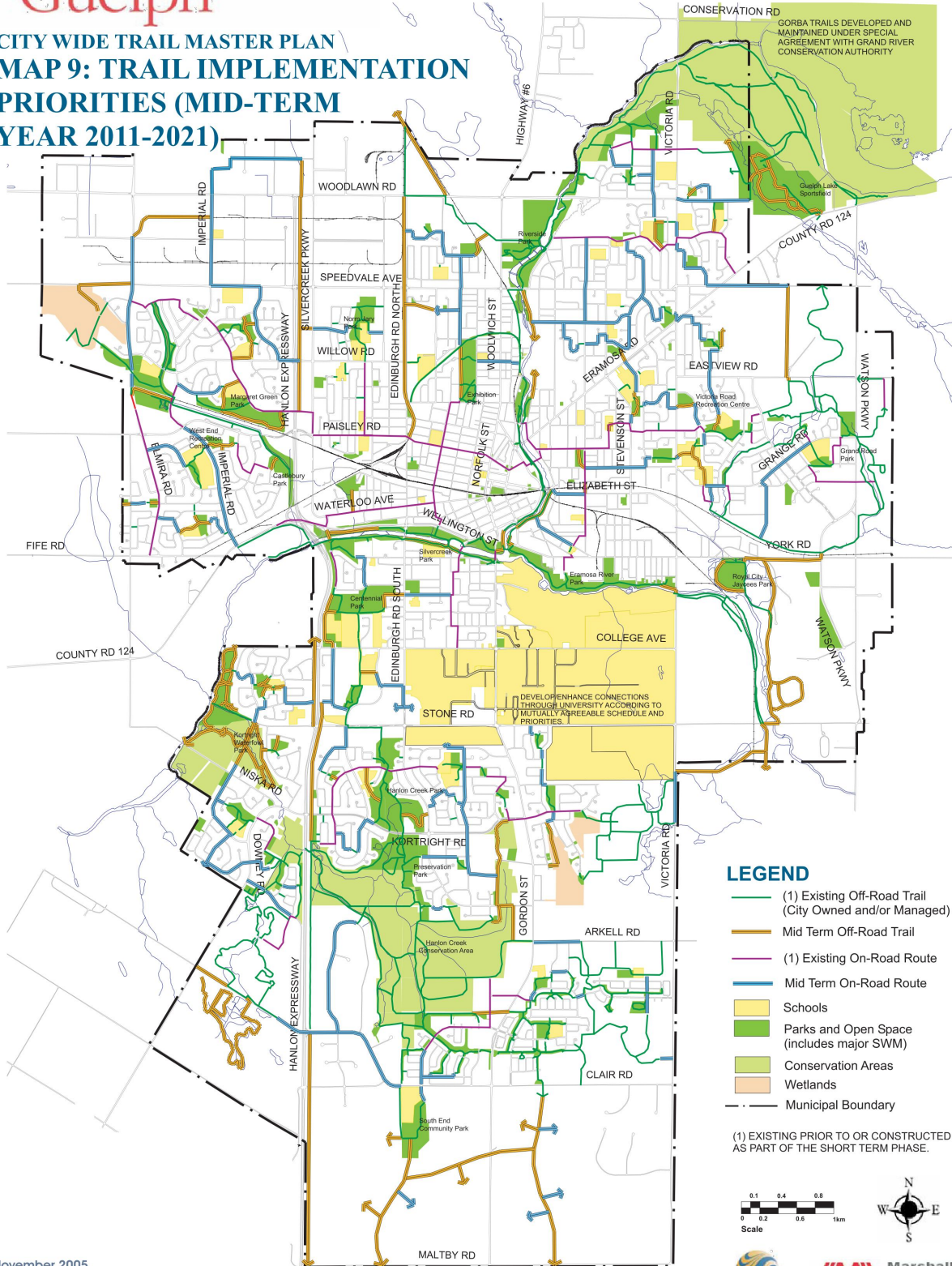
* Includes approved on-road routes (Official Plan) and additional on-road routes identified in this study.

This map is to be used as a planning tool. Background information depicted (e.g. land use designations) is included for illustrative purposes only. Please consult the appropriate official documents for further details. The location and exact alignment of trail routes will evolve through more detailed technical studies and/or community consultation as required. At the same time, it is important to note that the extensive community consultation that established the direction for this plan must be respected, therefore changes to the routing will be evaluated in the context of the overall network.

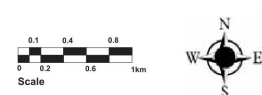


**CITY WIDE TRAIL MASTER PLAN:
 POTENTIAL ON-ROAD CYCLING LINKAGES**

**CITY WIDE TRAIL MASTER PLAN
MAP 9: TRAIL IMPLEMENTATION
PRIORITIES (MID-TERM
YEAR 2011-2021)**



- LEGEND**
- (1) Existing Off-Road Trail (City Owned and/or Managed)
 - Mid Term Off-Road Trail
 - (1) Existing On-Road Route
 - Mid Term On-Road Route
 - Schools
 - Parks and Open Space (includes major SWM)
 - Conservation Areas
 - Wetlands
 - Municipal Boundary
- (1) EXISTING PRIOR TO OR CONSTRUCTED AS PART OF THE SHORT TERM PHASE.



November 2005

This map is to be used as a planning tool. Background information depicted (e.g. land use designations) is included for illustrative purposes only. Please consult the appropriate official documents for further details. The location and exact alignment of trail routes will evolve through more detailed technical studies and/or community consultation as required. At the same time, it is important to note that the extensive community consultation that established the direction for this plan must be respected, therefore changes to the routing will be evaluated in the context of the overall network.

**CITY WIDE TRAIL MASTER PLAN:
TRAIL IMPLEMENTATIONS PRIORITIES
(MID-TERM YEAR 2011-2021)**

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8.2 CYCLING MASTER PLAN – BICYCLE FRIENDLY GUELPH (2012)

The City's Cycling Master Plan (February 2012), is directed by the City's Office Plan, and provides recommendations and strategies that aim to operationalize the visions of the Bicycle-Friendly Guelph Initiative formed by the City.

The City's vision for becoming Canada's most bicycle-friendly communities includes 1) more people cycling, 2) a safer and more connected network, 3) strong culture of cycling, and 4) measured improvements.

The Cycling Master Plan developed the following seven principles:

1. Cycling and safety are not mutually exclusive.
2. Cycling is an essential transportation mode for Guelph.
3. Every street is a cycling street and bicycles are vehicles.
4. Bicycles are unlike other vehicles that share the road.
5. Cycling is for everyone to enjoy.
6. A successful cycling network is a product of a well-integrated transportation network.
7. Transportation choices create opportunities for everyone to get to their destination.

The Cycling Master Plan addresses both physical and social infrastructure needs within the context of the 5E's:

1. Engineering: Enhance the Bikeway Network
2. Education & 3. Encouragement: Promote a bicycle-friendly city
4. Enforcement: Protect a cycling-friendly environment
5. Evaluation: Monitor progress in achieving targets and goals; and

The Cycling Master Plan provides 22 actionable recommendations within the 5E's for City staff, stakeholders, and residents to achieve implementation of the City's visions.

8.2.1 Engineering Principles

The Cycling Master Plan's recommendations for Safe and Continuous Infrastructure (Engineering) outlines tools for selecting types of bikeways relative to vehicular volume, vehicular speed, and local context that influence cyclist safety and comfort levels relative to other on-street facilities and vehicles.

Bikeway Treatments

The Cycling Master Plan identifies several types of bikeway treatments for consideration by the City of Guelph:

- Signed Routes
- Bicycle Boulevards
- Shared-Use Lanes (Sharrows)
- Advisory or Suggested Lanes
- Bike Lanes and Paved Shoulders
- Multi-Use Boulevard Trails, and,
- Cycle Tracks / Physically-Separated Bike Lanes

Intersection Treatments

The plan also recommends that the design of intersections should also take into account the many possible movements of cyclists at intersections including:

- General intersection guidelines to address visibility where there is a higher presence of conflicts between cyclists, motorists, and pedestrians;
- Accommodating Left Turns at signalized and unsignalized intersections; and,
- Specific cases where two arterial roads intersect and all intersections with multi-use boulevard trails.

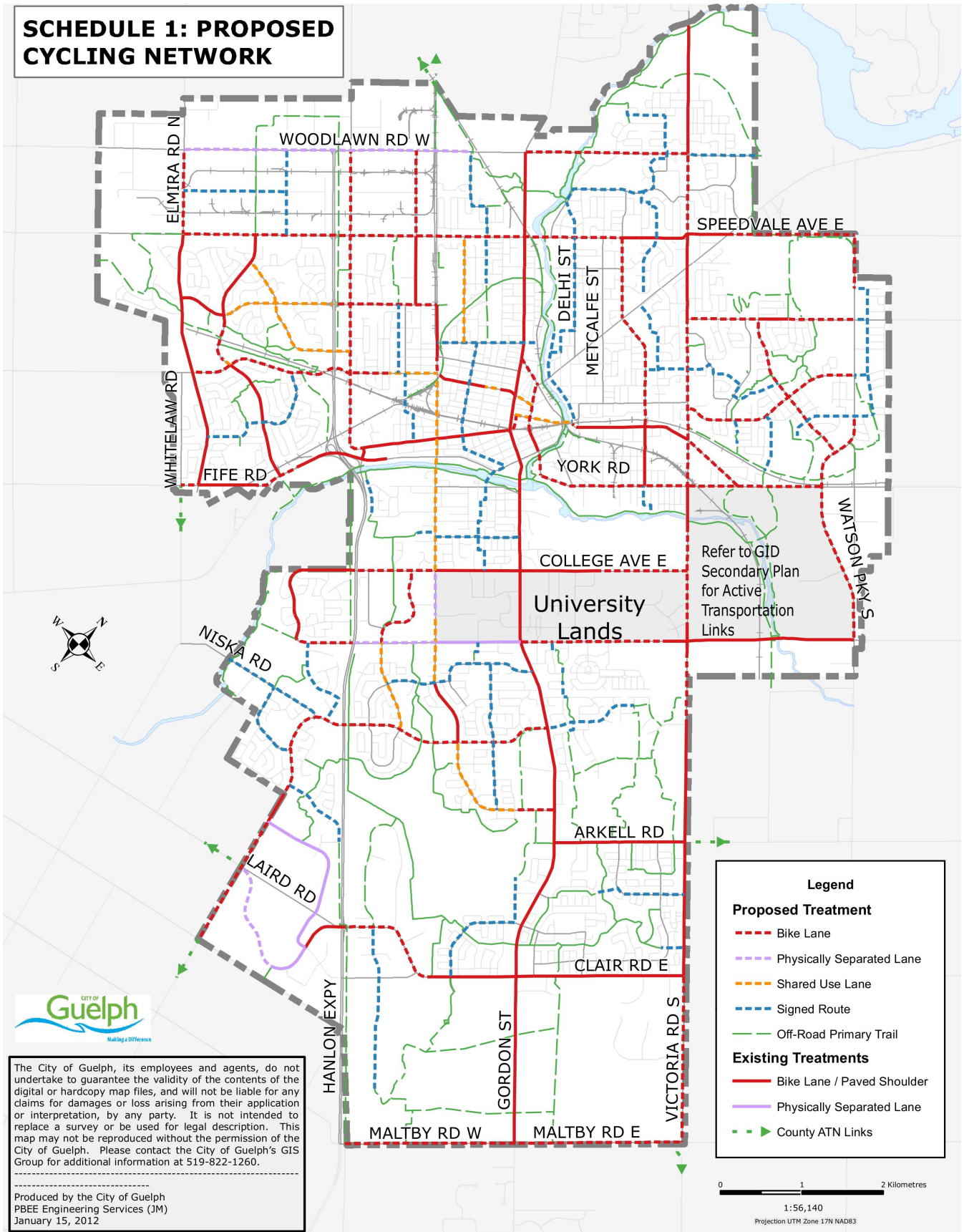
Cycling Network Plan

The recommended Cycling Network Plan from the Cycling Master Plan is provided in Figure 12.

This Cycling Network Plan identifies several existing and proposed surface treatments for the Clair Maltby study area. Existing and proposed cycling treatments within the study area include:

- **Existing Bike Lanes / Paved Shoulder** are identified along both Clair Road East and Gordon Street within the study area.
- **Proposed 1 metre Paved Shoulder** is proposed along east-west Maltby Road and along north-south Victoria Road South (between Clair Road and Maltby Road)
- **Off-Road Primary Trails** are proposed at two locations running east-west across Gordon Street that will make connections to the proposed north-south signed routes along Southgate Drive. North-south off-road trails are also proposed within the study area that will connect to proposed signed routes along Clairfields Drive West, existing trails north of Clair Road, as well as at two locations potentially crossing Maltby Road to the south.
- **County ATN Links** are proposed at the southeast corner of the study area at the intersection of Maltby Road East and Victoria Road South.

SCHEDULE 1: PROPOSED CYCLING NETWORK



PROPOSED CYCLING NETWORK - 2013 GUELPH CYCLING MASTER PLAN

End-of-Trip Facilities Recommendations

The Cycling Master Plan outlines guidelines for providing end-of-trip facilities (bike parking facilities). They have identified two classes of bicycle parking as follows:

- Class One: Long-term bicycle parking
- Class Two: Short-term bicycle parking
- Additional Class: Artistic bicycle parking

The Cycling Master Plan outlines recommended Bicycles Parking Requirements for each Class of parking, by type of land use. Recommendations for General Rack Spacing and Rack Spacing within the Public Right-of-Way are also recommended as part of this section of the Cycling Master Plan.

8.2.2 Education and Encouragement

The Cycling Master Plan recommends complementing the guidelines for providing a safe cycling environment with complementary encouragement and education with a set of recommended objectives and actions.

8.2.3 Enforcement

The Cycling Master Plan recommends continued and improved actions to cycling enforcement as a means to reduce incidents and provide front-line education to both drivers and cyclists.

8.2.4 Evaluation

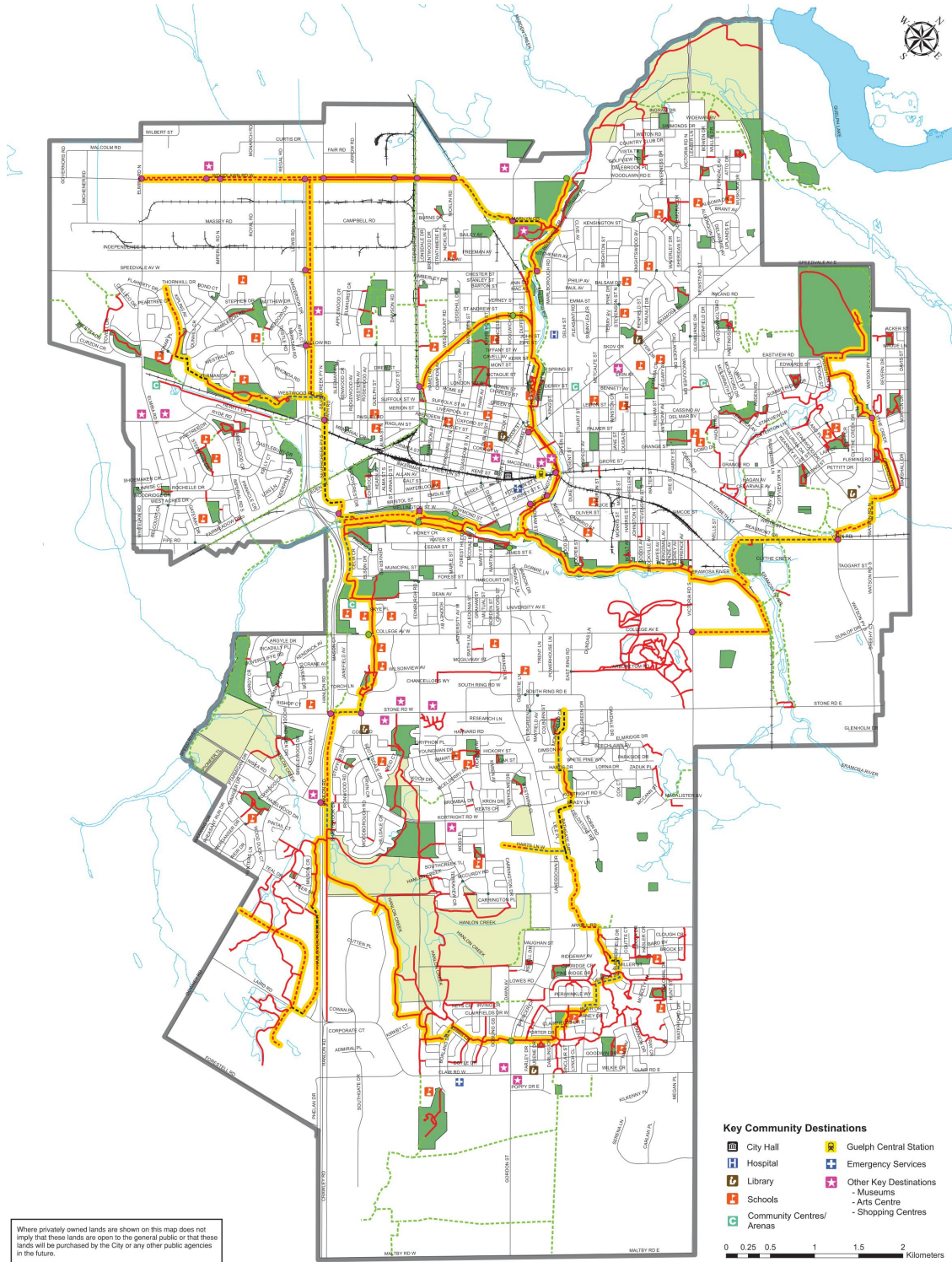
The Cycling Master Plan recommends actions to monitor and measure success in order to guide future planning and policy decisions.

8.3 ACTIVE TRANSPORTATION NETWORK STUDY (2017)

The Active Transportation Network Study (ATN Study, January 2017) builds on the Primary Trails system of the Guelph Trails Master Plan (2005) and the infrastructure (Engineering) objectives of the Cycling Master Plan (2012).

The ATN Study was prepared by MMM Group / Paradigm Transportation Solutions on behalf of the City of Guelph to assess the feasibility of upgrading and maintaining existing and proposed Primary Trails in Guelph – notably the trail network identified in the City’s Draft Proposed Active Transportation Network (ATN).

The ATN’s Recommended Active Transportation Network is presented in Figure 13. However, given that the ATN largely reviewed the primary trail system identified by the Trail Master Plan and Cycling Master Plan, the planned trails identified in the Clair Maltby study were outside of the scope of the ATN.



4.1 RECOMMENDED ACTIVE TRANSPORTATION NETWORK



Off-Road Trail Network

- Existing Trail
- Proposed Trail (from previously approved plans, alignment to be confirmed in the next Guelph Trail Master Plan Update)
- Proposed trail route identified during the ATN Study
- Recommended Active Transportation Network
- Proposed trail identified in the Guelph Trail Master Plan (2005) or other approved City plan / planning approval process. Shown for illustrative purposes only; not examined during the ATN Study

On-Road Links

- On-road link: critical to connectivity of the Active Transportation Network. Route also identified in the Guelph Cycling Master Plan (2013)
- On-road link: critical to connectivity of the Active Transportation Network. Route identified during the ATN Study

Existing Active Transportation Network Crossings

- Existing Mid-block Pedestrian Signal located on the ATN Study Route
- Existing Signalized Road Intersection located on the ATN Study Route

- Roads
- Rivers and Streams
- Railway
- City-owned Park or Open Space
- Conservation Authority Lands
- Guelph Lake
- City Boundary

RECOMMENDED ACTIVE TRANSPORTATION NETWORK

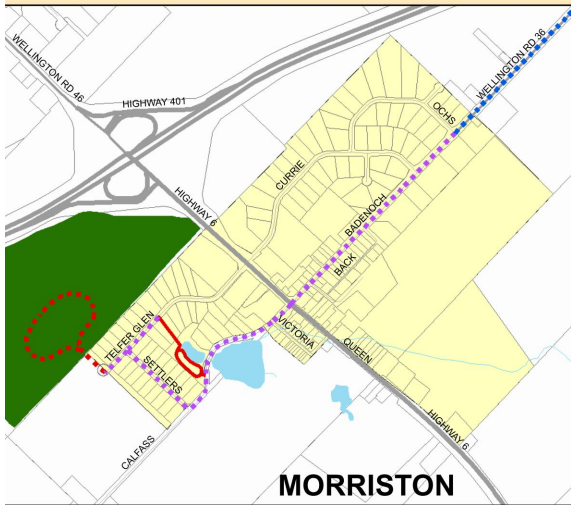
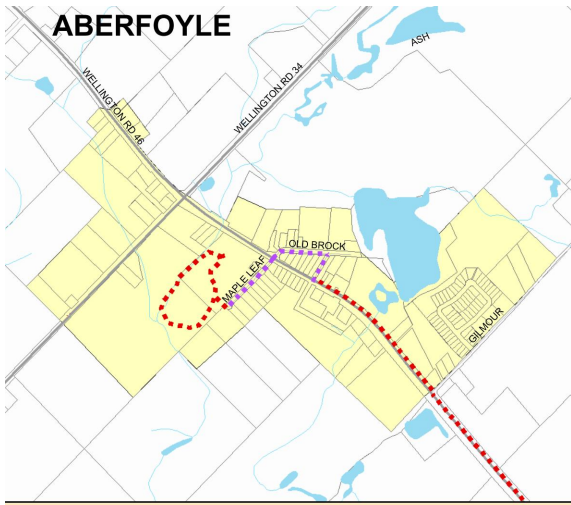
8.4 WELLINGTON COUNTY ACTIVE TRANSPORTATION PLAN

The Wellington County Active Transportation Plan (ATP, September 2012) provides guidelines and strategies that aim to meet the County's goals in fostering a healthy and more sustainably community, notably including an Active Transportation Network (ATN) that connects the County's communities.

The Township of Puslinch, within Wellington County, is directly adjacent to the Clair Maltby study area.

The County of Wellington Active Transportation Plan for Puslinch is illustrated in Figure 14. A proposed paved shoulder condition is recommended along Victoria Road, connecting with the southeast corner of the Clair Maltby study area.

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COUNTY OF WELLINGTON ACTIVE TRANSPORTATION PLAN

MAP EX.7 - PUSLINCH NETWORK FACILITY TYPES (ENLARGEMENTS)

Legend

- Existing Spine Off-Road Route
- Proposed Spine Off-Road Route
- Existing Off-Road Secondary Route
- Proposed Off-Road Secondary Route
- Existing Signed Route
- Proposed Signed Route
- Existing Paved Shoulder
- Proposed Paved Shoulder
- Proposed Signed Route with Sharrows
- Proposed Bike Lane
- County Wide Spine Route
- Proposed Future Connection on Lands in Private Ownership
- Proposed Bridge
- Rail
- Local Roads
- County Roads
- Provincial Highway / Freeway
- Streams
- Lakes and Rivers
- Parkland
- County Forests
- Forests Tracts owned by Conservation Authority or MNR
- Hamlets / Urban Centres
- Municipal Boundary

SEPTEMBER 2012

ecoplans

Paradigm

MMM GROUP



**COUNTY OF WELLINGTON ACTIVE TRANSPORTATION PLAN:
MAP EX. 7 PUSLINCH NETWORK FACILITY TYPES (ENLARGEMENTS)**

9.0 CLAIR-MALTBY SECONDARY PLAN

9.1 COMMUNITY VISIONING EXERCISE AND CHARRETTE

A Community Visioning Workshop was undertaken in September 2017 to assist in establishing a Conceptual Community Structure, which was carried-forward as part of meetings with a Community Working Group and Technical Advisory Group.

The Conceptual Community Structure was used in the development of three (3) Community Structure Alternatives, which formed the discussion of a 5-day planning and design charrette held in April 2018. The charrette was a multi-disciplinary, intensive, and collaborative design and planning workshop, and was undertaken in order to develop a Preliminary Preferred Community Structure – which was presented for information purposes on April 9, 2018.

9.2 PREFERRED COMMUNITY STRUCTURE

A “Preferred Community Structure” has been pursued as a planning objective for the future development of the Clair-Maltby Secondary Plan, and utilized as a basis for detailed technical analysis – including the transportation analysis prepared herein. The Preferred Community Structure was advanced through modifications to the Preliminary Preferred Community Structure developed as part of the April 2018 design and planning workshop. These modifications to the community structure plan included adjustments to the Secondary Plan boundary, the removal of a conceptual north-south direction collector street aligned east of Gordon Street, changes to the location of high-density residential development, and the identification of cultural heritage resources and existing wetlands.

The Preferred Community Structure provides a general layout of land use, connective elements (arterial / collector streets and trails), community facilities, potential locations for storm water management facilities, existing cultural heritage resources, and wetlands.

The Clair-Maltby Secondary Plan Preferred Community Structure advances an urban village concept comprised of the Gordon Street Corridor, surrounding neighbourhoods and the Natural Heritage System. The Plan indicates that the area will be primarily residential in character with a full range and mix of housing types and a variety of other uses that meet the needs of all residents. The Natural Heritage System and the Paris Moraine, together with a system of parks and open spaces, provide a framework for the balanced development of interconnected and sustainable neighbourhoods. The Natural Heritage System further informs the opportunities for transportation infrastructure including a network of development-supportive collector streets.

9.3 MOBILITY NETWORK

A system of connected arterial and collector streets was advanced as part of the Preferred Community Structure to support development of the Secondary Plan area, while respecting the Natural Heritage System and existing topography. The street network represents a modified grid system, which is intended to allow for frequent and robust routing for all street users, while respecting the important environmental features of the area.

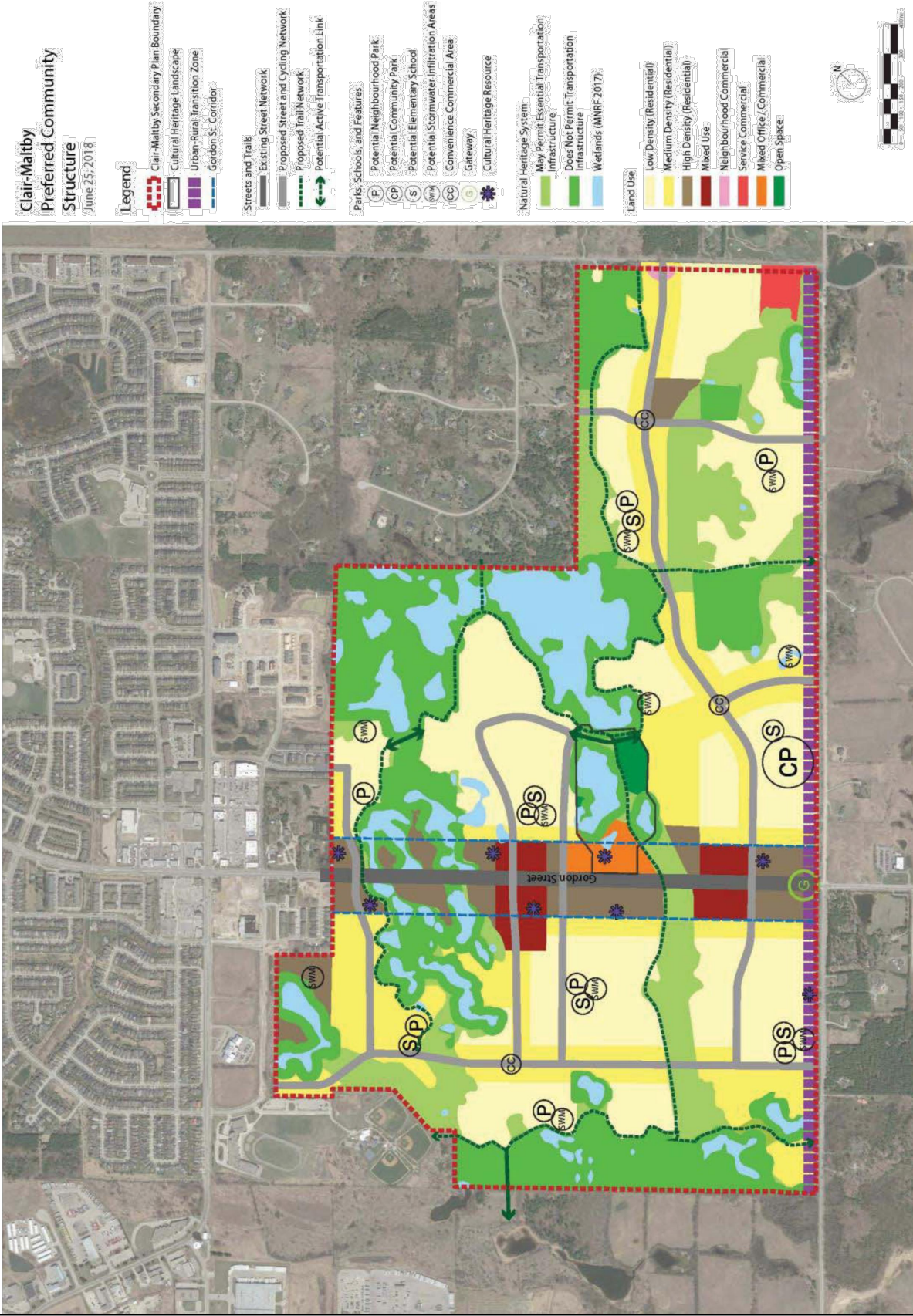
A total of four (4) east-west oriented collector streets are proposed to cross Gordon Street between Gosling Gardens in the north and Maltby Road in the south. One (1) north-south oriented collector street is proposed to extend between Poppy Road in the north and Maltby Road in the south, and will be located in the western portion of the Secondary Plan area (west of Gordon Street). Two (2) additional north-south collector streets are illustrated in the south-eastern portions of the Secondary Plan area in order to establish a robust street-network grid in this location. All collector streets, as well as existing arterial streets, are intended to appropriately integrate cycling and pedestrian facilities to ensure multi-modal mobility and accessibility.

The design of all collector streets and existing arterial streets is intended to allow for the operation of buses, to provide several opportunities and flexibility for transit vehicle routing throughout the Clair-Maltby Secondary Plan. Transit services are intended to route throughout the Secondary Plan area, allowing for bus stops to be provided at regular intervals within 400 metres of all residents and businesses. Additional transit provisions may also be made along the Gordon Street corridor to allow for convenient service transfers, and infrastructure to support the efficient and reliable routing of transit vehicles (discussed further in Section 9.5).

The planned network of streets (and trails – as discussed in Section 9.4) are intended to achieve safe, convenient and comfortable travel and access for all street-users, with priority given to pedestrians, cyclists, and transit operations, to provide mobility choice and support city policy and modal-split objectives. Vehicular movement will be accommodated, but is not prioritized, and will be subject to levels-of-service which are more constrained than typical in new-build areas within the City.

Following the planning and design charrette, the City of Guelph undertook a transportation modelling assessment of the anticipated future traffic conditions within the Secondary Plan area pending the introduction of a second north-south oriented collector street extending between Clair Road and Maltby Road (located east of Gordon Street). This assessment demonstrated that Gordon Street would be able to accommodate future traffic demands without a north-south collector street on the easterly side of Gordon Street. This modelling allowed a general understanding of the potential impacts that a collector street would have on the existing Natural Heritage System in two locations, as well as on an identified Cultural Heritage Landscape, and resulted in the removal of this collector road where it crosses these features as part of the Secondary Plan. The analysis undertaken herein supports this conclusion, understanding certain traffic movements are anticipated to operate near theoretical capacity during weekday peak hours at the key Gordon Street / Clair Road intersection north of the Secondary Plan area.

The Preferred Community Structure, and associated Mobility Network, are illustrated in Figure 15.



PREFERRED COMMUNITY STRUCTURE PLAN

9.3.1 Concept Public Right-of-Way Cross Sections

Right-of-way cross-sections have been developed for collector streets contemplated as part off the Clair-Maltby Secondary Plan, as well as existing arterial streets and concept future local streets within the area.

A series of cross-sections are developed for different types of streets, which are appropriately designed to accommodate a diverse mix of users and respond to the urban design, land use, and public realm contexts. Cross-sections are intended to be understood in conjunction with City of Guelph construction standards and guidelines, and should be flexible enough to meet context specific limitations and servicing / utility requirements and will be designed in detailed plan and section view as part of future area development.

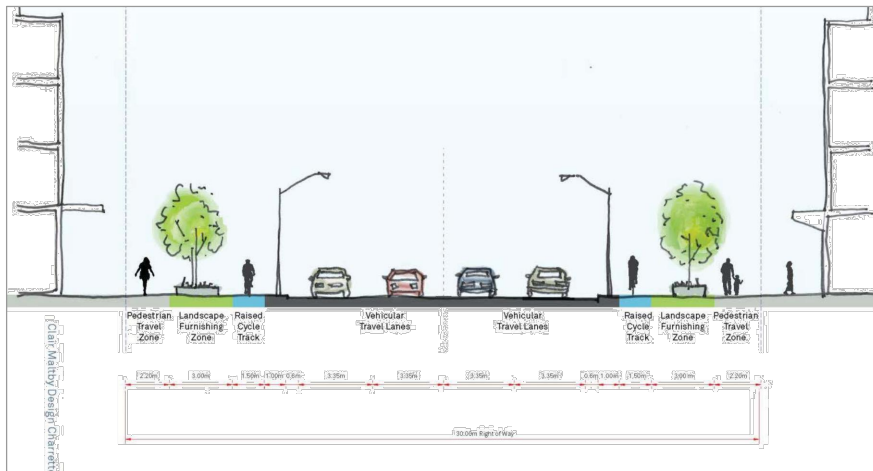
Cross sections prepared in support of the Clair-Maltby Secondary Plan intend the design and delivery of complete streets, which include pedestrian and cycling infrastructure, support transit service routing, street trees and landscaping, and utility / service delivery. Vehicle travel lanes are reduced to an appropriate level, to accommodate vehicle movement while not prioritizing vehicles over other street users.

In the design of public right-of-ways, the City will balance the provision of safe, functional and attractive pedestrian-oriented, cyclist friendly and transit-supportive environments while accommodating for an acceptably level of vehicular traffic and operation.

Different public right-of-way cross-sections have been developed for unique circumstances that accommodate for differences in adjacent land uses and the types of demands these uses can place on a typical street. For example, three-lane collector street cross-sections may be more appropriate for corridors with frequent transit service, larger (heavy) turning vehicles, intended to accommodate a greater number of “through” traffic, or frequent driveway connections. Wider pavement areas, or off-centre median lane designs, may also be pursued in instances where on-street parking will be accommodated. Similarly, wider right-of-ways may be pursued in instances where other infrastructure are required such as major trunk utilities, municipal service corridors, or overland flow routes.

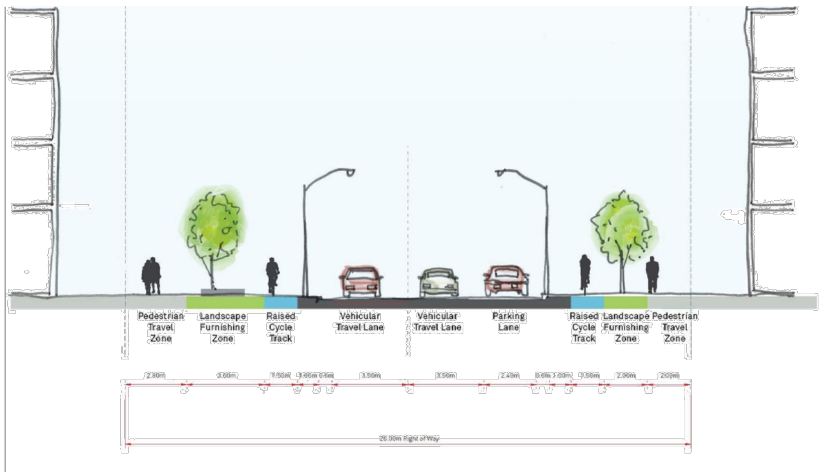
The narrowest public right-of-ways are typically reserved for local streets intended to provide property access, accommodate local traffic and relatively low volumes of street users, and serve low and medium density development.

Concept street cross-sections, developed as part of the Clair-Maltby Secondary Plan, are included in Exhibit 1.



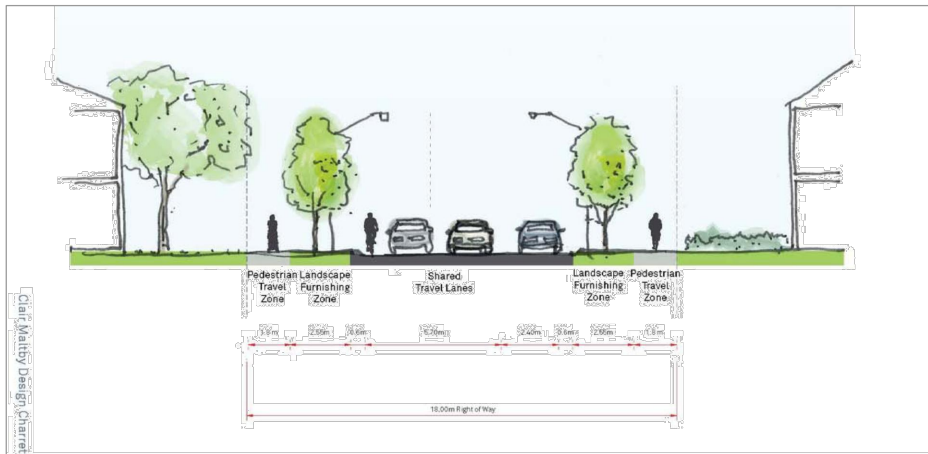
Gordon Street Arterial Road
30 m ROW - Raised Cycle Track

Clair-Maltby Secondary Plan
Scale 1:150
BrookMcIlroy



Collector Road
26 m ROW - Parking Lane and Raised Cycle Track

Clair-Maltby Secondary Plan
Scale 1:150
BrookMcIlroy



Local Road
18 m ROW - Shared Travel Lanes and On Street
Parking

Clair-Maltby Secondary Plan
Scale 1:150
BrookMcIlroy

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CLAIR-MALTBY SECONDARY PLAN CONCEPTUAL CROSS SECTIONS

9.4 CLAIR-MALTBY SECONDARY PLAN TRAIL NETWORK

Trail locations are identified within the Master Environmental Service Plan for the Clair-Maltby Secondary Plan area, and are generally located along the edges of the Natural Heritage System. The function of the Trail Network is to provide additional pedestrian and cycling facilities throughout the Secondary Plan area in order to:

- accommodate commuter and practical pedestrian and cycling circulation and connectivity;
- provide recreational amenity and active transportation use;
- augment the wider trail network in the southern parts of the City of Guelph; and
- augment the collector street network prepared as part of the Preferred Community Structure plan.

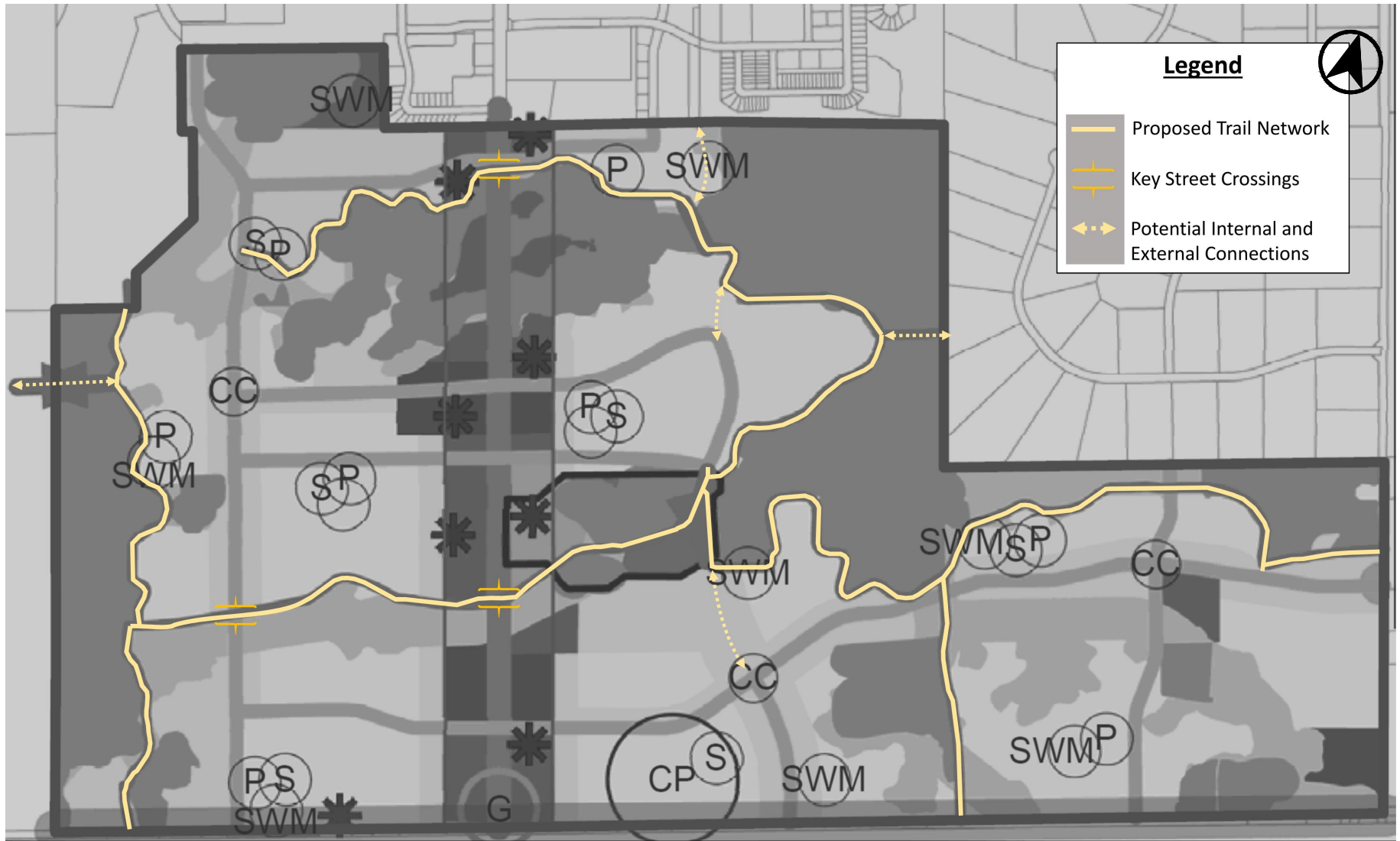
The Clair-Maltby Secondary Plan creates a linked trail system for both recreational and utilitarian users, and is intended to accommodate and prioritize active transportation travel modes. Trail links are strategically located to compensate for limitations in the Secondary Plan street network (understanding the limitations of new road construction on the Natural Heritage System), and to provide the most direct and convenient pedestrian and cycling connections between residential areas and community facilities and commercial developments.

East of Gordon Street, important elements of the Trail Network are proposed to cross the Natural Heritage System to continue to allow for pedestrian and cycling connectivity where typical street right-of-ways would otherwise not be permitted. Future studies will be required to demonstrate that active transportation links are compatible with natural and cultural heritage attributes in these areas.

Potential trail sections are also identified, which are intended to support utilitarian access to the trail system itself, and provide more direct linkages within the wider mobility network identified as part of the Preferred Community Structure plan. Potential linkages are also identified conceptually to extend beyond the Clair-Maltby Secondary Plan area and connect with the wider trail network and adjacent neighbourhoods.

The proposed trail network is illustrated on the Preferred Community Structure Plan and outlined in Figure 16. Detailed trail and path design guidelines are discussed in Section 8.0, herein, and detailed in the City of Guelph Active Transportation Network Study Plan (2017).

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CLAIR-MALTBY SECONDARY PLAN TRAIL NETWORK

9.5 GORDON STREET MAIN STREET CONCEPT

Gordon Street plays an important role in accommodating development within the Clair-Maltby Secondary Plan area. The Gordon Street corridor is a central element in the local transportation network, connects the area with the wider City and County, provides an opportunity for transit priority, and is envisioned as a main street / village core destination.

The Gordon Street corridor is intended to be designed to highlight and celebrate the public realm, cultural and natural heritage features, and otherwise be framed by a continuous urban built form with building facades fronting onto the street. Given the variety of land uses and cultural / public facilities anticipated along the Gordon Street corridor, the public right-of-way is required to accommodate all street users through the delivery of multi-modal infrastructure. Its design will support the efficient and effective routing of transit services, the comfortable movement of cyclists and pedestrians, and accommodate for automobile travel.

Vehicle parking is not intended to separate the Gordon Street right-of-way from private buildings. Vehicle parking should generally be located underground, in structures, or to the rear or sides of buildings, and designed in a manner such that it does not have a direct impact on the street.

9.5.1 Traffic Operations

Gordon Street is intended to be a multi-modal travel corridor, prioritizing transit, cycling and walking. However, the corridor is also anticipated to accommodate considerable traffic volumes given its role as a regional traffic corridor, its interchange with Highway 401 to the south, and the extent of north / south vehicular routes planned within the Secondary Plan area.

Understanding this, important improvements should be advanced to allow for additional traffic routing in the northbound and southbound directions, including planned improvements to Hanlon Parkway, the extension of Southgate Drive to Maltby Road, and new north-south oriented collector roads outlined in the Preferred Community Structure Plan.

To improve traffic flow along the corridor, Gordon Street itself can also be optimized through appropriate signal timing and coordination, and the inclusion of ancillary turn lanes when necessary. Separate left-turn lanes should be provided at all junctions where left-turns are permitted, which may further support the introduction of a continuous left-turn / centre median lane along the extent of Gordon Street within the Secondary Plan area. The location of ancillary turn lanes and traffic signal control for intersections along the Gordon Street corridor are further detailed in Section 15.5.

Traffic signal coordination can process estimated future traffic volumes through the corridor, limit traffic queue impacts and decrease associated traffic delays. It may also be appropriate that traffic signal timing prioritize traffic movement northbound and southbound along the Gordon Street corridor in lieu of eastbound and westbound movements across the corridor.

A 4-lane Gordon Street cross-section is anticipated to appropriately accommodate traffic demands along the corridor, but will also require the inclusion of ancillary turn lanes at signalized intersections. Separate left-turn lanes are appropriate at all signalized intersections along the corridor. Separate right-turn lanes may be

supported in certain instances when traffic demands warrant them or longer transit-stop dwell times are expected – specifically at the Gordon Street / Clair Road intersection.

9.5.2 Transit-Support Elements

The Clair-Maltby Secondary Plan encourages dense, mixed-use development along the Gordon Street corridor to support the deployment of transit services currently operating along Gordon Street and anticipated to be extended along the corridor through the Secondary Plan area. The provision of frequent transit service along the Gordon Street corridor also supports the urban development of the corridor, provides mobility choice for area residents, employees, and visitors, and establishes a multi-modal and public amenity framework for the corridor.

Transit priority measures, to be potentially integrated within the Maltby Secondary Plan area to increase transit mode split and the proportional uptake of transit use, can include physical design elements to reduce transit vehicle delays and provide amenity and convenience to perspective riders, and policy measures to make transit more appealing, affordable and competitive with other travel modes.

A variety of measures can be introduced within the Secondary Plan area to support Gordon Street as a *Transit Spine*, are summarized in Table 9 and segmented into three primary categories:

1. Transit vehicle priority,
2. Transit policy and operations, and
3. Transit amenity.

The measures outlined in Table 9 provide a high-level summary of potential infrastructure and policies to prioritize transit service delivery within the Clair-Maltby Secondary Plan area and specifically along the Gordon Street corridor. Other measures can be pursued for the area, or for the City overall, to better deliver transit. The detailed design and location of transit services, as well as operational provisions, are to be developed in consultation with Guelph Transit.

The ability for Gordon Street to respond to traffic demands, reduce traffic queue impacts, and minimize traffic delay will also have an impact on transit vehicles routing along the corridor. Where traffic delays persist, additional measures can be implemented to prioritize transit vehicle travel. These measures should be given greater consideration when planning for key transit terminals or transfer points, which typically are associated with higher transit vehicle volumes and tend to be located in more densely-populated locations. The addition of traffic signals to facilitate specific transit vehicle movements at the location of transit terminals should also be considered. Within the context of the Secondary Plan, it may be appropriate to locate a bus terminal near the intersection of Gordon Street / Street E to accommodate intra and inter-city transit services.

The location and design of transit stops will impact the attractiveness of transit in a variety of ways. Transit stops and stations should be designed to be universally accessible, safe and amenity-rich. Transit stops should be clear of clutter and obstructions, well-lit, have boarding / alighting areas, and appropriate shelter and convenience items (transit information, seating, etc.). The location of transit stops should reflect the local pedestrian and cycling networks, and further be supported by these networks. Transit stops must also be appropriately spaced to service new development while not incurring induced delay to transit vehicles and

their riders. The spacing of transit stops depends on the type of service provided, whereas local bus services would have higher stop frequencies than express bus or other higher-order transit services.

Potential Transit Terminal

Opportunity may exist to pursue the development of a transit terminal in the area of the Clair-Maltby Secondary Plan to achieve a number of objectives, including:

- 1) Support dense, mixed-use urban development;
- 2) Support and encourage Transit Oriented Development;
- 3) Support transit service operations;
- 4) Encourage transit use; and
- 5) Take advantage of the strategic urban boundary location of the Clair-Maltby Secondary Plan to support interaction and transfers between local and regional transit services.

The introduction of a transit (bus) terminal is also supported in the City's Transit Growth Strategy and Plan (2010) which specifies that the City work with property owners to establish a 4 to 6 bay bus terminal within the South End Node (Gordon Street and Clair Road intersection).

Transit terminals are supported by robust active transportation connections, an appropriate mix of commercial uses, and higher density residential and employment uses. Metrolinx highlights six important aspects of Transit Oriented Development, which support the creation of transit hubs and transit terminals:

- i) Multi-modal transportation allowing transportation choice;
- ii) Urban density and use intensity;
- iii) High levels of pedestrian priority, including spaces designed for pedestrian priority;
- iv) Embedded technology (i.e. access to real time transit information, internet, and seamless transfers between transportation modes);
- v) Economic vitality and competitiveness, consisting of significant development potential and strong economic anchors; and
- vi) A strong sense of place – a vibrant and vital place to support the transportation experience.

Within the context of the Clair-Maltby Secondary Plan, it may be appropriate to locate a bus terminal in a location that accommodates intra and inter-city transit services and associated transfer activity, in proximity to public amenity, and high density and mixed land uses.

Conceptually, a transit terminal may be located in vicinity of the Gordon Street / Clair Road intersection (as noted within the Transit Growth Strategy and Plan), or a location near the southern extent of the Clair-Maltby Secondary Plan area in the vicinity of the Gordon Street / Street E intersection. A transit terminal near the south extent of the Clair-Maltby Secondary Plan area would support mixed-use and high-density residential development planned in this area, and allow for a logical southern terminus for local transit routes that could, potentially, connect with existing GO Transit bus routes routing along Gordon Street from Highway 401.

A transit terminal facility, should it be pursued, would be developed in consultation with Guelph Transit, Metrolinx, and other potential private and public transit service providers, in order to appropriately design and locate a desirable facility.

TABLE 9 POTENTIAL TRANSIT-SUPPORTIVE MEASURES

Transit-Supportive Policy	Potential Implementation Measure	Description	Examples
Transit Vehicle Priority	Transit Priority Signal (TPS)	Traffic signals can be calibrated with bus detection technology, extending traffic signal <i>green-time</i> for transit vehicles.	Saskatoon Transit 3 rd Avenue and Broadway Avenue BRT Transport for London Selective Vehicle Detection Technology
	Transit Queue Jump Lanes	Right-turn lanes paired with a transit stop can be extend beyond typical traffic queue lengths to accommodate transit vehicles.	City of Toronto Complete Streets Guidelines
	Transit Vehicle Priority Turning Lanes	Designated transit-only turning lanes to accommodate transit routes with turns or transit vehicles routing to key transit terminals / stations. These can effectively reduced transit delays associated with typical left-turn movements.	Millway Avenue at Vaughan Metropolitan Centre Station (Toronto Transit Commission) Albany Highway / Nicholson Road, Perth, Australia (Western Australia PTA)
	Designated Transit-Only Lanes	Designated transit-only travel lanes or transit lanes within a separated right-of-way. Transit lanes can be separated by traffic lanes by physical barriers or appropriate pavement markings.	Express Bus Lanes (XBL) Network in New York City Bus Rapid Transit Network, Bogota, Colombia
Transit Policy and Operations	Free-Transit Use	To encourage transit use, transit fares can be removed on days with higher pollution levels, adverse weather, or for certain / designated trips.	Free Fare for Clean Air Program, Prince George, B.C.
	Pre-paid boarding	Provide options / services for fare payment before boarding a vehicle to reduce transit vehicle dwell times at transit stops.	Transport For London Fare Policy
	All-door boarding / alighting	Allow transit vehicle boarding and alighting at all transit vehicle doors to reduce transit vehicle dwell times at transit stops.	Toronto Transit Commission Streetcar Boarding / Alighting
	Minimum Service Standards	Provide a minimum service frequency (15-minutes or less), all-day, along designed corridors.	Toronto Transit Commission (Ridership Growth Strategy; Express Bus Network)
	Express Service	Provide supplementary express transit service operating with fewer stops, in addition to local frequent stop service.	
Transit Amenity	Provision of Transit Stop Amenities	Inclusion of transit stop shelters, furniture, lighting, landscape, public art, "next-bus" real-time information, and boarding / alighting pads.	City of Toronto Complete Street Guidelines
	Accommodate Transfers	Reduce the space between bus route transfers, or consolidate transfers within designated stops / stations. It may be appropriate to locate a bus terminal near the intersection of Gordon Street / Street E to accommodate intra and inter-city transit services transfers. Prioritize pedestrian movement allowing for safe, convenient walking spaces between transit stops where transfers are anticipated.	
	Incorporate "last-mile" Facilities	Transit stops should be well connected to area pedestrian and cycling infrastructure, include bicycle parking, wayfinding, and fare payment options.	
	Universal Accessibility	Design transit stops / stations to accommodate for all ages and users.	

10.0 MOBILITY PLAN FRAMEWORK: TRANSPORTATION DEMAND MANAGEMENT (TDM)

10.1 SECONDARY PLAN APPROACH TO TRANSPORTATION PLANNING

A Transportation Demand Management (TDM) framework will be pursued to:

- establish a foundation for managing future travel demands with development of the Secondary Plan area, and
- ensure that measures to promote transit and active transportation are implemented by way of the transportation amenities provided, as well as the built form of the community.

It is recommended that policy statements pertaining to TDM be included within the Clair-Maltby Secondary Plan. Within this section, a best practice review of municipal policy documents in southwestern Ontario and the Greater Toronto & Hamilton Area is outlined. The purpose of the review is to identify policy themes that could be included within the Clair-Maltby Secondary Plan, building upon TDM-related policy statements currently included in the City of Guelph Official Plan and the Guelph-Wellington Transportation Study.

10.2 APPLICABLE TRANSPORTATION DEMAND MANAGEMENT POLICY

The City of Guelph Official Plan contains policy statements relating to TDM, referring to it as an essential part of the City's integrated sustainable transportation system. TDM measures are suggested to increase the modal share of automobile travel alternatives, including bicycle infrastructure, providing support for transit, allocating car-share parking spaces, and other initiatives, all of which are expected to be considered as part of future development applications.

The Guelph-Wellington Transportation Study identifies TDM strategies, which partly accommodates forecast future travel demands through reductions in vehicular travel demands. These TDM measures include:

- a supportive land use and urban design practices (as outlined in the Official Plan);
- ridesharing, cycling and walking;
- alternative measures for reducing auto use (parking pricing / supply management, telecommuting, alternative work schedules, congestion pricing); and
- TDM programs (alternative strategies, education, etc.).

More detail relating to TDM policy found within the City of Guelph Official Plan and the Guelph-Wellington Transportation Study is included in Section 4.3.2 and Section 4.6, respectively, and additional policy documents making reference to TDM policy goals, including the Downtown Guelph Secondary Plan, Guelph Innovation District Secondary Plan, and City of Guelph Community Energy Plan, are included in Section 4.7.

10.2.1 Comparative Review of Transportation Demand Management Policy

BA Group has conducted a review of TDM policies found within the Official Plans, Secondary Plans, and Transportation Master Plans of municipalities in the Greater Toronto & Hamilton Area and Southwestern Ontario. The purpose of the review is to identify best practices that can inform the development of TDM policy that can be included in the Clair-Maltby Secondary Plan.

A complete set of researched TDM policy can be read in **Appendix D**. Within this section, a thematic review of TDM policies is provided, identifying the general purpose of the examined policy, comparable examples, and a list of Official Plans and Secondary Plans where similar TDM policy is present.

Policy Theme #1: Require a Transportation Demand Management Plan as part of Development Applications.

Several policy documents either stated that a TDM Plan would be a requirement as part of development applications, or indicated that a TDM Plan may be required.

Rationale:

Ensure that development applications not only take into consideration the vehicular traffic that the future development will generate, but to develop a strategy for mitigating vehicular trip generation through infrastructure improvements, marketing efforts, and the development of partnerships, each of which promote alternatives to automobile travel among residents or tenants.

Examples:

Section 6.11 of the Cambridge West Lands Secondary Plan states the following:

The implementation of Transportation Demand Management measures shall be considered as part of every application for new development or redevelopment within the Secondary Plan area.

In some cases, the requirement for a TDM Plan is stipulated based upon the scale of the proposed development, as is the case with Section 7.7.2.3.(b) of the North Oakville East Secondary Plan:

The Town will encourage any development which contains more than 3,000 square metres of office use or 9,290 square metres of industrial use to establish with the Town a travel demand management plan and implementation strategy for the specific development.

The following policy documents include similar policy statements:

- Downtown Guelph Secondary Plan, City of Kitchener Official Plan, City of Mississauga Official Plan, Port Credit Local Area Plan (Mississauga), City of London Official Plan, City of Vaughan Official Plan, Town of Aurora Official Plan, Newmarket Urban Centres Secondary Plan, Town of Oakville Official Plan, North Oakville West Secondary Plan, Town of Milton Official Plan

Policy Theme #2: Indicate that vehicular parking standards may be reduced with the implementation of Transportation Demand Management Measures.

Several municipalities indicate that either a TDM plan or a commitment to the implementation of TDM measures will be considered as justification for a reduction to vehicular parking requirements.

Rationale:

Sensible vehicular parking management and the provision of an extensive suite of TDM measures are mutually supportive. If vehicular parking is oversupplied, future residents, tenants, or visitors to a development would have less incentive to utilize the alternative transportation options that are available to them. Likewise, a modest parking supply without appropriate TDM measures would negatively affect local traffic and place undue parking demand on the surrounding area. Therefore, it is sensible to permit reductions to vehicular parking requirements if appropriate TDM measures are proposed as part of a development application.

Examples:

Section 13.C.8.2 of the City of Kitchener Official Plan states the following:

The City may consider adjustments to parking requirements for properties within an area or areas, where the City is satisfied that adequate alternative parking facilities are available, where developments adopt transportation demand management (TDM) measures or where sufficient transit exists or is to be provided.

Similarly, Section 11.1.4.1.4 of the Downtown Guelph Secondary Plan states the following:

The City may permit reduced parking standards for developments which demonstrate through a TDM plan and implementation strategy that a reduction in parking standards is appropriate.

The following policy documents include similar policy statements:

- City of Cambridge Official Plan, City of Waterloo Official Plan, Region of Waterloo Official Plan, City of London Official Plan, Newmarket Urban Centres Secondary Plan, Town of Oakville Official Plan, North Oakville East Secondary Plan, North Oakville West Secondary Plan, Sheppard Lansing Secondary Plan (Toronto)

Policy Theme #3: Provide a list of recommended or suggested Transportation Demand Management Measures or Initiatives.

It is common practice to include a list of suggested TDM measures to be included as part of a TDM Plan within the examined policy documents.

Rationale:

Generally, providing a list of suggested TDM measures serves to help the community gain a better understanding of what TDM is; it is generally not a well understood concept outside of the development community. Further, naming specific TDM measures sets expectations as to the kind of infrastructure can be expected in the community (i.e. car-share vehicles or preferential carpool spaces). As it relates to development applications, providing a suggestive list provides guidance to the type of TDM measures the municipality will favour.

Examples:

Section 9.3.5(iv) of the Newmarket Urban Centres Secondary Plan states the following:

TDM strategies should be designed to decrease single occupancy vehicle use, reduce peak period demands, especially discretionary trips in the afternoon peak period, promote active transportation and transit use, and to increase vehicle occupancy during peak periods and should include, but not be limited to:

- a) provision for car share opportunities in major residential developments;*
- b) secure indoor bicycle parking and showers in conjunction with major office and commercial uses, institutional and civic uses;*
- c) preferential parking for carpool and electric vehicles in non-residential developments;*
- d) provision for bicycle parking in close proximity to building entrances and transit stations;*
- e) transit incentive programs, including subsidized transit fares; and*
- f) incorporating paid parking requirements with non-residential development.*

The following policy documents include similar policy statements:

- City of Cambridge Official Plan, City of Kitchener Official Plan, City of Mississauga Official Plan, City of Vaughan Official Plan, City of Markham Official Plan, Town of Oakville Official Plan, Downsview Area Secondary Plan (Toronto), North York Centre Secondary Plan (Toronto)

Policy Theme #4: Pledge to promote Transportation Demand Management initiatives through Transportation Management Associations and associated marketing efforts or through programming.

In municipalities with existing Transportation Management Associations (TMA), several policy documents indicate that the municipality will continue to work with the TMA to promote TDM initiatives. In other cases, the document pledges to promote TDM measures and implement monitoring programs to measure the success of TDM programming.

Rationale:

Generally, a TMA is a non-profit organization that provides transportation services within a geographically defined area. Normally, it is member-controlled and focussed upon employment areas; they are generally public-private partnerships. The presence of a TMA is a significant advantage to the promotion of TDM programs, measures, and initiatives, given that it is an organization that exists to serve that purpose. The inclusion of policy statements indicating support for TMA's further strengthens TDM efforts.

Examples:

Section 8.5.3 of the Mississauga Official Plan indicates broad support for TDM programming:

Mississauga will encourage employers to implement TDM programs.

Section 5.4.1 of the Kitchener Transportation Master Plan specifically indicates support for the local TMA:

Expand employer TDM programs in Kitchener through existing TDM tools and services. This can begin with the City's membership in the TravelWise TMA to adopt carpool ridematching, subsidized transit passes, guaranteed-ride home and outreach programs to encourage its staff to choose sustainable modes of travel to and from work. Given TravelWise is a well-established program in the Region, TDM efforts and outreach should be expanded beyond City staff and beyond the downtown area to encourage major employers throughout the City to adopt these services.

The following policy documents include similar policy statements:

- Region of Waterloo Official Plan, City of Vaughan Official Plan, City of Markham Official Plan, Newmarket Urban Centres Secondary Plan, Town of Oakville Official Plan, Sheppard Lansing Secondary Plan (Toronto), Downsview Area Secondary Plan (Toronto)

Policy Theme #5: Indicate that a Transportation Demand Checklist will be created (or exists) to assess development applications.

In **Appendix D**, a selection of existing TDM checklists is provided; the intent of the documents are to assess development applications. In some cases, the TDM checklist is notified as a policy implementation instrument in the examined policy.

Rationale:

The utilization of a TDM checklist by a municipality (potentially within a Secondary Plan area) provides a streamlined instrument to review development applications. Further, it indicates the expectations of the municipality in regards to TDM, showing what needs to be included in development proposals for them to be acceptable from a TDM perspective.

Examples:

Section 5.4.4 of the Kitchener Transportation Master Plan states the following:

The City should develop a TDM checklist to help review and evaluate development applications, City of Kitchener transportation-related projects and projects of the Region and Province. This checklist would assign points and provide a rating, similar to the Region of Waterloo's Travel Demand Management Implementation Checklist. Another example of a TDM checklist was developed in the study "TDM Supportive Guidelines for Development Approvals" prepared by the Association for Commuter Transportation in Canada.

Part of this TDM checklist can include a requirement to prepare TDM plans as part of transportation impact studies for new developments and major transportation projects.

Policy Theme #6: Enable the inclusion of a Transportation Demand Management Plan as part of the rationale for increases to land density.

Several policy documents enable TDM initiatives (or a plan) to be included as part of the rationale to increase density permissions.

Rationale:

A policy statement indicating added leniency to density permissions if a TDM Plan (or initiatives) is proposed greatly enhances the appeal of TDM to a development proponent, and is likely to improve the TDM measures proposed as part of a project. Further, the City of Guelph can pledge, within the policy statement, to work with development proponents to cater appropriate TDM measures to the development proposal, as part of this effort.

Examples:

Section 11.1.38(5), which is a specific area provision, of the City of Waterloo Official Plan states the following:

The determination of appropriate increases in density for areas designated high density, shall be considered based on the ability of the project to meet one or more of the following objectives and shall be specified on a site by site basis, in the implementing zoning:

(i) To encourage improvements suggested by a Transportation Demand Management Plan, where appropriate;

The following policy documents include similar policy statements:

- City of Kitchener Official Plan, Port Credit Local Area Plan (Mississauga)

Additional Policy Themes

In addition to the aforementioned policy themes that appear in many policy documents in the study area, there are policy statements that are unique. These policy themes generally involve connecting TDM to other policy areas, including the following:

- The City of Kitchener Official Plan (Section 6.C.1.2) indicates that a Health Impact Assessment may be required as part of development applications, and indicates that it may be evaluated based upon the proposals support for physical activity, which could be connected to reducing automobile dependency and TDM measures.
- The City of Kitchener Official Plan (Section 7.C.7) makes a direct connection between air quality and TDM, as a policy goal.
- Similarly, the City of Waterloo Official Plan (Section 8.5.3(1)) makes a direct connection between energy conservation and TDM.
- The Region of Waterloo Official Plan (Section 3.C.3) specifies that when a development applicant agrees to implement TDM measures, the Region may consider granting reductions to the level of road improvement that would otherwise be required, associated with the proposed development.
- The City of Vaughan Official Plan (Section 4.3.3.5) pledges to work with developers to provide new homebuyers with information on multi-modal transportation options.

10.2.2 Land Use Planning and Transportation Demand Management Integration

In addition to the aforementioned policy statements identified from outside of Guelph, the City should consider including a policy statement highlighting the importance of the relationship between land use planning and transportation demand management. Land use planning decisions should be evaluated on the basis of their ability to facilitate and encourage shorter trip distances between typical weekday needs, including access to commuter services, amenities, routine errands/purchases, and schools.

10.3 RECOMMENDED TRANSPORTATION DEMAND MANAGEMENT FRAMEWORK

Upon review of existing policy statements in the Guelph Official Plan and the Guelph-Wellington Transportation Study relating to TDM, and a review of best practices in TDM policy in southwestern Ontario and the Greater Toronto & Hamilton Area, it is recommended that the Clair-Maltby Secondary Plan provide a robust framework of requirements ensuring that the development being pursued in the area meets a strict TDM standard.

The following policy themes, outlined in Table 10, are recommended for inclusion in the Clair-Maltby Secondary Plan.

TABLE 10 CLAIR-MALTBY SECONDARY PLAN RECOMMENDED TDM FRAMEWORK

Policy Theme Recommended for Inclusion	Best Practice Examples	Additional Notes
Policy Theme #1: Require a TDM Plan with Development Applications.	Cambridge West Lands Secondary Plan, North Oakville East Secondary Plan	Already included in Guelph Official Plan.
Policy Theme #2: Allow TDM provision to reduce vehicular parking standards.	City of Kitchener Official Plan, Downtown Guelph Secondary Plan	Currently suggested in Guelph Official Plan; can be made more specific in Clair-Maltby Secondary Plan.
Policy Theme #3: Provide suggested TDM Measures list.	Newmarket Urban Centres Secondary Plan	Already in Guelph Official Plan, list can be expanded in Clair-Maltby Secondary Plan.
Policy Theme #4: Work with TMA's to promote TDM initiatives and programming.	Mississauga Official Plan, Kitchener Transportation Master Plan	This would advocate the creation of a TMA in Guelph.
Policy Theme #5: Utilize TDM checklist to assess development applications.	Kitchener Transportation Master Plan	A selection of existing TDM Checklists in neighbouring municipalities is included in Appendix D .
Policy Theme #6: TDM Plan to rationalize increases to land density.	City of Waterloo Official Plan	Enable developers to propose a robust TDM Plan as a means of procuring additional density permissions.
Policy Theme #7: Support the integration of land use planning and transportation demand management decision making.	City of Mississauga Official Plan	Land use planning can be a TDM measure if it facilitates shorter trip distances.

11.0 VEHICLE PARKING CONSIDERATIONS

As the City of Guelph develops policies for the Clair-Maltby Secondary Plan and eventually, an area specific Zoning By-law, the challenge will be the development of standards that would provide parking supply to meet demands, where appropriate, and still encourage active transportation to support the BRT hub, main street and public realm.

Parking within this section is reviewed from two (2) perspectives:

1. The first perspective is policy based and influences the overall required parking supply. Parking standards are set out within the applicable Zoning By-law, which outlines the ratios and provides regulations governing the number of spaces and the location of these spaces based upon land use, unit type, and floor area.
2. The second perspective influences the use of the parking infrastructure – parking demand. Parking demands are influenced by the type of unit, ownership, location, demographic of the area, surrounding land uses, transit accessibility and pedestrian environment.

Both of these perspectives are discussed within this chapter. It is important to note the difference between 1) parking supply, and 2) parking demand particularly as management strategies.

The parking review and assessment is organized into four (4) key topic areas – as outlined in the following.

1. Review of the in-force City of Guelph parking standards based on land use to understand the variables and measurements (i.e. type of unit, floor area) used to calculate parking requirements.
2. A comparative review of parking regulations within neighbouring and comparable municipalities across southern Ontario to establish the range of parking requirements based upon type of land use.
3. Identification and discussion of effective parking management strategies to influence supply and demand.
4. A discussion of the appropriate parking management techniques which could be implemented to influence parking behaviour within the new Clair-Maltby Secondary Plan area.

There are a variety of factors influencing the development of parking requirements and standards. These factors (i.e. vehicular use, trip generation and travel choices) are affected by population density, layout of the municipality, transit accessibility, location of the development and adjacent land uses.

The purpose of this comparative parking standards review is to provide an understanding of the existing parking standards with the City of Guelph, how they compare relative to other neighbouring and similar municipalities, and how they might apply to the Clair-Maltby Secondary Plan area.

11.1 COMPARATIVE REVIEW OF PARKING REQUIREMENTS

11.1.1 Methodology

BA Group has completed a high-level comparative review of general parking requirements, which include common types of residential and non-residential uses that would likely be developed within the Clair-Maltby Secondary Plan area.

The purpose of this review is to understand the variations in minimum parking requirements for common land uses and to provide the City of Guelph with a range of standards, which can be used generally, to understand the current parking standards as they compare to other similar municipalities. The intent of this section is provide a foundation to guide discussions related to parking requirements, the approval process, and strategies that may be implemented to guide development within the Secondary Plan area.

We note that this high-level review is not meant to provide a set of parking regulations to be implemented. It is important to understand that each municipality exhibits their own unique characteristics and has implemented parking standards based upon development and approval patterns, reflective of parking demands and trends that may be occurring.

The parking standards, based upon land use, that have been selected for comparative review include common types of uses for residential and non-residential uses, as noted below:

- **Residential Uses:**
Includes single family dwelling units, multiple dwelling units, visitors to apartment buildings, mixed-use buildings and live-work units
- **Non-Residential Uses:**
Includes retail uses, service uses, office uses (exclusive of medical office uses), community uses, hospitality uses and restaurant uses

11.1.2 Understanding the Current Parking Context

Proposed developments located within the City of Guelph are required to review parking standards outlined within the applicable Zoning By-law. These standards are used to calculate the minimum number of parking spaces required based upon land use and location. The two applicable Zoning By-laws for proposed developments are:

- Downtown Zoning By-law (2017)-20187
- City of Guelph Comprehensive Zoning By-law 1995-14864

We understand that the City of Guelph has recently initiated a review of the in-force Zoning By-law. It is our understanding that the Clair-Maltby Secondary Plan parking requirements will align with the overall vision that the City of Guelph has towards its growth and development.

BA Group has generally reviewed the applicable parking standards for residential and non-residential uses based upon the in-force Zoning By-laws. Parking requirements for residential and non-residential uses are further discussed and summarized in Section 11.1.3.

11.1.2.1 Parking Reduction Permissions

Parking reductions are typically permitted within the Zoning By-law, depending on a number of factors, not limited to land use compatibility (i.e. shared parking) or other development restrictive factors (i.e. heritage buildings).

The City of Guelph currently permits parking reductions for proposed development sites, notably for Designated Structures (i.e. designated heritage building). In these applications, *a reduction of 20% of the required parking spaces are permitted, however, in no case shall the reduction be greater than 5 parking spaces.*

11.1.3 Parking Requirements Based Upon Land Use

11.1.3.1 Residential Uses

Residential land uses include a variety of dwelling unit types ranging from single family dwelling units (i.e. single-detached housing) to multiple dwelling units (i.e. apartment buildings or townhouses). We also note that the layout of multiple dwelling units can also result in varying standards depending upon the municipal interpretation and understanding of the urban form. To clarify, multiple dwelling units can refer to apartment buildings (i.e. units stacked on top of each other) or townhouses (i.e. units that are divided vertically and are side-by-side, sharing a common wall).

The layout of multiple dwelling units has resulted in varying standards within municipalities depending on the layout (i.e. units stacked on top of each other or units side by side). The City of Guelph has not differentiated between the two layouts. Multiple dwelling units have the same parking requirement whether they are stacked on top of each other or sharing a common wall horizontally. Parking requirements for this type of use are calculated based upon the number of dwelling units. A summary of the residential parking standards can be found in Table 11.

11.1.3.2 Non-Residential Uses

Non-residential land uses include retail, office, service, restaurant, and hospitality (i.e. hotel) land uses. These are the most common types of commercial units that are likely to be developed within the Clair-Maltby Secondary Plan area. Parking requirements for this type of unit are calculated based upon gross floor area (GFA). The City of Guelph has defined the GFA within the Zoning By-law as, *the total floor area of a building measured from the centre line of the partition walls and the exterior face of outside walls, but does not include any floor area of a basement, cellar, attic, garage, porch or any floor area used for parking or any floor area which does not have a clear floor to ceiling height of 2.15 metres.*

TABLE 11 GUELPH ZONING BY-LAW REVIEW– RESIDENTIAL USES

Municipality	Apartment Building / Multiple Dwelling Unit	Visitors to Apartment Buildings	Mixed-Use or Live-Work Unit
Guelph Downtown	1 per residential dwelling unit	See below for D1 and D2 zones	In addition to the non-residential parking requirement, 1 parking space per residential dwelling unit is required.
Guelph Special Downtown Zones (D1/D2)	1 per residential dwelling unit	0.05 spaces per dwelling units reserved for exclusive use of visitors, for 10+ dwelling units	Parking is required for residential uses only
Guelph General By-law Standard	For the first 20 units: 1.5 spaces per unit, and for each unit in excess of 20: 1.25 per unit	--	--
Burlington (Zoning By-law 2020)	1-Bed: 1.25 spaces per unit 2-bed: 1.50 spaces per unit 3+bed: 1.75 spaces per unit	0.35 spaces per unit	--
Burlington (Zoning By-law 2020) (<i>townhouse dwelling</i>)	2 occupant spaces per unit	0.50 spaces per unit	--
Cambridge (Zoning By-law 150-85) (<i>apartment house, maisonette, mixed terrace or cluster attached duplexes</i>)	1 space per dwelling unit;	plus 1 space for each 4 dwelling units for visitors only.	--
Cambridge (Zoning By-law 150-85) (<i>cluster row housing</i>)	1 space for the first 4 bedrooms per dwelling unit; plus 1 space for each additional 2 bedrooms	Plus 1 space for each 2 dwelling units for visitors only	--
Hamilton (Comprehensive Zoning By-law 05-200)	1 space per unit OR 0.3 spaces per unit ⁴	--	--
Kitchener (UGC Zones) (Final Draft Zoning By-law, April 2018)	0.8 spaces per dwelling unit	0 spaces per dwelling unit	--
Kitchener (MIX Zones) (Final Draft Zoning By-law, April 2018)	0.9 spaces per dwelling unit	0.1 spaces per dwelling unit only where 5 or more dwelling units are on a lot	--
Kitchener (All Other Zones) (Final Draft Zoning By-law, April 2018)	1 space per dwelling unit	0.1 spaces per dwelling unit only where 5 or more dwelling units are on a lot	--
London (Zoning By-law Z-1)	1.25 spaces per unit OR 1 space per unit OR Zero parking ¹	--	--

Municipality	Apartment Building / Multiple Dwelling Unit	Visitors to Apartment Buildings	Mixed-Use or Live-Work Unit
Mississauga (Zoning By-law 0225-2007): Downtown Apartment (within CC1 to CC4 zones)	1 space per unit	0.15 spaces per unit	1.25 spaces per unit (dwelling units located above a commercial development with a maximum height of 3 storeys)
Oshawa (Zoning By-law 60-94)	1.45 spaces per unit OR 1 space per unit OR 0.87 spaces per unit ²	0.3 spaces per unit OR 0.33 spaces per unit	--
Toronto (Zoning By-law 569-2013): Policy Area 3	Bachelor: 0.6 spaces per unit 1-Bed: 0.7 spaces per unit 2-Bed: 0.9 spaces per unit 3+ Bed: 1.5 spaces per unit	0.1 spaces per unit	Bachelor: 0.6 spaces per unit 1-Bed: 0.7 spaces per unit 2-Bed: 0.9 spaces per unit 3+ Bed: 1.5 spaces per unit
Toronto (Zoning By-law 569-2013): Policy Area 4 (Areas with Surface Transit)	Bachelor: 0.7 spaces per unit 1-Bed: 0.8 spaces per unit 2-Bed: 0.9 spaces per unit 3+Bed: 1.1 spaces per unit	0.15 spaces per unit	Bachelor: 0.7 spaces per unit 1-Bed: 0.8 spaces per unit 2-bed: 0.9 spaces per unit 3+bed: 1.1 spaces per unit
Toronto (Zoning By-law 569-2013): All Other Areas	Bachelor: 0.8 spaces per unit 1-Bed: 0.9 spaces per unit 2-bed: 1 space per unit 3+bed: 1.2 spaces per unit	0.2 spaces per unit	Bachelor: 0.8 spaces per unit 1-Bed: 0.9 spaces per unit 2-bed: 1 space per unit 3+bed: 1.2 spaces per unit
Waterloo (Zoning By-law 1108)	1.5 spaces per unit	--	1 space per dwelling unit
Waterloo (Zoning By-law 1418)	1.5 spaces per unit	--	1 space per dwelling unit

Notes:

- 1.25 spaces / unit is for Parking Areas 2 & 3 (PA2 & PA3); 1 space / unit is for Parking Area 1 (PA1); for all lands zoned "Downtown" in PA1, zero parking is required.
- 1.45 spaces / unit applies to condominium apartments; 1 space per unit applies to rental apartments; 0.87 spaces per unit for "Apartment Building – Rental for student accommodation only" in MU-B(1) zones (Mixed Use Zones)

TABLE 12 GUELPH ZONING BY-LAW REVIEW – COMMERCIAL USES

Municipality	Retail Uses	Service Uses	Office Uses	Restaurant Uses	Hotel Uses
Guelph Downtown	1 per 100 m ² of GFA	1 per 100 m ² of GFA	1 per 67 m ² of GFA	--	0.75 spaces per guest room + 1 parking space per 10 m ² of GFA open to the public, exclusive of corridors, lobbies or foyers
Guelph Special Downtown Zones (D1/D2)	No off-street parking is required	No off-street parking is required	No off-street parking is required	No off-street parking is required	No off-street parking is required
Guelph General By-law Standard	1 per 16.5 m ² of GFA	--	1 per 33 m ² of GFA	1 per 7.5 m ² of GFA (tavern) 1 per 9 m ² of GFA (take-out)	1 per guest room plus 1 per 10 m ² of GFA open to the public excluding corridors, lobbies or foyers
Burlington (Zoning By-law 2020)	4 spaces per 100 m ² of GFA	4 spaces per 100 m ² of GFA	3.5 spaces per 100 m ² of GFA	1 space per 4 persons capacity (standard restaurant) 1 space per 4 persons capacity or 25 spaces per 100 m ² of GFA, whichever is greater.	1 space per guest room or suite
Cambridge (Zoning By-law 150-85)	2.5 spaces per 100 m ² of GLCFA ¹	2.5 spaces per 100 m ² of GLCFA	2.5 spaces per 100 m ² of GLCFA	12 spaces per 100 m ² of GFA	1 space per guest room or suite; plus parking required for any other retail or other service commercial or commercial-recreational establishment provided in the hotel or motel
Hamilton (Comprehensive Zoning By-law 05-200)	1 space per 20 m ² of GFA	1 space per 16 m ² of GFA (personal services)	1 space per 50 m ² of GFA in excess of 450 m ² , which accommodates such use	1 space per 8.0 m ² of GFA	1 space per guest room
Kitchener (UGC Zones) (Final Draft Zoning By-law, April 2018)	1 per 95 m ² of GFA	1 per 95 m ² of GFA	1 per 50 m ² of GFA	1 per 19 m ² of GFA	0.7 spaces per guest room

Municipality	Retail Uses	Service Uses	Office Uses	Restaurant Uses	Hotel Uses
Kitchener (MIX Zones) (Final Draft Zoning By-law, April 2018)	1 per 40 m ² of GFA	1 per 40 m ² of GFA	1 per 33 m ² of GFA	1 per 7.5 m ² of GFA, or for a restaurant within a mixed use building, mixed use development, multi-unit building, or multi-unit development, a rate of 1 per 19 m ² GFA shall apply to the first 750 m ² of restaurant, and a rate of 1 per 7.5 m ² shall apply thereafter.	1 space per guest room
Kitchener (All Other Zones) (Final Draft Zoning By-law, April 2018)	1 space per 33 m ² of GFA	1 space per 33 m ² of GFA	1 space per 33 m ² of GFA	1 space per 7.5 m ² of GFA, or for a restaurant within a mixed use building, mixed use development, multi-unit building, or multi-unit development, a rate of 1 per 19 m ² GFA shall apply to the first 750 m ² of restaurant, and a rate of 1 per 7.5 m ² shall apply thereafter.	1 space per guest room
London (Zoning By-law Z-1)	1 space per 25 m ²	1 space per 15 m ² (personal services)	1 space per 40 m ²	1 space per 15 m ² (eat-in) 1 per 8 m ² (take-out)	1.25 spaces per unit
Mississauga (Zoning By-law 0225-2007): Downtown Apartment (within CC1 to CC4 zones)	5.4 spaces per 100 m ² of GFA 4.0 spaces per 100 m ² of GFA in a C4 zone 4.3 spaces per 100 m ² of GFA in a CC2 to CC4 zones	1 space per 100 m ² of GFA	3.2 spaces per 100 m ² of GFA	16.0 spaces per 100 m ² of GFA 6.0 spaces per 100 m ² of GFA (take-out) 9.0 spaces per 100 m ² of GFA (in a C4 zone)	0.8 spaces per guest room; plus 10.0 spaces per 100 m ² of GFA - non-residential used for public use areas including meeting rooms, conference rooms, recreational facilities, dining and lounge areas and other commercial facilities, but excluding bedrooms, kitchens, laundry rooms, washrooms, lobbies, hallways, elevators, stairways and recreational facilities directly related to the function of the overnight accommodation

Municipality	Retail Uses	Service Uses	Office Uses	Restaurant Uses	Hotel Uses
Oshawa (Zoning By-law 60-94)	1 space per 24 m ²	--	1 space per 28 m ²	1 space per 11 m ²	1 space per suite
Toronto (Zoning By-law 569-2013): Policy Area 3	1 space per 100 m ² of GFA	1 space per 100 m ² of GFA (personal services)	1 space per 100 m ² of GFA	0 spaces per unit (if GFA < 200 m ²)	0.2 spaces per 100 m ² of GFA
Toronto (Zoning By-law 569-2013): Policy Area 4 (Areas with Surface Transit)	1 space per 100 m ² of GFA	1 space per 100 m ² of GFA (personal services)	1 space per 100 m ² of GFA	0 spaces unit (if GFA < 200 m ²)	0.2 spaces per 100 m ² of GFA
Toronto (Zoning By-law 569-2013): All Other Areas	1.5 spaces per 100 m ² of GFA (if 10,000 m ² > GFA > 200 m ²) 3 spaces per 100 m ² of GFA (if 20,000 m ² > GFA > 10,000 m ²) 6 spaces per 100 m ² of GFA (if GFA > 20,000 m ²) 0 spaces if GFA < OR = 200 m ²)	1.5 spaces per 100 m ² of GFA (personal services)	1.5 spaces per 100 m ² of GFA	3 spaces per 100 m ² of GFA (if 500 m ² > GFA > 200 m ²) 5 spaces per 100 m ² of GFA (if GFA > 500 m ²)	1 space per guest room
Waterloo (Zoning By-law 1108 (within C4 and C5 zones)	5 spaces per 100 m ² of Gross Retail Commercial Space (in zone C5)	4.5 spaces per 100 m ² of building floor area (personal services in zone C4) 5 spaces per 100 m ² of building floor area (personal services in zone C5)	3 spaces per 100 m ² of building floor area where office space is on ground floor) 1 space per 100 m ² of building floor area where office space is greater than 10 % but less than 50% of the total Gross Leasable Retail Commercial Space 3 spaces per 100 m ² of building floor area which the Office space is 50% or greater of the Gross Leasable Retail Commercial Space (in zone C5)	1 space per 4 seats 15 spaces per 100 m ² of building floor area (take-out) (in zone C4 where the total building floor area is < 1000 m ²)	1 space per guest room plus 5 spaces per 100 m ² of all other building floor area (in zone C5)

Municipality	Retail Uses	Service Uses	Office Uses	Restaurant Uses	Hotel Uses
Waterloo (Zoning By-law 1418) (within C4 and C5 zones)	5 spaces per 100 m ² of Gross Retail Commercial Space (in zone C5)	5 spaces per 100 m ² of building floor area (personal services in zone C5)	3 spaces per 100 m ² of building floor area where office space is on ground floor) 1 space per 100 m ² of building floor area where office space is greater than 10 % but less than 50% of the total Gross Leasable Retail Commercial Space 3 spaces per 100 m ² of building floor area which the Office space is 50% or greater of the Gross Leasable Retail Commercial Space (in zone C5)	1 space per 4 seats 15 spaces per 100 m ² of building floor area (take- out) (in zone C4 where the total building floor area is < 1000 m ²)	1 space per guest room plus 5 spaces per 100 m ² of all other building floor area (in zone C5)

Notes:

1. GLCFA = gross leasable commercial floor area.
2. City of Waterloo, C4= Commercial Zone 4, C5= Commercial Zone 5

11.2 PARKING MANAGEMENT STRATEGIES

The Clair-Maltby Secondary Plan area is the City's last unplanned greenfield area, currently undergoing a comprehensive planning process to establish policies to guide development towards the realization of an urban village – a sustainable community which provides a full range and mix of residential housing, commercial and employment uses.

One of the key guiding principles established within the Clair-Maltby Secondary Plan, includes the careful consideration of connections to other areas of the City. The ability to integrate the Clair-Maltby Secondary Plan area into adjacent neighbourhoods is reliant upon a multi-modal mobility network which provides alternative transportation choices and connections to other neighbourhoods, the Downtown and surrounding employment areas.

Key to the realization of this vision is the appropriate consideration and management of vehicular parking. Parking supply and demand are two (2) facets which influence transportation choice in new and emerging neighbourhoods. Establishing the parking requirements and understanding parking demands will encourage transit use in transit supportive communities and discourage unnecessary auto use.

In order for parking management strategies to be successful in guiding development, they must be applied in conjunction with other strategies. The purpose of this section is to outline a variety of strategies and discuss methods for implementation to affect both parking supply and demand.

11.2.1 Parking Management Strategies to Affect Supply

Development within the City of Guelph is governed by the in-force Zoning By-law, which outlines where development can happen, the number of parking spaces associated with the land use and the location of these parking spaces relative to the primary pedestrian accesses. It is important to understand that while municipal policies govern parking space provisions, the use of parking spaces inform the user experience with a proposed development. Societal perceptions and user experience regarding these parking facilities directly affect transportation choices.

11.2.1.1 Flexible Area Based Parking Standards

Land use and transportation need to be well integrated to ensure the success of a development plan. One of the driving components behind a successful transportation plan is the development of an appropriate land use plan which recognizes mixed-uses and land use compatibility. Land use adjacencies influence the transportation choices that are made by users to the site. Generally speaking, parking requirements have typically been established recognizing variables which affect the supply and demand (i.e. location and access to transit services, density of use, mixed land uses, car-share provisions, and walkability).

Municipalities have established parking requirements which vary based upon land use adjacencies and the vision of growth for the area. The City of Guelph already recognizes the difference between areas and incorporates these within their Zoning By-law. The Downtown parking requirements, for example, have lower minimum ratios per unit type to encourage growth, the use of public parking facilities and transit services which are typically more prevalent and frequent in urban cores. By comparison, the in-force Zoning By-law outlines a different requirement for other areas of the City, recognizing the auto-oriented nature of some areas.

The Clair-Maltby Community Structure includes three (3) neighbourhood “theme” areas which will independently define the mix of land uses and residential character to meet the needs of residents and will also direct growth in an organized manner to support the proposed transit and natural heritage system connections.

1. Gordon Street Corridor

The Gordon Street Corridor, running in a north-south direction, forms the transit “spine” for the Clair-Maltby area and includes a mix of land uses and residential developments that will be developed with transit-supportive densities. Within the Clair-Maltby Secondary Plan area, the highest density will occur along this spine.

2. Urban Village Core

The Urban Village Core is the central focus of the Clair-Maltby secondary plan and includes the intersection of the Gordon Street corridor and the Main Street which runs in an east-west direction. The Core is intended to be pedestrian oriented with mixed-use buildings, high quality signature and landmark buildings.

3. Residential Neighbourhoods

There are eight (8) residential neighbourhoods where low and medium density residential uses will be directed. These neighbourhoods will be walkable, with each one anchored by a focal point (i.e. neighbourhood-scale mixed use development, commercial development, park or other community facility).

Parking requirements within these areas should be established recognizing the unique characteristics of each area. These nuances can help create a neighbourhood where residents, patrons and visitors prefer to live, work and play in. Ultimately, variations within parking requirements will affect transit use and travel mode choices.

Areas that are intended for higher density developments (i.e. Gordon Street Corridor and Urban Village Core) should have parking standards that encourage transit use and discourage non-essential parking. Limiting parking supply at the site ensures that other parking management strategies (i.e. shared parking, cash-in-lieu of parking, and consolidated parking) will also be effective at managing and mitigating parking demands as they arise.

Areas which are intended to be pedestrian oriented can also include locational requirements, in addition to the parking standards. The specification of location for parking provisions (i.e. to the rear of building or underground) also reinforces urban design principles and guidelines in developing the pedestrian realm.

11.2.1.2 Minimum and Maximum Parking Requirements

Minimum and maximum parking requirements control the amount of parking provided on a development site, based upon the type of use, the floor area or unit, and the standard being applied. Minimum parking standards outline the lowest number of parking spaces that must be provided from a municipality's perspective. A maximum parking standard outlines the highest number of parking spaces that are allowed to be located on a development site.

There are a variety of approaches which various municipalities have applied, depending on the nuances and characteristics that are specific and unique to them. Most commonly, minimum parking standards have been outlined within Zoning By-laws with some Zoning By-laws including maximum parking standards. The application of these standards can also be location specific (i.e. minimum and maximum parking standards along transit corridors) to influence the type of development and to encourage the use of active transportation modes.

Parking minimums are typically established based upon an understanding of the number of parking spaces that are considered to be necessary to enable the success of a development. However, as parking demands and traffic patterns shift and change over time, these minimum standards can become antiquated. For example, as transit services improve and traffic congestion increases, travel behaviour and associated mode choice shifts to more active modes (i.e. walking and cycling).

Maximum parking requirements have also been outlined within Zoning By-law regulations to limit the oversupply of parking which can occasionally occur for a number of reasons, including developer perceptions of parking and to fulfill certain tenant requirements. Parking maximums are not considered to be difficult to include within Zoning By-laws; however, the implication and impact of parking maximums should be considered with the decision to include or exclude them.

Use of parking maximums within transit corridors or transit station areas encourages use of alternative modes of transportation and the development of a public realm where pedestrians are prioritized. However, implementation of parking maximums should be carefully considered to avoid being overly restrictive – this could result in a potential spillover of parking into neighbourhoods or adjacent areas if it results in an undersupply.

It is recommended that the application of parking minimums and maximums be implemented with other parking management strategies to control parking demands in areas to encourage transit use and active transportation, densification and design policies to improve the public realm.

11.2.1.3 Shared Parking (Temporal Characteristics)

Consideration of shared parking opportunities is common and becoming more prevalent through Zoning By-law reviews. The concept of shared parking reflects the variations in usage levels of different land uses by time of day and day of week. Shared parking principles recognize that not all land uses will be at their peak parking demand at the same time throughout the day. This allows for the derivation of efficiencies in the overall parking supply requirements through a permissive sharing of a common pool of parking to support a range of planned uses at different times. The efficiency also unlocks development potential across the site by limiting the parking infrastructure to be built. Space that would have otherwise been utilized for parking can be re-allocated for building or program purposes.

The focus of a shared parking strategy within mixed-use development or master planned communities is to reduce the overall amount of parking infrastructure to be provided, which would allow for a mixed-use, multi-faceted proposals, such as the Clair-Maltby Secondary Plan area, to avoid, to the extent practical, the permanent and unnecessary allocation of parking to specific uses and users.

When considering the allocation of parking to certain uses given specific needs, the exclusive use and allocation of parking for some uses is appropriate, for instance, parking for residential uses (i.e. residents), given the usage patterns of such spaces and that parking spaces are privately and individually owned or rented.

Shared parking calculations utilize a range of “occupancy rates” that reflect the typical variation in parking demand over the course of a weekday or weekend (by hour). The occupancy rate is expressed as a percentage of the peak demand generated by a particular land use on a typical weekday or weekend day. These occupancy rates are recommended based upon industry resources and similar municipal by-laws that permit shared parking.

11.2.1.4 Parking Reduction Permissions

Municipalities are recognizing the impact of parking and its effect on changing travel behaviours. Parking reductions within Zoning By-laws or through the development approval process (i.e. Development Application Checklists) have become more prevalent recently.

Permissions for parking reductions can be implemented through physical infrastructure provisions stated within the Zoning By-law (i.e. City of Toronto permits parking reductions for extra bicycle parking spaces on-site, located in a conspicuous area) or with input from the municipality through a development application checklist which permits parking reductions in exchange for a variety of design improvements (i.e. City of Kitchener’s Development Application Checklist).

The inclusion of parking reduction permissions should be considered as they provide additional flexibility for the municipality to vary parking requirements and can result in urban design or program elements which also shift travel behaviour from auto usage to alternative modes.

11.2.1.5 Cash-in-Lieu

Cash-in-Lieu of parking is also known as payment-in-lieu of parking. This parking management strategy allows developers to seek a parking reduction (approved by Committee of Adjustment and City Staff) in exchange for a cost that is paid to the municipality. Cash-in-lieu of parking applications are evaluated on a project-by-project basis. The cost that is paid is typically associated with the cost of a parking space. The municipality then uses these funds to plan, operate or maintain a public parking facility which is intended to accommodate parking demands in the area.

Cash-in-lieu of parking is typically calculated on a per space basis and can be applied to residential or commercial land uses. It is noted that the municipality can outline tiers or levels where different formulae are applied based on the location. For example, the City of Toronto has specified a per space rate for areas of low transit service compared to a formula which accounts for land value within areas of higher density and transit accessibility (i.e. Downtown).

11.2.1.6 Consolidated Public Parking Facilities

Consolidation of private or public parking facilities provides a common pool of parking within an urban area which can be used by the general public. Public facilities are typically operated by the municipal parking authority and support underlying urban design principles by minimizing impacts of smaller individual parking lots through the consolidation of parking infrastructure into one structure or facility. It also encourages pedestrian activity through the area as parking is no longer located at a “front door”.

Consolidated public parking facilities inherently adhere to shared parking principles, recognizing that adjacent land uses will peak at varying times. For example, a parking facility within the downtown can accommodate business employees and visitors during the day and recreational facility users in the evening when businesses are closed. The surrounding land uses and proximity to activity centres, nodes or hubs must be considered when determining the appropriate location for a consolidated facility. Additionally, the parking pricing model must be considered to encourage use of the facility.

The City of Guelph can also consider longer-term impacts to land acquisition for a consolidated parking facility. As the area is developed, land values are likely to increase. The City could consider divesting the property at a later time or continue to provide public parking, allowing development in the area to provide a reduced parking supply. This however, would require further in-depth study.

11.2.1.7 On-Street Parking Permissions

Curbside space is often overlooked relative to its ability to accommodate a range of activity that would otherwise need dedicated space within a development site. While curbside is a physical infrastructure provision, it is also important to recognize that it is also a programmable space, which can be managed by the City of Guelph.

The functions of curbside space can contribute to the overall design and operations in the area, provided that there is enough pavement width for vehicular through movements. These programs can range from temporary events (i.e. parking space to a parkette in the summer) to pilot projects (i.e. signage permitting taxi ranks) and physical infrastructure provisions (i.e. EV charging stations).

Similar to consolidated public parking facilities, these spaces can also be managed by the municipality through signage or permits (i.e. 1 hour free parking in main corridors during certain periods of time or paid overnight visitor parking permits). These spaces, in fact, provide additional flexibility to accommodate parking demands – signage and operations can be changed based upon use.

The allowance of on-street parking capitalizes on the infrastructure that is built as part of the neighbourhood. It also provides additional parking spaces for the general public, to be utilized when land uses are at their peak. It also encourages better urban design and supports the pedestrian realm by providing a buffer to pedestrians from traffic and slowing down traffic speeds by activating the travel lane next to traffic and providing drivers with a visual cue to slow down.

11.2.2 Parking Management Strategies to Affect Demand

Parking demand can be influenced through a number of ways to change behaviour and perspectives towards non-single occupancy vehicle use or alternative modes of transportation. These strategies rely upon the implementation of parking management strategies / infrastructure which affect the supply. Changing travel behaviours and mindsets without the limiting parking supply will be near impossible if an easier alternative is ever present.

A key component in affecting parking demand is the implementation of a Transportation Demand Management (TDM) plan. TDM, as generally described below, includes a range of options both physical and operational, to influence these demands. Inclusion of TDM policies to support parking management will contribute significantly to the achievement of mobility goals outlined in the Clair-Maltby Secondary Plan.

11.2.2.1 Transportation Demand Management Plans

As specified in the previous section, Transportation Demand Management (TDM) strategies seek to increase the efficiency of a transportation system by influencing travel behaviour. This goal can be achieved through development of physical infrastructure or implementation of programs/operational measures. Often, a TDM or Mobility Plan can be required by municipalities as part of the development application process. This plan should outline the measures or programs to be implemented with the goal of reducing single occupancy vehicle use or shift travel behaviours to reduce congestion (i.e. encourage transit use, encourage bicycle use, etc). Implementation of TDM and Parking Strategies are most successful when implemented in conjunction with the other. The provision of TDM strategies encourages a shift to other modes of transportation and parking strategies often consider limiting or constraining the supply so that discretionary drivers are more likely to utilize other options.

11.2.2.2 Transit Oriented Development

Transit oriented development is a term which identifies areas where transit infrastructure or investment is located. It endeavours to leverage the transit investment through careful consideration of specific parking requirements for areas easily accessible by the BRT. The Gordon Street Corridor within the Clair-Maltby Secondary Plan area, is one example.

To ensure that developments around transit station areas are successful, municipalities have typically established policy guidelines with the goal of mixing complementary land uses, recognizing that these land uses are complementary to each other and provide a level of convenience where day-to-day activities can be accomplished without a vehicle.

Another method to ensure that transit oriented developments are successful, is the limitation of parking within areas easily accessible by the BRT. When the ability to use a vehicle is limited, transit use becomes a more attractive and viable option. Often, these policy guidelines also focus on design and include housing typologies to support a transit friendly development. Vehicle sharing programs (i.e. car-share) are also introduced to reduce overall vehicle ownership.

11.2.2.3 Car-Share

Car-sharing programs have evolved into common practice. The low-commitment and growing fleet size has created an alternative mode for automobile ownership and, in urban areas, further reduced the appeal of automobile use and person vehicle ownership. Car-share programs are becoming an increasingly relevant factor in the determination of minimum required parking standards. Where the private automobile ownership model requires a space for each user expected to own a car in a residential development, the car-share ownership model would only require a space for the number of users expected to use a car at the same time. Since the period of use does not necessarily overlap between users, more users are able to leverage the same parking space.

Car-share systems operate on a self-serve platform, where members may rent a vehicle from any car-share lot across the company's service area. Time-based user rates apply and a subscription to the service is generally based on a fixed membership fee. Car-share programs have become prevalent by locating vehicles within private developments or within municipal lots. This logistical dexterity enables program expansion. As vehicles become further dispersed and used increasingly, so too does the convenience and reliability for its users.

Car-share programs have been studied to understand their impact on vehicle ownership and to establish a standard that could be applied to developments which allow car-share to be located on-site. Review of car-share program impacts could be considered as a strategy to provide parking reductions.

For example, the City of Toronto permits a reduction of up to 4 vehicular parking spaces (net 3 spaces) for the provision of a car-share vehicle. This is based upon a study commissioned by the City (*Parking Standards Review: Examination of Potential Options and Impacts of Car Share Programs on Parking Standards, IBI Group, March 2009*) and is predicated on survey results which indicated the likelihood of a car owner to rely on a fleet vehicle instead of a personal vehicle, if the option were available.

Other municipalities have also recognized the positive impacts of car-share and the associated potential reduction of vehicular ownership. As such, an increasing number of municipalities are adopting car-share policies to encourage use of other modes of transportation, as summarized below in Table 13.

TABLE 13 MUNICIPALITIES WITH CAR-SHARE POLICIES

Municipality	Approval Mechanism	Policy Statement / Vehicular Allowance
City of Toronto	City Staff review	<p>For any apartment or condominium development, the minimum parking requirement should be reduced by up to 4 parking spaces for each dedicated car-share stall. The limit on this parking reduction is calculated as the greater of:</p> <ul style="list-style-type: none"> • 4 * (Total number of units / 60), rounded down to the nearest whole number; or • 1 space
City of Kitchener	Part of TDM Checklist	Commercial Uses: Provide car-share spaces equivalent to 2% of building occupants
Town of Newmarket	Recommendation for Urban Centres Secondary Plan	<p>For any apartment (freehold or condominium) development, the minimum parking requirement should be reduced by up to 3 parking spaces for each dedicated car-share stall. The limit on this parking reduction is calculated as the greater of:</p> <ul style="list-style-type: none"> • 4 * (Total number of units / 60), rounded down to the nearest whole number; or • 1 space
City of Richmond	Zoning By-law	<p>The minimum on-site parking requirements may be reduced by up to a maximum of 10% where:</p> <p>a) The City implements transportation demand management measures, including the use of car cooperatives, transit passes, private shuttles, carpools, or enhanced end-of-trip cycling facilities; and</p> <p>b) The minimum on-site parking requirements are substantiated by a parking study that is prepared by a registered professional engineer and is subject to review and approval of the City.</p>
City of Kelowna	Draft Policy Recommendation	Amend the parking and loading section of the Zoning By-law to provide a reduction of five parking spaces for every classic car-share vehicle and parking space provided to a maximum 10% of the total number of required spaces provided.

11.2.2.4 Improved Public Realm

Parking demands can be reduced as the user experience through a street or corridor improves. The easier or more pleasant the trip, the more likely it is that a member of the public would choose to walk or cycle instead of drive. There are varying methods to improve the public realm with most of these strategies typically outlined within an “Urban Design Guideline”.

These include consideration of the location of parking (i.e. towards the rear of the building instead of abutting a sidewalk), encouragement of underground parking facilities, screening of loading spaces and the location of visible, bicycle racks to encourage cycling use.

Amenities can range in costs as well from those easy to implement (i.e. benches, street furniture) to those that are higher in cost (i.e. transit plaza).

Establishing urban design principles that developments are required to adhere to will influence the overall corridor and area as buildings are built over time. It will also provide guidance towards the overall character of the neighbourhood and ensure that the vision for the area is achieved.

11.2.2.5 Unbundled Parking

Unbundled parking refers to the separation of the cost of a parking space with the rental or purchase price of a unit. When costs are not separated, the use of a vehicle is encouraged since the perception is that the unit comes with the parking space. However, if the costs were to be separated, this would ensure that owners or tenants are aware of the cost of parking. The pricing then affects trip making decisions by influencing whether or not a vehicle is needed / warranted over time. It can also encourage the exploration of other alternative modes or the use of car-share for the occasional trip where a vehicle is necessary.

Unbundled parking is a policy that can be suggested and implemented within a Secondary Plan. The concept should be discussed by municipal staff and developers to ensure that it is understood and properly implemented.

11.3 REVIEW & MONITORING

As part of the development of the Clair-Maltby Secondary Plan area, any implementation of parking management strategies should include review and monitoring of these strategies to understand their impacts on parking demand and supply. It is likely that parking demands will fluctuate and vary year to year as new residents move in, businesses change and transit services evolve to meet demands.

It is recommended that a review and monitoring plan be established to help provide flexibility to the City of Guelph as the area changes and matures. These reviews can be completed on an annual basis or every other year, depending on the progress of development. This will ensure that the necessary parking demands can be accommodated and provide information to help shift travel behaviour changes.

Future-proofing parking facilities are an important consideration as well, as buildings become more dynamic and the transportation landscape changes based upon technological advancements (i.e Autonomous Vehicles). A further in-depth study to understand and maximize a structure's full potential and capability for adaptive re-use is also recommended.

11.4 SUMMARY OF PARKING MANAGEMENT STRATEGIES

Parking demands and supply can be managed through a combination of strategies implemented to guide overall development through the Clair-Maltby Secondary Plan area. This urban village is envisioned to be a walkable, sustainable development supported by a transit "spine" along Gordon Road.

BA Group's parking review and assessment includes a review of the in-force City of Guelph parking standards, a comparative review of other municipal parking standards, and various parking management strategies to affect both supply and demand.

We understand that parking demands will fluctuate and vary over time, as the Clair-Maltby Secondary Plan area develops and matures. The opportunities discussed and summarized in Table 14, in our opinion, form the basis for applicable parking policies to be considered for inclusion within the Clair-Maltby Zoning By-law. These policies will likely have the most impact and would be a significant, positive contribution towards the City's approach to parking management.

TABLE 14 OPPORTUNITIES FOR PARKING MANAGEMENT STRATEGIES

Strategy	Potential Impact	Implementation Tool / Partner
Flexible Area Based Parking Standards	<ul style="list-style-type: none"> Accounts for variability in parking standards based upon land use, proximity to transit and overall character of the neighbourhood 	Zoning By-law
Minimum and Maximum Parking Standards	<ul style="list-style-type: none"> Controls parking supply Limits overbuilding of parking within transit oriented areas 	Zoning By-law
Shared Parking	<ul style="list-style-type: none"> Recognizes efficiencies that could be made between complementary land uses Acknowledges that parking demands will peak at varying times 	Zoning By-law
Parking Reduction Permissions	<ul style="list-style-type: none"> Provides flexibility to the municipality to reduce parking supply based upon the provision of TDM measures or other vehicle ownership reduction measures 	Zoning By-law
Cash-in-Lieu of Parking	<ul style="list-style-type: none"> Reduces parking requirements on a case-by-case basis Provides municipality with funds to operate, manage and maintain public parking infrastructure 	Municipal Operations / Cash-in-Lieu Parking Policy
Consolidated Public Parking	<ul style="list-style-type: none"> Location of a common pool / supply of parking limits the impact of small individual parking lots Allows for better urban design and encourages pedestrian activity 	Municipal Operations / Private Sector
On-Street Parking	<ul style="list-style-type: none"> Flexibly increases parking supply Allows the municipality to operate paid parking / parking permits Utilizes existing infrastructure to accommodate temporary and temporal needs 	Municipal Operations
TDM Plan Requirement as part of Development Application	<ul style="list-style-type: none"> Encourages developer to think about ways to reduce parking and single occupancy travel Physical infrastructure and program elements contribute to the shift in overall travel behaviour 	Zoning By-law / Special Municipal Policy
Car-Share Parking Reductions	<ul style="list-style-type: none"> Provides an alternative to vehicle ownership 	Zoning By-law / Special Municipal Policy
Public Realm Improvements	<ul style="list-style-type: none"> Encourages active transportation within core areas Reduces overall vehicle use 	Urban Design Guidelines
Unbundled Parking	<ul style="list-style-type: none"> Allows for the real cost of parking to be distributed to those who use the facilities Reduces parking requirements 	Private Sector / Developer

12.0 TRAFFIC CALMING CONSIDERATIONS

12.1 TRAFFIC CALMING OBJECTIVES

Community traffic calming strategies are primarily intended to address problems that include excessive speed, infiltration and congestion. It involves a range of measures, devices and techniques that include:

- Engineering - traffic control, speed limits, signs and markings, physical changes to the road.
- Education - speed monitoring, public information, 'Road Watch' type programs
- Enforcement - speed enforcement, turn restrictions, community safety zones

The ultimate goal of traffic calming is to increase the safety and liveability of the community by reducing speeding and excessive traffic volumes, while accommodating local traffic, transit and emergency vehicles. This objective is in keeping with the City of Guelph's own "Neighbourhood Traffic Management Policy", intended to outline the procedures for initiating, reviewing and implementing neighbourhood traffic management plans to address traffic safety concerns related to speeding and high volumes.

12.2 TRAFFIC CALMING OPPORTUNITIES

The Clair-Maltby Secondary Plan area includes provisions for local schools, recreation facilities, and mixed-use retail areas. Although certain traffic calming strategies may be applicable for all new street segments within the Secondary Plan area, particular attention may be directed to street segments in adjacency to the aforementioned land uses, as well as other street segments where the propensity of vulnerable road users is more acute.

With regards to potential community traffic calming measures that might be implemented along segments of new local streets and collector streets planned as part of the Clair-Maltby Secondary Plan, it is generally recommended that a pro-active approach be taken so as to implement traffic calming in sequence with new development. This strategy establishes a degree of expectation for motorists and other road users, and ascertains the priority of pedestrians and cyclists within the prevailing urban design context.

Traffic calming measures are identified as Level I or Level II measures. Level I measures include minor changes to the roadway, that are generally lower cost and relatively straightforward, such as pavement markings, textures pavement / crossings and signage. Level II measures are generally more significant, more costly and require physical changes to the roadway. Some Level II examples include raised crosswalks, curb extensions, roundabouts and road closures.

The following tables and figures identify and describe a variety traffic calming measures that may be appropriate for certain local street and / or collector street segments within the Clair-Maltby Secondary Plan area. They take into consideration factors such as road width, right-of-way availability, proximity to schools, and street parking provisions. Potential Level I traffic calming measures are identified in Table 15, while several Level II measures are identified in Table 16. Conceptual and basic curb extension and median design examples are also provided in Figure 17, and would need to be designed in detail to reflect intersection traffic control, pedestrian crossing facilities, accommodation of specific vehicles, and street context. In addition to the potential measures summarized below, the "Canadian Guide to Neighbourhood Traffic Calming" lists 25 traffic calming measures available for consideration.

FIGURE 17 TYPICAL CURB EXTENSIONS AND CENTER MEDIAN

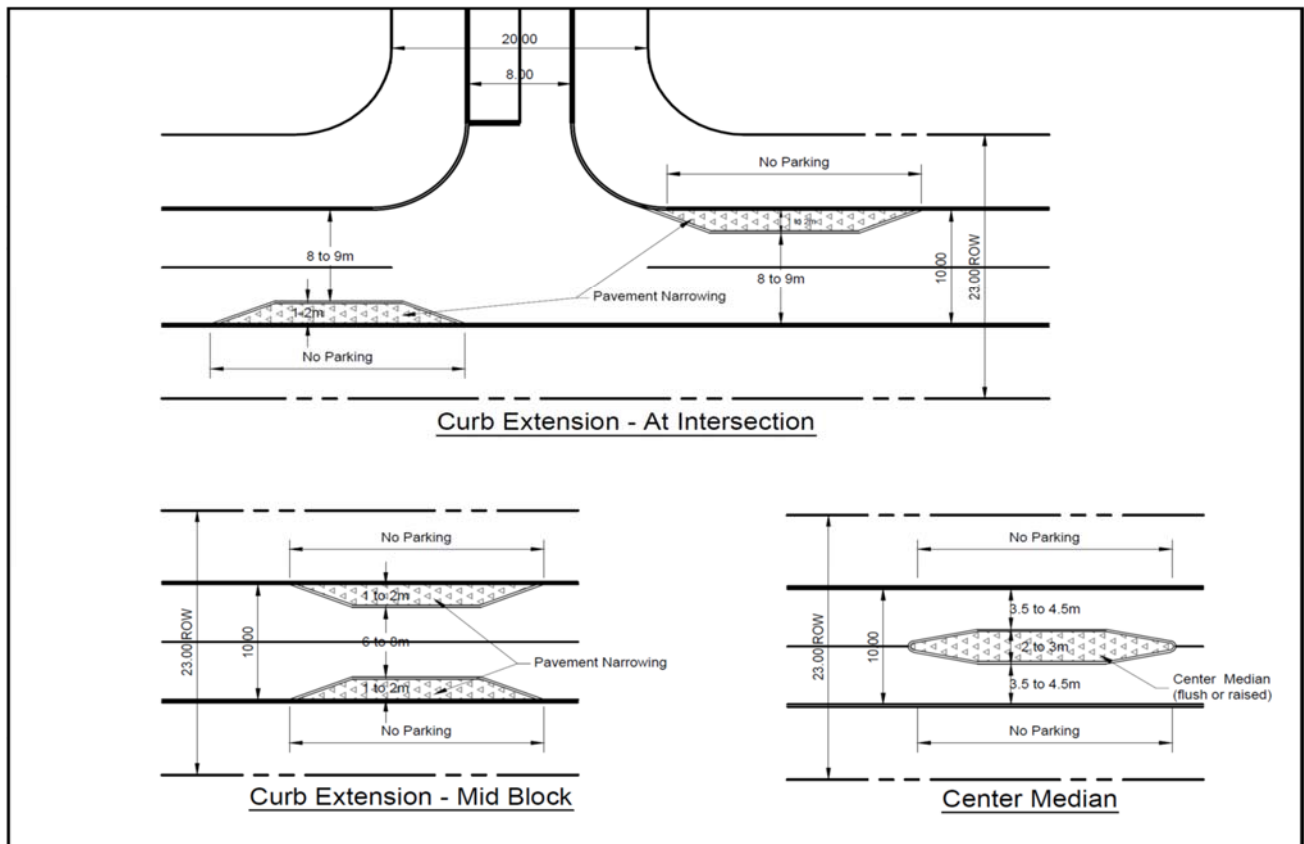


TABLE 15 LEVEL I TRAFFIC CALMING MEASURING

Mitigation Measure	Description	Implementation
Traffic Control Signage and Pavement Markings	Relatively inexpensive and easy to implement, but is not an enforcement tool in its own right.	
Through Traffic / Turn Traffic Restrictions	Regulatory control measure that restricts specific traffic movements at intersections.	<p>Certain movements could be restricted during peak travel periods.</p> <p>Good level of compliance even without direct enforcement.</p> <p>Disadvantage is that restrictions generally conflict with legitimate school or local-based trips into and out of specified areas.</p> <p>Implementation can be done at any time.</p>
Pavement Markings / Lane Narrowing	Pavement markings can be implemented that visually 'narrow' the traffic lane width in order to reduce speeds.	<p>Pavement widths could be painted to formally define parking lanes or traffic lanes.</p> <p>Implementation can be done at any time.</p>

TABLE 16 LEVEL II TRAFFIC CALMING MEASURING

Mitigation Measure	Description	Implementation
Physical Measures	Generally a more expensive option that entails engineering and reconfiguring the road to implement physical changes that lead to reduced speeds and traffic volumes.	
Median Islands (Flush or Raised)	<p>Medians can be implemented to narrow the width travel lanes with the goal to reduce speeds.</p> <p>Medians can also be implemented in conjunction with pedestrian crossing facilities to allow for reduced pedestrian crossing distances.</p>	<p>A 1.5m to 2.5m wide median can allow for 3.0m to 3.5m travel lanes on either side within a local street context.</p> <p>Disadvantage would be loss of on-street parking and possible restricted access to driveways.</p> <p>Raised medians may be too restrictive for emergency, transit, and / or maintenance vehicles.</p>
Curb Extensions	<p>A horizontal extrusion of the curb into the roadway with the effect of reducing the travel width and reduce speeds.</p> <p>Additional benefits of intersection curb extensions relates to reducing pedestrian crossing distances and increasing pedestrian visibility.</p>	<p>Minimum street width adjacent to an intersection (throat width) opening of 6.0m with a wider opening at intersections to accommodate turning vehicles.</p> <p>Disadvantage would be loss of on-street parking</p> <p>Curb extensions may be too restrictive for certain transit, and / or maintenance vehicles.</p>
Roundabout / Traffic Circle	<p>A road junction in which traffic streams circulate around a central island.</p> <p>Roundabouts are intended to reduce vehicle speeds and reduce vehicle conflicts by virtue of their design.</p>	<p>Provide for continuous, managed-speed vehicle flow, lower vehicle emissions, and do not require traffic signal infrastructure.</p> <p>Roundabouts require more land than a typical intersection, which makes it difficult to retrofit into an existing urban built form.</p> <p>Some jurisdictions have taken the position that roundabouts should not be placed in proximity to school sites due to concerns related to pedestrian crossing facilities.</p> <p>Certain transit authorities have commented that they generally do not support the inclusion of traffic circles or roundabouts on collector roads designated as transit routes for a number of operational and customer service reasons.</p>
Raised Intersection (with All-Way Stop Control)	A speed control device that consists of a raised section of roadway that cause drivers to slow down, prior to and as the cross over them.	<p>Appropriate use is at a limited number of key intersections in the vicinity of schools where there are a substantial number students crossing the road</p> <p>All-way Stop control is not a recommended method for speed control, and is not supported by the City's "Neighbourhood Traffic Management Policy"</p>
Speed Humps	A speed control device that consists of raised sections of roadway that cause drivers to slow down, prior to and as the cross over them.	<p>Effective tool to slow vehicle speeds.</p> <p>Disadvantages include delay to emergency services and transit, and general inconvenience for local road users.</p>

12.3 MONITORING AND CONSULTATION

Many communities manage a Neighbourhood Traffic Monitoring program that reviews and identifies municipal streets that may qualify for traffic calming and management measures. These programs specifically tend to monitor the level of traffic infiltration (i.e. through traffic not local to the area), overall traffic volumes, traffic speeds, and the volume of pedestrians and cyclists.

If there are any expressed concerns from the community as it relates to traffic during or after solutions are implemented, further mitigation measures are then typically pursued by the municipality through this type of program.

Consultation with the various City stakeholders including Emergency Services, Guelph Transit, and Transportation Engineering is essential in reviewing and approving any mitigation solution. Community involvement is also a key part in determining the type of measures, if any, that should be implemented. The public is to be advised and allowed to offer feedback, comments and participate in the process through public meetings or working groups.

The City of Guelph's "Neighbourhood Traffic Management Policy" further identifies monitoring principles that specify the undertaking of a follow-up review after implementation of any specific traffic management measures. A review includes a comparison of traffic volumes, speed data, collision data, and feedback from emergency services, residents and other stakeholders.

13.0 MULTI-MODAL TRAVEL FORECASTING

The Clair-Maltby Secondary Plan area is located at the southern extent of the City of Guelph within a greenfield development area. As part of this study BA Group has established travel demand forecasts for auto-based and non-auto-based trips for the Secondary Plan area, understanding the travel characteristics in the southern portions of the City of Guelph, and travel behaviour associated with other new development areas in the Greater Toronto and Hamilton area that exhibit contemporary planning methods. Further details are provided in the following sections.

13.1 APPROACH AND BASELINE PARAMETERS

Travel demand forecasts have been developed for residential and office land uses, understanding that new development is anticipated to be prominently residential, and that other retail and mixed-use development would result in relatively small travel demands, would often be internal to the Secondary Plan area, and could be considered ancillary to overall development travel demands.

Travel demand forecasts for residential and office land uses have been developed by applying traffic generation rates as derived from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition*, and factoring prevailing non-automobile trips based on selected travel mode splits anticipated for residential and office development in the Secondary Plan area. Modal split information has been obtained from the Transportation Tomorrow Survey (TTS) while total traffic generation rates and direction of travel has been obtained from information provided in the ITE Trip Generation Manual (10th Edition).

Travel demand forecasts for the Clair-Maltby Secondary Plan area development have been developed to reflect pedestrian, cycling and transit usage that is reflective of the existing travel characteristics of the area, and to the extent that transit services and active transportation infrastructure is pursued as part of the Secondary Plan. The addition of mixed-use zones within the Clair-Maltby Secondary Plan area further supports sustainable and short trip making, particular during weekday peak travel periods, and is considered in travel demand forecasting in mixed-use development zones.

13.2 MODE SHARE ASSUMPTIONS

For the purpose of this analysis, travel demands to and from the Clair-Maltby Secondary Plan area have been developed for residential and office land uses by applying modal share information, which is based on a review of data retrieved from the 2016 Transportation Tomorrow Survey (TTS). A combination of study area travel information, and proxy development information was utilized in selecting an appropriate travel mode split for Secondary Plan residential development.

13.2.1 Resident-Based Trips – South Guelph

For the purposes of this analysis, future Clair-Maltby Secondary Plan resident-related trips are assumed, conservatively, to have mode shares similar to the existing condition. Existing resident-related mode share for weekday morning and weekday afternoon peak periods in the southern portions of the City of Guelph are summarized in Table 17.

TABLE 17 RESIDENT-RELATED TRIPS: TRAVEL MODE SPLITS

Travel Mode	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	<i>Inbound</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Outbound</i>
Auto Driver ⁴	83%	65%	75%	64%
Auto Passenger ⁵	2%	8%	9%	32%
Transit	5%	9%	10%	4%
Walk	10%	5%	1%	0%
Cycle	0%	3%	2%	0%
Other ⁶	0%	10%	3%	0%

Notes:

Notes:

1. Based on 2016 TTS results for morning (7:00 a.m. – 9:00 a.m.) and afternoon (4:00 p.m. – 6:00 p.m.) peak traffic periods.
2. Statistics specific to 2006 GTA Zones 8062, 8064, 8067-8076, and 8078-8081. TTS data included in **Appendix E**. ¹ 2016 TTS data was used to determine existing mode split for home-based trips during the morning and afternoon peak hours in the vicinity of the Secondary Plan area. The selected study area (proxy zone) is bounded generally by Kortnight Road to the north, Clair Road to the south, Victoria Road to the east and Preservation Park to the west).
3. Trips represent an expanded value based on a sample of persons surveyed in the study area.
4. Auto driver trips (includes auto drivers and motorcycles).
5. Auto passenger trips (includes auto passenger trips only).
6. Other trips include school bus and taxi trips, consistent with The City's model document.

For key outbound trips during the weekday morning peak travel period and inbound trips during the weekday afternoon peak travel period, approximately 65% to 75% of resident-related trips are undertaken as an auto drivers, 8% to 9% are undertaken as an auto passenger, and 9% to 10% are undertaken by transit. The remaining proportion of priority outbound trips in the morning and inbound trips in the afternoon, are undertaken by walking, cycling and other modes (i.e. taxi and school bus).

For the purposes of this study, existing travel mode share in the southern portions of the City of Guelph (as summarized in Table 17) are compared with other proxy area developments that are summarized in the following.

13.2.2 Resident-Based Trips – Proxy Development Areas

A number of proxy development areas were reviewed using 2016 TTS data to understand general mode split for resident-related travel. A total of three (3) development areas were reviewed, all of which comprise relatively recent construction and best practices in planning, and include:

- (i) Cornell in Markham, Ontario;
- (ii) Oak Park (Uptown Core) in Oakville, Ontario; and
- (iii) Orchard Park in Burlington, Ontario.

The Clair-Maltby Secondary Plan is located within a similar suburban land use and transportation context as the proxy development areas chosen, and would be anticipated to exhibit similar transportation behaviour given the anticipated level of transit services provided within the secondary plan area, the land uses and residential density mixes proposed, and the greenfield development context. All proxy development areas generally adhere to contemporary planning design principles, and are relatively recent greenfield residential

developments, are provided basic transit service provisions, and are located near the edge of the built-up areas of municipalities in the Greater Toronto and Hamilton area.

TTS data was reviewed for the 2016 survey year, to understand resident-related travel mode split in the inbound and outbound directions during weekday peak travel periods. Data was also summarized based on the type of residential dwelling unit (house, townhouse, or apartment). Noted in the TTS survey data, amongst the proxy development areas reviewed, is that there is no sustained difference in travel mode split between low-density and medium to high-density residential development. Proxy development area travel mode split data is included in **Appendix F**.

An average mode split for inbound and outbound resident-related travel during weekday peak travel periods, amongst the proxy development areas reviewed, is summarized in Table 18.

TABLE 18 RESIDENT-RELATED TRIPS: PROXY DEVELOPMENT AREA AVERAGE MODE SPLITS

Travel Mode	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	<i>Inbound</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Outbound</i>
Auto Driver ⁴	86%	60%	72%	65%
Auto Passenger ⁵	1%	15%	10%	26%
Transit	0%	10%	13%	5%
Walk	13%	9%	2%	3%
Cycle	0%	1%	1%	1%
Other ⁶	0%	6%	2%	0%

Notes:

1. Based on 2016 TTS results for morning (7:00 a.m. – 9:00 a.m.) and afternoon (4:00 p.m. – 6:00 p.m.) peak traffic periods.
2. Statistics specific to 2006 GTA Zones associated with the identified proxy development areas. TTS data included in **Appendix F**.
3. Trips represent an expanded value based on a sample of persons surveyed in the study area.
4. Auto driver trips (includes auto drivers and motorcycles).
5. Auto passenger trips (includes auto passenger trips only).
6. Other trips include school bus and taxi trips, consistent with The City’s model document.

Overall travel mode splits for the proxy development areas are generally shown to be similar to travel mode splits observed for the southern portions of the City of Guelph (as summarized in Table 17).

On average, for key outbound trips during the weekday morning peak travel period, approximately 60% resident-related trips are undertaken as an auto drivers, 15% are undertaken as an auto passenger, 10% are undertaken by transit, 9% are undertaken by walking and 1% are undertaken by cycling. The remaining proportion of priority outbound trips in the morning are undertaken by other modes (i.e. taxi and school bus). For key inbound trips during the weekday afternoon peak travel period, on average, approximately 72% of resident-related trips are undertaken as an auto drivers, 10% are undertaken as an auto passenger, 13% are undertaken by transit, 2% are undertaken by walking and 1% are undertaken by cycling. The remaining proportion of priority inbound trips in the afternoon are undertaken by other modes (i.e. taxi and school bus).

13.2.3 Employee (Office)-Based Trips – South Guelph

Clair-Maltby Secondary Plan area employee-related trips are assumed, conservatively, to have mode shares similar to the existing conditions in the southern portions of the City of Guelph. Existing employee-related mode share for weekday morning and weekday afternoon peak periods in the southern portions of the City of Guelph are summarized in Table 17.

TABLE 19 EMPLOYEE-RELATED TRIPS: TRAVEL MODE SPLITS

Travel Mode	Weekday Morning Peak Hour	Weekday Afternoon Peak Hour
	<i>Inbound</i>	<i>Outbound</i>
Auto Driver ⁴	93%	86%
Auto Passenger ⁵	0%	4%
Transit	3%	6%
Walk	2%	4%
Cycle	2%	0%

Notes:

1. Based on 2016 TTS results for morning (6:00 a.m. – 9:00 a.m.) and afternoon (3:00 p.m. – 6:00 p.m.) peak traffic periods.
2. Statistics specific to 2006 GTA Zones 8062, 8064, 8067-8076, and 8078-8081. TTS data included in **Appendix G**.
3. Trips represent an expanded value based on a sample of persons surveyed in the study area.
4. Auto driver trips (includes auto drivers and motorcycles).
5. Auto passenger trips (includes auto passenger trips only).-

For key inbound trips during the weekday morning peak travel period and outbound trips during the weekday afternoon peak travel period, approximately 90% to 93% of employee-related trips are undertaken as an auto driver or passenger, and 3% to 6% are undertaken by transit. The remaining proportion of priority inbound trips in the morning and outbound trips in the afternoon, are undertaken by walking and cycling (in the order of 4%).

13.3 SECONDARY PLAN MULTI-MODAL TRAVEL DEMAND FORECASTS

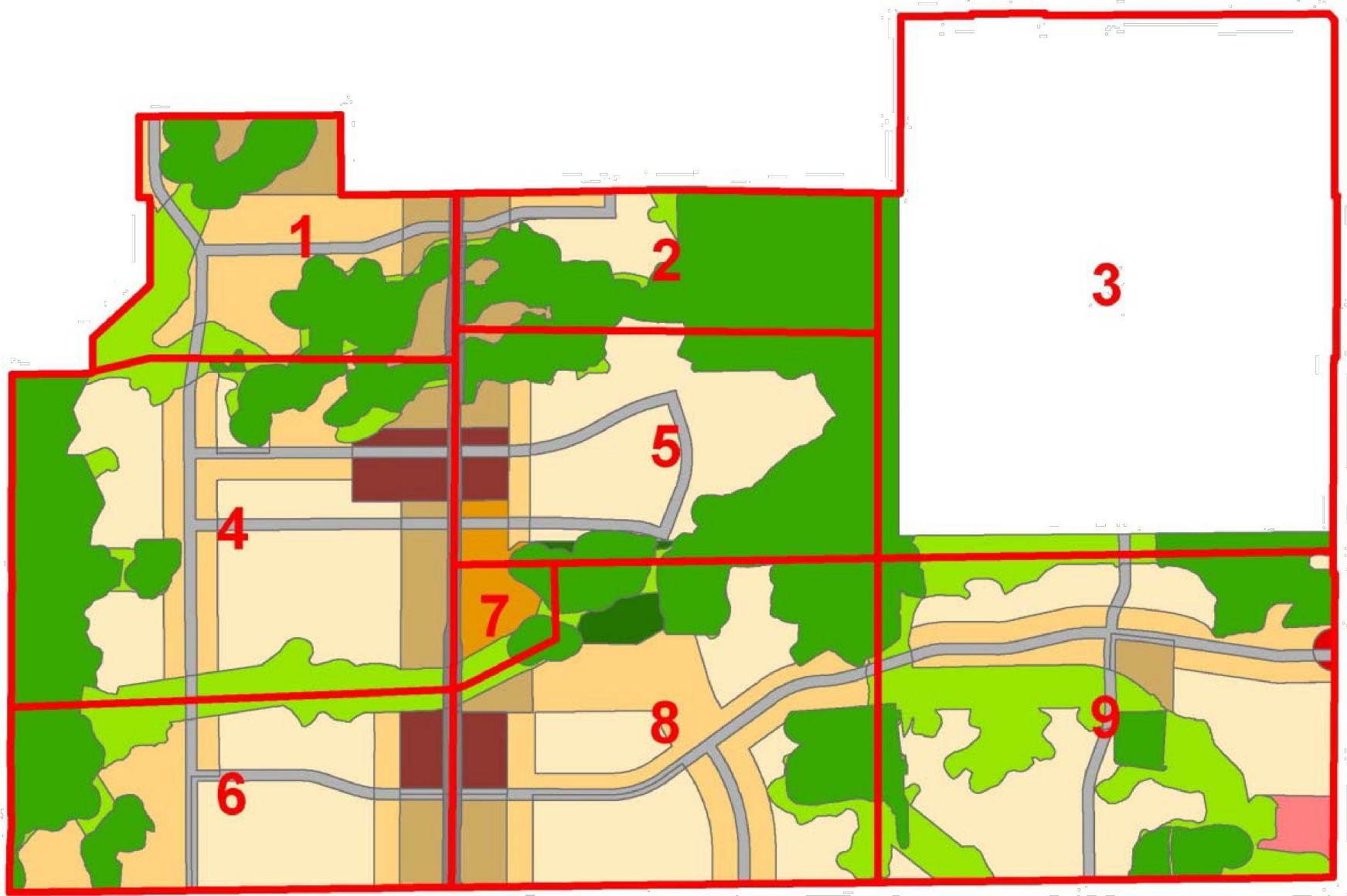
Travel demands for development anticipated within the Secondary Plan area are summarized in the following, and have been developed based on the most conservative (highest density) assumptions outlined in the “Land Development Budget” prepared by the project team – dated August 27, 2018. For the purposes of the analysis herein, a total of 10,125 residential units and 333 jobs were assessed.

Travel demands are developed for nine (9) individual “Traffic Zones” that comprise the Secondary Plan area, to provide appropriately-sized areas to assign travel demands on the area transportation network and assess the overall transportation impacts of Secondary Plan development.

Traffic zones were established based for segmented areas within the overall Preferred Community Structure Plan, and generally comprise zones east and west of Gordon Street. Travel demands for each zone are forecast and assigned individually on the area transportation network.

The nine identified Clair-Maltby Secondary Plan Traffic Zones are illustrated Figure 18.

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SECONDARY PLAN AREA TRAFFIC ZONES

13.3.1 Selected Mode Splits

As previously noted, Clair-Maltby Secondary Plan area travel demands have been developed for residential and office land uses by applying modal share information derived from the south Guelph area and the selected proxy development areas. A “selected” mode split was utilized for the purposes of forecasting Clair-Maltby Secondary Plan development traffic, and then forecasting multi-modal (non-traffic) trips.

The “selected” travel mode split is informed by the travel mode split characteristics summarized in Section 13.2, and would be considered achievable given reasonable expansion of transit services into the Clair-Maltby Secondary Plan area, the development of a comprehensive cycling network as identified in the Preferred Community Structure, and the extent of mixed-use land development contemplated. The selected travel mode splits generally reflect a higher degree of transit use and active transportation travel relative to what is currently observed in the south portions of the City of Guelph, and results in a lower degree of automobile use relative to other areas of the City.

The “selected” travel mode split for new development associated with the Clair-Maltby Secondary Plan, for resident-related and employee-related travel during weekday morning and afternoon peak hours, is summarized in Table 20

TABLE 20 SELECTED CLAIR-MALTBY SECONDARY PLAN TRAVEL MODE SPLITS

Travel Mode	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	<i>Inbound</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Outbound</i>
<i>Resident Travel</i>				
Auto Driver ¹	85%	60%	72%	65%
Auto Passenger ²	2%	10%	10%	25%
Transit	5%	10%	10%	5%
Walk	8%	10%	3%	3%
Cycle	0%	3%	2%	2%
Other ³	0%	7%	3%	0%
<i>Employee Travel</i> ⁴				
Auto Driver ¹	90%		90%	
Auto Passenger ²	2%		2%	
Transit	4%		4%	
Walk	2%		2%	
Cycle	2%		2%	

Notes:

1. Auto driver trips (includes auto drivers and motorcycles).
2. Auto passenger trips (includes auto passenger trips only).
3. Other trips include school bus and taxi trips, consistent with The City’s model document.
4. Employee-based mode share is summarized for the key inbound movement during the weekday morning peak period, and the key outbound movement during the weekday afternoon peak hour.

13.3.2 Traffic Forecasts

Residential and office employee traffic forecasts for the Clair-Maltby Secondary Plan have been developed using Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) traffic generation rates, combined with TTS data on residential and employee travel characteristics in the vicinity of the Secondary Plan area¹.

Residential Traffic Volumes

For residential related traffic volumes, ITE Trip Generation Manual traffic generation rates were derived for Single-Family Detached Housing (ITE Code 210) and applied to low-density housing; for Multi-Family Housing - Mid-Rise (ITE Code 221) and applied to medium density housing; and Multi-Family Housing – High-Rise (ITE Code 222) and applied to high-density housing. In all instances, traffic generation is based on:

- the proposed number of units for each housing type (trips / unit);
- reflects peak travel periods adjacent to the generator of traffic; and
- derived from ITE data reflecting general urban / suburban contexts.

A fitted-curve equation (rather than average) trip generation rate was utilized and applied to development contemplated for each individual traffic zone.

Office Traffic Volumes

For office related traffic volumes, ITE Trip Generation Manual traffic generation rates were derived for General Office (ITE Code 710) and applied to traffic zones with anticipated office-related employment. Office traffic generation is based on:

- the anticipated number of employees (trips / employee);
- reflects peak travel periods adjacent to the generator of traffic; and
- derived from ITE data reflecting general urban / suburban contexts.

A fitted-curve equation (rather than average) trip generation rate was utilized and applied to employment contemplated for each individual traffic zone.

Retail and Mixed-Use Traffic Volumes

Retail and mixed-use development is anticipated to result in relatively small amounts of “external” traffic, would often be internal to the Secondary Plan area, and could be considered ancillary to overall development travel demands. As such, traffic demands are not forecast for retail uses contemplated as part of mixed-use.

¹ 2016 TTS data was used to determine existing mode split for home-based trips during the morning and afternoon peak hours in the vicinity of the Secondary Plan area. The selected study area (proxy zone) is bounded generally by Kortnight Road to the north, Clair Road to the south, Victoria Road to the east and Preservation Park to the west).

Overall Traffic Volumes

ITE Trip Generation Manual traffic generation rates are factored for the selected travel mode splits, as summarized in Section 13.3.1. Traffic generation rates are factored from an assumed 95% auto mode share to a more appropriate level of automobile use for residential trips: 75% during the weekday morning peak hour, and 85% during the weekday afternoon peak hour. Given that employee-related trips currently are in the order of 90% to 95% undertaken by automobile, traffic generation rates are not factored for greater non-auto use for work-related trips.

Forecast residential and office traffic volumes for each traffic zone in the Clair-Maltby Secondary Plan area are summarized in Table 21.

Assuming the most conservative land use budget comprising 10,125 residential units and 333 employment positions, provided for the purposes of this analysis, the Clair-Maltby Secondary Plan would be anticipated to generate in the order of 3,350 and 4,700 two-way traffic trips during the weekday morning and weekday afternoon peak hours, respectively. The resulting vehicle trip rates are 0.33 trips per unit during the weekday morning peak hour, and 0.46 trips per unit in the weekday afternoon peak hour.

TABLE 21 CLAIR-MALTY TRAFFIC GENERATION SUMMARY

Land Use	Units / Employees	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Traffic Zone 1							
Medium density residential	492 units	33	96	129	111	72	183
High density residential	804 units	45	143	188	154	98	252
Total (rounded to nearest 5):	80 units	80	240	315	265	170	435
Traffic Zone 2							
Low density residential	56 units	9	27	36	33	19	52
Medium density residential	44 units	3	9	12	11	7	18
High density residential	284 units	17	55	73	57	37	94
Total (rounded to nearest 5):	384 units	30	90	120	100	65	165
Traffic Zone 3							
n/a							
Traffic Zone 4							
Low density residential	584 units	83	248	331	311	183	495
Medium density residential	659 units	44	127	171	148	95	242
High density residential	1,113 units	62	195	257	211	135	346
Total (rounded to nearest 5):	2,356 units	190	570	760	670	415	1,085

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Traffic Zone 5							
Low density residential	441 units	63	188	251	238	140	378
Medium density residential	120 units	9	24	32	29	19	47
High density residential	373 units	22	70	92	73	47	121
Office	114 emp.	44	9	53	11	43	54
Total (rounded to nearest 5):	934 units; 114 emp.	140	290	430	350	250	600
Traffic Zone 6							
Low density residential	294 units	43	126	169	161	95	256
Medium density residential	743 units	50	143	193	166	106	272
High density residential	516 units	30	94	124	100	64	164
Total (rounded to nearest 5):	1,553 units	125	365	485	425	265	690
Traffic Zone 7							
Office	219 emp.	71	14	85	17	66	83
Traffic Zone 8							
Low density residential	114 units	17	51	68	64	38	103
Medium density residential	1,309 units	88	249	336	385	183	468
High density residential	719 units	40	129	167	138	89	226
Total (rounded to nearest 5):	2,142 units	145	430	570	585	310	795
Traffic Zone 9							
Low density residential	663 units	94	282	376	352	207	558
Medium density residential	558 units	38	108	146	126	81	207
High density residential	239 units	15	48	63	49	31	81
Total (rounded to nearest 5):	1,460 units	145	440	585	525	320	845
Clair-Maltby Secondary Plan Maximum Density Scenario							
Low density residential	2,152 units	310	920	1,230	1,160	680	1,840
Medium density residential	3,925 units	265	755	1,020	975	565	1,435
High density residential	4,048 units	230	735	965	780	500	1,285
Office	333 emp.	115	25	140	30	110	135
Total (rounded to nearest 5):	10,125 units; 333 emp	925	2,440	3,350	2,935	1,860	4,700

Notes:

1. Residential unit and employee positions derived from "Clair-Maltby Secondary Plan Study Area Population and Employment": August 27, 2018. For the purposes of the analysis herein, maximum density allocations are assumed.
2. Total trips rounded to nearest 5.

13.3.3 Multi-Modal Forecasts

A proportion of residential and office travel to / from the Secondary Plan area will be made by sustainable transportation modes – including transit, walking and cycling. The uptake of transit and active transportation modes for residents, employees and visitors of the Secondary Plan area is anticipated to reflect the existing transportation context and travel behaviour present in the southern portions of the City of Guelph and other similar proxy development areas (as summarized in Section 13.2.2).

Multi-modal travel forecasts are derived by factoring forecast traffic volumes for selected mode splits. Transit and active transportation trips are estimated for each established Traffic Zone, so as to appropriately assign trips on the local transportation network, and understand the extent of travel demands for specific sections of the Secondary Plan area.

Forecast multi-modal travel demand for residential and office trips to / from the Secondary Plan area during the weekday morning and weekday afternoon peak hours is summarized in Table 21. Auto driver, auto passenger, transit, and active transportation trips are summarized, while “other” trips (i.e. school bus and taxi) are not included in the following summary.

Detailed calculations for multi-modal travel demands, including associated person trip generation rates, are attached in **Appendix H**.

TABLE 22 CLAIR-MALTY MULTI-MODAL TRAVEL DEMAND SUMMARY

Travel Mode	Units / Employees	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Traffic Zone 1							
Auto Driver Trips (Traffic)	1,296 units	80	240	315	265	170	435
Auto Passenger Trips		0	40	40	35	65	100
Transit Trips		5	40	45	35	15	50
Active Trips		10	50	60	20	15	35
Total Trips:		95	400	495	370	260	630
Traffic Zone 2							
Auto Driver Trips (Traffic)	384 units	30	90	120	100	65	165
Auto Passenger Trips		0	15	15	15	25	40
Transit Trips		0	15	15	15	5	20
Active Trips		5	20	25	5	5	100
Total Trips:		35	150	185	140	100	240
Traffic Zone 3							
n/a							
Traffic Zone 4							
Auto Driver Trips (Traffic)	2,356 units	190	570	760	670	415	1,085
Auto Passenger Trips		5	95	100	95	160	255
Transit Trips		10	95	105	95	30	125
Active Trips		20	125	145	45	30	75
Total Trips:		225	950	1,175	930	640	1,570
Traffic Zone 5							
Auto Driver Trips (Traffic)	934 units; 114 employees.	140	290	430	350	250	600
Auto Passenger Trips		0	45	45	45	80	125
Transit Trips		10	45	55	45	25	70
Active Trips		10	60	70	25	20	45
Total Trips:		165	480	645	485	385	870
Traffic Zone 6							
Auto Driver Trips (Traffic)	1,553 units	125	365	485	425	265	690
Auto Passenger Trips		5	60	65	60	105	165
Transit Trips		5	60	65	60	20	80
Active Trips		10	80	90	30	20	50
Total Trips:		145	610	755	590	410	1,000

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Traffic Zone 7							
Auto Driver Trips (Traffic)	219 employees	70	15	85	15	65	80
Auto Passenger Trips		0	0	0	0	0	0
Transit Trips		5	0	5	0	5	5
Active Trips		5	0	5	0	5	5
Total Trips:		80	15	95	15	75	90
Traffic Zone 8							
Auto Driver Trips (Traffic)	2,142 units	145	430	570	585	310	795
Auto Passenger Trips		5	70	75	80	120	200
Transit Trips		10	70	80	80	25	105
Active Trips		15	95	110	40	25	65
Total Trips:		170	715	885	815	475	1,290
Traffic Zone 9							
Auto Driver Trips (Traffic)	1,460 units	145	440	585	525	320	845
Auto Passenger Trips		5	75	80	75	125	200
Transit Trips		10	75	85	75	25	100
Active Trips		15	95	110	35	25	60
Total Trips:		170	735	905	730	490	1,220
Clair-Maltby Secondary Plan Maximum Density Scenario Travel Demands							
Auto Driver Trips (Traffic)	10,125 units; 333 employees	925	2,440	3,350	2,935	1,860	4,700
Auto Passenger Trips		20	400	420	405	680	1,085
Transit Trips		55	400	455	405	150	555
Active Trips		90	525	615	200	145	345
Total Trips:		1,090	4,065	5,155	4,075	2,860	6,935

Notes:

1. Residential unit and employee positions derived from "Clair-Maltby Secondary Plan Study Area Population and Employment": August 27, 2018. For the purposes of the analysis herein, maximum density allocations are assumed.
2. Trips rounded to nearest 5.

Assuming the most conservative land use budget comprising 10,125 residential units and 333 employee positions, provided for the purposes of this analysis, the Clair-Maltby Secondary Plan would be anticipated to result in the order of 5,155 and 6,935 two-way trips during the weekday morning and weekday afternoon peak hours, respectively. Total trips include those trips that utilize "other" travel modes, including those using school buses, taxis, or ride-share services, despite these travel modes not being explicitly identified in the above summary.

Overall, approximately 3,770 and 5,785 two-way person trips are anticipated to be undertaken in a personal vehicle (as a driver or passenger), comprising approximately 73% to 83% of all trips during weekday morning and afternoon peak hours. In the order of 455 and 555 two-way person trips are anticipated to be undertaken as a transit rider, comprising approximately 8% of all trips during weekday peak hours. Comparatively, in the order of 615 and 345 two-way person trips are anticipated to be undertaken as a pedestrian or cyclists during the weekday morning and afternoon peak hours, respectively, comprising approximately 12% and 5% of all trips during the respective weekday peak hours.

14.0 TRANSIT ASSESSMENT

14.1 AREA TRANSIT CONTEXT

14.1.1 Existing Context

The Secondary Plan area is not currently served by local or regional transit. Generally, the area transit network is limited to Guelph Transit local bus services operating along and north of Clair Road. GO Transit regional bus services route along Gordon Street within the Secondary Plan, but do not service the area.

14.1.2 Planned Transit Improvements

This transit assessment considers improved transit provisions within the planning horizon (year 2031) of this study, including potential new bus services routing along Secondary Plan arterial and collector streets.

The “Moving Guelph Forward” Transit Plan describes recommended service changes and future measures that are intended to increase ridership and achieve a 15% transit mode share – consistent with policy objectives of OPA 48 and the Guelph – Wellington Transportation Study. Recommended service changes, in the vicinity of the Clair-Maltby Secondary Plan area include minor alterations to the #5 Clair and #56 Victoria Express bus routes, which will potentially be altered again given the development of the Clair-Maltby precinct.

It is anticipated that the local transit network will continue to evolve in sequence with development of the Secondary Plan area, and as part of on-going service reviews conducted by Guelph Transit. The Preferred Community Structure Plan has been advanced anticipating the introduction of frequent transit provisions on Gordon Street between Clair Road and Maltby Road, and the option for additional or expanded services routing along arterial and collector streets within the Secondary Plan area.

New transit services would be anticipated to offer more robust connections for future area transit riders and encourage greater transit use as a proportion of overall mode share in keeping with the policy objectives of the Moving Guelph Forward Transit Plan.

14.2 EVALUATION APPROACH

Person-based transit trips have been forecast and assigned to the area transit network in order to evaluate future transit demands.

Transit trips are derived from the analysis undertaken in Section 13.3, which then forms the basis for assigning transit rider trips by orientation. Assignment of transit trips is based on a review of origin and destination data collected as part of the 2016 Transportation Tomorrow Survey (TTS) for the southern parts of the City of Guelph.

Clair-Maltby Secondary Plan transit trips are assigned to general directions, and would be captured by local transit services. Additional opportunities to explore regional transit connectivity and demands are discussed in the later portions of this chapter.

14.3 TRANSIT RIDER DEMANDS

Transit trips resulting from development contemplated within the Clair-Maltby Secondary Plan area are forecast for planned residential and office land uses, based on the trip forecasting methods outlined in Section 13.3. Transit trip forecasts are based on the most conservative (highest density) “Land Use Budget” circulated in support of planning for Secondary Plan development. Forecast new transit trips to / from each Secondary Plan “Traffic Zone” during analyzed peak hours is summarized in Table 23.

TABLE 23 FORECAST SECONDARY PLAN TRANSIT TRIPS

Transit Trips	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	Inbound	Outbound	2-Way	Inbound	Outbound	2-Way
Traffic Zone 1	5	40	45	35	15	50
Traffic Zone 2	0	15	15	15	5	20
Traffic Zone 3	n/a					
Traffic Zone 4	10	95	105	95	30	125
Traffic Zone 5	10	45	55	45	25	70
Traffic Zone 6	5	60	65	60	20	80
Traffic Zone 7	5	0	5	0	5	5
Traffic Zone 8	10	70	80	80	25	105
Traffic Zone 9	10	75	85	75	25	100
Total:	55	400	455	405	150	555

Notes

1. Trips Rounded to the nearest 5

The majority of transit trips are anticipated to route outbound during the weekday morning peak hour, and inbound during the weekday afternoon peak hour given the prevailing residential-related travel demands associated with the Secondary Plan.

A total of 455 and 555 new transit trips are forecast during the weekday morning and weekday afternoon peak hours, respectively.

14.4 TRANSIT DISTRIBUTION AND ASSIGNMENT

14.4.1 Distribution of Site Transit Trips

A review of TTS data was undertaken to understand the existing distribution and type of transit service utilized for resident-based trips to / from the southern parts of the City of Guelph (TTS Zones: 8062, 8064, 8067-8076, and 8078-8081). Work-related trips were not reviewed given the relative small number of forecast employee transit trips (in the order of 10 inbound trips during the weekday morning peak hour, and 10 outbound trips during the weekday afternoon peak hour).

The distribution of forecast transit trips generated by development within the Clair-Maltby Secondary Plan area is based upon existing transit distribution data made available in the TTS data set. A wider data area was established to accommodate a sizable base of data points, and reflect general transit distribution for resident based transit trips in the southern parts of the City of Guelph.

The review of resident-based area transit trips indicated that the majority of transit trips were undertaken exclusively by local transit services - in the order of 85% to 90%, while a smaller proportion of trips utilized regional GO Transit services to access other parts of the region. TTS transit distribution analysis data is included in **Appendix I**.

It is expected that most transit trips to the Clair-Maltby Secondary Plan area will be captured by local transit services, which is anticipated to continue to evolve in sequence with development of the Secondary Plan area, and as part of on-going service reviews conducted by Guelph Transit.

The anticipated distribution of transit trips and resulting number transit trips, based on the TTS transit distribution and forecast transit rider volumes, are summarized in Table 24. Forecast transit rider volumes are summarized based on the type of service riders would be anticipated to utilize (local or regional), and general directional orientation those riders would travel. Detailed transit rider assignment calculations for the Clair-Maltby Secondary Plan area, are included in **Appendix J**.

TABLE 24 RESULTING NEW TRANSIT TRIPS BY ORIENTATION AND SERVICE

Orientation	Orientation of Transit Trips	Two-way Transit Trips		
		Distribution	AM	PM
Regional Transit Services (GO Transit)				
East	Kitchener GO Line (Guelph Station); Aberfoyle GO Park and Ride Bus Stop	14%	65	75
Local Transit Services (Guelph Transit)				
North	Old Guelph (Downtown) Area	81%	370	450
	University of Guelph Area			
Northeast	Northeast areas of Guelph	2%	10	15
Northwest	Northwest and West areas of Guelph	3%	10	15

Notes:

1. Trips Rounded to the Nearest 5.

Clair-Maltby Secondary Plan area transit trips are predominantly anticipated to be oriented north of the Secondary Plan area, as transit riders tend to route to / from the downtown area, the University area, and central GO Transit Station. In the order of 370 and 450 two-way transit trips are anticipated to route to / from these areas during the weekday morning and weekday afternoon peak hours respectively.

In the order of 65 and 75 two-way transit trips are anticipated to route to / from GO Transit service stops during the weekday morning and weekday afternoon peak hours respectively, including the Guelph GO Station, as well as the existing GO Transit Bus Services routing through Aberfoyle GO Park and Ride.

A small number of transit trips are expected to route to other employment areas in the east and west portions of the City. However, as employment growth is anticipated in the Laird / Highway 6 area, opportunity to capture more trips via transit may exist given the proximity of this employment area to the Clair-Maltby Secondary Plan area, and relative direct options for transit routing.

Transit rider volumes related to development anticipated with the Clair-Maltby Secondary Plan are illustrated by general direction in Figure 19.

14.5 TRANSIT CAPACITY CONSIDERATIONS

Transit trips associated with development of the Clair-Maltby Secondary Plan area are analyzed for the prevailing directions in each of the key weekday morning and afternoon peak hours. Given that most new transit trips are resident-based, prevailing transit impacts are outbound during the weekday morning peak hour, and inbound during the weekday afternoon peak hour.

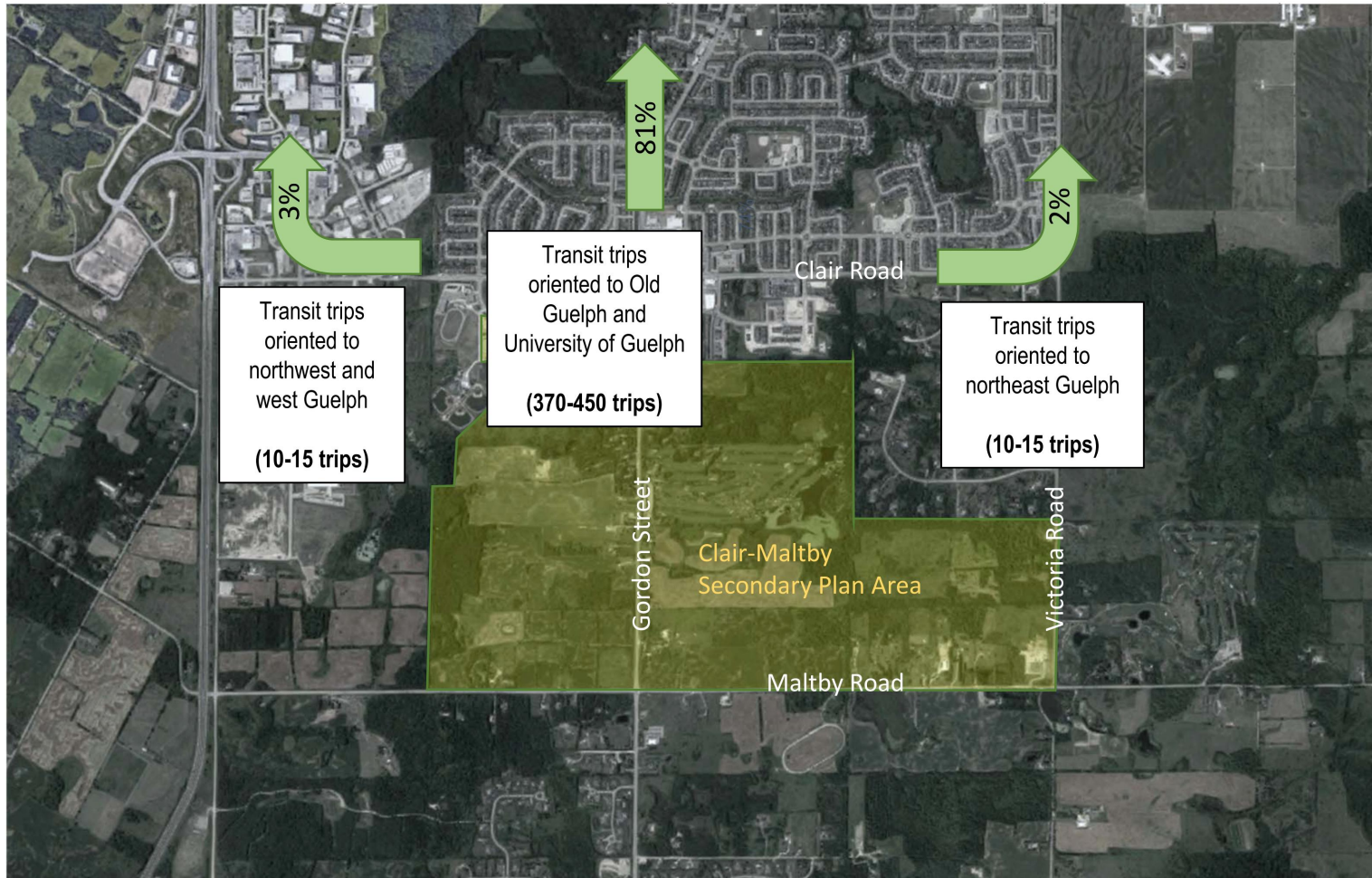
Understanding transit rider forecasts are based on the most conservative (highest density) “Land Use Budget” circulated in support of planning for Secondary Plan development, up to 400 outbound transit trips can be anticipated during the weekday morning peak hour, and 405 inbound trips can be anticipated during the weekday afternoon peak hour. In the order of 90% to 95% of these trips can be expected (conservatively) to be oriented north of the Secondary Plan area to / from the University and Downtown areas. Therefore, up to 385 peak direction transit trips can be expected between the Secondary Plan area and central areas of the City during weekday peak hours.

Guelph Transit currently utilizes Nova Bus LFS 40-foot buses, which have a total passenger capacity of 80 persons per vehicle.² As such, a total of 5 buses would be required to accommodate peak direction, peak time transit ridership demands associated with travel between the Clair-Maltby Secondary Plan area and central Guelph areas. However, transit service provisions would also have to accommodate for existing (and future) down-stream transit rider demands associated with existing developed areas north of the Secondary Plan.

The requirement for a minimum of 5 new buses (per hour) in excess of existing services, operating between the Secondary Plan area and the central areas of the City to accommodate development associated with the Secondary Plan area, can be accommodated through the provision of various routes, express-only services, or frequent services routing along the Gordon Street spine and supporting collector roads.

Based on the foregoing, development contemplated as part of the Clair-Maltby Secondary Plan can be reasonably accommodated by local and regional transit services, given the introduction of new transit services or the expansion of existing services operating within the Secondary Plan area, over the course of the weekday morning and afternoon peak hours

² Nova Bus LFS Diesel Specifications Sheet. 2019. http://novabus.com/wp-content/uploads/2017/09/2018_LFS_DIESEL_EN_REV.pdf



* Remaining percentage of transit rider trips (approx. 14%) are anticipated to utilize regional transit services (GO Transit) only via Guelph Station or Aberfoyle GO Park and Ride.

WEEKDAY PEAK HOUR FORECAST TRANSIT RIDER TRIPS

15.0 TRAFFIC OPERATIONS ANALYSIS

15.1 METHODOLOGY

15.1.1 Analysis Scope

Traffic operations analyses have been undertaken for a number of intersections within the Clair-Maltby Secondary Plan area in order to understand existing and future traffic conditions and demands. Traffic conditions have been reviewed at the following intersections under both existing and future traffic scenarios:

Signalized Intersections:

- Gordon Street and Clair Road;
- Gordon Street and Poppy Drive;
- Gordon Street and Gosling Gardens;
- Clair Road and Poppy Drive;
- Clair Road and Farley Drive;
- Clair Road and Beaver Meadow Drive;
- Clair Road and Victoria Road;
- Laird Road and Highway 6 northbound off-ramp; and
- Laird Road and Highway 6 southbound off-ramp.

Unsignalized Intersections:

- Laird Road and Clair Road West;
- Gordon Street and Maltby Road;
- Victoria Road and Maltby Road (east intersection); and
- Victoria Road and Maltby Road (west intersection).

The free traffic movements associated with the existing Highway 6 access ramps to / from Laird Road East are not analyzed as part of the traffic analysis herein.

Additional intersections are analyzed as part of the Future Total Traffic Operations Analysis, reflecting the introduction of new intersections associated with the build-out of the Preferred Community Structure plan.

New intersections include:

- Gordon Street and Collector Street B;
- Gordon Street and Collector Street C;
- Gordon Street and Collector Street D;
- Gordon Street and Collector Street E;
- Clairfields Extension (Street A) and Poppy Road;
- Clairfields Extension (Street A) and Collector Street B;
- Clairfields Extension (Street A) and Collector Street C;
- Clairfields Extension (Street A) and Collector Street D;
- Clairfields Extension (Street A) and Collector Street E;
- Clairfields Extension(Street A) and Maltby Road;
- Collector Street E and Collector Street F;
- Maltby Road and Collector Street F
- Maltby Road and Collector Street G; and
- Victoria Road and Collector Street E.

15.1.2 Analysis Scenarios

Traffic operations analyses have been undertaken during the prevailing weekday afternoon street peak hour under the following traffic conditions:

1. Existing traffic scenario: reflecting existing traffic volumes, lane configurations and traffic controls.
2. Future Background traffic scenario: reflecting traffic volumes projected to the year 2031 planning horizon that are not associated with the development of the Clair-Maltby Secondary Plan area, planned future lane configurations, planned future traffic controls, and planned new street elements (such as the southward extension of Southgate Drive to Maltby Road).
3. Future Total traffic scenario: reflecting traffic volumes projected to the year 2031 planning horizon including those associated with the development of the Clair-Maltby Secondary Plan area, planned future lane configurations, planned future traffic controls, and planned new street elements (such as new collector streets proposed as part of the Preferred Community Structure plan).

15.1.3 Analysis Assumptions

15.1.3.1 Intersection Capacity Analysis Methodology

Traffic operations analyses have been undertaken at study area intersections using standard capacity analysis procedures as follows.

The traffic operations analysis for signalized and unsignalized intersections was undertaken using *Synchro Version 10* software, adhering to the analysis methodology outlined in the *Highway Capacity Manual 2000*. Key performance indicators utilized for the signalized and unsignalized analyses are volume-to-capacity (v/c) ratios, delay times, and level-of-service (LOS).

Input parameters for the analyses are based on data acquired from traffic surveys. Peak hour factors and heavy traffic percentage parameters were calculated based on the traffic data acquired where appropriate. Bus blockages were estimated based on transit service frequency during prevailing traffic volume peak hours.

15.1.3.2 Calibration

Vehicle delay surveys were undertaken for the eastbound and westbound traffic movements at the Gordon Street and Maltby Road intersection so as to ensure that the traffic model appropriately reflects existing traffic delays for the eastbound and westbound movements. The existing traffic analysis herein is calibrated to reflect existing delay results observed during updated data collection and traffic delay surveys. Parameters calibrated under existing traffic conditions is carried forward as part of future analysis traffic scenarios.

Vehicle delay surveys are included in **Appendix K**.

15.2 EXISTING TRAFFIC OPERATIONS ANALYSIS

Existing traffic operations analysis contemplate existing traffic volumes and existing street network configurations and traffic control.

15.2.1.1 Traffic Volume Data

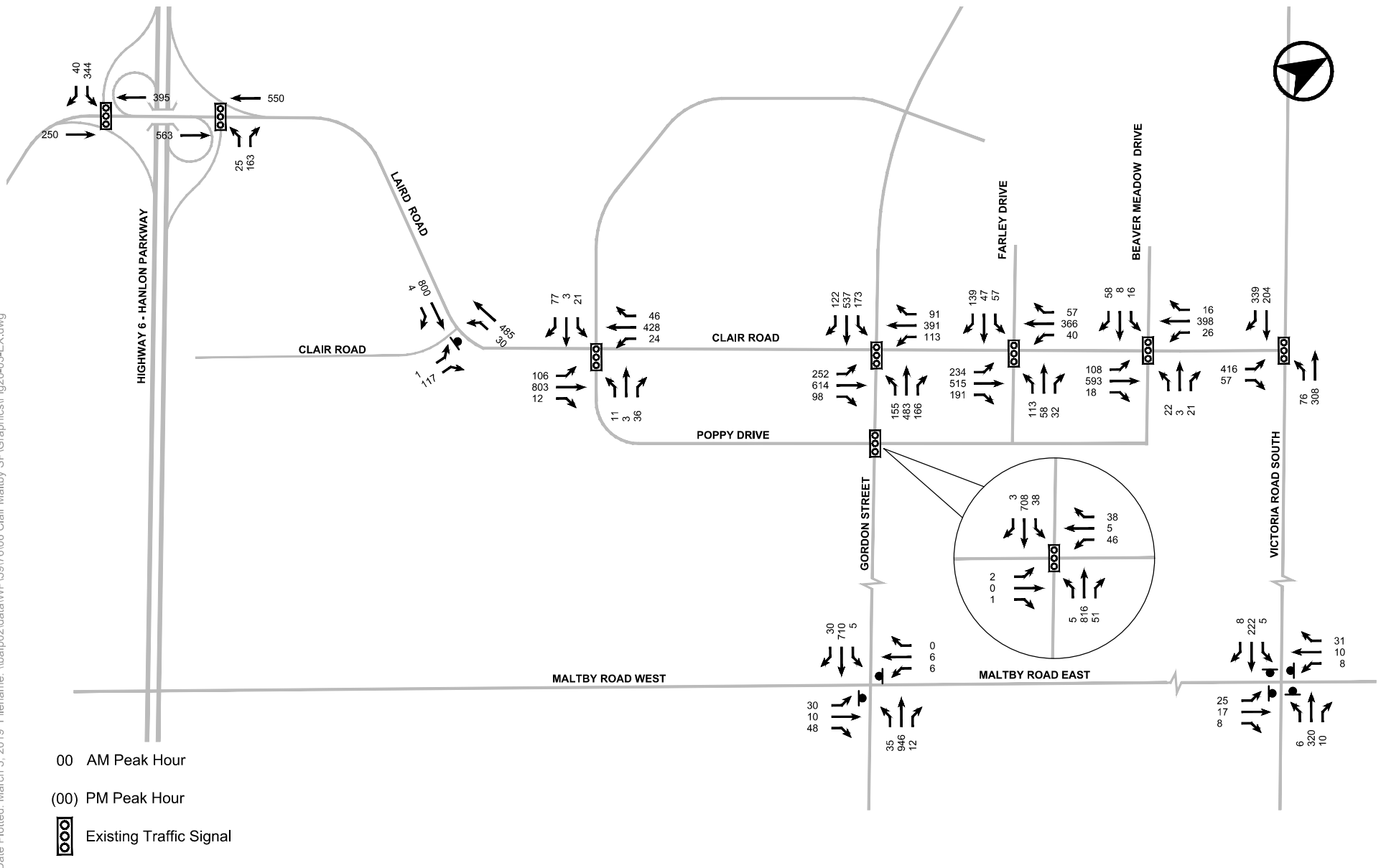
Existing traffic volume data were obtained for all study area intersections from the City of Guelph and / or traffic counts collected by Spectrum Traffic Data Inc. on behalf of BA Group.

Traffic volume data was collected for the period 2012 to 2017 for key intersections in the study area, as well as older traffic volume data for use as reference. Traffic volumes were reviewed against historical data (TMCs and ATRs) to verify general trends and understand potential inconsistencies. Generally, the most recent intersection counts (those from 2015 to 2017) were selected at key study area intersections, and utilized as the basis for analysis. Existing area traffic volumes utilized in assessing current traffic operations are illustrated in Figure 20. Traffic count data utilized in the traffic analysis prepared herein, are included in **Appendix L**.

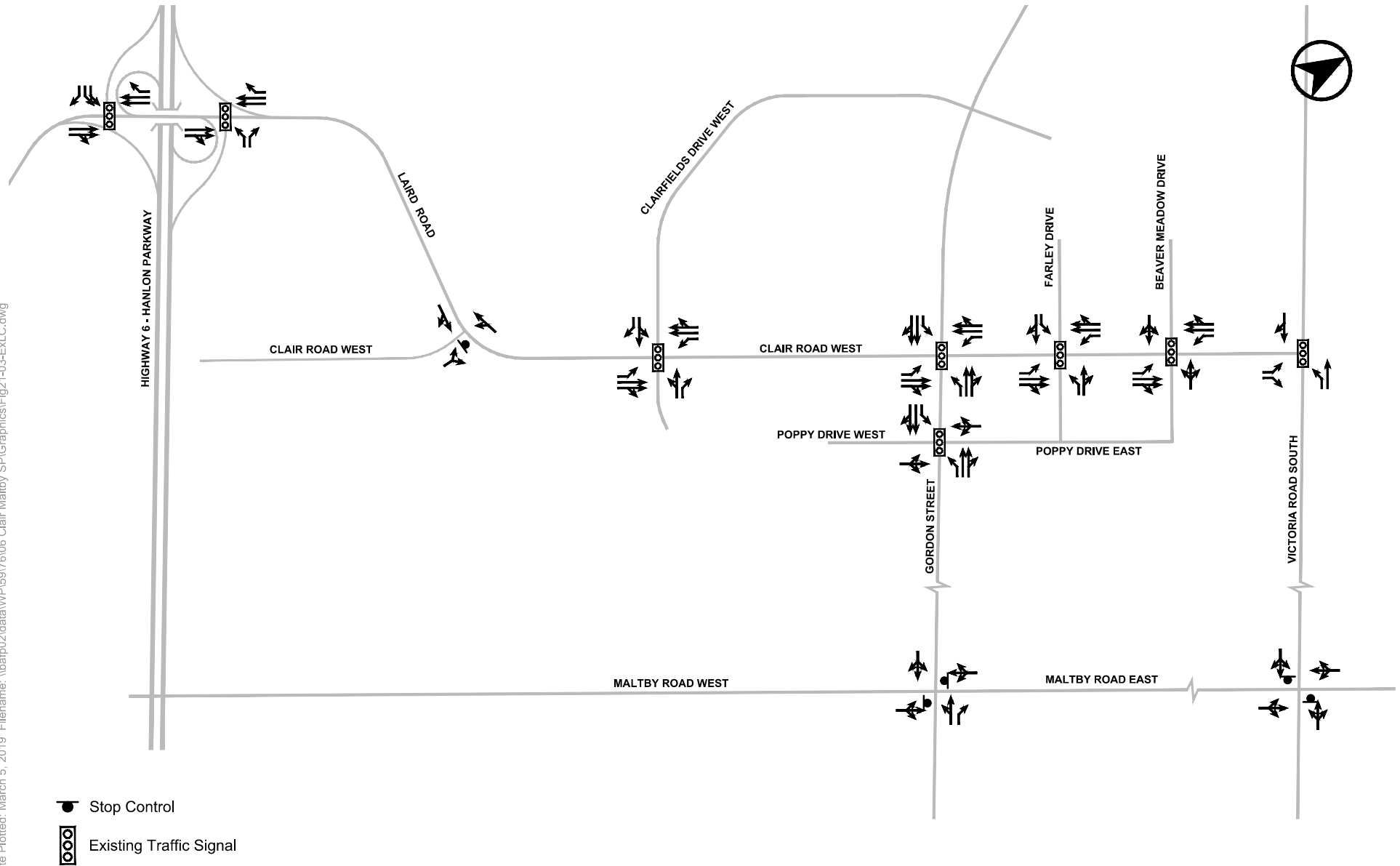
Traffic signal timing plans were provided by the Ministry of Transportation and the City of Guelph for signalized intersection included as part of the analysis.

15.2.1.2 Existing Transportation Network

Existing lane configurations on the public area road network reflect existing lane configurations and traffic controls. Existing traffic lane configurations and traffic controls are illustrated in Figure 21.



EXISTING WEEKDAY AFTERNOON PEAK HOUR TRAFFIC VOLUMES



EXISTING TRAFFIC LANE CONFIGURATIONS AND CONTROLS

15.2.2 Signalized Intersection Analysis Results

Detailed results of the Synchro analysis of signalized intersections within the study area under existing traffic conditions are included in **Appendix M**. A discussion of the traffic analysis findings follows.

A summary of existing signalized and unsignalized traffic operations at key existing study area intersections is provided in Figure 22.

15.2.2.1 General Findings

The traffic operations analyses outlined herein reflect traffic operations at the key intersections in the study area without explicitly considering the downstream congestion extending beyond study area intersections.

Individual movement and overall volume-to-capacity ratios for each of the signalized intersections within the study area are summarized in Table 25.

The signalized intersection traffic analysis indicates that all study area intersections perform acceptably, and without any traffic capacity constraints for any individual traffic movements. During the weekday afternoon peak hour, overall intersection v/c ratios are shown to be 0.70 or less, while individual traffic movements are shown to all operate with a v/c ratio of 0.73 or less.

Overall signalized intersection traffic operations are good under existing conditions, and are generally reflective of new infrastructure (updated and widened roads) and limited area development. Existing delay and capacity results are acceptable.

The key Gordon Street and Clair Road intersection operates acceptably under existing traffic conditions, with an overall intersection v/c ratio of 0.63 during the weekday afternoon peak hour. Traffic volumes and resulting traffic operations are reflective of the commercial land uses prevalent in each of the intersection's four quadrants.

The intersection of Clair Road East and Victoria Road was recently signalized. The signalized intersection analysis indicates that this intersection generally operates acceptably.

**TABLE 25 EXISTING CONDITIONS SIGNALIZED INTERSECTIONS ANALYSIS SUMMARY:
WEEKDAY AFTERNOON PEAK HOUR**

Intersection	Traffic Movement	Volume to Capacity (v/c) Ratio
Gordon Street and Clair Road	EB L	0.65
	EB TR	0.60
	WB L	0.47
	WB TR	0.42
	NB L	0.52
	NB TR	0.57
	SB L	0.56
	SB TR	0.59
	Overall	0.63
Gordon Street and Poppy Drive	EB LTR	0.00
	WB LTR	0.41
	NB L	0.01
	NB TR	0.37
	SB L	0.09
	SB TR	0.29
	Overall	0.36
Clair Road West and Poppy Drive West / Clairfields Drive	EB L	0.21
	EB TR	0.46
	WB L	0.08
	WB TR	0.29
	NB LT	0.03
	NB R	0.02
	SB LT	0.05
	SB R	0.05
	Overall	0.31
Clair Road East and Farley Drive	EB L	0.44
	EB TR	0.37
	WB L	0.13
	WB TR	0.28
	NB LT	0.32
	NB R	0.12
	SB LT	0.14
	SB R	0.17
	Overall	0.41

Clair Road East and Beaver Meadow Drive	EB L	0.20
	EB TR	0.35
	WB L	0.06
	WB TR	0.25
	NB LTR	0.07
	SB LT	0.04
	SB R	0.06
	Overall	0.25
Clair Road East and Victoria Road	EB L	0.68
	EB R	0.06
	NB L	0.38
	NB T	0.46
	SB T	0.73
	Overall	0.70
Laird Road and Highway 6 Northbound Off-Ramp	EB T	0.47
	WB T	0.46
	NB L	0.03
	NB R	0.15
	Overall	0.29
Laird Road and Highway 6 Southbound Off-Ramp	EB T	0.21
	WB T	0.32
	NB L	0.22
	NB R	0.03
	Overall	0.26

15.2.3 Unsignalized Intersection Analysis Results

The results of the capacity analysis performed for unsignalized intersections in the study area are summarized in Table 26.

Detailed Synchro analysis output sheets are included in **Appendix M**. A summary of existing signalized and unsignalized traffic operations at key existing study area intersections is provided in Figure 22.

**TABLE 26 EXISTING CONDITIONS UNSIGNALIZED INTERSECTIONS ANALYSIS SUMMARY:
WEEKDAY AFTERNOON PEAK HOUR**

Intersection	Movement of Interest	Existing Traffic Conditions	
		Delay (s)	LOS
Clair Road West and Laird Road	WB L	1.0	A
	NB (Clair Rd.) LR	18.6	C
Gordon Street and Maltby Road	EB LTR	19.6	C
	WB LTR	33.1	D
	NB LTR	1.2	A
	SB LTR	0.2	A
Victoria Road and Maltby Road (west intersection)	WB LT	7.1	A
	NB LR	10.3	B
Victoria Road and Maltby Road (east intersection)	EB LT	7.7	A
	SB LR	11.8	B

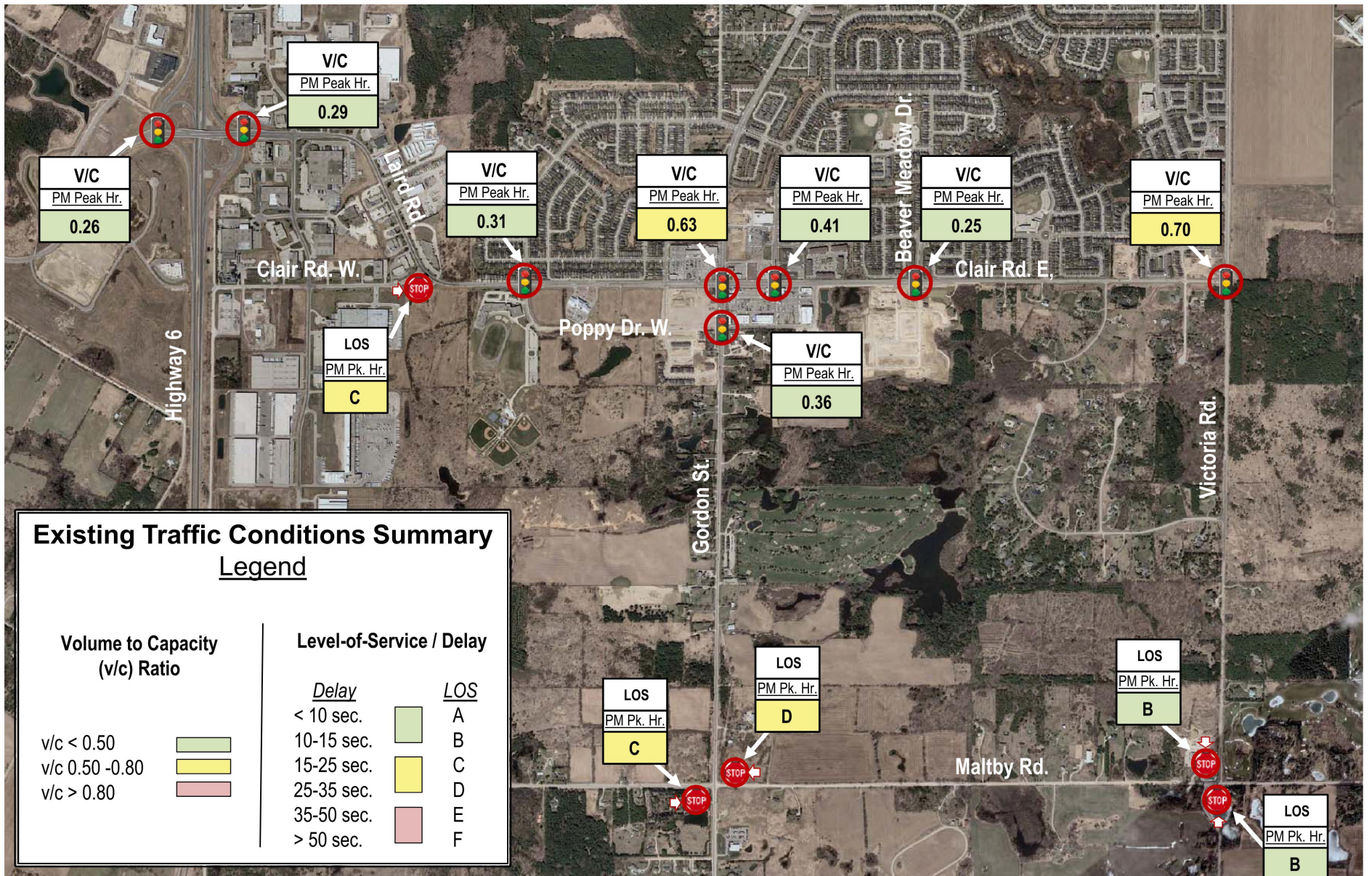
Existing Unsignalized Intersections

A total of four (4) unsignalized intersections were reviewed within the unsignalized intersection analysis. Traffic operations at unsignalized intersections within the study area operate acceptably, except for the following:

Gordon Street and Maltby Road:

The existing conditions traffic analysis indicates that eastbound and westbound STOP-control movements at the Gordon Street and Maltby Road intersection operate with longer delays and fewer gap opportunities. The unsignalized traffic analysis indicates that the eastbound movement operates with LOS C during the weekday afternoon peak hour, while the westbound movement operates with LOS D during the weekday afternoon peak hour. Signalization of this intersection may be considered in the longer-term given anticipated traffic growth along both streets. This intersection can be monitored, and will be considered more closely in the future traffic analysis to be completed as part of traffic analyses in forthcoming sections of this report.

All other movements at unsignalized intersections within the study area are shown to operate at LOS C or better during the weekday afternoon peak hour, which is acceptable.



SUMMARY OF EXISTING TRAFFIC OPERATIONS ANALYSIS

15.3 FUTURE BACKGROUND TRAFFIC CONSIDERATIONS

15.3.1 Future Background Scenario Road Network Assumptions

Future lane configurations on the area street network reflect the following planned improvements that are assumed as part of the future traffic analysis scenarios:

- Widening of Gordon Street from 2 to 4 lanes (approved 2001 EA) from Kortright Road to Wellington Road 34;
- Widening of Clair Road from 2 to 4 lanes (approved 2003 EA) – COMPLETE; and
- Southerly extension of Southgate Drive to Maltby Road.

15.3.2 General Corridor Growth

BA Group has undertaken a review of traffic patterns in the study area over the past 10 years (2008 to 2018) to provide an understanding of overall traffic growth trends on key street segments within the Secondary Plan area.

Traffic volumes were reviewed for the following street segments to provide an indication of prevailing trends in vehicle activity along the arterial road corridors of Gordon Street, Clair Road, and Victoria Road within this period.

1. Gordon Street south of Clair Road,
2. Gordon Street north of Maltby Road,
3. Clair Road east of Gordon Street,
4. Clair Road west of Gordon Street, and
5. Victoria Road south of Clair Road.

It should be noted that traffic volumes were also reviewed for segments of Maltby Road east of Gordon Street; however, the infrequency of historical data and generally small traffic volumes could not produce a reflective traffic growth rate. Traffic volumes on Maltby Road were shown to be relatively small, and variable from count to count.

Traffic corridor review observations are outlined in the following and are summarized in **Appendix N**.

- In the **northbound and southbound directions on Gordon Street**. Traffic volumes on the street segment south of Clair Road and on the street segment north of Maltby Road illustrate consistent traffic patterns for the entire Gordon Street segment through the Secondary Plan area. Two-way traffic volumes are shown to have increased in the order of +0.4% to +0.7% during the weekday afternoon peak hour.

During the weekday afternoon peak hour, northbound traffic is shown to have increased by +0.5% to +0.6% per annum over the last 10-year period, while southbound traffic is shown to have increased between +0.3% to +0.8% per annum over the same period.

- In the **eastbound and westbound directions on Clair Road**. Over the previous 10-year period, two-way traffic volumes on Clair Road are shown to have increased in the order of +3% to +4% annually during the weekday afternoon peak hour west of Gordon Street, and in the order of +4% to +5% annually during the weekday afternoon peak hour east of Gordon Street.
- In the **northbound and southbound directions on Victoria Road**. It is important to note that the rate of traffic growth on Victoria Road (percentage change) is somewhat misleading for the following reasons:
 - Victoria Road traffic volumes are relatively low, and despite higher rates of vehicle growth, the absolute volume of new traffic is less than those observed on Clair Road.
 - Historical traffic volume data indicates that most of the increase in traffic volumes on Victoria Road occurred between 2013 and 2014, and that traffic volumes after 2014 are shown to be more consistent.

Understanding this, two-way traffic volumes on Victoria Road south of Clair Road are shown to have increased by +16% to +18% annually during the weekday afternoon peak hour.

The general weekday afternoon corridor growth rates observed as part of the corridor analysis review are summarized in Table 27.

TABLE 27 CORRIDOR TRAFFIC GROWTH SUMMARY

Street	Direction	Observed Annual Growth Rate
Gordon Street Two-way Traffic	Northbound / Southbound	+0.4% to +0.7%
Clair Road Two-way Traffic	Eastbound / Westbound	+3.7% to +4.7%
Victoria Street Two-way Traffic	Northbound / Southbound	+18%

Understanding the prevailing traffic growth trends associated with key arterial roads within the Secondary Plan area (Gordon Street, Victoria Road and Clair Road), traffic growth was assumed for these corridors. Corridor traffic growth was carried through the study area, and in the case of Clair Road, assigned to terminal ramps at the Highway 6 / Laird Road interchange based on existing turning movement proportions. Corridor growth rates were applied over a 14-year period to the 2031 planning horizon year, to account for the 2017 date of traffic data collection associated with this project.

Application of Background Corridor Growth Rates:

An average annual corridor growth rate of 0.5% was applied to Gordon Street during the weekday afternoon peak hour.

Higher traffic growth rates along Victoria Road and Clair Road are expected to result from recent development along these corridors; however, this growth would not be expected to be maintained over the long-term without the introduction of new site-specific developments (accounted for in the following section). As such, a corridor growth rate of 1.5% per annum was applied to these corridors, which is generally consistent with growth rates applied by the City in traffic planning modelling exercises.

Traffic volumes resulting from the application of corridor growth rates outlined herein, are summarized in **Appendix O**.

15.3.3 Site Specific Background Developments

Future background traffic operations will be forecast and assessed, understanding general traffic growth trends (corridor growth assessed in the foregoing), and other area site-specific background developments – which are summarized in Table 28.

Area background developments also provide an understanding of current changes within the vicinity of the Clair-Maltby Secondary Plan area, and the existing development context that will be considered as part of future planning for the subject lands.

Traffic volumes associated with each of the developments outlined in Table 28 is assigned to the area road network.

It should be noted that traffic related to the proposed development comprising the Dallan Residential Subdivision (161, 205, and 253 Clair Road East) would be somewhat captured as part of existing traffic volumes given the initial occupancy of this development. For the purposes of the traffic analysis herein, traffic volumes associated with this development are reduced by 25% to account for existing occupancy.

Traffic volumes related to the Dallan, Neumann and Bird Subdivisions were slightly adjusted as part of the analysis herein to account for the introduction of Poppy Road, which was not utilized in the assignment of site specific trips within Transportation Studies prepared for these developments.

Traffic volumes resulting from the introduction of the site-specific developments cited herein, are summarized in **Appendix O**.

TABLE 28 AREA DEVELOPMENT APPLICATIONS

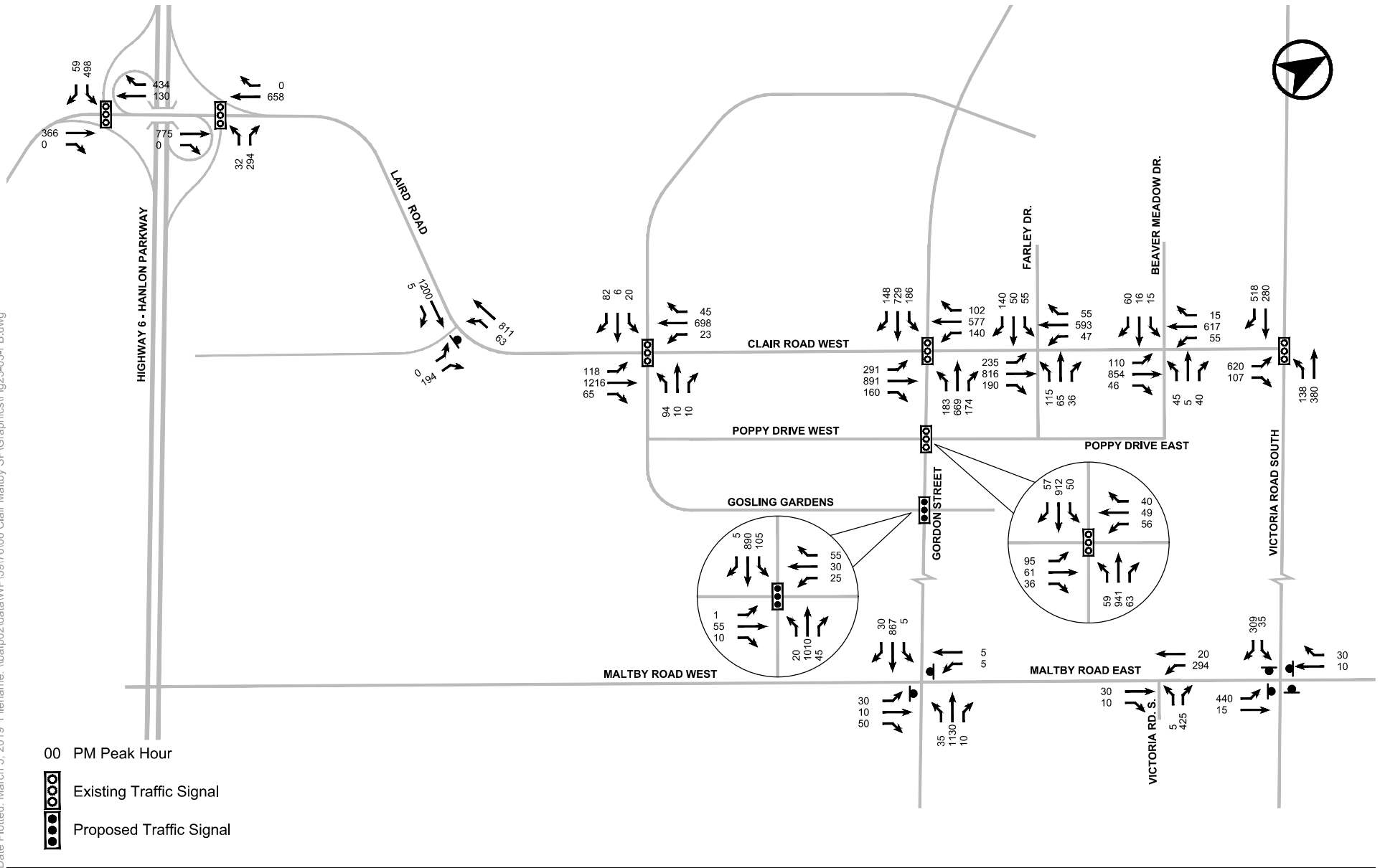
Development	Residential Units	Non-Residential GFA	Two-Way Site Traffic ¹ AM (PM)	Transportation Study / Analysis
1888 Gordon Street (Tricar Developments Inc.)	460 Apartment Units	6,350 sq. ft. non-residential GFA	297 (329)	<i>1888 Gordon Street Traffic Impact Study</i> , September 22, 2017, Stantec.
Neumann Subdivision (Coldwell Banker Neumann REB Ltd.)	Stacked townhouses and apartments (permitted use). Number of units unspecified.	3.22 ha Corporate Business Park <u>0.98 ha Commercial</u> 4.2 ha	205 (203)	<i>Neumann Subdivision Guelph, ON Transportation Impact Study</i> , October 2014, Paradigm Transportation Solutions Ltd.
Bird Subdivision (Thomasfield Homes Ltd.)	21 Single Family Units 36 Townhouse Units <u>249 Apartment Units</u> 306 Total Units	0.04 ha Future Development	107 (137)	<i>Bird Residential Subdivision Traffic Impact Study</i> , October 2010, Paradigm Transportation Solutions Ltd.
Southwest Corner of Gordon Street / Clair Road (Fieldgate)	-	7,408 sq. m. Retail	515 ²	<i>Gordon Street and Clair Road</i> October 2015, LEA Consulting Ltd.
Southgate Business Park (Industrial Equities)	-	27,870 sq. m. Manufacturing 122,632 sq. m. Warehouse	476 (450)	<i>Southgate Business Park Transportation Impact Study</i> June 2012, IBI Group
Hanlon Creek Business Park	--	--	--	--
Dallan Residential Subdivision 161, 205 & 253 Clair Road East	409 residential units (Mix of densities)	--	--	1888 Gordon TIS assumed 105 units. ±400 units were previously proposed. Unclear what's currently being built...
South End Centre	-	13,935 sq.m. (150,000 sq.ft.) Recreation Centre	308 (411)	No TIS. Traffic referenced from 1888 Gordon TIS.
Westminster Woods Victoria Road South & Clair Road East	101 residential apartment units	745 sq. m. Commercial	70 (149)	<i>Kingsbury C Westminster Woods Traffic Impact Study</i> , March 2015, Stantec.

Notes:

1. Two-Way Site Traffic based on individual TIS reports.
2. 515 total PM trips, 340 net new PM trip

15.3.4 Future Background Traffic Analysis Results

Future Background traffic volumes, which is the sum of existing traffic volumes, corridor growth traffic volumes, and site-specific background development traffic volumes, is illustrated in Figure 23.



FUTURE BACKGROUND TRAFFIC VOLUMES

15.3.5 Signalized Intersection Analysis Results

Detailed results of the Synchro analysis of signalized intersections within the study area under future background traffic conditions are included in **Appendix P**. A discussion of the traffic analysis findings follows.

A summary of future background signalized and unsignalized traffic operations at key existing study area intersections is provided in Figure 24.

15.3.5.1 General Findings

The traffic operations analyses outlined herein reflect traffic operations at the key intersections in the Secondary Plan analysis scope without explicitly considering the downstream congestion extending beyond study area intersections.

Individual movement and overall volume-to-capacity ratios for each of the signalized intersections within the study area are summarized in Table 29.

The signalized intersection traffic analysis indicates that all study area intersections are anticipated to perform acceptably under future background traffic conditions. During the weekday afternoon peak hour, overall intersection v/c ratios are shown to be 0.87 or less, while individual traffic movements are shown to all operate with a v/c ratio of 0.87 or less.

Overall signalized intersection traffic operations are generally good under future background traffic conditions and are similar to those observed under existing traffic conditions, although longer delays and higher volume-to-capacity ratios are observed at the key Gordon Street / Clair Road and Victoria Road / Clair Road intersections relative to the existing conditions.

The key Gordon Street / Clair Road intersection is anticipated to operate acceptably under future background traffic conditions, with an overall intersection v/c ratio of 0.87 during the weekday afternoon peak hour. Relative to the existing condition, overall intersection v/c ratios increase by 32% during the weekday afternoon peak hour, which is generally the result of anticipated increases in through traffic volumes along Gordon Street and Clair Road, site-specific development traffic, and an increase in eastbound left-turn traffic volumes resulting from specific area developments.

The future background traffic analysis indicates that the Victoria Road / Clair Road intersection generally operates acceptably, despite an increase in traffic delay and volume-to-capacity ratios. Relative to the existing condition, overall intersection v/c ratios increase by 25% during the weekday afternoon peak hour, which is generally the result of anticipated increases in southbound right-turn and eastbound left-turn traffic volumes resulting from area-specific background developments.

**TABLE 29 FUTURE BACKGROUND CONDITIONS SIGNALIZED INTERSECTIONS ANALYSIS
SUMMARY: WEEKDAY AFTERNOON PEAK HOUR**

Intersection	Traffic Movement	Volume to Capacity (v/c) Ratio
Gordon Street and Clair Road	EB L	0.87
	EB TR	0.84
	WB L	0.70
	WB TR	0.54
	NB L	0.86
	NB TR	0.87
	SB L	0.83
	SB TR	0.87
	Overall	0.87
Gordon Street and Poppy Drive	EB LTR	0.67
	WB LTR	0.47
	NB L	0.17
	NB TR	0.50
	SB L	0.15
	SB TR	0.48
	Overall	0.52
Gordon Street and Gosling Gardens	EB LTR	0.15
	WB LTR	0.21
	NB L	0.06
	NB TR	0.46
	SB L	0.37
	SB TR	0.39
	Overall	0.40
Clair Road West and Poppy Drive West / Clairfields Drive	EB L	0.31
	EB TR	0.72
	WB L	0.16
	WB TR	0.46
	NB LT	0.26
	NB R	0.01
	SB LT	0.06
	SB R	0.05
	Overall	0.54

Clair Road East and Farley Drive	EB L	0.56
	EB TR	0.53
	WB L	0.20
	WB TR	0.43
	NB L	0.31
	NB TR	0.14
	SB L	0.14
	SB TR	0.18
	Overall	0.48
Clair Road East and Beaver Meadow Drive	EB L	0.26
	EB TR	0.53
	WB L	0.18
	WB TR	0.37
	NB LTR	0.14
	SB L	0.04
	SB TR	0.07
	Overall	0.37
Clair Road East and Victoria Road	EB L	0.82
	EB R	0.11
	NB L	0.41
	NB T	0.67
	SB T	0.48
	SB R	0.34
	Overall	0.76
Laird Road and Highway 6 Northbound Off-Ramp	EB T	0.64
	WB T	0.55
	NB L	0.03
	NB R	0.40
	Overall	0.50
Laird Road and Highway 6 Southbound Off-Ramp	EB T	0.30
	WB T	0.35
	SB L	0.31
	SB R	0.04
	Overall	0.33

15.3.6 Unsignalized Intersection Analysis Results

The results of the capacity analysis performed for unsignalized intersections in the study area are summarized in Table 30.

Detailed Synchro analysis output sheets are included in **Appendix P**. A summary of existing signalized and unsignalized traffic operations at key existing study area intersections is provided in Figure 24.

TABLE 30 FUTURE BACKGROUND CONDITIONS UNSIGNALIZED INTERSECTION ANALYSIS SUMMARY: WEEKDAY AFTERNOON PEAK HOUR

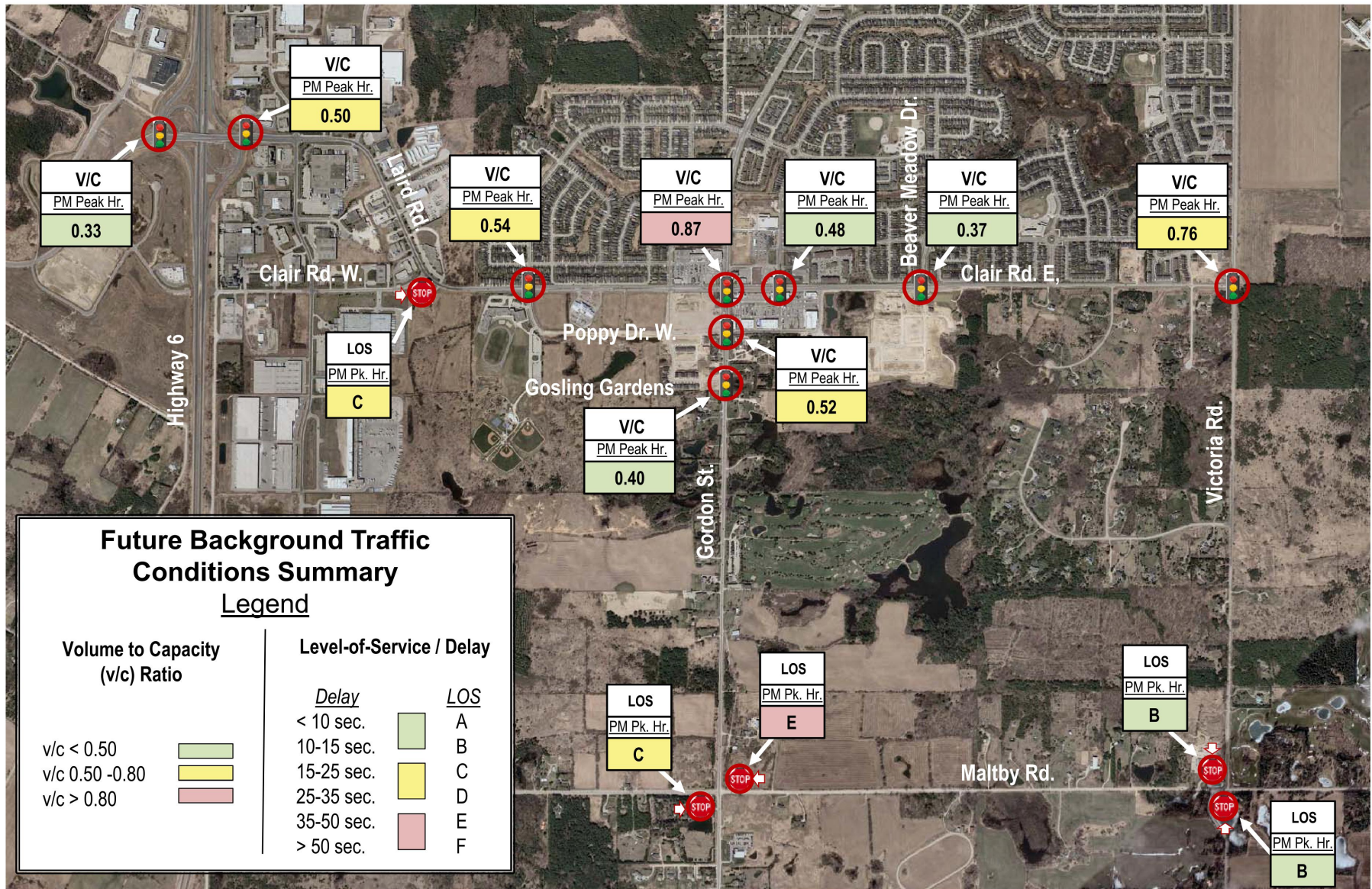
Intersection	Movement of Interest	Existing Traffic Conditions	
		Delay (s)	LOS
Clair Road West and Laird Road	WB L	12.1	C
	NB (Clair Rd.) LR	20.2	C
Gordon Street and Maltby Road	EB LTR	17.7	C
	WB LTR	36.3	E
	NB L	10.1	B
	SB L	12.1	B
Victoria Road and Maltby Road (west intersection)	WB LT	7.4	A
	NB LR	11.2	B
Victoria Road and Maltby Road (east intersection)	EB LT	8.0	A
	SB LR	13.8	B

Future Background Unsignalized Intersections

A total of four (4) unsignalized intersections were reviewed within the future background traffic conditions unsignalized intersection analysis. Traffic operations at unsignalized intersections within the study area are anticipated to continue to operate similar to existing conditions, and overall acceptably except for the Gordon Street / Maltby Road intersection.

The widening of Gordon Street at its intersection with Maltby Road is anticipated to somewhat off-set the delay implications of additional northbound / southbound traffic for eastbound and westbound STOP-controlled traffic. The future background conditions traffic analysis indicates that eastbound and westbound STOP-control movements at the Gordon Street and Maltby Road intersection will continue operate with longer delays and fewer gap opportunities, similar to conditions summarized as part of the existing traffic analysis. Signalization of this intersection may be considered in the longer-term given anticipated traffic growth along both streets.

All other movements at unsignalized intersections within the study area are shown to operate at LOS C or better during the weekday afternoon peak hour, which is acceptable.



SUMMARY OF FUTURE BACKGROUND WEEKDAY AFTERNOON TRAFFIC OPERATIONS

15.4 FORECAST CLAIR-MALTBY SECONDARY PLAN TRAFFIC

15.4.1 Existing Secondary Plan Traffic

Traffic volumes generated by the existing buildings within the Secondary Plan area are expected to be small, and generally represent individual households, small businesses, an existing golf course, and general rural activities.

A marginal volume of traffic results from existing operations and activities within the Secondary Plan area relative to the planned redevelopment of these lands. For the purposes of the traffic analysis conducted herein, existing Secondary Plan area traffic was conservatively retained on the area street network. Reductions to future forecast Clair-Maltby Secondary Plan traffic were not made to account for existing traffic resulting from current development within the subject lands.

15.4.2 Future Site Traffic Generation

Peak hour traffic volume forecasts for the Clair-Maltby Secondary Plan area are based upon the trip forecasting strategies outlined in Section 13, and have been developed based on the most conservative (highest density) assumptions outlined in the “Land Development Budget” prepared by the project team – dated August 27, 2018. For the purposes of the analysis herein, a total of 10,125 residential units and 333 jobs have been assessed to understand the traffic impacts on the area street network.

A summary of forecast traffic volumes, resulting from development of the Clair-Maltby Secondary Plan area, by land use and traffic zone, are summarized in Table 31.

TABLE 31 FORECAST CLAIR-MALTBY SECONDARY PLAN TRAFFIC GENERATION

Vehicle Trips	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	Inbound	Outbound	2-Way	Inbound	Outbound	2-Way
Traffic Zone 1	80	240	315	265	170	435
Traffic Zone 2	30	90	120	100	65	165
Traffic Zone 3	n/a					
Traffic Zone 4	190	570	760	670	415	1,085
Traffic Zone 5 (Residential)	95	280	375	340	205	545
Traffic Zone 5 (Employment)	45	10	55	10	45	55
Traffic Zone 6	125	365	485	425	265	690
Traffic Zone 7 (Employment)	70	15	85	15	65	80
Traffic Zone 8	145	430	570	585	310	795
Traffic Zone 9	145	440	585	525	320	845
Total:	925	2,440	3,350	2,935	1,860	4,700

Notes:

1. All trips rounded to the nearest 5.

The most dense land use scenario, as identified in the Clair-Maltby Secondary Plan Land Use Budget, would be anticipated to generate in the order of 3,350 and 4,700 two-way vehicle trips during the weekday morning and afternoon peak hours, respectively.

15.4.3 Clair-Maltby Secondary Plan Traffic Distribution and Assignment

The directional distribution of vehicle trips made to and from the Clair-Maltby Secondary Plan area has been based upon a review of information obtained from the 2016 Transportation Tomorrow Survey (TTS).

Residential and employment-related traffic distribution patterns have been developed based upon a review of 2016 TTS survey data for the 2006 TTS traffic zones 8062, 8064, 8067-8076, and 8078-8081, which generally comprises the area north of the Secondary Plan and would be identified as the southern portions of the City of Guelph. This local proxy area was chosen because it is anticipated that traffic resulting from the development of the Secondary Plan area would exhibit similar auto travel characteristics to existing residential and employment buildings in the identified area.

Travel patterns for traffic generated by the residential and employments uses planned within the Secondary Plan area are based upon a review of the following:

- Travel destination information provided in the 2016 Transportation Tomorrow Survey (TTS). A comprehensive series of surveys were conducted in the development of the TTS database that describes, among other information, the travel behaviour of motorists of a specific area during the street peak periods;
- Capacity constraints on turning movements at area intersections that would, because of the extent of the delays that may be experienced, influence motorists to choose alternate routes while travelling to and from the proposed building; and
- The introduction of planned new roads and road improvements within the vicinity of the Secondary Plan, advanced through City and County transportation planning and / or site-specific development.

For destinations within the City of Guelph, forecast site traffic is routed along both local (collector) and regional transportation corridors depending on their distance to / from the Secondary Plan area. At the regional level, a greater reliance on regional corridors such as Highway 6 - the Hanlon Parkway and Gordon Street is expected as many drivers would take advantage of highway and higher-order roads to travel greater distances across the region and connect with Highway 401 to the south.

Overall traffic distribution assumptions are applied to individual Traffic Zones, identified within the Secondary Plan area, to appropriately assign traffic volumes related to specific development areas within the overall Plan. As such, deviation from the general distribution of traffic can be anticipated given the variability in routing options for motorists from different traffic zones within the Secondary Plan area. For example, motorist in Traffic Zones 6 or 8 may utilize Gordon Street to travel north into the central portions of the City of Guelph given that these areas are bounded by Gordon Street, more so than motorists resulting from Traffic Zone 9 development which is located adjacent to Victoria Road – a viable north-south direction arterial to Gordon Street.

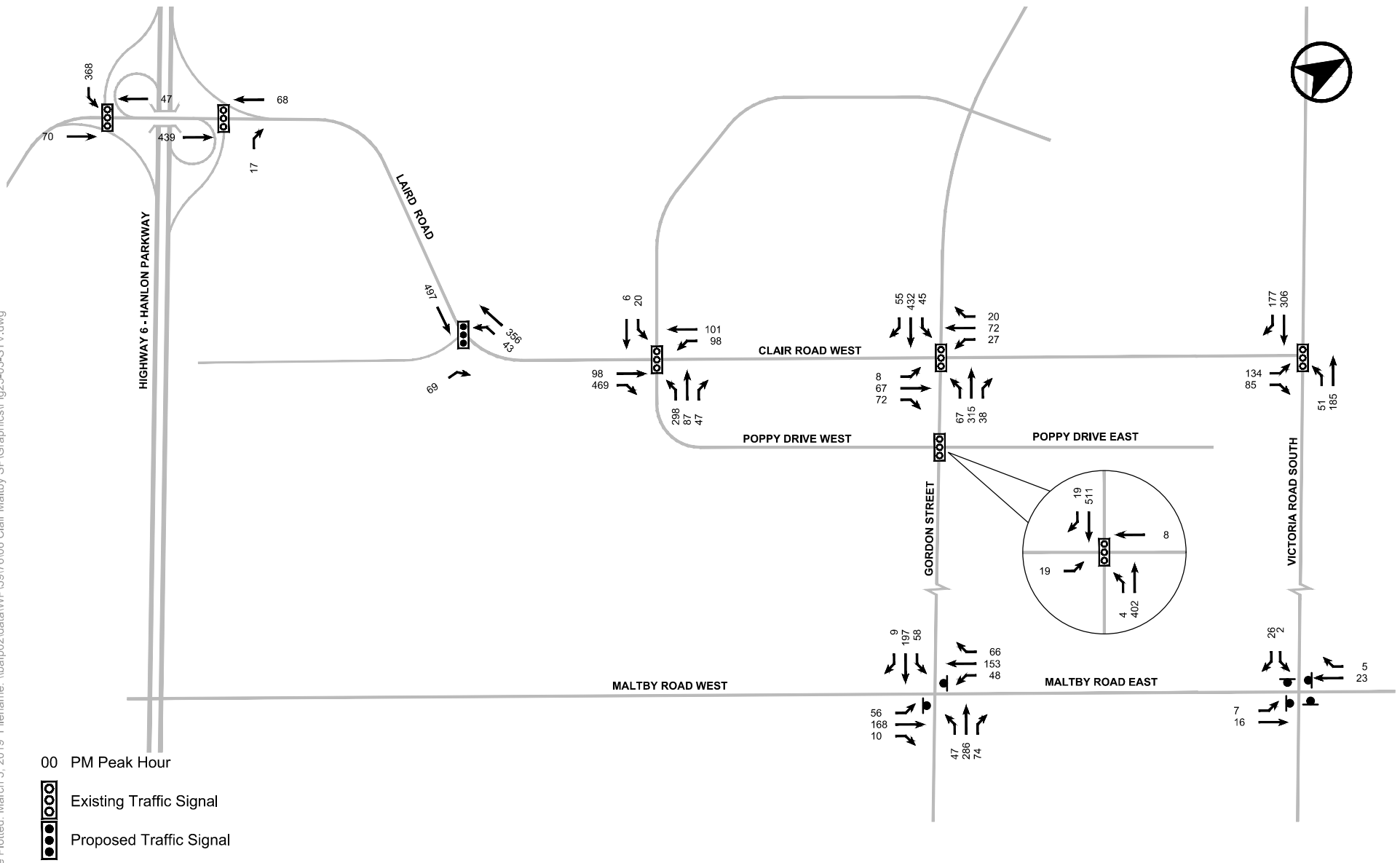
Table 32 summarizes the general directional distribution for traffic routing to / from the Clair-Maltby Secondary Plan area. Residential and employment-related Secondary Plan traffic volumes assignment calculations are summarized in **Appendix Q**. Forecast new Secondary Plan traffic volumes on the area street network are illustrated in Figure 25.

TABLE 32 CLAIR-MALTBY SECONDARY PLAN TRAFFIC ASSIGNMENT

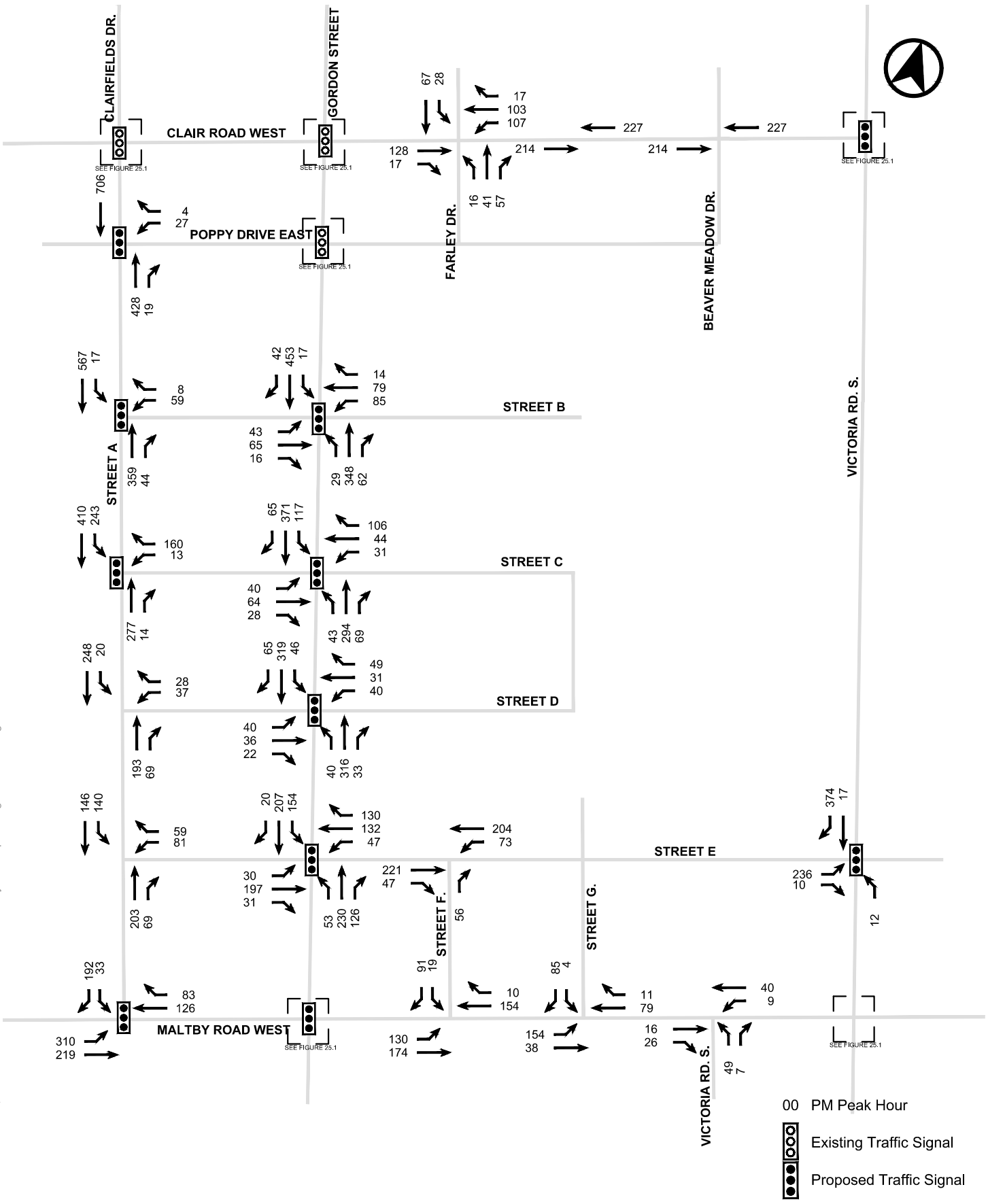
Direction (Route)	Orientation to / from Clair-Maltby Secondary Plan Area	General Distribution Proportion
Residential Trips		
Highway 401 (via Gordon St. or Hanlon Pkwy.)	East	11%
Highway 401 (via Gordon St. or Hanlon Pkwy.)	West	10%
Hanlon Parkway	North	17%
Gordon Street	North	26%
Gordon Street (south of Hwy. 401)	South	2%
Victoria Road	North	14%
Victoria Road	South	2%
Clair Road / Laird Road	West	9%
Maltby Road	East	1%
Maltby Road	West	2%
Southgate Drive (business area)	West	2%
Farley Drive / Beaver Meadow Drive	North	3%
Clairfields Drive	North	1%
Total		100%
Employment Trips		
Highway 401 (via Gordon St. or Hanlon Pkwy.)	East	3%
Highway 401 (via Gordon St. or Hanlon Pkwy.)	West	12%
Hanlon Parkway	North	34%
Gordon Street	North	5%
Gordon Street (south of Hwy. 401)	South	18%
Victoria Road	North	17%
Clair Road / Laird Road	West	4%
Farley Drive / Beaver Meadow Drive	North	3%
Clairfields Drive	North	4%
Total		100%

Notes:

1. Residential unit and employee positions derived from "Clair-Maltby Secondary Plan Study Area Population and Employment": August 27, 2018. For the purposes of the analysis herein, maximum density allocations are assumed.
2. Residential and employee trip distribution based on 2016 TTS data for home-based and work-based vehicle trips to and from 2006 TTS zones 8062, 8064, 8067-8076, and 8078-8081 during the morning and afternoon peak hours



CLAIR-MALTBY SECONDARY PLAN TRAFFIC VOLUMES



CLAIR-MALTBY SECONDARY PLAN TRAFFIC VOLUMES

15.5 FUTURE TOTAL TRAFFIC ANALYSIS

15.5.1 Future Total Scenario Road Network Assumptions

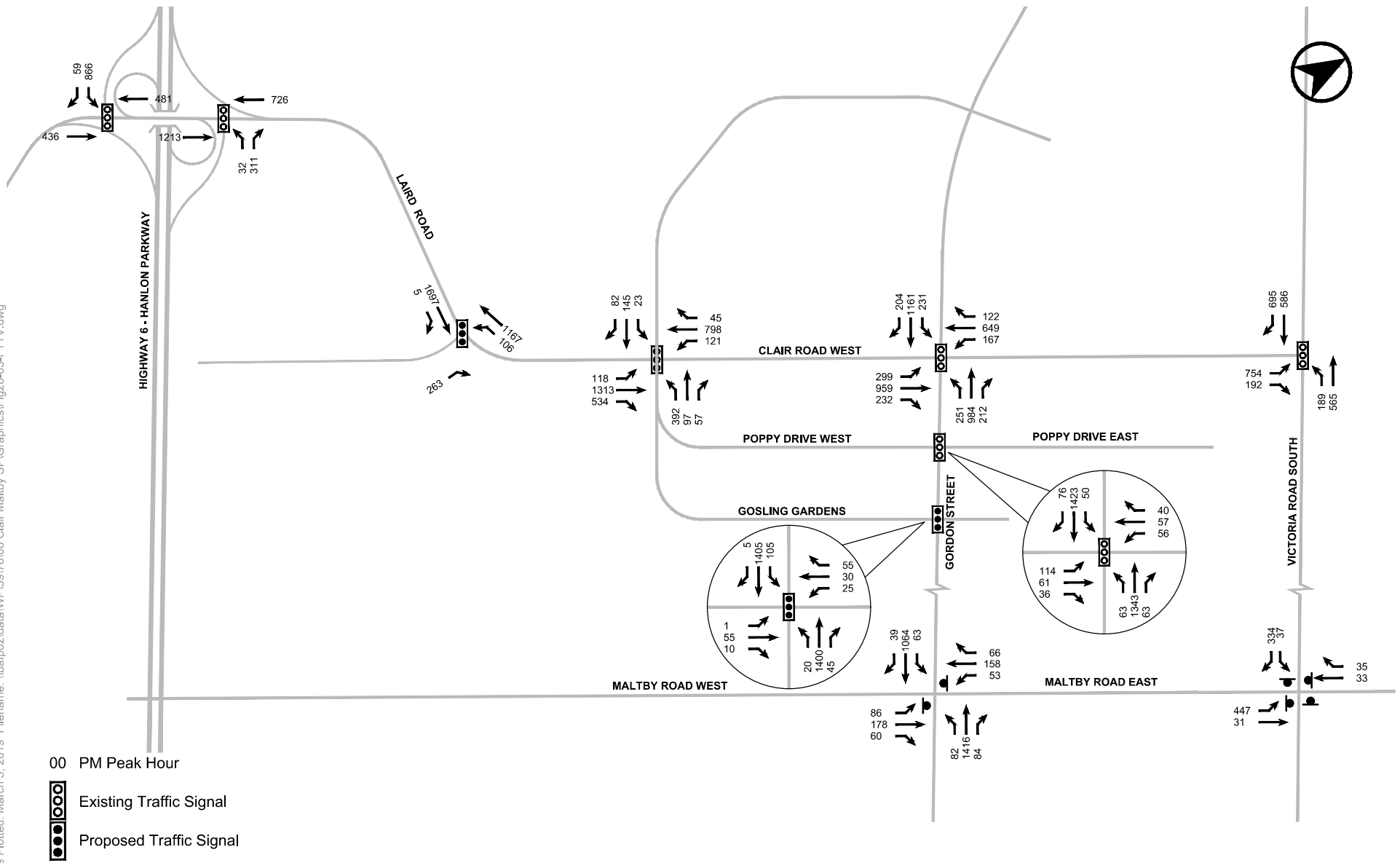
Future total traffic scenario lane configurations on the area street network reflect the following planned improvements that are assumed as part of the future traffic analysis scenarios:

- Widening of Gordon Street from 2 to 4 lanes (approved 2001 EA) from Kortright Road to Wellington Road 34;
- Widening of Clair Road from 2 to 4 lanes (approved 2003 EA) – COMPLETE;
- Southerly extension of Southgate Drive to Maltby Road; and
- Clair-Maltby Secondary Plan collector road network as outlined in the preferred “Community Structure”.

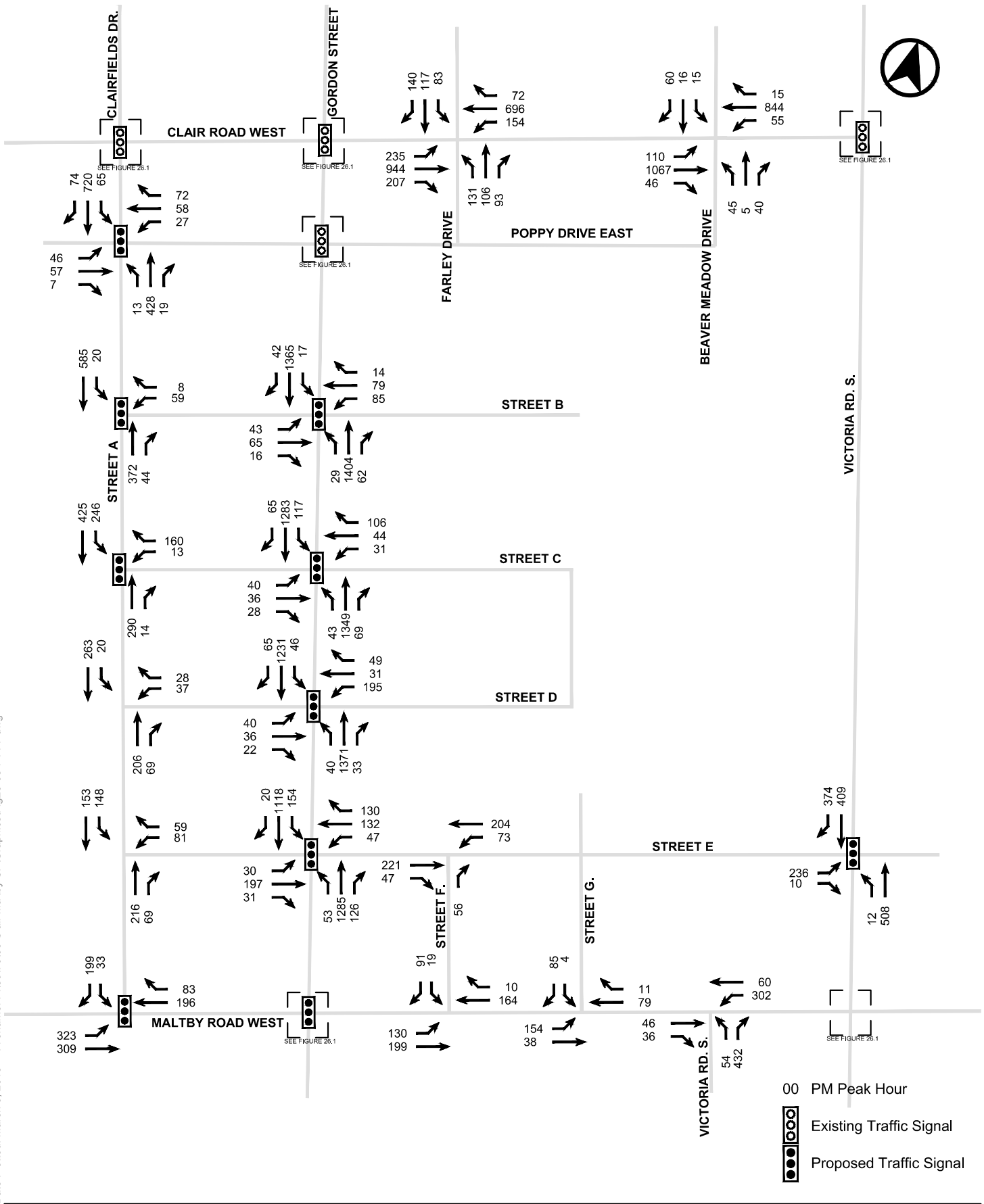
Future Total traffic volumes, which is the sum of future background traffic volumes and traffic volumes resulting from development of the Clair-Maltby Secondary Plan area, are illustrated in Figure 26. Future total traffic volumes also include minor adjustments to existing traffic volumes associated with Bishop Macdonell Catholic Secondary School and South End Community Park, which would be anticipated to utilize Poppy Drive upon completion of this street between Gordon Street and Clair Road West rather than being required to route through the Poppy Drive West / Clair Road West intersection.

Future Total traffic volumes have been forecast for existing study area intersections, as well as future collector road intersections as outlined within the Preferred Community Structure plan. The base future traffic lane configurations and traffic controls are illustrated in Figure 27, as are general street names for reference purposes.

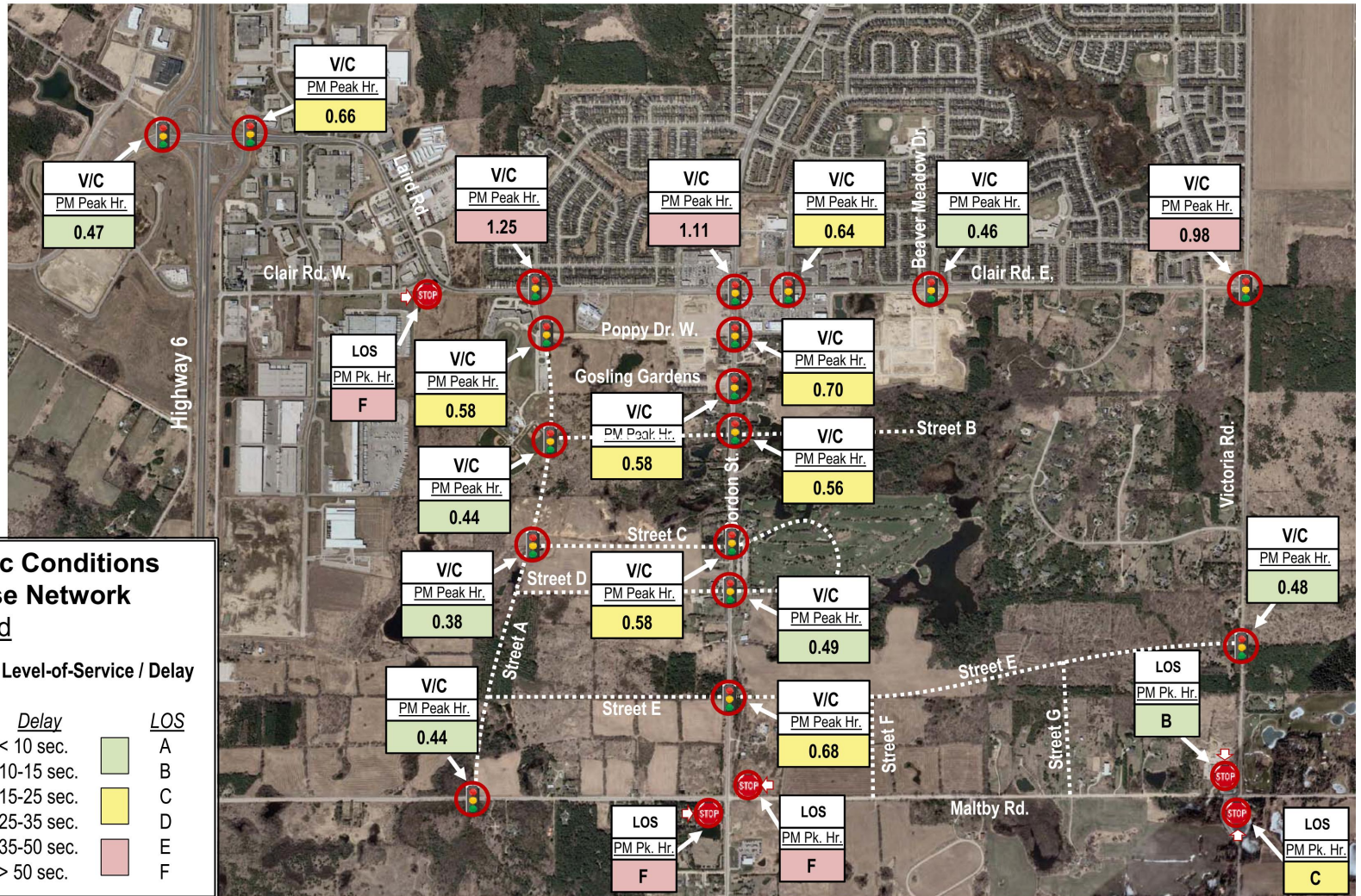
Clair-Maltby Secondary Plan forecast traffic volumes are assigned based on the Traffic Zones identified in Figure 18. Understanding that local streets have not been identified within the Preferred Community Structure, forecast traffic volumes have been assigned generally to collector roads. As such, collector road traffic volumes will not balance along collector street corridors.



FUTURE TOTAL TRAFFIC VOLUMES



FUTURE TOTAL TRAFFIC VOLUMES



SUMMARY OF FUTURE TOTAL WEEKDAY AFTERNOON TRAFFIC OPERATIONS - BASE FUTURE TRAFFIC NETWORK

15.5.2 Signalized Intersection Analysis Results

Detailed results of the Synchro analysis of signalized intersections within the study area under future total traffic conditions are included in **Appendix R**. A discussion of the traffic analysis findings follows.

15.5.2.1 General Findings

The traffic operations analyses outlined herein reflect traffic operations at the key intersections in the Secondary Plan area without explicitly considering the downstream congestion extending beyond study area intersections.

Base Future Total Street Network

Individual movement and overall volume-to-capacity ratios for each of the signalized intersections within the study area, under the future total traffic scenario, are summarized in Table 33.

Base future street network assumptions are analyzed for all signalized intersections.

A summary of future total signalized and unsignalized traffic operations at key study area intersections under base future total street network conditions is provided in Figure 28.

Recommended Future Total Street Network

Additional analysis is undertaken with recommended intersection improvements (as summarized in Section 15.5.4), at certain signalized intersections within the study area. Recommended improvements specifically imply physical improvements to existing intersection configurations (additional traffic lanes), or traffic control (signalization). Traffic analysis results with recommended improvements are also summarized in Table 33.

Assuming the introduction of the recommended intersection improvements (as outlined in Section 15.5.4), traffic operations at signalized and unsignalized intersections are anticipate to be acceptable, except for certain capacity constraints expected for specific traffic movements at key study area intersections.

A summary of future total signalized and unsignalized traffic operations at key study area intersections under recommended future total street network conditions is provided in Figure 30.

**TABLE 33 STUDY AREA SIGNALIZED INTERSECTIONS OVERALL V/C RATIOS:
WEEKDAY AFTERNOON PEAK HOUR**

Intersection	Traffic Movement	Volume to Capacity (v/c) Ratio	
		Base Future Street Network	Base Future Street Network with Recommended Improvements
Gordon Street and Clair Road	EB L	0.97	0.97
	EB T(R)	1.01	0.88
	EB R	--	0.30
	WB L	1.06	1.02
	WB TR	0.84	0.95
	NB L	1.05	0.99
	NB T(R)	1.03	0.78
	NB R	--	0.22
	SB L	0.95	0.85
	SB T(R)	1.19	0.94
	SB R	--	0.24
	Overall	1.11	1.01
Gordon Street and Poppy Drive	EB L	--	0.41
	EB (L)TR	0.72	0.20
	WB L	--	0.20
	WB (L)TR	0.45	0.19
	NB L	0.31	0.29
	NB TR	0.70	0.70
	SB L	0.22	0.22
	SB T(R)	0.74	0.74
	Overall	0.70	0.63
Gordon Street and Gosling Gardens	EB LTR	0.17	--
	WB LTR	0.24	--
	NB L	0.11	--
	NB TR	0.69	--
	SB L	0.45	--
	SB TR	0.58	--
	Overall	0.58	--

Gordon Street and Maltby Road	EB L	Unsignalized	0.45
	EB TR		0.52
	WB L		0.29
	WB TR		0.49
	NB L		0.32
	NB TR		0.66
	SB L		0.53
	SB TR		0.49
	Overall		0.62
Clair Road West and Clairfields Drive / Clairfields Extension	EB L	0.40	0.43
	EB T(R)	1.21	0.88
	EB R	--	0.40
	WB L	0.92	0.74
	WB TR	0.60	0.57
	NB L	--	0.93
	NB (L)TR	1.32	0.20
	SB L	--	0.09
	SB (L)T(R)	0.38	0.54
	Overall	1.25	0.92
Clair Road East and Farley Drive	EB L	0.56	--
	EB TR	0.69	--
	WB L	0.56	--
	WB TR	0.46	--
	NB L	0.56	--
	NB TR	0.36	--
	SB L	0.31	--
	SB TR	0.46	--
	Overall	0.64	--
Clair Road East and Beaver Meadow Drive	EB L	0.31	--
	EB TR	0.63	--
	WB L	0.21	--
	WB TR	0.49	--
	NB LTR	0.16	--
	SB L	0.04	--
	SB TR	0.07	--
	Overall	0.46	--

Clair Road East and Victoria Road	EB L	0.96	--
	EB R	0.14	--
	NB L	0.92	--
	NB T	0.70	--
	SB T	0.93	--
	SB R	0.53	--
	Overall	0.97	--
Laird Road and Highway 6 Northbound Off-Ramp	EB T	0.73	--
	WB T	0.44	--
	NB L	0.05	--
	NB R	0.58	--
	Overall	0.66	--
Laird Road and Highway 6 Southbound Off-Ramp	EB T	0.42	--
	WB T	0.45	--
	NB L	0.48	--
	NB R	0.04	--
	Overall	0.47	--
Clair Road West and Laird Road	EB TR	Unsignalized	0.82
	WB L		0.38
	WB T		0.45
	NB L		0.01
	NB R		0.86
	Overall		0.83
New Intersections Resulting from the Development of the Secondary Plan (Preferred Community Structure)			
Gordon Street and Street B	EB L	0.18	--
	EB TR	0.19	--
	WB L	0.33	--
	WB TR	0.23	--
	NB L	0.17	--
	NB TR	0.63	--
	SB L	0.09	--
	SB TR	0.60	--
	Overall	0.56	--

Gordon Street and Street C	EB L	0.16	--
	EB TR	0.21	--
	WB L	0.11	--
	WB TR	0.20	--
	NB L	0.24	--
	NB TR	0.72	--
	SB L	0.46	--
	SB TR	0.58	--
	Overall	0.58	--
Gordon Street and Street D	EB L	0.14	--
	EB TR	0.10	--
	WB L	0.14	--
	WB TR	0.11	--
	NB L	0.19	--
	NB TR	0.60	--
	SB L	0.26	--
	SB TR	0.55	--
	Overall	0.49	--
Gordon Street and Street E	EB L	0.19	--
	EB TR	0.56	--
	WB L	0.25	--
	WB TR	0.61	--
	NB L	0.21	--
	NB TR	0.72	--
	SB L	0.62	--
	SB TR	0.49	--
	Overall	0.68	--
Clairfields Extension (Street A) and Poppy Drive West	EB LTR	0.31	--
	WB L	0.10	--
	WB TR	0.25	--
	NB L	0.05	--
	NB TR	0.37	--
	SB L	0.01	--
	SB TR	0.65	--
	Overall	0.58	--

Clairfields Extension (Street A) and Street B	WB LR	0.12	--
	NB TR	0.46	--
	SB L	0.05	--
	SB T	0.64	--
	Overall	0.44	--
Clairfields Extension (Street A) and Street C	WB LR	0.14	--
	NB TR	0.50	--
	SB L	0.48	--
	SB T	0.46	--
	Overall	0.38	--
Maltby Road and Clairfields Extension (Street A)	EB L	0.56	--
	EB T	0.30	--
	WB TR	0.37	--
	SB L	0.07	--
	SB R	0.14	--
	Overall	0.44	--
Victoria Road and Street E	EB L	0.41	--
	EB R	0.01	--
	NB L	0.02	--
	NB T	0.53	--
	SB T	0.42	--
	SB R	0.24	--
	Overall	0.48	--

Notes:

1. Reference Figure 27 for new collector street names.

The signalized intersection traffic analysis indicates that most study area intersections perform acceptably, and without any traffic capacity constraints for any individual traffic movements, except for certain movements at the key Gordon Street / Clair Road; Victoria Road / Clair Road; and Clairfields Drive / Clairfields Extension / Clair Road intersections. The following movements are anticipated to operate with longer delays and / or near theoretical capacity during weekday peak hours.

Gordon Street / Clair Road

- Eastbound left-turn 0.95
- Westbound left turn 1.02
- Westbound through / right-turn 0.95
- Northbound left-turn 0.99
- Southbound through 0.94

Victoria Road / Clair Road

- Eastbound left-turn 0.96
- Northbound left-turn 0.92
- Southbound through 0.93

Clairfields Drive / Clair Road

- Northbound left-turn 0.93

The above noted intersections are anticipated to operate with overall intersections v/c ratios of 0.92 to 1.01 during the prevailing weekday afternoon peak hour, assuming the introduction of street network improvements outlined in Section 15.5.5.

During the weekday afternoon peak hour, all other signalized intersections within the study area are anticipated to operate with overall intersection v/c ratios of 0.83 or less, while individual traffic movements are shown to all operate with a v/c ratio of 0.86 or less (i.e. intersection of Laird Road / Clair Road).

Overall signalized intersection traffic operations within the Secondary Plan area are anticipated to be acceptable under future total conditions, and are accommodated by the Preferred Community Structure street network plan understanding that specific traffic movements are anticipated to operate at or near capacity during the prevailing weekday afternoon peak hour.

15.5.2.2 Gordon Street and Clair Road

The key Gordon Street and Clair Road intersection is anticipated to operate at theoretical capacity during the weekday afternoon peak hour under future total traffic conditions – even when accounting for the recommended intersection improvements at this location. This intersection, given its location within the wider street network and surrounding retail development pattern, would be anticipated to operate under busy conditions during weekday peak hours.

Specifically, during the weekday afternoon peak hour, left-turn movements, the westbound through / right-turn movement, and the southbound through movement are anticipated to operate with v/c ratios of 0.90 or greater, resulting in longer traffic queues and delay relative to the existing conditions.

Recommended improvements are not intended to retain existing levels-of-service for motorists. However, improvements (as recommended in Section 15.5.5) are intended to accommodate new traffic resulting from background traffic growth, current developments planned and under construction, and new traffic resulting from the development of the Clair-Maltby Secondary Plan area.

As noted previously, traffic forecast for Secondary Plan area development is based on the most conservative (highest density) Land Use Budget circulated for the purposes of this analysis. As such, the identified improvements outlined in Section 15.5.5 may not be warranted should a less-dense development programme be realized.

Traffic operations at the Gordon Street / Clair Road intersection may be further mitigated through improvements to the Hanlon Parkway corridor which may redirect some existing Gordon Street traffic volumes to this corridor. Other, on-going improvements to the street network in the vicinity of the Gordon Street / Clair

Road intersection will also further improve conditions at this intersection and provide viable routing alternative for motorists. The ability for motorists to respond to traffic delays at this intersection, and utilize other streets in the local vicinity also provides an imperative to monitor traffic operations at this intersection over the long-term to assess changes in the local and regional road network.

15.5.3 Unsignalized Intersection Analysis Results

The results of the future total traffic conditions capacity analysis performed for unsignalized intersections in the study area are summarized in Table 34.

Detailed Synchro analysis output sheets are included in **Appendix R**. A summary of future total traffic conditions signalized and unsignalized traffic operations at key study area intersections is provided in Figure 28 (base future condition) and Figure 29 (with recommended improvements).

Future Total Unsignalized Intersections

A total of four (4) existing unsignalized intersections were reviewed within the unsignalized intersection analysis, of which two (2) are recommended to be signalized in the future. Traffic operations at the Gordon Street / Maltby Road and Clair Road West / Laird Road intersections is anticipated to operate poorly under future total traffic conditions, and as such may warrant signalization.

Five (5) new unsignalized intersections were reviewed within the future total traffic analysis scenario. These intersections are identified as new junctions within the Preferred Community Structure street network plan, and are recommended to operate under STOP-control.

The new intersections of Clairfields Drive extension (Street A) / Street D; Clairfields Drive extension (Street A) / Street E; and Street E / Street F are proposed to operate with all-way STOP-control. The intersections of Maltby Road / Street F and Maltby Road / Street G are proposed to operate with one-way STOP-control in the southbound direction.

All other movements at unsignalized intersections within the study area are shown to operate at LOS C or better during weekday peak hours, which is acceptable.

Victoria Road / Maltby Road Intersections

The intersections of Victoria Road and Maltby Road are anticipated to continue to operate acceptably under future total traffic conditions. From a traffic capacity perspective, this intersection is not anticipated to warrant improvements.

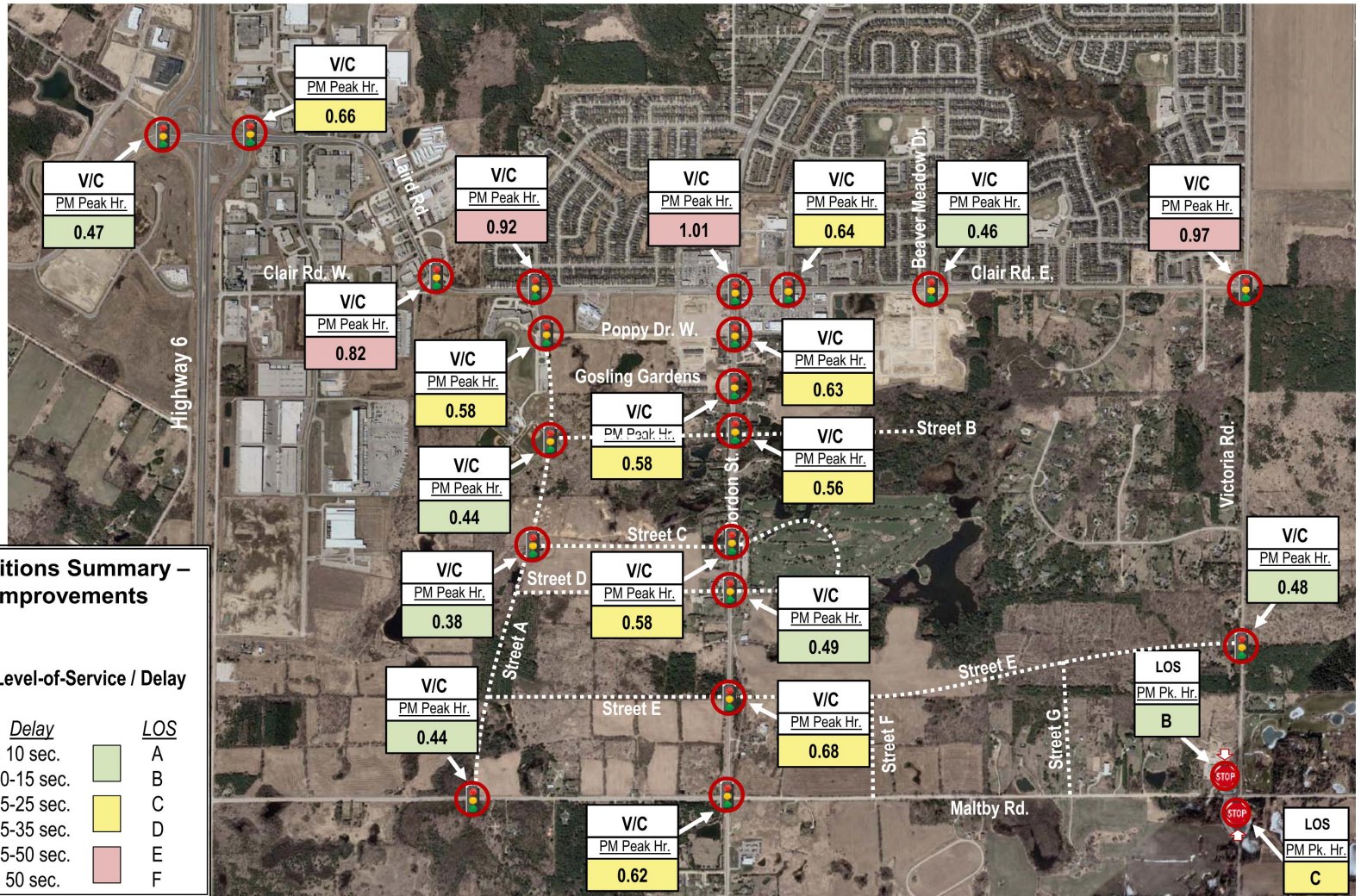
Further consideration may be given to this intersection to accommodate for traffic control or alignment alterations to improve safety or mitigate traffic speeds.

TABLE 34 UNSIGNALIZED INTERSECTION ANALYSIS RESULTS SUMMARY

Intersection	Movement of Interest	Future Total Traffic Conditions	
		Delay (s)	LOS
Clair Road West and Laird Road ¹	WB L	18.5	C
	NB (Clair Rd.) LR	76.1	F
Gordon Street and Maltby Road ¹	EB LTR	>120	F
	WB LTR	>120	F
	NB L	11.4	B
	SB L	18.4	C
Victoria Road and Maltby Road (west intersection)	WB LT	6.9	A
	NB LR	17.1	C
Victoria Road and Maltby Road (east intersection)	EB LT	7.9	A
	SB LR	14.7	B
New Intersections Resulting from the Development of the Secondary Plan (Preferred Community Structure)			
Clairfields Extension (Street A) and Street D	WB LR	8.5	A
	NB TR	9.3	A
	SB LT	9.7	A
Clairfields Extension (Street A) and Street E	WB LR	9.4	A
	NB TR	10.1	B
	SB LT	10.9	B
Maltby Road and Street F	EB L	7.8	A
	SB LR	10.9	B
Maltby Road and Street G	EB L	7.7	A
	SB LR	9.3	A
Street E and Street F	EB TR	9.2	A
	WB LT	9.7	A
	NB LR	8.0	A

Notes:

1. Recommended to be signalized under future total traffic conditions.



SUMMARY OF FUTURE TOTAL WEEKDAY AFTERNOON TRAFFIC OPERATIONS - WITH RECOMMENDED TRAFFIC NETWORK IMPROVEMENTS

15.5.4 Traffic Signal Timing Considerations

Traffic Signal Optimization

Traffic signal adjustments have been made as part of the analysis herein to accommodate for changes in traffic demands and patterns.

To accommodate an increase in traffic demands in the northbound and southbound directions along Gordon Street, and eastbound and westbound along Clair Road west of Gordon Street, traffic signal cycle lengths have been increased during the weekday afternoon peak hour.

Traffic signal timing along the Gordon Street corridor has been set to 110 second cycle lengths during the weekday afternoon peak hour. Signal timing cycle lengths have been made consistent along the Gordon Street corridor to allow for optimization of traffic signal off-sets and permit signal timing synchronization in order to best limit traffic delays, reduce transit vehicle delays, and manage vehicle queuing.

New Traffic Signal Controls

A total of eleven (11) new traffic signals are considered as part of the analysis herein, to accommodate future traffic demands and facilitate pedestrian movement across busy traffic corridors.

It is recommended that two (2) existing STOP-controlled intersections be considered for signalization as development occurs within the Secondary Plan area. The following existing unsignalized intersections are expected to warrant the introduction of traffic signals:

- Gordon Street / Maltby Road
- Clair Road West / Laird Road

A number of new arterial / collector street junctures are anticipated with the application of the Preferred Community Structure street network plan, including a total of four (4) new collector street intersections with Gordon Street between Gosling Gardens and Maltby Road.

It is recommended that all new east-west oriented collector streets include traffic signal control at their juncture with Gordon Street, to allow for acceptable levels-of-service for minor street traffic approaches, and accommodate pedestrian movement across Gordon Street.

In addition traffic signals recommended for new collector street intersections with Gordon Street, additional traffic signals may be warranted for intersections along the Clairfields Drive extension (Street A) and Victoria Road.

In addition to the two existing intersections noted above, the following new intersections are anticipated to warrant traffic signal control, or should be signalized to strategically allow for controlled pedestrian crossing. The expectation for these intersections to operate under traffic signal control has been informed by the analysis herein, and have subsequently been analyzed assuming traffic signal control under future total traffic conditions.

- Gordon Street / Street B
- Gordon Street / Street C
- Gordon Street / Street D
- Gordon Street / Street E
- Maltby Road West / Clarifields Drive extension (Street A)
- Victoria Road / Street E
- Clarifields Drive extension (Street A) and Poppy Road West
- Clarifields Drive extension (Street A) / Street B
- Clarifields Drive extension (Street A) / Street C

15.5.5 Recommended Intersection Traffic Capacity Improvements

It is important to understand that the recommended intersection improvements are based on the modelling exercise undertaken herein, and that changes to the wider street network, improvements to regional corridors, and changes in travel behaviour and patterns can alter these recommendations. Therefore, updated traffic analysis will be required in sequence with development in the Clair-Maltby Secondary Plan area to further justify the recommended improvements, and / or indicate further or alternative improvements.

The improvements outlined in the following are in addition to signal timing adjustments identified in Section 15.5.4. Improvements identified below relate to changes in the intersection lane configurations, intersection approach configuration, or traffic control.

Gordon Street / Clair Road Intersection

The intersection of Gordon Street / Clair Road is most impacted by forecast future traffic volume demands, and is anticipated to require changes to accommodate these future demands. Right-turn lanes are recommended for most intersection approaches to accommodate for increased through traffic demands, turning traffic demands (specifically for the eastbound approach leg), and transit vehicle layby. The following improvements are recommended based on the analysis herein:

- Introduction of a northbound separate right-turn lane
- Introduction of a southbound separate right-turn lane
- Introduction of an eastbound separate right-turn lane

Clair Road / Clairfields Drive Intersection

The intersection of Clair Road / Clairfields Drive is anticipated to be impacted by forecast Clair-Maltby Secondary Plan development-related traffic volumes as motorists route to / from the Hanlon Parkway via Clair Road and Laird Road. Changes to the eastbound, northbound and southbound approach legs of the intersection are recommended to accommodate these future demands. Separate left-turn lanes are recommended for the northbound and southbound approaches, and a separate right-turn lane is recommended in the eastbound direction. These improvements are suggested to accommodate the key northbound to westbound and eastbound to southbound traffic demands resulting from development of the Clair-Maltby Secondary Plan. Considerations should also be given to the length of the northbound separate left-turn lane, understanding relatively high number of traffic volumes anticipated for this movement.

The following improvements for this intersection are recommended based on the analysis herein:

- Introduction of a northbound separate left-turn lane
- Introduction of an eastbound separate right-turn lane
- Pavement restriping to accommodate a southbound separate left-turn lane

Gordon Street / Poppy Road Intersection

The intersection of Gordon Street / Poppy Road is anticipated to be impacted by forecast future traffic volumes – specifically as they relate to background site-specific developments. Changes to the eastbound and westbound approach legs of the intersection are recommended to better accommodate turning movement demands. Separate left-turn lanes are recommended for the eastbound and westbound approaches. These improvements are suggested to accommodate a good level-of-service for traffic anticipated to route along Poppy Road.

The following improvements for this intersection are recommended based on the analysis herein:

- Introduction of an eastbound separate left-turn lane
- Introduction of an westbound separate left-turn lane

Laird Road / Clair Road West Intersection

The intersection of Laird Road / Clair Road West is anticipated to warrant the introduction of traffic signal control under future total traffic conditions. In addition to this improvement, the introduction of a northbound right-turn lane (Clair Road approach) is recommended to accommodate northbound right-turn movements that may otherwise be blocked by the occasional motorists making a northbound left-turn.

The following improvements for this intersection are recommended based on the analysis herein:

- Introduction of a northbound separate right-turn lane

Future Victoria Road / Street E Intersection

The intersection of Victoria Road / Street E is anticipated to operate acceptably under future total traffic conditions. However, unlike other new collector street intersections as outlined in the Preferred Community Structure street network plan, this intersection is anticipated to accommodate a notable volume of southbound right-turn traffic – specifically during the weekday afternoon peak hour. As such, a separate southbound right-turn lane is advised in this location.

The following improvements for this intersection are recommended based on the analysis herein:

- Introduction of a southbound separate right-turn lane

Summary of Recommended Improvements

The improvements outlined above are summarized in Figure 29.

A summary of future total traffic conditions at signalized and unsignalized traffic operations at key study area intersections assuming the introduction of the recommended improvements is provided in Figure 30.

As previously noted, this traffic analysis reflects the highest density land use scenario advanced for the purposes of the Clair-Maltby Secondary Planning study and should, in itself, illustrate the conservative nature of the analysis herein. Furthermore, various changes in the transportation network, the introduction and advancement of TDM and Transit-Oriented Development (TOD), can collectively work to potentially change travel behaviour and improve traffic capacity concerns as they are identified herein.

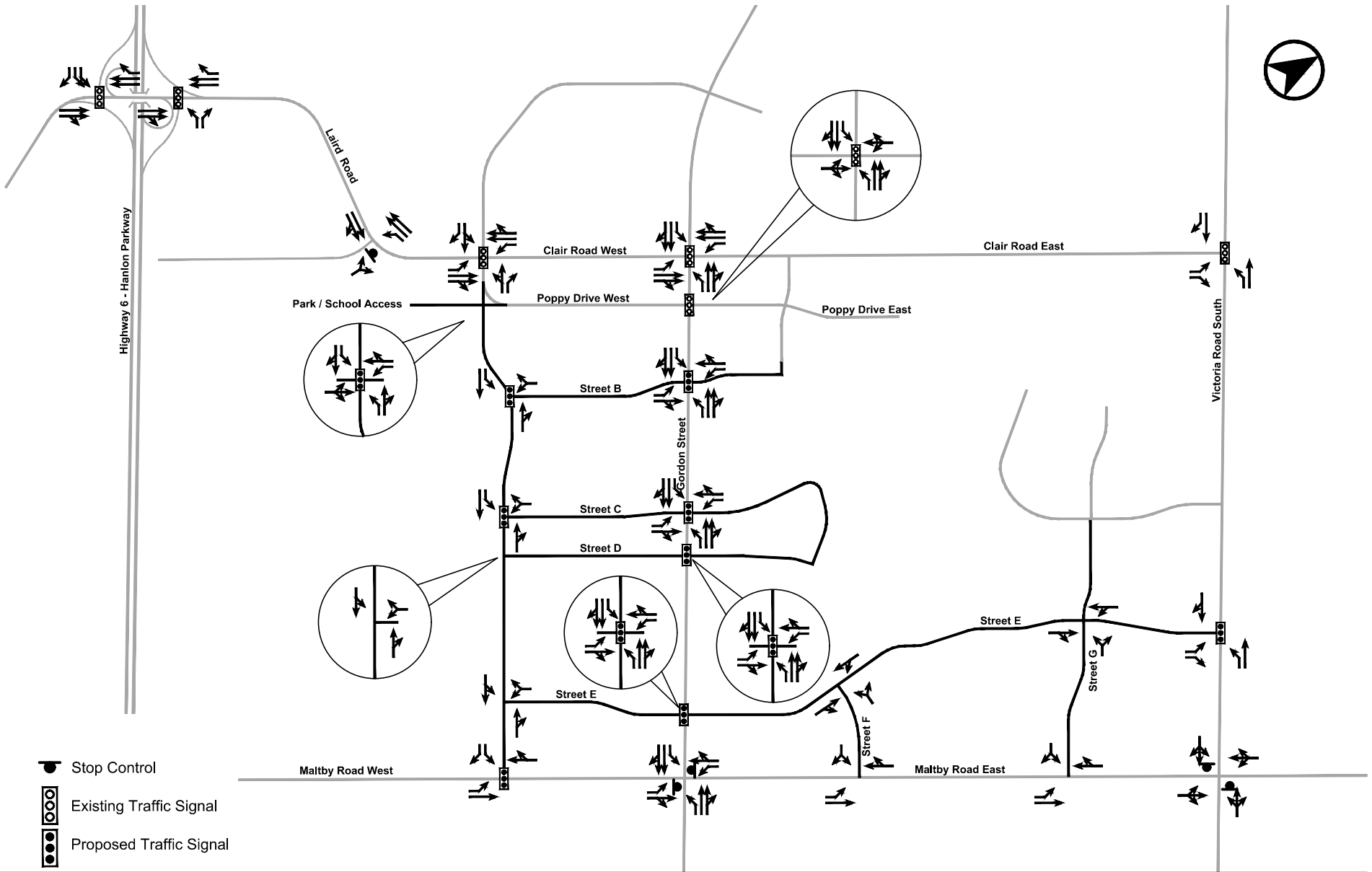
Therefore, updated traffic analysis will be required in sequence with development in the Clair-Maltby Secondary Plan area to further justify the recommended improvements, and / or indicate further or alternative improvements.

Additional North-South Collector Road East of Gordon Street

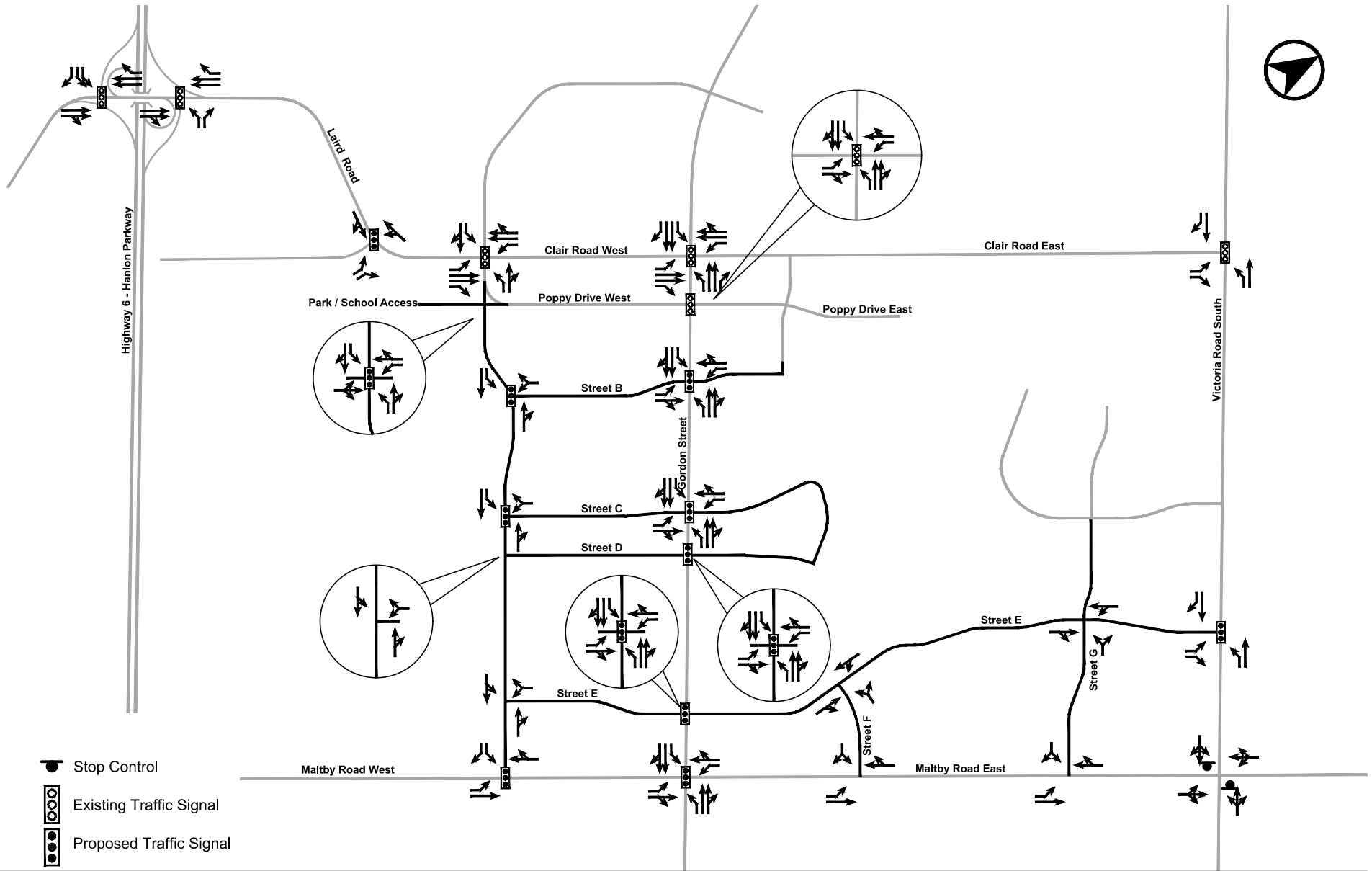
The transportation modelling undertaken herein demonstrates that traffic volumes resulting from background traffic and traffic related to the development of the Clair-Maltby Secondary Plan area, can be accommodated by Gordon Street as planned (i.e. with four through-traffic lanes), understanding that certain traffic movements at the Gordon Street / Clair Road intersection will operate under busy conditions during the prevailing weekday afternoon peak hour. Specifically, southbound through movements and left-turn movements in the weekday afternoon peak hour are anticipated to operate near theoretical capacity, with v/c ratios between 0.90 and 1.00, assuming the highest density Land Budget development scenario tested herein.

The macro-model analysis undertaken by the City of Guelph, and supported through the traffic analysis and forecasts undertaken herein, support the implementation of 4 through-traffic lanes along Gordon Street within the Clair-Maltby Secondary Plan area. Traffic capacity constraints, should they develop during prevailing weekday peak travel periods, may be anticipated at the key Gordon Street / Clair Road intersection, but are otherwise not anticipated for link segments of Gordon Street. Improvements, by way of ancillary turn lanes, are recommended herein to mitigate traffic capacity constraints at the Gordon Street / Clair Road intersection.

A typical 4-lane street section is anticipated to sufficiently accommodate forecast traffic demands along the Gordon Street corridor, understanding the need for ancillary turn lanes – specifically separate left-turn lanes at all intersections where left-turns are permitted. Pending the frequency of separate left-turn lanes, a continuous left-turn / centre median lane along the extent, or portions of, Gordon Street within the Secondary Plan area may be warranted.



FUTURE BASE TRAFFIC LANE CONFIGURATIONS AND CONTROLS



RECOMMENDED FUTURE TRAFFIC LANE CONFIGURATIONS AND CONTROLS

15.5.6 Gordon / Maltby Roundabout

The intersection of Gordon Street and Maltby Road is considered for the introduction of a roundabout, as an alternative to recommended signalization. A roundabout, at this junction, may be appropriate considering:

- its location as a gateway to / from the City of Guelph,
- its boundary character between urban Guelph and rural Wellington County, and
- the opportunity provided by a roundabout to accommodate transit vehicle loop functions as an alternative to an off-street transit terminal facility.

With regards to the first two points noted above, a roundabout may be appropriate as an option to reduce vehicle speeds on approach to the City of Guelph in transition from rural highway to urban arterial.

Understanding the opportunity for a roundabout at the junction of Gordon Street and Maltby Road, roundabout traffic analysis was completed for the future total traffic scenario.

15.5.6.1 Analysis Methodology

Future total traffic volumes were developed herein, and utilized in conducting the future total roundabout analysis. Traffic analysis was conducted for the weekday afternoon peak hour, consistent with the methodology pursued herein.

Roundabouts were analyzed using ARCADY 9 with no capacity adjustment and without y-intercept adjustments to account for downstream traffic platoons.

Key performance indicators cited in the roundabout analysis, and summarized for each approach leg, are volume-to-capacity (v/c) ratios, average delay, and level-of-service (LOS).

Roundabout geometries, for purposes of this roundabout analysis, are based generally on the functional design of planned 2-lane roundabouts in the City of Waterloo set within an approximate 60 metre diameter. The proposed roundabout design assumes a two-lane roundabout. The northbound and southbound approaches (Gordon Street) assumes two traffic lanes in either direction, and two roundabout entry lanes in either direction. The eastbound and westbound approaches (Maltby Road) assumes one traffic lane in either direction, which widen on approach to the roundabout to accommodate two roundabout entry lanes.

15.5.6.2 Analysis Results

ARCADY 9 traffic analysis results for the analyzed roundabout under future traffic conditions are summarized in Table 35. Detailed results analysis outputs are included in **Appendix S**.

TABLE 35 ROUNDABOUT ANALYSIS SUMMARY

Intersection	Approach Leg	Future Total Traffic Conditions		
		V/C Ratio	Average Delay (sec)	LOS
Gordon Street and Maltby Road	WB	0.56	17.12	C
	SB	0.60	4.13	A
	EB	0.39	6.53	A
	NB	0.81	9.01	A
	Overall	--	7.74	A

Notes:

1. Overall intersection capacity indicated as “residual” capacity.

Overall roundabout delay for the Gordon Street / Maltby Road junction is anticipated to be 7.74 seconds, reflecting an overall level-of-service ‘A’. Generally, eastbound and westbound traffic approaches are anticipated to operate with a level-of-service of ‘A’ to ‘C’ during the weekday afternoon peak hour, while northbound and southbound traffic movements are anticipated to operate with a level-of-service of ‘A’. Generally, short average delays are anticipated for northbound, southbound and eastbound motorists (less than 10 seconds). Generally acceptable average delays are anticipated for westbound motorists (approximately 17 seconds).

Should a traffic roundabout be pursued for the junction of Gordon Street and Maltby Road, traffic operations are anticipated to be acceptable. Further consideration would be required as to its functional design and ability to appropriately accommodate pedestrian crossings and transit vehicle and articulated truck routing.

Appendix A – Transportation Tomorrow Survey (TTS) Details: Local Travel Behaviour

TWO-WAY PEAK PERIOD TRIP DISTRIBUTION

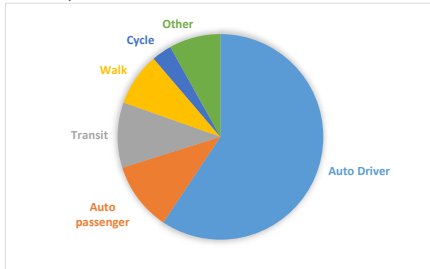
Orientation to / from South Guelph	Transit excluding GO rail	Cycle	Auto driver	GO rail only	Joint GO rail and local transit	Auto passenger	School bus & Taxi	Walk	Total Trips from TTS Zone
Local Area	1304	401	7536	0	0	1367	1027	1057	12692
	10%	3%	59%	0%	0%	11%	8%	8%	
Old City (Downtown)	61	0	905	0	0	275	43	0	1284
	5%	0%	70%	0%	0%	21%	3%	0%	
Rest of Guelph	77	27	2873	0	0	329	84	0	3390
	2%	1%	85%	0%	0%	10%	2%	0%	
Waterloo Region	0	0	2225	0	0	112	22	0	2359
	0%	0%	94%	0%	0%	5%	1%	0%	
Peel / Halton Regions	0	0	1512	0	0	161	19	0	1692
	0%	0%	89%	0%	0%	10%	1%	0%	
City of Toronto	52	0	170	53	0	9	0	0	284
	18%	0%	60%	19%	0%	3%	0%	0%	
Wellington County	0	0	901	0	0	134	8	0	1043
	0%	0%	86%	0%	0%	13%	1%	0%	
Other	0	0	736	0	0	84	0	0	820
	0%	0%	90%	0%	0%	10%	0%	0%	

	Auto Driver	Auto passenger	Transit	Walk	Cycle	Other
53.9%	59%	11%	10%	8%	3%	8%
5.4%	70%	21%	5%	0%	0%	3%
14.4%	85%	10%	2%	0%	1%	2%
10.0%	94%	5%	0%	0%	0%	1%
7.2%	89%	10%	0%	0%	0%	1%
1.2%	60%	3%	37%	0%	0%	0%
4.4%	86%	13%	0%	0%	0%	1%
3.5%	90%	10%	0%	0%	0%	0%

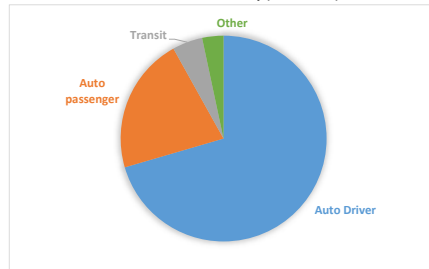
check: 14815 14815

	1494	428	16858	53	0	2471	1203	1057	23564	20%
Total Check:	1494	428	16858	53	0	2471	1203	1057	23564	
	6%	2%	72%	0%	0%	10%	5%	4%		
	138	27	3778	0	0	604	127	0	4674	
	3%	1%	81%	0%	0%	13%	3%	0%		

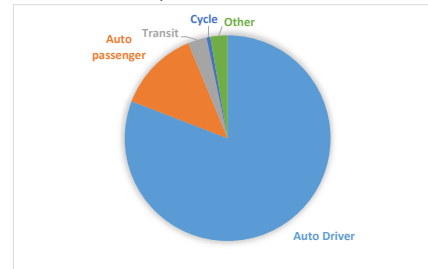
South Guelph



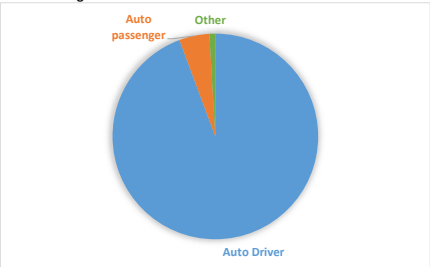
Old City (Downtown)



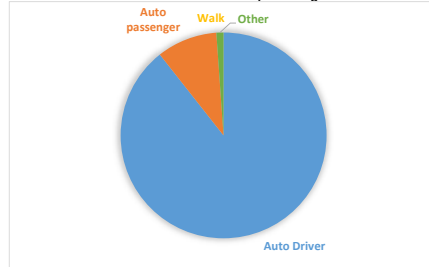
Rest of Guelph



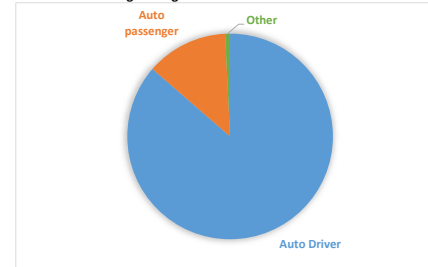
Waterloo Region



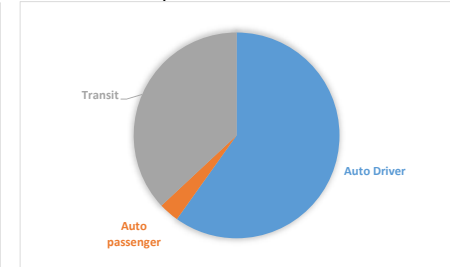
Halton / Peel Regions



Wellington Region



City of Toronto



Thu Dec 27 2018 18:20:11 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 700-900

and

2006 GTA z 8078-8081 8062 8064 8068 8067

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	2	45
Cycle	3	69
Auto driver	81	1712
Auto passe	9	186
School bus	4	96
Walk	23	440
Total:	122	2549

Thu Dec 27 2018 18:19:52 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 700-900

and

2006 GTA z 8078-8081 8062 8064 8068 8067

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	27	699
Cycle	8	215
Auto driver	277	5948
Auto passe	30	670
School bus	31	848
Walk	26	518
Total:	399	8897

Thu Dec 27 2018 18:20:33 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 1600-1800

and

2006 GTA z 8078-8081 8062 8064 8068 8067

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	26	669
Cycle	6	142
Auto driver	307	6200
GO rail only	3	53
Auto passe	37	751
School bus	9	211
Taxi passer	1	43
Walk	5	86
Total:	394	8157

Thu Dec 27 2018 18:18:57 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 1600-1800

and

2006 GTA z 8078-8081 8062 8064 8068 8067

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	2	82
Auto driver	145	2990
Auto passe	38	846
School bus	1	4
Walk	2	30
Total:	188	3951

Travel Mode	All Trips Travel Mode Split									
	Weekday AM Inbound		Weekday AM Outbound		Weekday PM Inbound		Weekday PM Outbound		Overall	
	Count	Proportion	Count	Proportion	Count	Proportion	Count	Proportion	Count	Proportion
Transit excluding GO rail	45	2%	699	8%	669	8%	82	2%	1495	6%
Cycle	69	3%	215	2%	142	2%		0%	426	2%
Auto driver	1712	67%	5948	67%	6200	76%	2990	76%	16850	72%
GO rail only		0%		0%	53	1%		0%	53	0%
Auto passenger	186	7%	670	8%	751	9%	846	21%	2453	10%
School bus	96	4%	848	10%	211	3%	4	0%	1159	5%
Taxi passenger		0%		0%	43	1%		0%	43	0%
Walk	440	17%	518	6%	86	1%	30	1%	1074	5%
Total:	2548	1	8898	1	8155	1	3952	1	23553	1

Appendix B – Detailed Collision Data



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location CLAIR RD W @ GORDON ST

Municipality..... GUELPH

Traffic Control.... Traffic signal

Total Collisions.... 69

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle type	First Event	Driver Action	No. Ped
12-03079	2012-Jan-18, Wed,09:00	Clear	Rear end	Non-fatal injury	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North		Stopped	Passenger van	Other motor vehicle	Driving properly	Daylight
12-12101	2012-Mar-04, Sun,23:35	Clear	Angle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	Dark, artificial
12-501569641S	2012-Mar-09, Fri,08:25	Snow	Rear end		South	Loose snow	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
12-501587590S	2012-May-17, Thu,14:30	Clear	Rear end		South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	Daylight
12-501595303S	2012-Jun-12, Tue,17:15	Clear	SMV other		South	Dry	Stopped	Automobile, station wagon	Cyclist	Driving properly	
Comments:											Daylight
12-501605073S	2012-Jul-13, Fri,12:15	Clear	Rear end		East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
12-47925	2012-Sep-09, Sun,11:09	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	Daylight
12-501620497S	2012-Sep-09, Sun,14:00	Clear	Turning movement		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Turning left	Pick-up truck	Other motor vehicle	Failed to yield right-of-way	Daylight
12-54333	2012-Oct-12, Fri,05:19	Clear	Turning movement	P.D. only	West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	Dark

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12-64639	2012-Dec-11, Tue,09:35	Snow	Angle	P.D. only	North	Wet	Going ahead	Truck - closed	Other motor vehicle	Disobeyed traffic control	
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
1313233	2013-Mar-22, Fri,18:52	Clear	Rear end	P.D. only	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:	Road #1: GORDON ST	Road #2: CLAIR RD E			North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	Dusk
13-501691571s	2013-Apr-19, Fri,17:00	Clear	Rear end		South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-501708279s	2013-Jun-10, Mon,00:00	Clear	Rear end		West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	Daylight
501708279	2013-Jun-10, Mon,16:00	Clear	Rear end	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:	Road #1: CLAIR ROAD E	Road #2: CLAIR ROAD E			West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-13233 **	2013-Jun-22, Sat,18:52	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:	CHARGED: D1 HTA 130 POT #1197527B				North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Dusk
501713459	2013-Jun-25, Tue,06:45	Clear	Rear end	Non-reportable	South	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly	
Comments:	Road #1: GORDON ST	Road #2: GORDON ST			South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
1336985	2013-Aug-07, Wed,19:15	Clear	Sideswipe	P.D. only	North	Dry	Turning right	Automobile, station wagon	Cyclist	Driving properly	
Comments:	Road #1: GORDON ST	Road #2: CLAIR ROAD E			North	Dry	Going ahead	Bicycle	Other motor vehicle	Failed to yield right-of-way	Daylight
13-36985	2013-Aug-07, Wed,19:15	Clear	SMV other	Non-fatal injury	North	Dry	Going ahead	Bicycle		Failed to yield right-of-way	
Comments:	LINE 31 - V1 HAD NO REAR BRAKE (CABLE UNHOOKED) CHARGED: D1 PON #2775027B SEC. 139 (1) HTA				North	Dry	Going ahead	Automobile, station wagon	Cyclist	Driving properly	Daylight
13-501728773s	2013-Aug-08, Thu,17:30	Clear	Rear end		North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
501731387	2013-Aug-15, Thu,02:00	Clear	Rear end	Non-reportable	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:	Road #1: GORDON ST	Road #2: GORDON ST			North	Dry	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly	Dark, artificial

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13-42655**	2013-Sep-09, Mon,05:38	Clear	SMV other	P.D. only	South	Dry		Pulling onto shoulder or toward curb	Automobile, station wagon	Ran off road	Lost control	
Comments: CHARGED: D1 32(1) HTA, 2(1)(A) C.A.I.A TELEPHONE POLE, GUIDE WIRE RIPPED OFF												
1344314	2013-Sep-16, Mon,20:30	Clear	SMV unattendedNon-reportable West vehicle		West	Dry		Stopped	Automobile, station wagon	Other motor vehicle		Dark, artificial
Comments: Road #1: CLAIR RD E Road #2: CLAIR RD E												
13-501742645s	2013-Sep-16, Mon,20:30	Clear	Rear end		West	Dry		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:												
					West			Going ahead	Unknown		Following too close	Dark
1349516	2013-Oct-13, Sun,05:03	Rain	SMV unattendedP.D. only vehicle		North	Wet		Turning right	Automobile, station wagon	Skidding/sliding	Improper turn	
Comments: Road #1: GORDON ST Road #2: CLAIR RD E												
					North	Wet		Turning right	Automobile, station wagon	Skidding/sliding	Improper turn	Dark
13-49516	2013-Oct-13, Sun,05:03	Rain	SMV other	P.D. only	North	Wet		Turning right	Automobile, station wagon	Skidding/sliding	Improper turn	Dark
Comments: CHARGED: D1 SEC 130 HTA PON#2775625B												
1356784	2013-Nov-24, Sun,10:30	Snow	Rear end	Non-reportable	North	Ice		Stopped	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					North	Ice		Slowing or stopping	Automobile, station wagon	Skidding/sliding		Daylight
14254	2014-Jan-02, Thu,18:21	Clear	Turning movement	P.D. only	South	Wet		Turning left	Pick-up truck	Other motor vehicle	Failed to yield right-of-way	
Comments: Road #1: GORDON ST Road #2: CLAIR RD W												
					North	Wet		Going ahead	Pick-up truck	Other motor vehicle	Driving properly	Dark, artificial
142012	2014-Jan-13, Mon,07:57	Clear	Turning movement	Non-reportable	West	Wet		Going ahead	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: CLAIR RD W Road #2: CLAIR RD W												
					West	Wet		Turning right	Automobile, station wagon	Other motor vehicle		Daylight
14004254	2014-Jan-26, Sun,09:57	Clear	Approaching	P.D. only	North	Slush		Going ahead	Automobile, station wagon	Pole (utility, power)	Driving properly	
Comments: Road #1: GORDON ST Road #2: CLAIR RD E												
					South	Slush		Turning left	Automobile, station wagon	Other	Improper turn	Daylight
14004386	2014-Jan-27, Mon,10:00	Clear	Angle	P.D. only	South	Loose snow		Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments: Road #1: GORDON ST Road #2: CLAIR RD E												
					West	Loose snow		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
501801711	2014-Feb-01, Sat,12:40	Snow	Rear end	Non-reportable	North	Wet		Stopped	Passenger van	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					North	Wet						Daylight
14005368	2014-Feb-01, Sat,13:00	Snow	SMV other	P.D. only	North	Loose snow		Slowing or stopping	Automobile, station wagon	Pole (sign, parking meter)	Speed too fast for condition	
Comments: Road #1: GORDON ST Road #2: CLAIR RD W												
						Loose snow						Daylight

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14010272	2014-Mar-03, Mon,14:00	Clear	Angle	Non-reportable	North	Dry		Turning left	Ambulance	Other motor vehicle		
Comments: Road #1: CLAIR RD E Road #2: CLAIR RD E												
					West	Dry		Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
501820599	2014-Mar-10, Mon,15:00	Clear	Rear end	Non-reportable	North	Dry		Stopped	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					North	Dry		Slowing or stopping	Automobile, station wagon	Other motor vehicle		Daylight
14011646	2014-Mar-12, Wed,09:59	Snow	SMV other	P.D. only	North	Loose snow		Turning right	Passenger van	Other	Speed too fast for condition	
Comments: Road #1: CLAIR RD E Road #2: GORDON ST												
						Loose snow						Daylight
14015614	2014-Apr-03, Thu,15:18	Clear	Turning movement	Non-fatal injury	North	Dry		Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments: Road #1: GORDON ST Road #2: CLAIR RD W												
					South	Dry		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
501837595	2014-Apr-17, Thu,17:30	Clear	Sideswipe	Non-reportable	North	Dry		Going ahead	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					North	Dry		Changing lanes	Automobile, station wagon	Other motor vehicle		Daylight
14030787	2014-Jun-23, Mon,18:18	Rain	Turning movement	P.D. only	East	Wet		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments: Road #1: CLAIR RD E Road #2: GORDON ST												
					West	Wet		Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	Daylight
14030806	2014-Jun-23, Mon,20:12	Rain	SMV other	P.D. only	West	Wet		Turning right	Truck - tractor	Pole (sign, parking meter)	Improper turn	
Comments: Road #1: CLAIR RD E Road #2: GORDON ST												
						Wet						Daylight
14044011	2014-Sep-04, Thu,17:45	Clear	Rear end	Non-reportable	South	Dry		Stopped	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					South	Dry		Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
14045068	2014-Sep-09, Tue,17:17	Clear	Sideswipe	P.D. only	East	Dry		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments: Road #1: CLAIR RD W Road #2: GORDON ST												
					East	Dry		Changing lanes	Truck - tractor	Other motor vehicle	Improper lane change	Daylight
501906850	2014-Oct-22, Wed,17:00	Clear	Rear end	Non-reportable	North	Dry		Stopped	Passenger van	Other motor vehicle		
Comments: Road #1: GORDON ST Road #2: GORDON ST												
					North	Dry						Daylight
501923890	2014-Nov-27, Thu,20:00	Snow	Rear end	Non-reportable	West	Ice		Stopped	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: CLAIR RD W Road #2: CLAIR RD W												
					West	Ice						Dark, artificial
14063021	2014-Dec-24, Wed,05:26	Rain	Angle	Non-fatal injury	West	Wet		Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments: Road #1: GORDON ST Road #2: CLAIR RD E												
					South	Wet		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Dark, artificial

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501958335	2015-Feb-12, Thu,15:45	Clear	Sideswipe	Non-reportable	North	Dry	Slowing or stopping	Passenger van	Other motor vehicle		
Comments:	Road #1: GORDON ST	Road #2: GORDON ST			North	Dry					Daylight
501959344	2015-Feb-14, Sat,13:00	Clear	Sideswipe	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:	Road #1: GORDON ST	Road #2: GORDON ST			North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
15008007	2015-Feb-20, Fri,18:10	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Other	
Comments:	d1 charged				West	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly	Dusk
15016262	2015-Apr-13, Mon,18:00	Rain	Sideswipe	Non-reportable	East	Wet	Going ahead	Pick-up truck	Other motor vehicle		
Comments:	Road #1: CLAIR RD E	Road #2: CLAIR RD E			East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle		Daylight
15021903A	2015-May-15, Fri,19:31	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:	d1 charged				South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
15021903	2015-May-15, Fri,19:31	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:	d1 charged				South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
502002088A	2015-May-25, Mon,12:15	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
502002088	2015-May-25, Mon,12:15	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
502006645	2015-Jun-04, Thu,06:00	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					East	Dry					Daylight
15043305	2015-Sep-14, Mon,08:58	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:	d1 charged				North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
15044486	2015-Sep-19, Sat,15:10	Clear	Rear end	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight

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502064738	2015-Oct-30, Fri,17:00	Clear	Rear end	Non-reportable	North	Dry	Stopped	Pick-up truck	Other motor vehicle		
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle		Daylight
15051958	2015-Nov-01, Sun,15:31	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:	d1 charged				West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
15053891	2015-Nov-13, Fri,18:45	Rain	Turning movement	P.D. only	West	Wet	Turning left	Passenger van	Other motor vehicle	Driving properly	
Comments:	d1 charged				West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Dark, artificial
15056451	2015-Nov-29, Sun,01:25	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Pole (utility, power)	Other	
Comments:	d1 charged					Dry					Dark
15057350	2015-Dec-04, Fri,16:39	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:	d1 charged			d2 charged	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Dusk
15057465	2015-Dec-05, Sat,08:45	Fog, mist, smoke, dust	Rear end	Non-fatal injury	North	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change	
Comments:					North	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	Daylight
502093430	2016-Jan-10, Sun,18:30	Snow	Rear end	Non-reportable	East	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle		
Comments:					East	Ice	Going ahead	Automobile, station wagon	Other motor vehicle		Dark, artificial
16003885	2016-Jan-25, Mon,13:35	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:	d1-charged				South	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly	Daylight
16013848	2016-Mar-23, Wed,21:08	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					West	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly	Dark, artificial
502129547	2016-Apr-10, Sun,20:00	Freezing Rain	Rear end		North	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle		
Comments:					North	Ice	Stopped	Automobile, station wagon	Other motor vehicle		Dark, artificial
502204755	2016-Oct-14, Fri,17:30	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					South	Dry					Daylight

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502209067	2016-Oct-22, Sat,20:00	Clear	Rear end	Non-reportable West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
Comments:				West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Dark, artificial
502219191	2016-Nov-16, Wed,12:30	Clear	Other	Non-reportable West	Dry	Reversing	Automobile, station wagon	Other motor vehicle	
Comments:				East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Daylight
16061845	2016-Dec-12, Mon,19:00	Clear	Turning movement	Non-reportable South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	
Comments:	d1 charged			North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Dark, artificial



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location CLAIR RD W @ LAIRD RD

Municipality..... GUELPH

Traffic Control.... Stop sign

Total Collisions.... 4

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle type	First Event	Driver Action	No. Ped
12-501609147S	2012-Jul-30, Mon,12:32	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-12702	2013-Mar-19, Tue,10:06	Snow	SMV other	P.D. only	East	Loose snow	Slowing or stopping	Automobile, station wagon	Pole (utility, power)	Speed too fast for condition	
Comments:						Loose snow					Daylight
13-18565	2013-Apr-23, Tue,20:28	Clear	Sideswipe	P.D. only	North	Dry	Turning right	Tow truck	Other motor vehicle	Improper lane change	
Comments:	CHARGED: JOHN HALL - START FROM STOPPED POSITION NOT IN SAFETY, 142(2) HTA				North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	Dusk
13-501713749s	2013-Jun-25, Tue,19:30	Rain	Rear end		East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location CLAIR RD E @ FARLEY DR

Municipality..... GUELPH

Traffic Control.... Traffic signal

Total Collisions.... 13

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle type	First Event	Driver Action	No. Ped
12-42187	2012-Aug-11, Sat,15:30	Rain	Angle	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
1356588	2013-Nov-23, Sat,09:45	Snow	SMV other	Non-reportable	West	Slush	Going ahead	Passenger van	Skidding/sliding	Speed too fast for condition	
Comments: Road #1: CLAIR RD E Road #2: FARLEY DR						Slush					Daylight
1357139	2013-Nov-23, Sat,09:50	Snow	SMV unattended vehicle	Non-reportable	North	Ice	Stopped	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: CLAIR RD E Road #2: CLAIR RD E						Ice					Daylight
501836603	2014-Apr-16, Wed,09:00	Clear	Rear end	Non-reportable	South	Dry	Turning right	Automobile, station wagon	Other motor vehicle		
Comments: Road #1: FARLEY DR Road #2: FARLEY DR					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle		Daylight
14048226	2014-Sep-25, Thu,06:39	Clear	Angle	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments: Road #1: CLAIR RD E Road #2: FARLEY DR					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Dawn
15041370	2015-Sep-04, Fri,16:50	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
16009138	2016-Feb-20, Sat,13:00	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments: d2-charged					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	Daylight
16012219	2016-Mar-15, Tue,13:22	Clear	Turning movement	P.D. only	East	Dry	Turning left	Pick-up truck	Other motor vehicle	Failed to yield right-of-way	
Comments: d1-charged					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
16040747	2016-Aug-24, Wed,08:30	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Bicycle	Other motor vehicle	Disobeyed traffic control	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Cyclist	Driving properly	Daylight

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502190116	2016-Sep-10, Sat,13:27	Clear	Turning movement	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle		Daylight
16053945	2016-Nov-02, Wed,21:55	Clear	Turning movement	Non-fatal injury	East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Other	
Comments: d1 charged					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Dark, artificial
16055850	2016-Nov-14, Mon,15:28	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments: d1 charged					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
17001674	2016-Dec-19, Mon,14:30	Clear	Turning movement	Non-reportable	West	Dry	Going ahead	Passenger van	Other motor vehicle		
Comments: d2 charged					West	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle		Daylight

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Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location CLAIR RD E @ VICTORIA RD S

Municipality..... GUELPH

Traffic Control.... Stop sign

Total Collisions.... 12

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle type	First Event	Driver Action	No. Ped
12-501575422S	2012-Apr-01, Sun,10:20	Clear	Angle		South	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-07923	2013-Feb-16, Sat,15:45	Clear	Angle	P.D. only	South	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-501690910s	2013-Apr-17, Wed,08:30	Clear	Rear end		South	Dry	Going ahead	Unknown		Driving properly	
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Following too close	Daylight
13-41575	2013-Jul-04, Thu,15:15	Clear	Angle	P.D. only	South	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:	CHARGED: D1 S.141 (2) HTA PON# 1195626B				East	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly	Daylight
1354335	2013-Nov-10, Sun,03:40	Rain	SMV other	P.D. only	East	Wet	Slowing or stopping	Automobile, station wagon	Steel guide rail	Speed too fast for condition	
Comments:	Road #1: CLAIR RD E, GUELP	Road #2: VICTORIA RD S				Wet					Dark, artificial
13-54335	2013-Nov-10, Sun,03:40	Rain	SMV other	Non-fatal injury	East	Wet	Slowing or stopping	Automobile, station wagon	Curb	Speed too fast for condition	
Comments:											Dark, artificial
141081	2014-Jan-07, Tue,14:10	Clear	Rear end	Non-reportable	South	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle		
Comments:	Road #1: VICTORIA RD S & CLAIR RD E GUELP VICTORIA RD S & CLAIR RD E GUELP	Road #2:			South	Ice	Stopped	Automobile, station wagon	Other motor vehicle		Daylight
50185889	2014-Jun-15, Sun,16:50	Clear	Angle	Non-reportable	South	Dry	Going ahead	Motorcycle	Other motor vehicle		
Comments:	Road #1: VICTORIA RD S	Road #2: VICTORIA RD S			East	Dry	Turning left	Automobile, station wagon	Other motor vehicle		Daylight
14030788	2014-Jun-23, Mon,16:19	Rain	Approaching	P.D. only	East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:	Road #1: CLAIR RD E	Road #2: VICTORIA RD S			West	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	Daylight

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14054348	2014-Oct-31, Fri,14:45	Rain	Angle	P.D. only	East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:	Road #1: CLAIR RD E	Road #2: VICTORIA RD S			South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	Daylight
15039629	2015-Aug-25, Tue,23:20	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Steel guide rail	Other	
Comments:	d1 charged					Dry					Dark
502055091	2015-Oct-06, Tue,17:00	Clear	Rear end	Non-reportable	East	Dry	Stopped	Passenger van	Other motor vehicle		
Comments:					East	Dry	Going ahead	Truck - closed	Other motor vehicle		Daylight

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Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location CLAIR RD W @ CLAIRFIELDS DR W

Municipality..... GUELPH

Traffic Control.... Traffic signal

Total Collisions.... 13

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
12-501561016S	2012-Feb-08, Wed,08:15	Clear	Rear end		West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
13-501696443s	2013-May-06, Mon,07:40	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Dry	Stopped	Unknown	Other motor vehicle	Driving properly	Daylight
501696443	2013-May-06, Mon,07:40	Clear	Rear end	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other motor vehicle	Daylight
Comments:	Road #1: CLAIRFIELDS DR		Road #2: CLAIRFIELDS DR		South	Dry	Stopped		Other motor vehicle		Daylight
1359695	2013-Dec-11, Wed,12:00	Snow	Angle	Non-reportable	East	Loose snow	Slowing or stopping	Passenger van	Skidding/sliding		
Comments:	Road #1: CLAIR RD W		Road #2: CLAIR RD W		North	Slush	Stopped	School bus	Other motor vehicle		Daylight
501970219	2015-Mar-05, Thu,15:25	Clear	Sideswipe	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:	Road #1: CLAIR RD W		Road #2: CLAIR RD W		West	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle		Daylight
501996511	2015-May-13, Wed,15:05	Clear	Sideswipe	Non-reportable	West	Dry	Stopped	Pick-up truck	Other motor vehicle		
Comments:					West	Dry	Turning left	School bus	Other motor vehicle		Daylight
502039616	2015-Aug-27, Thu,16:35	Clear	Rear end	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle		Daylight
502070671	2015-Nov-13, Fri,17:35	Clear	Angle	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Skidding/sliding		
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle		Dark, artificial
502072008	2015-Nov-17, Tue,05:45	Clear	Rear end	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					West	Dry					Dark, artificial

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502093617	2016-Jan-10, Sun,17:45	Strong wind	Rear end	Non-reportable	East	Ice	Stopped	Automobile, station wagon	Other motor vehicle		
Comments:					East	Ice					Dark
502094098	2016-Jan-12, Tue,12:40	Snow	Rear end	Non-reportable	East	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle		
Comments:					East	Packed snow	Stopped	Automobile, station wagon	Other motor vehicle		Daylight
502101937	2016-Jan-29, Fri,11:00	Clear	Turning movement	Non-reportable	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle		
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight
16062009	2016-Dec-12, Mon,08:15	Clear	Sideswipe	Non-reportable	West	Loose snow	Going ahead	Truck - closed	Other motor vehicle		
Comments:	d2 charged				West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle		Daylight

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Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location BEAVER MEADOW DR @ CLAIR RD E

Municipality..... GUELPH

Traffic Control....

Total Collisions.... 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
12-21783	2012-Apr-23, Mon,11:22	Clear	SMV other	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Pole (utility, power)	Failed to yield right-of-way	
Comments:						Dry					Daylight



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location GORDON ST @ MALTBY RD E

Municipality..... GUELPH

Traffic Control....

Total Collisions.... 5

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped	
1356949	2013-Nov-23, Sat,12:00	Snow	SMV other	Non-reportable	East	Ice	Going ahead	Automobile, station wagon	Skidding/sliding			
Comments: Road #1: MALTBY RD E Road #2: MALTBY RD E						Ice					Daylight	
14007199	2014-Feb-12, Wed,17:00	Clear	SMV other	P.D. only	West	Packed snow	Slowing or stopping	Passenger van	Pole (sign, parking meter)	Lost control		
Comments: Road #1: MALTBY RD E Road #2: GORDON ST						Dry					Daylight	
14051130	2014-Oct-11, Sat,17:55	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly		
Comments: Road #1: GORDON ST Road #2: MALTBY RD E						East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	Daylight
15059744	2015-Dec-19, Sat,08:04	Clear	Angle	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control		
Comments: d1-charged						North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
16001977	2016-Jan-14, Thu,01:30	Snow	SMV other	P.D. only	East	Loose snow	Slowing or stopping	Pick-up truck	Ran off road	Speed too fast for condition		
Comments:						Ice					Dark	



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location GORDON ST @ POPPY DR

Municipality..... GUELPH

Traffic Control.... Traffic signal

Total Collisions.... 2

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped		
12-20170	2012-Apr-15, Sun,11:27	Rain	Angle	Non-fatal injury	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control			
Comments: D1 CHARGED: SECTION 144(18) HTA PON# 8242161A							West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
12-501647502s	2012-Dec-01, Sat,09:00	Clear	Angle		West	Packed snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly			
Comments:							North	Packed snow	Going ahead	Automobile, station wagon		Daylight	



Collision Details Report

From: January 1, 2012 To: March 31, 2017

Location VICTORIA RD S @ MALTBY RD E

Municipality..... GUELPH

Traffic Control.... Stop sign

Total Collisions.... 15

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped		
12-501578669S	2012-Apr-14, Sat,09:30	Clear	Rear end		South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close			
Comments:							South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
1352809	2013-Nov-01, Fri,09:00	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle				
Comments: Road #1: VICTORIA RD S Road #2: VICTORIA RD S					South						Daylight		
15005190	2015-Feb-04, Wed,22:33	Snow	SMV other	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Steel guide rail	Speed too fast for condition			
Comments: Road #1: VICTORIA RD S Road #2: MALTBY RD E						Loose snow					Dark		
502043335	2015-Sep-08, Tue,08:15	Rain	SMV other	Non-reportable	South	Wet	Slowing or stopping	Automobile, station wagon					
Comments:							Wet				Daylight		
15047987	2015-Oct-08, Thu,16:30	Clear	Turning movement	Non-fatal injury	South	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Other			
Comments: d1 charged							South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
15049840	2015-Oct-20, Tue,11:18	Clear	Turning movement	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly			
Comments: d2 charged							South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	Daylight
502082229	2015-Dec-11, Fri,10:00	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle				
Comments:							South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Daylight	
502098039	2016-Jan-14, Thu,16:30	Clear	Rear end	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle				
Comments:							South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Daylight	
16008748	2016-Feb-24, Wed,09:45	Snow	SMV other	P.D. only	South	Packed snow	Slowing or stopping	Automobile, station wagon	Steel guide rail	Speed too fast for condition			
Comments:							Packed snow				Daylight		

502136435	2016-Apr-29, Fri,09:00	Clear	Rear end		North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	
Comments:										
					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Daylight
502155172	2016-Jun-15, Wed,07:15	Clear	Rear end	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
Comments:										
					East	Dry				Daylight
502159487	2016-Jun-25, Sat,09:00	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	
Comments:										
					South	Dry				Daylight
16057677	2016-Nov-23, Wed,19:45	Snow	SMV other	Non-reportable	South	Loose snow	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
Comments: metal guide rail										
						Loose snow				Dark
16057381	2016-Nov-23, Wed,21:45	Freezing Rain	SMV other	P.D. only	South	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:										
						Ice				Dark, artificial
16057382	2016-Nov-23, Wed,23:55	Freezing Rain	SMV other	P.D. only	South	Ice	Going ahead	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:										
						Ice				Dark, artificial

Appendix C – City of Guelph Access Design Guidelines

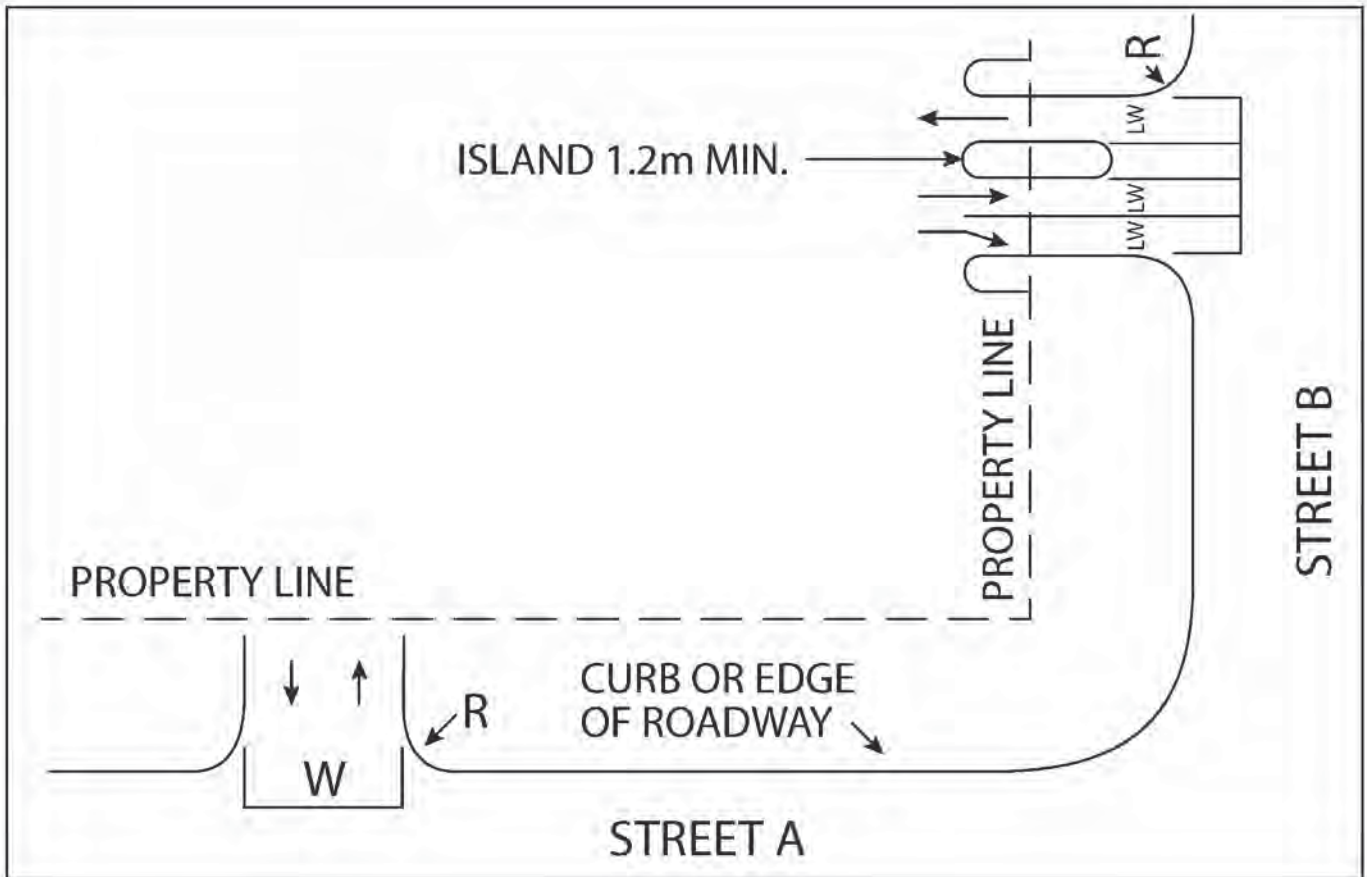


Figure 8
Access Details 1

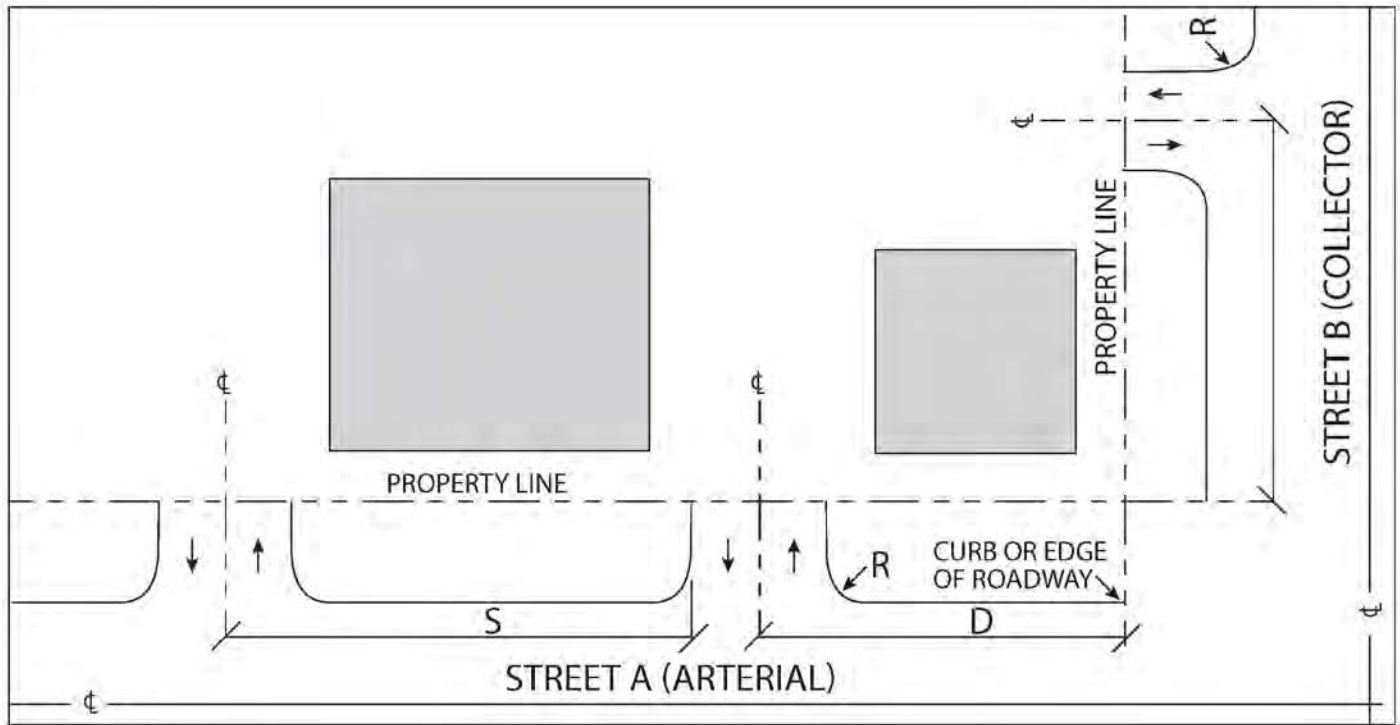


Figure 9
Access Details 2

Appendix D – TDM Policy Examples / Best Practices

Municipality	Province	Type of Plan/Policy	Year	Under Appeal?	Section	Text	Link
Guelph	Ontario	Downtown Guelph Secondary Plan	2012 (2016 Consolidation)	No	11.1.4.1.4	Transportation demand management (TDM) will be critical to achieving a transportation system Downtown that provides and promotes attractive alternatives to the automobile. The City shall work with transit providers, developers and businesses Downtown to develop and implement TDM measures that promote the use of transit, walking, cycling and carpooling. The City may require large-scale development or businesses to complete a TDM plan. TDM plans will describe facilities and programs intended to discourage single occupancy vehicle trips, minimize parking and promote transit use, cycling, car sharing and/or carpooling. The City may permit reduced parking standards for developments which demonstrate through a TDM plan and implementation strategy that a reduction in parking standards is appropriate.	https://guelph.ca/wp-content/uploads/Official-Plan-Consolidation-March-2018.pdf
Guelph	Ontario	Guelph Innovation District Secondary Plan	2014 (2017 Office Consolidation)	No	11.2.4.2.2	The City shall work with transit providers, developers and businesses within the University-Downtown-GID trinity area to develop and implement TDM measures that aim to reduce motorized vehicular trips and promote the use of active transportation modes, public transit, car-sharing and/or carpooling.	
Cambridge	Ontario	Official Plan	2012 (2018 Consolidation)	Yes, but only five sections, none of which are related to TDM	5.11.3	Shared parking arrangements between adjacent uses and reduced parking requirements may be considered through the development review process including transportation demand management measures as described in Section 6.15.	https://www.cambridge.ca/en/learn-about/resources/Official-Plan/Cambridge-2018-Official-Plan-Consolidation-AODA-2018-09-25.pdf
					6.10.4	Measures to encourage and/or support transit oriented development, existing and planned high frequency transit services, such as reductions in the amount of required parking, limiting the amount of surplus parking and considering transportation demand management programs as a community benefit under Section 10.16 of this Plan, may also be used	
					6.15.1	In order to maximize the efficiency of the transportation system through transportation demand management, the City will encourage the private and public sectors to implement measures, such as walking, cycling transit, car pooling, car sharing and flexible working hours, where feasible. Transportation demand management measures will be considered in evaluating development proposals	
					6.15.2	A comprehensive transportation demand management plan, including implementation measures, may be considered a component in justifying a reduction in the required amount of parking for a development or redevelopment, based on Section 10.11 of this Plan.	
					6.15.3	The City may prepare a city wide transportation demand management plan, which could be part of a future Master Transportation Plan.	
					10.11.2(f)	A reduction or exemption in required parking facilities may be considered where, in the opinion of the City, any of the following circumstances prevail f) the development is part of a comprehensive transportation demand management plan in accordance with the provisions of Section 6.15	
					10.16.1(xviii)	Development standards may be incorporated into a Zoning By-law to permit bonusing through an increase in height and/or density of development where such increase provides public benefits, and the increase: xviii) parking demand reduction measures as part of an approved transportation demand management plan, such as measures to increase access to public transit and/or participation in a formal car share program.	
Cambridge	Ontario	Secondary Plan: Cambridge West Lands	2016	No	6.11	The implementation of Transportation Demand Management measures shall be considered as part of every application for new development or redevelopment within the Secondary Plan area.	https://www.cambridge.ca/en/learn-about/resources/Cambridge-West-Draft-Plans/0800A_Cambridge-West-Secondary-Plan_June-2016---Copy.pdf
Cambridge	Ontario	Secondary Plan: Main Street and Dundas Street Area	2016	No	4.4.1.15	The implementing Zoning By-law may require the provision of secure bicycle parking facilities in a conspicuous location, long-term bike parking areas within buildings and on-site shower facilities and lockers for employees who bike to work. The City may allow for the reduction in the number of required parking spaces where bicycle parking facilities are provided	https://www.cambridge.ca/en/learn-about/resources/Main-and-Dundas-Draft-Secondary-Plan.pdf
					4.4.1.16	Council may require that development applications include a Transportation Demand Management (TDM) Plan, prepared to the satisfaction of the City of Cambridge. The intent of the TDM Plan shall be to implement and promote measures to reduce the use of low-occupancy automobiles for trips and to increase transit use, cycling and walking.	
Kitchener	Ontario	Official Plan	2014 (2018 Consolidation)	Yes	3.C.2.19 c)	c) a parking management and transportation demand management strategy for land uses within the station area to maximize intensification opportunities, minimize surface parking areas, to encourage large mixed use development and discourage auto-oriented land uses. Such strategies may include reduced parking requirements, shared parking, development of structured or underground parking facilities, parking pricing and other appropriate strategies;	https://www.kitchener.ca/en/resourcesGeneral/Documents/DSD_PLAN_New-Official-Plan--CONSOLIDATED-Version-Modifications-Deferrals--Appeals.pdf
					6.C.1.2(b)(iv)	The City may require a Health Impact Assessment in support of a development application or as part of an Environmental Assessment to ensure the proposal supports a complete and healthy community. The contents of a Health Impact Assessment will be outlined in a Terms of Reference. In general, the contents of a Health Impact Assessment may include, but not be limited to addressing the following: b) whether and how the proposal supports physical activity having regard for: iv) reducing the dependency on the automobile and encouraging active transportation and transportation demand management measures.	
					7.C.7(Preamble)	Clean air is essential for healthy, strong, liveable communities. Many day-to-day activities such as driving, home heating and industrial activities diminish air quality by producing a variety of harmful emissions and are a major source of pollution. One of the most effective strategies to ensure air quality is to encourage and achieve a complete and healthy community with a compact urban form and promote active modes of transportation such as walking, cycling and public transit and Transportation Demand Management (TDM) measures. The policies of this Plan seek to improve air quality in the city.	
					7.C.7.7	Transportation Demand Management (TDM) measures will be used in accordance with the policies in Section 13.C.7 to reduce the use of single occupancy vehicles and encourage increased transit ridership, walking and cycling	
					13.C.1	The City will implement the recommendations of Regional and/or City Transportation Master Plans, Transportation Demand Management Plans, Cycling Master Plans, Multi-Use Pathways and Trails Master Plans and Pedestrian Charters through the development review process, infrastructure projects and public realm improvements.	
					13.C.7 (entire section)	Objectives 13.7.1. To support and enhance sustainable transportation choices and discourage single occupant vehicle trips. 13.7.2. To reduce traffic congestion, parking supply needs, and demand for parking spaces by encouraging various modes of travel. Policies 13.C.7.1. The City will support the Region's Transportation Demand Management Policies and initiatives to reduce automobile dependency, make alternative travel modes more attractive, and influence people to adopt sustainable trip behaviours and practices. 13.C.7.2. The City will implement a comprehensive Transportation Demand Management program as recommended in the City of Kitchener Transportation Demand Management Plan which may include, but not limited to: a) community-wide, area-specific or site-specific practices or initiatives; b) employer programs that support and enhance sustainable transportation choices; and, c) requirements for features such as: car sharing, bike sharing facilities, van and carpool spaces, electric vehicle charging stations, shared parking, bicycle parking, transit waiting areas, and pedestrian facilities. 13.C.7.3. The City may require the incorporation of Transportation Demand Management measures. 13.C.7.4. The City will consider reduced parking requirements for development and/or redevelopment in accordance with Policy 13.C.8.2 where a comprehensive Transportation Demand Management Report is submitted to the satisfaction of the City.	
					13.C.8.2	The City may consider adjustments to parking requirements for properties within an area or areas, where the City is satisfied that adequate alternative parking facilities are available, where developments adopt transportation demand management (TDM) measures or where sufficient transit exists or is to be provided	
					15.D.2.22(b) (Urban Growth Centre - Downtown)	Where new parking spaces are proposed to be developed in combination with all new development or redevelopment, the City will: b) encourage owners/applicants to utilize Transportation Demand Management (TDM) measures	
					17.E.17.2(b) (Bonusing)	Community benefits may include: b) incorporation of Transportation Demand Management (TDM) strategies	
					5.4.1	Expand employer TDM programs in Kitchener through existing TDM tools and services. This can begin with the City's membership in the TravelWise TMA to adopt carpool ride-matching, subsidized transit passes, guaranteed-ride home and outreach programs to encourage its staff to choose sustainable modes of travel to and from work. Given TravelWise is a well-established program in the Region, TDM efforts and outreach should be expanded beyond City staff and beyond the downtown area to encourage major employers throughout the City to adopt these services	
					5.4.2	Have the city's TDM coordinator work closely with the Region and employers, especially in downtown Kitchener, to adopt TravelWise programs, help implement other TDM strategies such as telework and carbor tracking, and provide guidance on TDM-friendly site design of developments.	
					5.4.3	Support carsharing in the City through outreach and promotional events to increase awareness, and provisions for preferred parking for carsharing vehicles to promote these services, facilitate their growth and aid their long-term viability in the City and the Region.	

Kitchener	Ontario	Transportation Master Plan	2013	No	5.4.4	Integrate TDM strategies into site planning and development approval processes to provide for TDM-supportive measures in developments and encourage sustainable transportation choices. The City should develop a TDM checklist to help review and evaluate development applications, City of Kitchener transportation-related projects and projects of the Region and Province. This checklist would assign points and provide a rating similar to the Region of Waterloo's Travel Demand Management Implementation Checklist. Another example of a TDM checklist was developed in the study "TDM Supportive Guidelines for Development Approvals" prepared by the Association for Commuter Transportation in Canada. Part of this TDM checklist can include a requirement to prepare TDM plans as part of transportation impact studies for new developments and major transportation projects.	al/Documents/DSD_TRANSPORT_Transportation Master Plan 2013.pdf
					5.4.5	Work with Region and local partners to engage residents through individualized marketing to promote and encourage sustainable modes of transportation for all types of trips. As highlighted in the 2010 TDM plan, individualized marketing is aimed at targeted populations or groups and tailors the TDM strategies and programs based on the needs, opportunities and willingness to use other modes of travel.	
Waterloo (City)	Ontario	Official Plan	2012 (2018 Consolidation)	Yes	6.1.5(4)	To support transit and measures relating to transportation demand management through restrictions on parking supply, where appropriate.	
					6.4(1)	A Transportation Impact Study to assess the transportation demands, impacts and opportunities of a proposed development may form part of a development application. Applications for site plan approval may require a Transportation Impact Study if requested by the Ministry of Transportation. While the scope of the Transportation Impact Study will vary depending on the nature of the development application, the purpose of the Study will generally be to introduce appropriate transportation demand management measures and identify and implement mitigation measures or transportation improvements to accommodate travel generated by the development.	
					6.6.1(4)	The City will plan for the development of public and/or private parking facilities to meet parking needs while promoting the more efficient use of parking resources. In addition to establishing parking requirements through the Zoning By-Law, the City may use a range of mechanisms to require or facilitate the provision of such parking, including: (e) Pricing parking to cover some or all facility costs and to help fund Transportation Demand Management strategies	
					7.7.1(2)(g)	Post-secondary educational institutions are encouraged to create campus master plans in consultation with the City, surrounding neighbourhoods, and other stakeholders, provided further that campus master plans should: (g) Promote transportation demand management strategies for staff, faculty, and students	
					8.5.3(1)	The City will encourage energy conservation in the community by (c) promoting increased reliance on public transit and pedestrian and bicycle travel and a reduced reliance on motor vehicles through measures such as enhanced physical infrastructure for transit, pedestrians and cyclists and supporting transportation demand management initiatives	https://www.waterloo.ca/en/government/resources/Documents/Cityadministration/Official-plan/Official-Plan-Consolidated-August-2018.pdf
					10.1.1(12)	Development applications proposing to redesignate lands to the MixedUse Medium Density Residential designation, Mixed-Use Medium High Density Residential designation, or Mixed-Use High Density Residential designation may be contemplated based on the following: (h) The proposal identifies and implements any required transportation improvements, with a particular focus on transportation demand management measures	
					11.1.34(3) (Specific Provision Area 34 - University Expansion Area)	It shall be a policy of Council that creative parking strategies shall be encouraged, including: (b) Permitting reduced parking standards, subject to a Zoning By-Law Amendment. The review of such amendments will consider issues such as: (iv) Whether transportation demand management techniques are incorporated into the development.	
					11.1.38(5) (Specific Provision Area 38 - 247 and 253 King Street North)	The determination of appropriate increases in density for areas designated high density, shall be considered based on the ability of the project to meet one or more of the following objectives and shall be specified on a site by site basis, in the implementing zoning: (i) To encourage improvements suggested by a Transportation Demand Management Plan, where appropriate;	
Waterloo (City)	Ontario	Transportation Master Plan	2011	No	16.1.1 (Short Term Planning Horizon - 0-5 Years)	Land Use and Transportation Integration 1. Create a standardized list of TDM initiatives, based on real world experience, to enable developers to reduce auto trip numbers and parking spaces; 2. Establish maximum parking requirements for residential, commercial, industrial and institutional sites; 3. Require road networks to be transit friendly (i.e. grid structure); 4. Review development staging in new communities to ensure high density is contained in initial phasing; 5. Use trees and other green infrastructure to provide shelter, aesthetic value, shade and separation from motorized traffic; and 6. Pursue changes to Leadership in Energy and Environmental Design (LEED) rating systems transportation and parking credits (see more below in Section 16.1). Transportation Supply 7. Develop an incident detection and management system (IMS) for motorized vehicles that informs drivers of traffic congestion and alternative routes; 8. Expansion of a privately operated shared vehicle program (i.e. Grand River Car Share); and 9. Implement a bicycle sharing program (such as that being promoted at the University of Waterloo). Education Promotion and Outreach 10. Develop separate web based trip planners for cycling and walking, and provide on-route signage and maps	https://www.waterloo.ca/en/government/resources/Documents/Cityadministration/TransportationMasterPlan/Transportation-Master-Plan--PDF-Version.pdf
					16.1.2 (Long Term Planning Horizon - Recommended for Further Study)	Travel Incentives and Disincentives 11. Study the use of Transportation Pricing: - Road tolls, Congestion pricing, Area specific tolls, Distance-based auto insurance, High Occupancy Toll (HOT) Lanes, Vehicle user fees, Road space rationing, Emission fees, Fuel tax increases, Parking Program, Distance based fees	
Waterloo (Region)	Ontario	Official Plan	2009 (2015 Consolidation)	No, but there are deferrals	3.C.1	The Region, in collaboration with Area Municipalities, will implement a comprehensive Transportation Demand Management program as part of its efforts to reduce automobile dependency. This program will involve independent action as well as partnerships with the private sector, other levels of government and non-governmental organizations including educational institutions and community groups. It will also seek to make alternatives to driving more attractive, build a positive public attitude toward them, and provide information and incentives that encourage individuals to reduce automobile use. The Transportation Demand Management program will include, but not limited to: (a) community-wide and area-specific Transportation Demand Management programs; (b) employer Transportation Demand Management programs that support and enhance sustainable transportation choices to public and private sector employees and major institutions for such actions as walking, cycling, transit, carpooling, car sharing, teleworking, shuttle buses and ride-sharing programs, bicycle storage facilities and showers; and (c) increasing transportation system efficiency by encouraging van and carpooling, preferential parking for car and van pools, shared parking, bicycle parking facilities, indoor bus waiting areas, queue-jumping lanes for transit buses, smart cards and high-occupancy vehicle lanes.	https://www.regionofwaterloo.ca/en/resources/Regional-Official-Plan/Chapter_3_consolidated_rop_2015-access.pdf
					3.C.2	The Region will operate a commuter options program for Regional employees that supports and enhances sustainable transportation options for such actions as walking, cycling, transit, carpooling, car sharing, shuttle buses and ride-sharing programs, bicycle storage facilities and showers. Sustainable transportation options will also be supported and enhanced for commuter and business travel	
					3.C.3	Where an owner/applicant agrees to implement, and can appropriately secure, the transportation demand management strategies recommended in a Transportation Impact Study prepared in accordance with Policy 5.A.25, the Region may consider granting reductions in the level of road improvement that would otherwise be required to support the development.	
					3.C.4	Area Municipalities are encouraged to provide reduced parking standards for development applications where the owner/applicant agrees to incorporate transportation demand management strategies as part of the proposed development.	
					8.1.8	To better utilize existing infrastructure, Mississauga will encourage the application of transportation demand management (TDM) techniques, such as car-pooling, alternative work arrangements and shared parking.	
					8.4.1	Off-street parking facilities for vehicles and other modes of travel, such as bicycles, will be provided in conjunction with new development and will c. support transportation demand management (TDM) initiatives.	
					8.4.7	Within Intensification Areas, Mississauga will give consideration to: f. coordinating parking initiatives with transportation demand management (TDM) programs in order to effectively link transit planning, parking and other related issues in a comprehensive manner	
					8.5.1	Mississauga will encourage TDM strategies that promote transit use and active transportation, and reduce vehicle dependency, single occupant vehicle travel, trip distance and time and peak period congestion.	
					8.5.2	Mississauga will work with other levels of government, agencies and the private sector to encourage TDM measures.	
					8.5.3	Mississauga will encourage employers to implement TDM programs.	
					8.5.4	Mississauga will manage parking in Intensification Areas to encourage the use of alternative modes of transportation and the reduction of vehicular congestion.	
					8.5.5	Mississauga will encourage land uses permitted by this Plan that make efficient use of the transportation system and parking facilities during offpeak hours.	
					8.5.6	In appropriate areas, Mississauga will encourage a fee for parking and the separation of parking costs from other costs, such as transit fares, building occupancy and residential unit prices.	https://www2.mississauga.ca/online-services/transportation

Mississauga	Ontario	Official Plan	2010 (2018 Office Consolidation)	Yes	8.5.7	Prior to approval of development applications, particularly those that will generate significant employment opportunities, a TDM plan may be required that demonstrates, among other things, the following: a. building orientation that supports transit service; b. minimize distance between main building entrances and transit stations/stops; c. development that is integrated into the surrounding pedestrian and cycling network; d. parking facilities designed to provide safe and efficient access for pedestrians and cyclists emanating from the surrounding transit and active transportation network; e. secure, conveniently located, weather protected, on-site bicycle storage facilities, and associated amenities such as showers, change rooms and clothing lockers; f. reserved, priority car-pool parking spaces and, where applicable, car-share spaces and taxi stands; g. parking spaces for scooters, motorcycles and other similar motorized vehicles; h. techniques to manage the supply of on-site parking; and i. measures that: • increase the proportion of employee trips made by transit, walking and cycling; • increase the average car occupancy rate; • reduce the demand for vehicular travel; and • shift travel times from peak to off-peak periods.	http://www.mississauga.ca/onlinemaps/plan/bldg/MOP/Chapter8-Create_a_Multi-Modal_City.pdf
					8.5.8	Car-pooling will be encouraged through the provision of High Occupancy Vehicle Lanes, priority parking, and other measures as appropriate.	
					8.5.9	Further TDM policies may be identified through a Transportation Master Plan.	
Mississauga	Ontario	Port Credit Local Area Plan	2016	unknown	9.1.14	Development applications will be accompanied by transportation and traffic studies. Studies will address, among other things, strategies for limiting impacts on the transportation network, where appropriate, including measures such as: - transportation demand management	http://www6.mississauga.ca/onlinemaps/plan/bldg/MOP/PortCredit_LAP.pdf
					9.1.15	Due to capacity constraints on the Port Credit transportation network, development applications requesting increases in density and height, over and above what is currently permitted in the Port Credit Local Area Plan will be discouraged unless it can be demonstrated, to the City's satisfaction, that the proposed development has included measures to limit the amount of additional vehicular demand	
					9.2.1	Reduced parking requirements and maximum parking standards may be considered within a. the Community Node, particularly in proximity to the GO Station and future LRT stops; and b. the Mainstreet Neighbourhood Precinct.	
					9.2.3	The City will encourage Transportation Demand Management measures, where appropriate, within the Community Node and as part of any significant redevelopment projects outside of the node.	
London	Ontario	Official Plan	2016 (2018 Consolidation)	Yes, but sections copied here not under appeal	362_	Municipal commuter parking facilities will be established at strategic locations, to connect with other mobility choices and service surrounding communities.	http://www.london.ca/business/Planning-Development/Official-Plan/Documents/2018-London-Plan/The-London-Plan-Policies-In-Effect-August-2018-reduced.pdf
					363_	Commuter parking facilities integrated with transit will be directed to Transit Villages and transit station areas. These facilities will be designed to fit within the context of the surrounding area and should, where possible, be incorporated with other structures/buildings in the area	
					364_	Improvements to the mobility network will be planned with an emphasis on active mobility, improved transit services, and Transportation Demand Management (TDM) targets.	
					365_	A Transportation Demand Management Program may be provided as part of a complete planning and development application in support of lowered parking requirements or a Bonus Zone. The Transportation Demand Management Program may: 1. Be integrated with required transportation impact assessments submitted to support the proposed development. 2. Identify design and/or programmatic means to reduce single occupancy vehicle uses. 3. Identify the roles and responsibilities of the property owner with respect to each recommended program and its implementation. 4. Identify the operational and financial roles and responsibilities of the property owner including, but not limited to, program development, implementation and ongoing management and operations of the transportation demand management plan and/or program.	
					368_	Parking requirements may be reduced for developments that provide associated carshare and bikeshare services.	
Vaughan	Ontario	Official Plan	2010 (2017 Office Consolidation)	Yes, but sections copied here not under appeal	4.3.3	As Vaughan's population and travel needs grow, travel demand management will be increasingly necessary to promote efficient movement. A variety of travel demand management strategies at a number of scales ranging from building-specific efforts to regional initiatives such as the existing Smart Commute program and Metrolinx's proposed Mobility Hubs, will assist in reducing single-occupant vehicle travel and reducing congestion as a whole. It is the policy of Council:	https://www.vaughan.ca/projects/policy_planning_projects/General%20Documents/Official%20Plan%20Vol%201/VOP%202010%20Volume%201%202017%20Office%20Consolidation/VOP%202010_Volume%201%20Policies%20January%202017%20Consolidation(OPA%2013%20add%20Rev%20Oct%2012%202017im%20PDF).pdf
					4.3.3.1	To encourage and support City-wide and local travel demand management programs that reduce single-occupant vehicle travel.	
					4.3.3.2	To initiate a travel demand management program for City of Vaughan employees.	
					4.3.3.3	To work with York Region, Metrolinx and other stakeholders to support Smart Commute and other travel demand management organizations.	
					4.3.3.4	To work with school boards, the police department and residents to implement a Safe Routes to School program in all elementary schools to encourage children to walk to school, rather than relying upon auto transportation.	
					4.3.3.5	To work with developers to provide all new homebuyers with information on available pedestrian, cycling and transit facilities and carpooling options within the community, including local transit routes and schedules.	
					4.3.3.6	To facilitate choice and flexibility in mobility options by: a. encouraging, through the implementation of this Plan, the viability of pedestrian, bicycle and transit infrastructure and services as alternatives to driving; b. encouraging alternatives to peak period commuting, including telecommuting, hotelling work environments, zoning permissions for live-work units where appropriate, variable work start times and other means; c. supporting carpooling and ridesharing programs; and, d. adopting a recognition and/or awards program to highlight successful travel demand management initiatives and best practices in Vaughan.	
					4.3.3.7	To facilitate seamless connections between different modes of travel, where appropriate. The City will support a. park-and-ride lots and passenger pick-up and drop-off facilities at existing and future rapid transit and GO stations; b. working with the Region and the private sector to pursue shared use opportunities for park-and-ride facilities related to the Spadina subway. c. convenient bicycle and pedestrian access to transit stations and stops and appropriate bicycle parking facilities; d. carpool parking and coordination areas; and e. well-designed and convenient transfer stations and areas for transit users. To require the preparation and implementation of a travel demand management program for all site plan approval applications for office uses greater than 2,000 square metres or residential apartment or mixed use buildings with greater than 50 residential units. The travel demand management program shall: a. be integrated with required transportation impact assessments submitted to support the proposed development; b. identify design and/or programmatic means to reduce single occupancy vehicle use; c. identify the roles and responsibilities of the landowner with respect to each recommended program and its implementation; and d. identify the operational and financial roles and responsibilities of the landowner including, but not limited to, program development, implementation and ongoing management and operations of the travel demand management plan and/or program.	
					4.3.3.8	To require the preparation and implementation of a travel demand management program for all site plan approval applications for office uses greater than 2,000 square metres or residential apartment or mixed use buildings with greater than 50 residential units. The travel demand management program shall: a. be integrated with required transportation impact assessments submitted to support the proposed development; b. identify design and/or programmatic means to reduce single occupancy vehicle use; c. identify the roles and responsibilities of the landowner with respect to each recommended program and its implementation; and d. identify the operational and financial roles and responsibilities of the landowner including, but not limited to, program development, implementation and ongoing management and operations of the travel demand management plan and/or program.	
					4.3.3.9	To support the development of car-sharing and bike-sharing programs in Vaughan and to recognize car-sharing as an effective means for reducing parking demand.	

Markham	Ontario	Official Plan	2014 (2018 Consolidation)	Yes, TDM section specifically appealed	7.1.4.1	To provide leadership in the development, implementation and promotion of transportation demand management policies, programs and measures as an effective means of slowing the rate of growth in vehicle trips and managing peak-period congestion in the pursuit of a more environmentally sustainable future by: a) requiring that new significant development applications include a transportation demand management strategy; b) encouraging the inclusion of "travel plans" in the required transportation demand management strategies for non-residential development applications referred to in Section 7.1.4.1 a), in accordance with the Markham Transportation Strategic Plan; c) placing priority on the needs of pedestrians, cyclists and transit riders through the preparation of "mobility plans" in the 'Future Urban Area', as required by the Regional Official Plan; d) continuing to support and work with "Smart Commute Markham – Richmond Hill Transportation Management Association" to expand and strengthen the range of services offered to local workplaces; e) committing to support the continued provision of transportation demand management services and programs for Markham employees; f) supporting transportation demand management pilot projects as a strategic means to gain experience, develop best practices, build partnerships and demonstrate successful sustainable transportation initiatives; and g) continuing to work with the School Boards and the educational sector, and York Region to develop travel plans and to provide alternatives to car travel by developing safer and more attractive conditions for students to come to school by bicycle or on foot.	https://www.markham.ca/wps/wcm/connect/markham/d260f4ec-7547-4031-9b8e-53de79faa225/Official-Plan-Chapter-7-20180409.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE_Z18_2QD4H901OGV160QC8BLCRJ1001-d260f4ec-7547-4031-9b8e-53de79faa225-msi7Z4m
					7.1.4.2	To support walking and cycling throughout Markham as competitive mobility choices for everyday activities such as work, school, shopping, business and leisure by: a) creating a more pedestrian-friendly environment that is interconnected by a network of safe, direct, comfortable and convenient pedestrian routes that are suitable for year-round walking; b) designing, constructing and integrating new streets and retrofitting existing streets, where appropriate, to focus on the needs of pedestrians, cyclists and persons with disabilities and ensuring safety, accessibility, convenience, and comfort of all street users are considered; c) to work with York Region to ensure that sidewalks and street lighting are provided on all streets served by transit; d) supporting the provision of accessible, grade-separated crossings, where feasible and environmentally acceptable, at barrier points where major roads, highways, rail lines, and natural features such as ravines and waterways present a significant disruption to the movement of pedestrians and cyclists; e) promoting a safe and comprehensive network of signed bike routes, bike lanes, cycling trails and multi-use paths for cyclists of all ages and abilities generally as identified in Appendix D – Cycling Facilities based on the Markham and York Region Cycling Master Plans; f) implementing segregated bicycle lanes and/or off-road bicycle paths along arterial roads and major and minor collector roads where cycling safety is a foremost concern; g) enhancing and integrating convenient and secure public bicycle parking within: i. inter-modal locations such as rail stations and transit stops; ii. major trip attractors such as sports venues, entertainment centres, shopping complexes and community service centres; and iii. the right-of-ways of streets in new mixed-use neighbourhoods and intensification areas; h) updating the zoning by-law to include bicycle parking standards and requirements for shower and change facilities in major non-residential developments; i) supporting the implementation of Markham's Pathways and Trails Master Plan to create a connected network of off-road trails through natural areas and hydro corridors for use by pedestrians and cyclists; j) considering the introduction of a bike-share program for residents and visitors to Markham; and k) partnering with the Region and organizations in the local cycling community to support on-going promotional, safety and educational programs for pedestrians and cyclists.	
					7.1.5.3	To support the inclusion of preferential parking measures for carpool vehicles, car-share vehicles and low-emission vehicles as part of transportation demand management strategies and to secure such arrangements through an appropriate agreement.	
Aurora	Ontario	Official Plan	2010	No	14.2.1(f)	Travel Demand Management (TDM) measures shall be identified and developed as part of any major development or redevelopment in order to reduce the single-occupant vehicle usage and to promote other modes of transportation such as walking, cycling, and public transit.	https://www.aurora.ca/TownHall/Documents/Planning%20Services/REVISED%202015%20Official%20Plan_Full%20Document.pdf
Newmarket	Ontario	Newmarket Urban Centres Secondary Plan	2014 (2016 Office Consolidation)	Yes	9.2	Transportation and mobility in the Urban Centres will be planned to f) include an active transportation network that connects the Urban Centres internally and that links the Urban Centres to the surrounding community	https://www.newmarket.ca/LivingHere/Documents/Planning%20Department/Secondary%20Plan/Urban%20Centres%20Secondary%20Plan%20-%20October%202016%20Consolidation.pdf
					9.3.4(iii)	Developments will be required to facilitate and promote connectivity to the Town-wide Active Transportation Network identified on Schedule D of the Official Plan through urban design and Transportation Demand Measures.	
					9.3.5(iii)	In addition to all studies that may be required in accordance with Newmarket Official Plan, all non-residential development in the Urban Centres and all residential development in the Urban Centres proposing 10 or more residential units shall be required to prepare a Transportation Demand Management Strategy as part of its Traffic Impact Report. The TDM strategy will describe actions intended to discourage single-occupancy vehicle trips, alternative parking standards, minimize parking, and promote transit use, cycling, car and bike sharing, carpooling, and other measures	
					9.3.5(iv)	TDM strategies should be designed to decrease single occupancy vehicle use, reduce peak period demands, especially discretionary trips in the afternoon peak period, promote active transportation and transit use and to increase vehicle occupancy during peak periods and should include, but not be limited to: a) provision for car share opportunities in major residential developments; b) secure indoor bicycle parking and showers in conjunction with major office and commercial uses, institutional and civic uses; c) preferential parking for carpool and electric vehicles in non-residential developments; d) provision for bicycle parking in close proximity to building entrances and transit stations; e) transit incentive programs, including subsidized transit fares; and f) incorporating paid parking requirements with non-residential development	
					9.3.6(i)	The Town will establish appropriate parking standards for the Urban Centres in the Zoning By-law. Parking requirements will seek to reduce the parking standards in order to encourage a shift toward non-auto modes of transportation and reflect the walking distance to transit and complementary uses	
					9.3.6(ii)	Parking facilities shall be designed to accommodate bicycle parking as well as reserved spaces for drivers of car-share or car pool vehicles and electric cars.	
					9.3.6(vi)	All commercial, office, institutional, mixed use and multi-unit residential buildings, excluding townhouses and stacked townhouses, shall include secure bicycle parking and storage facilities, preferably indoors.	
					9.3.6(vii)	The implementing by-law shall establish minimum requirements for bicycle parking. Major office developments and major institutional employers shall be encouraged to include change rooms, showers and lockers for bicycle commuters.	
					14.2.2(ii)	The pace of development will be coordinated to ensure that development will be permitted where it is supported by the appropriate level of infrastructure including, where applicable c) Transportation Demand Management measures;	
Oakville	Ontario	Official Plan	2009 (2017 Office Consolidation)	No	8.14.1	Through the development process, the Town will encourage opportunities for developing transportation demand management (TDM) measures to reduce single occupancy motor vehicle use, especially during peak travel periods. TDM measures include, but are not limited to, carpooling programs, preferential parking for carpool members, transit pass incentives, cycling initiatives, telecommuting, flex hours, provision of private shuttles, and walking programs.	https://www.oakville.ca/assets/2011%20planing/2017-04-04%20Livable%20Oakville%20-%20Office%20Consolidation.pdf
					8.14.2	TDM will be used to reduce the use of single occupancy vehicles and encourage increased transit ridership, walking and cycling.	
					8.14.3	As an incentive to encourage TDM, the Town may permit reduced parking standards for developments which demonstrate, through a TDM plan and implementation strategy, that a reduction in parking standards is appropriate.	
					8.15.3	Reduced surface parking may be considered as part of a TDM plan.	
Oakville	Ontario	North Oakville East Secondary Plan	2008	No	7.7.2.3(a)	The Town recognizes the role of Travel Demand Management in promoting more efficient use of transportation infrastructure, making the use of private vehicles more sustainable and encouraging increased transit use. The Town shall encourage businesses and/or organizations to prepare and administer special transportation demand management strategies which promote more efficient use of existing road facilities including staggered work hours, car pooling and High Occupancy Vehicle (HOV) lanes and other similar approaches.	https://www.oakville.ca/assets/2011%20planing/nco-EastPlan.pdf
					7.7.2.3(b)	The Town will encourage any development which contains more than 3,000 square metres of office use or 9,290 square metres of industrial use to establish with the Town a travel demand management plan and implementation strategy for the specific development. Priority shall be given to measures which are not capital intensive (e.g. flexible working hours, priority parking for car pool vehicles) and which are feasible given the scale, ultimate occupant/user and location of the development.	
					7.7.2.3(c)	As an incentive to encourage travel demand management as set out in Subsection a) and b), the Town will permit reduced parking standards for developments which demonstrate through a travel demand management plan and implementation strategy that a reduction in parking standards is appropriate. A reduction in parking standards will also be considered where mixed use development is permitted, where there is significant density of development and good accessibility to transit, such as in the Urban Core Area designation.	
					6.4.1	Reduction of vehicle parking will be considered on the basis of the mix of uses, contributions to the installation and implementation of travel demand measures and other sustainable mobility options and facilities or services.	

Toronto	Ontario	Sheppard Lansing Secondary Plan	2017	Yes, completely	6.5.1	A Transportation Demand Management Program will be required for all applications to amend the zoning by-law and will: a. Be integrated with required transportation impact assessments submitted to support the proposed development; b. Identify design and/or programmatic means to reduce single occupancy vehicle use and encourage transit use, cycling and walking; c. Identify the roles and responsibilities of the property owner with respect to each recommended program and its implementation; and d. Identify the operational and financial roles and responsibilities of the property owner including, but not limited to, program development, implementation and ongoing management and operations of the <u>transportation demand management plan and/or program</u> .	https://www.toronto.ca/legdocs/bylaws/2017/aw0123.pdf
					6.5.2	Developments will provide transit supportive infrastructure, such as pavement markings at key stops, seating, street furniture and security features, to improve transit users' experience as part of the travel demand management strategies.	
Toronto	Ontario	Downsview Area Secondary Plan	1999 (updated in 2011)	No	2.3.20	Office and other employment development proponents will be encouraged to develop and implement appropriate travel demand management strategies to reduce peak period automobile trips, and facilitate non-automobile modes of travel such as transit, walking and cycling. In addition, measures to support transit use such as maximum parking standards, shared parking arrangements, public parking structures and payment-in-lieu of parking may be considered on sites within walking distances of rapid transit stations	https://www.toronto.ca/wp-content/uploads/2017/11/902d-cp-official-plan-SP-7-Downsview.pdf
					7.2.1	A transportation monitoring program will be developed with stakeholders to monitor the development levels and trends and associated travel characteristics. The monitoring program will address g) the results of Transportation Demand Management measures and the extent to which the objectives of the Downsview Area Secondary Plan Transportation Master Plan are being achieved	
Toronto	Ontario	North York Centre Secondary Plan	N/A	No	4.7(a)	It is a basic objective of this Secondary Plan to encourage the use of public transit and establish a high transit modal split in the North York Centre. This is desirable to make the best use of the available capacity of the existing and planned transportation network, and to minimize the environmental effects from automobile traffic. The City will actively work with developers, owners and tenants in the North York Centre to develop, implement, facilitate and promote measures to increase the use of transit, cycling and walking, and reduce the use of low-occupancy automobiles for trips, particularly work trips, to and from the North York Centre." These measures include: i. promoting the use of public transit by employees; ii. promoting the use of bicycles by employees, residents and visitors for business and recreational trips; iii. promoting measures to foster higher vehicle occupancy; iv. assisting in organizing and promoting car pooling; v. giving priority parking space assignments and/or reduced rates for car pools; vi. varying hours of work to reduce peak hour loads; vii. participating in a Transportation Management Association; viii. giving priority parking space assignments or reduced rates for non-polluting motor vehicles, such as electric cars, as they become available to the general market; and ix. other measures that may be identified	https://www.toronto.ca/wp-content/uploads/2017/11/8fe9-cp-official-plan-SP-8-North-York-Centre.pdf

Appendix E – Transportation Tomorrow Survey (TTS) Details: Residential Travel Mode Split (South Guelph)

Thu Dec 27 2018 18:16:16 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 700-900

and

2006 GTA zone of destination - gt 8078-8081 8062 8064 8068 8067

and

Trip purpose of destination - purp

Table: Trip 2016

Row:	Count:	Expanded:
Transit excluding GO rail	1	19
Auto driver	16	332
Auto passenger	1	8
Walk	2	42
Total:	20	401

Thu Dec 27 2018 18:15:33 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 700-900

and

2006 GTA zone of origin 8078-8081 8062 8064 8068 8067

and

Trip purpose of origin -

Table: Trip 2016

Row:	Count:	Expanded:
Transit excluding GO ra	27	699
Cycle	8	215
Auto driver	250	5310
Auto passenger	29	657
School bus	31	848
Walk	22	449
Total:	367	8177

Thu Dec 27 2018 18:17:00 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 1600-1800

and

2006 GTA z 8078-8081 8062 8064 8068 8067

and

Trip purpose

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	24	581
Cycle	6	142
Auto driver	243	4994
GO rail only	3	53
Auto passe	28	539
School bus	9	211
Taxi passer	1	43
Walk	5	86
Total:	319	6649

Thu Dec 27 2018 18:17:27 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:

Start time of trip - start_time In 1600-1800

and

2006 GTA z 8078-8081 8062 8064 8068 8067

and

Trip purpos:

Table: Trip 2016

Row:	Count:	Expanded:
Transit exc	2	82
Auto driver	59	1249
Auto passe	28	627
Total:	89	1958

Travel Mode	Resident Travel Mode Split									
	Weekday AM Inbound		Weekday AM Outbound		Weekday PM Inbound		Weekday PM Outbound		Overall	
	Count	Proportion	Count	Proportion	Count	Proportion	Count	Proportion	Count	Proportion
Transit excluding GO rail	19	5%	699	9%	581	9%	82	4%	1381	8%
Cycle		0%	215	3%	142	2%		0%	357	2%
Auto driver	332	83%	5310	65%	4994	75%	1249	64%	11885	69%
GO rail only		0%		0%	53	1%		0%	53	0%
Auto passenger	8	2%	657	8%	539	8%	627	32%	1831	11%
School bus		0%	848	10%	211	3%		0%	1059	6%
Taxi passenger		0%		0%	43	1%		0%	43	0%
Walk	42	10%	449	5%	86	1%		0%	577	3%
Total:	401	1	8178	1	6649	1	1958	1	17186	1

Travel Mode	Resident Travel Mode Split			
	Weekday AM Total		Weekday PM Total	
	Count	Proportion	Count	Proportion
Transit excluding GO rail	718	8%	663	8%
Cycle	215	3%	142	2%
Auto driver	5642	66%	6243	73%
GO rail only	0	0%	53	1%
Auto passenger	665	8%	1166	14%
School bus	848	10%	211	2%
Taxi passenger	0	0%	43	0%
Walk	491	6%	86	1%
Total:	8579	1	8607	1

Auto	74%	86%
Transit	8%	8%
Walk	6%	1%
Cycle	3%	2%
Other	10%	3%

Appendix F – Transportation Tomorrow Survey (TTS) Details: Residential Travel Mode Split (Proxy Area Data)

Cornell, Markham

Mon Jan 07 2019 11:18:59 GMT-0500 (Eastern Standard Time) - Run Time: 1648ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 2457

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin - purpose In 1

and

Type of dwelling unit - dwell_type In 1

Trip 2016

Table:

	2453	2454	2455	2457 Total	
Transit excluding GO rail	22	410	73	128	633
Cycle	0	19	0	9	28
Auto driver	177	1545	1029	517	3268
GO rail only	19	55	18	0	92
Joint GO rail and local transit	0	28	27	5	60
Auto passenger	32	587	102	313	1034
School bus	147	52	46	10	255
Walk	0	175	60	62	297
					5667

Travel Mode	Trips	Proportion
Auto Driver	3268	58%
Auto Passenger	1034	18%
Transit	785	14%
Walk	297	5%
Cycle	28	0%
Other	255	4%
	5667	

Mon Jan 07 2019 14:11:58 GMT-0500 (Eastern Standard Time) - Run Time: 1985ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination = 2457
and
Start time of trip - start_time In 700-900
and
Trip purpose of destination -
and
Type of dwelling unit - dwell

Trip 2016

Table:

	2454	2455	2457	Total
Auto driver	193	103	58	354
Auto passenger	0	26	0	26
Walk	0	42	16	58
				0
				0
				0
				0
				0
				438

Travel Mode	Trips	Proportion
Auto Driver	354	81%
Auto Passenger	26	6%
Transit	0	0%
Walk	58	13%
Cycle	0	0%
Other	0	0%
	438	

Mon Jan 07 2019 11:21:18 GMT-0500 (Eastern Standard Time) - Run Time: 1678ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 2453-2457

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin - purp_orig In 1-3

and

Type of dwelling unit - dwell_type In 2-3

Trip 2016

Table:

	2453	2454	2455	2457 Total	
Transit excluding GO rail	0	282	36	7	325
Auto driver	20	911	271	179	1381
GO rail only	0	66	15	0	81
Joint GO rail and local transit	0	9	0	0	9
Auto passenger	0	230	208	5	443
School bus	0	0	0	12	12
Walk	0	92	16	0	108
					0
					2359

Travel Mode	Trips	Proportion
Auto Driver	1381	59%
Auto Passenger	443	19%
Transit	415	18%
Walk	108	5%
Cycle		0%
Other	12	1%
	2359	

Mon Jan 07 2019 14:12:59 GMT-0500 (Eastern Standard Time) - Run Time: 2328ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - 2457

and

Start time of trip - start_time In 700-900

and

Trip purpose of destination - pu

and

Type of dwelling unit - dwell_ty 3

Trip 2016

Table:

	2454	2455	Total
Auto driver	159	75	234
Walk	18	0	18
			0
			0
			0
			0
			0
			0
			252

Travel Mode	Trips	Proportion
Auto Driver	234	93%
Auto Passenger	0	0%
Transit	0	0%
Walk	18	7%
Cycle	0	0%
Other	0	0%
	252	

Mon Jan 07 2019 11:13:23 GMT-0500 (Eastern Standard Time) - Run Time: 2404ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of dest 2457

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destination

and

Type of dwelling unit - dwell_type In 1

Trip 2016

Table:

	2453	2454	2455	2457 Total	
Transit excluding GO r	22	271	198	121	612
Cycle	0	39	0	0	39
Auto driver	278	1287	979	582	3126
GO rail only	9	90	42	49	190
Joint GO rail and local	0	43	35	8	86
Auto passenger	32	232	114	40	418
School bus	58	0	23	0	81
Walk	0	14	18	0	32
					4584

Travel Mode	Trips	Proportion
Auto Driver	3126	68%
Auto Passenger	418	9%
Transit	888	19%
Walk	32	1%
Cycle	39	1%
Other	81	2%
	4584	

Mon Jan 07 2019 14:21:32 GMT-0500 (Eastern Standard Time) - Run Time: 1965ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of orig 2457

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin

and

Type of dwelling unit -

Trip 2016

Table:

	2453	2454	2455	2457 Total	
Transit excluding GO r	0	0	28	0	28
Cycle	0	38	0	0	38
Auto driver	53	307	277	91	728
Auto passenger	32	128	85	16	261
					0
					0
					0
					0
					1055

Travel Mode	Trips	Proportion
Auto Driver	728	69%
Auto Passenger	261	25%
Transit	28	3%
Walk	0	0%
Cycle	38	4%
Other	0	0%
	1055	

Mon Jan 07 2019 11:12:53 GMT-0500 (Eastern Standard Time) - Run Time: 2227ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destina 2457

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destinatic

and

Type of dwelling unit - dwell_type In 2-3

Trip 2016

Table:

	2454	2455	2457	Total
Transit excluding GO rail	134	45	0	179
Auto driver	937	305	140	1382
GO rail only	59	22	12	93
Joint GO rail and local tra	25	6	7	38
Auto passenger	168	161	0	329
Taxi passenger	0	16	0	16
Walk	0	21	0	21
				0
				2058

Travel Mode	Trips	Proportion
Auto Driver	1382	67%
Auto Passenger	345	17%
Transit	310	15%
Walk	21	1%
Cycle		0%
Other	0	0%
	2058	

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - 2457

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin - pu

and

Type of dwelling unit - dw 3

Trip 2016

Table:

	2453	2454	2455	2457 Total	
Transit excluding GO rail	0	0	64	0	64
Auto driver	20	166	90	43	319
Auto passenger	0	39	0	0	39
Walk	0	47	0	0	47
					0
					0
					0
					0
					469

Travel Mode	Trips	Proportion
Auto Driver	319	68%
Auto Passenger	39	8%
Transit	64	14%
Walk	47	10%
Cycle	0	0%
Other	0	0%
	469	

Oak Park, Oakville

Mon Jan 07 2019 11:28:16 GMT-0500 (Eastern Standard Time) - Run Time: 1996ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4034-4036

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin

and

Type of dwelling unit - dwell_type In 1

Trip 2016

Table:

	4034	4035	4036	Total
Transit excluding GO	0	9	35	44
Cycle	28	0	0	28
Auto driver	502	356	630	1488
GO rail only	39	10	17	66
Joint GO rail and local	0	0	19	19
Auto passenger	234	103	246	583
School bus	162	40	0	202
Walk	0	20	176	196
				2626

Travel Mode	Trips	Proportion
Auto Driver	1488	57%
Auto Passenger	583	22%
Transit	129	5%
Walk	196	7%
Cycle	28	1%
Other	202	8%
	2626	

Mon Jan 07 2019 14:32:49 GMT-0500 (Eastern Standard Time) - Run Time: 1855ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4034-4036

and

Start time of trip - start_time In 700-900

and

Trip purpose of destir

and

Type of dwelling unit

Trip 2016

Table:

	4034	4035	4036	Total
Auto driver	108	72	90	270
Walk	0	0	44	44
				0
				0
				0
				0
				0
				0
				314

Travel Mode	Trips	Proportion
Auto Driver	270	86%
Auto Passenger	0	0%
Transit	0	0%
Walk	44	14%
Cycle	0	0%
Other	0	0%
	314	

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4034-4036

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin -

and

Type of dwelling unit - 3

Trip 2016

Table:

	4034	4035	4036 Total	
Transit excluding GO rail	0	28	49	77
Auto driver	306	483	388	1177
GO rail only	10	38	36	84
Joint GO rail and local transit	0	15	23	38
Auto passenger	69	54	43	166
School bus	71	0	0	71
Walk	0	32	68	100
				0
				1713

Travel Mode	Trips	Proportion
Auto Driver	1177	69%
Auto Passenger	166	10%
Transit	199	12%
Walk	100	6%
Cycle	0	0%
Other	71	4%
	1713	

Mon Jan 07 2019 14:32:27 GMT-0500 (Eastern Standard Time) - Run Time: 2302ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4034-4036

and

Start time of trip - start_time In 700-900

and

Trip purpose of destination

and

Type of dwelling unit - 3

Trip 2016

Table:

	4034	4035	4036	Total
Auto driver	86	26	32	144
Walk	0	0	22	22
				0
				0
				0
				0
				0
				0
				166

Travel Mode	Trips	Proportion
Auto Driver	144	87%
Auto Passenger	0	0%
Transit	0	0%
Walk	22	13%
Cycle	0	0%
Other	0	0%
	166	

Mon Jan 07 2019 11:29:46 GMT-0500 (Eastern Standard Time) - Run Time: 2094ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4034-4036

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destir

and

Type of dwelling unit - dwell_type In 1

Trip 2016

Table:

	4034	4035	4036	Total
Transit excluding GO	0	0	37	37
Cycle	28	0	23	51
Auto driver	420	369	506	1295
GO rail only	39	23	48	110
Joint GO rail and local	0	0	19	19
Auto passenger	13	14	105	132
Paid rideshare	23	0	0	23
Walk	0	0	23	23
				1690

Travel Mode	Trips	Proportion
Auto Driver	1295	77%
Auto Passenger	132	8%
Transit	166	10%
Walk	23	1%
Cycle	51	3%
Other	23	1%
	1690	

Mon Jan 07 2019 14:31:10 GMT-0500 (Eastern Standard Time) - Run Time: 1961ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4034-4036

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin

and

Type of dwelling unit

Trip 2016

Table:

	4034	4035	4036	Total
Auto driver	33	52	169	254
GO rail only	0	0	35	35
Auto passenger	47	0	29	76
				0
				0
				0
				0
				0
				365

Travel Mode	Trips	Proportion
Auto Driver	254	70%
Auto Passenger	76	21%
Transit	35	10%
Walk	0	0%
Cycle	0	0%
Other	0	0%
	365	

Mon Jan 07 2019 11:29:27 GMT-0500 (Eastern Standard Time) - Run Time: 1996ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4034-4036

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destination

and

Type of dwelling unit - 3

Trip 2016

Table:

	4034	4035	4036	Total
Transit excluding GO rail	0	10	14	24
Cycle	0	17	0	17
Auto driver	199	356	274	829
GO rail only	10	18	14	42
Joint GO rail and local transit	0	25	0	25
Auto passenger	58	36	43	137
Walk	0	0	23	23
				0
				1097

Travel Mode	Trips	Proportion
Auto Driver	829	76%
Auto Passenger	137	12%
Transit	91	8%
Walk	23	2%
Cycle	17	2%
Other	0	0%
	1097	

Mon Jan 07 2019 14:31:41 GMT-0500 (Eastern Standard Time) - Run Time: 1969ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4034-4036

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin -

and

Type of dwelling unit - 3

Trip 2016

Table:

	4034	4035	4036	Total
Auto driver	0	28	31	59
Auto passenger	0	10	49	59
Taxi passenger	14	0	0	14
Walk	0	10	0	10
				0
				0
				0
				0
				142

Travel Mode	Trips	Proportion
Auto Driver	59	42%
Auto Passenger	73	51%
Transit	0	0%
Walk	10	7%
Cycle	0	0%
Other	0	0%
	142	

Orchard, Burlington

Mon Jan 07 2019 11:46:00 GMT-0500 (Eastern Standard Time) - Run Time: 2228ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin = 4189

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin

and

Type of dwelling unit

Trip 2016

Table:

	4079	4189	Total
Transit excluding GO rail	130	223	353
Cycle	19	50	69
Auto driver	2947	2675	5622
GO rail only	125	22	147
Joint GO rail and local	104	70	174
Auto passenger	559	373	932
School bus	360	502	862
Walk	783	785	1568
			9727

Travel Mode	Trips	Proportion
Auto Driver	5622	58%
Auto Passenger	932	10%
Transit	674	7%
Walk	1568	16%
Cycle	69	1%
Other	862	9%
	9727	

Mon Jan 07 2019 15:32:35 GMT-0500 (Eastern Standard Time) - Run Time: 2400ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of des 4189
and
Start time of trip - start_time In 700-900
and
Trip purpose of destir
and
Type of dwelling unit

Trip 2016

Table:

	4079	4189	Total
Auto driver	400	132	532
Walk	28	76	104
			0
			0
			0
			0
			0
			0
			636

Travel Mode	Trips	Proportion
Auto Driver	532	84%
Auto Passenger	0	0%
Transit	0	0%
Walk	104	16%
Cycle	0	0%
Other	0	0%
	636	

Mon Jan 07 2019 11:45:39 GMT-0500 (Eastern Standard Time) - Run Time: 2071ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin = 4189

and

Start time of trip - start_time In 700-900

and

Trip purpose of origin

and

Type of dwelling unit = 3

Trip 2016

Table:

	4079	4189	Total
Transit excluding GO rail	53	0	53
Auto driver	784	313	1097
GO rail only	0	16	16
Joint GO rail and local	22	0	22
Auto passenger	89	47	136
School bus	25	0	25
Walk	60	0	60
			0
			1409

Travel Mode	Trips	Proportion
Auto Driver	1097	78%
Auto Passenger	136	10%
Transit	91	6%
Walk	60	4%
Cycle	0	0%
Other	25	2%
	1409	

Mon Jan 07 2019 15:33:00 GMT-0500 (Eastern Standard Time) - Run Time: 2528ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of des 4189

and

Start time of trip - start_time In 700-900

and

Trip purpose of destir

and

Type of dwelling unit 3

Trip 2016

Table:

	4079	4189	Total
Auto driver	80	16	96
Auto driver			0
GO rail only			0
Joint GO rail and local transit			0
Auto passenger			0
School bus			0
Walk			0
			0
			96

Travel Mode	Trips	Proportion
Auto Driver	96	100%
Auto Passenger	0	0%
Transit	0	0%
Walk	0	0%
Cycle	0	0%
Other	0	0%
	96	

Mon Jan 07 2019 11:43:49 GMT-0500 (Eastern Standard Time) - Run Time: 2464ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of des 4189

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destir

and

Type of dwelling unit - dwell_type In 1

Trip 2016

Table:

	4079	4189	Total
Transit excluding GO	55	170	225
Auto driver	2584	2321	4905
GO rail only	247	20	267
Joint GO rail and local	104	142	246
Auto passenger	201	390	591
School bus	51	213	264
Taxi passenger	0	17	17
Walk	23	220	243
			6758

Travel Mode	Trips	Proportion
Auto Driver	4905	73%
Auto Passenger	608	9%
Transit	738	11%
Walk	243	4%
Cycle	0	0%
Other	264	4%
	6758	

Mon Jan 07 2019 15:34:01 GMT-0500 (Eastern Standard Time) - Run Time: 2187ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin = 4189

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin

and

Type of dwelling unit

Trip 2016

Table:

	4079	4189	Total
Auto driver	732	514	1246
Auto passenger	329	272	601
Walk	0	28	28
			0
			0
			0
			0
			0
			1875

Travel Mode	Trips	Proportion
Auto Driver	1246	66%
Auto Passenger	601	32%
Transit	0	0%
Walk	28	1%
Cycle	0	0%
Other	0	0%
	1875	

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime
 Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of des 4189

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of destir

and

Type of dwelling unit 3

Trip 2016

Table:

	4079	4189	Total
Transit excluding GO	53	0	53
Auto driver	698	394	1092
GO rail only	61	0	61
Joint GO rail and local	22	18	40
Auto passenger	128	40	168
Walk	44	0	44
			0
			0
			1458

Travel Mode	Trips	Proportion
Auto Driver	1092	75%
Auto Passenger	168	12%
Transit	154	11%
Walk	44	3%
Cycle	0	0%
Other	0	0%
	1458	

Mon Jan 07 2019 15:33:43 GMT-0500 (Eastern Standard Time) - Run Time: 1937ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin = 4189

and

Start time of trip - start_time In 1600-1800

and

Trip purpose of origin

and

Type of dwelling unit = 3

Trip 2016

Table:

	4079	4189	Total
Auto driver	134	31	165
GO rail only	21	0	21
Auto passenger	35	0	35
Walk	44	0	44
			0
			0
			0
			0
			265

Travel Mode	Trips	Proportion
Auto Driver	165	62%
Auto Passenger	35	13%
Transit	21	8%
Walk	44	17%
Cycle	0	0%
Other	0	0%
	265	

Summary

Appendix G – Transportation Tomorrow Survey (TTS) Details: Employee (Office) Travel Mode Split

Mon Jan 14 2019 15:47:19 GMT-0500 (Eastern Standard Time) - Run Time: 2210ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of 8064 8067-8076 8078-8081

and

Trip purpose of d

and

Start time of trip - start_time In 600-900

Trip 2016

Table:

	8062	8064	8069	8070	8071	8072	8073	8074	8075	8079	
Transit excluding	0	0	0	0	26	0	0	0	0	0	26
Cycle	0	0	0	0	0	0	0	0	0	19	19
Auto driver	57	27	104	112	29	43	144	16	62	205	799
Walk	0	0	15	0	0	0	0	0	0	0	15
											859

Travel Mode	Trips	Propotion
Auto Driver	799	93%
Auto Pass	0	0%
Transit	26	3%
Walk	15	2%
Cycle	19	2%

859

Mon Jan 14 2019 15:45:57 GMT-0500 (Eastern Standard Time) - Run Time: 1854ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Primary travel mode of trip - mode_prime

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone c 8064 8067-8076 8078-8081

and

Trip purpose of c

and

Start time of trip - start_time In 1500-1600

Trip 2016

Table:

	8069	8070	8071	8072	8073	8075	8079	8080	
Transit excluding	0	0	26	0	0	0	0	0	26
Auto driver	51	23	0	11	110	88	54	18	355
Auto passenger	0	0	0	0	0	16	0	0	16
Walk	0	0	15	0	0	0	0	0	15
									0
									412

Travel Mode	Trips	Propotion
Auto Driver	355	86%
Auto Pass	16	4%
Transit	26	6%
Walk	15	4%
Cycle	0	0%

412

Appendix H – Multi-Modal Trip Forecast Calculations

Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									
Residential Units	1296	384	0	2356	934	1553	0	2142	1460

2152
3925
3102
946
333

1298

Forecast Development Traffic - Zone 1

Land Use: Residential
ITE Trip Gen. Manual Volume 10

		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour				
Land Use:	Single-Family Detached Housing	Fitted Curve Calc.: Equation: T = 0.71(X) + 4.80	1	4	5	Equation: Ln(T) = 0.96 Ln(X) + 0.20	#NUM!	#NUM!	Equation: T = 0.84(X) + 12	10	8	18
ITE Code:	Z10	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!
Peak Hour:	Adjacent Street (Sat. Generator)	Auto Mode Split:	1	3	4	Auto Mode Split:	#NUM!	#NUM!	Auto Mode Split:	8	6	14
Notes:	General Urban / Suburban	Transit Factor:	75%			85%			95%			
Sq. ft. GFA	Units	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!

		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
Land Use:	Multi-Family Housing (MID-RISE)	Fitted Curve Calc.: Equation: Ln(T) = 0.98 Ln(X) - 0.98	42	121	163	Equation: Ln(T) = 0.96 Ln(X) - 0.63	124	80	284	Equation: T = 0.42(X) + 6	104	109	213
ITE Code:	Z21	Rate: Trips / Dwelling Unit	0.09	0.25	0.33	Rate: Trips / Dwelling Unit	0.25	0.16	0.41	Rate: Trips / Dwelling Unit	0.21	0.22	0.43
Peak Hour:	Adjacent Street (Sat. Generator)	Auto Mode Split:	33	96	129	Auto Mode Split:	111	72	183	Auto Mode Split:	104	109	213
Notes:	General Urban / Suburban	Transit Factor:	75%			85%			95%				
Sq. ft. GFA	492 Units	Rate: Trips / Dwelling Unit	0.07	0.19	0.26	Rate: Trips / Dwelling Unit	0.23	0.15	0.37	Rate: Trips / Dwelling Unit	0.21	0.22	0.43

		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
Land Use:	Multi-Family Housing (HIGH-RISE)	Fitted Curve Calc.: Equation: T = 0.28(X) + 12.86	57	181	238	Equation: T = 0.34(X) + 8.56	172	110	282	Equation: T = 0.31(X) + 24	150	123	273
ITE Code:	Z22	Rate: Trips / Dwelling Unit	0.07	0.23	0.30	Rate: Trips / Dwelling Unit	0.21	0.14	0.35	Rate: Trips / Dwelling Unit	0.19	0.15	0.34
Peak Hour:	Adjacent Street (Sat. Generator)	Auto Mode Split:	45	143	188	Auto Mode Split:	154	98	252	Auto Mode Split:	134	110	244
Notes:	General Urban / Suburban	Transit Factor:	75%			85%			95%				
Sq. ft. GFA	804 Units	Rate: Trips / Dwelling Unit	0.06	0.18	0.23	Rate: Trips / Dwelling Unit	0.19	0.12	0.31	Rate: Trips / Dwelling Unit	0.17	0.14	0.30

Forecast Total Residential Trips	79	242	321	#NUM!	#NUM!	#NUM!	246	225	471
----------------------------------	----	-----	-----	-------	-------	-------	-----	-----	-----

		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
Land Use:	Office	Fitted Curve Calc.: Equation: Ln(T) = 0.72 Ln(X) + 0.56	#NUM!	#NUM!	#NUM!	Equation: T = 0.27 (X) + 23.67	5	19	24	Fixed Data (Average Rd	0	0	0
ITE Code:	710	Rate: Trips / Employee	#NUM!	#NUM!	#NUM!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	0.53
Peak Hour:	Adjacent Street	Auto Mode Split:	#NUM!	#NUM!	#NUM!	Auto Mode Split:	5	19	24	Auto Mode Split:	0	0	0
Notes:	General Urban / Suburban	Transit Factor:	95%			95%			95%				
Employees	em.	Rate: Trips / Employee	#NUM!	#NUM!	#NUM!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips	#NUM!	#NUM!	#NUM!	5	19	24	0	0	0
-----------------------------	-------	-------	-------	---	----	----	---	---	---



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 2

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor			
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	46		Equation: $T = 0.71(X) + 4.80$	9	28	37	Equation: $\ln(T) = 0.96 \ln(X) + 0.20$	30	18	48	Equation: $T = 0.84(X) + 17$	31	26	57
						Rate: Trips / Dwelling Unit	0.20	0.61	0.80	Rate: Trips / Dwelling Unit	0.65	0.39	1.04	Rate: Trips / Dwelling Unit	0.67	0.57	1.24
						Auto Mode Split	7	22	29	Auto Mode Split	27	16	43	Auto Mode Split	24	21	45
						Transit Factor	75%			Transit Factor	85%			Transit Factor	95%		
						Rate: Trips / Dwelling Unit	0.15	0.48	0.64	Rate: Trips / Dwelling Unit	0.58	0.35	0.93	Rate: Trips / Dwelling Unit	0.53	0.45	0.98

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor			
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	44		Equation: $\ln(T) = 0.98 \ln(X) - 0.98$	4	11	15	Equation: $\ln(T) = 0.96 \ln(X) - 0.63$	12	8	20	Equation: $T = 0.42(X) + 6$	12	13	25
						Rate: Trips / Dwelling Unit	0.09	0.25	0.34	Rate: Trips / Dwelling Unit	0.27	0.18	0.45	Rate: Trips / Dwelling Unit	0.27	0.30	0.57
						Auto Mode Split	3	9	12	Auto Mode Split	11	7	18	Auto Mode Split	12	13	25
						Transit Factor	75%			Transit Factor	85%			Transit Factor	95%		
						Rate: Trips / Dwelling Unit	0.07	0.20	0.27	Rate: Trips / Dwelling Unit	0.24	0.16	0.41	Rate: Trips / Dwelling Unit	0.27	0.30	0.57

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor			
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	284		Equation: $T = 0.28(X) + 12.86$	22	70	92	Equation: $T = 0.34(X) + 8.56$	64	41	105	Equation: $T = 0.31(X) + 24$	62	50	112
						Rate: Trips / Dwelling Unit	0.08	0.25	0.32	Rate: Trips / Dwelling Unit	0.23	0.14	0.37	Rate: Trips / Dwelling Unit	0.22	0.18	0.39
						Auto Mode Split	17	55	73	Auto Mode Split	57	37	94	Auto Mode Split	55	45	100
						Transit Factor	75%			Transit Factor	85%			Transit Factor	95%		
						Rate: Trips / Dwelling Unit	0.06	0.19	0.26	Rate: Trips / Dwelling Unit	0.20	0.13	0.33	Rate: Trips / Dwelling Unit	0.20	0.16	0.35

Forecast Total Residential Trips 28 86 114 95 60 155 92 78 170

Land Use	ITE Code	Peak Hour	Notes	Employees	em.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Rate: Trips / Employee	Auto Mode Split	Transit Factor	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Transit Factor	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Transit Factor			
Office	710	Adjacent Street	General Urban / Suburban			Equation: $\ln(T) = 0.72 \ln(X) + 0.56$	#NUM!	#NUM!	#NUM!	Equation: $T = 0.27(X) + 23.67$	5	19	24	Fixed Data (Average Rate)	0	0	0
						Rate: Trips / Employee	#NUM!	#NUM!	#NUM!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	0.53
						Auto Mode Split	#NUM!	#NUM!	#NUM!	Auto Mode Split	5	19	24	Auto Mode Split	0	0	0
						Transit Factor	95%			Transit Factor	95%			Transit Factor	95%		
						Rate: Trips / Employee	#NUM!	#NUM!	#NUM!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips #NUM! #NUM! #NUM! 5 19 24 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 4

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour													
							Equation: $T = 0.71(X) + 4.80$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $\ln(T) = 0.96 \ln(X) + 0.20$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.84(X) + 17$	Rate: Trips / Dwelling Unit	Auto Mode Split											
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	584			105	0.18	83	314	0.54	331	348	0.60	311	205	0.35	495	275	0.47	217	234	0.40	509	0.87	
						Transit Factor:	75%		85%		95%															
						Rate: Trips / Dwelling Unit	0.14	0.42	0.57	0.53	0.31	0.85	0.37	0.32	0.69											

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour													
							Equation: $\ln(T) = 0.98 \ln(X) - 0.98$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $\ln(T) = 0.96 \ln(X) - 0.63$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.42(X) + 6$	Rate: Trips / Dwelling Unit	Auto Mode Split											
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	659			54	0.08	44	161	0.24	171	165	0.25	148	106	0.16	242	139	0.21	139	145	0.22	284	0.43	
						Transit Factor:	75%		85%		95%															
						Rate: Trips / Dwelling Unit	0.07	0.19	0.26	0.22	0.14	0.37	0.21	0.22	0.43											

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour													
							Equation: $T = 0.28(X) + 12.86$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.34(X) + 8.56$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.31(X) + 24$	Rate: Trips / Dwelling Unit	Auto Mode Split											
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	1113			78	0.07	62	247	0.22	257	236	0.21	211	151	0.35	346	203	0.18	182	166	0.15	369	0.33	
						Transit Factor:	75%		85%		95%															
						Rate: Trips / Dwelling Unit	0.06	0.18	0.23	0.19	0.12	0.31	0.16	0.13	0.30											

Forecast Total Residential Trips 189 570 759 670 413 1084 538 478 1016

Land Use	ITE Code	Peak Hour	Notes	Employees	cm.	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour			
							Equation: $\ln(T) = 0.72 \ln(X) + 0.56$	#NUM!	#NUM!	#NUM!	Equation: $T = 0.27(X) + 23.67$	5	19	24	Fixed Data (Average Rate)	0
Office	710	Adjacent Street	General Urban / Suburban				#NUM!	#NUM!	#NUM!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.53
						Transit Factor:	95%		95%		95%					
						Rate: Trips / Employee	#NUM!	#NUM!	#NUM!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips #NUM! #NUM! #NUM! 5 19 24 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees	--	--	--	--	--	--	--	--	--

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 5

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour				
						Equation: $T = 0.71(X) + 4.80$	80	238	318	Equation: $\ln(T) = 0.96 \ln(X) + 0.20$	266	156	422	Equation: $T = 0.84(X) + 17$	210	178
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	441	Rate: Trips / Dwelling Unit	0.18	0.54	0.72	Rate: Trips / Dwelling Unit	0.60	0.35	0.96	Rate: Trips / Dwelling Unit	0.48	0.40	0.88
		Auto Mode Split:			Auto Mode Split:	63	188	251	Auto Mode Split:	238	140	378	Auto Mode Split:	166	141	306
		Transit Factor:			Transit Factor:	75%			Transit Factor:	85%			Transit Factor:	95%		
		Rate: Trips / Dwelling Unit			Rate: Trips / Dwelling Unit	0.14	0.43	0.57	Rate: Trips / Dwelling Unit	0.54	0.32	0.86	Rate: Trips / Dwelling Unit	0.38	0.32	0.69

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour				
						Equation: $\ln(T) = 0.98 \ln(X) - 0.98$	11	30	41	Equation: $\ln(T) = 0.96 \ln(X) - 0.63$	32	21	53	Equation: $T = 0.42(X) + 6$	28	29
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	120	Rate: Trips / Dwelling Unit	0.09	0.25	0.34	Rate: Trips / Dwelling Unit	0.27	0.18	0.44	Rate: Trips / Dwelling Unit	0.23	0.24	0.48
		Auto Mode Split:			Auto Mode Split:	9	24	32	Auto Mode Split:	29	19	47	Auto Mode Split:	28	29	57
		Transit Factor:			Transit Factor:	75%			Transit Factor:	85%			Transit Factor:	95%		
		Rate: Trips / Dwelling Unit			Rate: Trips / Dwelling Unit	0.07	0.20	0.27	Rate: Trips / Dwelling Unit	0.24	0.16	0.40	Rate: Trips / Dwelling Unit	0.23	0.24	0.48

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour				
						Equation: $T = 0.28(X) + 12.86$	28	89	117	Equation: $T = 0.34(X) + 8.56$	82	53	135	Equation: $T = 0.31(X) + 24$	77	63
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	373	Rate: Trips / Dwelling Unit	0.08	0.24	0.31	Rate: Trips / Dwelling Unit	0.22	0.14	0.36	Rate: Trips / Dwelling Unit	0.21	0.17	0.38
		Auto Mode Split:			Auto Mode Split:	22	70	92	Auto Mode Split:	73	47	121	Auto Mode Split:	69	56	125
		Transit Factor:			Transit Factor:	75%			Transit Factor:	85%			Transit Factor:	95%		
		Rate: Trips / Dwelling Unit			Rate: Trips / Dwelling Unit	0.06	0.19	0.25	Rate: Trips / Dwelling Unit	0.20	0.13	0.32	Rate: Trips / Dwelling Unit	0.18	0.15	0.34

Forecast Total Residential Trips 94 282 376 340 206 546 263 226 489

Land Use	ITE Code	Peak Hour	Notes	Employees	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour				
						Equation: $\ln(T) = 0.72 \ln(X) + 0.56$	44	9	53	Equation: $T = 0.27(X) + 23.67$	11	43	54	Input Data (Average Rate)	0	0
Office	710	Adjacent Street	General Urban / Suburban	114	Rate: Trips / Employee	0.39	0.08	0.46	Rate: Trips / 1,000 sq. ft.	0.10	0.38	0.47	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	0.53
		Auto Mode Split:			Auto Mode Split:	44	9	53	Auto Mode Split:	11	43	54	Auto Mode Split:	0	0	0
		Transit Factor:			Transit Factor:	95%			Transit Factor:	95%			Transit Factor:	95%		
		Rate: Trips / Employee			Rate: Trips / Employee	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips 44 9 53 11 43 54 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									
Residential Units	1296	384	0	2356	934	1553	0	2142	1460

2152
3925
3102
946
333

1298

Forecast Development Traffic - Zone 6

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour																							
						Equation: T = 0.71(X) + 4.80	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: Ln(T) = 0.96 Ln(X) + 0.20	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: T = 0.84(X) + 17	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor																				
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	294		54	0.18	43	75%	160	0.54	126	85%	214	0.73	169	85%	180	0.61	161	95%	286	0.97	256	0.87	143	0.49	113	0.38	122	0.41	96	0.33	265	0.90	209	0.71

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour																					
						Equation: Ln(T) = 0.98 Ln(X) - 0.98	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: Ln(T) = 0.96 Ln(X) - 0.63	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: T = 0.42(X) + 6	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor																		
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	743		63	0.08	50	75%	181	0.24	143	85%	244	0.33	193	85%	185	0.25	166	95%	304	0.41	272	0.37	156	0.21	156	0.21	163	0.22	319	0.43	319	0.43

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Units	Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour																			
						Equation: T = 0.28(X) + 12.86	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: T = 0.34(X) + 8.56	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor	Equation: T = 0.31(X) + 24	Rate: Trips / Dwelling Unit	Auto Mode Split	Transit Factor																
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	516		38	0.07	30	75%	119	0.23	94	85%	157	0.30	124	85%	112	0.22	100	95%	184	0.36	165	0.32	101	0.20	90	0.18	83	0.16	184	0.36

Forecast Total Residential Trips 122 363 486 427 266 693 359 334 693

Land Use	ITE Code	Peak Hour	Notes	Employees	Weekday AM Peak Hour				Weekday PM Peak Hour				Saturday Peak Hour																							
					Equation: Ln(T) = 0.72 Ln(X) + 0.56	Rate: Trips / Employee	Auto Mode Split	Transit Factor	Equation: T = 0.27 (X) + 23.67	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Transit Factor	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Transit Factor																					
Office	710	Adjacent Street	General Urban / Suburban	em.	#NUM!	#NUM!	#NUM!	95%	#NUM!	#NUM!	#NUM!	95%	5	#DIV/0!	19	#DIV/0!	24	#DIV/0!	5	#DIV/0!	19	#DIV/0!	24	#DIV/0!	24	#DIV/0!	24	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!

Forecast Total Office Trips #NUM! #NUM! #NUM! 5 19 24 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 7

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Equation: $T = 0.71(X) + 4.80$	1	4	5	Equation: $\text{Ln}(T) = 0.96 \text{Ln}(X) + 0.20$	#NUM!	#NUM!	Equation: $T = 0.84(X) + 17$	10	8	18	
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	Units		Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!
					Transit Factor:	Auto Mode Split:	1	3	4	Auto Mode Split:	#NUM!	#NUM!	#NUM!	Auto Mode Split:	8	6	14
						Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Equation: $\text{Ln}(T) = 0.98 \text{Ln}(X) - 0.98$	#NUM!	#NUM!	#NUM!	Equation: $\text{Ln}(T) = 0.96 \text{Ln}(X) - 0.63$	#NUM!	#NUM!	#NUM!	Equation: $T = 0.42(X) + 6$	3	4	7
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	Units		Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!
					Transit Factor:	Auto Mode Split:	#NUM!	#NUM!	#NUM!	Auto Mode Split:	#NUM!	#NUM!	#NUM!	Auto Mode Split:	3	4	7
						Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#NUM!	#NUM!	#NUM!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Equation: $T = 0.28(X) + 12.86$	3	10	13	Equation: $T = 0.34(X) + 8.56$	5	4	9	Equation: $T = 0.31(X) + 24$	13	11	24
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	Units		Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!
					Transit Factor:	Auto Mode Split:	2	8	10	Auto Mode Split:	4	4	8	Auto Mode Split:	12	10	21
						Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / Dwelling Unit	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Residential Trips #NUM! #NUM! #NUM! #NUM! #NUM! #NUM! #NUM! 23 20 43

Land Use	ITE Code	Peak Hour	Notes	Employees	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour					
						Equation: $\text{Ln}(T) = 0.72 \text{Ln}(X) + 0.56$	71	14	85	Equation: $T = 0.27(X) + 23.67$	17	66	83	Fixed Data (Average Rate)	0	0	0
Office	710	Adjacent Street	General Urban / Suburban	219 em.		Rate: Trips / Employee	0.32	0.06	0.39	Rate: Trips / 1,000 sq. ft.	0.08	0.30	0.38	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	0.53
					Transit Factor:	Auto Mode Split:	71	14	85	Auto Mode Split:	17	66	83	Auto Mode Split:	0	0	0
						Rate: Trips / Employee	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!	Rate: Trips / 1,000 sq. ft.	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips 71 14 85 17 66 83 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 8

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour																						
						Equation: T = 0.71(X) + 4.80	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: Ln(T) = 0.96 Ln(X) + 0.20	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: T = 0.84(X) + 17	Rate: Trips / Dwelling Unit	Auto Mode Split																				
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	114		22	0.19	75%	64	0.56	85%	86	0.75	95%	72	0.63	103	0.90	43	0.38	38	0.34	115	1.01	49	0.54	62	0.46	52	0.46	114	1.00	90	0.79
Transit Factor:																																		

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour																							
						Equation: Ln(T) = 0.98 Ln(X) - 0.98	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: Ln(T) = 0.96 Ln(X) - 0.63	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: T = 0.42(X) + 6	Rate: Trips / Dwelling Unit	Auto Mode Split																					
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	1309		111	0.08	75%	315	0.24	85%	426	0.33	95%	319	0.24	285	0.36	284	0.16	468	0.36	523	0.35	273	0.21	284	0.22	284	0.22	557	0.43	557	0.43	
Transit Factor:																																			

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour																							
						Equation: T = 0.28(X) + 12.86	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: T = 0.34(X) + 8.56	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: T = 0.31(X) + 24	Rate: Trips / Dwelling Unit	Auto Mode Split																					
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	719		51	0.07	75%	163	0.23	85%	214	0.30	95%	154	0.21	138	0.31	99	0.14	226	0.31	253	0.35	136	0.19	111	0.15	247	0.34	221	0.21	221	0.21	
Transit Factor:																																			

Forecast Total Residential Trips 145 428 573 488 310 797 444 424 868

Land Use	ITE Code	Peak Hour	Notes	Employees	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour																						
						Equation: Ln(T) = 0.72 Ln(X) + 0.56	Rate: Trips / Employee	Auto Mode Split	Equation: T = 0.27 (X) + 23.67	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Rate: Trips / 1,000 sq. ft.	Auto Mode Split																			
Office	710	Adjacent Street	General Urban / Suburban	em.		#NUM!	#NUM!	95%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	5	#DIV/0!	19	#DIV/0!	24	#DIV/0!	24	#DIV/0!	24	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!
Transit Factor:																																		

Forecast Total Office Trips #NUM! #NUM! #NUM! 5 19 24 0 0 0



Proposed Development Statistics

Land Use	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
Low Density Res.	0	56	--	584	441	294	--	114	663
Med. Density Res.	492	44	--	659	120	743	--	1309	558
High Density Res.	804	284	--	764	196	312	--	503	239
Mixed-Use Res.	0	0	--	349	177	204	--	216	0
Office Jobs	--	--	--	--	114	--	219	--	--
Employees									

2152
3925
3102
946
333

1298

Residential Units 1296 384 0 2356 934 1553 0 2142 1460 10125

Forecast Development Traffic - Zone 9

Land Use: Residential
ITE Trip Gen. Manual Volume 10

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour														
						Equation: $T = 0.71(X) + 4.80$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $\text{Ln}(T) = 0.96 \text{Ln}(X) + 0.20$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.84(X) + 17$	Rate: Trips / Dwelling Unit	Auto Mode Split												
Single-Family Detached Housing	210	Adjacent Street (Sat. Generator)	General Urban / Suburban	663		119	0.18	94	357	0.54	282	393	0.59	352	231	0.35	207	624	0.94	558	311	0.47	246	0.40	454	
Transit Factor:						75%		85%		95%																
Rate: Trips / Dwelling Unit						0.14	0.43	0.57	0.53	0.31	0.84	0.37	0.51	0.68												

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour														
						Equation: $\text{Ln}(T) = 0.98 \text{Ln}(X) - 0.98$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $\text{Ln}(T) = 0.96 \text{Ln}(X) - 0.63$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.42(X) + 6$	Rate: Trips / Dwelling Unit	Auto Mode Split												
Multi-Family Housing (MID-RISE)	221	Adjacent Street (Sat. Generator)	General Urban / Suburban	558		48	0.09	38	137	0.25	108	141	0.25	126	90	0.16	207	231	0.41	558	118	0.21	118	0.22	241	
Transit Factor:						75%		85%		95%																
Rate: Trips / Dwelling Unit						0.07	0.19	0.26	0.23	0.14	0.37	0.21	0.22	0.43												

Land Use	ITE Code	Peak Hour	Notes	Sq. ft. GFA	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour														
						Equation: $T = 0.28(X) + 12.86$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.34(X) + 8.56$	Rate: Trips / Dwelling Unit	Auto Mode Split	Equation: $T = 0.31(X) + 24$	Rate: Trips / Dwelling Unit	Auto Mode Split												
Multi-Family Housing (HIGH-RISE)	222	Adjacent Street (Sat. Generator)	General Urban / Suburban	239		19	0.08	15	61	0.26	48	55	0.23	49	35	0.15	81	90	0.38	239	54	0.23	48	0.18	98	
Transit Factor:						75%		85%		95%																
Rate: Trips / Dwelling Unit						0.06	0.20	0.26	0.21	0.13	0.34	0.20	0.16	0.37												

Forecast Total Residential Trips 147 438 585 527 319 846 412 371 783

Land Use	ITE Code	Peak Hour	Notes	Employees	Fitted Curve Calc.	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour													
						Equation: $\text{Ln}(T) = 0.72 \text{Ln}(X) + 0.56$	Rate: Trips / Employee	Auto Mode Split	Equation: $T = 0.27(X) + 23.67$	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Rate: Trips / 1,000 sq. ft.	Auto Mode Split	Rate: Trips / 1,000 sq. ft.	Auto Mode Split										
Office	710	Adjacent Street	General Urban / Suburban	em.		#NUM!	#NUM!	#NUM!	5	19	24	5	19	24	0	0	0	0	0	0	0	0	0	0	0
Transit Factor:						95%		95%		95%															
Rate: Trips / Employee						#NUM!	#NUM!	#NUM!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Forecast Total Office Trips #NUM! #NUM! #NUM! 5 19 24 0 0 0



TRAVEL DEMANDS

MODE SPLITS used in Calculation

Travel Mode	Units / Employees	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Traffic Zone 1							
Auto Driver Trips (Traffic)	1,296 units	80	240	315	265	170	435
Auto Passenger Trips		0	40	40	35	65	100
Transit Trips		5	40	45	35	15	50
Active Trips		10	50	60	20	15	35
Total Trips:		95	400	495	370	260	630
Traffic Zone 2							
Auto Driver Trips (Traffic)	384 units	30	90	120	100	65	165
Auto Passenger Trips		0	15	15	15	25	40
Transit Trips		0	15	15	15	5	20
Active Trips		5	20	25	5	5	10
Total Trips:		35	150	185	140	100	240
Traffic Zone 3							
n/a							
Traffic Zone 4							
Auto Driver Trips (Traffic)	2,356 units	190	570	760	670	415	1,085
Auto Passenger Trips		5	95	100	95	160	255
Transit Trips		10	95	105	95	30	125
Active Trips		20	125	145	45	30	75
Total Trips:		225	950	1175	930	640	1570
Traffic Zone 5							
Auto Driver Trips (Traffic)	934 units;	95	280	375	340	205	545
Auto Passenger Trips		0	45	45	45	80	125
Transit Trips		5	45	50	45	15	60
Active Trips		10	60	70	25	15	40
Total Trips:		110	465	575	470	315	785
Traffic Zone 5							
Auto Driver Trips (Traffic)	114 employees.	45	10	55	10	45	55
Auto Passenger Trips		0	0	0	0	0	0
Transit Trips		5	0	5	0	10	10
Active Trips		0	0	0	0	5	5
Total Trips:		55	15	70	15	70	85
Traffic Zone 6							
Auto Driver Trips (Traffic)	1,553 units	125	365	485	425	265	690
Auto Passenger Trips		5	60	65	60	105	165
Transit Trips		5	60	65	60	20	80
Active Trips		10	80	90	30	20	50
Total Trips:		145	610	755	590	410	1000
Traffic Zone 7							
Auto Driver Trips (Traffic)	219 employees	70	15	85	15	65	80
Auto Passenger Trips		0	0	0	0	0	0
Transit Trips		5	0	5	0	5	5
Active Trips		5	0	5	0	5	5
Total Trips:		80	15	95	15	70	85
Traffic Zone 8							
Auto Driver Trips (Traffic)	2,142 units	145	430	570	585	310	795
Auto Passenger Trips		5	70	75	80	120	200
Transit Trips		10	70	80	80	25	105
Active Trips		15	95	110	40	25	65
Total Trips:		170	715	885	815	475	1290
Traffic Zone 9							
Auto Driver Trips (Traffic)	1,460 units	145	440	585	525	320	845
Auto Passenger Trips		5	75	80	75	125	200
Transit Trips		10	75	85	75	25	100
Active Trips		15	95	110	35	25	60
Total Trips:		170	735	905	730	490	1220
Clair-Maltby Secondary Plan Maximum Density Scenario Travel Demands							
Auto Driver Trips (Traffic)	10,125 units;	925	2,440	3,350	2,935	1,860	4,700
Auto Passenger Trips	333 employees	20	400	420	405	680	1085
Transit Trips		55	400	455	405	150	555
Active Trips		90	525	615	200	145	345
Total Trips (less "other" trips):		1090	4065	5155	4075	2860	6935

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential						
Auto Driver	85%	60%		72%	65%	
Auto Pass	2%	10%		10%	25%	
Transit	5%	10%		10%	5%	
Active	8%	13%		5%	5%	
Total						
Other	0%	7%		3%	0%	

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Office						
Auto Driver	90%	90%		90%	90%	
Auto Pass	2%	2%		2%	2%	
Transit	4%	4%		4%	4%	
Active	4%	4%		4%	4%	
Total						
Other						

Traffic Zone 5 Total							
Travel Mode	AM Peak Hour			PM Peak Hour			
	In	Out	2-Way	In	Out	2-Way	
Auto Driver Trips	140	290	430	350	250	600	
Auto Passenger Trips	0	45	45	45	80	125	
Transit Trips	10	45	55	45	25	70	
Active Trips	10	60	70	25	20	45	
Total Trips:	165	480	645	485	385	870	

Appendix I – Transportation Tomorrow Survey (TTS): Transit Trip Distribution Data

Fri Jan 18 2019 18:03:05 GMT-0500 (Eastern Standard Time) - Run Time: 3092ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of 8064 8067-81 8078-8081
and

Trip purpose - trip_purp In 1-3

and

Start time of trip - start_time In 600-900

and

Primary travel mo J G

and

2006 GTA zone of destination - gta06_dest In 1-9999

Trip 2016

Table:

Destination Zone	Origin Zone												Total	Destination Area	Orientation / Assignment of Transit Trip			
	8062	8069	8071	8072	8073	8074	8076	8078	8079	8080	8081	GO to Toronto			North to University and Downtown	NE via Victoria	NW via other	
51	0	0	0	0	0	0	0	26	0	0	0	0	26	Toronto	26			
55	0	0	0	0	0	0	0	10	0	0	0	0	10	Toronto	10			
63	0	0	0	0	0	0	0	0	0	0	0	18	18	Toronto	18			
65	0	0	0	0	0	27	0	0	0	0	0	0	27	Toronto	27			
66	0	0	0	0	0	0	0	0	0	0	26	0	26	Toronto	26			
67	17	0	0	0	0	0	0	0	0	0	0	0	17	Toronto	17			
8008	0	0	0	0	0	0	16	0	0	0	0	0	16	East Guelph			16	
8056	0	0	25	0	0	0	0	0	0	0	0	0	25	University		25		
8057	0	53	0	39	139	83	0	13	133	51	141	0	652	University		652		
8123	0	0	0	26	0	0	0	0	0	0	0	0	26	Old Guelph		26		
8129	0	0	0	0	0	0	0	0	16	0	0	0	16	Old Guelph		16		
8175	0	0	0	0	0	0	25	0	0	0	0	0	25	Northwest Guelph				25
													884					
															124	719	16	25
															14%	81%	2%	3%

Appendix J – CMSP Future Development Transit Trip Assignment Calculations

Distribution of Clair-Maltby Secondary Plan Area

Forecast Transit Riders

Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
<i>Inbound</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Outbound</i>
55	400	405	150

Distribution		Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
		<i>Inbound</i>	<i>Outbound</i>	<i>2-way</i>	<i>Inbound</i>	<i>Outbound</i>	<i>2-way</i>
Regional GO	14%	10	55	65	55	20	75
Local North	81%	45	325	370	330	120	450
Local Northwest	3%	0	10	10	10	5	15
Local Northeast	2%	0	10	10	10	5	15
Total		55	400	455	405	150	555

Appendix K – Vehicle Delay Survey Data

Project No: 5976-06
Project: Clair Maltby Secondary Plan
Study Location: Maltby Rd EB to Gordon St
Municipality: City of Guelph
Study Date: Wednesday November 22, 2017
Study Time: 7:00-9:00 & 16:00-18:00

Delay Study

	Overall Delay (sec)	Left Turn Delay (sec)	Through Delay (sec)	Right Turn Delay (sec)	Courtesy Gap (sec)			2-Stage Gap (sec)		
					Left Turn	Through	Right Turn	Left Turn	Through	Right Turn
2-HR Period 07:00-00:30										
Minimum Delay	0	0	0	0	0	0	0	0	0	0
Average Delay	21	27	30	8	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	46	54	79	15	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	78	74	105	23	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	122	122	111	44	0	0	0	0	0	0
Total Vehicles Measured	105	45	23	37	0	0	0	0	0	0
Total from Traffic Count	105	46	23	36	n/a	n/a	n/a	n/a	n/a	n/a
Sample	100%	98%	100%	103%	n/a	n/a	n/a	n/a	n/a	n/a
AM Peak Hour 7:45 - 8:45										
Minimum Delay	0	0	4	0	0	0	0	0	0	0
Average Delay	29	35	47	10	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	62	62	100	19	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	101	79	108	35	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	122	122	111	44	0	0	0	0	0	0
Total Vehicles Measured	55	22	13	20	0	0	0	0	0	0
Total from Traffic Count	55	23	13	19	n/a	n/a	n/a	n/a	n/a	n/a
Sample	100%	96%	100%	105%	n/a	n/a	n/a	n/a	n/a	n/a
2-HR Period 16:00-18:00										
Minimum Delay	0	0	0	0	0	0	0	0	0	0
Average Delay	27	39	34	16	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	53	74	62	33	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	81	89	87	48	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	164	164	162	125	0	0	0	0	0	0
Total Vehicles Measured	164	62	18	84	0	0	0	0	0	0
Total from Traffic Count	162	61	18	83	n/a	n/a	n/a	n/a	n/a	n/a
Sample	101%	102%	100%	101%	n/a	n/a	n/a	n/a	n/a	n/a
PM Peak Hour 16:30 - 17:30										
Minimum Delay	0	3	6	0	0	0	0	0	0	0
Average Delay	24	32	39	16	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	43	59	57	27	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	64	77	118	41	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	164	164	162	106	0	0	0	0	0	0
Total Vehicles Measured	89	31	10	48	0	0	0	0	0	0
Total from Traffic Count	89	31	10	48	n/a	n/a	n/a	n/a	n/a	n/a
Sample	100%	100%	100%	100%	n/a	n/a	n/a	n/a	n/a	n/a

Project No: 5976-06
Project: Clair Maltby Secondary Plan
Study Location: Maltby Rd WB to Gordon St
Municipality: City of Guelph
Study Date: Wednesday November 22, 2017
Study Time: 7:00-9:00 & 16:00-18:00

Delay Study

	Overall Delay (sec)	Left Turn Delay (sec)	Through Delay (sec)	Right Turn Delay (sec)	Courtesy Gap (sec)			2-Stage Gap (sec)		
					Left Turn	Through	Right Turn	Left Turn	Through	Right Turn
2-HR Period 07:30-09:30										
Minimum Delay	0	6	0	0	0	0	0	0	0	0
Average Delay	17	29	15	10	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	30	46	26	21	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	43	47	30	25	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	47	47	30	27	0	0	0	0	0	0
Total Vehicles Measured	24	6	11	7	0	0	0	0	0	0
Total from Traffic Count	24	6	11	7	n/a	n/a	n/a	n/a	n/a	n/a
Sample	100%	100%	100%	100%	n/a	n/a	n/a	n/a	n/a	n/a
AM Peak Hour 7:45 - 8:45										
Minimum Delay	0	6	7	0	0	0	0	0	0	0
Average Delay	20	29	19	10	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	34	46	26	20	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	46	47	28	25	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	47	47	29	27	0	0	0	0	0	0
Total Vehicles Measured	15	6	4	5	0	0	0	0	0	0
Total from Traffic Count	15	6	4	5	n/a	n/a	n/a	n/a	n/a	n/a
Sample	100%	100%	100%	100%	n/a	n/a	n/a	n/a	n/a	n/a
2-HR Period 16:00-18:00										
Minimum Delay	0	0	2	0	0	0	0	0	0	0
Average Delay	37	32	46	4	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	70	58	92	8	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	108	68	121	11	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	150	74	150	12	0	0	0	0	0	0
Total Vehicles Measured	30	10	17	3	0	0	0	0	0	0
Total from Traffic Count	27	10	14	3	n/a	n/a	n/a	n/a	n/a	n/a
Sample	111%	100%	121%	100%	n/a	n/a	n/a	n/a	n/a	n/a
PM Peak Hour 16:30 - 17:30										
Minimum Delay	0	0	5	-	0	0	0	0	0	0
Average Delay	41	27	51	-	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
85th Percentile	73	41	93	-	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
95th Percentile	116	63	130	-	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Maximum Delay	150	74	150	-	0	0	0	0	0	0
Total Vehicles Measured	15	6	9	0	0	0	0	0	0	0
Total from Traffic Count	12	6	6	0	n/a	n/a	n/a	n/a	n/a	n/a
Sample	125%	100%	150%	#DIV/0!	n/a	n/a	n/a	n/a	n/a	n/a

Appendix L – Existing Traffic Count Data



Turning Movement Count (3 - CLAIR RD & GORDON ST)

Start Time	E Approach CLAIR RD						S Approach GORDON ST					W Approach CLAIR RD					N Approach GORDON ST					Int. Total (15 min)	Int. Total (1 hr)			
	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total	Right N:W	Thru N:S	Left N:E			U-Turn N:N	Peds N:	Approach Total
07:00:00	3	76	48	0	2	127	9	47	15	0	1	71	26	38	21	0	0	85	39	111	4	0	2	154	437	
07:15:00	4	108	56	0	2	168	13	63	28	0	0	104	30	37	23	0	0	90	53	93	11	0	3	157	519	
07:30:00	7	126	65	0	0	198	15	67	28	0	0	110	24	41	26	0	1	91	52	102	5	0	1	159	558	
07:45:00	14	161	58	0	0	233	25	76	24	0	0	125	30	58	21	0	0	109	53	112	11	0	3	176	643	
08:00:00	15	128	46	0	2	189	13	112	30	0	2	155	15	63	34	0	1	112	45	84	12	0	3	141	597	
08:15:00	7	134	41	0	0	182	25	128	18	0	0	171	23	66	23	0	0	112	51	82	15	0	5	148	613	
08:30:00	22	185	49	0	1	256	15	103	40	0	1	158	32	83	34	0	1	149	65	101	13	0	1	179	742	
08:45:00	10	133	42	0	0	185	16	135	21	0	2	172	19	81	54	0	1	154	65	94	33	0	1	192	703	
BREAK																										
16:00:00	18	86	24	0	0	128	35	128	30	0	3	193	28	147	60	0	2	235	22	119	42	0	1	183	739	
16:15:00	26	106	34	0	2	166	31	132	25	1	0	189	23	163	43	0	0	229	29	122	40	0	4	191	775	
16:30:00	20	80	26	0	6	126	45	132	36	0	1	213	23	168	60	0	0	251	37	135	46	0	6	218	808	
16:45:00	27	97	30	0	1	154	37	167	54	0	0	258	21	134	60	0	0	215	24	139	29	1	2	193	820	
17:00:00	19	115	26	0	2	160	42	149	35	0	5	226	27	174	74	0	2	275	31	129	46	0	3	206	867	
17:15:00	25	99	31	0	2	155	42	135	30	0	1	207	27	138	58	0	0	223	30	134	52	1	6	217	802	
17:30:00	15	116	26	0	3	157	44	135	30	0	3	209	20	156	63	0	4	239	21	124	38	0	7	183	788	
17:45:00	19	82	28	0	3	129	38	131	34	0	7	203	10	115	47	0	5	172	27	129	42	0	2	198	702	
Grand Total	251	1832	630	0	26	2713	445	1840	478	1	26	2764	378	1662	701	0	17	2741	644	1810	439	2	50	2895	11113	-
Approach %	9.3%	67.5%	23.2%	0%	-	-	16.1%	66.6%	17.3%	0%	-	-	13.8%	60.6%	25.6%	0%	-	-	22.2%	62.5%	15.2%	0.1%	-	-	-	-
Totals %	2.3%	16.5%	5.7%	0%	24.4%	4%	16.6%	4.3%	0%	24.9%	3.4%	15%	6.3%	0%	24.7%	5.8%	16.3%	4%	0%	26.1%	-	-	-	-	-	
Heavy	6	45	66	0	-	66	49	25	0	-	-	32	59	21	0	-	-	43	35	5	0	-	-	-	-	
Heavy %	2.4%	2.5%	10.5%	0%	-	14.8%	2.7%	5.2%	0%	-	-	8.5%	3.5%	3%	0%	-	-	6.7%	1.9%	1.1%	0%	-	-	-	-	
Bicycles	0	1	0	0	-	0	3	0	0	-	-	0	0	0	0	-	-	0	0	0	0	-	-	-	-	
Bicycle %	0%	0.1%	0%	0%	-	0%	0.2%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	-	-	



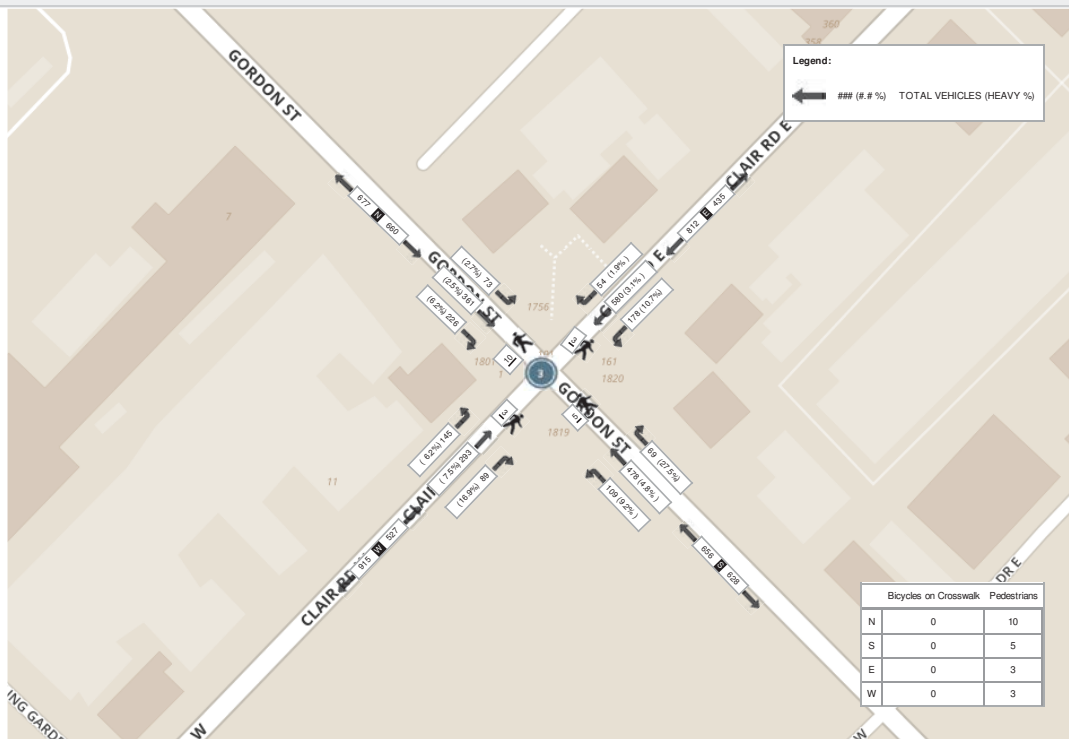
Peak Hour: 08:00 AM - 09:00 AM Weather: Mostly Cloudy (-1.9 °C)

Start Time	E Approach CLAIR RD						S Approach GORDON ST					W Approach CLAIR RD					N Approach GORDON ST					Int. Total (15 min)			
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left		U-Turn	Peds	Approach Total
08:00:00	15	128	46	0	2	189	13	112	30	0	2	155	15	63	34	0	1	112	45	84	12	0	3	141	597
08:15:00	7	134	41	0	0	182	25	128	18	0	0	171	23	66	23	0	0	112	51	82	15	0	5	148	613
08:30:00	22	185	49	0	1	256	15	103	40	0	1	158	32	83	34	0	1	149	65	101	13	0	1	179	742
08:45:00	10	133	42	0	0	185	16	135	21	0	2	172	19	81	54	0	1	154	65	94	33	0	1	192	703
Grand Total	54	580	178	0	3	812	69	478	109	0	5	656	89	293	145	0	3	527	226	361	73	0	10	660	2655
Approach %	6.7%	71.4%	21.9%	0%	-	-	10.5%	72.9%	16.6%	0%	-	-	16.9%	55.6%	27.5%	0%	-	-	34.2%	54.7%	11.1%	0%	-	-	-
Totals %	2%	21.8%	6.7%	0%	30.6%	2.6%	18%	4.1%	0%	24.7%	3.4%	11%	5.5%	0%	19.8%	8.5%	13.6%	2.7%	0%	24.9%	-	-	-	-	
PHF	0.61	0.78	0.91	0	0.79	0.69	0.89	0.68	0	0.95	0.7	0.88	0.67	0	0.86	0.87	0.89	0.55	0	0.86	-	-	-	-	
Heavy	1	18	19	0	38	19	23	10	0	52	15	22	9	0	46	14	9	2	0	25	-	-	-	-	
Heavy %	1.9%	3.1%	10.7%	0%	4.7%	27.5%	4.8%	9.2%	0%	7.9%	16.9%	7.5%	6.2%	0%	8.7%	6.2%	2.5%	2.7%	0%	3.8%	-	-	-	-	
Lights	53	562	159	0	774	50	455	99	0	604	74	271	136	0	481	212	352	71	0	635	-	-	-	-	
Lights %	98.1%	96.9%	89.3%	0%	95.3%	72.5%	95.2%	90.8%	0%	92.1%	83.1%	92.5%	93.8%	0%	91.3%	93.8%	97.5%	97.3%	0%	96.2%	-	-	-	-	
Single-Unit Trucks	0	0	14	0	14	10	10	0	0	20	9	10	0	0	19	0	0	2	0	2	-	-	-	-	
Single-Unit Trucks %	0%	0%	7.9%	0%	1.7%	14.5%	2.1%	6%	0%	3%	10.1%	3.4%	0%	0%	3.6%	0%	0%	2.7%	0%	0.3%	-	-	-	-	
Buses	1	17	1	0	19	2	11	6	0	19	0	7	6	0	13	11	9	0	0	20	-	-	-	-	
Buses %	1.9%	2.9%	0.6%	0%	2.3%	2.9%	2.3%	5.5%	0%	2.9%	0%	2.4%	4.1%	0%	2.9%	4.9%	2.5%	0%	0%	3%	-	-	-	-	
Articulated Trucks	0	1	4	0	5	7	2	4	0	13	6	5	3	0	14	3	0	0	0	3	-	-	-	-	
Articulated Trucks %	0%	0.2%	2.2%	0%	0.6%	10.1%	0.4%	3.7%	0%	2%	6.7%	1.7%	2.1%	0%	2.7%	1.3%	0%	0%	0%	0.5%	-	-	-	-	
Pedestrians	-	-	-	-	3	-	-	-	-	5	-	-	-	-	3	-	-	-	-	10	-	-	-	-	
Pedestrians %	-	-	-	-	14.3%	-	-	-	-	23.8%	-	-	-	-	14.3%	-	-	-	-	47.6%	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	
Bicycles on Road	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	

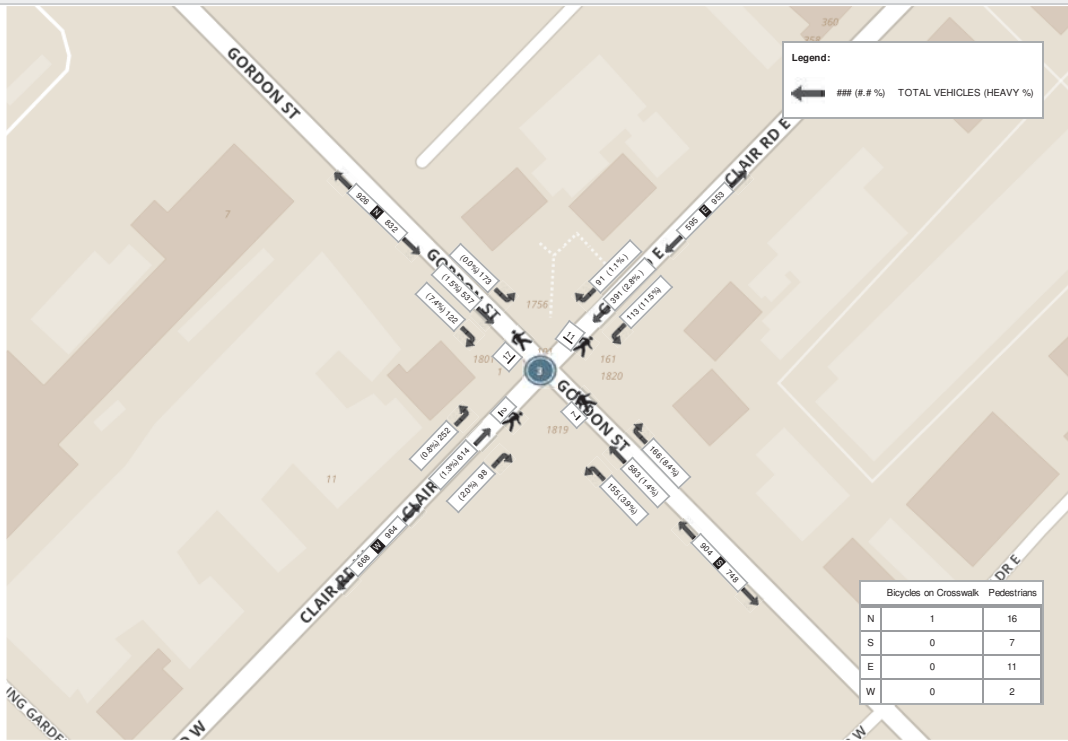
Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	E Approach CLAIR RD						S Approach GORDON ST						W Approach CLAIR RD						N Approach GORDON ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	20	80	26	0	6	126	45	132	36	0	1	213	23	168	60	0	0	251	37	135	46	0	6	218	808
16:45:00	27	97	30	0	1	154	37	167	54	0	0	258	21	134	60	0	0	215	24	139	29	1	2	193	820
17:00:00	19	115	26	0	2	160	42	149	35	0	5	226	27	174	74	0	2	275	31	129	46	0	3	206	867
17:15:00	25	99	31	0	2	155	42	135	30	0	1	207	27	138	58	0	0	223	30	134	52	1	6	217	802
Grand Total	91	391	113	0	11	595	166	583	155	0	7	904	98	614	252	0	2	964	122	537	173	2	17	834	3297
Approach%	15.3%	65.7%	19%	0%	-	-	18.4%	64.5%	17.1%	0%	-	-	10.2%	63.7%	26.1%	0%	-	-	14.6%	64.4%	20.7%	0.2%	-	-	-
Totals	2.8%	11.9%	3.4%	0%	18%	5%	17.7%	4.7%	0%	27.4%	3%	18.6%	7.6%	0%	29.2%	3.7%	16.3%	5.2%	0.1%	25.3%	-	-	-		
PHF	0.84	0.85	0.91	0	0.93	0.92	0.87	0.72	0	0.88	0.91	0.88	0.85	0	0.88	0.82	0.97	0.83	0.5	0.96	-	-	-		
Heavy	1	11	13	0	25	14	8	6	0	28	2	8	2	0	12	9	8	0	0	17	-	-	-		
Heavy %	1.1%	2.8%	11.5%	0%	4.2%	8.4%	1.4%	3.9%	0%	3.1%	2%	1.3%	0.8%	0%	1.2%	7.4%	1.5%	0%	0%	2%	-	-	-		
Lights	90	380	100	0	570	152	575	149	0	876	96	606	250	0	952	113	529	173	2	817	-	-	-		
Lights %	98.9%	97.2%	88.5%	0%	95.8%	91.6%	98.6%	96.1%	0%	96.9%	98%	98.7%	99.2%	0%	98.8%	92.6%	98.5%	100%	100%	98%	-	-	-		
Single-Unit Trucks	1	9	8	0	18	5	3	3	0	11	2	7	1	0	10	1	4	0	0	5	-	-	-		
Single-Unit Trucks %	1.1%	2.3%	7.1%	0%	3%	3%	0.5%	1.9%	0%	1.2%	2%	1.1%	0.4%	0%	1%	0.8%	0.7%	0%	0%	0.6%	-	-	-		
Buses	0	0	1	0	1	1	4	1	0	6	0	1	0	0	1	8	4	0	0	12	-	-	-		
Buses %	0%	0%	0.9%	0%	0.2%	0.6%	0.7%	0.6%	0%	0.7%	0%	0.2%	0%	0%	0.1%	6.6%	0.7%	0%	0%	1.4%	-	-	-		
Articulated Trucks	0	2	4	0	6	8	1	2	0	11	0	0	1	0	1	0	0	0	0	0	-	-	-		
Articulated Trucks %	0%	0.5%	3.5%	0%	1%	4.8%	0.2%	1.3%	0%	1.2%	0%	0%	0.4%	0%	0.1%	0%	0%	0%	0%	0%	-	-	-		
Pedestrians	-	-	-	-	11	-	-	-	-	7	-	-	-	2	-	-	-	-	16	-	-	-	-	-	
Pedestrians %	-	-	-	-	29.7%	-	-	-	-	18.9%	-	-	-	5.4%	-	-	-	-	43.2%	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	0	-	-	-	-	1	-	-	-	-	-	
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	0%	-	-	-	-	2.7%	-	-	-	-	-	
Bicycles on Road	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	

Peak Hour: 08:00 AM - 09:00 AM Weather: Mostly Cloudy (-1.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)



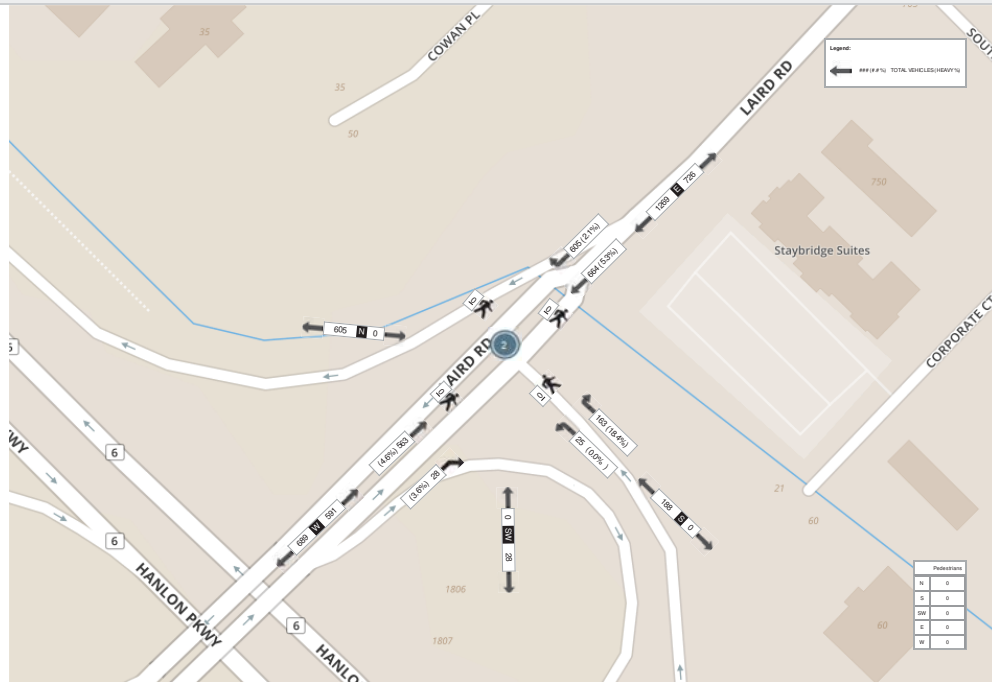
Turning Movement Count (2. LAIRD RD & HANLON PKWY NB OFF RAMP)

Start Time	W Approach			SW Approach			S Approach			N Approach			E Approach			E Approach (HANLON PKWY NB OFF RAMP)			E Approach (HANLON PKWY NB OFF RAMP)			SW Approach (HANLON PKWY NB OFF RAMP)			W Approach (LAIRD RD)			No. Motor (15+)	No. Motor (10-14)																	
	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach	Thru	Peak	Approach																			
070000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	156	0	0	157	306									
071500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	132	0	0	134	264									
073000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	149	0	0	153	447									
074500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	163	0	0	164	472	1556											
080000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	127	0	0	129	378	1619											
081500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	177	0	0	180	402	1700											
083000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	142	0	0	144	416	1659											
084500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	176	0	0	179	422	1919											
090000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	305	0	0	310	465												
140000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	146	0	0	149	463												
141500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	146	0	0	159	567												
143000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	146	0	0	149	448	1650											
170000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	133	0	0	141	567	2048											
171500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	129	0	0	139	421	2004											
173000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	159	0	0	166	426	1866											
174500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	118	0	0	121	335	1732											
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	2251	0	0	2321	6867												
Approach%	0%	0%	-	-	-	0%	0%	-	-	-	0%	0%	0%	0%	-	47.9%	52.1%	0%	0%	0%	-	88.2%	0%	11.7%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-							
Total%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	24.6%	26.7%	0%	0%	0%	0%	51.2%	0%	13.2%	0%	1.8%	0%	15%	0%	0%	0%	0%	0%	0%	1%	0%	32.7%	0%	0%	33.7%	-				
Heavy %	0	0	-	-	-	0	0	-	-	-	0	0	0	0	-	69	152	0	0	0	0	137	0	12	0	0	-	4	0	98	0	0	-	4	0	98	0	0	-	-	-	-	-	-	-	-
Heavy %	0%	0%	-	-	-	0%	0%	-	-	-	0%	0%	0%	0%	-	4.1%	8.2%	0%	0%	0%	0%	15%	0%	0.9%	0%	0%	-	0%	0%	0%	0%	0%	-	5.7%	0%	4.4%	0%	0%	-	-	-	-	-	-	-	-
Bicycles %	0	0	-	-	-	0	0	-	-	-	0	0	0	0	-	0	1	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-	-	-	-	-	-	-
Bicycle %	0%	0%	-	-	-	0%	0%	-	-	-	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-	-	-	-	-	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (-1.9 °C)

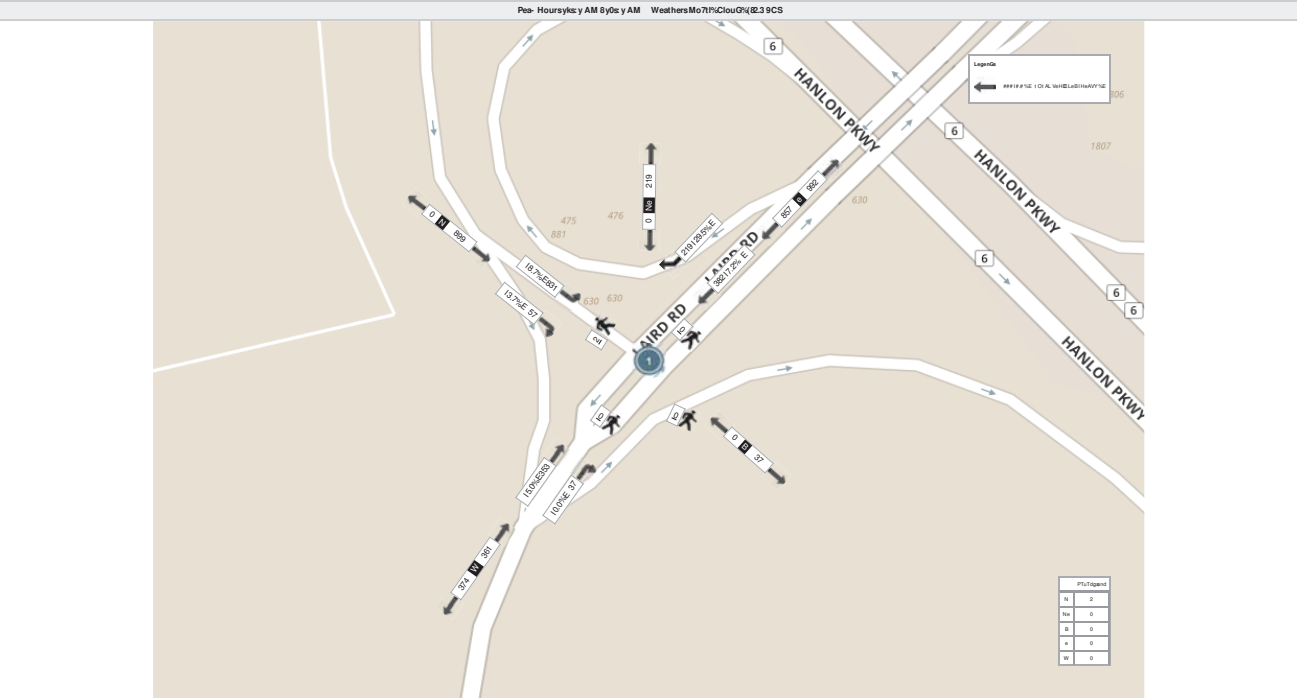


Peak Hour: 04:15 PM - 05:15 PM Weather: Partly Cloudy (-3 °C)

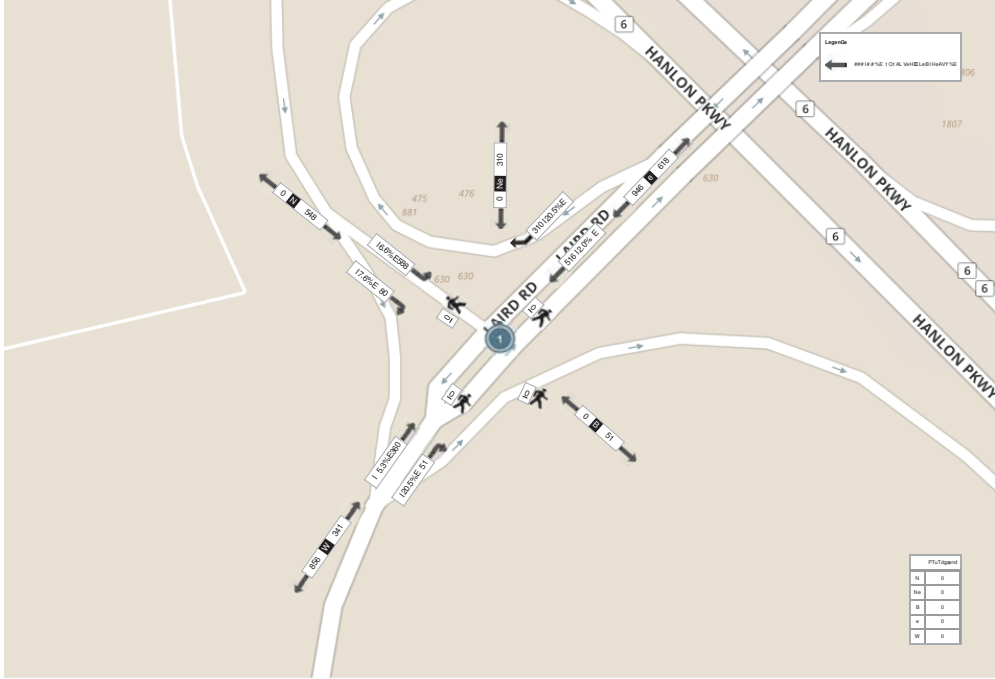




Start Time	W Approach		E Approach		NE Approach		N Approach		S Approach		HANLON PKWY (AF P)		NE Approach		E Approach		W Approach		SL Signal ID	
	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)	(#1)	(#2)		
20800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64
20800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
20800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95
21600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	241
Approach	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Total	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
PH	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Light	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Signal	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
PH	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Light	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Signal	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
PH	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Heav	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Light	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Signal	0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	



Pea- Hoursyd21 PM 8y121 PM WeathersPart%Cloud%: 8 9CS



1 Sinar F pvTmTngCp9g

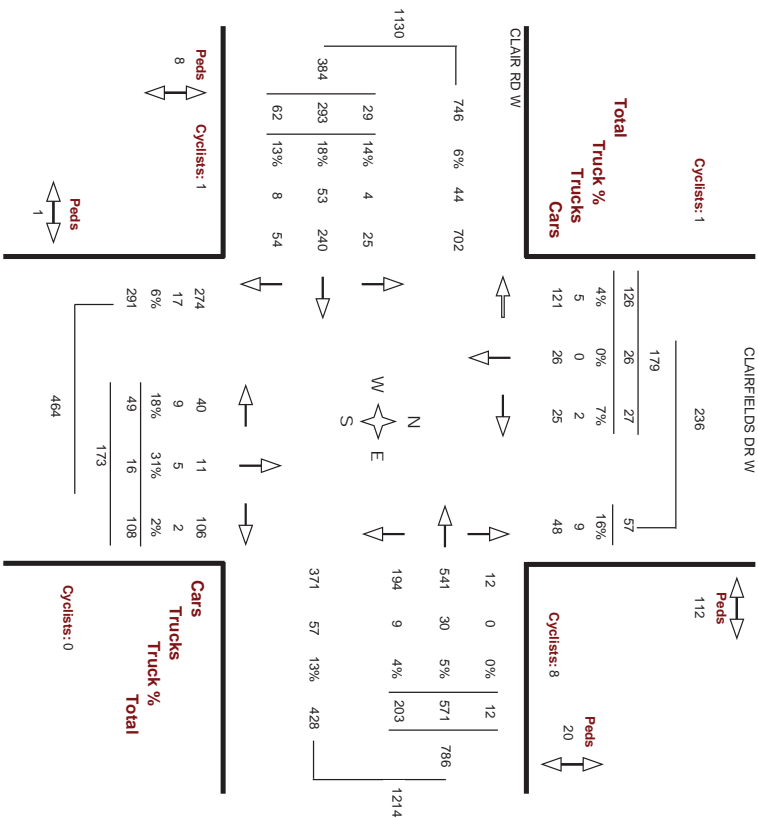
Por T6 pf 6

RAC279P



Turning Movements Report - AM Period

Location:..... CLAIR RD W @ CLAIRFIELDS DR W
Municipality: GUELPH
Traffic Cont.
Major Dir:..... None
GeoID:..... 1730
Count Date: Thursday, 17 September, 2015
Count Time: 07:00 AM — 09:00 AM
Peak Hour: 08:00 AM — 09:00 AM



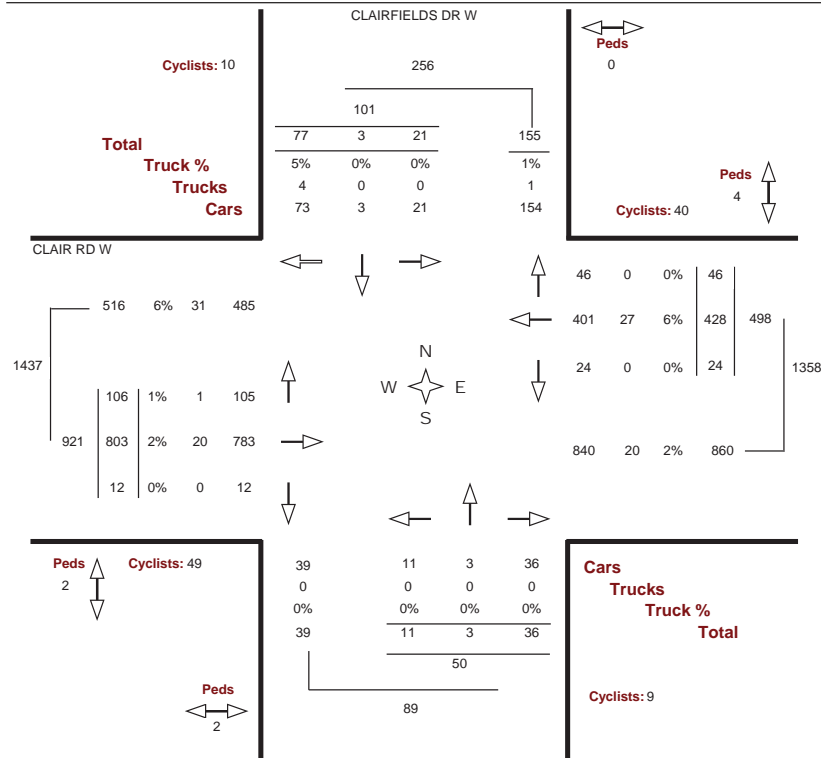
November 5, 2015

Page 1 of 4



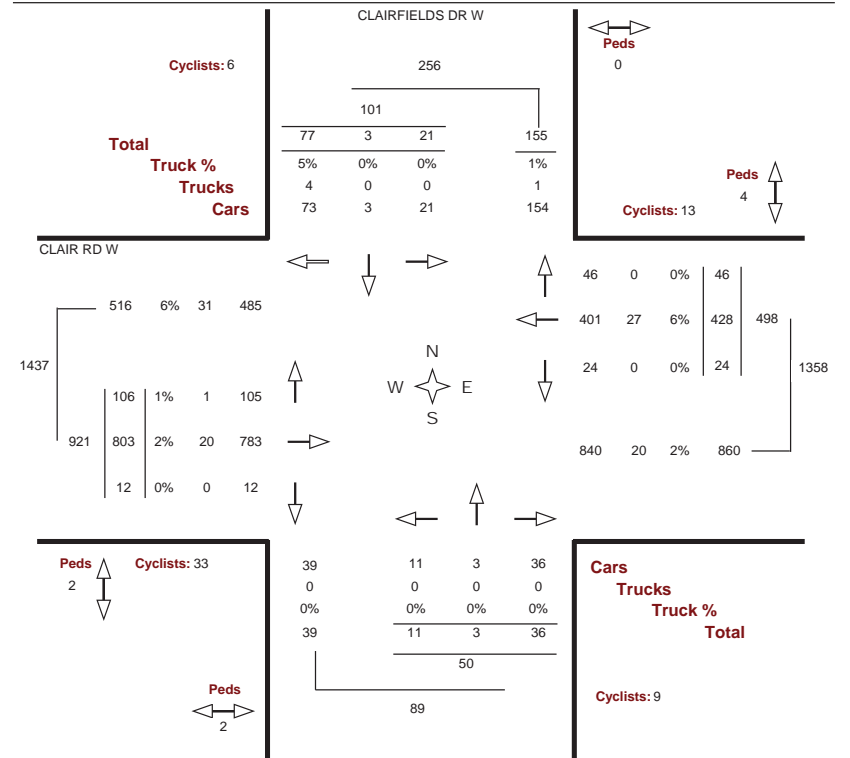
Turning Movements Report - Full Study

Location..... CLAIR RD W @ CLAIRFIELDS DR W **GeoID.....** I730
Municipality. GUELPH **Count Date.** Thursday, 17 September, 2015
Traffic Cont. **Count Time.** 07:00 AM — 06:00 PM
Major Dir..... None **Peak Hour..** 04:30 PM — 05:30 PM



Turning Movements Report - PM Period

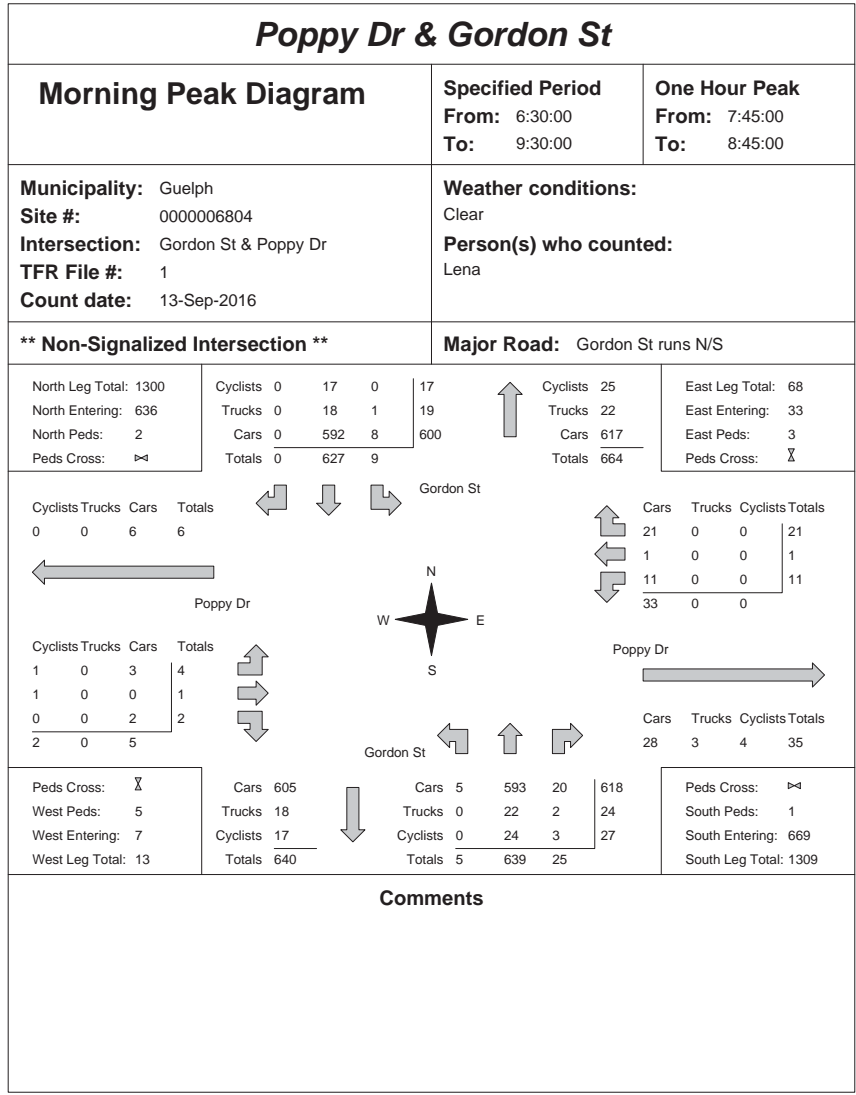
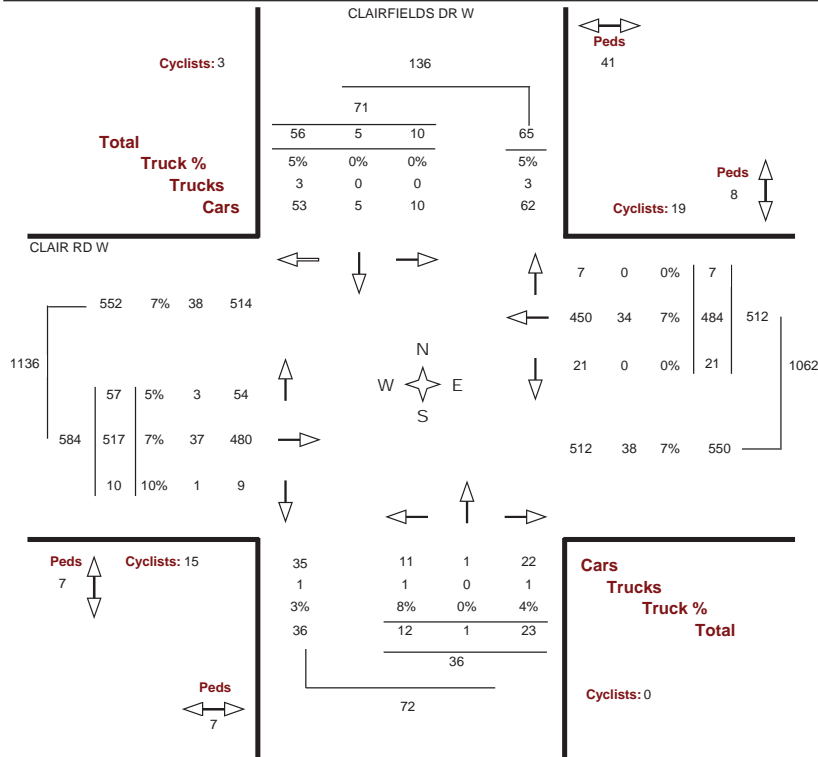
Location..... CLAIR RD W @ CLAIRFIELDS DR W **GeoID.....** I730
Municipality. GUELPH **Count Date.** Thursday, 17 September, 2015
Traffic Cont. **Count Time.** 03:00 PM — 06:00 PM
Major Dir..... None **Peak Hour..** 04:30 PM — 05:30 PM

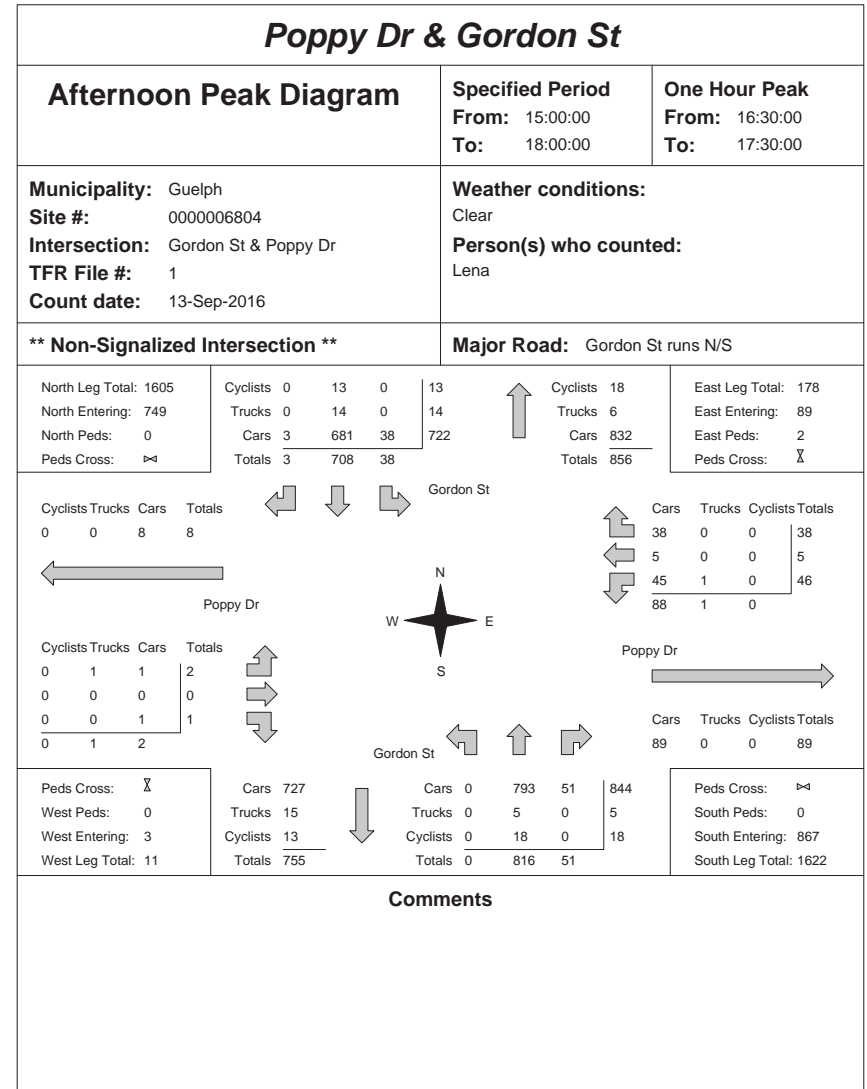
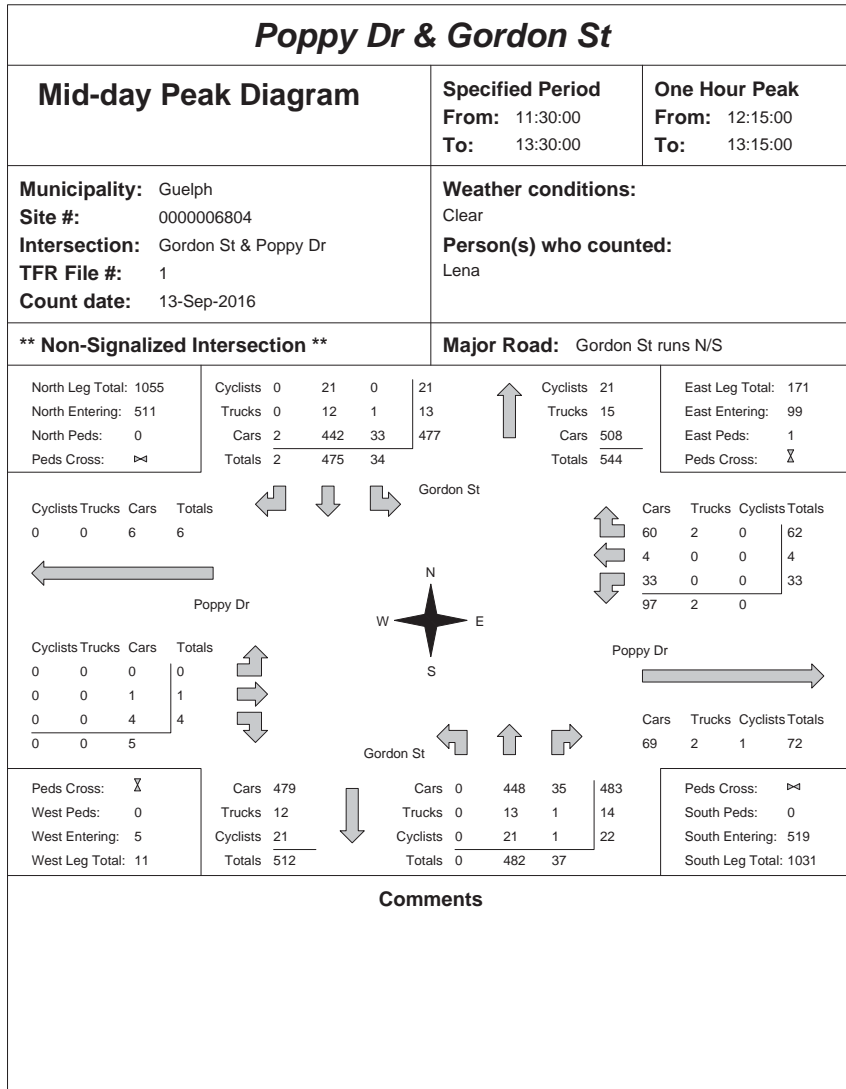




Turning Movements Report - MD Period

Location..... CLAIR RD W @ CLAIRFIELDS DR W **GeoID.....** I730
Municipality. GUELPH **Count Date.** Thursday, 17 September, 2015
Traffic Cont. **Count Time.** 11:00 AM — 02:00 PM
Major Dir..... None **Peak Hour..** 12:00 PM — 01:00 PM





Poppy Dr & Gordon St

Total Count Diagram

Municipality: Guelph
Site #: 0000006804
Intersection: Gordon St & Poppy Dr
TFR File #: 1
Count date: 13-Sep-2016

Weather conditions:
 Clear
Person(s) who counted:
 Lena

**** Non-Signalized Intersection **** **Major Road:** Gordon St runs N/S

North Leg Total: 9726	Cyclists 1 133 0 134	Trucks 1 110 5 116	Cyclists 146	East Leg Total: 1025
North Entering: 4917	Cars 19 4445 203 4667		Trucks 118	East Entering: 534
North Peds: 15	Totals 21 4688 208		Cars 4545	East Peds: 12
Peds Cross: 1			Totals 4809	Peds Cross: 1

Poppy Dr (East-West):

Cyclists 2	Trucks 1	Cars 54	Totals 57
Cyclists 2	Trucks 2	Cars 10	Totals 14
Cyclists 2	Trucks 0	Cars 12	Totals 14
Cyclists 1	Trucks 1	Cars 17	Totals 19
Cyclists 5	Trucks 3	Cars 39	Totals 47

Gordon St (North-South):

Cyclists 17	Trucks 0	Cars 0	Totals 17
Cyclists 222	Trucks 4	Cars 5	Totals 231
Cyclists 508	Trucks 19	Cars 7	Totals 534

Peds Cross: 1	Cars 4684	Trucks 115	Cyclists 139	Totals 4938
West Peds: 23	Cars 18	Trucks 0	Cyclists 1	Totals 19
West Entering: 47	Cars 4266	Trucks 101	Cyclists 142	Totals 4509
West Leg Total: 104	Cars 258	Trucks 5	Cyclists 6	Totals 269
	Cars 4542	Trucks 106	Cyclists 149	Totals 4809
	Cars 473	Trucks 10	Cyclists 8	Totals 491
	Cars 4797	Trucks 3	Cyclists 10	Totals 4938
	Cars 4938	Trucks 115	Cyclists 139	Totals 4938
	Cars 4938	Trucks 115	Cyclists 139	Totals 4938

Comments

Poppy Dr & Gordon St Traffic Count Summary

Intersection: Gordon St & Poppy Dr					Count Date: 13-Sep-2016			Municipality: Guelph				
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total			Left	Thru	Right	Grand Total		
7:00:00	6	276	0	282	1	433	7:00:00	1	137	13	151	1
8:00:00	5	671	4	680	0	1127	8:00:00	6	430	11	447	0
9:00:00	12	607	1	620	3	1259	9:00:00	3	610	26	639	1
12:00:00	20	487	3	510	1	981	12:00:00	2	444	25	471	0
13:00:00	42	460	6	508	7	1022	13:00:00	0	472	42	514	0
15:00:00	14	237	1	252	0	521	15:00:00	1	248	20	269	0
16:00:00	35	573	2	610	1	1292	16:00:00	1	640	41	682	0
17:00:00	30	675	3	708	0	1505	17:00:00	2	760	35	797	1
18:00:00	44	702	1	747	2	1574	18:00:00	3	768	56	827	0
Totals:	208	4688	21	4917	15	9714	19	4509	269	4797	3	
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total			Left	Thru	Right	Grand Total		
7:00:00	7	0	6	13	0	14	7:00:00	0	0	1	1	1
8:00:00	10	0	17	27	2	33	8:00:00	3	0	3	6	6
9:00:00	15	1	24	40	4	44	9:00:00	2	1	1	4	2
12:00:00	26	2	26	54	1	59	12:00:00	1	2	2	5	2
13:00:00	34	4	61	99	1	109	13:00:00	0	3	7	10	0
15:00:00	22	1	29	52	0	52	15:00:00	0	0	0	0	0
16:00:00	31	3	33	67	1	73	16:00:00	1	4	1	6	4
17:00:00	51	3	41	95	3	105	17:00:00	5	2	3	10	2
18:00:00	35	3	49	87	0	92	18:00:00	2	2	1	5	6
Totals:	231	17	286	534	12	581	14	14	19	47	23	
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	12:00	13:00	15:00	16:00	17:00	18:00				
Crossing Values:	13	22	30	45	23	37	60	42				

Turning Movement Count (1 - CLAIR RD & FARLEY DR)

Start Time	N Approach FARLEY DR						E Approach CLAIR RD						S Approach FARLEY DR						W Approach CLAIR RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N-W	Thru N-S	Left N-E	U-Turn N-N	Peds N:	Approach Total	Right E-N	Thru E-W	Left E-S	U-Turn E-E	Peds E:	Approach Total	Right S-E	Thru S-N	Left S-W	U-Turn S-S	Peds S:	Approach Total	Right W-S	Thru W-E	Left W-N	U-Turn W-W	Peds W:	Approach Total		
07:00:00	29	0	5	0	0	34	7	86	1	0	0	94	0	4	2	0	0	6	5	32	6	0	0	43	177	
07:15:00	38	3	6	0	0	47	5	103	2	0	0	110	2	2	4	0	0	8	10	35	6	0	0	51	216	
07:30:00	44	2	9	0	0	55	27	126	0	0	0	153	3	2	5	0	1	10	1	46	13	0	2	60	278	
07:45:00	47	1	7	0	1	55	22	153	4	0	0	179	2	2	4	0	0	8	9	37	22	0	0	68	310	
08:00:00	27	1	9	0	0	37	10	127	3	0	0	140	0	3	6	0	1	9	8	72	16	0	0	96	282	
08:15:00	30	5	6	0	1	41	14	131	6	0	0	151	1	3	5	0	1	9	9	69	24	0	1	102	303	
08:30:00	43	3	3	0	1	49	20	195	9	0	0	224	3	3	7	0	0	13	9	75	25	0	0	109	395	
08:45:00	45	11	7	0	1	63	17	140	9	0	1	166	2	4	12	0	0	18	20	75	36	0	1	131	378	
BREAK																										
16:00:00	40	12	10	0	1	62	11	54	7	0	1	72	9	14	28	0	0	51	40	144	52	0	1	236	421	
16:15:00	32	17	10	0	1	59	17	79	4	0	0	100	14	18	28	0	1	60	43	110	55	0	1	208	427	
16:30:00	27	20	16	0	2	63	12	74	6	0	5	92	7	15	25	0	2	47	63	136	54	0	6	253	455	
16:45:00	38	21	5	0	1	64	14	85	15	0	3	114	12	27	23	0	3	62	58	119	50	0	4	227	467	
17:00:00	42	20	18	0	1	80	27	78	10	0	2	115	7	28	22	0	0	57	44	129	51	0	5	224	476	
17:15:00	27	20	13	0	0	60	12	71	12	0	4	95	8	27	35	0	1	70	57	148	57	0	2	262	487	
17:30:00	44	12	20	0	4	76	22	71	11	0	6	104	10	24	31	0	4	65	61	131	74	0	5	266	511	
17:45:00	27	18	13	0	3	58	10	65	11	0	7	86	10	22	29	0	3	61	67	107	51	0	1	225	430	
Grand Total	580	166	157	0	17	903	247	1638	110	0	29	1955	90	198	266	0	17	554	504	1465	592	0	29	2561	6013	-
Approach %	64.2%	18.4%	17.4%	0%	-	-	12.4%	82.1%	5.5%	0%	-	-	16.2%	35.7%	48%	0%	-	-	19.7%	57.2%	23.1%	0%	-	-	-	-
Totals %	9.6%	2.8%	2.6%	0%	-	15%	4.1%	27.2%	1.8%	0%	-	33.2%	1.5%	3.3%	4.4%	0%	-	9.2%	8.4%	24.4%	9.8%	0%	-	42.6%	-	-
Heavy	3	0	2	0	-	-	2	93	0	0	-	-	2	2	5	0	-	-	8	87	11	0	-	-	-	-
Heavy %	0.5%	0%	1.3%	0%	-	-	0.8%	5.7%	0%	0%	-	-	2.2%	1%	1.9%	0%	-	-	1.6%	5.9%	1.9%	0%	-	-	-	-
Bicycles	0	0	0	0	-	-	0	0	0	0	-	-	0	1	0	0	-	-	0	1	0	0	-	-	-	-
Bicycle %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0.5%	0%	0%	-	-	0%	0.1%	0%	0%	-	-	-	-

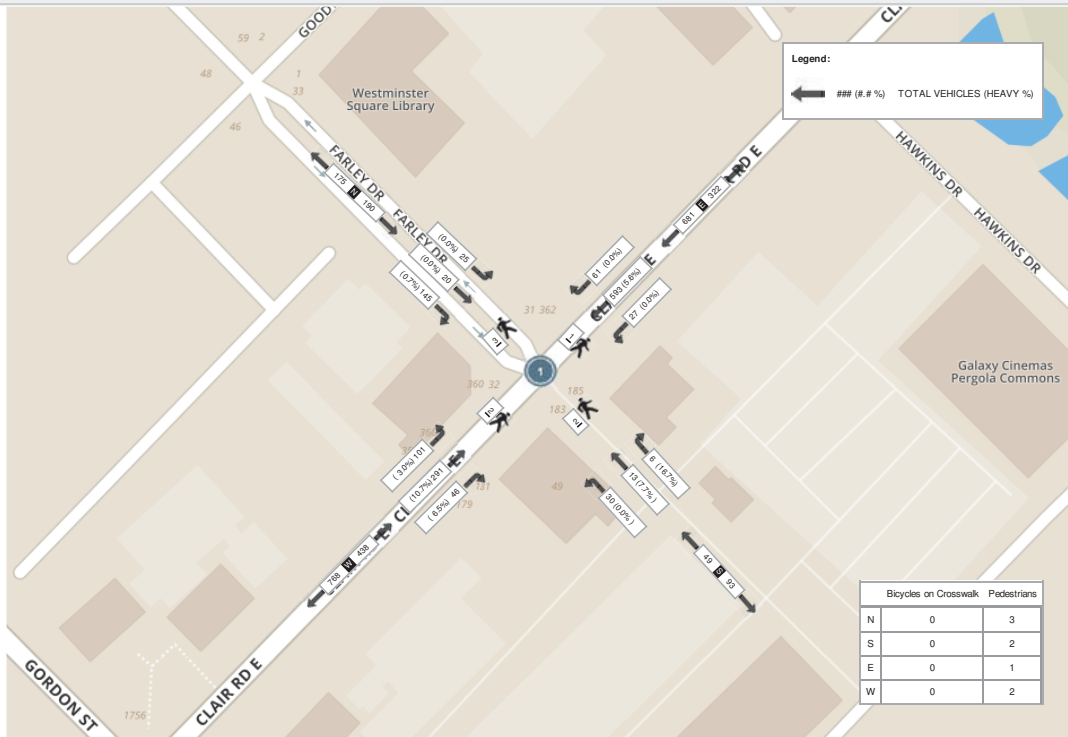
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (2.1 °C)

Start Time	N Approach FARLEY DR						E Approach CLAIR RD						S Approach FARLEY DR						W Approach CLAIR RD						Int. Total (15 min)		
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total			
08:00:00	27	1	9	0	0	37	10	127	3	0	0	140	0	3	6	0	1	9	8	72	16	0	0	96	282		
08:15:00	30	5	6	0	1	41	14	131	6	0	0	151	1	3	5	0	1	9	9	69	24	0	1	102	303		
08:30:00	43	3	3	0	1	49	20	195	9	0	0	224	3	3	7	0	0	13	9	75	25	0	0	109	395		
08:45:00	45	11	7	0	1	63	17	140	9	0	1	166	2	4	12	0	0	18	20	75	36	0	1	131	378		
Grand Total	145	20	25	0	3	190	61	593	27	0	1	681	6	13	30	0	2	49	46	291	101	0	2	438	1358		
Approach %	76.3%	10.5%	13.2%	0%	-	-	9%	87.1%	4%	0%	-	-	12.2%	26.5%	61.2%	0%	-	-	10.5%	66.4%	23.1%	0%	-	-	-	-	
Totals %	10.7%	1.5%	1.8%	0%	-	14%	4.5%	43.7%	2%	0%	-	50.1%	0.4%	1%	2.2%	0%	-	3.6%	3.4%	21.4%	7.4%	0%	-	32.3%	-	-	
PHF	0.81	0.45	0.69	0	-	0.75	0.76	0.76	0.75	0	-	0.76	0.5	0.81	0.63	0	-	0.68	0.58	0.97	0.7	0	-	0.84	-	-	
Heavy	1	0	0	0	-	1	0	33	0	0	-	33	1	1	0	0	-	2	3	31	3	0	-	37	-	-	
Heavy %	0.7%	0%	0%	0%	-	0.5%	0%	5.6%	0%	0%	-	4.8%	16.7%	7.7%	0%	0%	-	4.1%	6.5%	10.7%	3%	0%	-	8.4%	-	-	
Lights	144	20	25	0	-	189	61	560	27	0	-	648	5	12	30	0	-	47	43	260	98	0	-	401	-	-	
Lights %	99.3%	100%	100%	0%	-	99.5%	100%	94.4%	100%	0%	-	95.2%	83.3%	92.3%	100%	0%	-	95.9%	93.5%	89.3%	97%	0%	-	91.6%	-	-	
Single-Unit Trucks	1	0	0	0	-	1	0	8	0	0	-	8	1	1	0	0	-	2	3	14	1	0	-	18	-	-	
Single-Unit Trucks %	0.7%	0%	0%	0%	-	0.5%	0%	1.3%	0%	0%	-	1.2%	16.7%	7.7%	0%	0%	-	4.1%	6.5%	4.8%	1%	0%	-	4.1%	-	-	
Buses	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	0	8	2	0	-	10	-	-	
Buses %	0%	0%	0%	0%	-	0%	0%	1.2%	0%	0%	-	1%	0%	0%	0%	0%	-	0%	0%	2.7%	2%	0%	-	2.3%	-	-	
Articulated Trucks	0	0	0	0	-	0	0	18	0	0	-	18	0	0	0	0	-	0	0	9	0	0	-	9	-	-	
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	3%	0%	0%	-	2.6%	0%	0%	0%	0%	-	0%	0%	3.1%	0%	0%	-	2.1%	-	-	
Pedestrians	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-
Pedestrians %	-	-	-	-	37.5%	-	-	-	-	-	12.5%	-	-	-	-	-	25%	-	-	-	-	-	25%	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-

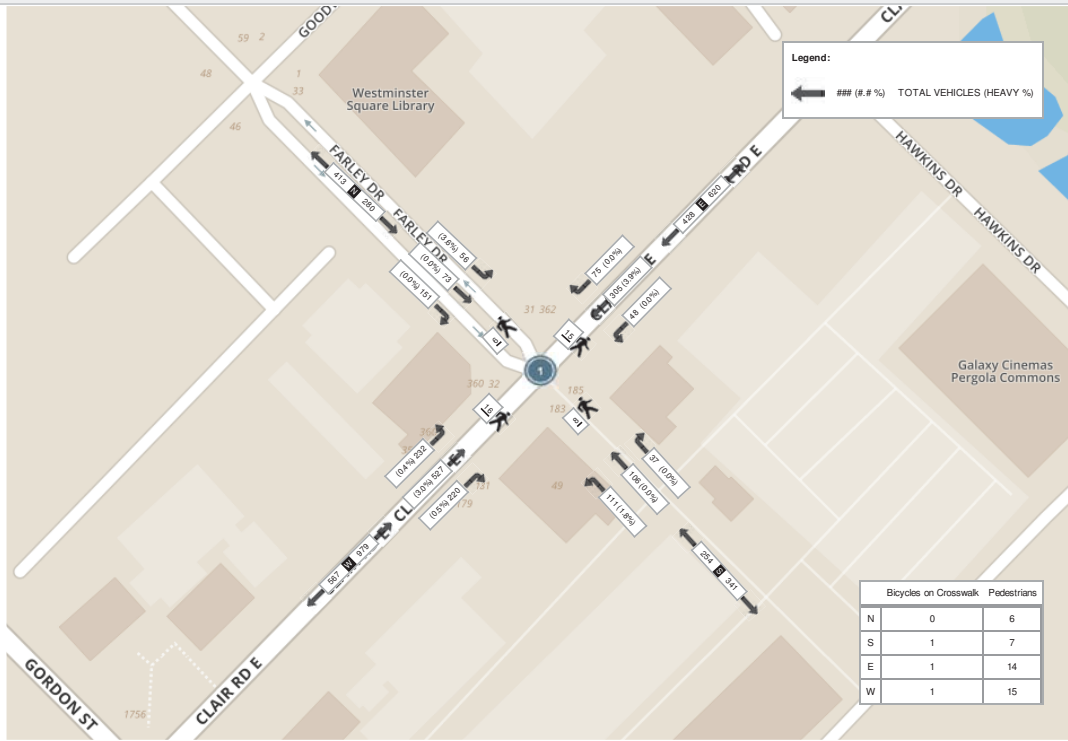
Peak Hour: 04:45 PM - 05:45 PM Weather: Mostly Cloudy (2.8 °C)

Start Time	N Approach FARLEY DR						E Approach CLAIR RD						S Approach FARLEY DR						W Approach CLAIR RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	38	21	5	0	1	64	14	85	15	0	3	114	12	27	23	0	3	62	58	119	50	0	4	227	467
17:00:00	42	20	18	0	1	80	27	78	10	0	2	115	7	28	22	0	0	57	44	129	51	0	5	224	476
17:15:00	27	20	13	0	0	60	12	71	12	0	4	95	8	27	35	0	1	70	57	148	57	0	2	262	487
17:30:00	44	12	20	0	4	76	22	71	11	0	6	104	10	24	31	0	4	65	61	131	74	0	5	266	511
Grand Total	151	73	56	0	6	280	75	305	48	0	15	428	37	106	111	0	8	254	220	527	232	0	16	979	1941
Approach%	53.9%	26.1%	20%	0%	-	-	17.5%	71.3%	11.2%	0%	-	-	14.6%	41.7%	43.7%	0%	-	-	22.5%	53.8%	23.7%	0%	-	-	-
Totals	7.8%	3.8%	2.9%	0%	14.4%	3.9%	15.7%	2.5%	0%	22.1%	1.9%	5.9%	5.7%	0%	13.1%	11.3%	27.2%	12%	0%	50.4%	-	-	-	-	
PHF	0.86	0.87	0.7	0	0.88	0.69	0.9	0.8	0	0.93	0.77	0.95	0.79	0	0.91	0.9	0.89	0.78	0	0.92	-	-	-	-	
Heavy	0	0	2	0	2	0	12	0	0	12	0	0	2	0	2	1	16	1	0	18	-	-	-	-	
Heavy %	0%	0%	3.6%	0%	0.7%	0%	3.9%	0%	0%	2.8%	0%	0%	1.8%	0%	0.8%	0.5%	3%	0.4%	0%	1.8%	-	-	-	-	
Lights	151	73	54	0	278	75	293	48	0	416	37	106	109	0	252	219	511	231	0	961	-	-	-	-	
Lights %	100%	100%	96.4%	0%	99.3%	100%	96.1%	100%	0%	97.2%	100%	100%	98.2%	0%	99.2%	99.5%	97%	99.6%	0%	98.2%	-	-	-	-	
Single-Unit Trucks	0	0	2	0	2	0	6	0	0	6	0	0	2	0	2	1	2	1	0	4	-	-	-	-	
Single-Unit Trucks %	0%	0%	3.6%	0%	0.7%	0%	2%	0%	0%	1.4%	0%	0%	1.8%	0%	0.8%	0.5%	0.4%	0.4%	0%	0.4%	-	-	-	-	
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-	-	-	-	
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.4%	0%	0%	0.2%	-	-	-	-	
Articulated Trucks	0	0	0	0	0	0	0	6	0	6	0	0	0	0	0	0	12	0	0	12	-	-	-	-	
Articulated Trucks %	0%	0%	0%	0%	0%	0%	2%	0%	0%	1.4%	0%	0%	0%	0%	0%	2%	0%	0%	1.2%	-	-	-	-		
Pedestrians	-	-	-	-	6	-	-	-	-	14	-	-	-	-	7	-	-	-	-	15	-	-	-	-	
Pedestrians %	-	-	-	-	13.3%	-	-	-	-	31.1%	-	-	-	-	15.6%	-	-	-	33.3%	-	-	-	-		
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	
Bicycles on Crosswalk %	-	-	-	-	0%	-	-	-	-	2.2%	-	-	-	-	2.2%	-	-	-	-	2.2%	-	-	-	-	
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (2.1 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Mostly Cloudy (2.8 °C)



Turning Movement Count (2 . CLAIR RD & BEAVER MEADOW DR)

Start Time	N Approach BEAVER MEADOW DR						E Approach CLAIR RD						S Approach BEAVER MEADOW DR						W Approach CLAIR RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	24	0	2	0	0	26	1	69	3	0	1	73	2	1	1	0	0	4	2	30	5	0	0	37	140	
07:15:00	18	0	4	0	0	22	0	94	5	0	0	99	4	1	6	0	0	11	0	38	4	0	0	42	174	
07:30:00	20	2	0	0	0	22	4	137	4	0	0	145	4	2	3	0	0	9	4	51	12	0	0	67	243	
07:45:00	25	0	6	0	0	31	2	148	3	1	0	154	5	1	4	0	0	10	2	41	4	0	0	47	242	
08:00:00	17	1	9	0	0	27	1	120	3	0	0	124	6	3	5	0	0	14	5	63	10	0	0	78	243	
08:15:00	27	1	11	0	0	39	6	124	3	0	2	133	8	6	12	0	1	26	6	63	17	0	0	86	284	
08:30:00	35	2	2	0	0	39	8	197	7	0	0	212	7	1	3	0	0	11	4	61	20	0	0	85	347	
08:45:00	17	2	5	0	2	24	9	137	2	0	0	148	6	1	4	0	0	11	5	66	15	0	0	86	269	
BREAK																										
16:00:00	10	1	5	0	0	16	3	70	3	0	1	76	5	2	2	0	0	9	6	141	20	1	0	168	269	
16:15:00	10	0	2	0	0	12	3	92	6	0	1	101	9	1	5	0	0	15	5	141	18	0	0	164	292	
16:30:00	13	2	5	0	1	20	8	87	5	0	0	100	6	1	6	0	0	13	5	161	21	0	0	187	320	
16:45:00	12	4	5	0	1	21	5	106	4	0	0	115	2	0	6	0	0	8	6	131	29	0	0	166	310	
17:00:00	24	1	3	0	0	28	8	105	2	0	3	115	6	2	4	0	0	12	5	145	28	0	0	178	333	
17:15:00	9	1	3	0	0	13	5	100	5	0	0	110	7	0	6	0	1	13	2	156	30	1	3	189	325	
17:30:00	13	2	5	0	0	20	4	97	6	0	0	107	3	1	4	0	0	8	3	158	22	1	0	184	319	
17:45:00	4	1	2	0	0	7	3	95	3	0	0	101	2	1	2	0	0	5	8	118	23	1	0	150	263	
Grand Total	278	20	69	0	4	367	70	1778	64	1	8	1913	82	24	73	0	2	179	68	1564	278	4	3	1914	4373	
Approach%	75.7%	5.4%	18.8%	0%	-	3.7%	92.9%	3.3%	0.1%	-	45.8%	13.4%	40.8%	0%	-	3.6%	81.7%	14.5%	0.2%	-	-	-	-	-		
Totals %	6.4%	0.5%	1.6%	0%	8.4%	1.6%	40.7%	1.5%	0%	43.7%	1.9%	0.5%	1.7%	0%	4.1%	1.6%	35.8%	6.4%	0.1%	43.8%	-	-	-	-		
Heavy	4	0	4	0	-	2	97	5	0	-	5	1	1	0	-	2	92	4	0	-	-	-	-	-		
Heavy %	1.4%	0%	5.8%	0%	-	2.9%	5.5%	7.8%	0%	-	6.1%	4.2%	1.4%	0%	-	2.9%	5.9%	1.4%	0%	-	-	-	-	-		
Bicycles	0	0	0	0	-	0	2	0	0	-	0	0	0	0	-	1	1	0	0	-	-	-	-	-		
Bicycle %	0%	0%	0%	0%	-	0%	0.1%	0%	0%	-	0%	0%	0%	0%	-	1.5%	0.1%	0%	0%	-	-	-	-	-		

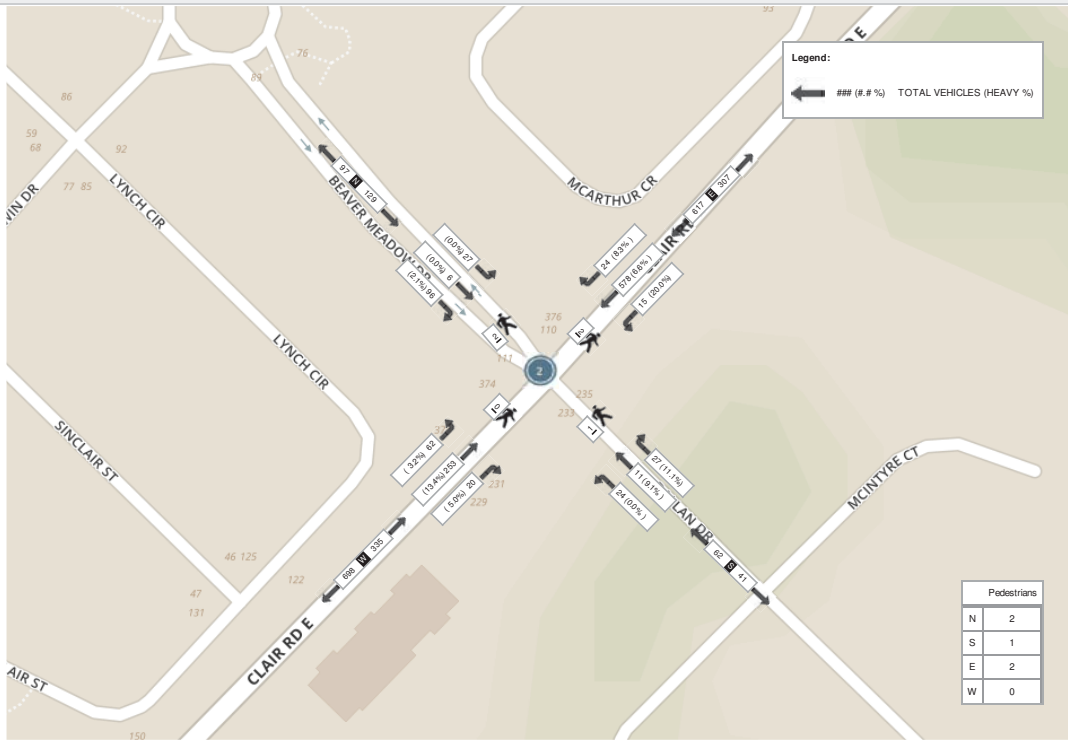
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (2.1 °C)

Start Time	N Approach BEAVER MEADOW DR						E Approach CLAIR RD						S Approach BEAVER MEADOW DR						W Approach CLAIR RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	17	1	9	0	0	27	1	120	3	0	0	124	6	3	5	0	0	14	5	63	10	0	0	78	243
08:15:00	27	1	11	0	0	39	6	124	3	0	2	133	8	6	12	0	1	26	6	63	17	0	0	86	284
08:30:00	35	2	2	0	0	39	8	197	7	0	0	212	7	1	3	0	0	11	4	61	20	0	0	85	347
08:45:00	17	2	5	0	2	24	9	137	2	0	0	148	6	1	4	0	0	11	5	66	15	0	0	86	269
Grand Total	96	6	27	0	2	129	24	578	15	0	2	617	27	11	24	0	1	62	20	253	62	0	0	335	1143
Approach%	74.4%	4.7%	20.9%	0%	-	-	3.9%	93.7%	2.4%	0%	-	-	43.5%	17.7%	38.7%	0%	-	6%	75.5%	18.5%	0%	-	-	-	-
Totals %	8.4%	0.5%	2.4%	0%	-	11.3%	2.1%	50.6%	1.3%	0%	-	54%	2.4%	1%	2.1%	0%	-	5.4%	1.7%	22.1%	5.4%	0%	-	29.3%	-
PHF	0.69	0.75	0.61	0	-	0.83	0.67	0.73	0.54	0	-	0.73	0.84	0.46	0.5	0	-	0.6	0.83	0.96	0.78	0	-	0.97	-
Heavy	2	0	0	0	-	2	2	38	3	0	-	43	3	1	0	0	-	4	1	34	2	0	-	37	-
Heavy %	2.1%	0%	0%	0%	-	1.6%	8.3%	6.6%	20%	0%	-	7%	11.1%	9.1%	0%	0%	-	6.5%	5%	13.4%	3.2%	0%	-	11%	-
Lights	94	6	27	0	-	127	22	540	12	0	-	574	24	10	24	0	-	58	19	219	60	0	-	298	-
Lights %	97.9%	100%	100%	0%	-	98.4%	91.7%	93.4%	80%	0%	-	93%	88.9%	90.9%	100%	0%	-	93.5%	95%	86.6%	96.8%	0%	-	89%	-
Single-Unit Trucks	0	0	0	0	-	0	0	8	2	0	-	10	1	0	0	0	-	1	0	16	0	0	-	16	-
Single-Unit Trucks %	0%	0%	0%	0%	-	0%	0%	1.4%	13.3%	0%	-	1.6%	3.7%	0%	0%	0%	-	1.6%	0%	6.3%	0%	0%	-	4.8%	-
Buses	2	0	0	0	-	2	2	9	1	0	-	12	1	1	0	0	-	2	0	9	2	0	-	11	-
Buses %	2.1%	0%	0%	0%	-	1.6%	8.3%	1.6%	6.7%	0%	-	1.9%	3.7%	9.1%	0%	0%	-	3.2%	0%	3.6%	3.2%	0%	-	3.3%	-
Articulated Trucks	0	0	0	0	-	0	0	21	0	0	-	21	1	0	0	0	-	1	1	9	0	0	-	10	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	3.6%	0%	0%	-	3.4%	3.7%	0%	0%	0%	-	1.6%	5%	3.6%	0%	0%	-	3%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians %	-	-	-	-	40%	-	-	-	-	-	40%	-	-	-	-	-	20%	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-

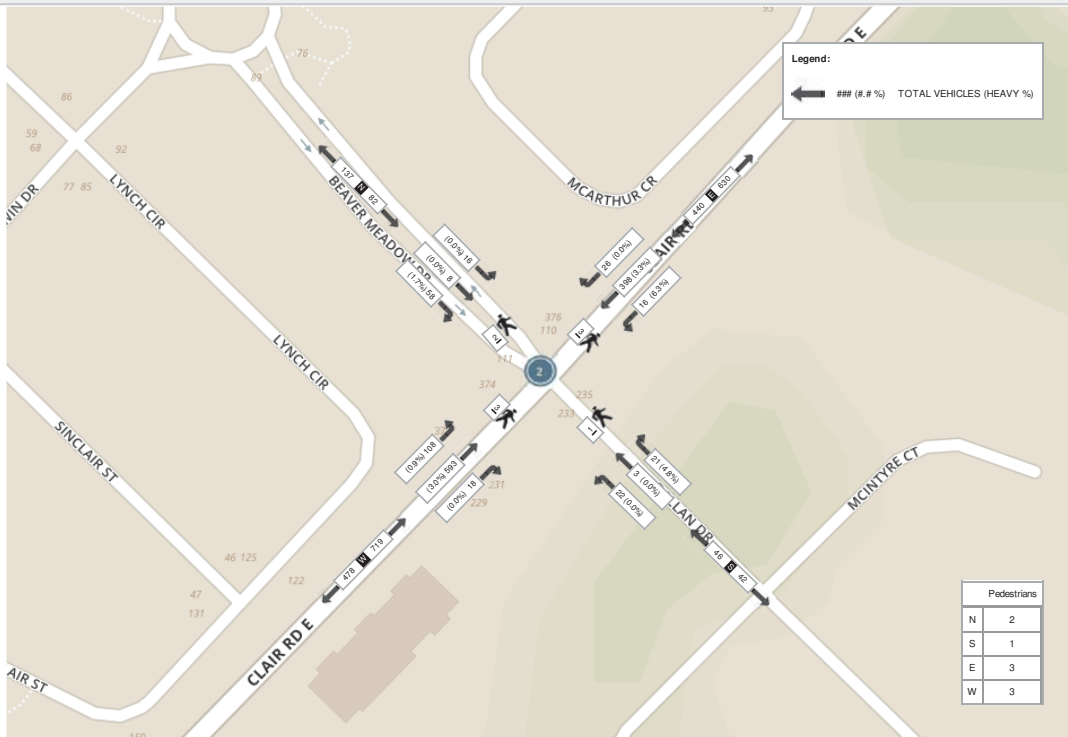
Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (2.8 °C)

Start Time	N Approach BEAVER MEADOW DR						E Approach CLAIR RD						S Approach BEAVER MEADOW DR						W Approach CLAIR RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	13	2	5	0	1	20	8	87	5	0	0	100	6	1	6	0	0	13	5	161	21	0	0	187	320
16:45:00	12	4	5	0	1	21	5	106	4	0	0	115	2	0	6	0	0	8	6	131	29	0	0	166	310
17:00:00	24	1	3	0	0	28	8	105	2	0	3	115	6	2	4	0	0	12	5	145	28	0	0	178	333
17:15:00	9	1	3	0	0	13	5	100	5	0	0	110	7	0	6	0	1	13	2	156	30	1	3	189	325
Grand Total	58	8	16	0	2	82	26	398	16	0	3	440	21	3	22	0	1	46	18	593	108	1	3	720	1288
Approach%	70.7%	9.8%	19.5%	0%	-	-	5.9%	90.5%	3.6%	0%	-	-	45.7%	6.5%	47.8%	0%	-	2.5%	82.4%	15%	0.1%	-	-	-	-
Totals %	4.5%	0.6%	1.2%	0%	-	6.4%	2%	30.9%	1.2%	0%	-	34.2%	1.6%	0.2%	1.7%	0%	-	3.6%	1.4%	46%	8.4%	0.1%	-	55.9%	-
PHF	0.6	0.5	0.8	0	-	0.73	0.81	0.94	0.8	0	-	0.96	0.75	0.38	0.92	0	-	0.88	0.75	0.92	0.9	0.25	-	0.95	-
Heavy	1	0	0	0	-	1	0	13	1	0	-	14	1	0	0	0	-	1	0	18	1	0	-	19	-
Heavy %	1.7%	0%	0%	0%	-	1.2%	0%	3.3%	6.3%	0%	-	3.2%	4.8%	0%	0%	0%	-	2.2%	0%	3%	0.9%	0%	-	2.6%	-
Lights	57	8	16	0	-	81	26	385	15	0	-	426	20	3	22	0	-	45	18	575	107	1	-	701	-
Lights %	98.3%	100%	100%	0%	-	98.8%	100%	96.7%	93.8%	0%	-	96.8%	95.2%	100%	100%	0%	-	97.8%	100%	97%	99.1%	100%	-	97.4%	-
Single-Unit Trucks	1	0	0	0	-	1	0	7	1	0	-	8	0	0	0	0	-	0	0	5	1	0	-	6	-
Single-Unit Trucks %	1.7%	0%	0%	0%	-	1.2%	0%	1.8%	6.3%	0%	-	1.8%	0%	0%	0%	0%	-	0%	0%	0.8%	0.9%	0%	-	0.8%	-
Buses	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	3	0	0	-	3	-
Buses %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	4.8%	0%	0%	0%	-	2.2%	0%	0.5%	0%	0%	-	0.4%	-
Articulated Trucks	0	0	0	0	-	0	0	6	0	0	-	6	0	0	0	0	-	0	0	10	0	0	-	10	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	1.5%	0%	0%	-	1.4%	0%	0%	0%	0%	-	0%	0%	1.7%	0%	0%	-	1.4%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians %	-	-	-	-	22.2%	-	-	-	-	-	33.3%	-	-	-	-	-	11.1%	-	-	-	-	-	33.3%	-	-
Bicycles on Road	0	0	0	0	0	-	0	2	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road %	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (2.1 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (2.8 °C)



Turning Movement Count (6 . CLAIR ROAD E & VICTORIA RD S)

Start Time	S Approach VICTORIA RD S					W Approach CLAIR ROAD E					N Approach VICTORIA RD S					Int. Total (15 min)	Int. Total (1 hr)
	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total		
07:00:00	16	4	0	0	20	12	33	0	0	45	47	59	0	0	106	171	
07:15:00	23	8	0	0	31	19	33	0	0	52	86	63	0	0	149	232	
07:30:00	41	15	0	0	56	13	34	0	0	47	93	73	0	0	166	269	
07:45:00	50	10	0	0	60	15	61	0	0	76	135	75	0	0	210	346	1018
08:00:00	52	10	0	0	62	9	59	0	0	68	84	56	0	0	140	270	1117
08:15:00	67	11	0	0	78	8	57	0	0	65	107	51	0	0	158	301	1186
08:30:00	57	8	0	0	65	8	51	0	0	59	107	48	0	0	155	279	1196
08:45:00	48	19	0	0	67	11	50	0	0	61	91	60	0	0	151	279	1129
BREAK																	
16:00:00	62	10	0	0	72	14	86	0	0	100	68	38	0	0	106	278	
16:15:00	66	12	0	0	78	13	109	0	0	122	81	56	0	0	137	337	
16:30:00	77	15	0	0	92	18	105	0	0	123	66	61	0	0	127	342	
16:45:00	78	18	0	0	96	11	103	0	0	114	76	47	0	0	123	333	1290
17:00:00	79	21	0	0	100	13	99	0	0	112	96	50	0	0	146	358	1370
17:15:00	74	22	0	0	96	15	109	0	0	124	101	46	0	0	147	367	1400
17:30:00	58	12	0	0	70	15	91	0	0	106	81	43	0	0	124	300	1358
17:45:00	70	16	0	0	86	11	70	0	0	81	64	28	0	0	92	259	1284
Grand Total	918	211	0	0	1129	205	1150	0	0	1355	1383	854	0	0	2237	4721	-
Approach%	81.3%	18.7%	0%	-	-	15.1%	84.9%	0%	-	-	61.8%	38.2%	0%	-	-	-	-
Totals %	19.4%	4.5%	0%	-	23.9%	4.3%	24.4%	0%	-	28.7%	29.3%	18.1%	0%	-	47.4%	-	-
Heavy	39	7	0	-	-	5	104	0	-	-	87	27	0	-	-	-	-
Heavy %	4.2%	3.3%	0%	-	-	2.4%	9%	0%	-	-	6.3%	3.2%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

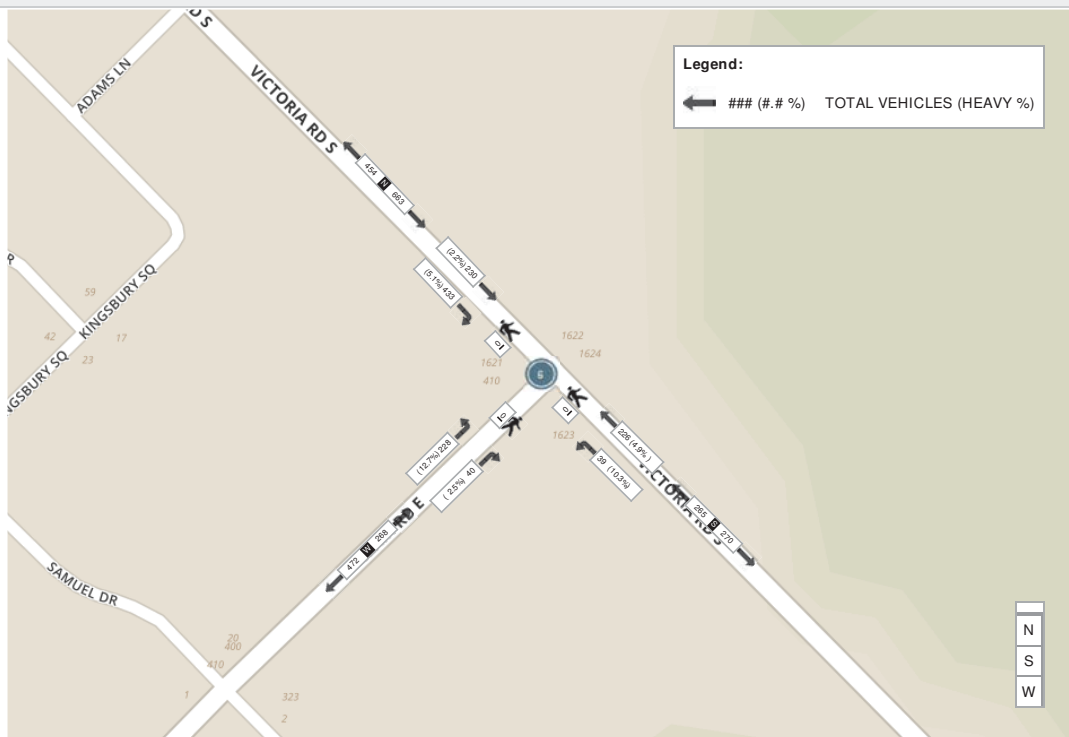
Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (-1.9 °C)

Start Time	S Approach VICTORIA RD S					W Approach CLAIR ROAD E					N Approach VICTORIA RD S					Int. Total (15 min)	
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total		
07:45:00	50	10	0	0	60	15	61	0	0	76	135	75	0	0	210	346	
08:00:00	52	10	0	0	62	9	59	0	0	68	84	56	0	0	140	270	
08:15:00	67	11	0	0	78	8	57	0	0	65	107	51	0	0	158	301	
08:30:00	57	8	0	0	65	8	51	0	0	59	107	48	0	0	155	279	
Grand Total	226	39	0	0	265	40	228	0	0	268	433	230	0	0	663	1196	
Approach%	85.3%	14.7%	0%	-	-	14.9%	85.1%	0%	-	-	65.3%	34.7%	0%	-	-	-	-
Totals %	18.9%	3.3%	0%	-	22.2%	3.3%	19.1%	0%	-	22.4%	36.2%	19.2%	0%	-	55.4%	-	-
PHF	0.84	0.89	0	-	0.85	0.67	0.93	0	-	0.88	0.8	0.77	0	-	0.79	-	-
Heavy	11	4	0	-	15	1	29	0	-	30	22	5	0	-	27	-	-
Heavy %	4.9%	10.3%	0%	-	5.7%	2.5%	12.7%	0%	-	11.2%	5.1%	2.2%	0%	-	4.1%	-	-
Lights	215	35	0	-	250	39	199	0	-	238	411	225	0	-	636	-	-
Lights %	95.1%	89.7%	0%	-	94.3%	97.5%	87.3%	0%	-	88.8%	94.9%	97.8%	0%	-	95.9%	-	-
Single-Unit Trucks	5	0	0	-	5	0	14	0	-	14	15	2	0	-	17	-	-
Single-Unit Trucks %	2.2%	0%	0%	-	1.9%	0%	6.1%	0%	-	5.2%	3.5%	0.9%	0%	-	2.6%	-	-
Buses	6	4	0	-	10	1	2	0	-	3	5	2	0	-	7	-	-
Buses %	2.7%	10.3%	0%	-	3.8%	2.5%	0.9%	0%	-	1.1%	1.2%	0.9%	0%	-	1.1%	-	-
Articulated Trucks	0	0	0	-	0	0	13	0	-	13	2	1	0	-	3	-	-
Articulated Trucks %	0%	0%	0%	-	0%	0%	5.7%	0%	-	4.9%	0.5%	0.4%	0%	-	0.5%	-	-

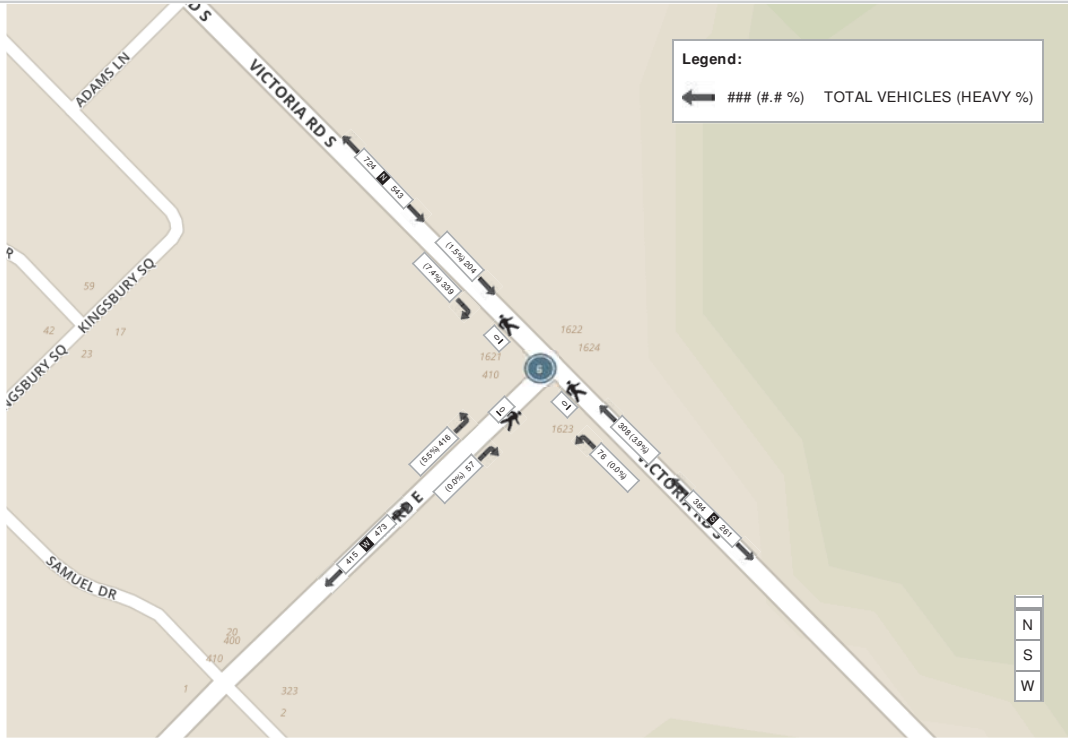
Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	S Approach VICTORIA RD S					W Approach CLAIR ROAD E					N Approach VICTORIA RD S					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	77	15	0	0	92	18	105	0	0	123	66	61	0	0	127	342
16:45:00	78	18	0	0	96	11	103	0	0	114	76	47	0	0	123	333
17:00:00	79	21	0	0	100	13	99	0	0	112	96	50	0	0	146	358
17:15:00	74	22	0	0	96	15	109	0	0	124	101	46	0	0	147	367
Grand Total	308	76	0	0	384	57	416	0	0	473	339	204	0	0	543	1400
Approach%	80.2%	19.8%	0%	-	-	12.1%	87.9%	0%	-	-	62.4%	37.6%	0%	-	-	-
Totals %	22%	5.4%	0%	-	27.4%	4.1%	29.7%	0%	-	33.8%	24.2%	14.6%	0%	-	38.8%	-
PHF	0.97	0.86	0	-	0.96	0.79	0.95	0	-	0.95	0.84	0.84	0	-	0.92	-
Heavy	12	0	0	-	12	0	23	0	-	23	25	3	0	-	28	-
Heavy %	3.9%	0%	0%	-	3.1%	0%	5.5%	0%	-	4.9%	7.4%	1.5%	0%	-	5.2%	-
Lights	296	76	0	-	372	57	393	0	-	450	314	201	0	-	515	-
Lights %	96.1%	100%	0%	-	96.9%	100%	94.5%	0%	-	95.1%	92.6%	98.5%	0%	-	94.8%	-
Single-Unit Trucks	5	0	0	-	5	0	14	0	-	14	17	2	0	-	19	-
Single-Unit Trucks %	1.6%	0%	0%	-	1.3%	0%	3.4%	0%	-	3%	5%	1%	0%	-	3.5%	-
Buses	6	0	0	-	6	0	2	0	-	2	0	1	0	-	1	-
Buses %	1.9%	0%	0%	-	1.6%	0%	0.5%	0%	-	0.4%	0%	0.5%	0%	-	0.2%	-
Articulated Trucks	1	0	0	-	1	0	7	0	-	7	8	0	0	-	8	-
Articulated Trucks %	0.3%	0%	0%	-	0.3%	0%	1.7%	0%	-	1.5%	2.4%	0%	0%	-	1.5%	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (-1.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)



Turning Movement Count (7 . MALTBY RD & GORDON ST)

Start Time	E Approach BEAVR NBO					S Approach WCDOCLMV					W Approach BEAVR NBO					N Approach WCDOCLMV					Int. Total (15 min)	Int. Total (1 hr)				
	Dight N:L	VhT Nu	AsT N:L	f UvT N:N	nSRd N:	EssT poshWptoc	Dight L:N	VhT L:L	AsT L:L	f UvT L:L	nSRd L:	EssT poshWptoc	Dight L:N	VhT L:L	AsT L:N	f UvT L:L	nSRd L:	EssT poshWptoc								
1:01:31	1	1	1	1	1	1	7	02	0	1	1	46	1	7	7	1	1	2	4	101	1	1	1	109	734	
1:02:11	1	7	1	1	1	7	1	92	11	1	1	112	5	5	5	1	1	9	71	130	1	1	1	140	515	
1:03:31	7	7	1	1	1	6	7	95	2	1	1	111	4	7	4	1	1	14	75	131	1	1	1	146	513	
1:04:21	1	5	1	1	1	6	5	170	6	1	1	156	4	1	2	1	1	16	10	149	7	1	1	171	531	1750
1:41:31	7	1	1	1	1	6	2	135	15	1	1	141	3	6	3	1	1	10	4	165	1	1	1	171	525	1577
1:42:11	1	1	5	1	1	5	1	126	9	1	1	136	6	6	2	1	1	15	4	152	1	1	1	166	576	1565
1:43:31	7	1	7	1	1	6	1	101	11	1	1	147	1	6	0	7	1	16	12	136	1	1	1	159	509	1613
1:44:21	1	5	1	1	1	5	1	154	7	1	1	161	2	5	11	1	1	14	11	150	1	1	1	169	511	1533
88FRDNE 88																										
13:11:31	1	1	1	1	1	7	5	710	0	1	1	710	11	7	6	1	1	13	11	160	5	1	1	177	590	
13:12:11	1	7	1	1	1	5	7	143	9	1	1	160	11	5	9	1	1	77	6	103	7	1	1	127	616	
13:13:31	1	1	7	1	1	5	5	773	11	1	1	761	11	1	4	1	1	71	2	141	1	1	1	145	669	
13:14:21	1	1	7	1	1	7	2	706	11	1	1	749	9	5	2	1	1	10	6	149	1	1	1	161	217	1027
10:11:31	1	5	1	1	1	5	1	774	17	1	1	761	16	5	2	1	1	77	11	101	7	1	1	126	664	1415
10:12:11	1	7	7	1	1	6	6	714	7	1	1	726	16	5	15	1	1	51	11	101	1	1	1	124	661	1459
10:13:31	7	1	1	1	1	6	1	753	11	1	1	760	9	1	0	1	1	10	9	123	1	1	1	135	655	1475
10:14:21	1	2	1	1	1	3	1	192	5	1	1	194	3	7	11	1	1	14	5	129	5	1	1	149	540	1014
Grand Total	11	72	13	1	1	21	57	7043	176	1	1	7967	119	61	110	5	1	701	130	7316	14	1	1	741	6063	U
Approach%	19%	69%	51%	1%		U	1%	99%	6%	1%	U	66%	12%	59%	1%		U	3%	95%	1%	1%		U	-	U	
Totals%	1%	1%	1%	1%		1%	1%	1%	6%	1%	6%	7%	1%	1%	1%		6%	7%	65%	1%	1%		63%	-	U	
Heavy	7	1	1	1		U	2	156	7	1	U	6	3	3	1		U	5	17	2	1		U	-	U	
Heavy %	71%	6%	3%	1%		U	12%	6%	1%	1%	U	5%	1%	2%	1%		U	1%	6%	7%	1%		U	-	U	
Bicycles	1	1	1	1		U	1	1	1	1	U	1	1	1	1		U	1	1	1	1		U	-	U	
Bicycle %	1%	1%	1%	1%		U	1%	1%	1%	1%	U	1%	7%	1%	1%		U	1%	1%	1%	1%		U	-	U	

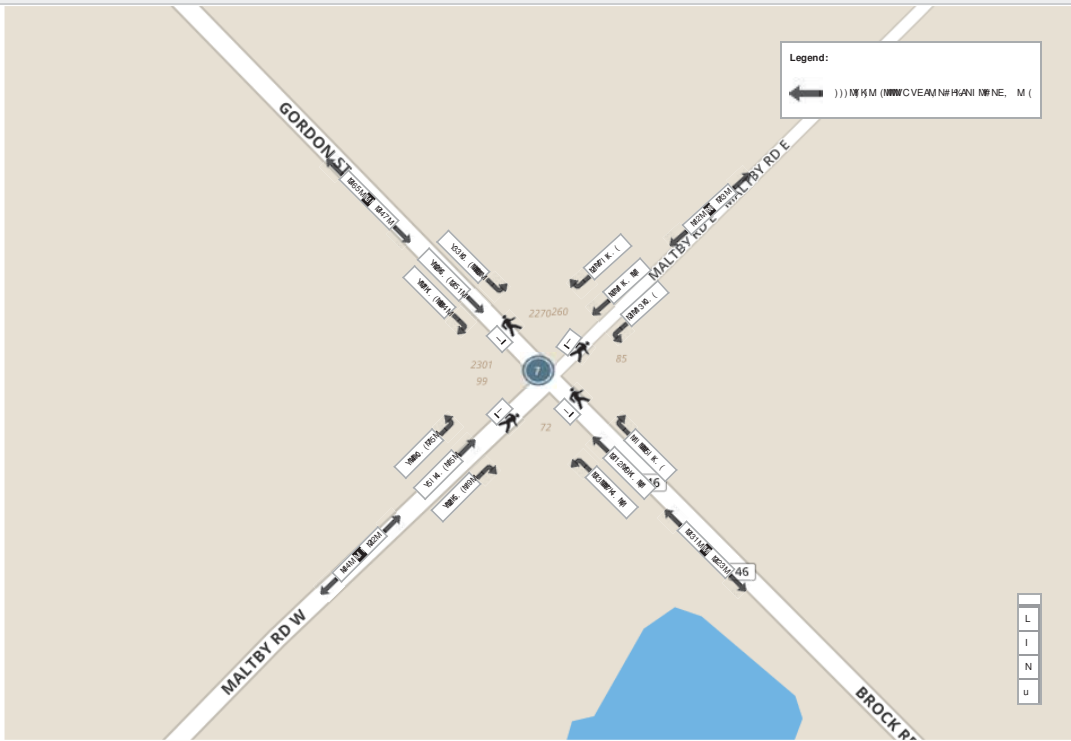
Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (-1.9 °C)

Start Time	E Approach BEAVR NBO						S Approach WCDOCLMV						W Approach BEAVR NBO						N Approach WCDOCLMV						Int. Total (15 min)
	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	
10:02:11	1	5	1	1	1	6	5	170	6	1	1	156	4	1	2	1	1	16	10	149	7	1	1	74	53
14:11:31	7	1	1	1	1	6	2	135	15	1	1	141	3	6	3	1	1	10	4	165	1	1	1	121	525
14:12:11	1	1	5	1	1	5	1	128	9	1	1	136	6	6	2	1	1	15	4	152	1	1	1	166	576
14:5:31	7	1	7	1	1	6	1	101	11	1	1	147	1	6	0	7	1	16	12	136	1	1	1	109	509
Grand Total	2	6	3	1	1	12	11	312	53	1	1	331	19	15	75	5	1	24	64	351	5	1	1	347	1416
Approach%	596	730	61	1	1	U	112	95	216	1	1	U	574	776	590	217	1	U	0	972	116	1	1	U	-
Totals %	116	116	116	1	1	119	110	696	712	1	1	630	116	116	116	117	1	61	516	668	117	1	1	647	-
PHF	1165	1165	112	1	1	1106	112	119	1169	1	1	1101	1129	1181	1187	1164	1	1182	1101	1185	1164	1	1	1187	-
Heavy	1	1	1	1	1	7	5	23	1	1	1	31	1	6	7	1	1	0	1	56	7	1	1	50	-
Heavy %	71	1	130	1	1	156	51	94	74	1	1	94	216	518	40	1	1	174	74	216	330	1	1	216	-
Lights	6	6	2	1	1	15	0	229	52	1	1	31	14	9	71	5	1	21	60	290	1	1	1	362	-
Lights %	41	111	456	1	1	430	01	916	907	1	1	916	990	397	916	111	1	406	906	968	556	1	1	968	-
Single-Unit Trucks	1	1	1	1	1	1	5	71	1	1	1	76	1	5	7	1	1	2	1	10	1	1	1	14	-
Single-Unit Trucks %	1	1	130	1	1	30	51	516	1	1	1	516	1	794	40	1	1	416	71	710	1	1	1	716	-
Buses	1	1	1	1	1	1	1	71	1	1	1	71	1	1	1	1	1	7	1	3	7	1	1	4	-
Buses %	71	1	1	1	1	30	1	516	1	1	1	5	216	01	1	1	1	516	1	1	330	1	1	117	-
Articulated Trucks	1	1	1	1	1	1	1	12	1	1	1	13	1	1	1	1	1	1	1	11	1	1	1	11	-
Articulated Trucks %	1	1	1	1	1	1	1	716	71	1	1	716	1	1	1	1	1	1	1	110	1	1	1	116	-
Bicycles on Road	1	1	1	1	1	U	1	1	1	1	1	U	1	1	1	1	1	U	1	1	1	1	1	U	-
Bicycles on Road %	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U	U	U	M	-

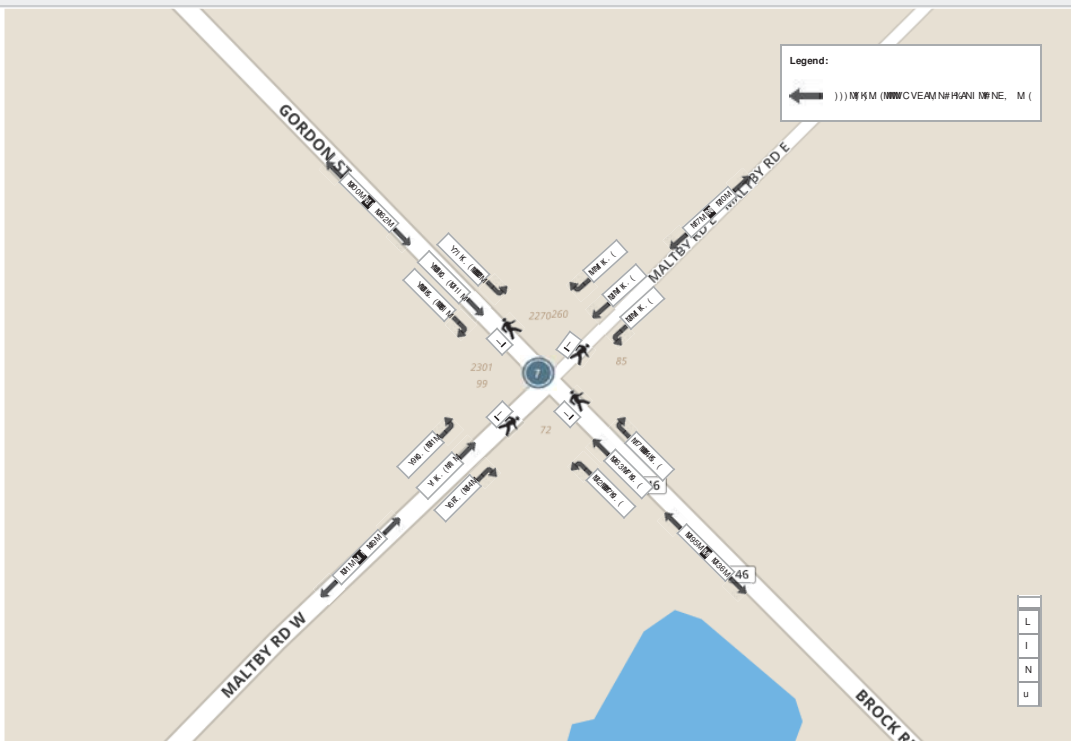
Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	E Approach BEAVR NBO						S Approach WCDOCLMV						W Approach BEAVR NBO						N Approach WCDOCLMV						Int. Total (15 min)
	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	Dght	VhT	ASt	f UvT	nSPt	Ess tpoahWptoc	
13:5:11	1	1	7	1	1	5	5	773	11	1	1	781	11	1	4	1	1	71	2	141	1	1	1	143	669
13:62:11	1	1	7	1	1	7	2	706	11	1	1	749	9	5	2	1	1	10	6	149	1	1	1	196	217
10:11:31	1	5	1	1	1	5	1	774	17	1	1	781	16	5	2	1	1	77	11	101	7	1	1	145	664
10:12:11	1	7	7	1	1	6	6	714	7	1	1	776	16	5	15	1	1	51	11	101	1	1	1	147	661
Grand Total	1	3	3	1	1	17	17	963	52	1	1	995	64	11	51	1	1	49	51	011	2	1	1	062	1839
Approach%	1	21	21	1	1	U	117	9216	512	1	1	U	2516	1117	564	1	1	U	6	9216	110	1	1	U	-
Totals %	1	116	116	1	1	110	110	2116	116	1	1	216	716	112	110	1	1	61	116	546	116	1	1	612	-
PHF	1	112	1102	1	1	1102	110	1183	1105	1	1	1183	1183	1183	1185	118	1	1106	1164	1106	1185	1	1	1183	-
Heavy	1	1	1	1	1	1	1	70	1	1	1	79	7	1	5	1	1	2	1	73	1	1	1	74	-
Heavy %	1	1	1	1	1	1	416	716	716	1	1	716	617	1	910	1	1	216	516	510	71	1	1	516	-
Lights	1	3	3	1	1	17	11	919	56	1	1	936	63	11	74	1	1	46	79	346	6	1	1	010	-
Lights %	1	111	111	1	1	111	910	904	904	1	1	904	924	111	9116	1	1	9616	930	9316	41	1	1	937	-
Single-Unit Trucks	1	1	1	1	1	1	1	9	1	1	1	11	7	1	1	1	1	7	1	13	1	1	1	14	-
Single-Unit Trucks %	1	1	1	1	1	1	1	1	716	1	1	1	617	1	1	1	1	717	516	716	71	1	1	716	-
Buses	1	1	1	1	1	1	1	3	1	1	1	3	1	1	5	1	1	5	1	2	1	1	1	2	-
Buses %	1	1	1	1	1	1	1	118	1	1	1	118	1	1	910	1	1	516	1	110	1	1	1	110	-
Articulated Trucks	1	1	1	1	1	1	1	17	1	1	1	15	1	1	1	1	1	1	1	2	1	1	1	2	-
Articulated Trucks %	1	1	1	1	1	1	416	116	1	1	1	116	1	1	1	1	1	1	1	110	1	1	1	110	-
Bicycles on Road	1	1	1	1	1	U	1	1	1	1	1	U	1	1	1	1	1	U	1	1	1	1	1	U	-
Bicycles on Road %	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U	U	U	M	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (-1.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)



Turning Movement Count (8 . MALTBY RD & VICTORIA RD S (NORTH LEG))

Start Time	N Approach VICTORIA RD S LEORTh ru: N					E Approach e ArTt RD					W Approach e ArTt RD					Int. Total (15 min)	Int. Total (1 hr)
	RW n ERl	r spn ERl	o aTcli E/E	gs07 EP	A111642- T6n43	RW n u/E	T-lc uRl	o aTcli uRl	gs07 uP	A111642- T6n43	T-lc d Rl	r spn d/E	o aTcli d Rl	gs07 d P	A111642- T6n43		
59P5P55	89	9	5	5	9*	B	K	5	5	.	B	B%	5	5	BK	%B	
59P. P55	9%	%B	5	5	GK	.	K	5	5	G	%	B9	5	5	BG	%v	
59R5P55	G5	.	5	5	G	8	.	5	5	%%	K	*K	5	5	*8	%B	
59P. P55	95	v	5	5	9v	.	B	5	5	9	B	.	5	5	.8	%B	.5.
5G55P55	8.	K	5	5	8G	*	8	5	5	%6	*	8v	5	5	9K	%%	..*
5GP. P55	8%	%	5	5	8B	9	%	5	5	G	B	.v	5	5	8%	%%	.88
5GR5P55	*8	%	5	5	*9	*	%	5	5	.	B	.8	5	5	.G	%6	.K*
5GP. P55	85	%B	5	5	98	v	K	5	5	%B	K	*v	5	5	.B	%5	.KB
...f RuAM...																	
%P55P55	*%	G	5	5	*v	%6	B	5	5	%B	*	9G	5	5	GB	%K	
%P. P55	.K	9	5	5	85	.	K	5	5	G	B	.G	5	5	85	%BG	
%R5P55	8v	%6	5	5	9v	%%	5	5	5	%%	*	G%	5	5	G	%B	
%P. P55	..	v	5	%	8*	B	.	5	5	9	.	v%	5	5	v8	%B9	8%K
%P55P55	.B	%6	5	5	8B	v	%	5	5	%6	*	v%	5	5	v.	%B9	8K9
%P. P55	.*	8	5	5	85	v	*	5	5	%K	*	GB	5	5	GB	%v	88G
%R5P55	*v	*	5	5	.K	.	K	5	5	G	*	8K	5	5	89	%BG	8B%
%P. P55	K%	.	5	5	K8	9	*	5	5	%%	B	9.	5	5	99	%B*	.9G
Grand Total	vB*	%K	5	%	%K9	%5	*8	5	5	%8	*G	vv9	5	5	%6*	2228	a
Approach%	Qrnl&	%m&	5&	a	8Qm&	K%&	5&	a	*r8&	v.rn&	5&	a	-	a	-	a	-
Totals %	*%n&	.rn&	5&	*8m&	*m&	B%&	5&	8r8&	B%&	**r8&	5&	*8m&	-	a	-	a	-
Heavy	B.	%6	5	a	.	8	5	a	K	*B	5	a	-	a	-	a	-
Heavy %	B%&	G%&	5&	a	.&	%K&	5&	a	8rK&	*rB&	5&	a	-	a	-	a	-
Bicycles	5	5	5	a	5	5	5	a	%	5	5	a	-	a	-	a	-
Bicycle %	5&	5&	5&	a	5&	5&	5&	a	B%&	5&	5&	a	-	a	-	a	-

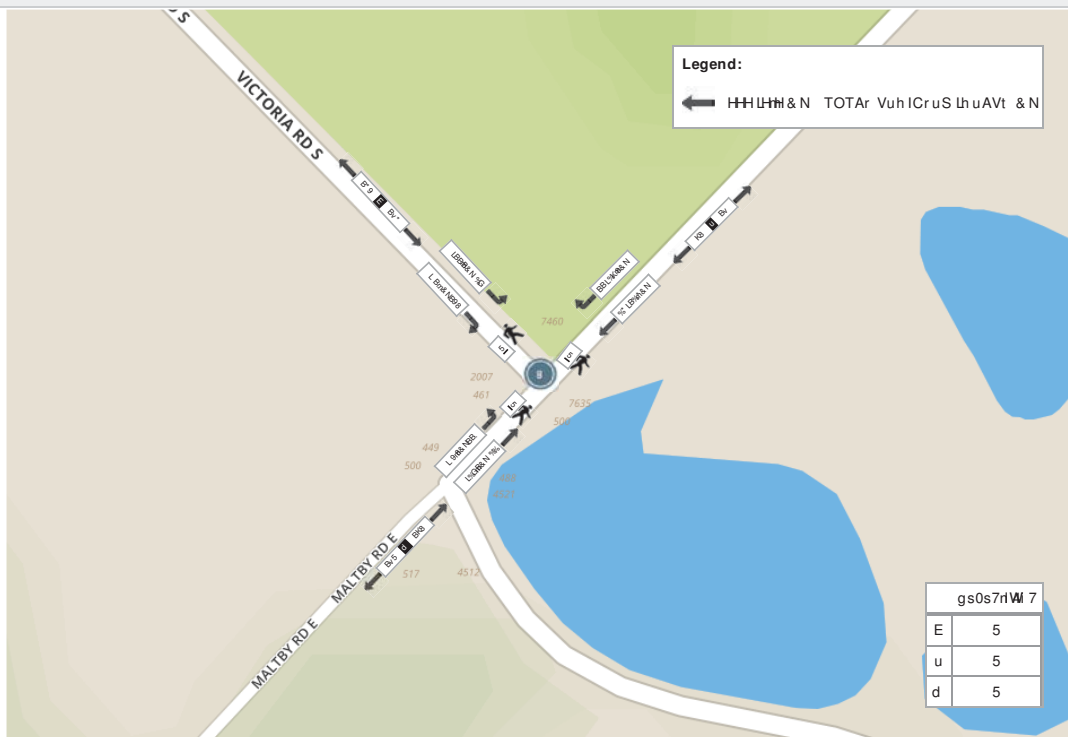
Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (-1.9 °C)

Start Time	N Approach VICTORIA RD S LEORTh ru: N					E Approach e ArTt RD					W Approach e ArTt RD					Int. Total (15 min)	
	RW n	r spn	o aTcli	gs07	A111642- T6n43	RW n	T-lc	o aTcli	gs07	A111642- T6n43	T-lc	r spn	o aTcli	gs07	A111642- T6n43		
59R5P55	G5	.	5	5	G	8	.	5	5	%%	K	*K	5	5	*8	%B	
59P. P55	95	v	5	5	9v	.	B	5	5	9	B	.	5	5	.8	%B	
5G55P55	8.	K	5	5	8G	*	8	5	5	%6	*	8v	5	5	9K	%%	
5GP. P55	8%	%	5	5	8B	9	%	5	5	G	B	.v	5	5	8%	%%	
Grand Total	B98	%G	5	5	Bv*	BB	%	5	5	K8	%%	B8	5	5	BK8	566	
Approach%	vKn&	8rn&	5&	a	8%rn&	KQn&	5&	a	*r8&	v.rK&	5&	a	-	a	-	a	-
Totals %	*Gr&	KrB&	5&	.%n&	Kn&	Bm&	5&	8rn&	%n&	Kvr&	5&	*%8&	-	a	-	a	-
PHF	5rn&	5m	5	5rn&	5rnv	5mG	5	5rn&	5rnv	5rn&	5	5rn&	-	a	-	a	-
Heavy	9	*	5	%%	K	K	5	8	B	%	5	%v	-	a	-	a	-
Heavy %	Bm&	BBB&	5&	KrB&	%Kr&	B%h&	5&	%Bn&	%Gr&	9rn&	5&	Gn&	-	a	-	a	-
Lights	B8v	%	5	BCK	%v	%%	5	K5	v	B5G	5	B%9	-	a	-	a	-
Lights %	v9m&	99rn&	5&	v8rn&	Grh&	9G8&	5&	CKrK&	G%G&	vBh&	5&	v%n&	-	a	-	a	-
Single-Unit Trucks	*	5	5	*	5	%	5	%	%	v	5	%6	-	a	-	a	-
Single-Unit Trucks %	%n&	5&	5&	%n&	5&	9rn&	5&	Brn&	vrn&	*&	5&	*rn&	-	a	-	a	-
Buses	B	*	5	8	K	B	5	.	%	G	5	v	-	a	-	a	-
Buses %	5rn&	BBB&	5&	B&	%Kr&	%rK&	5&	%Kn&	vrn&	KrB&	5&	Krn&	-	a	-	a	-
Articulated Trucks	%	5	5	%	5	5	5	5	5	5	5	5	5	5	5	5	-
Articulated Trucks %	5rn&	5&	5&	5rn&	5&	5&	5&	5&	5&	5&	5&	5&	5&	5&	5&	5&	-
Pedestrians	a	a	a	5	a	a	a	5	a	a	a	a	5	a	-	a	-
Pedestrians%	a	a	a	5&	a	a	a	5&	a	a	a	a	5&	a	-	a	-
Bicycles on Road	5	5	5	5	a	5	5	5	5	a	5	5	5	5	a	-	a
Bicycles on Road%	a	a	a	5&	a	a	a	5&	a	a	a	a	5&	a	-	a	-

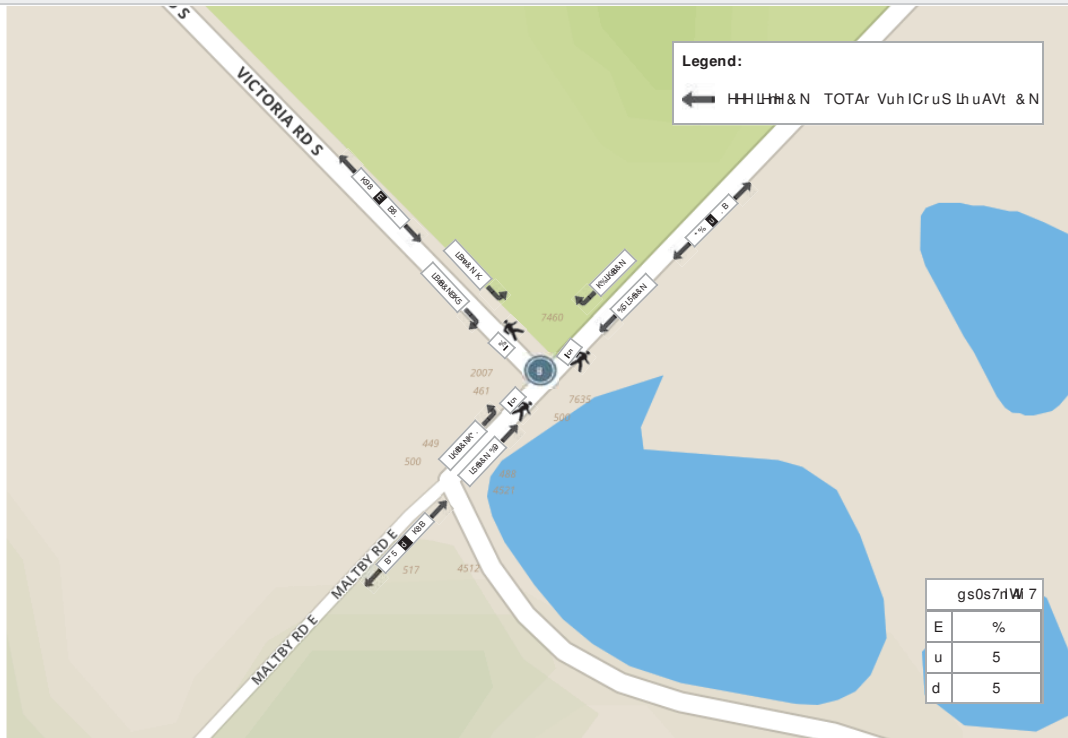
Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	N Approach VICTORIA RD S IEORTh ru: N					E Approach e ArTf t RD					W Approach e ArTf t RD					Int. Total (15 min)
	RW-n	r spn	o a f c li	gs07	A111642- T6m43	RW-n	T- lc	o a f c li	gs07	A111642- T6m43	T- lc	r spn	o a f c li	gs07	A111642- T6m43	
%8R5F55	8v	%5	5	5	9v	%%	5	5	5	%%	*	G%	5	5	G	%0.
%8P . F55	.	v	5	%	8*	B	.	5	5	9	.	v%	5	5	v8	%89
%9F55F55	.B	%5	5	5	8B	v	%	5	5	%5	*	v%	5	5	v.	%89
%9P% F55	.*	8	5	5	85	v	*	5	5	%K	*	GB	5	5	GB	%v
Grand Total	BK5	K	5	%	B8.	K%	%5	5	5	*%	%0	K.	5	5	K8B	668
Approach%	G8r6%	%KfB%	5&		a	9. r0%	B' r0%	5&		a	*r0%	v. r0%	5&		a	-
Totals %	K' r0%	. r0%	5&		Kv r0%	* r0%	%0%	5&		8r0%	Bm%	. %0%	5&		* r0%	-
PHF	5r0K	5r0G	5		5r0T	5r0	5m	5		5r0v	5r0	5m.	5		5m*	-
Heavy	.	%	5		8	%	5	5		%	5	%%	5		%%	-
Heavy %	Bf0%	Bm%	5&		Bf0%	Kf0%	5&	5&		Bf0%	5&	Kf0%	5&		K%	-
Lights	BB.	K'	5		B. v	K5	%5	5		*5	%9	KK'	5		K %	-
Lights %	v9r0%	v9r0%	5&		v9r0%	v8r0%	%5&	5&		v9r0%	%5&	v8r0%	5&		v9%	-
Single-Unit Trucks	*	5	5		*	5	5	5		5	5	.	5		.	-
Single-Unit Trucks %	%0%	5&	5&		%0%	5&	5&	5&		5&	5&	%0%	5&		%0%	-
Buses	5	%	5		%	%	5	5		%	5	.	5		.	-
Buses %	5&	Bm%	5&		5r0%	Kf0%	5&	5&		Bf0%	5&	%0%	5&		%0%	-
Articulated Trucks	%	5	5		%	5	5	5		5	5	%	5		%	-
Articulated Trucks %	5r0%	5&	5&		5r0%	5&	5&	5&		5&	5&	5r0%	5&		5r0%	-
Pedestrians	a	a	a	%	a	a	a	5		a	a	a	a	5	a	-
Pedestrians%	a	a	a	%5&	a	a	a	5&		a	a	a	a	5&	a	-
Bicycles on Road	5	5	5	5	a	5	5	5	5	a	%	5	5	5	a	-
Bicycles on Road%	a	a	a	5&	a	a	a	5&		a	a	a	5&		5&	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (-1.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)



Tcll WJJe 6ys(si nC6ci n

g4Ls . 6p8

f AC%9t 8g

Turning Movement Count (9 . MALTBY RD & VICTORIA RD S (SOUTH LEG))

Start Time	W Approach				S Approach				E Approach				Int. Total (15 min)	Int. Total (1 hr)
	VICTO R A	DTS. R /AE	hru: R A	NeeS t WUDf 0-	nr RD /AR	VICTO /AE	hru: A	NeeS t WUDf 0-	DTS. E/AR	nr RD EA	hru: EA	NeeS t WUDf 0-		
dsAldAld	p	o	d	a	p	cl	d	pc	o	ai	d	al	la	
dsAcl AId	d	i	d	i	d	po	d	po	i	ag	d	s0	cdp	
dsA0dAId	c	l	d	cd	c	0g	d	0l	o	ss	d	gc	c0d	
dsAbl AId	p	s	d	l	c	i0	d	io	s	a0	d	sd	c00	oac
dgAldAId	i	s	d	cp	p	aa	d	ag	s	il	d	aa	coa	icc
dgAcl AId	d	s	d	s	d	io	d	io	i	is	d	ap	cp0	i0p
dgA0dAId	0	g	d	cc	p	id	d	ip	p	os	d	ol	ccp	ico
dgAbl AId	0	o	d	s	c	ip	d	io	i	ia	d	ac	cpc	idp
7771 VEN677														
caAldAld	d	g	d	g	d	si	d	si	o	0s	d	oc	cpo	
caAcl AId	0	i	d	g	d	io	d	io	o	ip	d	ia	ccg	
caA0dAId	p	l	d	cc	c	ss	d	sg	i	ao	d	al	cig	
caAbl AId	p	cd	d	cp	o	gs	d	lc	i	io	d	ig	cac	iac
csAldAId	c	g	d	l	c	gi	c	ga	o	os	d	ic	coa	ig0
csAcl AId	0	i	d	g	d	gc	d	gc	o	ip	d	ia	coi	acd
csA0dAId	d	a	d	a	d	ap	d	ap	a	oa	d	ip	cpd	isp
csAbl AId	0	0	d	a	0	so	d	ss	o	0c	d	0l	ccg	ipl
Grand Total	0d	cdi	d	c0i	cg	lic	c	lal	si	gso	d	lol	2053	4
Approach%	pp3	ss3		4	c23	lg23		4	s23	lp23		4	-	4
Totals %	c23	i23		a23	d23	oa23		os23	023	op23		oa23	-	4
Heavy	0	i		4	p	pp		4	o	pd		4	-	4
Heavy %	cd3	o23		4	cc23	p23		4	i23	p23		4	-	4
Bicycles	d	c		4	d	d		4	d	d		4	-	4
Bicycle %	d3	c3		4	d3	d3		4	d3	d3		4	-	4

DLSl*Q6f8r, r*0fl*O

ht Q l0WU

1N9 csMh

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (-1.9 °C)

Start Time	W Approach				S Approach				E Approach				Int. Total (15 min)
	VICTO	DTSL	hr u:	NeeSt WUDf 0-	nr FD	VICTO	hr u:	NeeSt WUDf 0-	DTSL	nr FD	hr u:	NeeSt WUDf 0-	
dsAdAid	c	l	d	cd	c	0g	d	0l	o	ss	d	gc	c0d
dsAi AId	p	s	d	l	c	i 0	d	i o	s	a0	d	sd	c00
dgAdAid	i	s	d	cp	p	aa	d	ag	s	i l	d	aa	coa
dgAi AId	d	s	d	s	d	i o	d	i o	i	i s	d	ap	cp0
Grand Total	g	0d	d	0g	o	pcc	d	pci	p0	pi a	d	psl	532
Approach%	pc23	sg2 3		4	c2 3	lg23		4	g23	lc23		4	-
Totals %	c2 3	i 2a3		s2:3	d23	0l 2a3		od23	o23	og2:3		i p23	-
PHF	d2b	d230		d2l	d2	d23		d2l	d2p	d230		d23a	-
Heavy	p	c		0	d	a		a	d	p		p	-
Heavy %	pi 3	023		s2 3	d3	p23		p23	d3	d23		d23	-
Lights	a	pl		0i	o	pdi		pdl	p0	pi o		pss	-
Lights %	si 3	la23		lp2:3	cdd3	ls23		ls23	cdd3	ll 23		ll 23	-
Single-Unit Trucks	d	d		d	d	d		d	d	d		d	-
Single-Unit Trucks %	d3	d3		d3	d3	d3		d3	d3	d3		d3	-
Buses	p	c		0	d	a		a	d	p		p	-
Buses %	pi 3	023		s2 3	d3	p23		p23	d3	d23		d23	-
Articulated Trucks	d	d		d	d	d		d	d	d		d	-
Articulated Trucks %	d3	d3		d3	d3	d3		d3	d3	d3		d3	-
Pedestrians	4	4	d	4	4	4	d	4	4	4	d	4	-
Pedestrians%	4	4	d3	U	4	4	d3	U	4	4	d3	U	-
Bicycles on Road	d	d	d	4	d	d	d	4	d	d	d	4	-
Bicycles on Road%	4	4	d3	U	4	4	d3	U	4	4	d3	U	-

Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

Start Time	W Approach				S Approach				E Approach				Int. Total (15 min)
	VICTO	DTSL	hr u:	NeeSt WUDf 0-	nr FD	VICTO	hr u:	NeeSt WUDf 0-	DTSL	nr FD	hr u:	NeeSt WUDf 0-	
caAdAid	p	l	d	cc	c	ss	d	sg	i	ao	d	al	ci g
caAi AId	p	cd	d	cp	o	gs	d	lc	i	i 0	d	ig	cac
csAdAid	c	g	d	l	c	gi	c	ga	o	os	d	ic	coa
csAi AId	0	i	d	g	d	gc	d	gc	o	ip	d	ia	coi
Grand Total	g	0p	d	od	a	00d	c	00a	cg	pca	d	p0o	610
Approach%	pd3	gd3		4	c23	lg23		4	s23	lp23		4	-
Totals %	c23	i 23		a2a3	c3	i o23		ii 23	03	0i 23		0g23	-
PHF	d2as	d23		d230	d23g	d2 i		d2 p	d2	d230		d23i	-
Heavy	c	c		p	p	cc		c0	p	0		i	-
Heavy %	cp2 3	02:3		i 3	0023	023		02 3	cc2:3	c23		p2:3	-
Lights	s	0c		0g	o	0cl		0p0	ca	pc0		ppl	-
Lights %	gs2 3	la2 3		li 3	aa23	la23		la2:3	gg2 3	lg23		ls2 3	-
Single-Unit Trucks	d	d		d	p	a		g	p	0		i	-
Single-Unit Trucks %	d3	d3		d3	0023	c23		p23	cc2:3	c23		p2:3	-
Buses	c	d		c	d	i		i	d	d		d	-
Buses %	cp2 3	d3		p2 3	d3	c2 3		c2 3	d3	d3		d3	-
Articulated Trucks	d	c		c	d	d		d	d	d		d	-
Articulated Trucks %	d3	02:3		p2 3	d3	d3		d3	d3	d3		d3	-
Pedestrians	4	4	d	4	4	4	c	4	4	4	d	4	-
Pedestrians%	4	4	d3	U	4	4	cdd3	U	4	4	d3	U	-
Bicycles on Road	d	c	d	4	d	d	d	4	d	d	d	4	-
Bicycles on Road%	4	4	d3	U	4	4	d3	U	4	4	d3	U	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (-1.9 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Partly Cloudy (-3 °C)

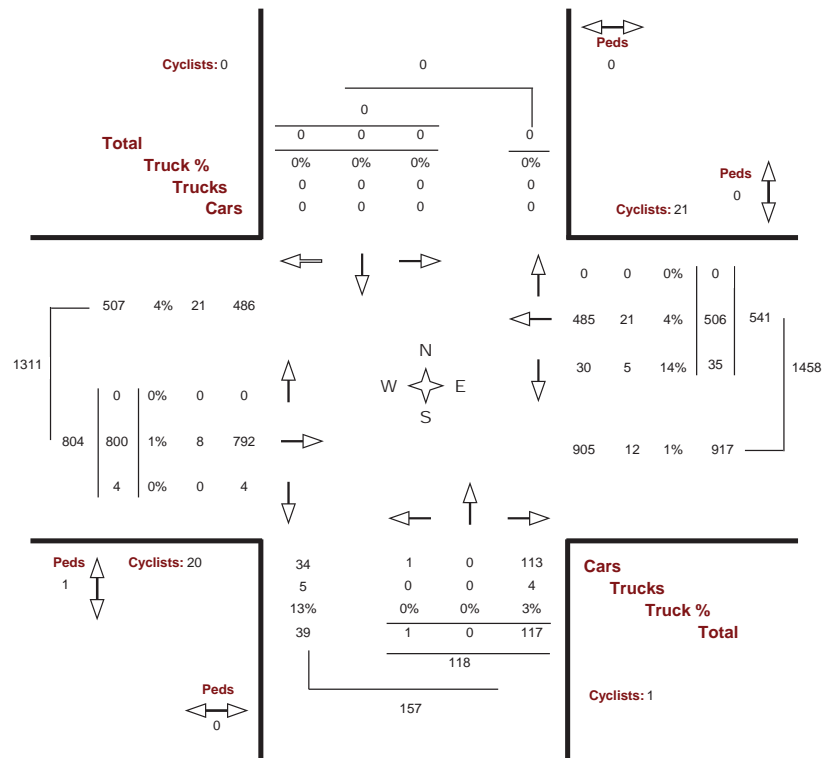




Turning Movements Report - Full Study

Location..... CLAIR RD W @ LAIRD RD
Municipality. GUELPH
Traffic Cont.
Major Dir..... None

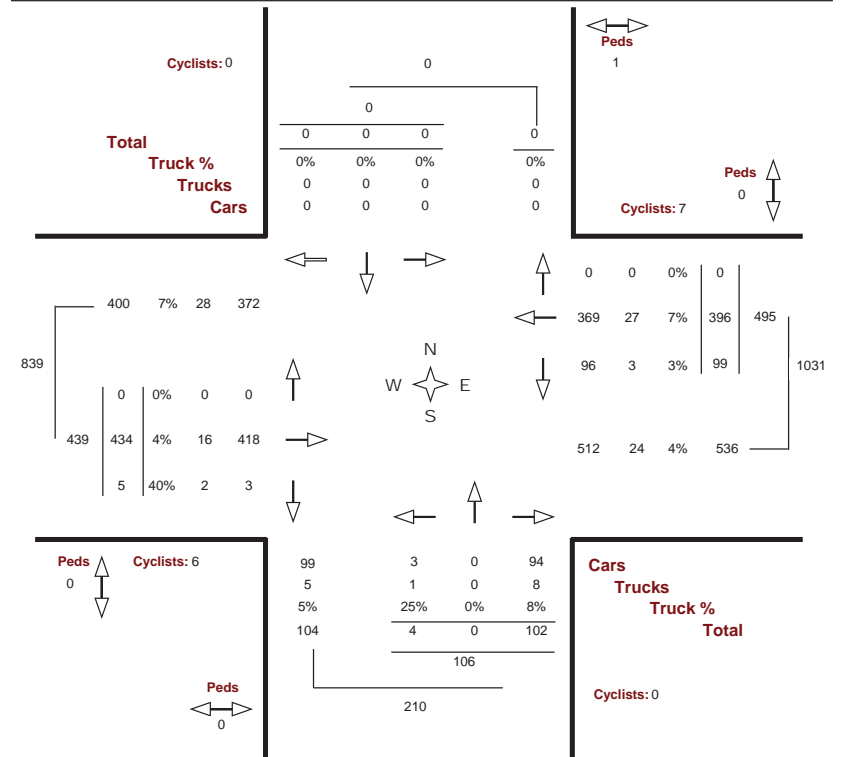
GeoID..... I725
Count Date. Thursday, 08 October, 2015
Count Time. 07:00 AM — 06:00 PM
Peak Hour.. 04:30 PM — 05:30 PM



Turning Movements Report - MD Period

Location..... CLAIR RD W @ LAIRD RD
Municipality. GUELPH
Traffic Cont.
Major Dir..... None

GeoID..... I725
Count Date. Thursday, 08 October, 2015
Count Time. 11:00 AM — 02:00 PM
Peak Hour.. 12:00 PM — 01:00 PM

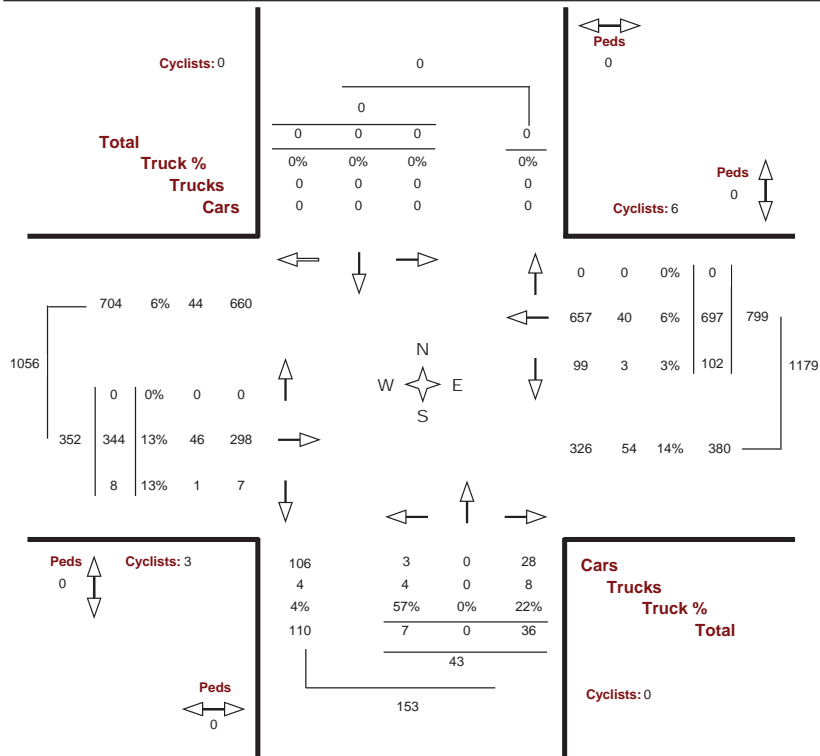




Turning Movements Report - AM Period

Location..... CLAIR RD W @ LAIRD RD
Municipality. GUELPH
Traffic Cont.
Major Dir..... None

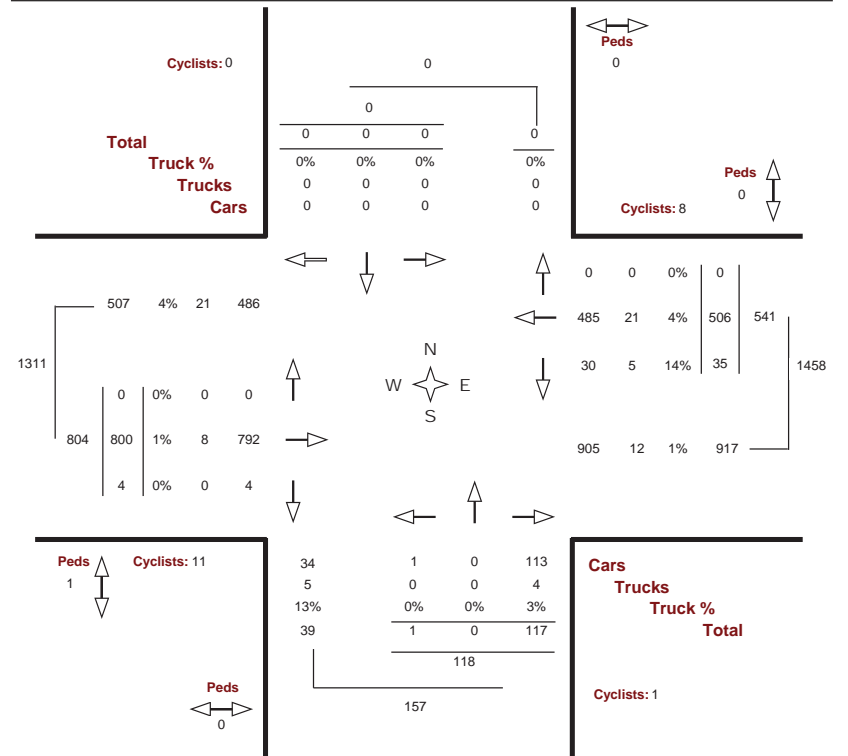
GeoID..... I725
Count Date. Thursday, 08 October, 2015
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... CLAIR RD W @ LAIRD RD
Municipality. GUELPH
Traffic Cont.
Major Dir..... None

GeoID..... I725
Count Date. Thursday, 08 October, 2015
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:30 PM — 05:30 PM



Appendix M – Synchro Analysis Results: Existing Traffic Conditions

Queues
1: Gordon St. & Clair Rd.

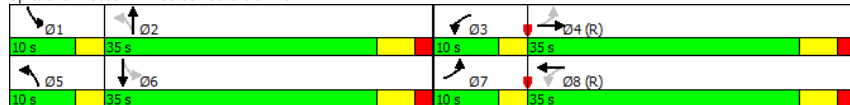
Existing Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	250	615	115	390	155	485	175	535
Future Volume (vph)	250	615	115	390	155	485	175	535
Lane Group Flow (vph)	250	715	115	480	155	650	175	655
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	24.0	9.5	24.0	9.5	24.0
Total Split (s)	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0
Total Split (%)	11.1%	38.9%	11.1%	38.9%	11.1%	38.9%	11.1%	38.9%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	3.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	C-Max	None	C-Max
v/c Ratio	0.63	0.60	0.41	0.43	0.49	0.59	0.53	0.59
Control Delay	39.6	41.4	15.4	20.8	20.1	25.8	21.0	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	41.4	15.4	20.8	20.1	25.8	21.0	26.9
Queue Length 50th (m)	46.0	71.4	14.4	34.5	15.9	47.2	18.2	49.6
Queue Length 95th (m)	69.9	90.4	24.7	47.7	28.3	65.3	31.3	67.8
Internal Link Dist (m)		775.0		194.1		153.6		314.0
Turn Bay Length (m)	75.0		25.0		50.0		140.0	
Base Capacity (vph)	399	1200	284	1104	316	1106	330	1105
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	0.63	0.60	0.40	0.43	0.49	0.59	0.53	0.59

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green, Master Intersection
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Splits and Phases: 1: Gordon St. & Clair Rd.



HCM Signalized Intersection Capacity Analysis
1: Gordon St. & Clair Rd.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓	↖	↗	↓	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗		
Traffic Volume (vph)	250	615	100	115	390	90	155	485	165	175	535	120	
Future Volume (vph)	250	615	100	115	390	90	155	485	165	175	535	120	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0		
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95		
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.97		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1760	3445		1593	3357		1716	3317		1783	3364		
Flt Permitted	0.39	1.00		0.27	1.00		0.29	1.00		0.29	1.00		
Satd. Flow (perm)	729	3445		453	3357		516	3317		542	3364		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	615	100	115	390	90	155	485	165	175	535	120	
RTOR Reduction (vph)	0	14	0	0	22	0	0	37	0	0	21	0	
Lane Group Flow (vph)	250	701	0	115	458	0	155	613	0	175	634	0	
Confl. Peds. (#/hr)	17		7	7		17	2		11	11		2	
Confl. Bikes (#/hr)							1						
Heavy Vehicles (%)	1%	1%	2%	12%	3%	1%	4%	1%	8%	0%	2%	7%	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	37.4	30.4		34.6	29.0		36.0	29.0		36.0	29.0		
Effective Green, g (s)	37.4	30.4		34.6	29.0		36.0	29.0		36.0	29.0		
Actuated g/C Ratio	0.42	0.34		0.38	0.32		0.40	0.32		0.40	0.32		
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	383	1163		245	1081		299	1068		313	1083		
v/s Ratio Prot	c0.05	0.20		0.03	0.14		0.04	0.18		c0.04	c0.19		
v/s Ratio Perm	c0.22			0.15			0.17			0.18			
v/c Ratio	0.65	0.60		0.47	0.42		0.52	0.57		0.56	0.59		
Uniform Delay, d1	19.1	24.8		18.9	23.9		18.3	25.4		18.5	25.5		
Progression Factor	1.94	1.60		0.79	0.87		1.00	1.00		1.00	1.00		
Incremental Delay, d2	3.7	2.2		1.4	1.2		1.5	2.2		2.2	2.3		
Delay (s)	40.8	41.8		16.3	22.0		19.8	27.6		20.6	27.8		
Level of Service	D	D		B	C		B	C		C	C		
Approach Delay (s)		41.6			20.9			26.1			26.3		
Approach LOS		D			C			C			C		

Intersection Summary

HCM 2000 Control Delay: 29.8, HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.63
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 18.0
 Intersection Capacity Utilization: 74.2%, ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

Queues
2: Gordon St. & Poppy Dr.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

Lane Group	WBL	WBT	NBL	NBT	SBL	SBT	Ø4
Lane Configurations		↔	↔	↕	↕	↕	
Traffic Volume (vph)	45	5	5	815	40	710	
Future Volume (vph)	45	5	5	815	40	710	
Lane Group Flow (vph)	0	90	5	865	40	715	
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	
Protected Phases		8	5	2	1	6	4
Permitted Phases		8		2		6	
Detector Phase		8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	9.5	24.0	24.0
Total Split (s)	30.0	30.0	10.0	50.0	10.0	50.0	30.0
Total Split (%)	33.3%	33.3%	11.1%	55.6%	11.1%	55.6%	33%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	3.0	6.0	3.0	6.0	6.0	
Lead/Lag			Lead	Lag	Lead	Lag	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Max	None	Max	None
v/c Ratio		0.45	0.01	0.35	0.08	0.27	
Control Delay		26.9	2.8	7.1	2.8	4.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	
Total Delay		26.9	2.8	7.1	2.8	4.8	
Queue Length 50th (m)		6.8	0.2	30.1	1.0	14.6	
Queue Length 95th (m)		19.9	0.9	49.8	3.6	38.6	
Internal Link Dist (m)		256.4		1837.2		153.6	
Turn Bay Length (m)			65.0		27.0		
Base Capacity (vph)		505	648	2447	549	2642	
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		0.18	0.01	0.35	0.07	0.27	

Intersection Summary	
Cycle Length:	90
Actuated Cycle Length:	73.5
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated

Splits and Phases: 2: Gordon St. & Poppy Dr.



HCM Signalized Intersection Capacity Analysis
2: Gordon St. & Poppy Dr.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	0	0	45	5	40	5	815	50	40	710	5
Future Volume (vph)	0	0	0	45	5	40	5	815	50	40	710	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor					1.00		1.00	0.95		1.00	0.95	
Frt					0.94		1.00	0.99		1.00	1.00	
Flt Protected					0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)					1689		1750	3470		1750	3496	
Flt Permitted					0.84		0.38	1.00		0.30	1.00	
Satd. Flow (perm)					1457		700	3470		546	3496	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	45	5	40	5	815	50	40	710	5
RTOR Reduction (vph)	0	0	0	0	36	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	54	0	5	862	0	40	715	0
Turn Type				Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases					8		5	2		1	6	
Permitted Phases		4			8		2			6		
Actuated Green, G (s)					7.0		52.8	51.7		57.8	54.2	
Effective Green, g (s)					7.0		52.8	51.7		57.8	54.2	
Actuated g/C Ratio					0.09		0.68	0.67		0.75	0.70	
Clearance Time (s)					6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)					3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)					131		493	2320		464	2451	
v/s Ratio Prot					0.00		0.00	c0.25		c0.00	0.20	
v/s Ratio Perm					c0.04		0.01			0.06		
v/c Ratio					0.41		0.01	0.37		0.09	0.29	
Uniform Delay, d1					33.2		3.9	5.6		2.7	4.3	
Progression Factor					1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2					2.1		0.0	0.5		0.1	0.3	
Delay (s)					35.3		3.9	6.1		2.8	4.6	
Level of Service					D		A	A		A	A	
Approach Delay (s)		0.0			35.3		6.1			4.5		
Approach LOS		A			D		A			A		

Intersection Summary	
HCM 2000 Control Delay	6.9
HCM 2000 Volume to Capacity ratio	0.36
Actuated Cycle Length (s)	77.3
Intersection Capacity Utilization	46.8%
Analysis Period (min)	15
ICU Level of Service	A
Sum of lost time (s)	15.0

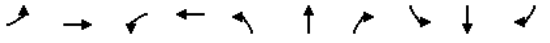
c Critical Lane Group

Queues

3: Poppy Dr./Clairfields Dr. & Clair Rd.

Existing Traffic Conditions

Weekday Afternoon Peak Hour

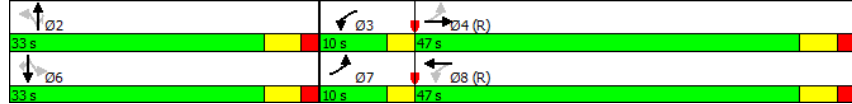


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↕	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	105	805	25	430	10	5	35	20	5	75
Future Volume (vph)	105	805	25	430	10	5	35	20	5	75
Lane Group Flow (vph)	105	815	25	475	0	15	35	0	25	75
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	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	24.0	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	47.0	10.0	47.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	11.1%	52.2%	11.1%	52.2%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max	Max
v/c Ratio	0.19	0.45	0.06	0.29		0.03	0.07		0.05	0.14
Control Delay	8.6	15.1	11.7	19.4		22.6	1.4		23.0	6.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	8.6	15.1	11.7	19.4		22.6	1.4		23.0	6.6
Queue Length 50th (m)	7.4	40.9	2.6	34.8		1.9	0.0		3.2	0.0
Queue Length 95th (m)	14.3	70.3	m5.6	45.7		6.5	1.8		9.1	9.9
Internal Link Dist (m)		186.5		775.0		114.2			150.9	
Turn Bay Length (m)	55.0		45.0			20.0			20.0	
Base Capacity (vph)	541	1831	413	1656		490	520		465	522
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	0.19	0.45	0.06	0.29		0.03	0.07		0.05	0.14

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 86.4 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Poppy Dr./Clairfields Dr. & Clair Rd.

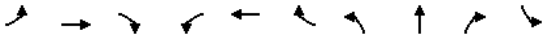


HCM Signalized Intersection Capacity Analysis

3: Poppy Dr./Clairfields Dr. & Clair Rd.

Existing Traffic Conditions

Weekday Afternoon Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	105	805	10	25	430	45	10	5	35	20	5	75
Future Volume (vph)	105	805	10	25	430	45	10	5	35	20	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	1.00
Flt Protected	0.95	1.00		0.95	1.00		0.97	1.00		0.96	1.00	0.96
Satd. Flow (prot)	1750	3493		1750	3450		1783	1566		1771	1566	1771
Flt Permitted	0.43	1.00		0.30	1.00		0.89	1.00		0.84	1.00	0.84
Satd. Flow (perm)	793	3493		560	3450		1634	1566		1554	1566	1554
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	105	805	10	25	430	45	10	5	35	20	5	75
RTOR Reduction (vph)	0	1	0	0	8	0	0	0	25	0	0	53
Lane Group Flow (vph)	105	814	0	25	467	0	0	15	11	0	25	25
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2		2		6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	51.0	45.4		45.0	42.4		27.0	27.0		27.0	27.0	27.0
Effective Green, g (s)	51.0	45.4		45.0	42.4		27.0	27.0		27.0	27.0	27.0
Actuated g/C Ratio	0.57	0.50		0.50	0.47		0.30	0.30		0.30	0.30	0.30
Clearance Time (s)	3.0	6.0		3.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	508	1762		314	1625		490	469		466	469	466
v/s Ratio Prot	c0.01	c0.23		0.00	0.14							
v/s Ratio Perm	0.10			0.04			0.01	0.01		c0.02	0.01	
v/c Ratio	0.21	0.46		0.08	0.29		0.03	0.02		0.05	0.05	
Uniform Delay, d1	9.1	14.4		11.6	14.6		22.3	22.2		22.4	22.4	22.4
Progression Factor	1.00	1.00		1.53	1.32		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		0.1	0.4		0.1	0.1		0.2	0.2	0.2
Delay (s)	9.3	15.3		17.7	19.6		22.4	22.3		22.6	22.6	22.6
Level of Service	A	B		B	B		C	C		C	C	C
Approach Delay (s)		14.6			19.5		22.3			22.6		
Approach LOS		B			B		C			C		

Intersection Summary

HCM 2000 Control Delay: 16.9, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.31
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 48.1%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

Queues
4: Hwy. 6 Northbound Off-Ramp & Laird Rd.

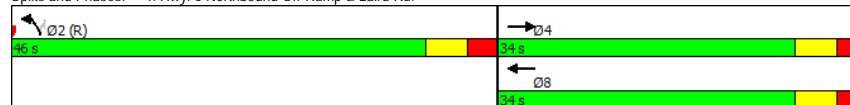
Existing Traffic Conditions
Weekday Afternoon Peak Hour

	→	←	↶	↷
Lane Group	EBT	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↶	↷
Traffic Volume (vph)	565	550	25	165
Future Volume (vph)	565	550	25	165
Lane Group Flow (vph)	565	550	25	165
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	34.0	34.0	46.0	46.0
Total Split (%)	42.5%	42.5%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.47	0.46	0.03	0.23
Control Delay	17.6	21.7	10.9	4.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.6	21.7	10.9	4.4
Queue Length 50th (m)	31.8	35.3	2.0	2.8
Queue Length 95th (m)	45.0	49.8	5.9	12.7
Internal Link Dist (m)	282.0	205.6	157.0	
Turn Bay Length (m)				100.0
Base Capacity (vph)	1190	1190	870	726
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.47	0.46	0.03	0.23

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 50
 Control Type: Pretimed

Splits and Phases: 4: Hwy. 6 Northbound Off-Ramp & Laird Rd.



HCM Signalized Intersection Capacity Analysis
4: Hwy. 6 Northbound Off-Ramp & Laird Rd.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

	→	↶	↷	←	↶	↷
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↶	↷
Traffic Volume (vph)	565	0	0	550	25	165
Future Volume (vph)	565	0	0	550	25	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	7.0	7.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Flt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3400			3400	1785	1353
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3400			3400	1785	1353
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	565	0	0	550	25	165
RTOR Reduction (vph)	0	0	0	0	0	67
Lane Group Flow (vph)	565	0	0	550	25	98
Heavy Vehicles (%)	5%	2%	2%	5%	0%	18%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	28.0			28.0	39.0	39.0
Effective Green, g (s)	28.0			28.0	39.0	39.0
Actuated g/C Ratio	0.35			0.35	0.49	0.49
Clearance Time (s)	6.0			6.0	7.0	7.0
Lane Grp Cap (vph)	1190			1190	870	659
v/s Ratio Prot	c0.17			0.16	0.01	
v/s Ratio Perm						c0.07
v/c Ratio	0.47			0.46	0.03	0.15
Uniform Delay, d1	20.3			20.2	10.7	11.3
Progression Factor	0.79			1.00	1.00	1.00
Incremental Delay, d2	1.3			1.3	0.1	0.5
Delay (s)	17.4			21.5	10.7	11.8
Level of Service	B			C	B	B
Approach Delay (s)	17.4			21.5	11.7	
Approach LOS	B			C	B	

Intersection Summary

HCM 2000 Control Delay: 18.3, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.29
 Actuated Cycle Length (s): 80.0, Sum of lost time (s): 13.0
 Intersection Capacity Utilization: 36.7%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

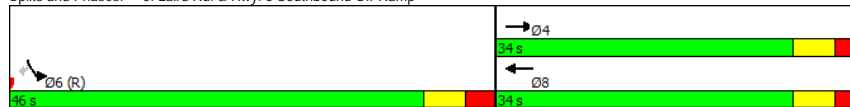
Queues
5: Laird Rd. & Hwy. 6 Southbound Off-Ramp

Existing Traffic Conditions
Weekday Afternoon Peak Hour

	→	←	↘	↙
Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↓	↑
Traffic Volume (vph)	250	395	345	40
Future Volume (vph)	250	395	345	40
Lane Group Flow (vph)	250	395	345	40
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	6	
Permitted Phases				6
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	34.0	34.0	46.0	46.0
Total Split (%)	42.5%	42.5%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.21	0.32	0.22	0.05
Control Delay	18.8	26.3	12.2	4.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.8	26.3	12.2	4.0
Queue Length 50th (m)	14.4	20.2	15.4	0.0
Queue Length 95th (m)	23.1	34.5	23.4	4.8
Internal Link Dist (m)	199.6	282.0	265.0	
Turn Bay Length (m)				40.0
Base Capacity (vph)	1213	1237	1592	741
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.32	0.22	0.05

Intersection Summary
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
 Natural Cycle: 50
 Control Type: Pretimed

Splits and Phases: 5: Laird Rd. & Hwy. 6 Southbound Off-Ramp



HCM Signalized Intersection Capacity Analysis
5: Laird Rd. & Hwy. 6 Southbound Off-Ramp

Existing Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	←	↙	↘	
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↓	↑
Traffic Volume (vph)	0	250	395	0	345	40
Future Volume (vph)	0	250	395	0	345	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		7.0	7.0
Lane Util. Factor		0.95	0.95		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3466	3535		3267	1479
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3466	3535		3267	1479
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	250	395	0	345	40
RTOR Reduction (vph)	0	0	0	0	0	21
Lane Group Flow (vph)	0	250	395	0	345	20
Heavy Vehicles (%)	2%	3%	1%	2%	6%	8%
Turn Type	NA	NA		Prot	Perm	
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		28.0	28.0		39.0	39.0
Effective Green, g (s)		28.0	28.0		39.0	39.0
Actuated g/C Ratio		0.35	0.35		0.49	0.49
Clearance Time (s)		6.0	6.0		7.0	7.0
Lane Grp Cap (vph)		1213	1237		1592	721
v/s Ratio Prot		0.07	c0.11		c0.11	
v/s Ratio Perm						0.01
v/c Ratio		0.21	0.32		0.22	0.03
Uniform Delay, d1		18.2	19.0		11.7	10.6
Progression Factor		1.00	1.33		1.00	1.00
Incremental Delay, d2		0.4	0.6		0.3	0.1
Delay (s)		18.6	26.0		12.1	10.7
Level of Service		B	C		B	B
Approach Delay (s)		18.6	26.0		11.9	
Approach LOS		B	C		B	

Intersection Summary
 HCM 2000 Control Delay: 18.9, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.26
 Actuated Cycle Length (s): 80.0, Sum of lost time (s): 13.0
 Intersection Capacity Utilization: 36.7%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

Queues
6: Farley Dr. & Clair Rd.

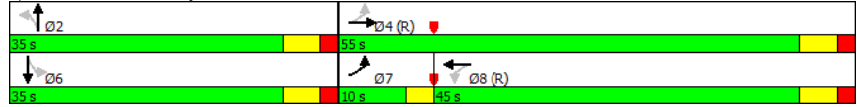
Existing Traffic Conditions
Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	235	515	40	365	115	60	55	45
Future Volume (vph)	235	515	40	365	115	60	55	45
Lane Group Flow (vph)	235	705	40	420	115	90	55	185
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4	8	8	2	2	6	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	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
Minimum Split (s)	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	55.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	11.1%	61.1%	50.0%	50.0%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	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)	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.42	0.38	0.13	0.29	0.32	0.15	0.14	0.30
Control Delay	16.9	15.8	13.3	13.7	26.1	16.0	22.9	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	15.8	13.3	13.7	26.1	16.0	22.9	8.3
Queue Length 50th (m)	30.0	44.7	5.3	30.3	15.7	7.6	7.0	5.7
Queue Length 95th (m)	45.6	58.2	13.3	41.8	30.5	18.6	16.1	20.8
Internal Link Dist (m)		194.1		563.0		111.7		152.1
Turn Bay Length (m)	125.0		50.0		45.0		20.0	
Base Capacity (vph)	564	1843	310	1471	360	588	398	616
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	0.42	0.38	0.13	0.29	0.32	0.15	0.14	0.30

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 50.4 (56%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 6: Farley Dr. & Clair Rd.



HCM Signalized Intersection Capacity Analysis
6: Farley Dr. & Clair Rd.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	235	515	190	40	365	55	115	60	30	55	45	140
Future Volume (vph)	235	515	190	40	365	55	115	60	30	55	45	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.95		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1779	3308		1772	3367		1718	1764		1682	1621	
Flt Permitted	0.46	1.00		0.38	1.00		0.62	1.00		0.70	1.00	
Satd. Flow (perm)	855	3308		715	3367		1120	1764		1237	1621	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	515	190	40	365	55	115	60	30	55	45	140
RTOR Reduction (vph)	0	42	0	0	13	0	0	20	0	0	95	0
Lane Group Flow (vph)	235	663	0	40	407	0	115	70	0	55	90	0
Confl. Peds. (#/hr)	6		8	8		6	16		15	15		16
Confl. Bikes (#/hr)							1					
Heavy Vehicles (%)	0%	3%	1%	0%	4%	0%	2%	0%	0%	4%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8		2	2		6	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	49.0	49.0		39.0	39.0		29.0	29.0		29.0	29.0	
Effective Green, g (s)	49.0	49.0		39.0	39.0		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.54	0.54		0.43	0.43		0.32	0.32		0.32	0.32	
Clearance Time (s)	3.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	537	1801		309	1459		360	568		398	522	
v/s Ratio Prot	c0.03	0.20			0.12			0.04			0.06	
v/s Ratio Perm	c0.20			0.06			c0.10			0.04		
v/c Ratio	0.44	0.37		0.13	0.28		0.32	0.12		0.14	0.17	
Uniform Delay, d1	10.9	11.7		15.3	16.4		23.0	21.5		21.6	21.9	
Progression Factor	1.58	1.50		0.78	0.84		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		0.9	0.5		2.3	0.4		0.7	0.7	
Delay (s)	17.6	18.0		12.8	14.3		25.4	22.0		22.4	22.6	
Level of Service	B	B		B	B		C	C		C	C	
Approach Delay (s)	17.9			14.2			23.9			22.6		
Approach LOS	B			B			C			C		

Intersection Summary

HCM 2000 Control Delay: 18.2, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.41
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 67.7%, ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Queues

7: Beaver Meadow Dr. & Clair Rd.

Existing Traffic Conditions

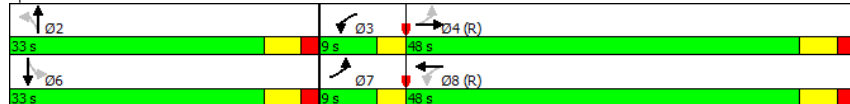
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↙↘		↗	↗↘	↘
Traffic Volume (vph)	110	595	25	400	20	5	15	10
Future Volume (vph)	110	595	25	400	20	5	15	10
Lane Group Flow (vph)	110	615	25	415	0	45	15	70
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	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
Minimum Split (s)	9.5	24.0	9.5	24.0	24.0	24.0	24.0	24.0
Total Split (s)	9.0	48.0	9.0	48.0	33.0	33.0	33.0	33.0
Total Split (%)	10.0%	53.3%	10.0%	53.3%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max
v/c Ratio	0.19	0.34	0.05	0.24	0.10	0.04	0.14	
Control Delay	5.6	10.7	7.6	14.3	15.5	22.8	8.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.6	10.7	7.6	14.3	15.5	22.8	8.8	
Queue Length 50th (m)	3.8	13.3	1.7	22.7		3.2	1.9	1.3
Queue Length 95th (m)	7.2	63.5	4.8	32.6		11.3	6.6	10.8
Internal Link Dist (m)		563.0		1233.2		183.8		182.6
Turn Bay Length (m)	55.0		30.0					
Base Capacity (vph)	571	1835	495	1696		467	399	516
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	0.19	0.34	0.05	0.24	0.10	0.04	0.14	

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 86.4 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 7: Beaver Meadow Dr. & Clair Rd.



HCM Signalized Intersection Capacity Analysis

7: Beaver Meadow Dr. & Clair Rd.

Existing Traffic Conditions

Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓	↖	↗	↘	↙	←	↘	↓	↖	↗	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations	↖	↖↗		↙	↙↘			↗	↗↘	↘	↘	↘						
Traffic Volume (vph)	110	595	20	25	400	15	20	5	20	15	10	60						
Future Volume (vph)	110	595	20	25	400	15	20	5	20	15	10	60						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900						
Total Lost time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	6.0						
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	1.00						
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.99	1.00						
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	1.00						
Frt	1.00	1.00		1.00	0.99			0.94		1.00	0.87	1.00						
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	1.00						
Satd. Flow (prot)	1748	3480		1749	3478			1670		1738	1583	1583						
Flt Permitted	0.48	1.00		0.41	1.00			0.89		0.73	1.00	1.00						
Satd. Flow (perm)	878	3480		748	3478			1512		1331	1583	1583						
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Adj. Flow (vph)	110	595	20	25	400	15	20	5	20	15	10	60						
RTOR Reduction (vph)	0	2	0	0	3	0	0	14	0	0	42	0						
Lane Group Flow (vph)	110	613	0	25	412	0	0	31	0	15	28	0						
Confl. Peds. (#/hr)	2		1	1		2	3		3	3		3						
Confl. Bikes (#/hr)			1	1		2												
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA							
Protected Phases	7	4		3	8			2			6							
Permitted Phases	4			8			2			6								
Actuated Green, G (s)	50.4	45.6		45.6	43.2			27.0		27.0	27.0	27.0						
Effective Green, g (s)	50.4	45.6		45.6	43.2			27.0		27.0	27.0	27.0						
Actuated g/C Ratio	0.56	0.51		0.51	0.48			0.30		0.30	0.30	0.30						
Clearance Time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	6.0						
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0						
Lane Grp Cap (vph)	538	1763		405	1669			453		399	474	474						
v/s Ratio Prot	c0.01	c0.18		0.00	0.12						0.02	0.02						
v/s Ratio Perm	0.10			0.03				c0.02		0.01								
v/c Ratio	0.20	0.35		0.06	0.25			0.07		0.04	0.06	0.06						
Uniform Delay, d1	9.3	13.3		11.1	13.8			22.5		22.3	22.4	22.4						
Progression Factor	0.62	0.78		1.00	1.00			1.00		1.00	1.00	1.00						
Incremental Delay, d2	0.2	0.5		0.1	0.4			0.3		0.2	0.2	0.2						
Delay (s)	6.0	11.0		11.2	14.2			22.8		22.5	22.7	22.7						
Level of Service	A	B		B	B			C		C	C	C						
Approach Delay (s)		10.2			14.0			22.8			22.6	22.6						
Approach LOS		B			B			C			C	C						

Intersection Summary

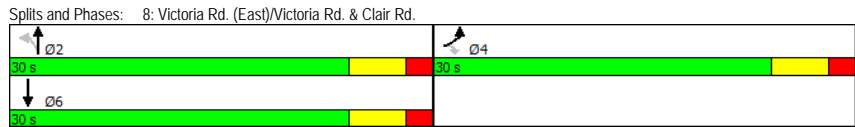
HCM 2000 Control Delay: 12.7, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.25
 Actuated Cycle Length (s): 90.0, Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 49.6%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

Queues
8: Victoria Rd. (East)/Victoria Rd. & Clair Rd.

Existing Traffic Conditions
 Weekday Afternoon Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↔	↔	↔	↑	↓
Traffic Volume (vph)	415	55	75	310	205
Future Volume (vph)	415	55	75	310	205
Lane Group Flow (vph)	415	55	75	310	545
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.69	0.09	0.38	0.47	0.78
Control Delay	20.2	7.3	18.6	14.5	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	7.3	18.6	14.5	18.4
Queue Length 50th (m)	28.2	1.3	4.3	18.6	25.0
Queue Length 95th (m)	63.4	7.4	16.2	43.7	#70.5
Internal Link Dist (m)	1233.2		2005.5	465.2	
Turn Bay Length (m)		10.0	65.0		
Base Capacity (vph)	939	904	299	1008	986
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	0.44	0.06	0.25	0.31	0.55

Intersection Summary
 Cycle Length: 60
 Actuated Cycle Length: 45.9
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis
8: Victoria Rd. (East)/Victoria Rd. & Clair Rd.

Existing Traffic Conditions
 Weekday Afternoon Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↓	↔
Traffic Volume (vph)	415	55	75	310	205	340
Future Volume (vph)	415	55	75	310	205	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1684	1597	1785	1807	1637	
Flt Permitted	0.95	1.00	0.29	1.00	1.00	
Satd. Flow (perm)	1684	1597	537	1807	1637	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	415	55	75	310	205	340
RTOR Reduction (vph)	0	19	0	0	105	0
Lane Group Flow (vph)	415	36	75	310	440	0
Heavy Vehicles (%)	6%	0%	0%	4%	2%	7%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	16.4	16.4	16.7	16.7	16.7	
Effective Green, g (s)	16.4	16.4	16.7	16.7	16.7	
Actuated g/C Ratio	0.36	0.36	0.37	0.37	0.37	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	612	580	198	669	606	
v/s Ratio Prot	c0.25			0.17	c0.27	
v/s Ratio Perm		0.02	0.14			
v/c Ratio	0.68	0.06	0.38	0.46	0.73	
Uniform Delay, d1	12.1	9.3	10.4	10.8	12.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.0	0.0	1.2	0.5	4.3	
Delay (s)	15.1	9.4	11.6	11.3	16.6	
Level of Service	B	A	B	B	B	
Approach Delay (s)	14.4			11.4	16.6	
Approach LOS	B			B	B	

Intersection Summary
 HCM 2000 Control Delay: 14.4, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.70
 Actuated Cycle Length (s): 45.1, Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 73.8%, ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Clair Rd. & Laird Rd.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	800	5	30	485	1	115
Future Volume (Veh/h)	800	5	30	485	1	115
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	800	5	30	485	1	115
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			805		1348	802
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			805		1348	802
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		99	70
cM capacity (veh/h)			819		160	384
Direction, Lane #	EB 1	WB 1	NE 1			
Volume Total	805	515	116			
Volume Left	0	30	1			
Volume Right	5	0	115			
cSH	1700	819	379			
Volume to Capacity	0.47	0.04	0.31			
Queue Length 95th (m)	0.0	0.9	10.2			
Control Delay (s)	0.0	1.0	18.6			
Lane LOS	A		C			
Approach Delay (s)	0.0	1.0	18.6			
Approach LOS	C		C			
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			63.9%		ICU Level of Service B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: Gordon St. & Maltby Rd.

Existing Traffic Conditions
Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (veh/h)	30	10	50	5	5	0	35	945	10	5	710	30
Future Volume (Veh/h)	30	10	50	5	5	0	35	945	10	5	710	30
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour 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
Hourly flow rate (vph)	30	10	50	5	5	0	35	945	10	5	710	30
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1752	1760	725	1805	1765	945	740	955				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1752	1760	725	1805	1765	945	740	955				
tC, single (s)	*4.8	*4.6	*4.4	*5.6	*5.0	6.2	4.1	4.3				
tC, 2 stage (s)												
tF (s)	*3.2	*3.0	*3.0	3.5	*3.5	3.3	2.2	2.4				
p0 queue free %	85	96	92	96	97	100	96	99				
cM capacity (veh/h)	202	230	659	113	177	320	862	652				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1							
Volume Total	90	10	980	10	745							
Volume Left	30	5	35	0	5							
Volume Right	50	0	0	10	30							
cSH	336	138	862	1700	652							
Volume to Capacity	0.27	0.07	0.04	0.01	0.01							
Queue Length 95th (m)	8.5	1.8	1.0	0.0	0.2							
Control Delay (s)	19.6	33.1	1.2	0.0	0.2							
Lane LOS	C		D		A							
Approach Delay (s)	19.6	33.1	1.1		0.2							
Approach LOS	C		D		C							
Intersection Summary												
Average Delay					1.8							
Intersection Capacity Utilization			86.0%		ICU Level of Service E							
Analysis Period (min)					15							

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
11: Victoria Rd. (West) & Maltby Rd.

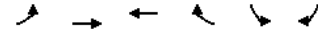
Existing Traffic Conditions
Weekday Afternoon Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	30	10	215	20	5	330
Future Volume (Veh/h)	30	10	215	20	5	330
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	10	215	20	5	330
Pedestrians					1	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			41		486	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		486	36
tC, single (s)			4.1		6.7	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.3
p0 queue free %			86		99	68
cM capacity (veh/h)			1574		421	1033
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	40	235	335			
Volume Left	0	215	5			
Volume Right	10	0	330			
cSH	1700	1574	1011			
Volume to Capacity	0.02	0.14	0.33			
Queue Length 95th (m)	0.0	3.8	11.7			
Control Delay (s)	0.0	7.1	10.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	7.1	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay		8.4				
Intersection Capacity Utilization		47.0%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: Maltby Rd. & Victoria Rd. (East)

Existing Traffic Conditions
Weekday Afternoon Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	345	15	10	30	35	230
Future Volume (Veh/h)	345	15	10	30	35	230
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	345	15	10	30	35	230
Pedestrians					1	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	41				731	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	41				731	26
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				88	78
cM capacity (veh/h)	1561				301	1049
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	360	40	265			
Volume Left	345	0	35			
Volume Right	0	30	230			
cSH	1561	1700	790			
Volume to Capacity	0.22	0.02	0.34			
Queue Length 95th (m)	6.8	0.0	11.8			
Control Delay (s)	7.7	0.0	11.8			
Lane LOS	A		B			
Approach Delay (s)	7.7	0.0	11.8			
Approach LOS			B			
Intersection Summary						
Average Delay		8.9				
Intersection Capacity Utilization		49.4%	ICU Level of Service	A		
Analysis Period (min)		15				

Appendix N – Corridor Growth Traffic Analysis Calculations

Background Traffic Growth/Decline Summary

Location: **Gordon Street Background Growth, South of Clair Road**
Time Period: **2008** to **2017**
Analyst: **IFC**

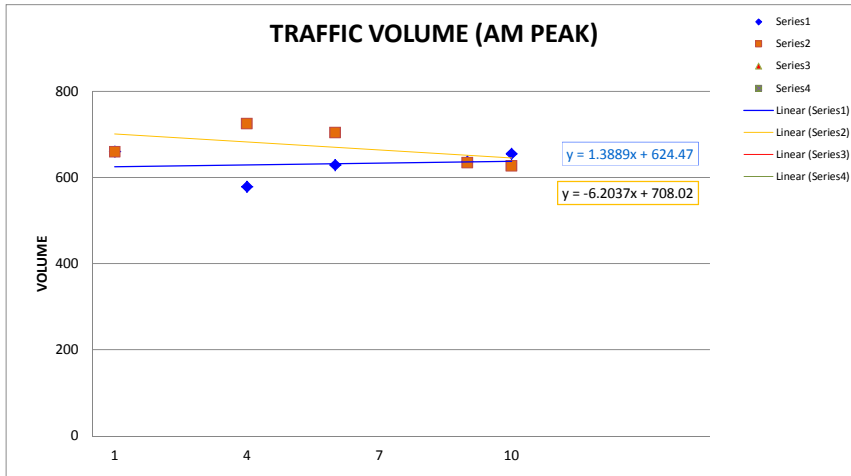
Weekday AM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.20%
Southbound	-0.80%
Eastbound	0.00%
Westbound	0.00%

Weekday PM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.62%
Southbound	0.80%
Eastbound	0.00%
Westbound	0.00%

Gordon Street Background Growth, South of Clair Road

Gordon Street Background Growth, South of Clair Road

Movement	1 2008		4 2011		6 2013		9 2016		10 2017	
	am	pm	am	pm	am	pm	am	pm	am	pm
NBT	661	832	579	813	630	1111	638	831	656	904
SBT	660	702	726	697	705	1005	635	757	628	748

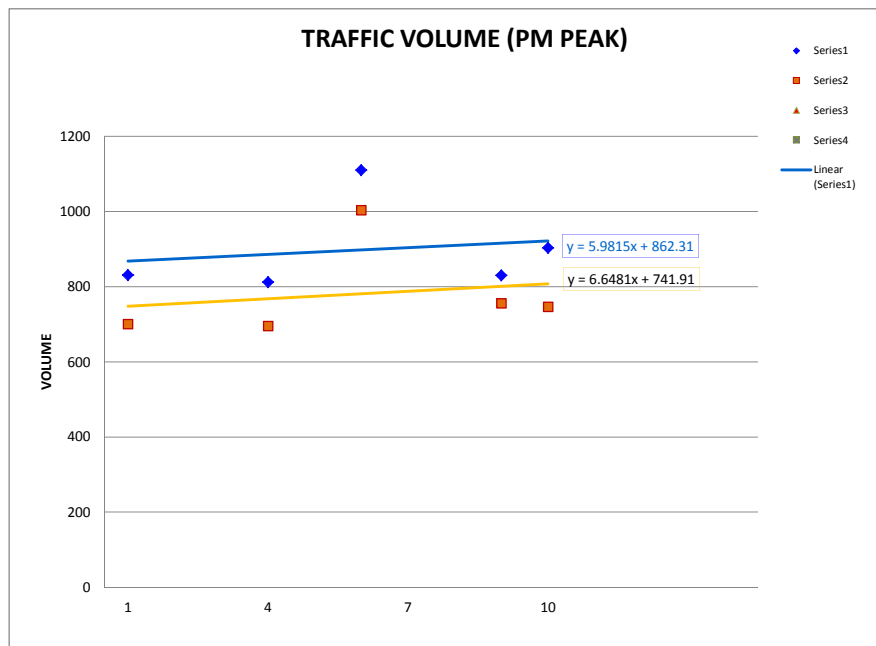


Year	X	Y
2008	1	626
2017	10	638
Year	X	Y
2008	1	702
2017	10	646

Growth/year NB	
1	0.20%

N-S Average	-0.3%
-------------	-------

Growth/year SB	
-6	-0.80%



Year	X	Y
2008	1	868
2017	10	922
Year	X	Y
2008	1	749
2017	10	808

Growth/year NB	
5	0.62%

N-S Average	0.7%
E-W Average	0.0%
Total Average	0.4%

Growth/year SB	
6	0.80%

Background Traffic Growth/Decline Summary

Location: **Gordon Street Background Growth, North of Maltby Road**
Time Period: **2008** to **2017**
Analyst: **IFC**

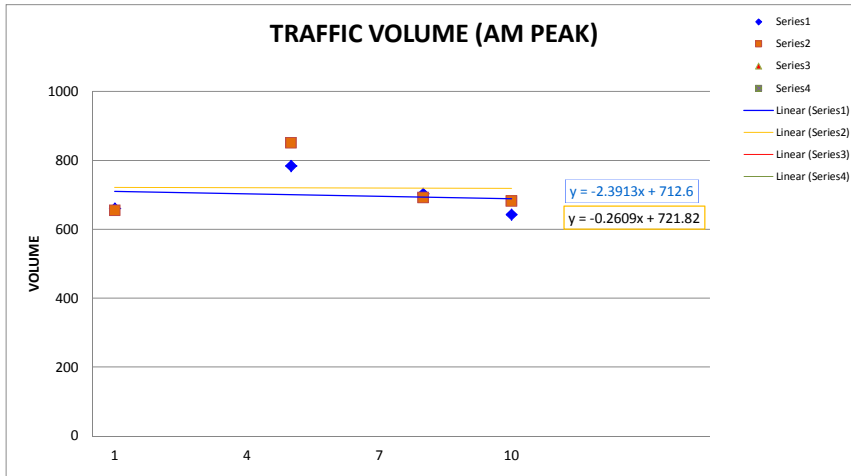
Weekday AM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	-0.30%
Southbound	-0.03%
Eastbound	0.00%
Westbound	0.00%

Weekday PM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.47%
Southbound	0.27%
Eastbound	0.00%
Westbound	0.00%

Gordon Street Background Growth, North of Maltby Road

Gordon Street Background Growth, North of Maltby Road

Movement	1		5		8		10		10	
	2008		2012		2015		2017			
	am	pm	am	pm	am	pm	am	pm	am	pm
NBT	661	1074	785	1019	704	1371	643	977		
SBT	655	845	851	852	693	1109	682	745		



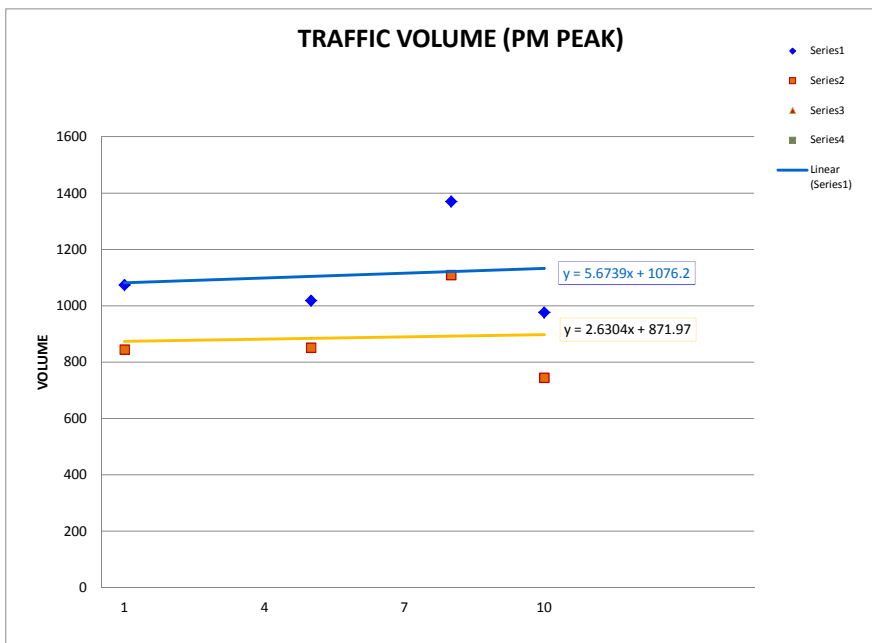
Year	X	Y
2008	1	710
2017	10	689

Year	X	Y
2008	1	722
2017	10	719

Growth/year NB	
-2	-0.30%

N-S Average	0%
-------------	----

Growth/year SB	
0	-0.03%



Year	X	Y
2008	1	1082
2017	10	1133

Year	X	Y
2008	1	875
2017	10	898

Growth/year NB	
5	0.47%

N-S Average	0%
E-W Average	0%
Total Average	0%

Growth/year SB	
2	0.27%

Background Traffic Growth/Decline Summary

Location: **Clair Road Background Growth, East of Gordon Street**

Time Period: **2008** to **2017**

Analyst: **IFC**

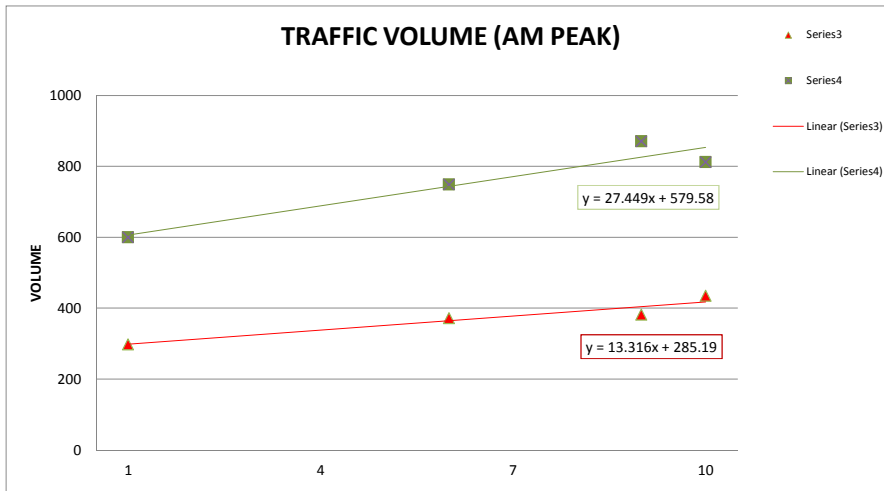
Weekday AM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.00%
Southbound	0.00%
Eastbound	4.01%
Westbound	4.07%

Weekday PM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.00%
Southbound	0.00%
Eastbound	4.07%
Westbound	5.37%

Clair Road Background Growth, East of Gordon Street

Clair Road Background Growth, East of Gordon Street

Movement	1		6		9		10		10	
	2008		2013		2016		2017			
	am	pm	am	pm	am	pm	am	pm	am	pm
EBT	298	662	372	1049	382	978	435	953		
WBT	600	370	749	639	871	592	812	595		



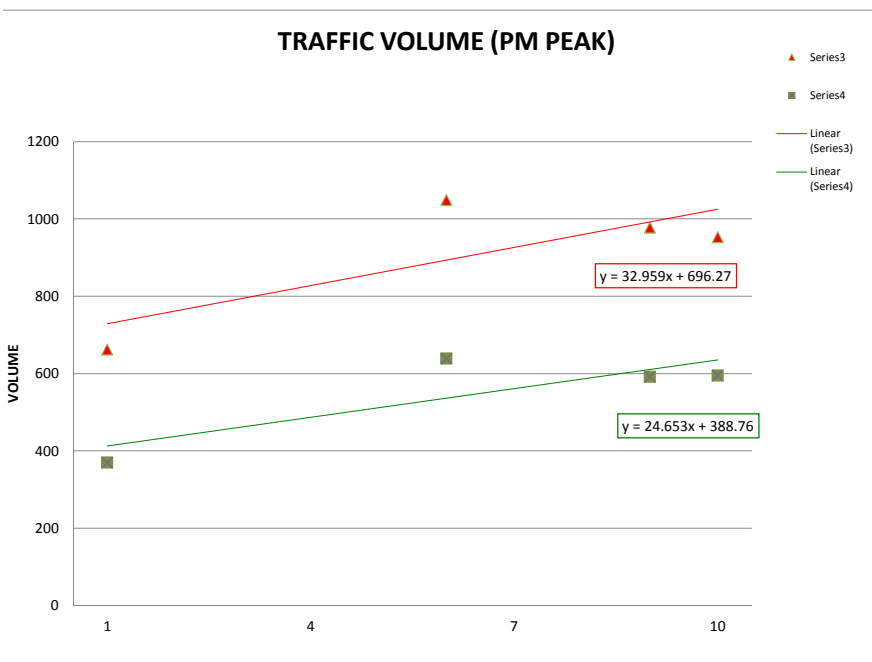
Year	X	Y
2008	1	299
2017	10	418

Year	X	Y
2008	1	607
2017	10	854

Growth/year EB	
12	4.01%

E-W Average	4.0%
-------------	------

Growth/year WB	
25	4.07%



Year	X	Y
2008	1	729
2017	10	1026

Year	X	Y
2008	1	413
2017	10	635

Growth/year EB	
30	4.07%

E-W Average	4.7%
-------------	------

Growth/year WB	
22	5.37%

Background Traffic Growth/Decline Summary

Location: **Clair Road Background Growth, West of Gordon Street**
Time Period: **2008** to **2017**
Analyst: **IFC**

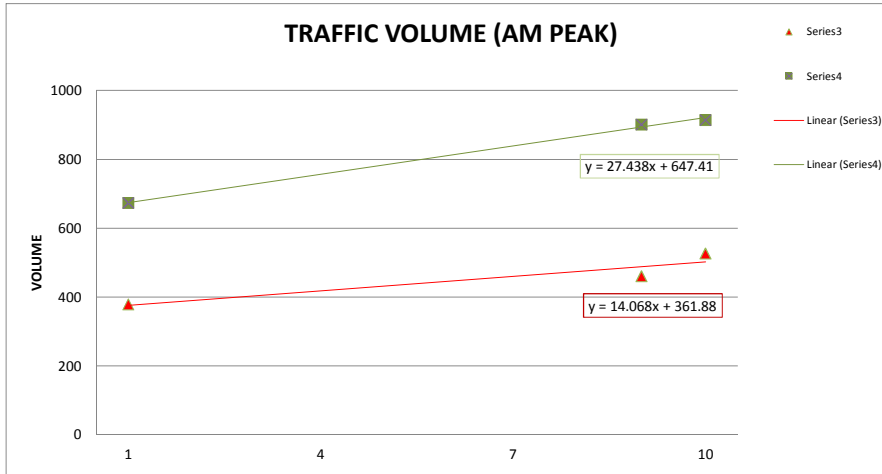
Weekday AM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.00%
Southbound	0.00%
Eastbound	3.51%
Westbound	3.66%

Weekday PM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	0.00%
Southbound	0.00%
Eastbound	3.39%
Westbound	3.97%

Clair Road Background Growth, West of Gordon Street

Clair Road Background Growth, West of Gordon Street

Movement	1		6		9		10		10	
	2008		2013		2016		2017			
	am	pm	am	pm	am	pm	am	pm	am	pm
EBT	379	726			461	957	527	964		
WBT	674	465			902	600	915	668		

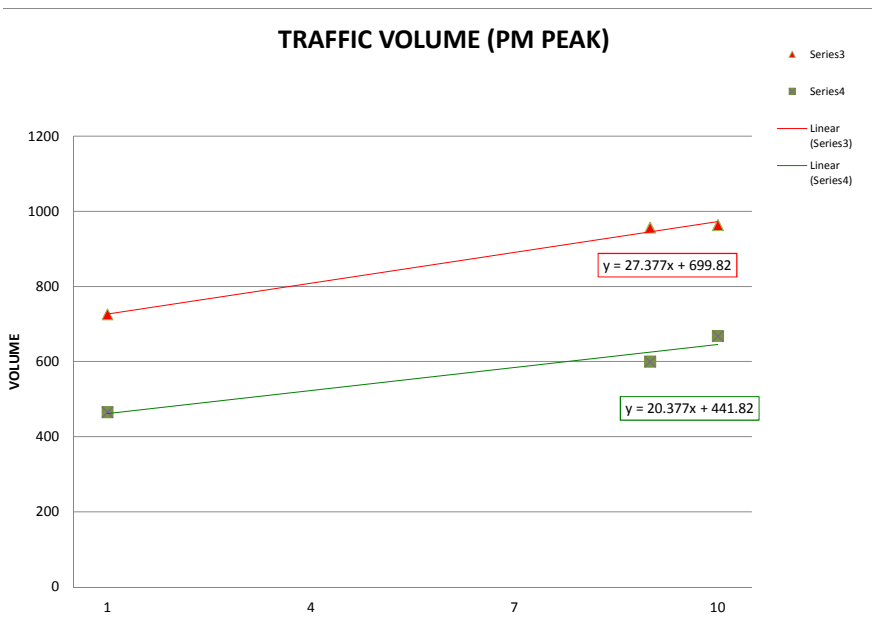


Year	X	Y
2008	1	377
2017	10	509
Year	X	Y
2008	1	675
2017	10	922

Growth/year EB	
13	3.51%

E-W Average	
3.6%	

Growth/year WB	
25	3.66%



Year	X	Y
2008	1	727
2017	10	974
Year	X	Y
2008	1	462
2017	10	646

Growth/year EB	
25	3.39%

E-W Average	
3.7%	

Growth/year WB	
18	3.97%

Background Traffic Growth/Decline Summary

Location: **Victoria Road Background Growth, South of Clair Road**
Time Period: **2008** to **2017**
Analyst: **IFC**

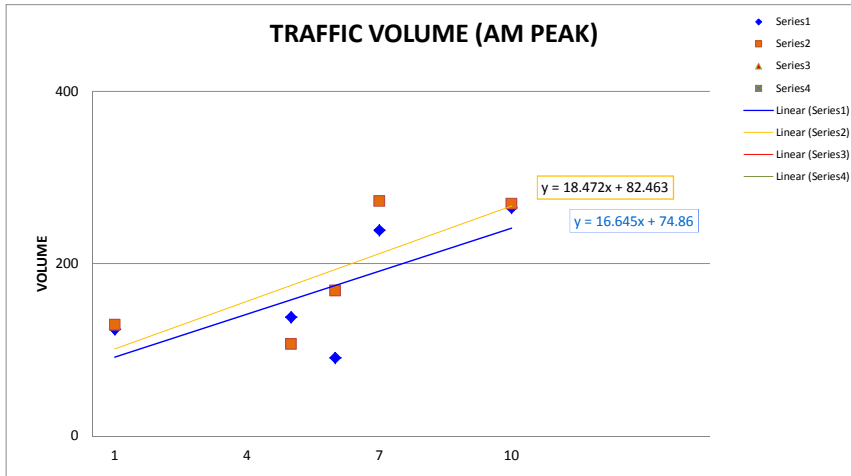
Weekday AM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	16.37%
Southbound	16.47%
Eastbound	0.00%
Westbound	0.00%

Weekday PM Peak Hour	
<i>Direction</i>	<i>Percent Change</i>
Northbound	25.48%
Southbound	11.40%
Eastbound	0.00%
Westbound	0.00%

Victoria Road Background Growth, South of Clair Road

Victoria Road Background Growth, South of Clair Road

Movement	1		5		6		7		10	
	2008		2012		2013		2014		2017	
	am	pm	am	pm	am	pm	am	pm	am	pm
NBT	124	171	138	89	91	142	239	338	265	384
SBT	129	128	107	191	169	178	273	279	270	261

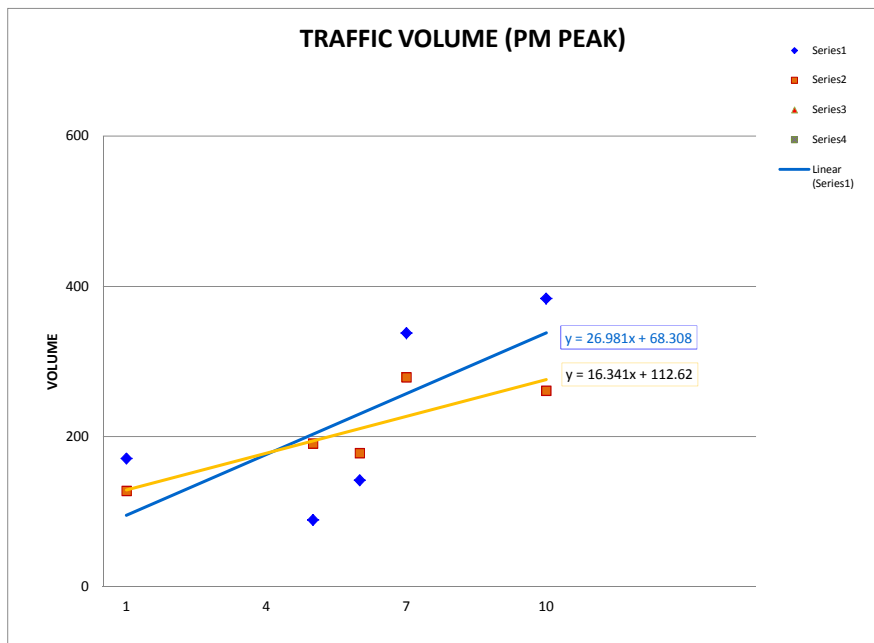


Year	X	Y
2008	1	92
2017	10	241
Year	X	Y
2008	1	101
2017	10	267

Growth/year NB	
15	16.37%

N-S Average	16%
-------------	-----

Growth/year SB	
17	16.47%



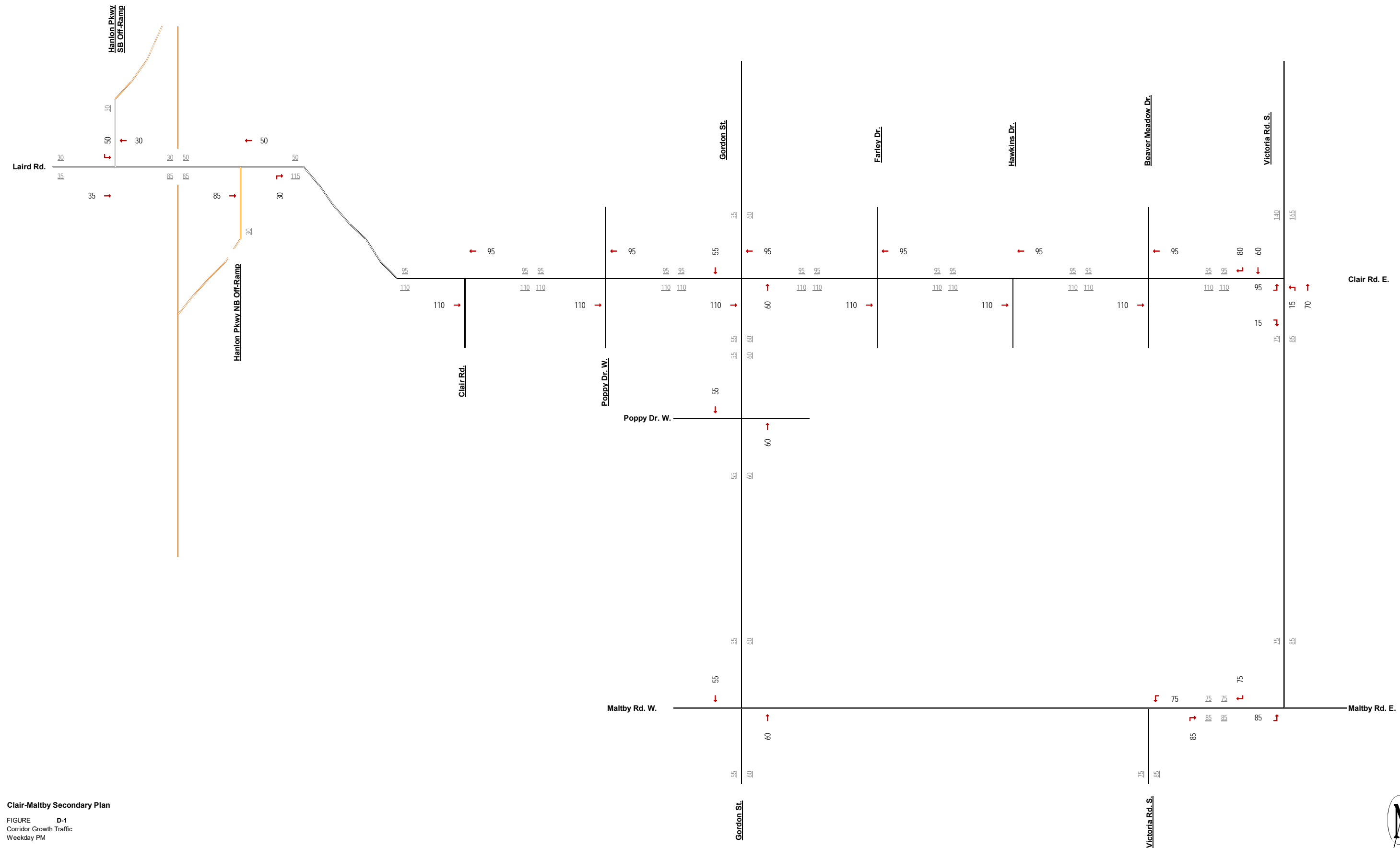
Year	X	Y
2008	1	95
2017	10	338
Year	X	Y
2008	1	129
2017	10	276

Growth/year NB	
24	25.48%

N-S Average	18%
E-W Average	0%
Total Average	9%

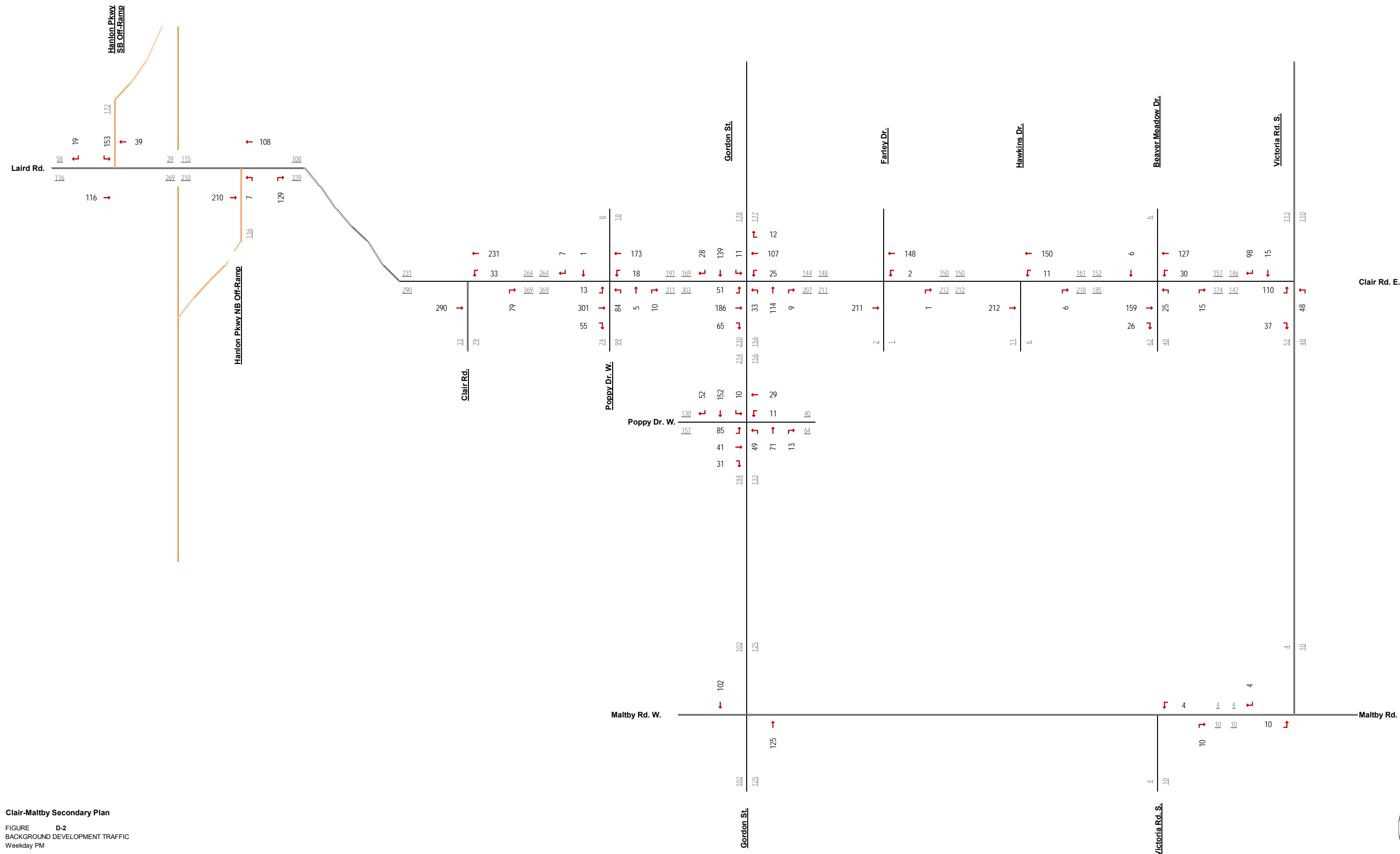
Growth/year SB	
15	11.40%

Appendix O – Background Traffic Volumes (Corridor Growth and Site-Specific Background Developments)



Clair-Maltby Secondary Plan
 FIGURE D-1
 Corridor Growth Traffic
 Weekday PM





Clair-Maltby Secondary Plan
 FIGURE D-2
 BACKGROUND DEVELOPMENT TRAFFIC
 Weekday PM

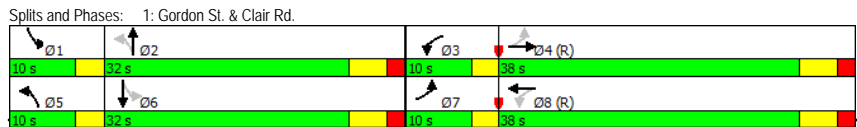


Appendix P – Synchro Analysis Results: Future Background Traffic Conditions

Queues
1: Gordon St. & Clair Rd. Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↖	↖↗	↖	↖↗	↖	↖↗
Traffic Volume (vph)	290	890	140	575	185	700	185	730
Future Volume (vph)	290	890	140	575	185	700	185	730
Lane Group Flow (vph)	290	1050	140	675	185	875	185	880
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	24.0	9.5	24.0	9.5	24.0
Total Split (s)	10.0	38.0	10.0	38.0	10.0	32.0	10.0	32.0
Total Split (%)	11.1%	42.2%	11.1%	42.2%	11.1%	35.6%	11.1%	35.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	3.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	Max	None	Max
v/c Ratio	0.83	0.84	0.68	0.55	0.82	0.87	0.79	0.88
Control Delay	50.2	48.8	28.4	22.2	48.0	40.1	43.0	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	48.8	28.4	22.2	48.0	40.1	43.0	41.0
Queue Length 50th (m)	54.3	107.5	19.2	56.1	20.7	76.5	20.6	77.7
Queue Length 95th (m)	m#94.7	129.0	#35.4	69.5	#51.8	#110.8	#49.3	#112.5
Internal Link Dist (m)		775.0		194.1		153.6		314.0
Turn Bay Length (m)	75.0		25.0		50.0		140.0	
Base Capacity (vph)	351	1251	207	1231	225	1006	234	1004
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	0.83	0.84	0.68	0.55	0.82	0.87	0.79	0.88

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green, Master Intersection
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Background Traffic Conditions
1: Gordon St. & Clair Rd. Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↘	↓	↙	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Traffic Volume (vph)	290	890	160	140	575	100	185	700	175	185	730	150
Future Volume (vph)	290	890	160	140	575	100	185	700	175	185	730	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	3475		1612	3418		1735	3400		1804	3411	
Flt Permitted	0.29	1.00		0.12	1.00		0.15	1.00		0.15	1.00	
Satd. Flow (perm)	550	3475		212	3418		281	3400		292	3411	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	290	890	160	140	575	100	185	700	175	185	730	150
RTOR Reduction (vph)	0	16	0	0	15	0	0	24	0	0	19	0
Lane Group Flow (vph)	290	1034	0	140	660	0	185	851	0	185	861	0
Confl. Peds. (#/hr)	17		7	7		17	2		11	11		2
Confl. Bikes (#/hr)							1					
Heavy Vehicles (%)	1%	1%	2%	12%	3%	1%	4%	1%	8%	0%	2%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.0	32.0		39.0	32.0		33.0	26.0		33.0	26.0	
Effective Green, g (s)	39.0	32.0		39.0	32.0		33.0	26.0		33.0	26.0	
Actuated g/C Ratio	0.43	0.36		0.43	0.36		0.37	0.29		0.37	0.29	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	1235		200	1215		216	982		224	985	
v/s Ratio Prot	c0.07	0.30		0.05	0.19		c0.07	0.25		0.06	c0.25	
v/s Ratio Perm	c0.31			0.25			0.25			0.24		
v/c Ratio	0.87	0.84		0.70	0.54		0.86	0.87		0.83	0.87	
Uniform Delay, d1	20.7	26.6		18.7	23.2		22.1	30.4		22.0	30.4	
Progression Factor	2.10	1.65		0.83	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.7	5.4		9.6	1.6		26.7	10.2		21.3	10.7	
Delay (s)	60.2	49.2		25.0	22.7		48.9	40.5		43.3	41.1	
Level of Service	E	D		C	C		D	D		D	D	
Approach Delay (s)		51.6			23.1		42.0			41.5		
Approach LOS		D			C		D			D		

Intersection Summary
 HCM 2000 Control Delay 41.3 HCM 2000 Level of Service D
 HCM 2000 Volume to Capacity ratio 0.87
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 18.0
 Intersection Capacity Utilization 89.6% ICU Level of Service E
 Analysis Period (min) 15
 c Critical Lane Group

Queues
2: Gordon St. & Poppy Dr.

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	←		→		↖		↗	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↖	↗	↖	↗
Traffic Volume (vph)	95	60	55	50	60	940	50	910
Future Volume (vph)	95	60	55	50	60	940	50	910
Lane Group Flow (vph)	0	190	0	145	60	1005	50	965
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5		2
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	24.0	9.5	24.0
Total Split (s)	30.0	30.0	30.0	30.0	10.0	50.0	10.0	50.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	11.1%	55.6%	11.1%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		3.0		6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
v/c Ratio		0.67		0.49	0.14	0.49	0.13	0.47
Control Delay		39.5		30.0	5.8	12.3	5.8	12.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		39.5		30.0	5.8	12.3	5.8	12.2
Queue Length 50th (m)		27.0		17.9	2.6	49.7	2.1	47.2
Queue Length 95th (m)		48.8		35.6	8.1	83.6	7.0	79.3
Internal Link Dist (m)		247.7		256.4		171.0		153.6
Turn Bay Length (m)					65.0		27.0	
Base Capacity (vph)		440		450	428	2045	411	2043
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.43		0.32	0.14	0.49	0.12	0.47

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Gordon St. & Poppy Dr.



HCM Signalized Intersection Capacity Analysis
2: Gordon St. & Poppy Dr.

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	←		→		↖		↗					
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	95	60	35	55	50	40	60	940	65	50	910	55
Future Volume (vph)	95	60	35	55	50	40	60	940	65	50	910	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Flt		0.98			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1772			1760		1770	3505		1770	3509	
Flt Permitted		0.77			0.79		0.25	1.00		0.23	1.00	
Satd. Flow (perm)		1406			1417		464	3505		436	3509	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	60	35	55	50	40	60	940	65	50	910	55
RTOR Reduction (vph)	0	10	0	0	17	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	180	0	0	128	0	60	1000	0	50	961	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.4			15.4		49.6	45.9		49.6	45.9	
Effective Green, g (s)		15.4			15.4		49.6	45.9		49.6	45.9	
Actuated g/C Ratio		0.19			0.19		0.62	0.57		0.62	0.57	
Clearance Time (s)		6.0			6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		270			272		348	2010		332	2013	
v/s Ratio Prot							c0.01	c0.29		0.01	0.27	
v/s Ratio Perm		c0.13			0.09		0.10			0.09		
v/c Ratio		0.67			0.47		0.17	0.50		0.15	0.48	
Uniform Delay, d1		29.9			28.7		6.4	10.2		6.4	10.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.1			1.3		0.2	0.9		0.2	0.8	
Delay (s)		36.1			30.0		6.6	11.1		6.6	10.8	
Level of Service		D			C		A	B		A	B	
Approach Delay (s)		36.1			30.0			10.8			10.6	
Approach LOS		D			C			B			B	

Intersection Summary

HCM 2000 Control Delay: 13.9, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.52
 Actuated Cycle Length (s): 80.0, Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 61.0%, ICU Level of Service: B
 Analysis Period (min): 15

c Critical Lane Group

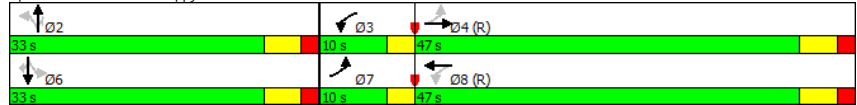
Queues
3: Poppy Dr./Clairfields Dr. & Clair Rd. Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖		↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1215	25	700	95	10	10	20	5	80
Future Volume (vph)	120	1215	25	700	95	10	10	20	5	80
Lane Group Flow (vph)	120	1280	25	745	0	105	10	0	25	80
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	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	24.0	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	47.0	10.0	47.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	11.1%	52.2%	11.1%	52.2%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max	Max
v/c Ratio	0.30	0.69	0.11	0.46		0.26	0.02		0.06	0.15
Control Delay	9.8	19.4	12.1	23.6		26.0	0.1		23.0	6.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	9.8	19.4	12.1	23.6		26.0	0.1		23.0	6.5
Queue Length 50th (m)	8.6	77.2	2.9	58.8		14.4	0.0		3.2	0.0
Queue Length 95th (m)	16.0	128.5	m4.5	m73.5		28.1	0.0		9.2	10.1
Internal Link Dist (m)		186.5		775.0		114.2			150.9	
Turn Bay Length (m)	55.0		45.0			20.0			20.0	
Base Capacity (vph)	404	1844	256	1610		408	526		450	530
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	0.30	0.69	0.10	0.46		0.26	0.02		0.06	0.15

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 86.4 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Poppy Dr./Clairfields Dr. & Clair Rd.



HCM Signalized Intersection Capacity Analysis Future Background Traffic Conditions
3: Poppy Dr./Clairfields Dr. & Clair Rd. Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↗	↘	↓	↖		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1215	65	25	700	45	95	10	10	20	5	80
Future Volume (vph)	120	1215	65	25	700	45	95	10	10	20	5	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0			6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Flt	1.00	0.99		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3512		1770	3507			1782	1583		1791	1583
Flt Permitted	0.28	1.00		0.13	1.00			0.73	1.00		0.80	1.00
Satd. Flow (perm)	522	3512		242	3507			1359	1583		1499	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	1215	65	25	700	45	95	10	10	20	5	80
RTOR Reduction (vph)	0	4	0	0	5	0	0	0	7	0	0	56
Lane Group Flow (vph)	120	1276	0	25	740	0	105	3	0	25	24	24
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	51.0	45.4		43.8	41.2			27.0	27.0		27.0	27.0
Effective Green, g (s)	51.0	45.4		43.8	41.2			27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.57	0.50		0.49	0.46			0.30	0.30		0.30	0.30
Clearance Time (s)	3.0	6.0		3.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	390	1771		161	1605			407	474		449	474
v/s Ratio Prot	c0.02	c0.36		0.00	0.21						0.02	0.02
v/s Ratio Perm	0.15			0.07				c0.08	0.00		0.02	0.02
v/c Ratio	0.31	0.72		0.16	0.46			0.26	0.01		0.06	0.05
Uniform Delay, d1	9.8	17.4		13.6	16.8			23.9	22.1		22.4	22.4
Progression Factor	1.00	1.00		1.53	1.36			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	2.6		0.3	0.7			1.5	0.0		0.2	0.2
Delay (s)	10.3	19.9		21.2	23.5			25.4	22.1		22.7	22.6
Level of Service	B	B		C	C			C	C		C	C
Approach Delay (s)		19.1			23.5			25.1			22.6	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay 20.9 HCM 2000 Level of Service C
 HCM 2000 Volume to Capacity ratio 0.54
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 15.0
 Intersection Capacity Utilization 65.6% ICU Level of Service C
 Analysis Period (min) 15
 c Critical Lane Group

Queues
4: Hwy. 6 Northbound Off-Ramp & Laird Rd.

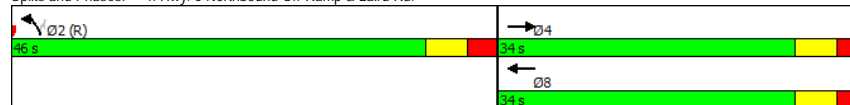
Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	→	←	↙	↘
Lane Group	EBT	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↘	↘
Traffic Volume (vph)	775	660	30	295
Future Volume (vph)	775	660	30	295
Lane Group Flow (vph)	775	660	30	295
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	34.0	34.0	46.0	46.0
Total Split (%)	42.5%	42.5%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.64	0.55	0.03	0.42
Control Delay	21.6	23.0	10.9	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.6	23.0	10.9	12.8
Queue Length 50th (m)	45.3	43.9	2.4	22.8
Queue Length 95th (m)	69.6	60.7	6.6	42.4
Internal Link Dist (m)	282.0	205.6	157.0	
Turn Bay Length (m)				100.0
Base Capacity (vph)	1203	1203	879	696
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.64	0.55	0.03	0.42

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green
 Natural Cycle: 50
 Control Type: Pretimed

Splits and Phases: 4: Hwy. 6 Northbound Off-Ramp & Laird Rd.



HCM Signalized Intersection Capacity Analysis
4: Hwy. 6 Northbound Off-Ramp & Laird Rd.

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	→	↙	↘	←	↙	↘
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↘
Traffic Volume (vph)	775	0	0	660	30	295
Future Volume (vph)	775	0	0	660	30	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	7.0	7.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Flt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3438			3438	1805	1369
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3438			3438	1805	1369
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	775	0	0	660	30	295
RTOR Reduction (vph)	0	0	0	0	0	29
Lane Group Flow (vph)	775	0	0	660	30	266
Heavy Vehicles (%)	5%	2%	2%	5%	0%	18%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	28.0			28.0	39.0	39.0
Effective Green, g (s)	28.0			28.0	39.0	39.0
Actuated g/C Ratio	0.35			0.35	0.49	0.49
Clearance Time (s)	6.0			6.0	7.0	7.0
Lane Grp Cap (vph)	1203			1203	879	667
v/s Ratio Prot	c0.23			0.19	0.02	
v/s Ratio Perm						c0.19
v/c Ratio	0.64			0.55	0.03	0.40
Uniform Delay, d1	21.8			20.9	10.7	13.0
Progression Factor	0.86			1.00	1.00	1.00
Incremental Delay, d2	2.6			1.8	0.1	1.8
Delay (s)	21.3			22.7	10.8	14.8
Level of Service	C			C	B	B
Approach Delay (s)	21.3			22.7	14.5	
Approach LOS	C			C	B	

Intersection Summary

HCM 2000 Control Delay: 20.6, HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.50
 Actuated Cycle Length (s): 80.0, Sum of lost time (s): 13.0
 Intersection Capacity Utilization: 50.5%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

Queues
5: Laird Rd. & Hwy. 6 Southbound Off-Ramp

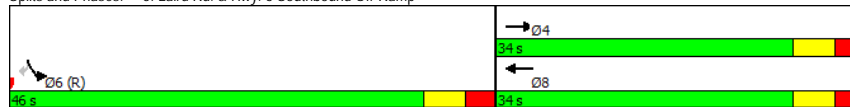
Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	→	←	↘	↙
Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↑↑	↑↑	↑↓	↑
Traffic Volume (vph)	365	435	500	60
Future Volume (vph)	365	435	500	60
Lane Group Flow (vph)	365	435	500	60
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	6	
Permitted Phases				6
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	34.0	34.0	46.0	46.0
Total Split (%)	42.5%	42.5%	57.5%	57.5%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.30	0.35	0.31	0.08
Control Delay	19.7	29.8	13.1	3.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.7	29.8	13.1	3.5
Queue Length 50th (m)	21.9	25.1	23.6	0.0
Queue Length 95th (m)	32.7	40.0	33.8	5.8
Internal Link Dist (m)	199.6	282.0	265.0	
Turn Bay Length (m)				40.0
Base Capacity (vph)	1226	1250	1610	759
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.35	0.31	0.08

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
 Natural Cycle: 50
 Control Type: Pretimed

Splits and Phases: 5: Laird Rd. & Hwy. 6 Southbound Off-Ramp



HCM Signalized Intersection Capacity Analysis
5: Laird Rd. & Hwy. 6 Southbound Off-Ramp

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	←	↗	↙	
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↓	↑
Traffic Volume (vph)	0	365	435	0	500	60
Future Volume (vph)	0	365	435	0	500	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		7.0	7.0
Lane Util. Factor		0.95	0.95		0.97	1.00
Flt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3505	3574		3303	1495
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3505	3574		3303	1495
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	365	435	0	500	60
RTOR Reduction (vph)	0	0	0	0	0	31
Lane Group Flow (vph)	0	365	435	0	500	29
Heavy Vehicles (%)	2%	3%	1%	2%	6%	8%
Turn Type	NA	NA		Prot	Perm	
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		28.0	28.0		39.0	39.0
Effective Green, g (s)		28.0	28.0		39.0	39.0
Actuated g/C Ratio		0.35	0.35		0.49	0.49
Clearance Time (s)		6.0	6.0		7.0	7.0
Lane Grp Cap (vph)		1226	1250		1610	728
v/s Ratio Prot		0.10	c0.12		c0.15	
v/s Ratio Perm						0.02
v/c Ratio		0.30	0.35		0.31	0.04
Uniform Delay, d1		18.9	19.2		12.4	10.7
Progression Factor		1.00	1.50		1.00	1.00
Incremental Delay, d2		0.6	0.7		0.5	0.1
Delay (s)		19.5	29.5		12.9	10.8
Level of Service		B	C		B	B
Approach Delay (s)		19.5	29.5		12.7	
Approach LOS		B	C		B	

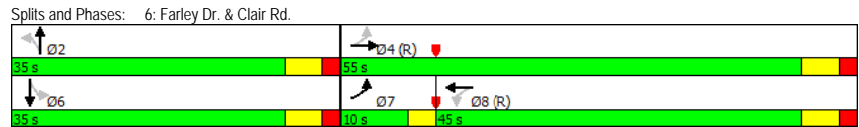
Intersection Summary

HCM 2000 Control Delay: 19.9, HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.33
 Actuated Cycle Length (s): 80.0, Sum of lost time (s): 13.0
 Intersection Capacity Utilization: 50.5%, ICU Level of Service: A
 Analysis Period (min): 15
 c Critical Lane Group

Queues
6: Farley Dr. & Clair Rd. Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↙	↘	↖	↗	↙	↘
Traffic Volume (vph)	235	815	45	595	115	65	55	50
Future Volume (vph)	235	815	45	595	115	65	55	50
Lane Group Flow (vph)	235	1005	45	650	115	100	55	190
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4	8	8	2	2	6	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	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
Minimum Split (s)	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	55.0	45.0	45.0	35.0	35.0	35.0	35.0
Total Split (%)	11.1%	61.1%	50.0%	50.0%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	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)	3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.53	0.54	0.20	0.44	0.32	0.17	0.14	0.30
Control Delay	16.5	17.2	14.3	15.8	26.1	16.2	22.9	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	17.2	14.3	15.8	26.1	16.2	22.9	8.6
Queue Length 50th (m)	33.1	78.1	6.2	51.8	15.7	8.6	7.0	6.3
Queue Length 95th (m)	m38.7	m98.5	16.0	67.7	30.5	20.3	16.1	21.7
Internal Link Dist (m)		194.1		563.0		111.7		152.1
Turn Bay Length (m)	125.0		50.0		45.0		20.0	
Base Capacity (vph)	440	1870	227	1492	360	594	399	624
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	0.53	0.54	0.20	0.44	0.32	0.17	0.14	0.30

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 50.4 (56%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Background Traffic Conditions
6: Farley Dr. & Clair Rd. Weekday Afternoon Peak Hour

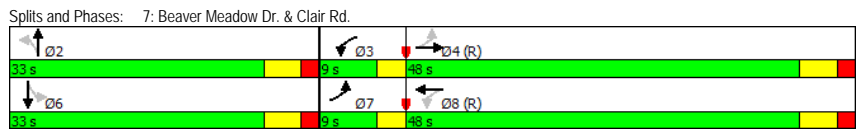
	↖	→	↙	←	↘	↑	↗	↓	↖	↗	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↙	↘		↖	↗		↙	↘	
Traffic Volume (vph)	235	815	190	45	595	55	115	65	35	55	50	140
Future Volume (vph)	235	815	190	45	595	55	115	65	35	55	50	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.95		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3392		1796	3428		1738	1778		1702	1646	
Flt Permitted	0.32	1.00		0.28	1.00		0.61	1.00		0.69	1.00	
Satd. Flow (perm)	604	3392		525	3428		1119	1778		1240	1646	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	815	190	45	595	55	115	65	35	55	50	140
RTOR Reduction (vph)	0	22	0	0	8	0	0	22	0	0	95	0
Lane Group Flow (vph)	235	983	0	45	642	0	115	78	0	55	95	0
Confl. Peds. (#/hr)	6		8	8		6	16		15	15		16
Confl. Bikes (#/hr)							1					
Heavy Vehicles (%)	0%	3%	1%	0%	4%	0%	2%	0%	0%	4%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		8	8		2	2		6	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	49.0	49.0		39.0	39.0		29.0	29.0		29.0	29.0	
Effective Green, g (s)	49.0	49.0		39.0	39.0		29.0	29.0		29.0	29.0	
Actuated g/C Ratio	0.54	0.54		0.43	0.43		0.32	0.32		0.32	0.32	
Clearance Time (s)	3.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	1846		227	1485		360	572		399	530	
v/s Ratio Prot	0.04	c0.29			0.19			0.04			0.06	
v/s Ratio Perm	c0.26			0.09			c0.10			0.04		
v/c Ratio	0.56	0.53		0.20	0.43		0.32	0.14		0.14	0.18	
Uniform Delay, d1	11.4	13.2		15.8	17.8		23.0	21.6		21.6	21.9	
Progression Factor	1.46	1.31		0.74	0.85		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.6		1.9	0.9		2.3	0.5		0.7	0.7	
Delay (s)	17.5	17.8		13.6	15.9		25.4	22.1		22.4	22.7	
Level of Service	B	B		B	B		C	C		C	C	
Approach Delay (s)		17.8			15.8			23.9			22.6	
Approach LOS		B			B			C			C	

Intersection Summary
 HCM 2000 Control Delay 18.2 HCM 2000 Level of Service B
 HCM 2000 Volume to Capacity ratio 0.48
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 15.0
 Intersection Capacity Utilization 74.3% ICU Level of Service D
 Analysis Period (min) 15
 c Critical Lane Group

Queues Future Background Traffic Conditions
7: Beaver Meadow Dr. & Clair Rd. Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	110	855	55	615	45	5	15	15
Future Volume (vph)	110	855	55	615	45	5	15	15
Lane Group Flow (vph)	110	901	55	630	0	90	15	75
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	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
Minimum Split (s)	9.5	24.0	9.5	24.0	24.0	24.0	24.0	24.0
Total Split (s)	9.0	48.0	9.0	48.0	33.0	33.0	33.0	33.0
Total Split (%)	10.0%	53.3%	10.0%	53.3%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max
v/c Ratio	0.24	0.53	0.16	0.37		0.20	0.04	0.14
Control Delay	4.5	12.5	8.6	15.6		15.5	22.7	9.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	4.5	12.5	8.6	15.6		15.5	22.7	9.4
Queue Length 50th (m)	2.5	78.1	3.8	37.4		6.6	1.9	1.9
Queue Length 95th (m)	4.9	98.0	8.5	50.6		18.1	6.6	11.9
Internal Link Dist (m)		563.0		1233.2		183.8		182.6
Turn Bay Length (m)	55.0		30.0					
Base Capacity (vph)	465	1710	342	1716		461	414	527
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	0.24	0.53	0.16	0.37		0.20	0.04	0.14

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 86.4 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated



HCM Signalized Intersection Capacity Analysis Future Background Traffic Conditions
7: Beaver Meadow Dr. & Clair Rd. Weekday Afternoon Peak Hour

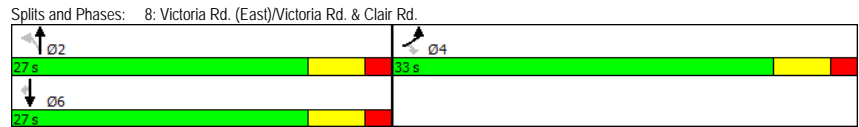
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	110	855	46	55	615	15	45	5	40	15	15	60
Future Volume (vph)	110	855	46	55	615	15	45	5	40	15	15	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00			0.94		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1769	3508		1769	3524			1684		1758	1618	
Flt Permitted	0.37	1.00		0.24	1.00			0.84		0.75	1.00	
Satd. Flow (perm)	687	3508		443	3524			1446		1383	1618	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	855	46	55	615	15	45	5	40	15	15	60
RTOR Reduction (vph)	0	4	0	0	2	0	0	28	0	0	42	0
Lane Group Flow (vph)	110	897	0	55	628	0	0	62	0	15	33	0
Confl. Peds. (#/hr)	2		1	1		2	3		3	3		3
Confl. Bikes (#/hr)			1			2						
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	48.0	43.2		48.0	43.2			27.0		27.0	27.0	
Effective Green, g (s)	48.0	43.2		48.0	43.2			27.0		27.0	27.0	
Actuated g/C Ratio	0.53	0.48		0.53	0.48			0.30		0.30	0.30	
Clearance Time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	424	1683		306	1691			433		414	485	
v/s Ratio Prot	c0.01	c0.26		0.01	0.18						0.02	
v/s Ratio Perm	0.12			0.09				c0.04		0.01		
v/c Ratio	0.26	0.53		0.18	0.37			0.14		0.04	0.07	
Uniform Delay, d1	10.6	16.4		10.8	14.8			23.0		22.3	22.5	
Progression Factor	0.43	0.69		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.1		0.3	0.6			0.7		0.2	0.3	
Delay (s)	4.9	12.4		11.1	15.4			23.7		22.5	22.8	
Level of Service	A	B		B	B			C		C	C	
Approach Delay (s)		11.6			15.1			23.7			22.7	
Approach LOS		B			B			C			C	

Intersection Summary
 HCM 2000 Control Delay: 14.0 HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.37
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 57.6% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Queues Future Background Traffic Conditions
 8: Victoria Rd. (East)/Victoria Rd. & Clair Rd. Weekday Afternoon Peak Hour

	↖	↗	↙	↘	↑	↓
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↙	↘	↑	↓
Traffic Volume (vph)	620	105	140	380	280	520
Future Volume (vph)	620	105	140	380	280	520
Lane Group Flow (vph)	620	105	140	380	280	520
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	33.0	33.0	27.0	27.0	27.0	27.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%	45.0%	45.0%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	Min
v/c Ratio	0.83	0.14	0.41	0.67	0.49	0.63
Control Delay	24.7	6.6	19.0	22.5	18.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	6.6	19.0	22.5	18.0	5.6
Queue Length 50th (m)	48.4	3.3	10.9	32.6	22.4	0.0
Queue Length 95th (m)	#114.6	11.4	25.3	60.1	42.8	17.9
Internal Link Dist (m)	1233.2		2005.5	465.2		
Turn Bay Length (m)		10.0	65.0		20.0	
Base Capacity (vph)	961	930	482	802	818	954
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.11	0.29	0.47	0.34	0.55

Intersection Summary
 Cycle Length: 60
 Actuated Cycle Length: 49.9
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis Future Background Traffic Conditions
 8: Victoria Rd. (East)/Victoria Rd. & Clair Rd. Weekday Afternoon Peak Hour

	↖	↗	↙	↘	↑	↓
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↙	↘	↑	↓
Traffic Volume (vph)	620	105	140	380	280	520
Future Volume (vph)	620	105	140	380	280	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1703	1615	1805	1827	1863	1509
Flt Permitted	0.95	1.00	0.58	1.00	1.00	1.00
Satd. Flow (perm)	1703	1615	1098	1827	1863	1509
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	105	140	380	280	520
RTOR Reduction (vph)	0	23	0	0	0	358
Lane Group Flow (vph)	620	82	140	380	280	162
Heavy Vehicles (%)	6%	0%	0%	4%	2%	7%
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	22.0	22.0	15.4	15.4	15.4	15.4
Effective Green, g (s)	22.0	22.0	15.4	15.4	15.4	15.4
Actuated g/C Ratio	0.45	0.45	0.31	0.31	0.31	0.31
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	758	719	342	569	580	470
v/s Ratio Prot	c0.36			c0.21	0.15	
v/s Ratio Perm		0.05	0.13			0.11
v/c Ratio	0.82	0.11	0.41	0.67	0.48	0.34
Uniform Delay, d1	12.0	8.0	13.4	14.8	13.8	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.9	0.1	0.8	3.0	0.6	0.4
Delay (s)	18.8	8.1	14.2	17.7	14.4	13.6
Level of Service	B	A	B	B	B	B
Approach Delay (s)	17.3			16.8	13.9	
Approach LOS	B			B	B	

Intersection Summary
 HCM 2000 Control Delay: 15.8 HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.76
 Actuated Cycle Length (s): 49.4 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 71.8% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Clair Rd. & Laird Rd.

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↕↕		↘	↕↕	↘	↕↕
Traffic Volume (veh/h)	1200	5	65	810	1	195
Future Volume (Veh/h)	1200	5	65	810	1	195
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1200	5	65	810	1	195
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1205		1738	602
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1205		1738	602
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		99	56
cM capacity (veh/h)			575		69	442
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NE 1
Volume Total	800	405	65	405	405	196
Volume Left	0	0	65	0	0	1
Volume Right	0	5	0	0	0	195
cSH	1700	1700	575	1700	1700	431
Volume to Capacity	0.47	0.24	0.11	0.24	0.24	0.46
Queue Length 95th (m)	0.0	0.0	3.0	0.0	0.0	18.6
Control Delay (s)	0.0	0.0	12.1	0.0	0.0	20.2
Lane LOS			B			C
Approach Delay (s)	0.0		0.9			20.2
Approach LOS						C
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			59.1%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
10: Gordon St. & Maltby Rd.

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕			↕↕			↕↕		↘	↕↕	↘	
Traffic Volume (veh/h)	30	10	50	5	5	0	35	1130	10	5	865	30	
Future Volume (Veh/h)	30	10	50	5	5	0	35	1130	10	5	865	30	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour 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	
Hourly flow rate (vph)	30	10	50	5	5	0	35	1130	10	5	865	30	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None				None		
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	1528	2100	448	1702	2110	570	895			1140			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1528	2100	448	1702	2110	570	895			1140			
tC, single (s)	*4.8	*4.6	*4.4	*5.6	*5.0	6.9	4.2			4.5			
tC, 2 stage (s)													
tF (s)	*3.2	*3.0	*3.0	3.5	*3.5	3.3	2.2			2.4			
p0 queue free %	88	94	94	96	96	100	95			99			
cM capacity (veh/h)	249	164	832	128	122	470	748			515			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	90	10	35	753	387	5	577	318					
Volume Left	30	5	35	0	0	5	0	0					
Volume Right	50	0	0	0	10	0	0	30					
cSH	372	125	748	1700	1700	515	1700	1700					
Volume to Capacity	0.24	0.08	0.05	0.44	0.23	0.01	0.34	0.19					
Queue Length 95th (m)	7.5	2.1	1.2	0.0	0.0	0.2	0.0	0.0					
Control Delay (s)	17.7	36.3	10.1	0.0	0.0	12.1	0.0	0.0					
Lane LOS	C	E	B				B						
Approach Delay (s)	17.7	36.3	0.3				0.1						
Approach LOS	C	E											
Intersection Summary													
Average Delay					1.1								
Intersection Capacity Utilization					44.1%		ICU Level of Service	A					
Analysis Period (min)					15								

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
11: Victoria Rd. (West) & Maltby Rd.

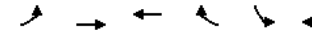
Future Background Traffic Conditions
Weekday Afternoon Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	30	10	295	20	5	425
Future Volume (Veh/h)	30	10	295	20	5	425
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	10	295	20	5	425
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			41		646	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		646	36
tC, single (s)			4.1		6.7	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.3
p0 queue free %			81		98	59
cM capacity (veh/h)			1574		317	1033
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	40	315	430			
Volume Left	0	295	5			
Volume Right	10	0	425			
cSH	1700	1574	1006			
Volume to Capacity	0.02	0.19	0.43			
Queue Length 95th (m)	0.0	5.5	17.4			
Control Delay (s)	0.0	7.4	11.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	7.4	11.2			
Approach LOS			B			
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			57.3%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: Maltby Rd. & Victoria Rd. (East)

Future Background Traffic Conditions
Weekday Afternoon Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Volume (veh/h)	440	15	10	30	35	310
Future Volume (Veh/h)	440	15	10	30	35	310
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	440	15	10	30	35	310
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	41				921	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	41				921	26
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	72				84	70
cM capacity (veh/h)	1561				215	1049
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	455	40	345			
Volume Left	440	0	35			
Volume Right	0	30	310			
cSH	1561	1700	752			
Volume to Capacity	0.28	0.02	0.46			
Queue Length 95th (m)	9.3	0.0	19.4			
Control Delay (s)	8.0	0.0	13.8			
Lane LOS	A		B			
Approach Delay (s)	8.0	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			10.0			
Intersection Capacity Utilization			59.6%	ICU Level of Service		B
Analysis Period (min)			15			

Queues
13: Gordon St. & Gosling Gardens

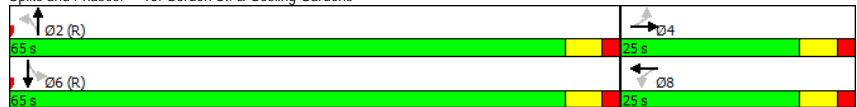
Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↖	↗	↖	↗
Traffic Volume (vph)	1	55	25	30	20	1010	105	890
Future Volume (vph)	1	55	25	30	20	1010	105	890
Lane Group Flow (vph)	0	66	0	110	20	1055	105	895
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases		4		8		2		6
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	25.0	25.0	25.0	25.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	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
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio		0.17		0.29		0.06		0.46
Control Delay		27.2		19.5		6.1		8.3
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		27.2		19.5		6.1		8.3
Queue Length 50th (m)		8.5		8.9		1.2		43.5
Queue Length 95th (m)		19.7		23.3		3.8		56.4
Internal Link Dist (m)		183.5		226.8		1642.2		171.0
Turn Bay Length (m)						50.0		50.0
Base Capacity (vph)		391		378		355		2309
Starvation Cap Reductn		0		0		0		0
Spillback Cap Reductn		0		0		0		0
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.17		0.29		0.06		0.46

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed

Splits and Phases: 13: Gordon St. & Gosling Gardens



HCM Signalized Intersection Capacity Analysis
13: Gordon St. & Gosling Gardens

Future Background Traffic Conditions
Weekday Afternoon Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖	↗		↖	↗	
Traffic Volume (vph)	1	55	10	25	30	55	20	1010	45	105	890	5
Future Volume (vph)	1	55	10	25	30	55	20	1010	45	105	890	5
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	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.98			0.93		1.00	0.99		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1823			1717		1770	3517		1770	3536	
Flt Permitted		1.00			0.92		0.29	1.00		0.24	1.00	
Satd. Flow (perm)		1819			1603		542	3517		438	3536	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	55	10	25	30	55	20	1010	45	105	890	5
RTOR Reduction (vph)	0	7	0	0	40	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	59	0	0	70	0	20	1052	0	105	895	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Actuated Green, G (s)		19.0			19.0		59.0	59.0		59.0	59.0	
Effective Green, g (s)		19.0			19.0		59.0	59.0		59.0	59.0	
Actuated g/C Ratio		0.21			0.21		0.66	0.66		0.66	0.66	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		384			338		355	2305		287	2318	
v/s Ratio Prot							c0.30				0.25	
v/s Ratio Perm		0.03			c0.04		0.04			0.24		
v/c Ratio		0.15			0.21		0.06	0.46		0.37	0.39	
Uniform Delay, d1		28.9			29.3		5.5	7.6		7.0	7.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			1.4		0.3	0.7		3.6	0.5	
Delay (s)		29.8			30.7		5.8	8.3		10.6	7.6	
Level of Service		C			C		A	A		B	A	
Approach Delay (s)		29.8			30.7			8.2			7.9	
Approach LOS		C			C			A			A	

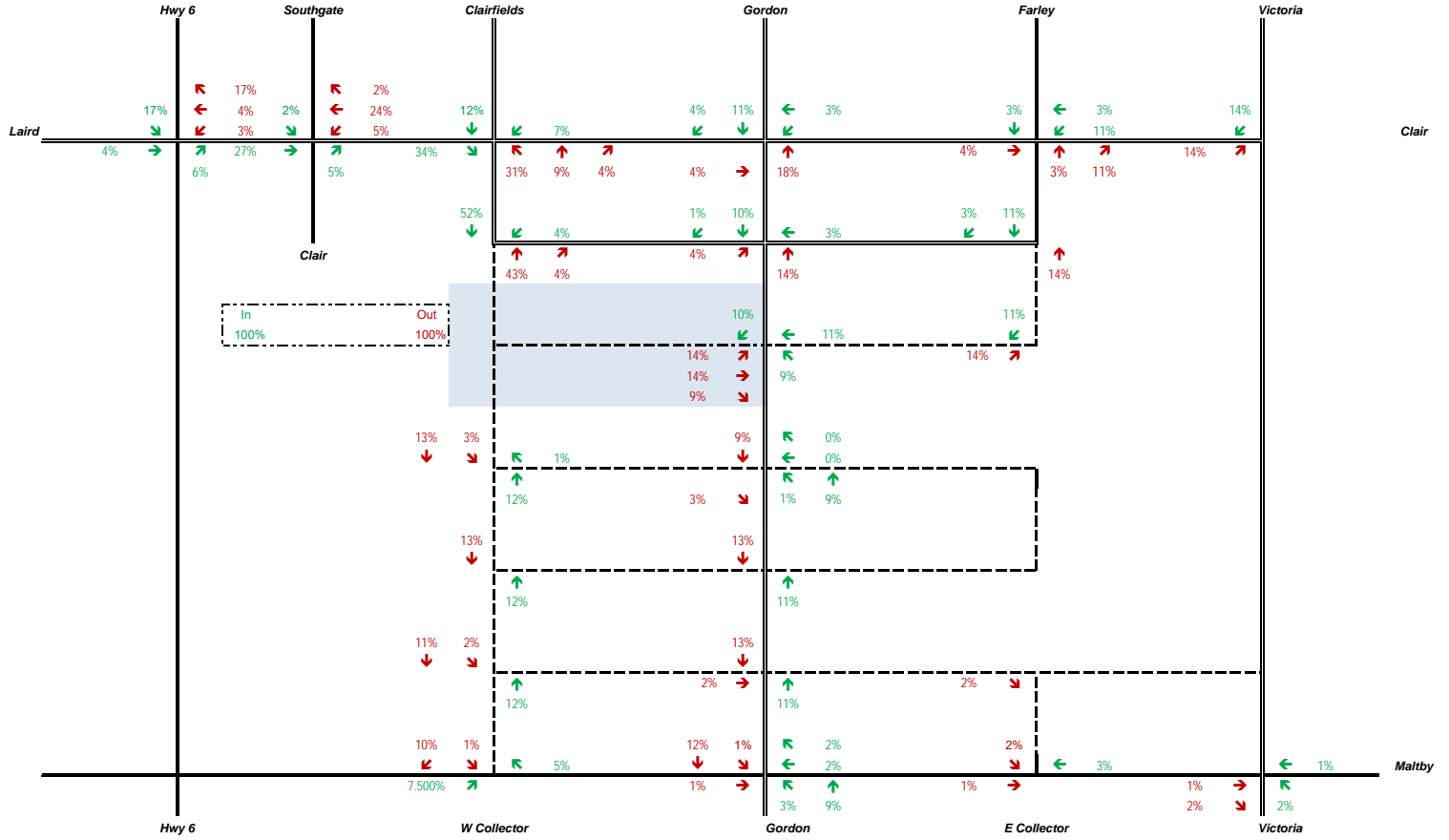
Intersection Summary

HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Appendix Q – CMSP Future Development Traffic Trip Assignment Calculations

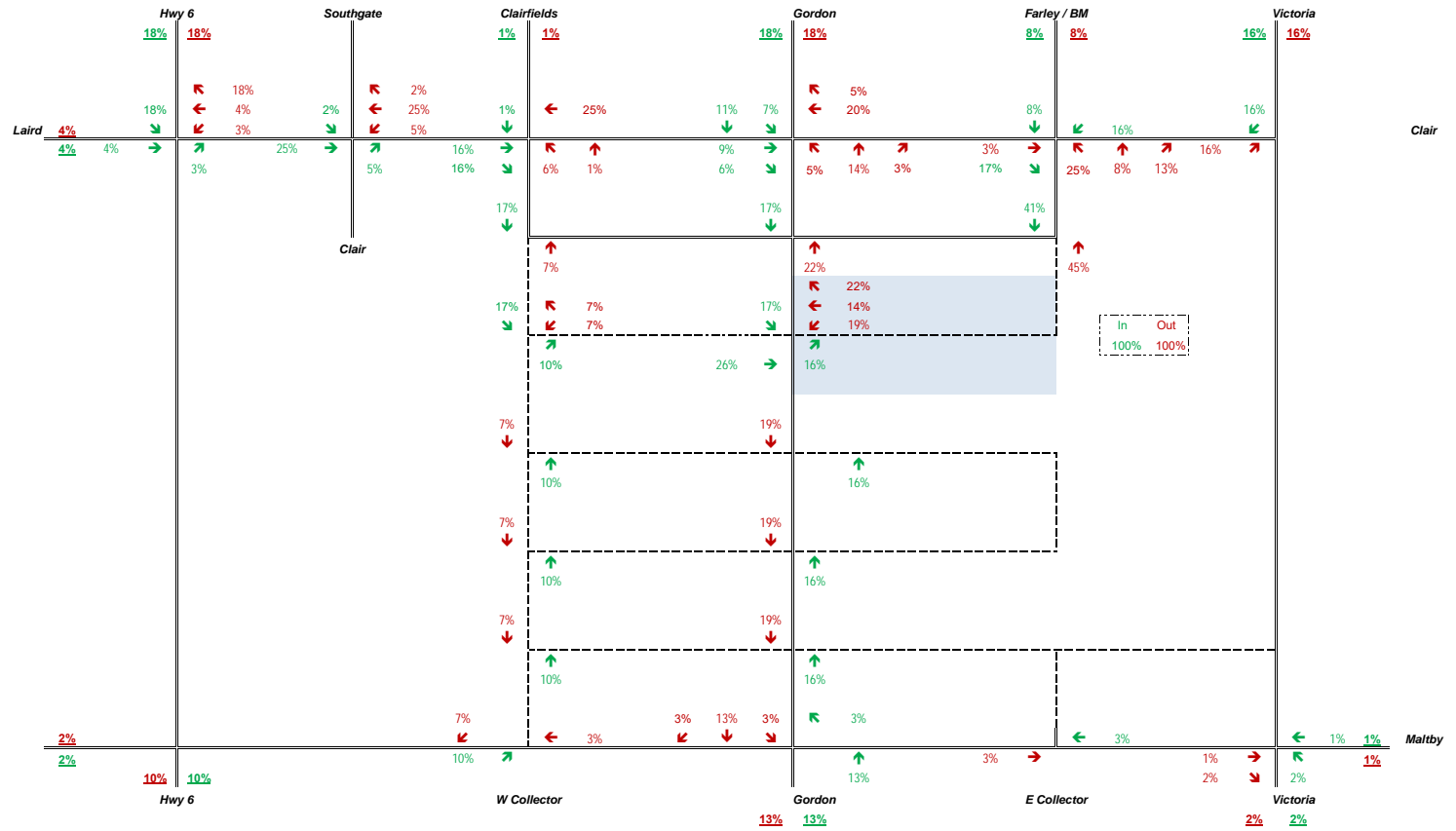
General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	17%	17%
	Clairfields	12%	9%
	Gordon	15%	18%
	Hawkins	3%	3%
	Victoria	14%	14%
	Southgate	2%	2%
	Total	63%	63%
S	Hwy.6	11%	11%
	Gordon	12%	12%
	Victoria	2%	2%
	Total	25%	25%
E			
	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%

Zone 1 Distribution Map



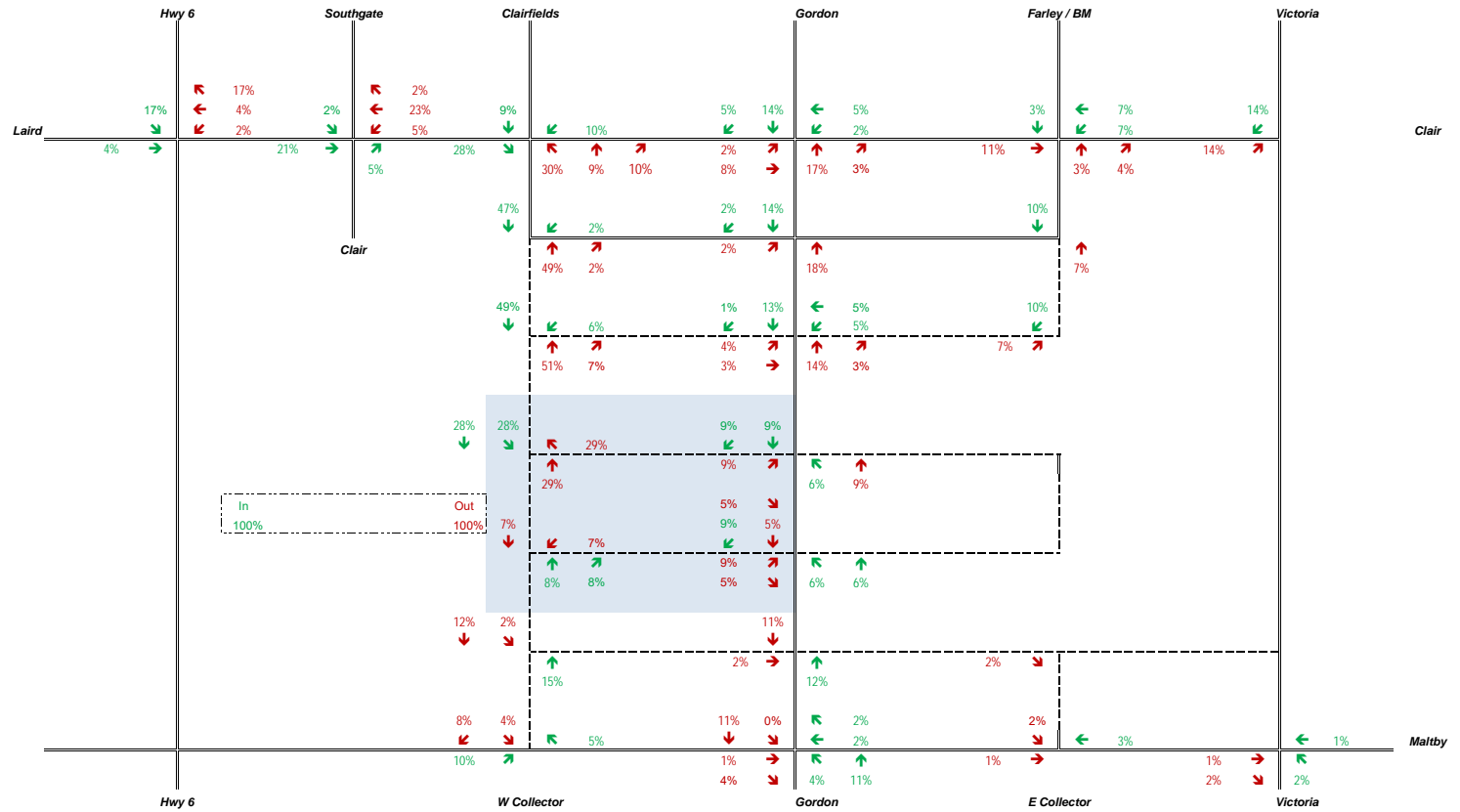
Zone 2 Distribution Map

General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy 6	18%	18%
	Clairfields	1%	1%
	Gordon	18%	18%
	Hawkins	8%	8%
	Victoria	16%	16%
	Southgate	2%	2%
	Total	63%	63%
S	Hwy 6	10%	10%
	Gordon	13%	13%
	Victoria	2%	2%
	Total	25%	25%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%
		100%	100%



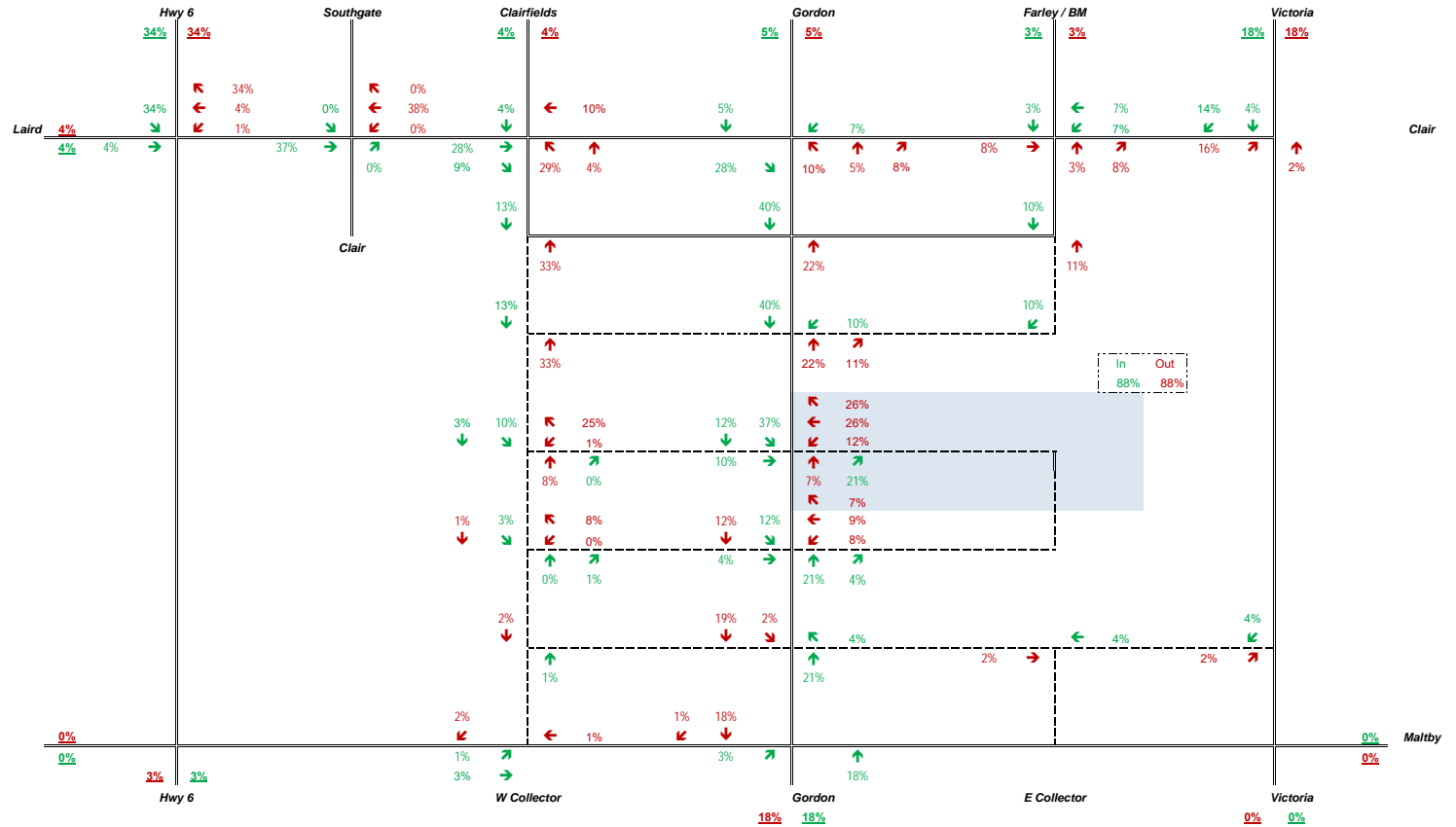
General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	17%	17%
	Clairfields	9%	9%
	Gordon	19%	19%
	Hawkins	3%	3%
	Victoria	14%	14%
	Southgate	2%	2%
	Total	64%	64%
S	Hwy.6	10%	10%
	Gordon	14%	14%
	Victoria	2%	2%
	Total	26%	26%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%
		102%	102%

Zone 4 Distribution Map



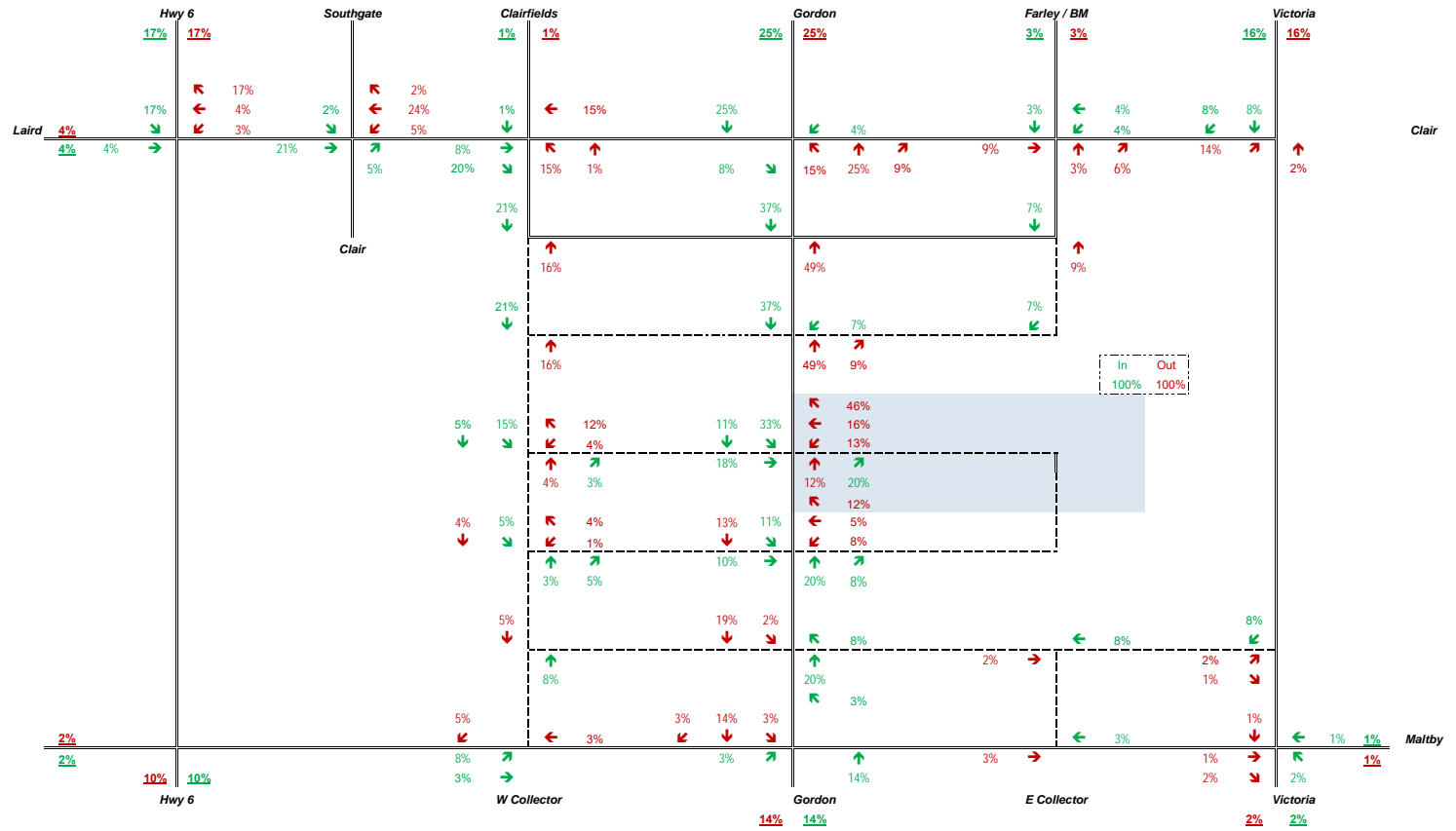
Zone 5 (EMPLOYMENT) Distribution Map

General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	34%	34%
	Clairfields	4%	4%
	Gordon	5%	5%
	Hawkins	3%	3%
	Victoria	18%	18%
	Southgate	0%	0%
	Total	63%	63%
S	Hwy.6	3%	3%
	Gordon	18%	18%
	Victoria	0%	0%
	Total	21%	21%
E	Maltby	0%	0%
	Total	0%	0%
W	Laird	4%	4%
	Maltby	0%	0%
	Clair	0%	0%
	Total	4%	4%
		88%	88%



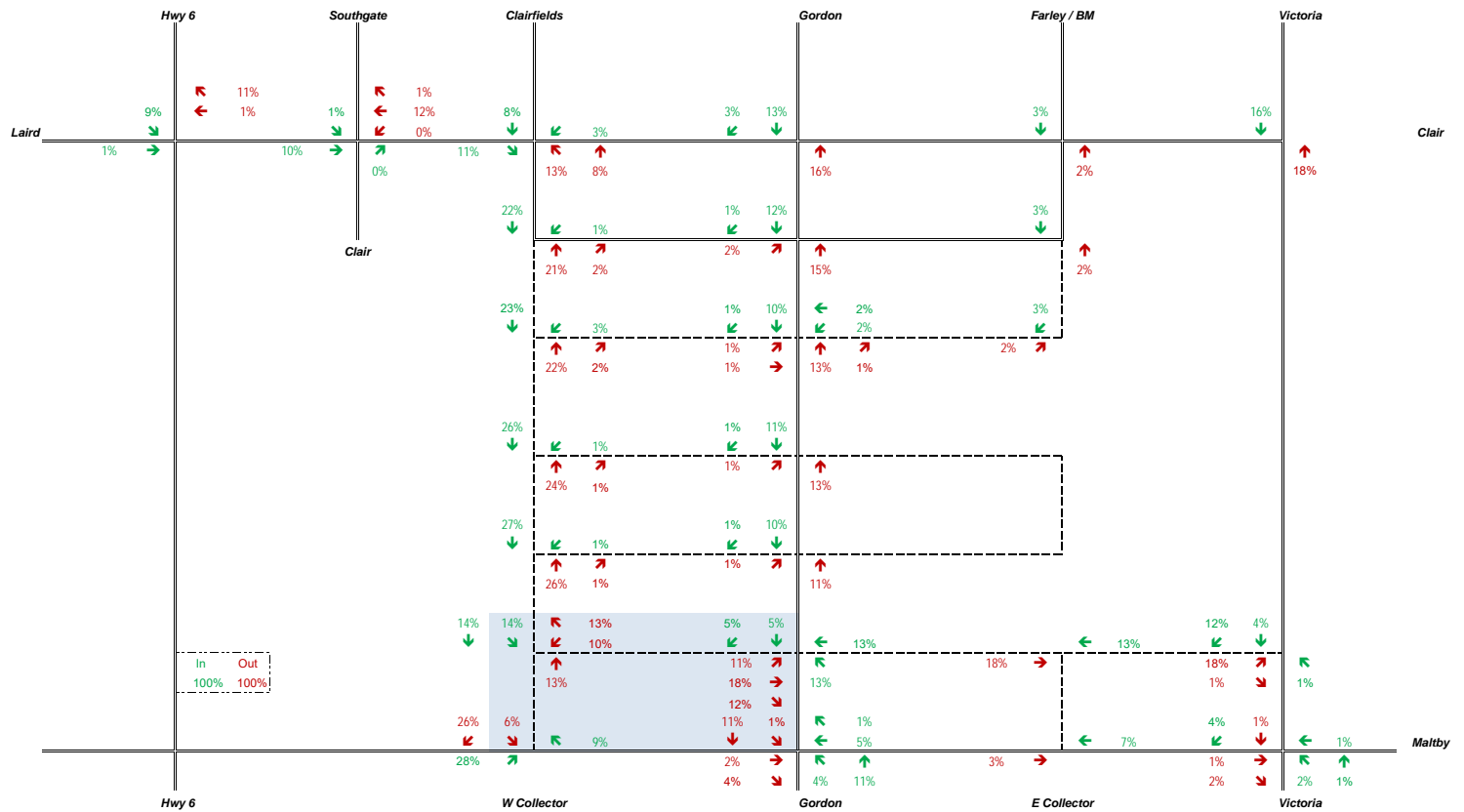
General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	17%	17%
	Clairfields	1%	1%
	Gordon	25%	25%
	Hawkins	3%	3%
	Victoria	16%	16%
	Southgate	2%	2%
Total		64%	64%
S	Hwy.6	10%	10%
	Gordon	14%	14%
	Victoria	2%	2%
	Total	26%	26%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
Total		11%	11%
		102%	102%

Zone 5 Distribution Map



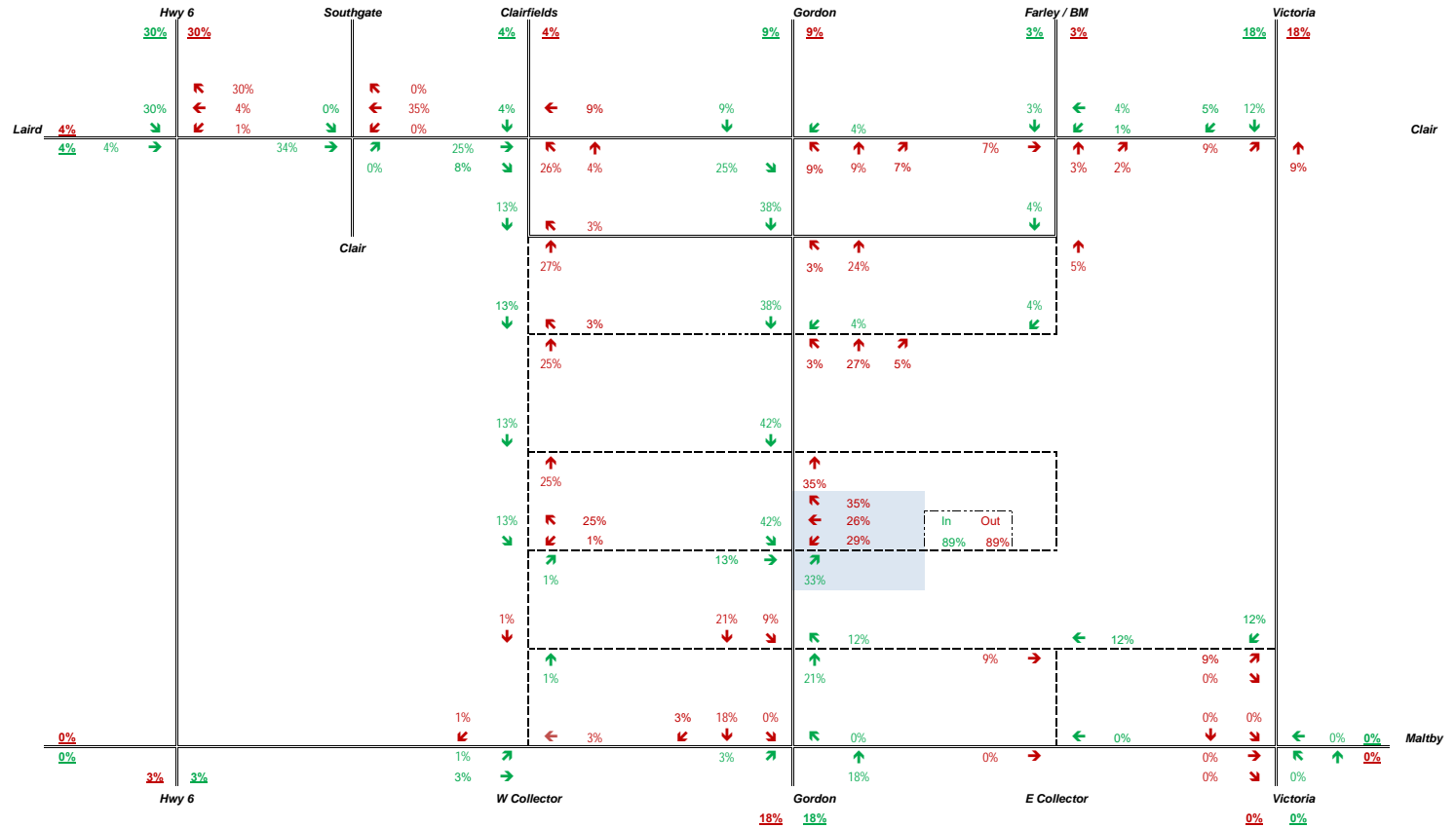
General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	18%	18%
	Clairfields	8%	6%
	Gordon	16%	18%
	Hawkins	3%	3%
	Victoria	16%	16%
	Southgate	2%	2%
	Total	63%	63%
S	Hwy.6	8%	8%
	Gordon	15%	15%
	Victoria	2%	2%
	Total	25%	25%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%
		100%	100%

Zone 6 Distribution Map



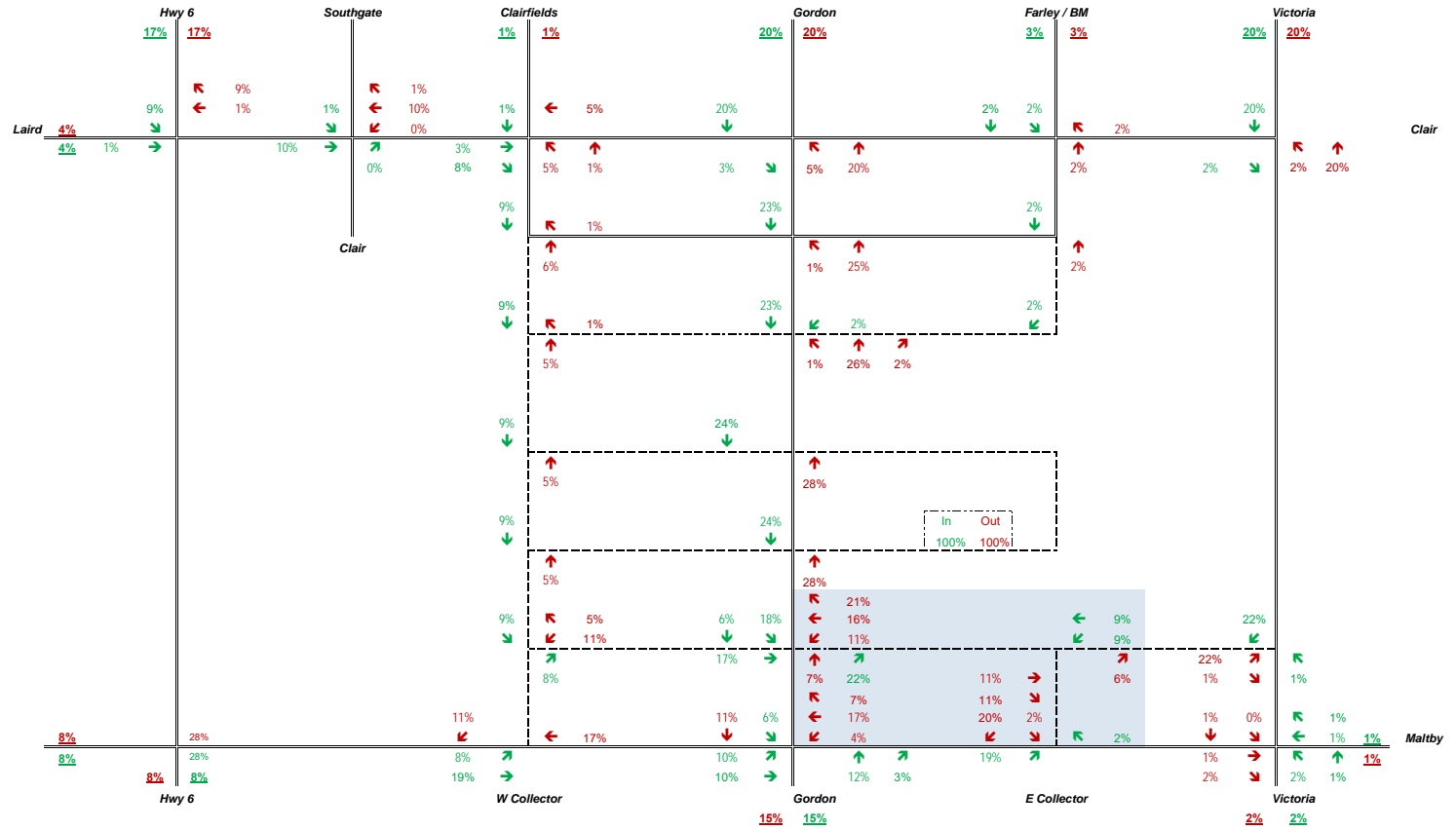
General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	30%	30%
	Clairfields	4%	4%
	Gordon	9%	9%
	Hawkins	3%	3%
	Victoria	18%	18%
	Southgate		
	Total	64%	64%
S	Hwy.6	3%	3%
	Gordon	18%	18%
	Victoria		
	Total	21%	21%
E	Maltby		
	Total	0%	0%
W	Laird	4%	4%
	Maltby		
	Clair		
	Total	4%	4%
		89%	89%

Zone 7 Distribution Map



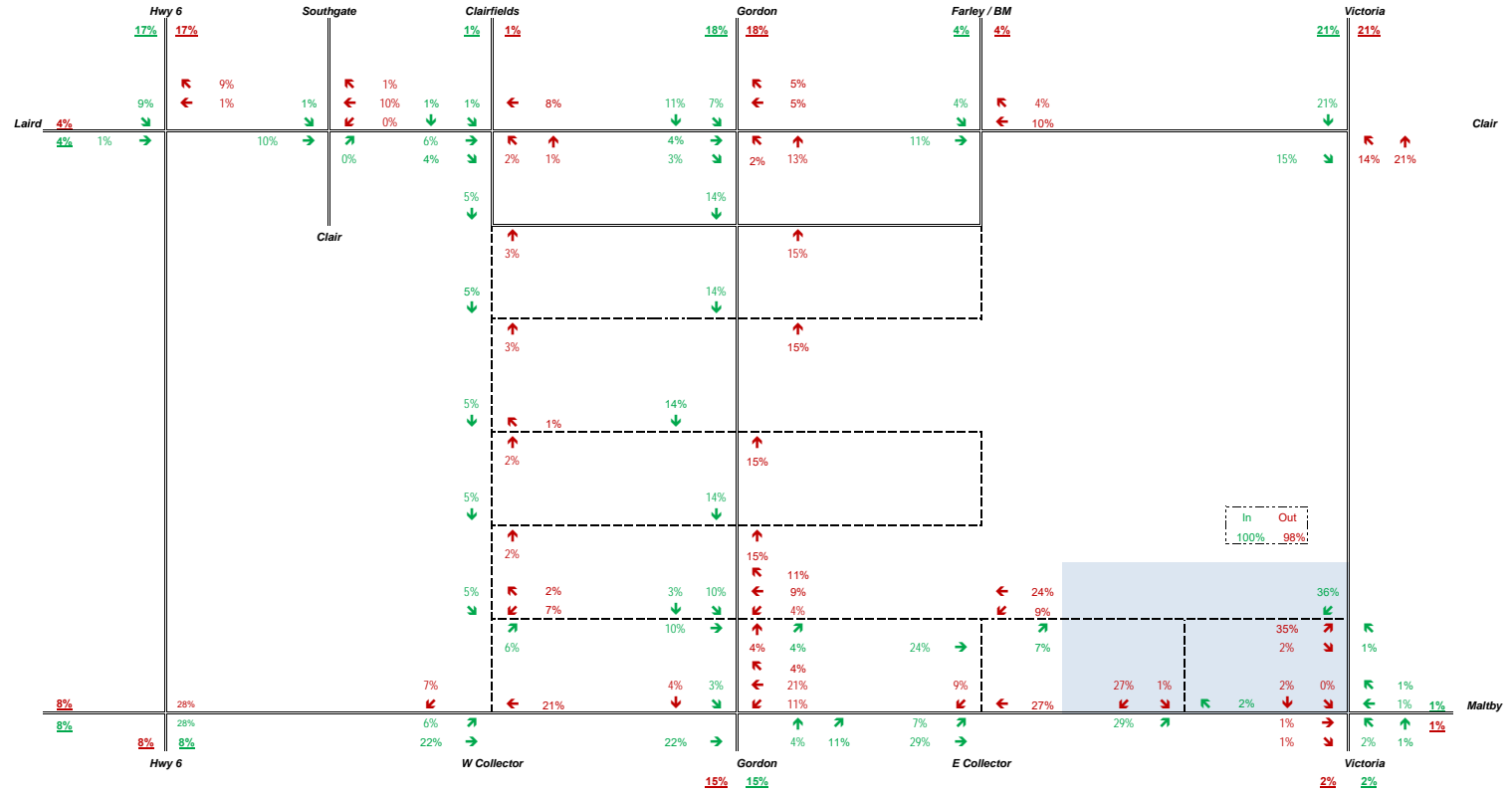
Zone 8 Distribution Map

General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	17%	17%
	Clairfields	1%	1%
	Gordon	20%	20%
	Hawkins	3%	3%
	Victoria	20%	20%
	Southgate	2%	2%
	Total	63%	63%
S	Hwy.6	8%	8%
	Gordon	15%	15%
	Victoria	2%	2%
	Total	25%	25%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%
		100%	100%



Zone 9 Distribution Map

General Res. Distribution			
Orientation	Route	Peak Hr.	
		In	Out
N	Hwy.6	17%	17%
	Clairfields	1%	1%
	Gordon	18%	18%
	Hawkins	4%	4%
	Victoria	21%	21%
	Southgate	2%	2%
	Total	63%	63%
S	Hwy.6	8%	8%
	Gordon	15%	15%
	Victoria	2%	2%
	Total	25%	25%
E	Maltby	1%	1%
	Total	1%	1%
W	Laird	4%	4%
	Maltby	2%	2%
	Clair	5%	5%
	Total	11%	11%
		100%	100%

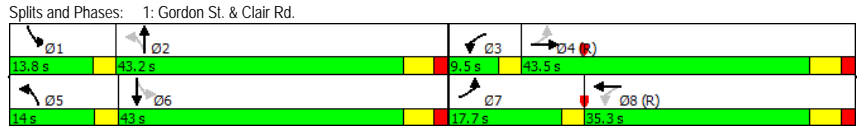


Appendix R – Synchro Analysis Results: Future Total Traffic Conditions

Queues
1: Gordon St. & Clair Rd. Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↖↗	↙	↖↗	↙	↖↗
Traffic Volume (vph)	300	960	165	650	250	985	230	1160
Future Volume (vph)	300	960	165	650	250	985	230	1160
Lane Group Flow (vph)	300	1190	165	770	250	1195	230	1365
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	24.0	9.5	24.0	9.5	24.0
Total Split (s)	17.7	43.5	9.5	35.3	14.0	43.2	13.8	43.0
Total Split (%)	16.1%	39.5%	8.6%	32.1%	12.7%	39.3%	12.5%	39.1%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	3.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	Max	None	Max
v/c Ratio	0.95	1.01	1.02	0.84	1.03	1.03	0.92	1.18
Control Delay	43.3	58.5	104.2	47.1	100.1	73.1	66.3	125.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	43.3	58.5	104.2	47.1	100.1	73.1	66.3	126.3
Queue Length 50th (m)	69.0	-151.0	-22.4	84.8	-53.7	-110.3	34.0	-195.0
Queue Length 95th (m)	m61.2	m127.7	#67.4	#112.1	m#97.0	#158.2	#82.4	#239.6
Internal Link Dist (m)		775.0		194.1		153.6		314.0
Turn Bay Length (m)	75.0		25.0		50.0		140.0	
Base Capacity (vph)	315	1181	161	912	242	1160	249	1152
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	144
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	1.01	1.02	0.84	1.03	1.03	0.92	1.35

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green, Master Intersection
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 - 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.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
1: Gordon St. & Clair Rd. Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓	↖	↗	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↙	↖↗		↙	↖↗		↙	↖↗	
Traffic Volume (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
Future Volume (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3409		1594	3373		1716	3381		1785	3388	
Flt Permitted	0.13	1.00		0.14	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	246	3409		229	3373		194	3381		203	3388	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
RTOR Reduction (vph)	0	19	0	0	14	0	0	17	0	0	13	0
Lane Group Flow (vph)	300	1171	0	165	756	0	250	1178	0	230	1352	0
Confl. Peds. (#/hr)	17		7	7		17	2		11	11		2
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	2%	12%	3%	1%	4%	1%	8%	0%	2%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	47.0	37.5		35.8	29.3		48.2	37.2		47.8	37.0	
Effective Green, g (s)	47.0	37.5		35.8	29.3		48.2	37.2		47.8	37.0	
Actuated g/C Ratio	0.43	0.34		0.33	0.27		0.44	0.34		0.43	0.34	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	1162		155	898		237	1143		243	1139	
v/s Ratio Prot	c0.13	c0.34		c0.06	0.22		c0.11	0.35		0.09	c0.40	
v/s Ratio Perm	0.29			0.28			0.36			0.32		
v/c Ratio	0.97	1.01		1.06	0.84		1.05	1.03		0.95	1.19	
Uniform Delay, d1	29.1	36.2		34.3	38.2		30.3	36.4		28.6	36.5	
Progression Factor	1.39	1.40		1.00	1.00		1.78	1.22		1.00	1.00	
Incremental Delay, d2	10.1	9.9		90.5	9.4		64.4	30.8		42.7	93.1	
Delay (s)	50.7	60.8		124.8	47.6		118.2	75.4		71.3	129.6	
Level of Service	D	E		F	D		F	E		E	F	
Approach Delay (s)	58.7				61.2			82.8			121.2	
Approach LOS	E				E			F			F	

Intersection Summary
 HCM 2000 Control Delay 83.7 HCM 2000 Level of Service F
 HCM 2000 Volume to Capacity ratio 1.11
 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 18.0
 Intersection Capacity Utilization 112.3% ICU Level of Service H
 Analysis Period (min) 15
 c Critical Lane Group

Queues
 2: Gordon St. & Poppy Dr.
 Future Traffic Conditions - Base Future Street Network
 Weekday Afternoon Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔	↔	↔	↔	↔
Traffic Volume (vph)	115	60	55	55	65	1345	50	1425
Future Volume (vph)	115	60	55	55	65	1345	50	1425
Lane Group Flow (vph)	0	210	0	150	65	1410	50	1500
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases		4		8	2		6	
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	24.0	9.5	24.0
Total Split (s)	30.0	30.0	30.0	30.0	10.0	70.0	10.0	70.0
Total Split (%)	27.3%	27.3%	27.3%	27.3%	9.1%	63.6%	9.1%	63.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	3.0	6.0	3.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
v/c Ratio		0.73		0.47	0.30	0.70	0.21	0.74
Control Delay		54.5		39.1	15.7	41.7	3.7	10.5
Queue Delay		0.2		0.0	0.0	4.9	0.0	31.9
Total Delay		54.7		39.1	15.7	46.7	3.7	42.4
Queue Length 50th (m)		42.7		26.6	9.9	167.1	1.5	154.4
Queue Length 95th (m)		#77.3		47.6	m12.8	191.1	m1.3	m41.7
Internal Link Dist (m)		727.4		256.4		172.0		153.6
Turn Bay Length (m)					65.0		27.0	
Base Capacity (vph)		288		321	214	2025	236	2023
Starvation Cap Reductn		0		0	0	541	0	608
Spillback Cap Reductn		2		2	0	0	0	159
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.73		0.47	0.30	0.95	0.21	1.06

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 61 (55%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Gordon St. & Poppy Dr.



HCM Signalized Intersection Capacity Analysis
 2: Gordon St. & Poppy Dr.
 Future Traffic Conditions - Base Future Street Network
 Weekday Afternoon Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
Future Volume (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.98			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1753			1744		1750	3476		1750	3474	
Flt Permitted		0.72			0.80		0.09	1.00		0.11	1.00	
Satd. Flow (perm)		1295			1420		170	3476		206	3474	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
RTOR Reduction (vph)	0	6	0	0	12	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	204	0	0	138	0	65	1407	0	50	1497	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases		4			8		2			6		
Actuated Green, G (s)		24.0			24.0		71.0	64.0		71.0	64.0	
Effective Green, g (s)		24.0			24.0		71.0	64.0		71.0	64.0	
Actuated g/C Ratio		0.22			0.22		0.65	0.58		0.65	0.58	
Clearance Time (s)		6.0			6.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)		282			309		210	2022		231	2021	
v/s Ratio Prot							c0.02	0.40		0.01	c0.43	
v/s Ratio Perm		c0.16			0.10		0.18			0.13		
v/c Ratio		0.72			0.45		0.31	0.70		0.22	0.74	
Uniform Delay, d1		39.9			37.3		12.3	16.2		10.8	16.9	
Progression Factor		1.00			1.00		2.45	2.46		0.67	0.60	
Incremental Delay, d2		14.9			4.6		2.8	1.5		0.2	0.2	
Delay (s)		54.8			41.9		32.9	41.2		7.4	10.3	
Level of Service		D			D		C	D		A	B	
Approach Delay (s)		54.8			41.9		40.8			10.2		
Approach LOS		D			D		D			B		

Intersection Summary
 HCM 2000 Control Delay: 27.7, HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.70
 Actuated Cycle Length (s): 110.0, Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 77.5%, ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 3: Gordon St. & Maltby Rd. Weekday Afternoon Peak Hour

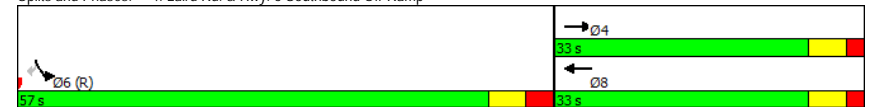
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	85	180	60	55	160	65	80	1415	85	65	1065	40
Future Volume (Veh/h)	85	180	60	55	160	65	80	1415	85	65	1065	40
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour 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
Hourly flow rate (vph)	85	180	60	55	160	65	80	1415	85	65	1065	40
Pedestrians	50			50			50			50		
Lane Width (m)	3.5			3.5			3.5			3.5		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	4			4			4			4		
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)	211											
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	2328	2975	652	2530	2952	850	1155	1550				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2208	2971	234	2446	2944	850	826	1550				
tC, single (s)	*4.8	*4.6	*4.4	*5.6	*5.0	6.9	4.2	4.5				
tC, 2 stage (s)												
tF (s)	*3.2	*3.0	*3.0	3.5	*3.5	3.3	2.2	2.4				
p0 queue free %	0	0	92	0	0	77	88	80				
cM capacity (veh/h)	0	40	775	0	29	284	647	333				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3		
Volume Total	85	240	55	225	80	943	557	65	710	395		
Volume Left	85	0	55	0	80	0	0	65	0	0		
Volume Right	0	60	0	65	0	0	85	0	0	40		
cSH	0	53	0	39	647	1700	1700	333	1700	1700		
Volume to Capacity	Err	4.56	Err	5.78	0.12	0.55	0.33	0.20	0.42	0.23		
Queue Length 95th (m)	Err	Err	Err	Err	3.4	0.0	0.0	5.7	0.0	0.0		
Control Delay (s)	Err	Err	Err	Err	11.4	0.0	0.0	18.4	0.0	0.0		
Lane LOS	F	F	F	F	B	C						
Approach Delay (s)	Err	Err	Err	0.6	1.0							
Approach LOS	F	F										
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	77.2%		ICU Level of Service		D							
Analysis Period (min)	15											
* User Entered Value												

Queues Future Traffic Conditions - Base Future Street Network
 4: Laird Rd. & Hwy. 6 Southbound Off-Ramp Weekday Afternoon Peak Hour

Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↔	↔	↔	↔
Traffic Volume (vph)	435	480	865	60
Future Volume (vph)	435	480	865	60
Lane Group Flow (vph)	435	480	865	60
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	6	
Permitted Phases	6			
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	33.0	33.0	57.0	57.0
Total Split (%)	36.7%	36.7%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.42	0.45	0.48	0.07
Control Delay	26.7	15.1	13.2	2.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.7	15.1	13.2	2.9
Queue Length 50th (m)	33.2	13.8	45.9	0.0
Queue Length 95th (m)	47.1	18.4	60.6	5.3
Internal Link Dist (m)	199.6	282.0	265.0	
Turn Bay Length (m)	40.0			
Base Capacity (vph)	1039	1060	1815	848
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.45	0.48	0.07

Intersection Summary				
Cycle Length: 90				
Actuated Cycle Length: 90				
Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green				
Natural Cycle: 50				
Control Type: Pretimed				

Splits and Phases: 4: Laird Rd. & Hwy. 6 Southbound Off-Ramp



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 4: Laird Rd. & Hwy. 6 Southbound Off-Ramp Weekday Afternoon Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	435	480	0	865	60
Future Volume (vph)	0	435	480	0	865	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		7.0	7.0
Lane Util. Factor		0.95	0.95		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3466	3535		3267	1479
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3466	3535		3267	1479
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	435	480	0	865	60
RTOR Reduction (vph)	0	0	0	0	0	27
Lane Group Flow (vph)	0	435	480	0	865	33
Heavy Vehicles (%)	2%	3%	1%	2%	6%	8%
Turn Type		NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		27.0	27.0		50.0	50.0
Effective Green, g (s)		27.0	27.0		50.0	50.0
Actuated g/C Ratio		0.30	0.30		0.56	0.56
Clearance Time (s)		6.0	6.0		7.0	7.0
Lane Grp Cap (vph)		1039	1060		1815	821
v/s Ratio Prot		0.13	c0.14		c0.26	
v/s Ratio Perm						0.02
v/c Ratio		0.42	0.45		0.48	0.04
Uniform Delay, d1		25.2	25.5		12.1	9.1
Progression Factor		1.00	0.54		1.00	1.00
Incremental Delay, d2		1.2	1.3		0.9	0.1
Delay (s)		26.5	15.0		13.0	9.2
Level of Service		C	B		B	A
Approach Delay (s)		26.5	15.0		12.7	
Approach LOS		C	B		B	

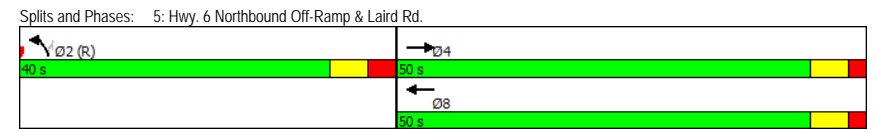
Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues Future Traffic Conditions - Base Future Street Network
 5: Hwy. 6 Northbound Off-Ramp & Laird Rd. Weekday Afternoon Peak Hour

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑	↑
Traffic Volume (vph)	1215	725	30	310
Future Volume (vph)	1215	725	30	310
Lane Group Flow (vph)	1215	725	30	310
Turn Type	NA	NA	Prot	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Minimum Split (s)	24.0	24.0	25.0	25.0
Total Split (s)	50.0	50.0	40.0	40.0
Total Split (%)	55.6%	55.6%	44.4%	44.4%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.73	0.44	0.05	0.60
Control Delay	22.9	16.0	18.7	25.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.9	16.0	18.7	25.8
Queue Length 50th (m)	95.8	43.1	3.5	39.3
Queue Length 95th (m)	126.7	57.7	9.3	67.8
Internal Link Dist (m)	282.0	205.6	157.0	
Turn Bay Length (m)				100.0
Base Capacity (vph)	1662	1662	654	520
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.73	0.44	0.05	0.60

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
5: Hwy. 6 Northbound Off-Ramp & Laird Rd. Weekday Afternoon Peak Hour

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (vph)	1215	0	0	725	30	310
Future Volume (vph)	1215	0	0	725	30	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	7.0	7.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3400			3400	1785	1353
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3400			3400	1785	1353
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1215	0	0	725	30	310
RTOR Reduction (vph)	0	0	0	0	0	24
Lane Group Flow (vph)	1215	0	0	725	30	286
Heavy Vehicles (%)	5%	2%	2%	5%	0%	18%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	44.0			44.0	33.0	33.0
Effective Green, g (s)	44.0			44.0	33.0	33.0
Actuated g/C Ratio	0.49			0.49	0.37	0.37
Clearance Time (s)	6.0			6.0	7.0	7.0
Lane Grp Cap (vph)	1662			1662	654	496
v/s Ratio Prot	c0.36			0.21	0.02	
v/s Ratio Perm						c0.21
v/c Ratio	0.73			0.44	0.05	0.58
Uniform Delay, d1	18.3			14.9	18.4	22.9
Progression Factor	1.09			1.00	1.00	1.00
Incremental Delay, d2	2.6			0.8	0.1	4.8
Delay (s)	22.5			15.8	18.5	27.7
Level of Service	C			B	B	C
Approach Delay (s)	22.5			15.8	26.9	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay		21.0			HCM 2000 Level of Service C	
HCM 2000 Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		90.0			Sum of lost time (s)	13.0
Intersection Capacity Utilization		63.6%			ICU Level of Service	B
Analysis Period (min)		15				
c Critical Lane Group						

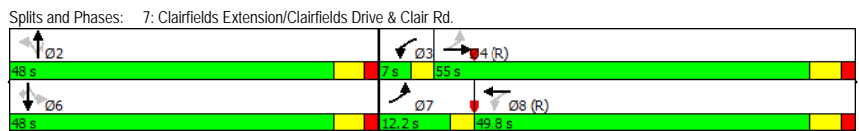
HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
6: Clair Rd. & Laird Rd. Weekday Afternoon Peak Hour

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑		↖	↑↑	↖	↗
Traffic Volume (veh/h)	1695	5	105	1165	1	265
Future Volume (Veh/h)	1695	5	105	1165	1	265
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1695	5	105	1165	1	265
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1700		2490	850
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1700		2490	850
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			72		94	13
cM capacity (veh/h)			371		17	304
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NE 1
Volume Total	1130	570	105	582	582	266
Volume Left	0	0	105	0	0	1
Volume Right	0	5	0	0	0	265
cSH	1700	1700	371	1700	1700	286
Volume to Capacity	0.66	0.34	0.28	0.34	0.34	0.93
Queue Length 95th (m)	0.0	0.0	9.2	0.0	0.0	70.5
Control Delay (s)	0.0	0.0	18.5	0.0	0.0	76.1
Lane LOS			C			F
Approach Delay (s)	0.0		1.5			76.1
Approach LOS						F
Intersection Summary						
Average Delay			6.9			
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			

Queues Future Traffic Conditions - Base Future Street Network
 7: Clairfields Extension/Clairfields Drive & Clair Rd. Weekday Afternoon Peak Hour

	↖	→	↗	←	↖	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖		↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1315	120	800	390	95	55	25	145	80
Future Volume (vph)	120	1315	120	800	390	95	55	25	145	80
Lane Group Flow (vph)	120	1850	120	845	0	485	55	0	170	80
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases	4		8		2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	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	24.0	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	12.2	55.0	7.0	49.8	48.0	48.0	48.0	48.0	48.0	48.0
Total Split (%)	11.1%	50.0%	6.4%	45.3%	43.6%	43.6%	43.6%	43.6%	43.6%	43.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max	Max	Max
v/c Ratio	0.39	1.21	0.89	0.60		1.08	0.08		0.30	0.12
Control Delay	16.6	128.6	61.2	44.3		98.9	1.8		25.6	4.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	16.6	128.6	61.2	44.3		98.9	1.8		25.6	4.5
Queue Length 50th (m)	12.9	-265.2	21.8	104.1		-122.3	0.0		26.5	0.0
Queue Length 95th (m)	22.7	#310.7	m23.6	m113.6		#187.4	3.4		44.3	8.5
Internal Link Dist (m)		186.5		775.0		156.4			150.9	
Turn Bay Length (m)	55.0		45.0			20.0			20.0	
Base Capacity (vph)	316	1531	135	1409		450	652		563	652
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	0.38	1.21	0.89	0.60		1.08	0.08		0.30	0.12

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 - 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.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 7: Clairfields Extension/Clairfields Drive & Clair Rd. Weekday Afternoon Peak Hour

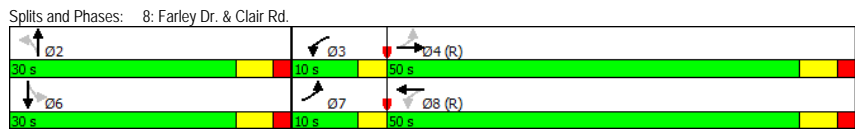
	↖	→	↗	←	↖	↑	↗	↘	↓	↖		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1315	535	120	800	45	390	95	55	25	145	80
Future Volume (vph)	120	1315	535	120	800	45	390	95	55	25	145	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0			6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Flt	1.00	0.96		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	1.00
Satd. Flow (prot)	1750	3348		1750	3472			1771	1566		1829	1566
Flt Permitted	0.20	1.00		0.09	1.00			0.64	1.00		0.80	1.00
Satd. Flow (perm)	376	3348		166	3472			1181	1566		1476	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	1315	535	120	800	45	390	95	55	25	145	80
RTOR Reduction (vph)	0	40	0	0	4	0	0	0	34	0	0	49
Lane Group Flow (vph)	120	1810	0	120	841	0	0	485	21	0	170	31
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	56.0	49.0		48.5	44.5			42.0	42.0		42.0	42.0
Effective Green, g (s)	56.0	49.0		48.5	44.5			42.0	42.0		42.0	42.0
Actuated g/C Ratio	0.51	0.45		0.44	0.40			0.38	0.38		0.38	0.38
Clearance Time (s)	3.0	6.0		3.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	297	1491		130	1404			450	597		563	597
v/s Ratio Prot	0.03	c0.54		c0.03	0.24							
v/s Ratio Perm	0.17			0.37				c0.41	0.01		0.12	0.02
v/c Ratio	0.40	1.21		0.92	0.60			1.08	0.04		0.30	0.05
Uniform Delay, d1	16.2	30.5		29.3	25.7			34.0	21.3		23.8	21.4
Progression Factor	1.00	1.00		2.35	1.68			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	102.7		26.7	0.6			64.9	0.1		1.4	0.2
Delay (s)	17.1	133.2		95.5	43.8			98.9	21.4		25.1	21.6
Level of Service	B	F		F	D			F	C		C	C
Approach Delay (s)		126.1			50.3			91.0			24.0	
Approach LOS		F			D			F			C	

Intersection Summary
 HCM 2000 Control Delay: 94.5
 HCM 2000 Level of Service: F
 HCM 2000 Volume to Capacity ratio: 1.14
 Actuated Cycle Length (s): 110.0
 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 114.0%
 ICU Level of Service: H
 Analysis Period (min): 15
 c Critical Lane Group

Queues
8: Farley Dr. & Clair Rd. Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↗	↙	↙↘	↖	↖↗	↙	↙↘
Traffic Volume (vph)	235	945	155	695	130	105	85	115
Future Volume (vph)	235	945	155	695	130	105	85	115
Lane Group Flow (vph)	235	1150	155	765	130	200	85	255
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	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
Minimum Split (s)	9.5	24.0	9.5	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	50.0	10.0	50.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	11.1%	55.6%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max
v/c Ratio	0.54	0.69	0.55	0.46	0.56	0.41	0.31	0.51
Control Delay	12.3	19.7	28.4	17.7	39.3	23.1	30.3	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	19.7	28.4	17.7	39.3	23.1	30.3	24.7
Queue Length 50th (m)	16.3	78.6	19.0	36.5	20.4	22.1	12.4	28.7
Queue Length 95th (m)	26.6	102.3	38.5	57.9	40.2	42.1	25.9	52.7
Internal Link Dist (m)		194.1		563.0		111.7		152.1
Turn Bay Length (m)	125.0		50.0		45.0		20.0	
Base Capacity (vph)	433	1667	286	1663	232	493	271	499
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	0.54	0.69	0.54	0.46	0.56	0.41	0.31	0.51

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated



HCM Signalized Intersection Capacity Analysis
8: Farley Dr. & Clair Rd. Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↖	→	↙	←	↘	↑	↗	↓	↙↘	↖↗	↘↙	↗↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖↗	↙	↙↘	↙↘	↖	↖↗	↖↗	↙	↙↘	↙↘
Traffic Volume (vph)	235	945	205	155	695	70	130	105	95	85	115	140
Future Volume (vph)	235	945	205	155	695	70	130	105	95	85	115	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1783	3361		1785	3387		1724	1716		1689	1691	
Flt Permitted	0.30	1.00		0.15	1.00		0.48	1.00		0.57	1.00	
Satd. Flow (perm)	566	3361		283	3387		869	1716		1019	1691	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	945	205	155	695	70	130	105	95	85	115	140
RTOR Reduction (vph)	0	20	0	0	8	0	0	36	0	0	48	0
Lane Group Flow (vph)	235	1130	0	155	757	0	130	164	0	85	207	0
Confl. Peds. (#/hr)	6		8	8		6	16		15	15		16
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	3%	1%	0%	4%	0%	2%	0%	0%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.1	44.1		50.9	44.0		24.0	24.0		24.0	24.0	
Effective Green, g (s)	51.1	44.1		50.9	44.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.57	0.49		0.57	0.49		0.27	0.27		0.27	0.27	
Clearance Time (s)	3.0	6.0		3.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	416	1646		275	1655		231	457		271	450	
v/s Ratio Prot	c0.04	c0.34		0.04	0.22		0.10			0.12		
v/s Ratio Perm	0.28			0.28			c0.15			0.08		
v/c Ratio	0.56	0.69		0.56	0.46		0.56	0.36		0.31	0.46	
Uniform Delay, d1	10.1	17.6		11.8	15.1		28.5	26.8		26.4	27.6	
Progression Factor	1.00	1.00		3.10	1.12		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	2.4		2.4	0.8		9.6	2.2		3.0	3.3	
Delay (s)	11.9	20.0		38.8	17.8		38.0	29.0		29.4	30.9	
Level of Service	B	B		D	B		D	C		C	C	
Approach Delay (s)	18.6			21.4			32.5			30.5		
Approach LOS	B			C			C			C		

Intersection Summary
 HCM 2000 Control Delay: 22.4 HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.64
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 82.4% ICU Level of Service: E
 Analysis Period (min): 15
 c Critical Lane Group

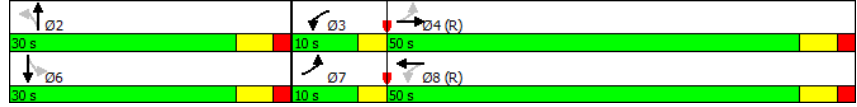
Queues Future Traffic Conditions - Base Future Street Network
 9: Beaver Meadow Dr. & Clair Rd. Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	110	1065	55	845	45	5	15	15
Future Volume (vph)	110	1065	55	845	45	5	15	15
Lane Group Flow (vph)	110	1110	55	860	0	90	15	75
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	3	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
Minimum Split (s)	9.5	24.0	9.5	24.0	24.0	24.0	24.0	24.0
Total Split (s)	10.0	50.0	10.0	50.0	30.0	30.0	30.0	30.0
Total Split (%)	11.1%	55.6%	11.1%	55.6%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	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)	3.0	6.0	3.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	Max	Max	Max	Max
v/c Ratio	0.28	0.62	0.19	0.48		0.22	0.04	0.16
Control Delay	14.2	30.0	7.8	15.9		17.2	25.0	10.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.2	30.0	7.8	15.9		17.2	25.0	10.4
Queue Length 50th (m)	11.9	96.2	3.4	53.3		6.9	2.0	2.0
Queue Length 95th (m)	m20.0	119.7	7.7	70.1		19.1	6.9	12.6
Internal Link Dist (m)		563.0		1233.2		183.8		182.6
Turn Bay Length (m)	55.0		30.0					
Base Capacity (vph)	392	1791	303	1784		409	365	470
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	0.62	0.18	0.48		0.22	0.04	0.16

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 86.4 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Beaver Meadow Dr. & Clair Rd.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Base Future Street Network
 9: Beaver Meadow Dr. & Clair Rd. Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗		↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	110	1065	45	55	845	15	45	5	40	15	15	60
Future Volume (vph)	110	1065	45	55	845	15	45	5	40	15	15	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.94		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1750	3475		1750	3489			1674		1743	1600	
Flt Permitted	0.26	1.00		0.17	1.00			0.83		0.75	1.00	
Satd. Flow (perm)	483	3475		317	3489			1427		1372	1600	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	1065	45	55	845	15	45	5	40	15	15	60
RTOR Reduction (vph)	0	3	0	0	1	0	0	29	0	0	44	0
Lane Group Flow (vph)	110	1107	0	55	859	0	0	61	0	15	31	0
Confl. Peds. (#/hr)	2		1	1		2	3		3	3		3
Confl. Bikes (#/hr)			1	1		2						
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.3	45.7		50.7	45.4			24.0		24.0	24.0	
Effective Green, g (s)	51.3	45.7		50.7	45.4			24.0		24.0	24.0	
Actuated g/C Ratio	0.57	0.51		0.56	0.50			0.27		0.27	0.27	
Clearance Time (s)	3.0	6.0		3.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	354	1764		262	1760			380		365	426	
v/s Ratio Prot	c0.02	c0.32		0.01	0.25						0.02	
v/s Ratio Perm	0.16			0.11				c0.04		0.01		
v/c Ratio	0.31	0.63		0.21	0.49			0.16		0.04	0.07	
Uniform Delay, d1	9.5	16.0		10.3	14.7			25.3		24.5	24.7	
Progression Factor	1.92	1.76		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.4		0.4	1.0			0.9		0.2	0.3	
Delay (s)	18.5	29.5		10.7	15.6			26.2		24.7	25.0	
Level of Service	B	C		B	B			C		C	C	
Approach Delay (s)		28.5			15.3			26.2			25.0	
Approach LOS		C			B			C			C	

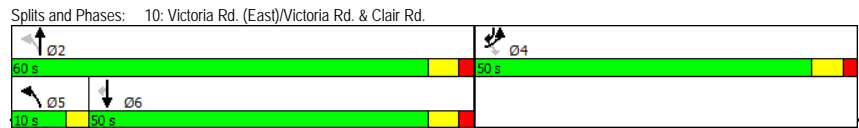
Intersection Summary

HCM 2000 Control Delay: 23.1 HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.46
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 63.4% ICU Level of Service: B
 Analysis Period (min): 15
 c Critical Lane Group

Queues Future Traffic Conditions - Base Future Street Network
 10: Victoria Rd. (East)/Victoria Rd. & Clair Rd. Weekday Afternoon Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	755	190	190	565	585	695
Future Volume (vph)	755	190	190	565	585	695
Lane Group Flow (vph)	755	190	190	565	585	695
Turn Type	Prot	Perm	pm+pt	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	24.0	24.0
Total Split (s)	50.0	50.0	10.0	60.0	50.0	50.0
Total Split (%)	45.5%	45.5%	9.1%	54.5%	45.5%	45.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
v/c Ratio	0.99	0.25	0.89	0.69	0.90	0.54
Control Delay	61.6	6.6	57.4	27.2	49.0	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	6.6	57.4	27.2	49.0	3.4
Queue Length 50th (m)	-159.2	4.8	22.2	91.4	114.4	20.0
Queue Length 95th (m)	#263.2	20.0	#54.7	130.1	162.1	32.8
Internal Link Dist (m)	1233.2		1674.8	465.2		
Turn Bay Length (m)			75.0		75.0	
Base Capacity (vph)	763	773	214	954	792	1280
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.25	0.89	0.59	0.74	0.54

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 102.7
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 - 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.



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 10: Victoria Rd. (East)/Victoria Rd. & Clair Rd. Weekday Afternoon Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	755	190	190	565	585	695
Future Volume (vph)	755	190	190	565	585	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	3.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1773	1597	1785	1807	1842	1493
Flt Permitted	1.00	1.00	0.12	1.00	1.00	1.00
Satd. Flow (perm)	1773	1597	224	1807	1842	1493
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	755	190	190	565	585	695
RTOR Reduction (vph)	0	86	0	0	0	29
Lane Group Flow (vph)	755	104	190	565	585	666
Heavy Vehicles (%)	6%	0%	0%	4%	2%	7%
Turn Type	Prot	Perm	pm+pt	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases		4	2			6
Actuated Green, G (s)	44.2	44.2	46.5	46.5	36.5	80.7
Effective Green, g (s)	44.2	44.2	46.5	46.5	36.5	80.7
Actuated g/C Ratio	0.43	0.43	0.45	0.45	0.36	0.79
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	763	687	207	818	654	1260
v/s Ratio Prot	c0.43		c0.06	0.31	0.32	0.23
v/s Ratio Perm		0.07	c0.35			0.22
v/c Ratio	0.99	0.15	0.92	0.69	0.89	0.53
Uniform Delay, d1	29.0	17.8	22.5	22.4	31.3	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.6	0.1	40.0	2.5	14.7	0.4
Delay (s)	58.6	17.9	62.4	24.9	46.0	4.4
Level of Service	E	B	E	C	D	A
Approach Delay (s)	50.5			34.3	23.4	
Approach LOS	D			C	C	

Intersection Summary
 HCM 2000 Control Delay 34.8 HCM 2000 Level of Service C
 HCM 2000 Volume to Capacity ratio 0.98
 Actuated Cycle Length (s) 102.7 Sum of lost time (s) 15.0
 Intersection Capacity Utilization 96.5% ICU Level of Service F
 Analysis Period (min) 15
 c Critical Lane Group

Queues Future Traffic Conditions - Base Future Street Network
11: Gordon St. & Gosling Gardens Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↖	↗	↖	↗
Traffic Volume (vph)	1	55	25	30	20	1400	105	1405
Future Volume (vph)	1	55	25	30	20	1400	105	1405
Lane Group Flow (vph)	0	66	0	110	20	1445	105	1410
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases		4		8		2	1	6
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	9.5	24.0
Total Split (s)	28.0	28.0	28.0	28.0	72.0	72.0	10.0	82.0
Total Split (%)	25.5%	25.5%	25.5%	25.5%	65.5%	65.5%	9.1%	74.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag				Lag		Lag		Lead
Lead-Lag Optimize?				Yes		Yes		Yes
v/c Ratio		0.18		0.32		0.11	0.69	0.44
Control Delay		34.3		26.6		18.0	35.1	13.2
Queue Delay		0.0		1.0		0.0	48.7	0.0
Total Delay		34.3		27.7		18.0	83.7	13.2
Queue Length 50th (m)		11.1		13.2		3.6	178.0	12.4
Queue Length 95th (m)		23.6		29.8		m5.4	200.1	m14.5
Internal Link Dist (m)		118.2		132.0		118.1	118.1	172.0
Turn Bay Length (m)						30.0		30.0
Base Capacity (vph)		365		349		184	2091	239
Starvation Cap Reductn		0		0		0	820	0
Spillback Cap Reductn		0		102		0	173	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.18		0.45		0.11	1.14	0.44

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Pretimed
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Base Future Street Network
11: Gordon St. & Gosling Gardens Weekday Afternoon Peak Hour

	↖	→	↘	←	↙	↑	↘	↓	↙	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖	↗		↖	↗	
Traffic Volume (vph)	1	55	10	25	30	55	20	1400	45	105	1405	5
Future Volume (vph)	1	55	10	25	30	55	20	1400	45	105	1405	5
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		3.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.98			0.93		1.00	1.00		1.00	1.00	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803			1698		1750	3484		1750	3498	
Flt Permitted		1.00			0.92		0.17	1.00		0.11	1.00	
Satd. Flow (perm)		1799			1585		308	3484		195	3498	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	55	10	25	30	55	20	1400	45	105	1405	5
RTOR Reduction (vph)	0	6	0	0	33	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	60	0	0	77	0	20	1443	0	105	1410	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases		4			8			2		1	6	
Actuated Green, G (s)		22.0			22.0		66.0	66.0		76.0	76.0	
Effective Green, g (s)		22.0			22.0		66.0	66.0		76.0	76.0	
Actuated g/C Ratio		0.20			0.20		0.60	0.60		0.69	0.69	
Clearance Time (s)		6.0			6.0		6.0	6.0		3.0	6.0	
Lane Grp Cap (vph)		359			317		184	2090		233	2416	
v/s Ratio Prot							c0.41			0.03	c0.40	
v/s Ratio Perm		0.03			c0.05		0.06			0.28		
v/c Ratio		0.17			0.24		0.11	0.69		0.45	0.58	
Uniform Delay, d1		36.4			37.0		9.4	15.0		11.2	8.8	
Progression Factor		1.00			1.00		1.69	2.19		1.99	2.46	
Incremental Delay, d2		1.0			1.8		0.9	1.5		4.1	0.7	
Delay (s)		37.4			38.8		16.9	34.5		26.4	22.4	
Level of Service		D			D		B	C		C	C	
Approach Delay (s)		37.4			38.8		34.2			22.6		
Approach LOS		D			D		C			C		

Intersection Summary

HCM 2000 Control Delay: 28.9 HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.58
 Actuated Cycle Length (s): 110.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 72.3% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Queues Future Traffic Conditions - Base Future Street Network
12: Gordon St. & Street B Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	65	85	80	30	1405	15	1365
Future Volume (vph)	45	65	85	80	30	1405	15	1365
Lane Group Flow (vph)	45	80	85	95	30	1465	15	1405
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6	
Permitted Phases	4		8		2		6	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	30.0	30.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	27.3%	27.3%	27.3%	27.3%	72.7%	72.7%	72.7%	72.7%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.18	0.21	0.33	0.24	0.17	0.63	0.09	0.60
Control Delay	37.2	32.4	40.4	34.4	15.8	25.2	12.1	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.5
Total Delay	37.2	32.4	40.4	34.4	15.8	74.2	12.1	12.1
Queue Length 50th (m)	8.3	13.0	16.3	16.3	4.6	183.3	1.1	55.5
Queue Length 95th (m)	18.8	26.7	31.7	31.3	m7.0	207.3	m2.6	85.1
Internal Link Dist (m)	725.3		381.8		529.0		118.1	
Turn Bay Length (m)	30.0		30.0		50.0		50.0	
Base Capacity (vph)	256	390	260	392	176	2326	160	2335
Starvation Cap Reductn	0	0	0	0	0	0	0	451
Spillback Cap Reductn	0	0	0	2	0	1086	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.21	0.33	0.24	0.17	1.18	0.09	0.75

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 65 (59%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Base Future Street Network
12: Gordon St. & Street B Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	45	65	15	85	80	15	30	1405	60	15	1365	40	
Future Volume (vph)	45	65	15	85	80	15	30	1405	60	15	1365	40	
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		6.0	6.0		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	0.98		1.00	0.98		1.00	0.99		1.00	1.00		
Flpb, ped/bikes	0.92	1.00		0.92	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	1.00		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1609	1756		1606	1770		1750	3454		1750	3468		
Flt Permitted	0.70	1.00		0.70	1.00		0.14	1.00		0.13	1.00		
Satd. Flow (perm)	1178	1756		1192	1770		261	3454		237	3468		
Peak-hour factor, PHF	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Adj. Flow (vph)	45	65	15	85	80	15	30	1405	60	15	1365	40	
RTOR Reduction (vph)	0	8	0	0	6	0	3	0	0	2	0	0	
Lane Group Flow (vph)	45	72	0	85	89	0	30	1462	0	15	1403	0	
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases	4			8			2			6			
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0		
Effective Green, g (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0		
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.67	0.67		0.67	0.67		
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0		
Lane Grp Cap (vph)	257	383		260	386		175	2323		159	2333		
v/s Ratio Prot	0.04			0.05			0.42			0.40			
v/s Ratio Perm	0.04			c0.07			0.11			0.06			
v/c Ratio	0.18	0.19		0.33	0.23		0.17	0.63		0.09	0.60		
Uniform Delay, d1	35.0	35.1		36.2	35.4		6.7	10.2		6.3	9.9		
Progression Factor	1.00	1.00		1.00	1.00		1.94	2.34		1.63	1.06		
Incremental Delay, d2	1.5	1.1		3.3	1.4		1.5	0.9		1.0	1.0		
Delay (s)	36.4	36.1		39.5	36.8		14.5	24.9		11.2	11.4		
Level of Service	D			D			C			B			
Approach Delay (s)	36.3			38.1			24.7			11.4			
Approach LOS	D			D			C			B			

Intersection Summary
 HCM 2000 Control Delay 20.0 HCM 2000 Level of Service C
 HCM 2000 Volume to Capacity ratio 0.56
 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 12.0
 Intersection Capacity Utilization 65.9% ICU Level of Service C
 Analysis Period (min) 15

Queues
13: Gordon St. & Street C
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↖		→		↗		←		↖		↑		↗		↓	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT								
Lane Configurations	↖	↗	↖	↗	↖	↗	↖	↗								
Traffic Volume (vph)	40	65	30	45	45	1350	115	1285								
Future Volume (vph)	40	65	30	45	45	1350	115	1285								
Lane Group Flow (vph)	40	95	30	150	45	1420	115	1350								
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA								
Protected Phases	4		8		2		6									
Permitted Phases	4		8		2		6									
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	9.5	24.0								
Total Split (s)	30.0	30.0	30.0	30.0	68.0	68.0	12.0	80.0								
Total Split (%)	27.3%	27.3%	27.3%	27.3%	61.8%	61.8%	10.9%	72.7%								
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0								
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	0.0	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)	6.0	6.0	6.0	6.0	6.0	6.0	3.0	6.0								
Lead/Lag					Lag	Lag	Lead									
Lead-Lag Optimize?					Yes	Yes	Yes									
v/c Ratio	0.16	0.24	0.11	0.34	0.24	0.72	0.45	0.58								
Control Delay	37.0	30.1	35.8	16.5	20.8	22.7	16.8	3.4								
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0								
Total Delay	37.0	30.1	35.8	16.5	20.8	22.8	16.8	3.4								
Queue Length 50th (m)	7.4	14.1	5.5	9.5	5.0	83.3	6.2	12.0								
Queue Length 95th (m)	17.4	29.0	14.0	27.8	m9.4	150.9	m14.5	13.5								
Internal Link Dist (m)	719.7		611.7		130.0		529.0									
Turn Bay Length (m)	30.0		30.0		50.0		50.0									
Base Capacity (vph)	245	397	279	436	191	1962	255	2341								
Starvation Cap Reductn	0	0	0	0	0	43	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	0.16	0.24	0.11	0.34	0.24	0.74	0.45	0.58								

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Pretimed
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis
13: Gordon St. & Street C
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↖		→		↗		←		↖		↑		↗		↓	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖	↗			
Traffic Volume (vph)	40	65	30	30	45	105	45	1350	70	115	1285	65				
Future Volume (vph)	40	65	30	30	45	105	45	1350	70	115	1285	65				
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		3.0	6.0					
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95					
Frt	1.00	0.95		1.00	0.90		1.00	0.99		1.00	0.99					
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00					
Satd. Flow (prot)	1750	1755		1750	1649		1750	3474		1750	3475					
Flt Permitted	0.61	1.00		0.70	1.00		0.18	1.00		0.10	1.00					
Satd. Flow (perm)	1126	1755		1281	1649		339	3474		181	3475					
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Adj. Flow (vph)	40	65	30	30	45	105	45	1350	70	115	1285	65				
RTOR Reduction (vph)	0	15	0	0	77	0	0	3	0	0	3	0				
Lane Group Flow (vph)	40	80	0	30	73	0	45	1417	0	115	1347	0				
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA					
Protected Phases	4			8			2			6						
Permitted Phases	4			8			2			6						
Actuated Green, G (s)	24.0	24.0		24.0	24.0		62.0	62.0		74.0	74.0					
Effective Green, g (s)	24.0	24.0		24.0	24.0		62.0	62.0		74.0	74.0					
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.56	0.56		0.67	0.67					
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		3.0	6.0					
Lane Grp Cap (vph)	245	382		279	359		191	1958		250	2337					
v/s Ratio Prot	c0.05			0.04			c0.41			0.04		c0.39				
v/s Ratio Perm	0.04			0.02			0.13			0.27						
v/c Ratio	0.16	0.21		0.11	0.20		0.24	0.72		0.46	0.58					
Uniform Delay, d1	34.9	35.2		34.4	35.2		12.1	17.7		12.9	9.6					
Progression Factor	1.00	1.00		1.00	1.00		1.39	1.16		1.90	0.26					
Incremental Delay, d2	1.4	1.2		0.8	1.3		2.4	2.0		4.9	0.9					
Delay (s)	36.3	36.5		35.2	36.5		19.2	22.4		29.4	3.3					
Level of Service	D	D		D	D		B	C		C	A					
Approach Delay (s)	36.4			36.3			22.3			5.4						
Approach LOS	D			D			C			A						

Intersection Summary
 HCM 2000 Control Delay 16.0 HCM 2000 Level of Service B
 HCM 2000 Volume to Capacity ratio 0.58
 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 15.0
 Intersection Capacity Utilization 77.2% ICU Level of Service D
 Analysis Period (min) 15
 c Critical Lane Group

Queues
14: Gordon St. & Street D
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	40	35	40	30	40	1370	45	1230
Future Volume (vph)	40	35	40	30	40	1370	45	1230
Lane Group Flow (vph)	40	55	40	80	40	1405	45	1295
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	30.0	30.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	27.3%	27.3%	27.3%	27.3%	72.7%	72.7%	72.7%	72.7%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.14	0.14	0.14	0.20	0.19	0.60	0.26	0.55
Control Delay	36.4	25.4	36.3	17.5	6.5	6.4	6.2	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3
Total Delay	36.4	25.4	36.3	17.5	6.5	6.4	6.2	5.0
Queue Length 50th (m)	7.4	6.4	7.3	5.4	2.1	41.4	2.2	59.6
Queue Length 95th (m)	17.2	17.5	17.2	18.5	m2.8	45.7	m5.3	87.9
Internal Link Dist (m)		715.4		532.4		581.1		130.0
Turn Bay Length (m)	30.0		30.0		50.0		50.0	
Base Capacity (vph)	283	395	289	403	207	2346	176	2339
Starvation Cap Reductn	0	0	0	0	0	0	0	397
Spillback Cap Reductn	0	0	0	1	0	104	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.14	0.14	0.20	0.19	0.63	0.26	0.67

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis
14: Gordon St. & Street D
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

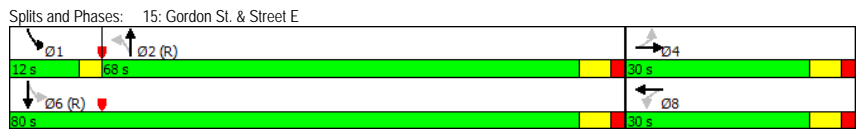
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	35	20	40	30	50	40	1370	35	45	1230	65
Future Volume (vph)	40	35	20	40	30	50	40	1370	35	45	1230	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.91		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1742		1750	1669		1750	3487		1750	3474	
Flt Permitted	0.70	1.00		0.72	1.00		0.17	1.00		0.14	1.00	
Satd. Flow (perm)	1299	1742		1328	1669		308	3487		261	3474	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	35	20	40	30	50	40	1370	35	45	1230	65
RTOR Reduction (vph)	0	16	0	0	39	0	0	2	0	0	4	0
Lane Group Flow (vph)	40	39	0	40	41	0	40	1403	0	45	1291	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.67	0.67		0.67	0.67	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)	283	380		289	364		207	2345		175	2337	
v/s Ratio Prot		0.02			0.02			c0.40			0.37	
v/s Ratio Perm	c0.03			0.03			0.13			0.17		
v/c Ratio	0.14	0.10		0.14	0.11		0.19	0.60		0.26	0.55	
Uniform Delay, d1	34.7	34.4		34.7	34.5		6.8	9.9		7.1	9.4	
Progression Factor	1.00	1.00		1.00	1.00		0.67	0.56		0.41	0.42	
Incremental Delay, d2	1.0	0.5		1.0	0.6		1.4	0.8		3.0	0.8	
Delay (s)	35.7	34.9		35.7	35.1		6.0	6.3		5.9	4.7	
Level of Service	D	C		D	D		A	A		A	A	
Approach Delay (s)		35.3			35.3			6.3			4.8	
Approach LOS		D			D			A			A	

Intersection Summary
 HCM 2000 Control Delay: 7.7
 HCM 2000 Volume to Capacity ratio: 0.49
 Actuated Cycle Length (s): 110.0
 Intersection Capacity Utilization: 57.9%
 Analysis Period (min): 15
 c Critical Lane Group
 HCM 2000 Level of Service: A
 Sum of lost time (s): 12.0
 ICU Level of Service: B

Queues
15: Gordon St. & Street E
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	195	45	130	55	1285	155	1120
Future Volume (vph)	30	195	45	130	55	1285	155	1120
Lane Group Flow (vph)	30	225	45	260	55	1410	155	1140
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	4		8		2		1	6
Permitted Phases	4		8		2		6	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	9.5	24.0
Total Split (s)	30.0	30.0	30.0	30.0	68.0	68.0	12.0	80.0
Total Split (%)	27.3%	27.3%	27.3%	27.3%	61.8%	61.8%	10.9%	72.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	0.0	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)	6.0	6.0	6.0	6.0	6.0	6.0	3.0	6.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
v/c Ratio	0.19	0.57	0.25	0.64	0.21	0.72	0.61	0.49
Control Delay	39.0	43.6	39.8	40.9	14.6	20.1	26.4	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	43.6	39.8	40.9	14.6	20.1	26.4	11.1
Queue Length 50th (m)	5.6	44.4	8.5	45.0	5.8	115.6	22.7	74.5
Queue Length 95th (m)	14.7	70.2	19.5	74.1	14.0	142.9	42.9	101.5
Internal Link Dist (m)	709.2		605.3		187.1		581.1	
Turn Bay Length (m)	30.0		30.0		50.0		50.0	
Base Capacity (vph)	155	398	183	404	258	1953	256	2348
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	0.19	0.57	0.25	0.64	0.21	0.72	0.61	0.49

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Pretimed



HCM Signalized Intersection Capacity Analysis
15: Gordon St. & Street E
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

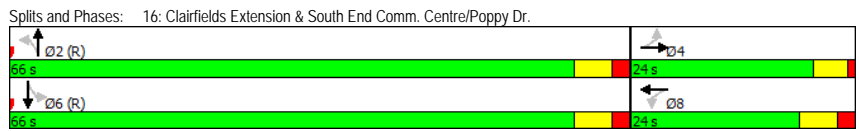
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	195	30	45	130	130	55	1285	125	155	1120	20
Future Volume (vph)	30	195	30	45	130	130	55	1285	125	155	1120	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1805		1750	1704		1750	3453		1750	3491	
Flt Permitted	0.39	1.00		0.46	1.00		0.25	1.00		0.10	1.00	
Satd. Flow (perm)	711	1805		840	1704		459	3453		185	3491	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	195	30	45	130	130	55	1285	125	155	1120	20
RTOR Reduction (vph)	0	5	0	0	33	0	0	7	0	0	1	0
Lane Group Flow (vph)	30	220	0	45	227	0	55	1403	0	155	1139	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	4			8			2			1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		62.0	62.0		74.0	74.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		62.0	62.0		74.0	74.0	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.56	0.56		0.67	0.67	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	155	393		183	371		258	1946		252	2348	
v/s Ratio Prot	0.12			c0.13			c0.41			c0.05	0.33	
v/s Ratio Perm	0.04			0.05			0.12			0.36		
v/c Ratio	0.19	0.56		0.25	0.61		0.21	0.72		0.62	0.49	
Uniform Delay, d1	35.1	38.3		35.5	38.8		11.9	17.6		14.1	8.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.83	1.18	
Incremental Delay, d2	2.8	5.7		3.2	7.4		1.9	2.3		9.3	0.6	
Delay (s)	37.9	44.0		38.7	46.2		13.8	20.0		35.2	10.9	
Level of Service	D	D		D	D		B	B		D	B	
Approach Delay (s)	43.3			45.1			19.8			13.8		
Approach LOS	D			D			B			B		

Intersection Summary
 HCM 2000 Control Delay: 21.6
 HCM 2000 Volume to Capacity ratio: 0.68
 Actuated Cycle Length (s): 110.0
 Intersection Capacity Utilization: 85.4%
 Analysis Period (min): 15
 c Critical Lane Group
 HCM 2000 Level of Service: C
 Sum of lost time (s): 15.0
 ICU Level of Service: E

Queues Future Traffic Conditions - Base Future Street Network
 16: Clairfields Extension & South End Comm. Centre/Poppy Dr. Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	45	55	25	60	15	430	5	720
Future Volume (vph)	45	55	25	60	15	430	5	720
Lane Group Flow (vph)	0	105	25	130	15	450	5	795
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Minimum Split (s)	22.5	22.5	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	24.0	24.0	24.0	24.0	66.0	66.0	66.0	66.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	73.3%	73.3%	73.3%	73.3%
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	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
Total Lost Time (s)		4.5	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.32	0.10	0.34	0.05	0.37	0.01	0.65	
Control Delay	31.9	30.7	20.5	5.7	7.6	5.2	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	1.5	
Total Delay	31.9	30.7	20.5	5.7	7.6	5.2	13.4	
Queue Length 50th (m)	15.7	3.7	11.1	0.8	31.4	0.3	74.2	
Queue Length 95th (m)	30.8	10.7	27.2	3.0	47.6	1.4	111.8	
Internal Link Dist (m)	84.0		727.4		311.0		156.4	
Turn Bay Length (m)			30.0		30.0		30.0	
Base Capacity (vph)	333	254	385	315	1221	576	1214	
Starvation Cap Reductn	0	0	0	0	0	0	234	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.10	0.34	0.05	0.37	0.01	0.81	

Intersection Summary
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Pre-timed



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Base Future Street Network
 16: Clairfields Extension & South End Comm. Centre/Poppy Dr. Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	45	55	5	25	60	70	15	430	20	5	720	75
Future Volume (vph)	45	55	5	25	60	70	15	430	20	5	720	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		6.0	6.0		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	
Frt		0.99		1.00	0.92		1.00	0.99		1.00	0.99	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1792		1750	1693		1750	1830		1750	1816	
Flt Permitted		0.83		0.69	1.00		0.26	1.00		0.47	1.00	
Satd. Flow (perm)		1527		1270	1693		474	1830		864	1816	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	55	5	25	60	70	15	430	20	5	720	75
RTOR Reduction (vph)	0	2	0	0	46	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	103	0	25	84	0	15	448	0	5	791	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.5		18.0	18.0		60.0	60.0		60.0	60.0	
Effective Green, g (s)		19.5		18.0	18.0		60.0	60.0		60.0	60.0	
Actuated g/C Ratio		0.22		0.20	0.20		0.67	0.67		0.67	0.67	
Clearance Time (s)		4.5		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		330		254	338		316	1220		576	1210	
v/s Ratio Prot					0.05			0.24			c0.44	
v/s Ratio Perm		c0.07		0.02			0.03			0.01		
v/c Ratio		0.31		0.10	0.25		0.05	0.37		0.01	0.65	
Uniform Delay, d1		29.6		29.4	30.3		5.2	6.6		5.0	8.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4		0.8	1.7		0.3	0.9		0.0	2.8	
Delay (s)		32.1		30.2	32.0		5.4	7.5		5.1	11.6	
Level of Service		C		C	C		A	A		A	B	
Approach Delay (s)		32.1			31.7			7.4			11.6	
Approach LOS		C			C			A			B	

Intersection Summary
 HCM 2000 Control Delay: 13.8 HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.58
 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 12.0
 Intersection Capacity Utilization: 69.3% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Queues
17: Clairfields Extension & Street B

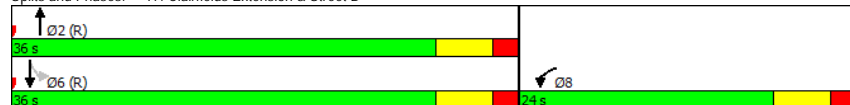
Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

	↙	↑	↘	↓
Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↘	↑	↘	↑
Traffic Volume (vph)	60	375	20	585
Future Volume (vph)	60	375	20	585
Lane Group Flow (vph)	70	420	18	587
Turn Type	Prot	NA	Perm	NA
Protected Phases	8	2		6
Permitted Phases			6	
Minimum Split (s)	24.0	24.0	24.0	24.0
Total Split (s)	24.0	36.0	36.0	36.0
Total Split (%)	40.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
v/c Ratio	0.13	0.46	0.04	0.67
Control Delay	14.5	10.6	8.2	16.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.5	10.6	8.2	16.1
Queue Length 50th (m)	5.0	42.3	1.0	49.6
Queue Length 95th (m)	13.0	62.1	4.0	84.0
Internal Link Dist (m)	725.3	531.6		311.0
Turn Bay Length (m)	50.0		50.0	
Base Capacity (vph)	526	915	405	874
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.46	0.04	0.67

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 17: Clairfields Extension & Street B



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
17: Clairfields Extension & Street B Weekday Afternoon Peak Hour

	↙	↘	↑	↘	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘		↑		↘	↑
Traffic Volume (vph)	60	10	375	45	20	585
Future Volume (vph)	60	10	375	45	20	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		0.95	0.95
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1732		1815		1662	1750
Flt Permitted	0.96		1.00		0.46	1.00
Satd. Flow (perm)	1732		1815		810	1748
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	10	375	45	20	585
RTOR Reduction (vph)	7	0	7	0	0	0
Lane Group Flow (vph)	63	0	413	0	18	587
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	18.0		30.0		30.0	30.0
Effective Green, g (s)	18.0		30.0		30.0	30.0
Actuated g/C Ratio	0.30		0.50		0.50	0.50
Clearance Time (s)	6.0		6.0		6.0	6.0
Lane Grp Cap (vph)	519		907		405	874
v/s Ratio Prot	c0.04		0.23			
v/s Ratio Perm					0.02	c0.34
v/c Ratio	0.12		0.46		0.04	0.67
Uniform Delay, d1	15.3		9.7		7.7	11.3
Progression Factor	1.00		0.93		1.00	1.00
Incremental Delay, d2	0.5		1.5		0.2	4.1
Delay (s)	15.7		10.5		7.9	15.4
Level of Service	B		B		A	B
Approach Delay (s)	15.7		10.5			15.2
Approach LOS	B		B			B

Intersection Summary

HCM 2000 Control Delay 13.4 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio 0.47
Actuated Cycle Length (s) 60.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization 37.6% ICU Level of Service A
Analysis Period (min) 15
c Critical Lane Group

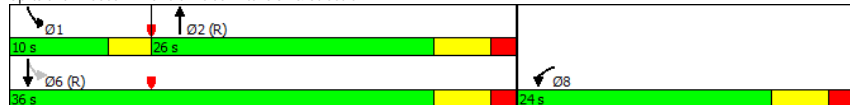
Queues
18: Clairfields Extension & Street C

Future Traffic Conditions - Base Future Street Network
Weekday Afternoon Peak Hour

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations	↖ ↗	↑	↖ ↗	↑
Traffic Volume (vph)	15	290	245	425
Future Volume (vph)	15	290	245	425
Lane Group Flow (vph)	175	305	245	425
Turn Type	Prot	NA	pm+pt	NA
Protected Phases	8	2	1	6
Permitted Phases			6	
Minimum Split (s)	24.0	24.0	9.5	24.0
Total Split (s)	24.0	26.0	10.0	36.0
Total Split (%)	40.0%	43.3%	16.7%	60.0%
Yellow Time (s)	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	3.0	6.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
v/c Ratio	0.32	0.50	0.45	0.46
Control Delay	5.8	19.2	4.1	3.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.8	19.2	4.1	3.4
Queue Length 50th (m)	1.2	27.2	3.1	5.6
Queue Length 95th (m)	13.4	48.0	m4.9	8.5
Internal Link Dist (m)	719.7	130.0		531.6
Turn Bay Length (m)	30.0		30.0	
Base Capacity (vph)	549	610	543	921
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.50	0.45	0.46

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Clairfields Extension & Street C



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
18: Clairfields Extension & Street C Weekday Afternoon Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖ ↗		↑		↖ ↗	↑
Traffic Volume (vph)	15	160	290	15	245	425
Future Volume (vph)	15	160	290	15	245	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		3.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frbp, ped/bikes	0.91		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		0.98	1.00
Frt	0.88		0.99		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1458		1821		1716	1842
Flt Permitted	1.00		1.00		0.45	1.00
Satd. Flow (perm)	1458		1821		805	1842
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	160	290	15	245	425
RTOR Reduction (vph)	112	0	3	0	0	0
Lane Group Flow (vph)	63	0	302	0	245	425
Confl. Peds. (#/hr)	50	50		50	50	
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	18.0		20.0		30.0	30.0
Effective Green, g (s)	18.0		20.0		30.0	30.0
Actuated g/C Ratio	0.30		0.33		0.50	0.50
Clearance Time (s)	6.0		6.0		3.0	6.0
Lane Grp Cap (vph)	437		607		508	921
v/s Ratio Prot	c0.04		0.17		c0.06	0.23
v/s Ratio Perm					c0.18	
v/c Ratio	0.14		0.50		0.48	0.46
Uniform Delay, d1	15.4		16.0		9.0	9.7
Progression Factor	1.00		1.00		0.26	0.20
Incremental Delay, d2	0.7		2.9		2.6	1.3
Delay (s)	16.1		18.9		5.0	3.3
Level of Service	B		B		A	A
Approach Delay (s)	16.1		18.9			3.9
Approach LOS	B		B			A

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 19: Clairfields Extension & Street E Weekday Afternoon Peak Hour

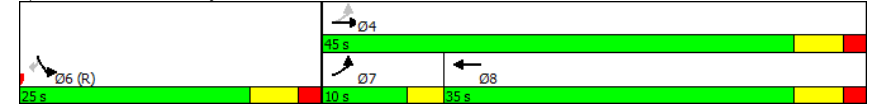
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↕	
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	80	60	215	70	150	155
Future Volume (vph)	80	60	215	70	150	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	80	60	215	70	150	155
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total (vph)	140	285	305			
Volume Left (vph)	80	0	150			
Volume Right (vph)	60	70	0			
Hadj (s)	-0.11	-0.11	0.13			
Departure Headway (s)	5.2	4.5	4.7			
Degree Utilization, x	0.20	0.36	0.40			
Capacity (veh/h)	632	763	729			
Control Delay (s)	9.4	10.1	10.9			
Approach Delay (s)	9.4	10.1	10.9			
Approach LOS	A	B	B			
Intersection Summary						
Delay			10.3			
Level of Service			B			
Intersection Capacity Utilization			55.7%	ICU Level of Service	B	
Analysis Period (min)			15			

Queues Future Traffic Conditions - Base Future Street Network
 20: Maltby Rd. & Clairfields Extension Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↔		↔		↕
Traffic Volume (vph)	325	310	195	35	200
Future Volume (vph)	325	310	195	35	200
Lane Group Flow (vph)	325	310	280	35	200
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	7	4	8	6	
Permitted Phases	4		6		
Minimum Split (s)	9.5	24.0	24.0	24.0	24.0
Total Split (s)	10.0	45.0	35.0	25.0	25.0
Total Split (%)	14.3%	64.3%	50.0%	35.7%	35.7%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
v/c Ratio	0.53	0.30	0.38	0.07	0.38
Control Delay	10.6	9.3	14.1	19.6	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	9.3	14.1	19.6	5.9
Queue Length 50th (m)	19.5	20.7	22.0	3.6	0.0
Queue Length 95th (m)	32.8	34.6	40.0	10.1	14.3
Internal Link Dist (m)	695.6		711.4	191.8	
Turn Bay Length (m)	50.0			50.0	
Base Capacity (vph)	612	1026	728	475	521
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	0.53	0.30	0.38	0.07	0.38

Intersection Summary
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed

Splits and Phases: 20: Maltby Rd. & Clairfields Extension



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 20: Maltby Rd. & Clairfields Extension Weekday Afternoon Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	325	310	195	85	35	200
Future Volume (vph)	325	310	195	85	35	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.97	1.00	0.88	
Flpb, ped/bikes	0.97	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.96	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1702	1842	1705	1750	1385	
Flt Permitted	0.50	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	903	1842	1705	1750	1385	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	325	310	195	85	35	200
RTOR Reduction (vph)	0	0	22	0	0	146
Lane Group Flow (vph)	325	310	258	0	35	54
Confl. Peds. (#/hr)	50			50	50	50
Turn Type	pm+pt	NA	NA	Prot	Perm	
Protected Phases	7	4	8	6		
Permitted Phases	4				6	
Actuated Green, G (s)	39.0	39.0	29.0	19.0	19.0	
Effective Green, g (s)	39.0	39.0	29.0	19.0	19.0	
Actuated g/C Ratio	0.56	0.56	0.41	0.27	0.27	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	583	1026	706	475	375	
v/s Ratio Prot	c0.06	0.17	0.15	0.02		
v/s Ratio Perm	c0.25				c0.04	
v/c Ratio	0.56	0.30	0.37	0.07	0.14	
Uniform Delay, d1	8.8	8.3	14.1	19.0	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.8	0.8	1.5	0.3	0.8	
Delay (s)	12.6	9.0	15.6	19.3	20.1	
Level of Service	B	A	B	B	C	
Approach Delay (s)		10.9	15.6	20.0		
Approach LOS		B	B	C		

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

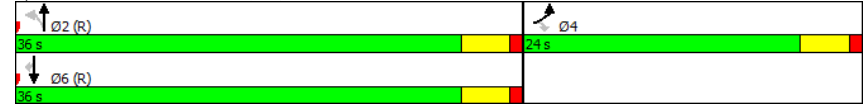
c Critical Lane Group

Queues Future Traffic Conditions - Base Future Street Network
 21: Victoria Rd. (East) & Street E Weekday Afternoon Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	235	10	10	510	410	375
Future Volume (vph)	235	10	10	510	410	375
Lane Group Flow (vph)	235	10	10	510	410	375
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.41	0.02	0.02	0.53	0.42	0.38
Control Delay	18.5	8.3	7.1	11.9	10.4	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	8.3	7.1	11.9	10.4	2.2
Queue Length 50th (m)	20.8	0.0	0.5	35.3	26.4	0.0
Queue Length 95th (m)	38.1	2.7	2.4	59.0	44.7	10.5
Internal Link Dist (m)	617.1			306.7	1674.8	
Turn Bay Length (m)	50.0		50.0			50.0
Base Capacity (vph)	568	515	442	967	967	1000
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.02	0.02	0.53	0.42	0.38

Intersection Summary
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed

Splits and Phases: 21: Victoria Rd. (East) & Street E



HCM Signalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
21: Victoria Rd. (East) & Street E Weekday Afternoon Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	235	10	10	510	410	375
Future Volume (vph)	235	10	10	510	410	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1750	1566	1750	1842	1842	1566
Flt Permitted	0.95	1.00	0.46	1.00	1.00	1.00
Satd. Flow (perm)	1750	1566	842	1842	1842	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	10	10	510	410	375
RTOR Reduction (vph)	0	7	0	0	0	178
Lane Group Flow (vph)	235	3	10	510	410	197
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	19.5	19.5	31.5	31.5	31.5	31.5
Effective Green, g (s)	19.5	19.5	31.5	31.5	31.5	31.5
Actuated g/C Ratio	0.32	0.32	0.52	0.52	0.52	0.52
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	568	508	442	967	967	822
v/s Ratio Prot	c0.13			c0.28	0.22	
v/s Ratio Perm		0.00	0.01			0.13
v/c Ratio	0.41	0.01	0.02	0.53	0.42	0.24
Uniform Delay, d1	15.8	13.7	6.9	9.4	8.7	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.0	0.1	2.1	1.4	0.7
Delay (s)	18.0	13.7	6.9	11.4	10.1	8.4
Level of Service	B	B	A	B	B	A
Approach Delay (s)	17.8			11.3	9.3	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			11.3	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			60.0	Sum of lost time (s)		9.0
Intersection Capacity Utilization			47.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
22: Maltby Rd. & Victoria Rd. (East) Weekday Afternoon Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	435	30	35	35	35	335
Future Volume (Veh/h)	435	30	35	35	35	335
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	435	30	35	35	35	335
Pedestrians						1
Lane Width (m)						3.5
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	71				954	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71				954	54
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	71				83	67
cM capacity (veh/h)	1522				204	1013
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	465	70	370			
Volume Left	435	0	35			
Volume Right	0	35	335			
cSH	1522	1700	737			
Volume to Capacity	0.29	0.04	0.50			
Queue Length 95th (m)	9.5	0.0	22.8			
Control Delay (s)	7.9	0.0	14.7			
Lane LOS	A		B			
Approach Delay (s)	7.9	0.0	14.7			
Approach LOS			B			
Intersection Summary						
Average Delay			10.1			
Intersection Capacity Utilization			61.6%	ICU Level of Service		B
Analysis Period (min)			15			

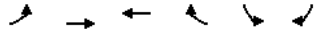
HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 23: Victoria Rd. (West) & Maltby Rd. Weekday Afternoon Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	45	35	300	60	55	430
Future Volume (Veh/h)	45	35	300	60	55	430
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	35	300	60	55	430
Pedestrians	1					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			81		724	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			81		724	64
tC, single (s)			4.1		6.7	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.3
p0 queue free %			80		80	57
cM capacity (veh/h)			1522		281	997
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	80	360	485			
Volume Left	0	300	55			
Volume Right	35	0	430			
cSH	1700	1522	774			
Volume to Capacity	0.05	0.20	0.63			
Queue Length 95th (m)	0.0	5.9	35.9			
Control Delay (s)	0.0	6.9	17.1			
Lane LOS	A		C			
Approach Delay (s)	0.0	6.9	17.1			
Approach LOS	C		C			
Intersection Summary						
Average Delay			11.7			
Intersection Capacity Utilization			62.7%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 24: Clairfields Extension & Street D Weekday Afternoon Peak Hour

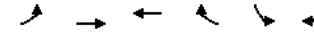
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	35	30	205	70	20	265
Future Volume (vph)	35	30	205	70	20	265
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	30	205	70	20	265
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total (vph)	65	275	285			
Volume Left (vph)	35	0	20			
Volume Right (vph)	30	70	0			
Hadj (s)	-0.14	-0.12	0.05			
Departure Headway (s)	5.0	4.3	4.4			
Degree Utilization, x	0.09	0.33	0.35			
Capacity (veh/h)	649	823	793			
Control Delay (s)	8.5	9.3	9.7			
Approach Delay (s)	8.5	9.3	9.7			
Approach LOS	A	A	A			
Intersection Summary						
Delay			9.4			
Level of Service			A			
Intersection Capacity Utilization			40.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 25: Maltby Rd. & Traffic Zone 8 North-South Collector Weekday Afternoon Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	
Traffic Volume (veh/h)	130	200	165	10	20	90
Future Volume (Veh/h)	130	200	165	10	20	90
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	130	200	165	10	20	90
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	175			630	170	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175			630	170	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	91			95	90	
cM capacity (veh/h)	1401			404	874	
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	130	200	175	110		
Volume Left	130	0	0	20		
Volume Right	0	0	10	90		
cSH	1401	1700	1700	721		
Volume to Capacity	0.09	0.12	0.10	0.15		
Queue Length 95th (m)	2.4	0.0	0.0	4.3		
Control Delay (s)	7.8	0.0	0.0	10.9		
Lane LOS	A			B		
Approach Delay (s)	3.1		0.0	10.9		
Approach LOS				B		
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 26: Maltby Rd. & Traffic Zone 9 North-South Collector Weekday Afternoon Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↑	↔		↔	
Traffic Volume (veh/h)	155	40	80	10	5	85
Future Volume (Veh/h)	155	40	80	10	5	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	155	40	80	10	5	85
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	90			435	85	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90			435	85	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	90			99	91	
cM capacity (veh/h)	1505			519	974	
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	155	40	90	90		
Volume Left	155	0	0	5		
Volume Right	0	0	10	85		
cSH	1505	1700	1700	929		
Volume to Capacity	0.10	0.02	0.05	0.10		
Queue Length 95th (m)	2.7	0.0	0.0	2.6		
Control Delay (s)	7.7	0.0	0.0	9.3		
Lane LOS	A			A		
Approach Delay (s)	6.1		0.0	9.3		
Approach LOS				A		
Intersection Summary						
Average Delay			5.4			
Intersection Capacity Utilization			27.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis Traffic Conditions - Base Future Street Network
 27: Traffic Zone 8 North-South Collector & Street E Weekday Afternoon Peak Hour

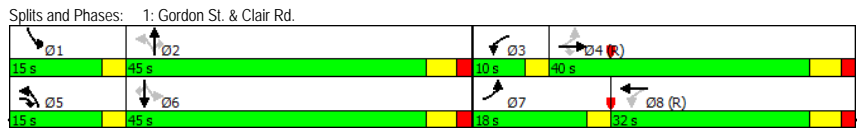


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	220	45	75	205	5	55
Future Volume (vph)	220	45	75	205	5	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	220	45	75	205	5	55
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	265	280	60			
Volume Left (vph)	0	75	5			
Volume Right (vph)	45	0	55			
Hadj (s)	-0.07	0.09	-0.50			
Departure Headway (s)	4.3	4.4	4.6			
Degree Utilization, x	0.31	0.34	0.08			
Capacity (veh/h)	823	793	703			
Control Delay (s)	9.2	9.7	8.0			
Approach Delay (s)	9.2	9.7	8.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			9.3			
Level of Service			A			
Intersection Capacity Utilization			42.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues Future Traffic Conditions - Recommended Improvements
 1: Gordon St. & Clair Rd. Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	960	230	165	650	250	985	210	230	1160	205	
Future Volume (vph)	300	960	230	165	650	250	985	210	230	1160	205	
Lane Group Flow (vph)	300	960	230	165	770	250	985	210	230	1160	205	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	
Protected Phases	7	4	5	3	8	5	2		1	6		
Permitted Phases	4		4	8		2		2	6		6	
Detector Phase	7	4	5	3	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	
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	24.0	24.0	9.5	24.0	24.0	
Total Split (s)	18.0	40.0	15.0	10.0	32.0	15.0	45.0	45.0	15.0	45.0	45.0	
Total Split (%)	16.4%	36.4%	13.6%	9.1%	29.1%	13.6%	40.9%	40.9%	13.6%	40.9%	40.9%	
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	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)	3.0	6.0	3.0	3.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	None	None	C-Max	None	Max	Max	None	Max	Max	
v/c Ratio	0.95	0.88	0.32	0.98	0.95	0.97	0.78	0.35	0.82	0.94	0.34	
Control Delay	62.7	52.0	33.3	91.1	62.4	83.8	45.1	20.3	44.8	49.0	12.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	0.0	
Total Delay	62.7	52.0	33.3	91.1	62.4	83.8	45.2	20.3	44.8	58.8	12.3	
Queue Length 50th (m)	69.1	122.2	45.7	23.3	88.7	52.8	90.0	19.0	28.7	131.9	12.6	
Queue Length 95th (m)	m#90.0	m#141.0	m55.0	#63.8	#128.3	#94.5	112.5	m32.7	#69.9	#176.7	31.3	
Internal Link Dist (m)		775.0			194.1		153.6			314.0		
Turn Bay Length (m)	75.0		50.0	25.0		50.0		50.0	140.0		50.0	
Base Capacity (vph)	315	1092	717	169	811	258	1263	607	284	1240	600	
Starvation Cap Reductn	0	0	0	0	0	0	3	0	0	0	0	
Spillback Cap Reductn	0	0	2	0	0	0	0	0	0	83	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.95	0.88	0.32	0.98	0.95	0.97	0.78	0.35	0.81	1.00	0.34	

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green, Master Intersection
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
 1: Gordon St. & Clair Rd. Weekday Afternoon Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
Future Volume (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	3.0	3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	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	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1767	3535	1537	1593	3373		1716	3535	1431	1785	3500	1469
Flt Permitted	0.14	1.00	1.00	0.15	1.00		0.10	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	257	3535	1537	258	3373		184	3535	1431	234	3500	1469
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	960	230	165	650	120	250	985	210	230	1160	205
RTOR Reduction (vph)	0	0	35	0	14	0	0	0	96	0	0	79
Lane Group Flow (vph)	300	960	195	165	756	0	250	985	114	230	1160	126
Confl. Peds. (#/hr)	17		7	7		17	2		11	11		2
Confl. Bikes (#/hr)							1					
Heavy Vehicles (%)	1%	1%	2%	12%	3%	1%	4%	1%	8%	0%	2%	7%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	44.0	34.0	46.0	33.0	26.0		51.3	39.3	39.3	50.7	39.0	39.0
Effective Green, g (s)	44.0	34.0	46.0	33.0	26.0		51.3	39.3	39.3	50.7	39.0	39.0
Actuated g/C Ratio	0.40	0.31	0.42	0.30	0.24		0.40	0.36	0.36	0.46	0.35	0.35
Clearance Time (s)	3.0	6.0	3.0	3.0	6.0		3.0	6.0	6.0	3.0	6.0	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)	308	1092	642	162	797		252	1262	511	272	1240	520
v/s Ratio Prot	c0.13	0.27	0.03	0.06	0.22		c0.11	0.28		0.09	0.33	
v/s Ratio Perm	c0.26		0.09	0.24			c0.35		0.08	0.30		0.09
v/c Ratio	0.97	0.88	0.30	1.02	0.95		0.99	0.78	0.22	0.85	0.94	0.24
Uniform Delay, d1	29.9	36.1	21.3	34.6	41.3		30.8	31.5	24.7	22.3	34.3	25.1
Progression Factor	1.26	1.26	2.47	1.00	1.00		1.66	1.30	2.26	1.00	1.00	1.00
Incremental Delay, d2	32.6	6.4	0.2	75.7	21.6		46.5	3.6	0.8	20.8	14.2	1.1
Delay (s)	70.2	51.7	52.9	110.2	63.0		97.7	44.5	56.5	43.0	48.4	26.2
Level of Service	E	D	D	F	E		F	D	E	D	D	C
Approach Delay (s)		55.6			71.3			55.5			44.8	
Approach LOS		E			E			E			D	

Intersection Summary
 HCM 2000 Control Delay 55.1 HCM 2000 Level of Service E
 HCM 2000 Volume to Capacity ratio 1.01
 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 18.0
 Intersection Capacity Utilization 101.3% ICU Level of Service G
 Analysis Period (min) 15
 c Critical Lane Group

Queues Future Traffic Conditions - Recommended Improvements
2: Gordon St. & Poppy Dr. Weekday Afternoon Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	115	60	55	55	65	1345	50	1425
Future Volume (vph)	115	60	55	55	65	1345	50	1425
Lane Group Flow (vph)	115	95	55	95	65	1410	50	1500
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases	4		8		5		2	
Permitted Phases	4		8		2		6	
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	24.0	9.5	24.0
Total Split (s)	30.0	30.0	30.0	30.0	10.0	70.0	10.0	70.0
Total Split (%)	27.3%	27.3%	27.3%	27.3%	9.1%	63.6%	9.1%	63.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	3.0	6.0	3.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
v/c Ratio	0.41	0.24	0.20	0.24	0.30	0.70	0.21	0.74
Control Delay	42.2	28.2	37.4	26.3	15.8	41.8	3.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	4.7	0.0	22.8
Total Delay	42.2	28.2	37.4	26.3	15.8	46.5	3.8	31.6
Queue Length 50th (m)	22.5	13.2	10.2	12.0	9.9	167.0	0.4	10.0
Queue Length 95th (m)	40.6	28.0	22.0	26.8	m13.2	191.0	m1.1	m176.1
Internal Link Dist (m)		727.4		256.4		172.0		153.6
Turn Bay Length (m)	30.0		30.0		65.0		27.0	
Base Capacity (vph)	279	398	279	400	214	2025	236	2023
Starvation Cap Reductn	0	0	0	0	0	537	0	575
Spillback Cap Reductn	0	3	1	0	0	0	0	159
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.24	0.20	0.24	0.30	0.95	0.21	1.04

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 61 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Pretimed
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
2: Gordon St. & Poppy Dr. Weekday Afternoon Peak Hour

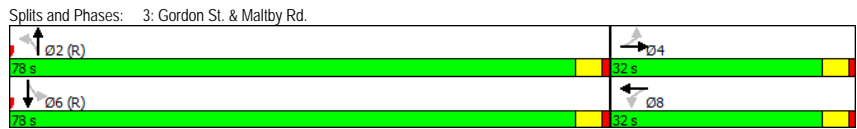
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
Future Volume (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1740		1750	1726		1750	3476		1750	3474	
Flt Permitted	0.70	1.00		0.70	1.00		0.09	1.00		0.11	1.00	
Satd. Flow (perm)	1281	1740		1281	1726		170	3476		206	3474	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	60	35	55	55	40	65	1345	65	50	1425	75
RTOR Reduction (vph)	0	19	0	0	23	0	0	3	0	0	3	0
Lane Group Flow (vph)	115	76	0	55	72	0	65	1407	0	50	1497	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4			8			5			2		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		71.0	64.0		71.0	64.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		71.0	64.0		71.0	64.0	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.58		0.65	0.58	
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	6.0		3.0	6.0	
Lane Grp Cap (vph)	279	379		279	376		210	2022		231	2021	
v/s Ratio Prot	0.04			0.04			c0.02	0.40		0.01	c0.43	
v/s Ratio Perm	c0.09			0.04			0.18			0.13		
v/c Ratio	0.41	0.20		0.20	0.19		0.31	0.70		0.22	0.74	
Uniform Delay, d1	36.9	35.2		35.1	35.1		12.3	16.2		10.8	16.9	
Progression Factor	1.00	1.00		1.00	1.00		2.45	2.46		0.54	0.44	
Incremental Delay, d2	4.4	1.2		1.6	1.1		2.9	1.5		1.1	1.3	
Delay (s)	41.4	36.4		36.7	36.2		33.0	41.2		6.9	8.7	
Level of Service	D	D		D	D		C	D		A	A	
Approach Delay (s)	39.1			36.4			40.9			8.6		
Approach LOS	D			D			D			A		

Intersection Summary
 HCM 2000 Control Delay: 25.8 HCM 2000 Level of Service: C
 HCM 2000 Volume to Capacity ratio: 0.63
 Actuated Cycle Length (s): 110.0 Sum of lost time (s): 15.0
 Intersection Capacity Utilization: 72.3% ICU Level of Service: C
 Analysis Period (min): 15
 c Critical Lane Group

Queues
3: Gordon St. & Maltby Rd. Future Traffic Conditions - Recommended Improvements
Weekday Afternoon Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	85	180	55	160	80	1415	65	1065
Future Volume (vph)	85	180	55	160	80	1415	65	1065
Lane Group Flow (vph)	85	240	55	225	80	1500	65	1105
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases		4		8		2		6
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	32.0	32.0	32.0	32.0	78.0	78.0	78.0	78.0
Total Split (%)	29.1%	29.1%	29.1%	29.1%	70.9%	70.9%	70.9%	70.9%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.46	0.54	0.29	0.50	0.32	0.66	0.53	0.49
Control Delay	44.8	38.6	38.4	36.9	11.8	12.5	26.7	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	38.6	38.4	36.9	11.8	12.5	26.7	6.0
Queue Length 50th (m)	16.4	44.2	10.1	40.1	6.9	95.2	2.5	21.7
Queue Length 95th (m)	33.4	70.2	22.6	64.9	16.4	117.5	m#30.0	22.6
Internal Link Dist (m)		711.4		659.2		165.0		187.1
Turn Bay Length (m)	50.0		50.0		50.0		50.0	
Base Capacity (vph)	183	447	190	449	253	2270	122	2271
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	0.46	0.54	0.29	0.50	0.32	0.66	0.53	0.49

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 107 (97%), Referenced to phase 2:NBL and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
3: Gordon St. & Maltby Rd. Weekday Afternoon Peak Hour

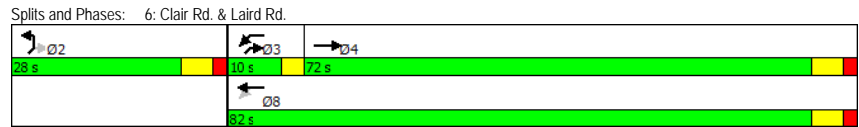
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	85	180	60	55	160	65	80	1415	85	65	1065	40
Future Volume (vph)	85	180	60	55	160	65	80	1415	85	65	1065	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.97		1.00	0.97		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.95	1.00		0.95	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1536	1745		1694	1745		1696	3394		1487	3394	
Flt Permitted	0.45	1.00		0.43	1.00		0.21	1.00		0.12	1.00	
Satd. Flow (perm)	734	1745		763	1745		380	3394		183	3394	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	180	60	55	160	65	80	1415	85	65	1065	40
RTOR Reduction (vph)	0	11	0	0	14	0	0	4	0	0	2	0
Lane Group Flow (vph)	85	229	0	55	212	0	80	1496	0	65	1103	0
Confl. Peds. (#/hr)	50		50	50		50	50		50	50		50
Heavy Vehicles (%)	10%	0%	4%	0%	0%	0%	3%	3%	8%	20%	4%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases		4			8			2			6	
Actuated Green, G (s)	27.5	27.5		27.5	27.5		73.5	73.5		73.5	73.5	
Effective Green, g (s)	27.5	27.5		27.5	27.5		73.5	73.5		73.5	73.5	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.67	0.67		0.67	0.67	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Grp Cap (vph)	183	436		190	436		253	2267		122	2267	
v/s Ratio Prot		c0.13			0.12			c0.44			0.32	
v/s Ratio Perm	0.12			0.07			0.21			0.36		
v/c Ratio	0.46	0.52		0.29	0.49		0.32	0.66		0.53	0.49	
Uniform Delay, d1	35.0	35.6		33.4	35.2		7.7	10.8		9.4	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.94	0.58	
Incremental Delay, d2	8.2	4.5		3.8	3.8		3.3	1.5		14.1	0.7	
Delay (s)	43.3	40.1		37.2	39.0		10.9	12.4		22.9	5.9	
Level of Service	D	D		D	D		B	B		C	A	
Approach Delay (s)		40.9			38.7			12.3			6.9	
Approach LOS		D			D			B			A	

Intersection Summary
 HCM 2000 Control Delay: 15.4 HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.62
 Actuated Cycle Length (s): 110.0 Sum of lost time (s): 9.0
 Intersection Capacity Utilization: 80.9% ICU Level of Service: D
 Analysis Period (min): 15
 c Critical Lane Group

Queues Future Traffic Conditions - Recommended Improvements
6: Clair Rd. & Laird Rd. Weekday Afternoon Peak Hour

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NEL	NER
Lane Configurations	↑↑	↖	↑↑	↖	↖
Traffic Volume (vph)	1695	105	1165	1	265
Future Volume (vph)	1695	105	1165	1	265
Lane Group Flow (vph)	1700	105	1165	1	265
Turn Type	NA	pm+pt	NA	Prot	pm+ov
Protected Phases	4	3	8	2	3
Permitted Phases		8			2
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	9.5	24.0	24.0	9.5
Total Split (s)	72.0	10.0	82.0	28.0	10.0
Total Split (%)	65.5%	9.1%	74.5%	25.5%	9.1%
Yellow Time (s)	4.0	3.0	4.0	4.0	3.0
All-Red Time (s)	2.0	0.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	3.0	6.0	6.0	3.0
Lead/Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	
Recall Mode	None	None	None	Min	None
v/c Ratio	0.82	0.37	0.45	0.01	0.60
Control Delay	14.6	6.6	4.0	34.0	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	6.6	4.0	34.0	28.7
Queue Length 50th (m)	83.2	2.1	23.5	0.1	27.2
Queue Length 95th (m)	110.6	7.9	31.7	1.8	#70.4
Internal Link Dist (m)	795.3		198.1	144.4	
Turn Bay Length (m)		50.0		50.0	
Base Capacity (vph)	3276	299	3441	579	456
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	0.52	0.35	0.34	0.00	0.58

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 67.8
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
6: Clair Rd. & Laird Rd. Weekday Afternoon Peak Hour

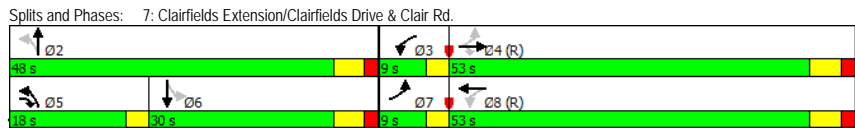
	→	↖	←	↗	↘	
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑		↖	↑↑	↖	↖
Traffic Volume (vph)	1695	5	105	1165	1	265
Future Volume (vph)	1695	5	105	1165	1	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		3.0	6.0	6.0	3.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3498		1750	3500	1750	1566
Flt Permitted	1.00		0.09	1.00	0.95	1.00
Satd. Flow (perm)	3498		171	3500	1750	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1695	5	105	1165	1	265
RTOR Reduction (vph)	0	0	0	0	0	20
Lane Group Flow (vph)	1700	0	105	1165	1	245
Turn Type	NA		pm+pt	NA	Prot	pm+ov
Protected Phases	4		3	8	2	3
Permitted Phases			8			2
Actuated Green, G (s)	40.2		49.8	49.8	5.7	12.3
Effective Green, g (s)	40.2		49.8	49.8	5.7	12.3
Actuated g/C Ratio	0.60		0.74	0.74	0.08	0.18
Clearance Time (s)	6.0		3.0	6.0	6.0	3.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2083		280	2582	147	285
v/s Ratio Prot	c0.49		0.04	0.33	0.00	c0.08
v/s Ratio Perm			0.24			0.07
v/c Ratio	0.82		0.38	0.45	0.01	0.86
Uniform Delay, d1	10.7		8.3	3.5	28.3	26.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6		0.8	0.1	0.0	22.4
Delay (s)	13.3		9.2	3.6	28.3	49.1
Level of Service	B		A	A	C	D
Approach Delay (s)	13.3		4.1	49.1		
Approach LOS	B		A	D		

Intersection Summary
 HCM 2000 Control Delay 12.6 HCM 2000 Level of Service B
 HCM 2000 Volume to Capacity ratio 0.83
 Actuated Cycle Length (s) 67.5 Sum of lost time (s) 15.0
 Intersection Capacity Utilization 71.8% ICU Level of Service C
 Analysis Period (min) 15
 c Critical Lane Group

Queues Future Traffic Conditions - Recommended Improvements
 7: Clairfields Extension/Clairfields Drive & Clair Rd. Weekday Afternoon Peak Hour

	↖	→	↘	↙	←	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↖	↖	↖	↖↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1315	535	120	800	390	95	25	145
Future Volume (vph)	120	1315	535	120	800	390	95	25	145
Lane Group Flow (vph)	120	1315	535	120	845	390	150	25	225
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	7	4	5	3	8	5	2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	5	3	8	5	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
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	24.0	24.0	24.0
Total Split (s)	9.0	53.0	18.0	9.0	53.0	18.0	48.0	30.0	30.0
Total Split (%)	8.2%	48.2%	16.4%	8.2%	48.2%	16.4%	43.6%	27.3%	27.3%
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	0.0	2.0	0.0	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)	3.0	6.0	3.0	3.0	6.0	3.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	Max	Max	Max
v/c Ratio	0.42	0.88	0.48	0.72	0.57	0.88	0.22	0.09	0.57
Control Delay	17.4	37.2	3.9	48.2	48.6	49.3	19.0	35.6	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	37.2	3.9	48.2	48.6	49.3	19.0	35.6	40.6
Queue Length 50th (m)	12.9	140.5	10.6	24.7	103.6	65.8	17.6	4.5	40.9
Queue Length 95th (m)	22.7	173.1	27.8	m28.1	m113.0	#120.5	32.8	12.2	66.6
Internal Link Dist (m)		186.5			775.0		156.4		150.9
Turn Bay Length (m)	55.0		200.0	45.0		100.0		50.0	
Base Capacity (vph)	288	1495	1125	166	1486	442	683	265	398
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	0.88	0.48	0.72	0.57	0.88	0.22	0.09	0.57

Intersection Summary
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
 7: Clairfields Extension/Clairfields Drive & Clair Rd. Weekday Afternoon Peak Hour

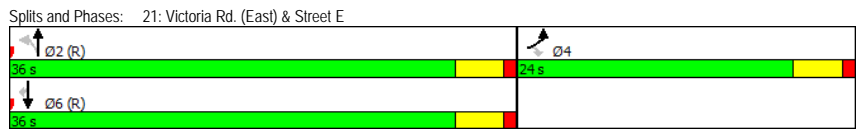
	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↖	↖	↖	↖↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	120	1315	535	120	800	45	390	95	55	25	145	80	
Future Volume (vph)	120	1315	535	120	800	45	390	95	55	25	145	80	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	3.0	3.0	6.0		3.0	6.0		6.0	6.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.95		
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1750	3500	1566	1750	3472		1750	1741		1750	1744		
Flt Permitted	0.23	1.00	1.00	0.09	1.00		0.41	1.00		0.66	1.00		
Satd. Flow (perm)	423	3500	1566	157	3472		747	1741		1219	1744		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	1315	535	120	800	45	390	95	55	25	145	80	
RTOR Reduction (vph)	0	0	180	0	3	0	19	0	0	18	0	0	
Lane Group Flow (vph)	120	1315	355	120	842	0	390	131	0	25	207	0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		Perm	NA		
Protected Phases	7	4	5	3	8		5	2			6		
Permitted Phases	4		4	8			2			6			
Actuated Green, G (s)	53.0	47.0	62.0	53.0	47.0		42.0	42.0		24.0	24.0		
Effective Green, g (s)	53.0	47.0	62.0	53.0	47.0		42.0	42.0		24.0	24.0		
Actuated g/C Ratio	0.48	0.43	0.56	0.48	0.43		0.38	0.38		0.22	0.22		
Clearance Time (s)	3.0	6.0	3.0	3.0	6.0		3.0	6.0		6.0	6.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	276	1495	882	162	1483		421	664		265	380		
v/s Ratio Prot	0.02	c0.38	0.05	c0.04	0.24		c0.13	0.08			0.12		
v/s Ratio Perm	0.19		0.17	0.32			c0.23			0.02			
v/c Ratio	0.43	0.88	0.40	0.74	0.57		0.93	0.20		0.09	0.54		
Uniform Delay, d1	17.1	28.9	13.5	22.4	23.8		29.9	22.7		34.3	38.2		
Progression Factor	1.00	1.00	1.00	2.27	2.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.1	7.7	0.3	9.0	0.8		26.2	0.7		0.7	5.5		
Delay (s)	18.2	36.6	13.8	59.7	48.4		56.1	23.4		35.0	43.7		
Level of Service	B	D	B	E	D		E	C		D	D		
Approach Delay (s)		29.3			49.8		47.0			42.8			
Approach LOS		C			D		D			D			

Intersection Summary
 HCM 2000 Control Delay: 38.1 HCM 2000 Level of Service: D
 HCM 2000 Volume to Capacity ratio: 0.92
 Actuated Cycle Length (s): 110.0 Sum of lost time (s): 18.0
 Intersection Capacity Utilization: 93.8% ICU Level of Service: F
 Analysis Period (min): 15
 c Critical Lane Group

Queues Future Traffic Conditions - Recommended Improvements
 21: Victoria Rd. (East) & Street E Weekday Afternoon Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	235	10	10	510	410	375
Future Volume (vph)	235	10	10	510	410	375
Lane Group Flow (vph)	235	10	10	510	410	375
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag						
Lead-Lag Optimize?						
v/c Ratio	0.41	0.02	0.02	0.53	0.42	0.38
Control Delay	18.5	8.3	7.1	11.9	10.4	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	8.3	7.1	11.9	10.4	2.2
Queue Length 50th (m)	20.8	0.0	0.5	35.3	26.4	0.0
Queue Length 95th (m)	38.1	2.7	2.4	59.0	44.7	10.5
Internal Link Dist (m)	617.1			306.7	1674.8	
Turn Bay Length (m)	50.0		50.0			50.0
Base Capacity (vph)	568	515	442	967	967	1000
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.02	0.02	0.53	0.42	0.38

Intersection Summary
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 45
 Control Type: Pretimed



HCM Signalized Intersection Capacity Analysis Future Traffic Conditions - Recommended Improvements
 21: Victoria Rd. (East) & Street E Weekday Afternoon Peak Hour

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↖	↗	↖	↖	↖	↖
Lane Configurations	↖	↗	↖	↖	↖	↖
Traffic Volume (vph)	235	10	10	510	410	375
Future Volume (vph)	235	10	10	510	410	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1750	1566	1750	1842	1842	1566
Flt Permitted	0.95	1.00	0.46	1.00	1.00	1.00
Satd. Flow (perm)	1750	1566	842	1842	1842	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	235	10	10	510	410	375
RTOR Reduction (vph)	0	7	0	0	0	178
Lane Group Flow (vph)	235	3	10	510	410	197
Turn Type	Prot	Perm	Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	19.5	19.5	31.5	31.5	31.5	31.5
Effective Green, g (s)	19.5	19.5	31.5	31.5	31.5	31.5
Actuated g/C Ratio	0.32	0.32	0.52	0.52	0.52	0.52
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	568	508	442	967	967	822
v/s Ratio Prot	c0.13			c0.28	0.22	
v/s Ratio Perm		0.00	0.01			0.13
v/c Ratio	0.41	0.01	0.02	0.53	0.42	0.24
Uniform Delay, d1	15.8	13.7	6.9	9.4	8.7	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.0	0.1	2.1	1.4	0.7
Delay (s)	18.0	13.7	6.9	11.4	10.1	8.4
Level of Service	B	B	A	B	B	A
Approach Delay (s)	17.8			11.3	9.3	
Approach LOS	B			B	A	

Intersection Summary
 HCM 2000 Control Delay 11.3 HCM 2000 Level of Service B
 HCM 2000 Volume to Capacity ratio 0.48
 Actuated Cycle Length (s) 60.0 Sum of lost time (s) 9.0
 Intersection Capacity Utilization 47.4% ICU Level of Service A
 Analysis Period (min) 15
 c Critical Lane Group

Appendix S – Roundabout Analysis Results

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
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Filename: Gordon and Maltby - FT_PM.j9

Path: P:\59\76\06 Clair Maltby SP\Traffic Analysis\Phase 2\5. Roundabout Analysis

Report generation date: 2019-02-13 3:12:23 PM

«Gordon Street / Maltby Road - Future Total Traffic, Weekday Afternoon Peak Hour

- »Intersection Network
- »Legs
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Results

Summary of intersection performance

	Weekday Afternoon Peak Hour						
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
Gordon Street / Maltby Road - Future Total Traffic							
1 - Maltby Road East (East Leg)	1.4	6.9	17.12	0.59	C	7.74	A
2 - Gordon Street (North Leg)	1.5	2.0	4.13	0.60	A		
3 - Maltby Road East (West Leg)	0.6	3.0	6.53	0.39	A		
4 - Gordon Street (South Leg)	4.3	16.9	9.01	0.81	A		

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

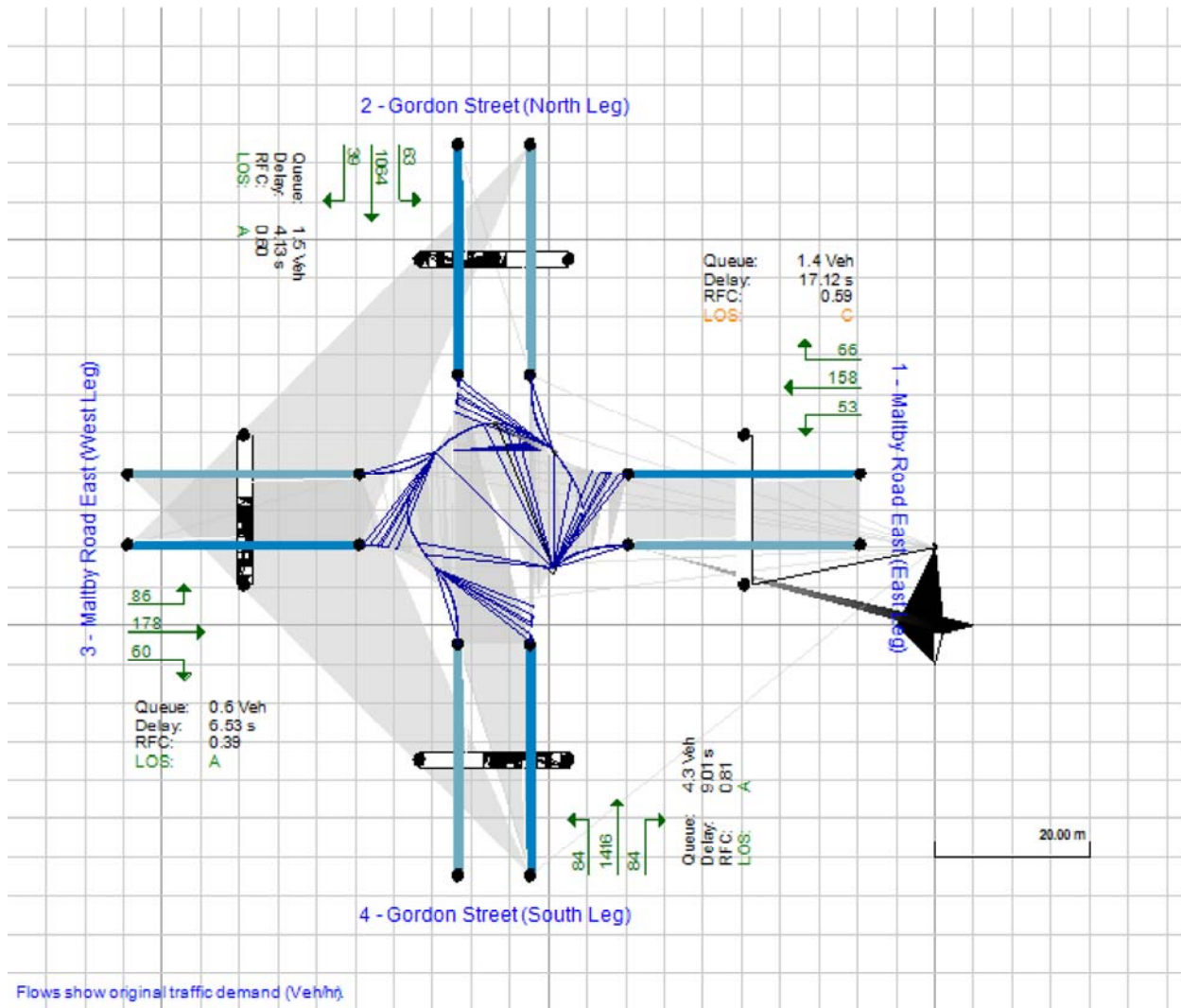
File summary

File Description

Title	Future Total Traffic Conditions
Location	Erb St. W. / Ira Needles Blvd.
Site number	1
Date	2017-04-26
Version	
Status	Weekday Afternoon Peak Hour
Identifier	
Client	
Jobnumber	
Analyst	BACTOR\ifc
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
✓		0.85	36.00	20.00

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A2	Gordon Street / Maltby Road	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	Future Total Traffic	Weekday Afternoon Peak Hour	ONE HOUR	15:45	17:15	15

Gordon Street / Maltby Road - Future Total Traffic, Weekday Afternoon Peak Hour

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	1 - Maltby Road East (East Leg) - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queuing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	3 - Maltby Road East (West Leg) - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queuing to leave the intersection in 6 timesegment(s).
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection Type	Intersection Delay (s)	Intersection LOS
2	Gordon Street / Maltby Road	Standard Roundabout	7.74	A

Intersection Network Options

Driving side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Name	Description
1	Maltby Road East (East Leg)	
2	Gordon Street (North Leg)	
3	Maltby Road East (West Leg)	
4	Gordon Street (South Leg)	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Maltby Road East (East Leg)	3.70	8.00	25.0	50.0	60.0	20.0	
2 - Gordon Street (North Leg)	7.00	8.00	15.0	60.0	60.0	30.0	
3 - Maltby Road East (West Leg)	3.70	8.00	25.0	50.0	60.0	20.0	
4 - Gordon Street (South Leg)	7.00	8.00	15.0	60.0	60.0	30.0	

Unsignalld Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (Unsignalld Pedestrian Crossing) (PCE)	Vehicles queueing on exit (Unsignalld Pedestrian Crossing) (PCE)	Central Refuge	Crossing data type	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
1 - Maltby Road East (East Leg)	2.00	2.00	✓	Distance	3.70	2.64	3.70	2.64
2 - Gordon Street (North Leg)	2.00	2.00	✓	Distance	7.00	5.00	7.00	5.00
3 - Maltby Road East (West Leg)	2.00	2.00	✓	Distance	3.70	2.64	3.70	2.64
4 - Gordon Street (South Leg)	2.00	2.00	✓	Distance	7.00	5.00	7.00	5.00

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
1 - Maltby Road East (East Leg)	0.641	2087

2 - Gordon Street (North Leg)	0.695	2448
3 - Maltby Road East (West Leg)	0.641	2087
4 - Gordon Street (South Leg)	0.695	2448

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Vehicle mix source	PCE Factor for a Truck (PCE)
Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - Maltby Road East (East Leg)		✓	277	100.000
2 - Gordon Street (North Leg)		✓	1166	100.000
3 - Maltby Road East (West Leg)		✓	324	100.000
4 - Gordon Street (South Leg)		✓	1584	100.000

Demand overview (Pedestrians)

Leg	Average pedestrian flow (Ped/hr)
1 - Maltby Road East (East Leg)	15.00
2 - Gordon Street (North Leg)	100.00
3 - Maltby Road East (West Leg)	15.00
4 - Gordon Street (South Leg)	15.00

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - Maltby Road East (East Leg)	2 - Gordon Street (North Leg)	3 - Maltby Road East (West Leg)	4 - Gordon Street (South Leg)
From	1 - Maltby Road East (East Leg)	0	66	158	53
	2 - Gordon Street (North Leg)	63	0	39	1064
	3 - Maltby Road East (West Leg)	178	86	0	60
	4 - Gordon Street (South Leg)	84	1416	84	0

Vehicle Mix

Truck Percentages

		To			
		1 - Maltby Road East (East Leg)	2 - Gordon Street (North Leg)	3 - Maltby Road East (West Leg)	4 - Gordon Street (South Leg)
From	1 - Maltby Road East (East Leg)	2	2	2	2
	2 - Gordon Street (North Leg)	2	2	2	2
	3 - Maltby Road East (West Leg)	2	2	2	2
	4 - Gordon Street (South Leg)	2	2	2	2

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
1 - Maltby Road East (East Leg)	0.59	17.12	1.4	6.9	C
2 - Gordon Street (North Leg)	0.60	4.13	1.5	2.0	A
3 - Maltby Road East (West Leg)	0.39	6.53	0.6	3.0	A
4 - Gordon Street (South Leg)	0.81	9.01	4.3	16.9	A

Main Results for each time segment

15:45 - 16:00

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	209	1189	11.29	968	0.215	207	0.3	4.727	A
2 - Gordon Street (North Leg)	878	221	75.29	2239	0.392	875	0.6	2.636	A
3 - Maltby Road East (West Leg)	244	886	11.29	1260	0.194	243	0.2	3.535	A
4 - Gordon Street (South Leg)	1193	245	11.29	2227	0.535	1188	1.1	3.449	A

16:00 - 16:15

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	249	1423	13.48	767	0.325	248	0.5	6.914	A
2 - Gordon Street (North Leg)	1048	264	89.90	2204	0.476	1047	0.9	3.108	A
3 - Maltby Road East (West Leg)	291	1060	13.48	1108	0.263	291	0.4	4.402	A
4 - Gordon Street (South Leg)	1424	294	13.48	2192	0.650	1421	1.8	4.655	A

16:15 - 16:30

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	305	1737	16.52	521	0.586	301	1.4	16.173	C
2 - Gordon Street (North Leg)	1284	322	110.10	2157	0.595	1282	1.5	4.103	A
3 - Maltby Road East (West Leg)	357	1296	16.52	910	0.392	356	0.6	6.476	A
4 - Gordon Street (South Leg)	1744	359	16.52	2143	0.814	1735	4.2	8.631	A

16:30 - 16:45

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	305	1746	16.52	515	0.593	305	1.4	17.120	C
2 - Gordon Street (North Leg)	1284	325	110.10	2155	0.596	1284	1.5	4.132	A
3 - Maltby Road East (West Leg)	357	1299	16.52	908	0.393	357	0.6	6.528	A
4 - Gordon Street (South Leg)	1744	360	16.52	2142	0.814	1744	4.3	9.012	A

16:45 - 17:00

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	249	1435	13.48	758	0.329	253	0.5	7.179	A
2 - Gordon Street (North Leg)	1048	269	89.90	2201	0.476	1050	0.9	3.132	A
3 - Maltby Road East (West Leg)	291	1064	13.48	1105	0.264	292	0.4	4.436	A
4 - Gordon Street (South Leg)	1424	295	13.48	2191	0.650	1434	1.9	4.814	A

17:00 - 17:15

Leg	Total Demand (Veh/hr)	Circulating flow (Veh/hr)	Pedestrian demand (Ped/hr)	Capacity (Veh/hr)	V/C Ratio	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	LOS
1 - Maltby Road East (East Leg)	209	1197	11.29	962	0.217	209	0.3	4.792	A
2 - Gordon Street (North Leg)	878	223	75.29	2238	0.392	879	0.6	2.651	A
3 - Maltby Road East (West Leg)	244	890	11.29	1257	0.194	244	0.2	3.559	A
4 - Gordon Street (South Leg)	1193	247	11.29	2226	0.536	1195	1.2	3.501	A

Queue Variation Results for each time segment

15:45 - 16:00

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	0.27	0.00	0.00	0.27	0.27			N/A	N/A
2 - Gordon Street (North Leg)	0.64	0.55	1.00	1.40	1.45			N/A	N/A
3 - Maltby Road East (West Leg)	0.24	0.00	0.00	0.24	0.24			N/A	N/A

4 - Gordon Street (South Leg)	1.14	0.55	1.00	1.40	1.45			N/A	N/A
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16:00 - 16:15

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	0.48	0.04	0.41	1.25	1.37			N/A	N/A
2 - Gordon Street (North Leg)	0.90	0.06	0.76	1.63	2.03			N/A	N/A
3 - Maltby Road East (West Leg)	0.35	0.00	0.00	0.35	0.35			N/A	N/A
4 - Gordon Street (South Leg)	1.83	0.04	0.43	4.91	8.42			N/A	N/A

16:15 - 16:30

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	1.36	0.03	0.27	1.36	2.87			N/A	N/A
2 - Gordon Street (North Leg)	1.45	0.03	0.26	1.45	1.45			N/A	N/A
3 - Maltby Road East (West Leg)	0.64	0.03	0.25	0.64	0.64			N/A	N/A
4 - Gordon Street (South Leg)	4.16	0.03	0.30	4.16	16.95			N/A	N/A

16:30 - 16:45

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	1.41	0.03	0.30	1.90	6.87			N/A	N/A
2 - Gordon Street (North Leg)	1.46	0.03	0.26	1.46	1.46			N/A	N/A
3 - Maltby Road East (West Leg)	0.64	0.03	0.30	1.04	3.04			N/A	N/A
4 - Gordon Street (South Leg)	4.27	0.03	0.27	4.27	5.55			N/A	N/A

16:45 - 17:00

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	0.50	0.04	0.43	1.27	1.39			N/A	N/A
2 - Gordon Street (North Leg)	0.91	0.51	0.99	1.42	1.48			N/A	N/A
3 - Maltby Road East (West Leg)	0.36	0.00	0.00	0.36	0.36			N/A	N/A
4 - Gordon Street (South Leg)	1.88	0.06	0.86	4.72	6.98			N/A	N/A

17:00 - 17:15

Leg	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - Maltby Road East (East Leg)	0.28	0.03	0.30	0.87	1.20			N/A	N/A
2 - Gordon Street (North Leg)	0.65	0.08	0.78	1.36	1.43			N/A	N/A
3 - Maltby Road East (West Leg)	0.24	0.00	0.00	0.24	0.24			N/A	N/A
4 - Gordon Street (South Leg)	1.16	0.04	0.38	2.94	5.22			N/A	N/A