50 Speers Road
Proposed Residential Development
Traffic Impact Study

Town of Oakville

Version 1

Prepared For: Helberg Properties Limited

October 14, 2022

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1.0 EXECUTIVE SUMMARY

BA Group was retained by Helberg Properties Limited to provide transportation consulting services related to a development proposal for 314 purpose-built residential rental units on a site municipally known as 50 Speers Road ("the site"), in the Town of Oakville ("the Town"), in the Region of Halton ("the Region"). The site is located on the south side of Speers Road and is bounded by the two-way Speers Service Road that connects to Speers Road to the north, a multi-unit residential development to the east, a parking lot to the west, and single-family homes along Bartose Drive and Oakwood Public School to the south. The site is currently occupied by a 7-storey residential building with 59 units. This Traffic Impact Study (TIS) was prepared as part of the **Zoning By-law Amendment (ZBA)** application being submitted to the Town of Oakville. The terms of reference for the study was reviewed and approved by the Town of Oakville.

Development Proposal

The development proposal includes the demolition of the existing residential building and the construction of a new residential building with 314 purpose-built residential rental units.

Site access is proposed with a new driveway that connects to the existing Speers Service Road at the front of the building, with 2 existing access points at Speers Road. There are a total of three pick-up/drop off spaces proposed along the new site driveway. Parking is to be provided within a new 3-level below-grade parking facility. It is expected that site will most likely be build-out by 2027.

Area Transportation Context

The site is currently served by 5 local surface bus routes operated by Oakville Transit that provide connections to the higher-order GO Transit System. There are bus stops adjacent to the site on Speers Road (just west of the site and directly across the street on the north side of the road). The Oakville GO Station is located only 750 metres from the site.

A number of cycling infrastructure improvements are planned within the vicinity of the site. On-road cycling lanes are proposed along Speers Road (west of Cross Avenue), Kerr Street (north of Speers Road), Queen Mary Drive and Cross Avenue. On-road signed cycling routes are proposed on Kerr Street (south of Speers Road), Stewart Street, Maurice Drive and Speers Road (east of Cross Avenue). Multi-use trails on Dorval Drive are to be extended. In addition, a future grade-separated crossing is proposed at the intersection of Speers Road and Kerr Street.

The site is located in midtown Oakville which provides access to a number of commercial and employment uses within a reasonable walking distance. All public streets in the site vicinity (including Speers Road, Kerr Street, Bartos Drive, Shepherd Road and Prince Charles Drive) have continuous sidewalks on both sides of the roadway. Pedestrian connectivity between the site and Oakwood Public School will be provided through the property adjacent to the site (80 Speers Road) and the existing connection to the sidewalk along Bartos Drive.

Both Speers Road and Kerr Street provide strategic connections within the Town of Oakville, connecting to key roads within the Town and Region. The Queen Elizabeth Way (QEW)/Highway 403 is less than 2 km from the site. The proximity of the QEW will provide convenient access for vehicles travelling to and from the site.

Vehicle Parking Considerations

The application of Zoning By-law 2014-014 parking standards to the site results in a total parking requirement of 340 spaces, inclusive of 261 resident spaces and 79 visitor spaces. This results in a total parking supply ratio for the site of 1.08 spaces per unit, with an effective resident rate of 0.83 spaces per unit. The proposed parking strategy for the site recommends a blended parking rate of a minimum of 1.0 spaces per unit, inclusive of resident and visitor parking. The proposed parking supply includes a total of 314 spaces. The parking supply is deemed appropriated based on several factors such as the area transportation context, the proximity of the Oakville GO station (only 750 m from the site), consideration for Transportation Demand Management, the proposed unit mix (84% of the proposed rental units are less than 75 m^2), parking demand surveys and recent parking approvals.

Bicycle Parking Considerations

The site is subject to the minimum bicycle parking requirements of the Town of Oakville Zoning By-law 2014-014. Application of the minimum bicycle parking requirements results in a requirement for 314 bicycle parking spaces, including 236 long-term spaces and 78 visitor spaces. The bicycle parking supply includes a total of 314 spaces and meets the requirements of the Zoning By-law.

Loading Considerations

The Town's Zoning By-law 2014-014, requires that the minimum dimensions of a loading space are: 3.5 m width, 12.0 m length and 4.2 m vertical clearance. A total of one loading space is proposed at-grade to accommodate the servicing needs of the residential development. The proposed loading facilities are appropriate will meet the practical needs of the site.

Transportation Demand Management Plan

The Transportation Demand Management (TDM) Plan strives to reduce automobile use through an on-going strategy that supports and promotes the use of non-auto transportation modes. Proposed TDM strategies include a reduced parking supply with "unbundled" parking, active transportation facilities (pedestrian connection, bike parking and bike repair station) and travel mode information packages.

Travel Demand

The TTS travel data demonstrates that the site study area has an auto driver mode share in the order of 57% for morning outbound and 64% for afternoon inbound home-based trips, during the peak travel periods. Non-auto trips (i.e. transit, walking and cycling) account for approximately 29% of all home-based trips made in the morning outbound and 28% in the afternoon inbound, during the peak travel periods. The proposed development is anticipated to generate in the order of **75 and 90 two-way vehicle trips,** during the weekday morning and afternoon peak hours, respectively. In consideration of the existing trips generated by the site, the development is forecasted to have a net impact of approximately **55 two-way vehicle trips,** during both the weekday morning and afternoon peak hours.

Traffic Operations Analysis

The traffic operations analysis was undertaken during the weekday morning and afternoon street peak hours for existing conditions and the horizons of 2026 and 2031. The study area and analysis considered four signalized intersections and ten unsignalized intersections.

Overall, area signalized intersections operate well under existing conditions, with volume to capacity (v/c) ratios of less than 1.0 for all movements. Considering future traffic conditions with redevelopment of the site and the planned road network improvements at the Kerr Street / Speers Road intersection, all signalized

intersections will continue to operate acceptably with (v/c) ratios of less than 1.0 for all movements in the future horizon years.

Traffic operations at all unsignalized intersections within the study area are at acceptable level of service under all scenarios, without the need for road improvements or mitigation measures, with the exception of the site access points at Speers Service Road (West Access & East Access) / Speers Road, which are expected to continue to experience delays for northbound left-turning vehicles. It is noted that delays related to the left-turning movements are an existing condition and that the left-turning traffic volumes from the site to Speers Road are expected to continue to be low under future total traffic conditions. The additional delays related to the northbound left-turning movements as a result of this development, are expected to be negligible when compared to existing and future background conditions, and will not impact the traffic operations along Speers Road.

Road Safety Analysis

The traffic analysis for this study indicates that there are expected to be a future total maximum of 5 westbound left-turning vehicles from Speers Road to Speers Service Road, at both the east and west access point to the site, during the peak hours of the day. Due to the expected low number of left-turning vehicles from Speers Road into either of the access points, a left-turn lane on Speers Road is deemed to be not be required.

The sight distance for the two existing access points on Speers Service Road was evaluated based on Transportation Association of Canada (TAC) design criteria and confirmed that the access points meet the minimum sight distance requirements.

An analysis of the existing and projected future vehicle queues was undertaken at all signalized intersections in order to confirm that queues would be acceptably accommodated under the study horizon years. The results of the queuing analysis indicate that the development proposal is expected to have negligible impacts on intersection queuing in the study area. As a result, there are no safety-related concerns in relation to the development and intersection queuing in the study area.

Overall Conclusion

Based on the foregoing, the proposed development can be acceptably accommodated on the existing and future transportation network.

2.0 INTRODUCTION

BA Group was retained by Helberg Properties Limited to provide transportation consulting services related to a development proposal for 314 purpose-built residential rental units on a site municipally known as 50 Speers Road ("the site"), in the Town of Oakville ("the Town"), in the Region of Halton ("the Region"). The site is located on the south side of Speers Road and is bounded by the two-way Speers Service Road that connects to Speers Road to the north, a multi-unit residential development to the east, a parking lot to the west, and single-family homes along Bartose Drive and Oakwood Public School to the south. The site is currently occupied by a 7-storey residential building with 59 units. The site location is illustrated in **Figure 1.**

This Traffic Impact Study has been prepared as part of the **Zoning By-law Amendment (ZBA)** application being submitted to the Town of Oakville. The terms of reference for the study was reviewed and approved by the Town of Oakville and is attached in **Appendix A**.

2.1 EXISTING SITE CONTEXT

The site is currently occupied by a 7-storey residential building with 59 units.

The existing parking supply for the building includes a total of 67 spaces (39 below-grade spaces and 28 at-grade spaces). Vehicle access to the site is currently provided by a private driveway in front of the building that connects to Speers Service Road that connects with two points of access to Speers Road.

2.2 DEVELOPMENT PROPOSAL

The development proposal includes the demolition of the existing 7-storey residential building and the construction of a new residential building with 314 purpose-built residential rental units.

Site access is proposed with a new driveway that connects to Speers Service Road at the front of the building, with 2 existing access points at Speers Road. There are a total of three pick-up/drop off spaces proposed along the new site driveway. Parking is to be provided within a new 3-level below-grade parking facility.

It is expected that site will most likely be build-out by 2027.

The development statistics for the site are summarized in **Table 1** while the development proposal for the site is illustrated in **Figure 2**. Reduced scale architectural ground floor and parking level plans are provided in **Appendix B.**

TABLE 1 DEVELOPMENT PROPOSAL

Use		Proposed	
	**Residential Rental Units**	Studio	28 units
		1-bedroom	147 units
		2-bedroom	107 units
		3-bedroom	32 units
		Total	**314 units**
	**Vehicle Parking spaces**	Resident	267 spaces
		Non-Resident	47 spaces
		Total	**314 spaces**
	**Bicycle Parking Spaces**	Long Term (Resident)	236 spaces
		Short Term (Resident Visitor)	78 spaces
		Total	**314 spaces**
	**Loading Facilities**	One loading space	
	**Site Access**	Access to the pick-up/drop-off area, loading facility and ramp connection to the below-grade parking facility to be provided via a new private driveway that connects to the existing Speers Service Road that connects to Speers Road	

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.

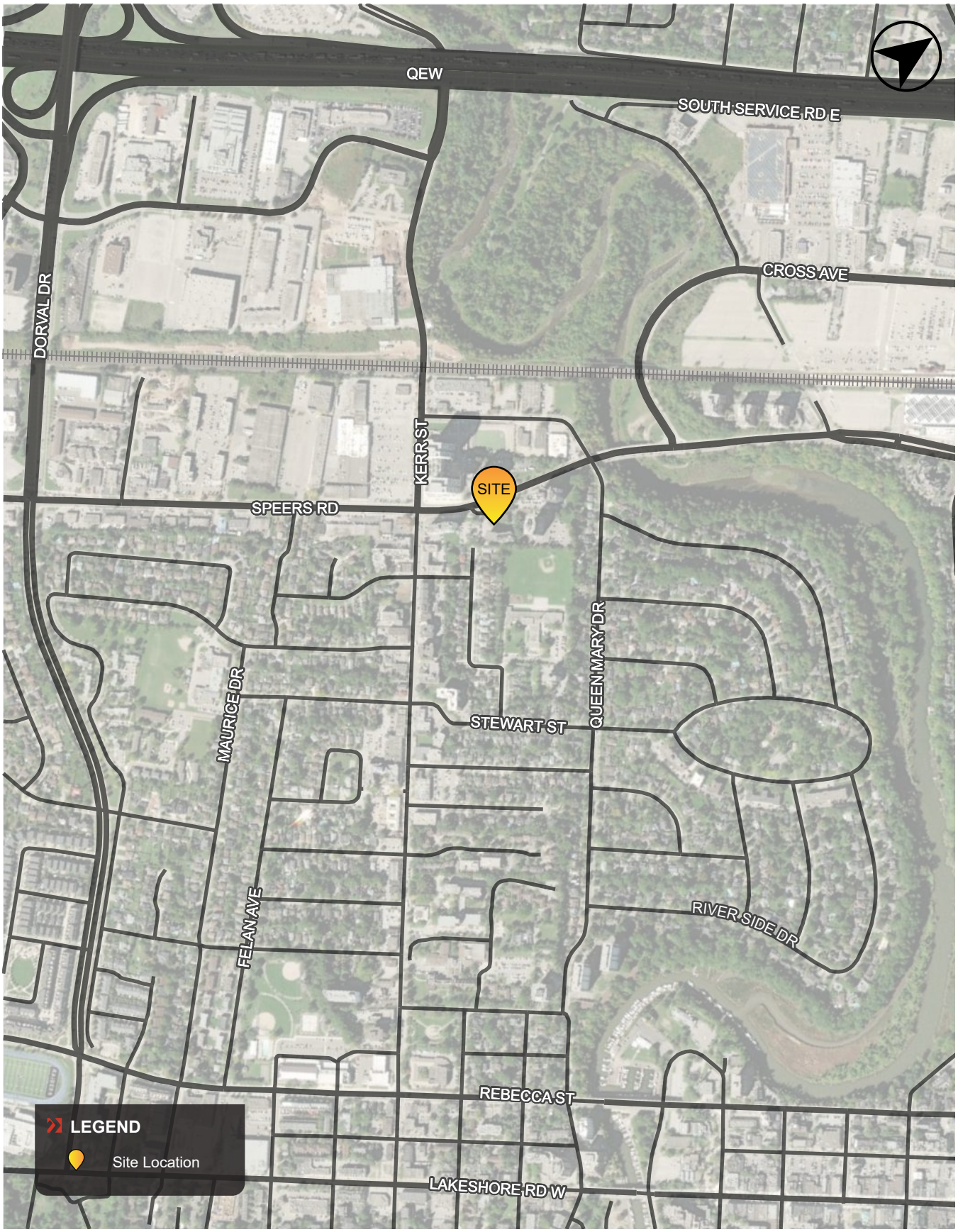

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FIGURE 1 SITE LOCATION

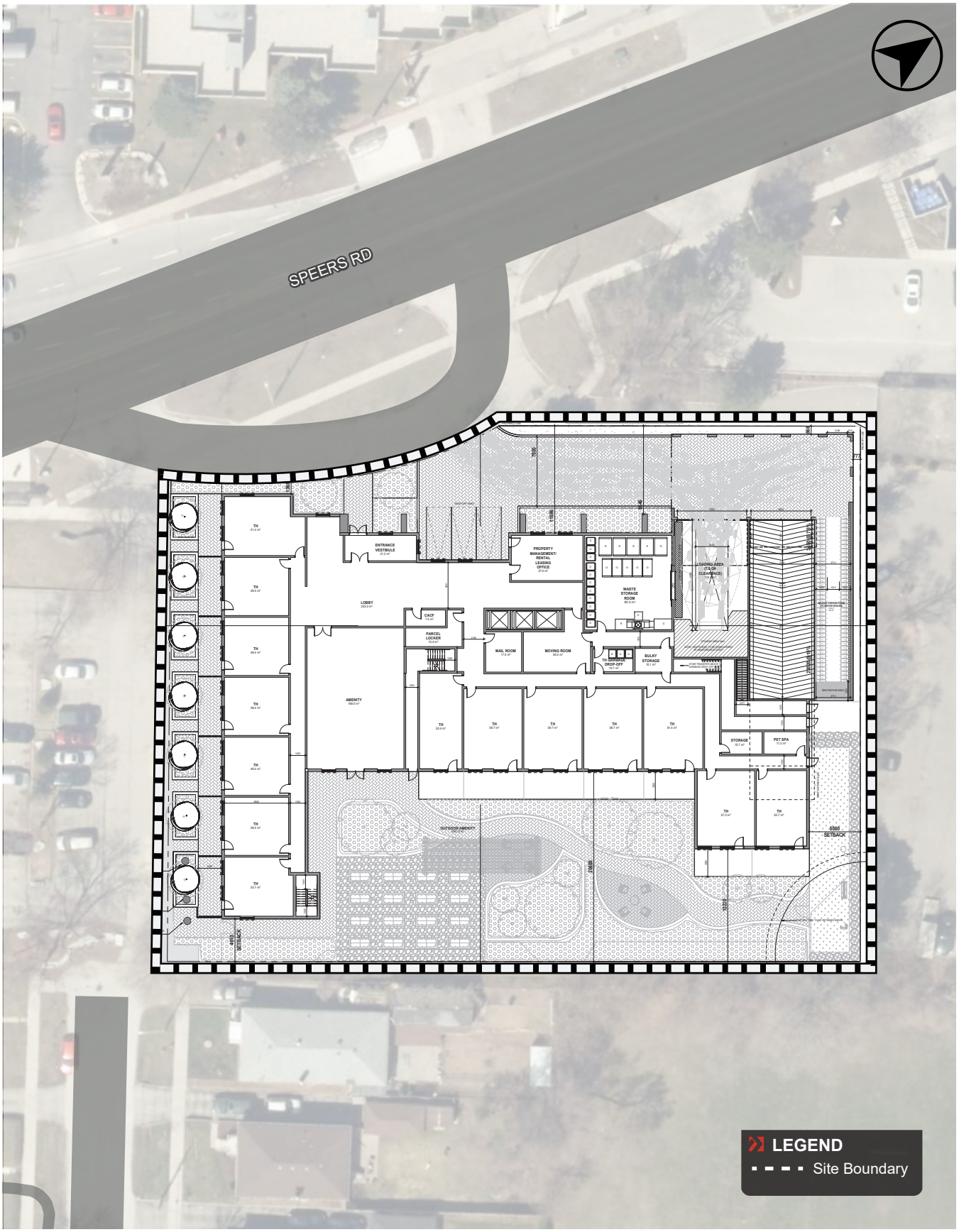

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FIGURE 2 DEVELOPMENT PROPOSAL

2.3 STUDY SCOPE

The study scope is outlined below.

Transportation Context

- A description of the existing transportation context with consideration for the area road network, transit system and active transportation facilities.
- A description of any future transportation changes and/or improvements to the area context such as transit improvements and other non-automobile dependent travel options.

Development Proposal

- A summary of the proposed development.
- An overview of the site and the area-wide transportation system that facilitates a shift towards non-automobile travel for prospective residents and visitors, while still being able to meet the practical and operational needs of the proposed development plan.
- A review of the transportation elements of the proposed development plan that includes vehicle access and circulation, loading and parking facilities.

Transportation Demand Management Framework

- An overview of potential Transportation Demand Management (TDM) measures and initiatives that are being considered to encourage prospective residents and visitors to use more active and sustainable modes of transportation.

Site Plan

- A review of the adequacy of the vehicle and bicycle parking supply.
- A review of the adequacy of the loading space provisions.
- A review of the functionality and appropriateness of the proposed vehicle, pedestrian and cycling facilities incorporated into the site plan, including loading/garbage collection facility arrangements.

Travel Demand Forecasting

- An assessment of the existing travel patterns and traffic volumes in the study area, during the key weekday morning and afternoon peak hours.
- A comprehensive review of future growth that may occur in the area, including corridor growth and consideration for a number of other area development projects.
- An assessment of the multi-modal trip generation potential of the proposed development.

Traffic Operations Review

- A review of traffic operations at intersections in the area, under existing and future conditions, including an assessment of the operational impacts of the proposed development.
- An assessment of any mitigative measures to accommodate the development traffic.

The findings of this review are summarized in the following sections.

3.0 POLICY & PLANNING CONTEXT

The **Provincial Policy Statement** (PPS 2020) is issued under the authority of Section 3 of the Planning Act. It provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial "policy-led" planning system.

With respect to transportation systems, Part V of the PPS, through the Policies in Section 1.6.7, promote maintaining and improving connectivity within and among transportation systems and modes (1.6.7.3) as well as a land use pattern, density and mix of uses that minimize the length and number of vehicle trips and support the development of viable choices and plans for public transit and other alternative transportation modes, including commuter rail and bus (1.6.7.4).

In addition, the PPS in Policy 1.6.8.3 indicates that planning authorities shall not permit development in planned corridors that could preclude or negatively affect the use of the corridor for the purpose(s) for which it was identified.

The **Growth Plan for the Greater Golden Horseshoe** (2019) provides a framework for implementing the Government of Ontario's vision for building stronger, prosperous communities within the Greater Golden Horseshoe by better managing growth.

The Plan directs growth within the Greater Golden Horseshoe area to the existing urban areas in order to make better use of land and infrastructure. Concentrating intensification in these areas provides a focus for a transit and infrastructure investment to support growth.

The Growth Plan supports a transportation system that exhibits connectivity amongst modes, a balance of modal choices for users of the system ensuring walking, cycling and transit are promoted, sustainability (i.e., economical and environmentally appropriate), multi-modal choices for all trip types to satisfy their travel needs, and is safe. Furthermore, the Growth Plan directs Transportation Demand Management (TDM) policies to be adopted by municipalities towards reducing trip distance and time and increasing modal share to alternatives to the automobile.

The location of the proposed development demonstrates the characteristics of an area within a Major Transit Station Area (MTSA). The Growth Plan for the Greater Golden Horseshoe (2020) defines the Major Transit Station Areas (MTSAs) that are within a 500 to 800-metre radius of a transit station (i.e. a 10-minute walking distance). The proposed development is 750 metres (approximately a 10-minute walk) away from the Oakville GO Station (a higher order transit station). As shown in **Figure 3**, the site is just inside the 800-metre radius of a major transit station and is a reasonable walking distance of the Oakville GO Station.

The policies of the Growth Plan support transportation systems as follows:

- Connectivity amongst travel modes;
- Provide travel mode choices for all trip types and promotes walking, cycling and transit;
- Promotes sustainability (i.e. travel that is economical and environmentally appropriate);
- Consideration for safety related to all travel modes;
- Adopt Transportation Demand Management (TDM) strategies to reduce trip distances & travel time and shift travel mode shares away from single occupant automobile trips;

- Highlight the importance of planning for the integration of active transportation within the existing and planned street network and within development projects;
- Prioritize intensification and higher densities in strategic growth areas to support the efficient use of land, infrastructure and transit viability;
- Consider the provision of higher density housing that provides access to transit and other amenities.

3.1 RELEVANT POLICIES OF THE TOWN OF OAKVILLE OFFICIAL PLAN – LIVABLE OAKVILLE

3.1.1 Livable Oakville – Growth Areas – Kerr Village

The Upper Kerr Village District is envisioned as a higher density, transit-supportive, mixed use area. This district will include gateway features, urban park with pedestrian midblock connections and establish a mix of commercial and residential uses. Within Livable Oakville, Part E – Growth Areas, Kerr Village, there are a number of relevant policies that support the intensification of the Upper Kerr Village and directly consider the mobility needs and requirements, supporting land use policies (internalization of trip making), and phasing necessary to fulfill those goals and objectives and that have been incorporated into the Draft OPA document.

Policy 23.2.2 states that:

> ***Objectives***
>
> *Enhance the mobility of all users with the provision of transit priority measures and increase levels of service through the development process by:*
>
> *a) promoting pedestrian and cycling-oriented mixed use development, with improved connections to the Downtown as well as the GO train station and proposed employment hub in Midtown Oakville;*
>
> *b) improving circulation, connections and access for cyclists, pedestrians and public transit; and,*
>
> *c) increasing efficiencies for alternate modes of transportation by encouraging compact urban form.*

Policy 23.3.1 states in part that:

> ***Development Concept***
>
> *Upper Kerr Village District*
>
> *The Upper Kerr Village District will become a transit-supportive and mixed use area. Higher density forms of development are permitted to achieve the critical mass required for enhanced transit.*

Policy 23.4.1 states that:

> ***Functional Policies***
>
> *Transportation*
>
> *a) The Town will introduce transit service improvements at an early stage in the development of Upper Kerr Village District. As the revitalization of this district evolves it will be serviced by the extension of improved transit levels of service, including transit priority measures and infrastructure required to create an efficient and attractive transit environment.*
>
> *b) Through the development process, attractive transit environments are encouraged to include transit passenger amenities, minimal surface parking, and other travel demand management strategies to encourage transit ridership.*
>
> *d) Bicycle facilities are encouraged throughout Kerr Village with the appropriate signage and infrastructure such as bicycle racks and bicycle lockers.*
>
> *e) The feasibility of creating a new or improved east-west pedestrian/cycling connection across Sixteen Mile Creek in the general area of the QEW/Speers Road shall be investigated by the Town.*
>
> *f) The redevelopment of Upper Kerr Village District shall anticipate the westerly extension of Shepherd Road and the northerly extension of St. Augustine Drive, with regard for potential redevelopment of adjacent lands.*

3.1.2 The Plan for Kerr Village (2009)

The *Plan for Kerr Village (2009)* provides a framework of land use designations and policy tools to guide the revitalization of the Kerr Village community.

Within *The Plan for Kerr Village (2009)* there are seven considerations relating to revitalization:

- Effectively using existing infrastructure such as roads, water and wastewater services;
- Providing a wide range of housing choices closer to amenities, increasing convenience and reducing travel time;
- Improving infrastructure such as sidewalks and streets;
- Supporting new public assets such as parks, open space, civic buildings, libraries and community centres, as well as programs and services;
- Protecting the environment;
- Promoting the demand for walking and cycling;
- Promoting the demand for transit by improving levels of transit service, reducing the use of the private automobile and relieving traffic and congestion; and,
- Accommodating growth in appropriate places and curbing sprawl.

3.1.3 Summary

Given that the site is proposed to provide new high density residential rental units within walking distance of the Oakville GO Station, it satisfies the objectives of the Growth Plan for a MTSA area. In addition to the aforementioned points, the proposed development is within the Kerr Village Growth area (illustrated in **Figure 4**) that will be revitalized as a vibrant business core and cultural area, and will create new opportunities for sustainable growth by supporting and promoting higher density developments in the area. The densification target of the Kerr Village Growth Plan aligns with the targets set in the Growth Plan.

The development proposal fulfills a number of transportation-related policy directions by proposing to redevelop in proximity of a major transit corridor, with intensification and density of housing that will permit and encourage the efficient use of land, infrastructure and transit viability. The proposed development also satisfies the criteria to reduce the reliance on single occupant vehicle trips by proposing a TDM Plan.

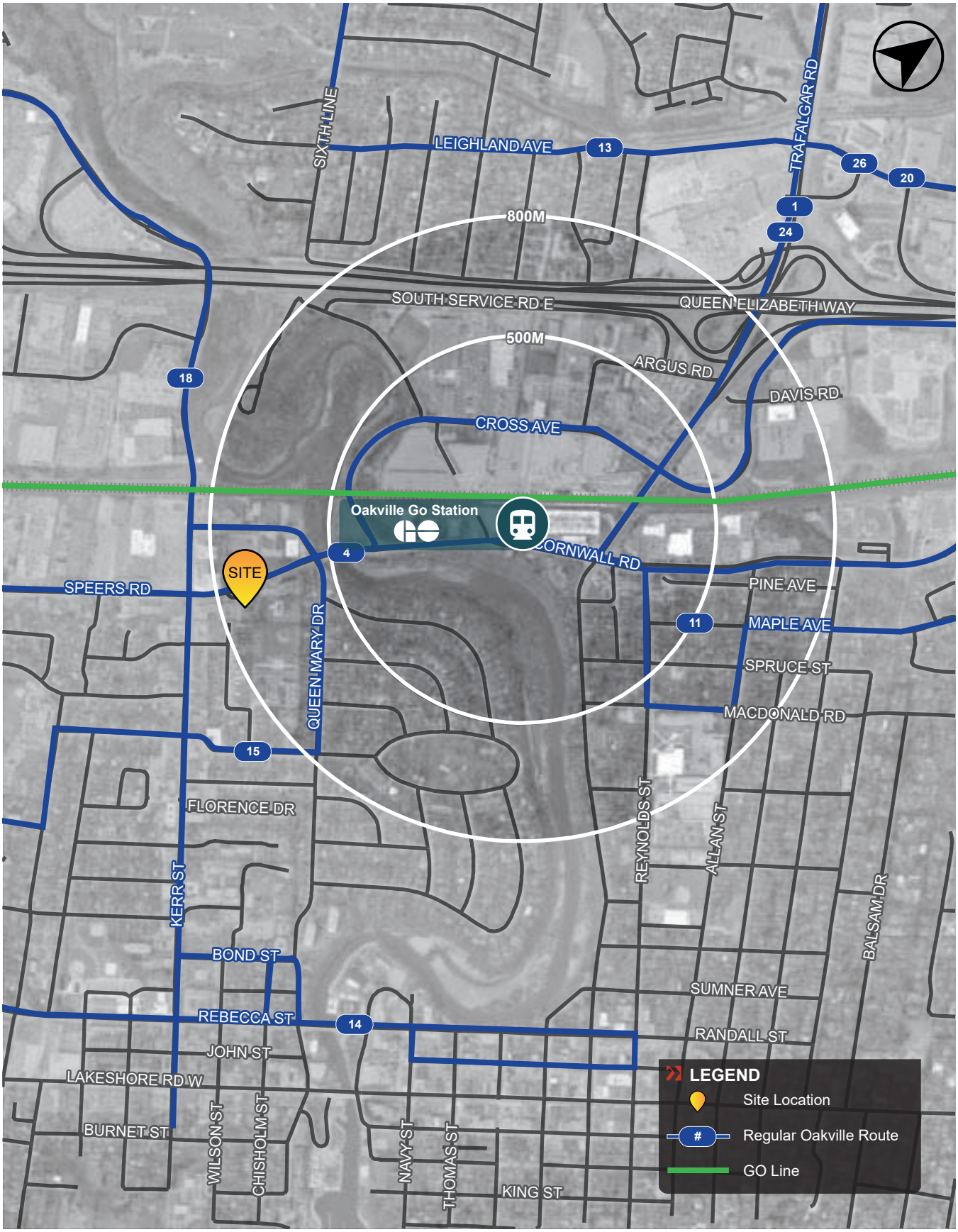

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FIGURE 3 MAJOR TRANSIT STATION AREAS (MTSA) NEAR OAKVILLE GO STATION

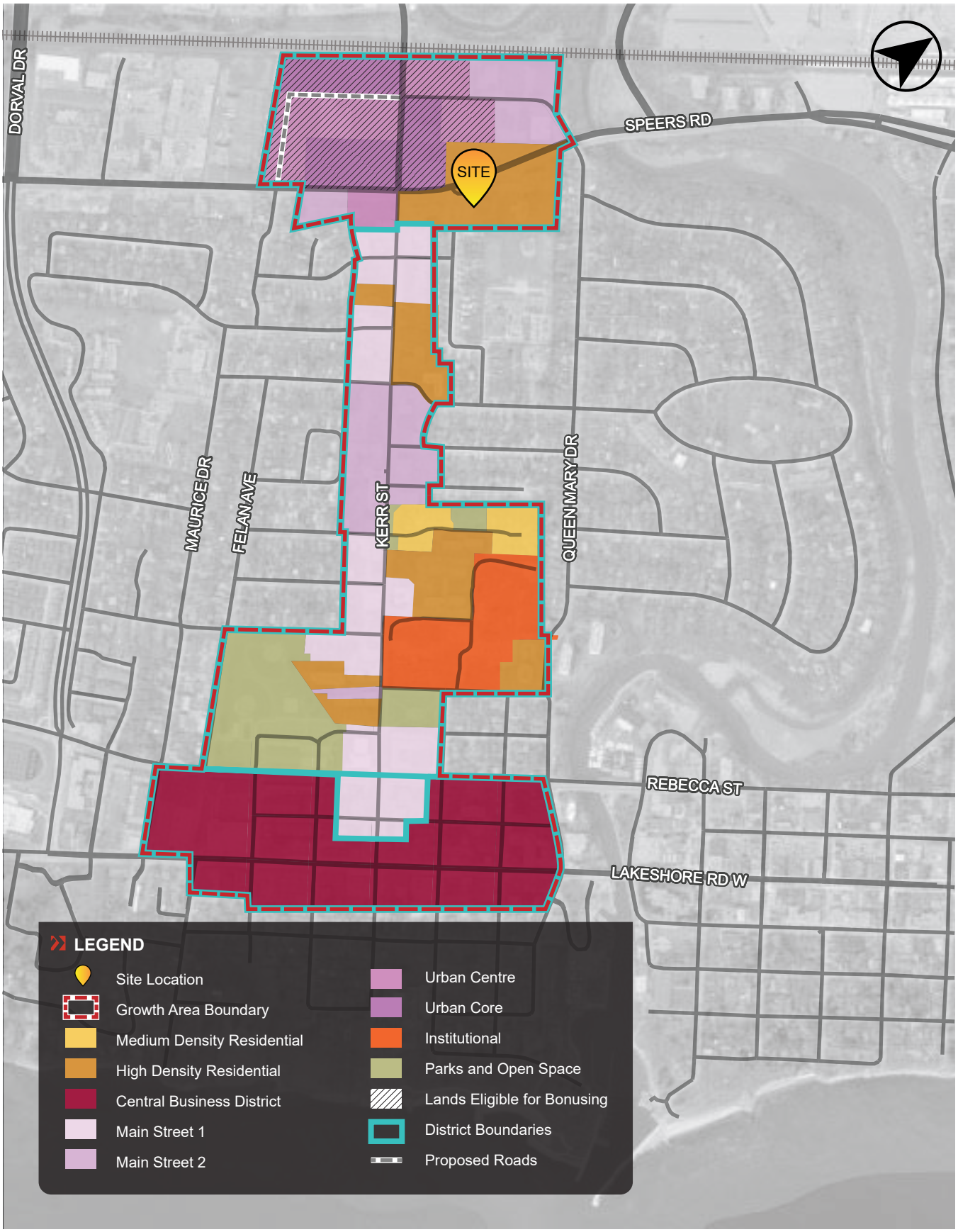

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FIGURE 4 KERR VILLAGE GROWTH AREA

4.0 TRANSPORTATION CONTEXT

A number of transportation network improvements are planned or underway within the vicinity of the site, that will significantly alter the way area residents and visitors are able to travel. Most significantly, these improvements will facilitate a shift from predominantly automobile-based travel to more sustainable modes of travel, including transit, cycling and walking.

A summary of the key transportation network improvements that are planned or underway within the vicinity of the site includes the following:

- Lakeshore West Line (LW) GO Regional Express Rail (GO RER) high-order transit;
- Trafalgar Bus Rapid Transit (BRT); and
- Improved cycling connections outlined in the Town of Oakville Active Transportation Master Plan

The following sections provide a detailed discussion of the existing transportation context of the site and the above-noted network improvements.

4.1 AREA ROAD NETWORK

4.1.1 Existing Area Road Network

A description of the existing area road network is provided in **Table 2**. ‘

Both Speers Road and Kerr Street are Town of Oakville streets and are both considered Major Transportation Corridors according to the Livable Oakville Urban Structure. Both corridors provide strategic connections within the Town of Oakville, connecting to other key Town of Oakville Major Transportation corridors as well as Regional Roads.

The Queen Elizabeth Way (QEW)/Highway 403 is outside of the traffic analysis study area, but it is noted that the nearest Highway 403 ramp terminals, that provide both eastbound and westbound access to the highway, are less than 2 km from the site. The proximity of the QEW will provide convenient access for vehicles travelling to and from the site.

TABLE 2 EXISTING AREA ROAD NETWORK

Roadway	Description
Minor Arterials	
Speers Road	Speers Road is an east-west minor arterial road under the jurisdiction of the Town of Oakville. In the vicinity of the site, Speers Road has a 4-lane cross-section, with 2 lanes of travel in each direction and dedicated turning lanes at key intersections. The posted speed limit for this section of Speers Road is 60 km/h.
Kerr Street	Kerr Street is a north-south minor arterial road under the jurisdiction of the Town of Oakville. In the vicinity of the site, Kerr Street has a 4-lane cross-section, with 2 lanes of travel in each direction and dedicated turning lanes at key intersections. The posted speed limit for this section of Kerr Street is 50 km/h.
Collectors	
Queen Mary Drive	Queen Mary Drive is a north-south collector road under the jurisdiction of the Town of Oakville. Queen Mary Drive continues as Shepherd Road, north of Speers Road. In the vicinity of the site, Kerr Street has a 2-lane cross-section, with 1 lane of travel in each direction. The posted speed limit for this section of Queen Mary Drive is 50 km/h.
Steward Street	Steward Street is an east-west collector road under the jurisdiction of the Town of Oakville. In the vicinity of the site, Kerr Street has a 2-lane cross-section, with 1 lane of travel in each direction. The posted speed limit for this section of Steward Street is 50 km/h.
Local Roads	
Bartos Drive	Bartos Drive is a north-south local road under the jurisdiction of the Town of Oakville and extends from Stewart Street in the south. Bartos Drive consists of a 2-lane cross-section with 1 lane of travel in each direction. The posted speed limit is 40 km/h.
Prince Charles Drive	Prince Charles Drive is an east-west local road under the jurisdiction of the Town of Oakville and extends from St Augustine Drive in the west and Bartos Drive in the east. Prince Charles Drive consists of a 2-lane cross-section with 1 lane of travel in each direction. The posted speed limit is 50 km/h.

The existing area road network is illustrated in **Figure 5**. The existing area road lane configuration and traffic control are illustrated in **Figure 6**.

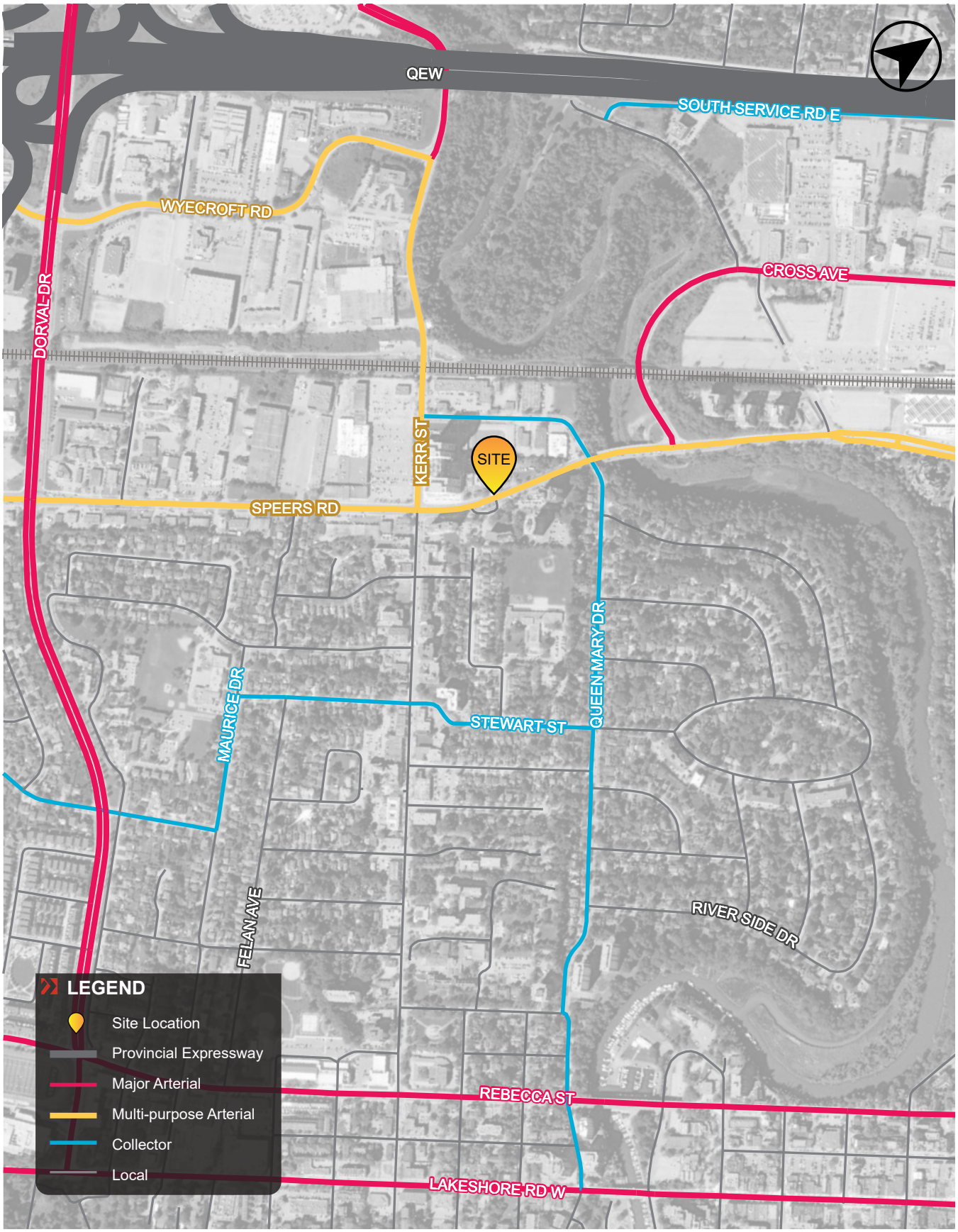

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FIGURE 5 EXISTING AREA ROAD NETWORK

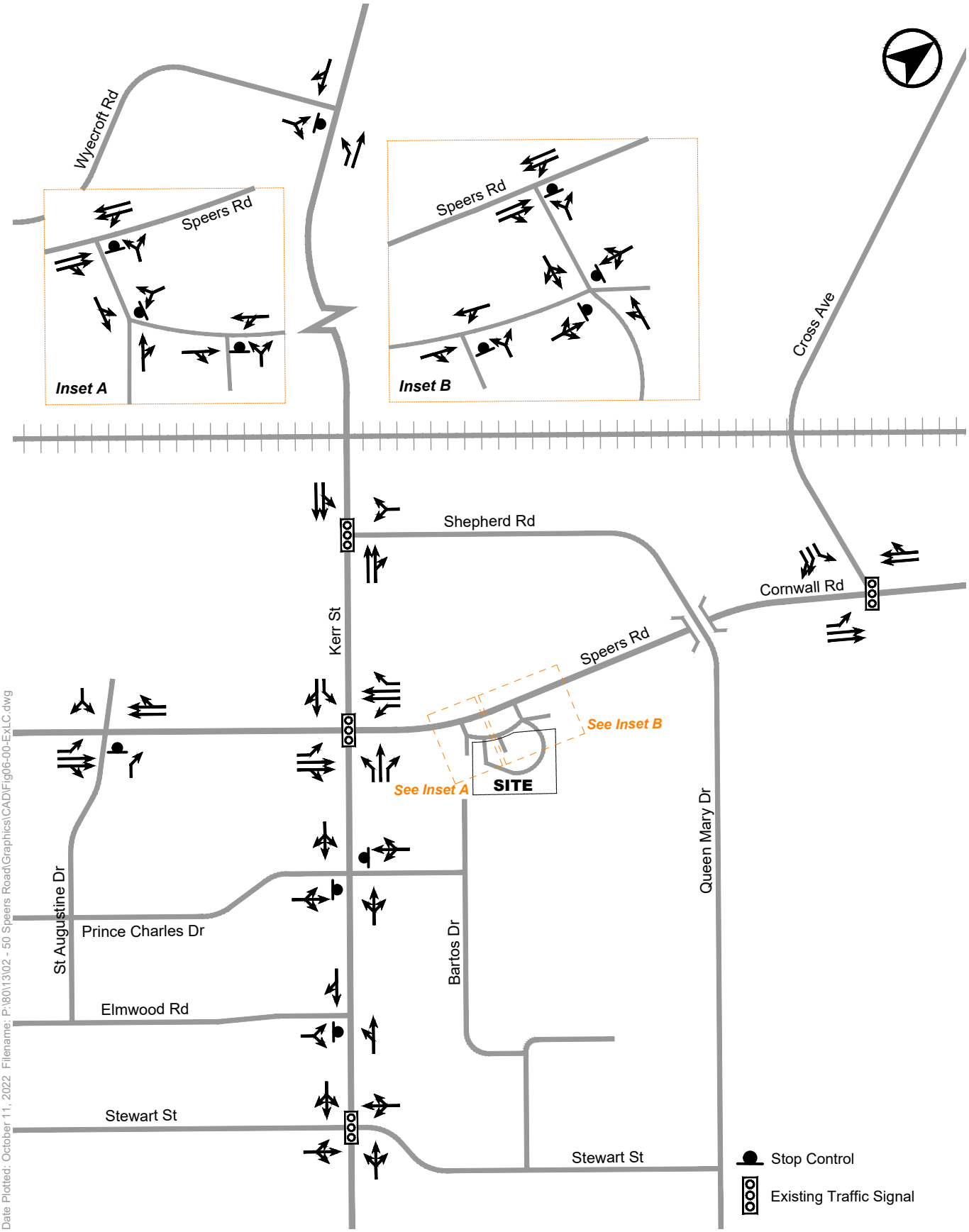


FIGURE 6 EXISTING AREA ROAD LANE CONFIGURATION AND TRAFFIC CONTROL

4.1.2 Planned Road Network Improvements

As part of the 2009 Kerr Village Transportation Assessment, the 2009 Speers Road Environmental Study Report and the Kerr Street Grade Separation Proposed Road Improvements, improvements in the immediate vicinity of the site area were identified for implementation in conjunction with development (intensification) and regional rail service upgrades within the Kerr Village Growth Area:

- Speers Road was identified as requiring an eastbound right-turn lane, in addition to the current lane configurations;
- Speers Road was identified as requiring bicycle lanes long its length to east of Kerr Street;
- Kerr Street was identified with dual southbound left-turn lanes at Speers Road and a dedicated southbound through lane and a dedicated southbound right-turn lane; and
- Given the potential future grade separation planned for Kerr Street, Kerr will have two through lanes in each direction plus left and right-turn lanes at Shepherd Road.

As the timing for the future Kerr Street underpass at the railway project has a deferred timeline, for the purpose of this study, it was assumed that grade separation would occur beyond the study horizon year.

Speers Road is also identified:

- As a Priority Transit Corridor (Mobility Management Strategy – Halton Region);
- With Transit in semi-exclusive/exclusive right-of-way (Transportation Master Plan – Halton Region); and
- As a Multi-purpose Arterial (Liveable Oakville).

It is important to note that the development of the site will have no impact on the existing Speers Service Road along the north boundary of the site that connects to Speers Road. As such, the development of the site will have no impact on the Town's future ability to widen Speers Boulevard.

These improvements and designations were identified within the context of the planned intensification associated with the overall Kerr Village Growth Area**.** The future area road lane configuration and traffic control is illustrated in **Figure 7**.

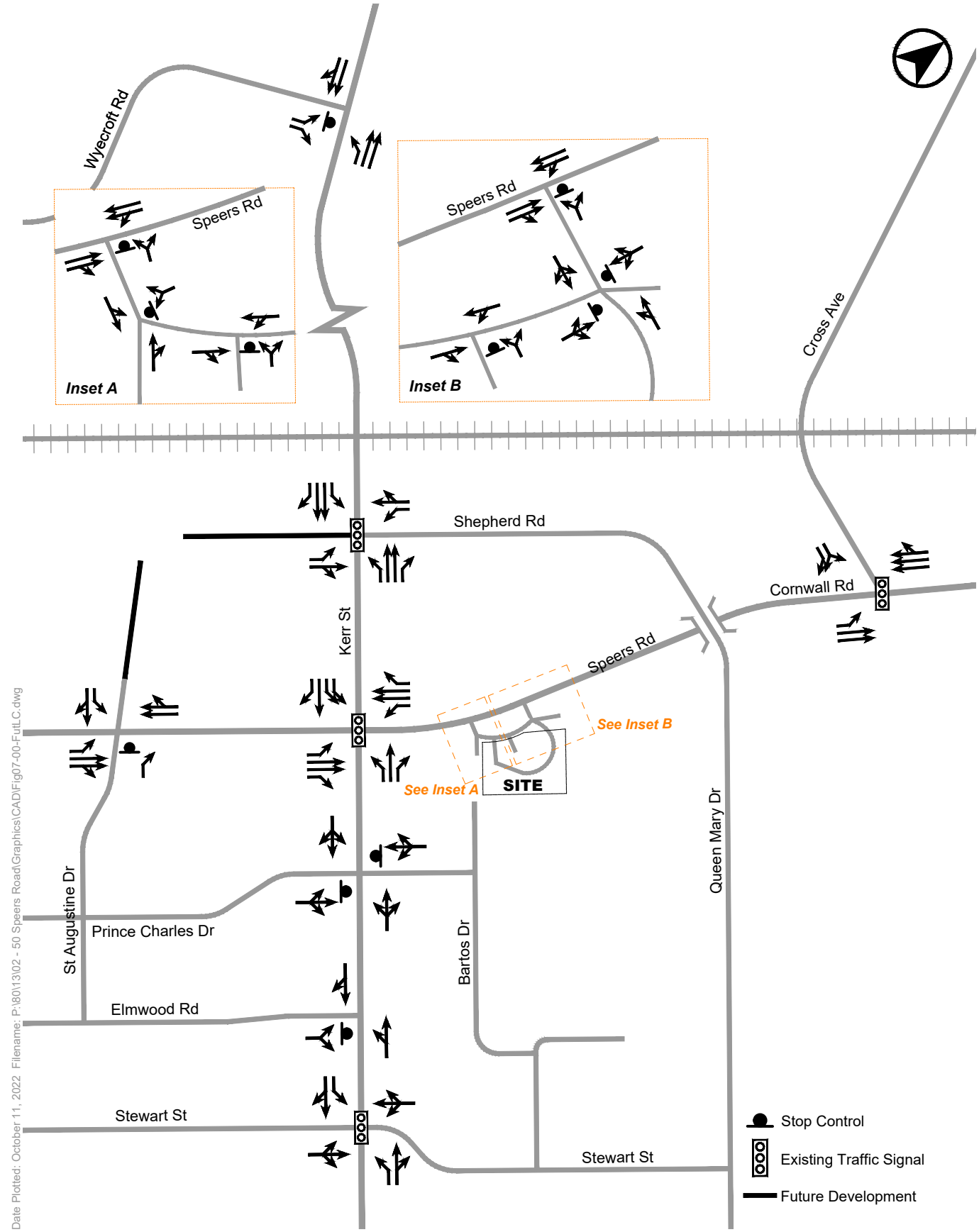


FIGURE 7 FUTURE AREA ROAD LANE CONFIGURATION AND TRAFFIC CONTROL

4.2 AREA TRANSIT NETWORK

4.2.1 Existing Transit Network

The site is currently served by local surface bus routes operated by Oakville Transit. Specifically, the site is currently serviced by 5 regular bus routes which collectively provide local connections to the higher-order GO Transit System. A detailed overview of the existing area transit network is summarized in **Table 3** and illustrated in **Figure 8**.

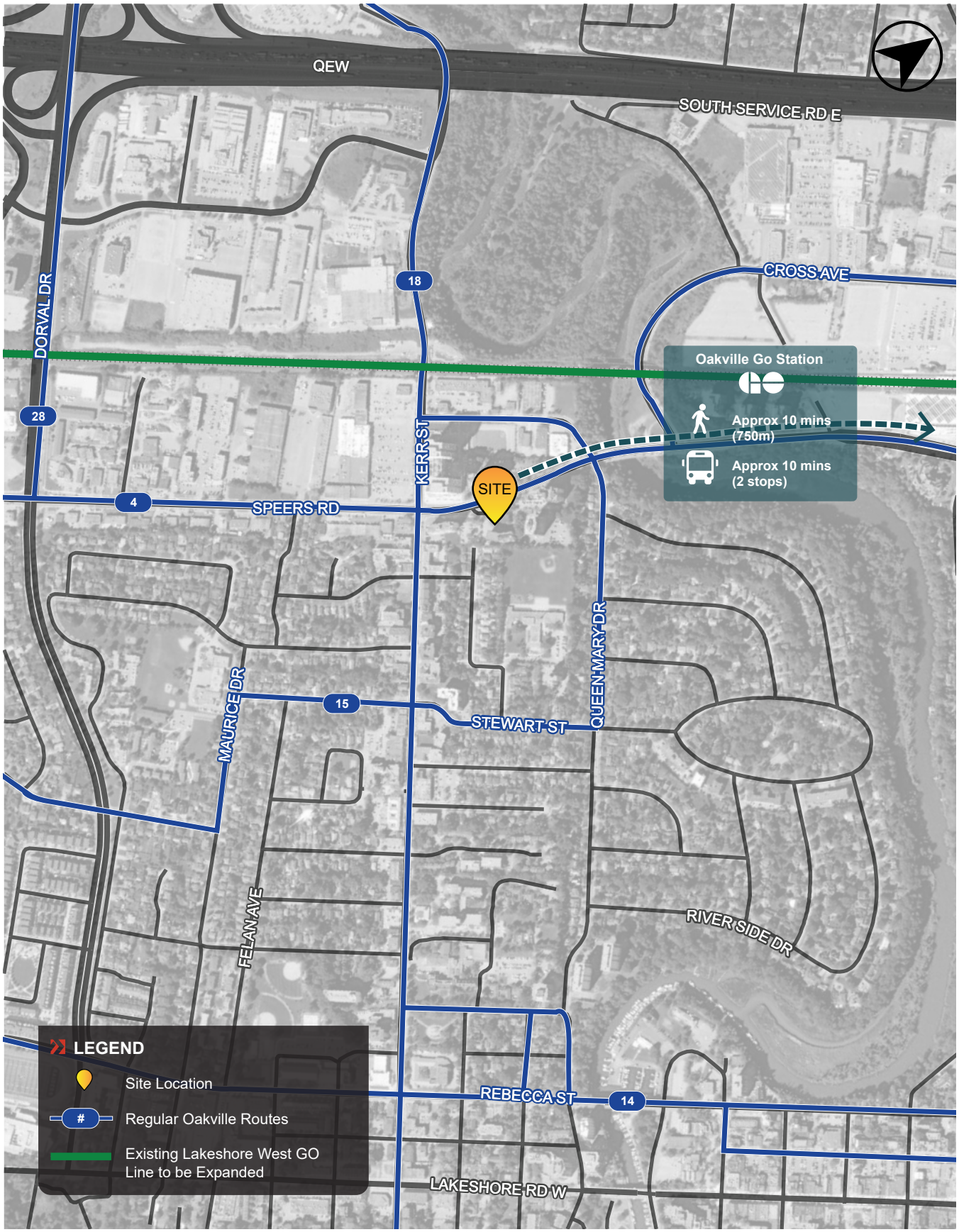
The site is in the enviable position of being at the convergence of 5 Oakville Transit routes that all lead to the Oakville GO Station. There are bus stops directly adjacent to the site on Speers Road (just west of the site and directly across the street on the north side of the road).

For transit trips facilitating commuting to the Oakville GO station, the combined headways of all 5 routes produce effective headways that result in only minutes between routes arriving at the Speers and Kerr intersection. Commuting connections to GO Transit Rail and bus service is centralized at the Oakville GO Station in Mid-town (only 750 metres to the east) for convenient transfers. For transit trips destined to other areas of the Town, the Speers and Kerr junction is an extremely convenient focal point that offers residents, guests/visitors, retail patrons and employees a high degree of accessibility.

In addition to the regular transit service offered by Oakville Transit, an Accessibility Service referred to as Care-A-Van is provided that offers door-to-door service for anyone unable to use conventional transit service. This service has flexible hours and is offered 7 days a week.

TABLE 3 EXISTING AREA TRANSIT NETWORK

Route	Headway (peak periods)	Closest Stop Location	Description
4 Speers - Cornwall	Approx. 30 min.	Speers Road / Kerr Street (adjacent to site)	The 4 Speers - Cornwall bus route generally operates in an east-west direction along Cornwall Road between Bronte GO Station and Clarkson GO Station. **Key stops include:** Bronte GO, Oakville GO and Clarkson GO (Lakeshore West GO Line).
14 & 14A Lakeshore West	Approx. 15 min.	Speers Road / Kerr Street (adjacent to site)	The 14 & 14A Lakeshore West bus route generally operates in an east-west direction, between Appleby GO Station and Oakville GO Station. The 14 Lakeshore West bus runs along Great Lakes Boulevard while the 14A bus runs along Burloak Drive. **Key stops include**: Oakville GO (Lakeshore West GO Line), South Oakville Centre, RioCan Centre, Appleyby GO (Lakeshore West GO Line).
15 Bridge	Approx. 30 min.	Speers Road / Kerr Street (adjacent to site)	The 15 Bridge bus route generally operates in an east-west direction between South Oakville Centre, Bronte Road and Rebecca Street, and Oakville GO Station. **Key stops include:** Oakville GO (Lakeshore West GO Line), and South Oakville Centre.
18 Glen Abbey South	Approx. 30 min.	Speers Road / Kerr Street (adjacent to site)	The 18 Glen Abbey South generally operates in an east-west direction, between Bronte GO Station and Oakville GO Station, along Abbeywood Drive, Pilgrims Way and Kerr Street. **Key stops include:** Bronte GO and Oakville GO (Lakeshore West GO Line)
28 Glen Abbey North	Approx. 30 min.	Speers Road / Kerr Street (adjacent to site)	The 28 Glen Abbey North generally operates in an east-west direction, between Bronte GO Station and Oakville GO Station, along Glenn Abbey Gate and Dorval Drive. **Key stops include:** Bronte GO and Oakville GO (Lakeshore West GO Line)
Oakville GO	-	Trafalgar Road / Cornwall Road (750 m or 10 mins walk)	The site is in the enviable position of being at the convergence of 5 Oakville Transit routes that all lead to the Oakville GO Station. Commuting connections to GO Transit Rail and bus service is centralized at the Oakville GO Station in Mid-town for convenient transfers. **Key Routes include:** Lakeshore West GO Line



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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 8 EXISTING AND FUTURE AREA TRANSIT NETWORK

4.2.2 Planned Transit Network Improvements

Lakeshore West GO Line Service Expansion

The Lakeshore West line is an existing GO Rail line that currently provides two-way, all-day service 7 days a week between Toronto and Aldershot. It also provides weekday rush-hour service from Hamilton to Toronto in the morning and back in the afternoon. Metrolinx has proposed expanded service characteristics to include 15-minute service or better frequencies, both-ways, throughout the day between Toronto and Aldershot, in addition to a 7-day a week, hourly service between Toronto and Hamilton. Oakville Transit will look to expand the hours of service and increase frequency of service to facilitate efficient and reliable connectivity with the rail line.

Trafalgar Road Rapid Transit – BRT

In both Halton Region's and Metrolinx's Transportation Master Plans, Trafalgar Road has been identified as a rapid transit corridor to feature an exclusive BRT service between Midtown Oakville and Highway 407. The idea behind BRT is to provide a dedicated lane for buses, allowing for faster, more reliable and more frequent transit service. The Trafalgar Road BRT will form a critical link for businesses and residents along the Trafalgar corridor. The systems also includes a major connection at the existing Uptown Oakville transit hub, and will provide connections with the future Dundas Street BRT, as well as the future Highway 407 Transitway, and improved GO Rail services.

In a December 2021 Planning and Development meeting, Oakville's Town Council included the Trafalgar Road BRT in its top seven priority projects indicating that the Town of Oakville is working closely with Metrolinx to support this initiative, and will continue to request Halton Region install High Occupancy Vehicle (HOV) lanes on the route until the BRT is built.

Dundas Street Rapid Transit – BRT

Dundas Street is a major east-west corridor in the GHTA, linking Toronto, Mississauga, and Halton Region. A 48 kilometre exclusive BRT service has been proposed on Dundas Street from Highway 6 in the City of Hamilton to Kipling Transit Hub in Toronto. Rapid transit connections will be provided at the Bloor-Danforth Subway in Toronto, the Milton GO Rail line, and the proposed Hurontario LRT in Brampton/Mississauga. Within the Town of Oakville, access to the Dundas Street BRT will be provided along various stops within the Town, as well as a major connection at the Uptown Oakville Transit Hub (Trafalgar Road / Dundas Street – Upper Middle Road intersection).

Oakville Mobility Hub

With the Big Move, Metrolinx established goals to implement Transit Mobility Hubs throughout the GTHA. Metrolinx defines a mobility hub as a place with significant amounts/connections to existing and/or planned transit. Through the Big Move, Midtown Oakville was identified as a major mobility hub which will act as a node for many incoming transit projects.

4.3 AREA CYCLING NETWORK

4.3.1 Existing Cycling Network

In the vicinity of the site there are presently no existing dedicated cycling facilities along either Speers Road or Kerr Street. The nearest cycling infrastructure are cycling lanes along Rebecca Street and Lakeshore Road West, approximately 1.2 kilometers south of the site, multi-use trails on Dorval Drive, approximately 800 metres west of the site, and multi-use trails within Sixteen Mile Creek park, approximately 350 metres east of the site.

These cycling connections provide opportunities for residents and visitors of the site and surrounding area to travel using active forms of transportation.

The existing and future area cycling network is illustrated in **Figure 9**.

4.3.2 Future Area Cycling Network Improvements

In the vicinity of the site, there a number of planned connections and improvements have been identified by the Town of Oakville and have been addressed through the *Oakville Active Transportation Master Plan (ATMP)* (2009), a policy document that outlines proposed cycling infrastructure improvements in Oakville over a twenty-year period implemented in two phases.

A number of cycling infrastructure improvements are planned within the vicinity of the site. On-road cycling lanes are proposed along Speers Road (west of Cross Avenue), Kerr Street (north of Speers Road), Queen Mary Drive and Cross Avenue. On-road signed cycling routes are proposed on Kerr Street (south of Speers Road), Stewart Street, Maurice Drive and Speers Road (east of Cross Avenue). Multi-use trails on Dorval Drive are to be extended. In addition, a potential future grade-separated crossing is proposed at the intersection of Speers Road and Kerr Street.

The existing and future area cycling network is illustrated in **Figure 9**.

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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 9 EXISTING AND FUTURE AREA CYCLING NETWORK

4.4 AREA PEDESTRIAN CONTEXT

The site is located in midtown Oakville and is situated northeast of the intersection of Speers Road and Kerr Street, which affords access to a number of commercial and employment uses within a reasonable walking distance.

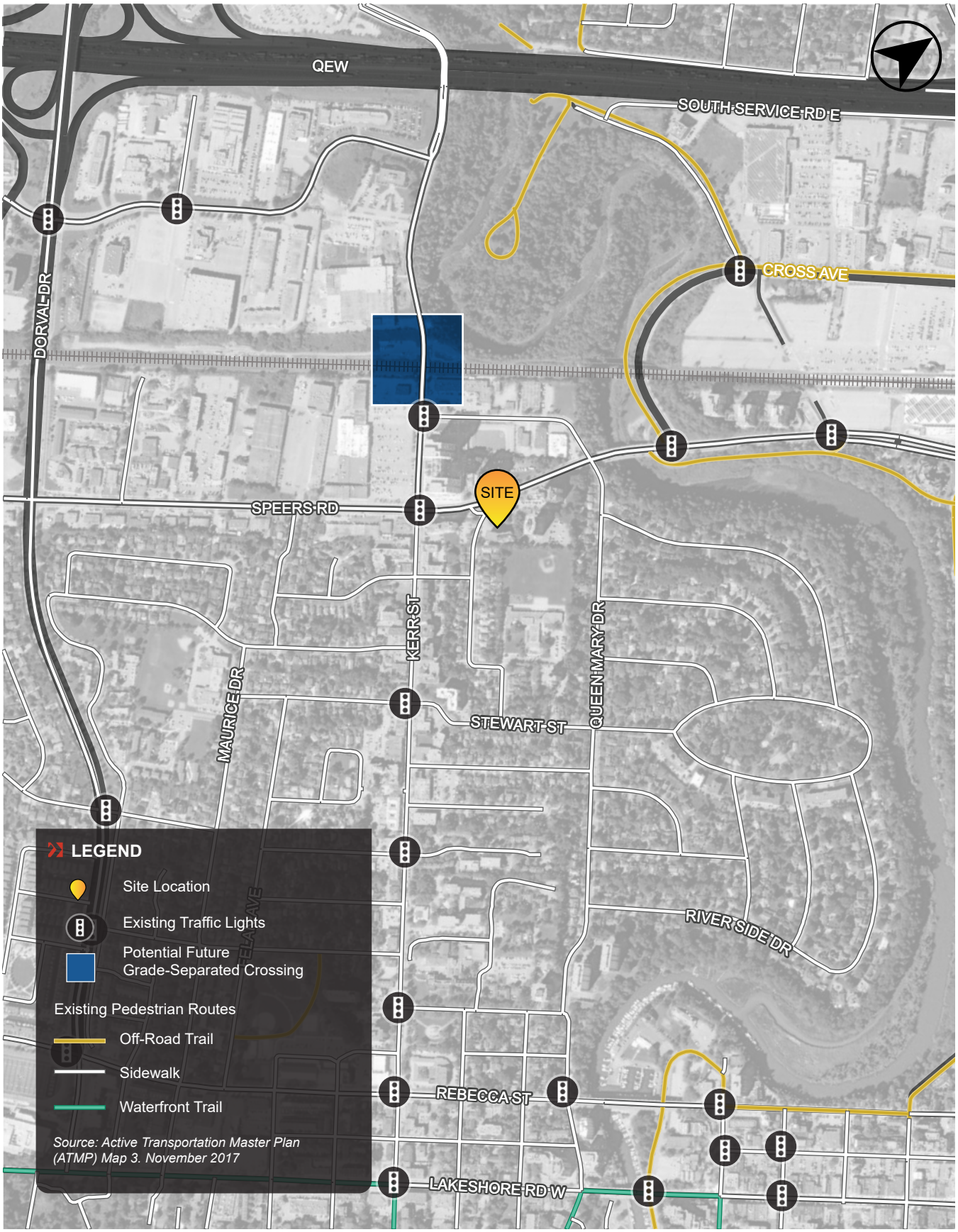
At key locations near the site, there are many opportunities for pedestrians to cross at traffic signals and travel within the wider transportation network. All public streets in the site vicinity (including Speers Road, Kerr Street, Bartos Drive, Shepherd Road, and Prince Charles Drive) have continuous sidewalks on both sides of the roadway.

Pedestrian connectivity between the site and Oakwood Public School will be provided through the property adjacent to the site (80 Speers Road) and the existing connection to the sidewalk along Bartos Drive.
A new walkway on the site will provide connectivity to the existing sidewalk on the east side of Bartos Drive.

Pedestrians can cross Speers Road at the existing pedestrian signal at Kerr Street (approximately 100 metres from the site). Pedestrian crosswalks are provided at all signalized intersections in the site vicinity, as well as at all-way stop controlled intersections.

The site is also located 400 metres (approximately a 6-minute walk) from Sixteen Mile Creek Park providing access to an off-road trail system. In addition, a future grade-separated crossing is proposed at the intersection of Speers Road and Kerr Street.

Figure 10 illustrates the area pedestrian context.



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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 10 EXISTING & FUTURE AREA PEDESTRIAN NETWORK

5.0 VEHICLE PARKING CONSIDERATIONS

5.1 ZONING BY-LAW REQUIREMENTS

The prevailing Zoning By-law for the site for parking supply requirements is the Town of Oakville's Zoning By-law 2014-014.

As shown in **Table 4,** the application of Zoning By-law 2014-014 parking standards to the site results in a total parking requirement of 340 spaces, inclusive of 261 resident spaces and 79 visitor spaces. This results in a total parking supply ratio for the site of 1.08 spaces per unit, with an effective resident rate of 0.83 spaces per unit.

TABLE 4 ZONING BY-LAW 2014-014 - MINIMUM PARKING REQUIREMENTS

Apartment Building	Description	Number of Units	Zoning By-law Minimum Parking Rate (spaces/unit)	Minimum Spaces Required
Residential units with **NFA <75 m²**	Resident	264	0.75[2]	198
	Resident Visitor		0.25	66
		Sub-total	**1.0**	**264**
Residential units with **NFA ≥75 m²**	Resident	50	1.25 [3]	63
	Resident Visitor		0.25	13
		Sub-Total	**1.5**	**76**
Total Resident		**314**	**0.83**	**261**
Total Resident Visitor			**0.25**	**79**
SITE TOTAL		**314**	**1.08**	**340**

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.
2. Assumed that as Zoning 2014-014 requires a total of 1.0 spaces/unit that 0.75 is assigned to residents and 0.25 is assigned to visitors.
3. As per Zoning By-law 2014-014 (Table 5.2.1) "*Of the total number of parking spaces required (1.5 spaces/unit), 0.25 of the parking spaces required per dwelling shall be designated as visitor parking*".
4. As per Zoning By-law 2014-014 (Section 5.1.5), should the calculation of the number of parking spaces required end in a fraction, the "*the minimum number of spaces shall be increased to the next highest whole number if the fraction is greater than 0.25.*"
5. For the purpose of the parking calculations, NFA = GFA.

5.2 PROPOSED PARKING SUPPLY

The proposed parking supply for the site is summarized in **Table 5** and is based on a blended rate of 1.0 spaces per unit, inclusive of resident and visitor parking. The total proposed parking supply includes 314 spaces.

TABLE 5 PROPOSED PARKING SUPPLY

Description	Number of Units	Proposed Minimum Blended Parking Rate (spaces/unit)[2]	Proposed Number of Spaces
Site Total	314	1.0	314

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.
2. Proposed parking rate is inclusive of resident and visitor parking.

5.3 ADEQUACY OF PROPOSED PARKING SUPPLY

5.3.1 Adequacy of Recommended Residential Parking Supply

Residential parking standards outlined in Zoning By-law 2014-014 could be considered to overstate the parking needs of a residential building in an area well served by transit. There is a broad range of parking supply and demand associated with residential buildings across the town of Oakville. Generally, parking demands have been declining over recent years in response to the changing demographics and economic factors.

The following provides an overview of the contextual factors influencing parking demand at residential buildings in the site area.

5.3.1.1 Ontario's Five-Year Climate Change Action Plan

Trends in urban transportation policy are leaning heavily towards reductions in mandatory minimum parking requirements. A reduced minimum parking supply requirement for the project would be in conformance with Ontario's current vision for transit corridors.

Ontario's Five-Year Climate Change Action Plan was announced in June 2016. Some of the key transportation / land-use planning actions outlined in the Plan are as follows:

- **Support cycling and walking**: Commuter cycling networks will be established across Ontario, targeting routes with high-commuting volume such as between residential communities, major transit stations and employment areas. There will be more cycling facilities in urban areas, including grade separated routes and cycling signals. There will be more bike parking at transit stations and provincially owned, publicly accessible facilities. Ontario will revise provincial road and highway

standards to require commuter cycling infrastructure be considered for all road and highway construction projects where it is safe and feasible. Ontario will do the same for major transit corridors.

- **Reduce single-passenger vehicle trips**: Ontario would provide grants to municipalities and large private employers to implement Transportation Demand Management Plans. The plans will be designed to help increase walking, cycling, carpooling, telecommuting, and flex-work schedules, thereby reducing overall fossil fuel consumption, traffic congestion, and transportation emissions.
- **Eliminate minimum parking requirements**: Minimum parking requirements would be eliminated over the next five years for municipal zoning bylaws, especially in transit corridors and other high density, highly walkable communities. Minimum parking requirements are a barrier to creating complete, compact and mixed-use communities. Instead, bylaws will encourage bike lanes, larger sidewalks, and enhanced tree canopies.

As of the submission date of this report, the website for the Action Plan has the following disclaimer at the top of the page: "*This page was published under a previous government and is available for archival and research purposes*."

The idea to eliminate minimum parking requirements in transit accessible areas is not new in North America. Residential developments proposing zero resident parking are being promoted, approved and developed across North America including Toronto, Calgary, Vancouver, Portland and Boston. Some cities are even going as far as to eliminate minimum residential parking requirements altogether (i.e. Edmonton) or in downtown/core areas, including London, Guelph, and Ottawa in Canada, and San Francisco, Oakland, Sacramento, Santa Monica, Portland, Seattle, and Minneapolis in the United States.

Although zero parking has not been requested for the project, this shift away from providing excess residential parking highlights a changing perspective toward automobile ownership, travel, and the cost of living.

5.3.1.2 Transportation Planning Principles

A reduction in parking is consistent with the Town of Oakville's *Livable Oakville Plan* policies which support focused urban growth connected by public transportation systems and reduced auto dependency. A reduced parking supply is also consistent with the Provincial Growth Plan, *A Place to Grow: Growth Plan for the Greater Golden Horseshoe*, and the *Provincial Policy Statement* ("PPS"), which prioritize developments that promote active transportation and in areas with strong connections to transit.

Providing additional parking, over and above the essential minimum needs of a building, encourages automobile ownership, which encourages single occupant automobile commuting / usage. In consideration of the broader overall transportation network, one of the most effective and direct ways to induce changes in travel behaviour and reduce automobile use, is to reduce the amount of vehicle parking provided, particularly in transit accessible and central areas of the town.

While the consideration and implementation of various TDM initiatives has been proposed as a part of the development plan (detailed in **Section 8.0**), these are more effectively implemented in tandem with a limited vehicle parking supply. Providing a limited amount of parking is a direct incentive for residents to use sustainable transportation.

5.3.1.3 Existing and Evolving Transportation Context

The location of the site will afford future residents with numerous options for transportation that will eliminate the need to own a vehicle and park on-site. The complete transportation context is provided in **Section 4.0**.

The site is well-located relative to existing higher order and surface transit routes and is currently serviced by 5 regular bus routes which collectively provide local connections to the higher-order GO Transit System. The nearest bus stops to the site are currently located directly adjacent to the site on the south side of Speers Road and directly across from the site on the north side of Speers Road. The site is also located within approximately 750 metres of Oakville GO Station.

The site's position relative to the above-noted non-automobile transportation infrastructure is highly supportive of the adoption of parking standards that are lower than the prevailing zoning by-law requirements.

Future upgrades in the surrounding transportation network are also supportive of a reduced parking standard, including the Lakeshore West GO RER and Trafalgar BRT. The Lakeshore West GO Line service expansion will provide 15-minute service or better frequencies, both ways throughout the day. Oakville GO Station is approximately 750 metres from the site and Oakville Transit is looking to expand its frequency of service to facilitate efficient and reliable connectivity to the rail line. The Trafalgar bus rapid transit (BRT) will form a critical link for residences along the Trafalgar corridor, allowing for faster and more frequent transit service. The site is approximately 1.0 kilometer west from Trafalgar Road.

5.3.1.4 Recent Residential Condominium Approval Trends

The Town of Oakville has regularly granted permission to establish minimum residential parking standards well below the prevailing by-laws. Such approvals have been provided by the Town as part of the Zoning By-law Amendment process, by the Committee of Adjustment as part of Minor Variance applications, or at the Ontario Municipal Board (OMB) / Local Planning Appeal Tribunal (LPAT). **Table 6** outlines a selection of approvals in the area surrounding the site.

These examples where reduced standards have been adopted are strongly indicative of a level of support and acceptance of parking supply standards that are often substantially lower than the requirements of Zoning By-law 2014-014. Furthermore, the extent and number of new developments that are proceeding with reduced parking standards across the Town is, increasingly, reflective of a situation where the proposed requirements are considered to overstate current parking needs of residential buildings.

From the approvals seen below in **Table 6**, it is clear that the minimum parking rates outlined in the Town of Oakville Zoning By-laws are not absolute. The Town of Oakville has shown flexibility and pragmatism in adapting to the evolving transportation landscape as options became available to residents that were not available at the time when the Zoning By-law was enacted. As more transit options surrounding the site will be available in the future, it is appropriate to approve parking standards that are less than the prevailing by-law.

TABLE 6 AREA APPROVED REDUCED RESIDENTIAL PARKING SUPPLY RATIOS

Address	Major Intersection	Residential Standard Applied	Permission Through
70 Old Mill Road (Block 2)	Cornwall Road / Trafalgar Road	154 dwelling units (condos) 115 residential parking spaces ***Effective res ratio 0.75 spaces / unit***	Site-Specific By-law 2022-047
278 Dundas Street East	Dundas Street / Trafalgar Road	750 dwelling units (condos) 750 residential parking spaces ***Effective res ratio: 1.0 spaces / unit***	Site-Specific By-law 2017-124
2264, 2274 and 2320 Trafalgar Road (Town's Former Public Works Site)	Oak Park Boulevard / Trafalgar Road	1231 dwelling units (condos) 1231 residential parking spaces ***Effective res ratio: 1.0 spaces / unit***	Site-Specific By-law 2021-021
177-185 Cross Avenue and 580 Argus Road	Cross Avenue / Trafalgar Road	720 dwelling units (condos) 828 residential parking spaces ***Effective res ratio: 1.15 spaces / unit***	Site-Specific By-law 2016-038
194-266 Lakeshore Road	Lakeshore Road East / Trafalgar Road	668 dwelling units (retirement / condos) 668 residential parking spaces ***Effective res ratio: 1.0 spaces / unit***	Site Specific By-law 0281-2015 City By-law Exception C4-59
1005 Dundas St / 3033 Eighth Line	Dundas Street East / Eighth Line	380 dwelling units (condos) 399 residential parking spaces ***Effective res ratio: 1.05 spaces / unit***	CoA Decision CAV.147/2021

As listed in **Table 6**, the approved parking supply ratios for residential condominium buildings range from 0.75 spaces per unit to 1.15 spaces per unit.

The recent approval of a Site Specific By-law related to the condominium development at 70 Old Mill Road (highlighted in **Table 6**), provides an excellent comparison for the proposed development at 50 Speers Road. While the 70 Old Mill Road location is closer to the Oakville GO Station, the 50 Speers site is 750 metres (10-minute walk) to the Oakville GO Station and is still within a reasonable walking distance.

As summarized in **Table 7**, the minimum resident parking rate proposed for 50 Speers Road is a blended rate of 1.0 spaces per unit, and is 0.10 spaces/unit higher than the approved minimum parking rate of a total of 0.90 spaces per unit (resident + visitor). The higher minimum parking rate proposed for the 50 Speers Road site is reasonable and considers that the site is a further distance to the Oakville GO Station than 70 Old Mill Road.

TABLE 7 MINIMUM PARKING RATES: 50 SPEERS ROAD VS. 70 OLD MILL ROAD

Location	Minimum Resident Parking Rate (spaces/unit)	Minimum Resident Visitor Parking Rate (spaces/unit)	Total Minimum Parking Rate (spaces/unit)
50 Speers Road	1.0[1]		**1.0**
70 Old Mill Road	0.75[2]	0.15[2]	**0.90**

Notes:
1. Proposed parking rate for 50 Speers Road is a blended rate, inclusive of resident and visitor parking
2. Approved parking rates through Site-Specific By-law 2022-047

Recent Residential Approval Trends in the Vicinity of Higher-Order Transit

The site is in the ideal position of being at the convergence of five Oakville Transit routes that all lead to the Oakville GO Station. As discussed in **Section 3.3.1.3** the site is well-located relative to existing higher order and surface transit routes, which will afford future residents with alternative options for transportation which will reduce the need to own a vehicle and park on-site. As more transit options surrounding the site will be available in the future, it is appropriate to consider parking standards that are less than the prevailing Zoning By-law.

A selection of recent residential approvals with similar transit connections to the site are outlined in **Table 8**. These approvals show the growing trend of reduced parking supply as a result to well-served surface transit and higher-order transit routes such as GO Rail or subway. The site is approximately 750 metres or a 10-minute walk from Oakville GO station. The selected sites outlined in **Table 8** include a range of 600 meters (7-minute walk) to 1.8 kilometers (23-minute walk) from a major transit station.

TABLE 8 APPROVED REDUCED RESIDENTIAL PARKING SUPPLY RATIOS WITH SIMILAR TRANSIT CONNECTIONS

Address	Nearest Transit Station (Distance)	Residential Standard Applied	Permission Through
81 Robinson Street	Hamilton GO Centre Station (600m / 7min walk)	283 dwelling units (condos) 226 residential parking spaces *Effective res ratio 0.8 spaces / unit*	City of Hamilton Site-Specific By-law 14-118
43-51 King Street East & 60 King William Street	Hamilton GO Centre Station (600m / 7min walk)	525 dwelling units (condos) 393 residential parking spaces[1] *Effective res ratio 0.74 spaces / unit*	City of Hamilton Site-Specific By-law 18-011
5365 Dundas Street West (Phase 2 & Phase 3)	Kipling GO Station (600m / 7min walk)	1234 dwelling units (condos) 987 residential parking spaces *Effective res ratio: 0.8 spaces / unit*	City of Toronto Site Specific By-law 1268-2018
3939-3947 Lawrence Avenue East	Guildwood GO Station (1.8km / 23min walk)	337 dwelling units (rental) 303 residential parking spaces *Effective res ratio: 0.9 spaces / unit*	City of Toronto CoA Decision - A0105/17SC (2017)
24-64 Elm Drive	Cooksville GO Station (1.4km / 18min walk)	1284 dwelling units (condos) 1219 residential parking spaces *Effective res ratio: 0.95 spaces / unit*	City of Mississauga Site-Specific By-law 0154-2016 City By-law Exception RA5-46
3560, 3580, 3600 Lake Shore Boulevard West	Long Branch GO Station (1.2km / 16min walk)	530 dwelling units (condos) 477 residential parking spaces *Effective res ratio: 0.9 spaces / unit*	City of Toronto Site Specific By-law 1723-2013
3560 St. Clair Avenue East	Scarborough GO Station (750m / 9min walk)	96 dwelling units (condos) 86 residential parking spaces *Effective res ratio: 0.9 spaces / unit*	City of Toronto Site Specific By-law 1671-2013
2035 Kennedy Road	Agincourt GO Station (1.5km / 19min walk)	1044 dwelling units (condos) 939 residential parking spaces *Effective res ratio: 0.9 spaces / unit*	City of Toronto Site Specific By-law 1092-2019(LPAT)

Notes:
1. Residential parking 0.74 spaces per dwelling unit, except where a dwelling unit is 50 square metres in gross floor area or less, in which case, parking shall be provided at a rate of 0.3 spaces per dwelling unit.

As listed in **Table 8**, the approved parking supply ratios for residential condominium buildings range from 0.74 spaces per unit to 0.90 spaces per unit.

5.3.1.5 Proxy Site Observed Parking Demand

In order to assess the residential parking demand at other similar buildings in the area, BA Group conducted evening and overnight resident parking surveys at serval residential locations within the Town of Oakville.

Parking demand surveys were conducted at 2379 Central Park Drive, 216 Oak Park, White Oaks Apartments (1297 Marlborough Court & 1360 White Oaks Boulevard), and 1229 Malborough Court, between October 9th, 2013, and October 28th, 2019 as a means to understand demand, given the evolving transit context and shift towards more urban conditions of the site.

TABLE 9 RESIDENTIAL PARKING DEMAND STUDIES - PROXIES

Address (Major Intersection)	Study Date	Peak Hour	Site Description	Resident Parking	
				Demand (spaces)	Ratio (spaces/unit)
2379 Central Park Dr[1] (Dundas St E / Sixth Line)	Tues, Nov. 27, 2018	6:00 a.m.	301 Units / 344 Parking Spaces (condominium)	244	0.81
	Sat, Dec. 1, 2018	6:00 a.m.		240	0.80
	Sun, Dec. 2, 2018	6:00 a.m.		249	0.83
1297 Marlborough Crt & 1360 White Oaks Blvd[2] (Trafalgar Rd / Upper Middle Rd E)	Fri, Oct. 25, 2019	3:00 a.m.	263 Units / 343 Parking Spaces (apartments)	181	0.69
	Fri, Oct. 25, 2019	9:00 p.m.		130	0.49
	Sat, Oct. 26, 2019	3:00 a.m.		180	0.68
	Sat, Oct. 26, 2019	9:00 p.m.		147	0.56
	Mon, Oct. 28, 2019	9:00 p.m.		121	0.46
1229 Malborough Crt[3] (Trafalgar Rd / Queen Elizabeth Way)	Wed, Oct. 9, 2013	3:00 a.m.	227 Units / 329 Parking Spaces (apartments)	161	0.71
	Thurs, Oct. 10, 2013	3:00 a.m.		155	0.68

Notes:
1. The surveys were undertaken from 6:00 a.m. to 5:30 p.m. with 30 minute interval counts.
2. The surveys were undertaken from 2:00 p.m. to 9:00 p.m. with 30 minute interval counts, and 3:00 a.m. spot counts.
3. The surveys were undertaken at 3:00 a.m. (spot counts).

The observed overall resident parking demand at the proxy sites are in the range of 0.46 – 0.83 spaces per unit.

5.3.1.6 Residential Parking Assessment Summary

In summary, the proposed resident parking supply ratio is considered to be appropriate based upon the following:

- Aligns with the effective minimum resident parking requirements of Zoning By-law 2014-014;
- Ontario's Five-Year Climate Change Action Plan;
- Transportation planning principles;
- The evolving transportation context;
- Recent reduced residential parking supply ratio approvals for buildings in the surrounding area and with similar transit connections;
- Proxy sites observed parking demands; and,
- Residential parking sales data.

A summary of the observed / recorded ranges outlined within this section are provided in **Table 10.**

TABLE 10 SUMMARY OF RESIDENT PARKING RATIOS

	Resident Parking (spaces/unit)
Resident parking reduction approvals (in area of site)	0.75 – 1.15
Resident parking reduction approvals (with similar transit context)[1]	0.74 - 0.90
Resident parking demand proxy studies (Oakville)	0.46 – 0.83

Notes:
1. Includes Hamilton and the Greater Toronto Area (GTA)

5.3.2 Adequacy of Recommended Visitor Parking Supply

As outlined in the review of the proposed residential parking supply, the availability of existing and future travel alternatives available within the vicinity of the site, reduces the need for residents and visitors of the site to use a car on a day-to-day basis. As such, the visitor parking standards in Zoning By-law 2014-014 could also be considered to overstate the parking needs of the site.

In addition to the future transportation context of the site previously outlined, adoption of reduced residential visitor parking rates should be considered based upon the following considerations:

- Recent reduced visitor parking supply ratio approvals;
- Proxy sites observed visitor parking demands; and
- Proposed TDM measures for the site.

5.3.2.1 Visitor Parking Assessment

It is proposed to provide a blended parking rate of 1.0 spaces per unit, inclusive of resident and visitor parking.

As with resident parking, visitor parking standards in areas with high levels of transit accessibility, such as the site, have been approved at rates below the Zoning By-law 2014 standards, setting a new precedent. Such approvals have been secured through municipal councils, the former Ontario Municipal Board, the Local Planning Appeal Tribunal (LPAT), and the Committee of Adjustment (CoA).

A selection of examples of such condominium buildings where reduced overall visitor parking supplies have been approved by the municipality, or other processes, in other transit accessible areas, is provided in **Table 11** and **Table 12**. The examples are from residential condominiums in Oakville and developments with a similar transportation context as the site.

TABLE 11 AREA APPROVED REDUCED VISITOR PARKING SUPPLY RATIOS

Address	Major Intersection	Visitor Parking Ratio Applied	Permission Through
70 Old Mill Road (Block 2)	Cornwall Road / Trafalgar Road	0.15 spaces per unit	Site-Specific By-law 2022-047
2264, 2274 and 2320 Trafalgar Road (Town's Former Public Works Site)	Oak Park Boulevard / Trafalgar Road	0.15 spaces per unit	Site-Specific By-law 2021-021
194-266 Lakeshore Road	Lakeshore Road East / Trafalgar Road	0.19 spaces per unit	Site Specific By-law 0281-2015 Town By-law Exception C4-59
1005 Dundas St / 3033 Eighth Line	Dundas Street East / Eighth Line	0.12 spaces per unit	CoA Decision CAV.147/2021

TABLE 12 APPROVED REDUCED VISITOR PARKING SUPPLY RATIOS WITH SIMILAR TRANSIT CONNECTIONS

Address	Nearest Transit Station (Distance)	Visitor Parking Ratio Applied	Permission Through
81 Robinson Street	Hamilton GO Centre Station (600m / 7min walk)	0.13 spaces per unit	City of Hamilton Site-Specific By-law 14-118
5365 Dundas Street West (Phase 2 & Phase 3)	Kipling GO Station (600m / 7min walk)	0.10 spaces per unit[1]	City of Toronto Site Specific By-law 1268-2018
24-64 Elm Drive	Cooksville GO Station (1.4km / 18min walk)	0.15 spaces per unit	City of Mississauga Site-Specific By-law 0154-2016 City By-law Exception RA5-46
3560, 3580, 3600 Lake Shore Boulevard West	Long Branch GO Station (1.2km / 16min walk)	0.15 spaces per unit	City of Toronto Site Specific By-law 1723-2013
3560 St. Clair Avenue East	Scarborough GO Station (750m / 9min walk)	0.15 spaces per unit	City of Toronto Site Specific By-law 1671-2013
2035 Kennedy Road	Agincourt GO Station (1.5km / 19min walk)	0.17 spaces per unit	City of Toronto Site Specific By-law 1092-2019(LPAT)

Notes:
1. Provided residential parking is inclusive of visitor parking.
2. Parking ratio was provided in LPAT approved plans dated June 11, 2019.

The approved visitor parking supply ratios outlined in **Table 11** and **Table 12** range from 0.10 spaces per unit to 0.19 spaces per unit.

5.3.2.2 Proxy Site Observed Visitor Parking Demand

In order to assess the visitor parking demand at other similar buildings in the area, BA Group conducted evening and overnight visitor parking surveys at serval residential locations within the Town of Oakville.

Parking demand surveys were conducted at 2379 Central Park Drive, 216 Oak Park, White Oaks Apartments (1297 Marlborough Court & 1360 White Oaks Boulevard), and 1229 Malborough Court, between October 9th, 2013, and October 28th, 2019 as a means to understand demand, given the evolving transit context and shift towards more urban conditions of the site.

TABLE 13 VISITOR PARKING DEMAND STUDIES - PROXIES

Address (Major Intersection)	Study Date	Peak Hour	Site Description	Visitor Parking	
				Demand (spaces)	Ratio (spaces / unit)
2379 Central Park Dr[1] (Dundas St E / Sixth Line)	Tues, Nov. 27, 2018	6:00 a.m.	301 Units / 68 Visitor Parking Spaces	20	0.07
	Sat, Dec. 1, 2018	6:00 a.m.		31	0.10
	Sun, Dec. 2, 2018	6:00 a.m.		30	0.10
216 Oak Park[2] (Trafalgar Rd / Glenashton Dr)	Tues, Nov. 27, 2018	5:30 p.m.	213 Units / 38 Visitor Parking Spaces	30	0.14
	Sat, Dec. 1, 2018	1:30 .m.		29	0.14
	Sun, Dec. 2, 2018	2:30 p.m.		29	0.14
1297 Marlborough Crt & 1360 White Oaks Blvd[3] (Trafalgar Rd / Upper Middle Rd E)	Fri, Oct. 25, 2019	3:00 a.m.	263 Units / 56 Visitor Parking Spaces	35	0.13
	Fri, Oct. 25, 2019	9:00 p.m.		42	**0.16**
	Sat, Oct. 26, 2019	3:00 a.m.		34	0.13
	Sat, Oct. 26, 2019	9:00 p.m.		33	0.13
	Mon, Oct. 28, 2019	9:00 p.m.		35	0.13
1229 Malborough Crt[4] (Trafalgar Rd / Queen Elizabeth Way)	Wed, Oct. 9, 2013	3:00 a.m.	227 Units / 329 Parking Spaces	7	**0.03**
	Thurs, Oct. 10, 2013	3:00 a.m.		9	0.04

Notes:
1. The surveys were undertaken from 6:00 a.m. to 5:30 p.m. with 30 minute interval counts.
2. Visitor parking spaces surveyed were undertaken from 6:00 a.m. to 5:30 p.m. with 30 minute interval counts.
3. The surveys were undertaken from 2:00 p.m. to 9:00 p.m. with 30 minute interval counts, and 3:00 a.m. spot counts.
4. The surveys were undertaken at 3:00 a.m. (spot counts).

Table 13 outlines that the overall visitor parking demand at the proxy sites are in the range of 0.03 and 0.16 spaces per unit.

A summary of the observed / recorded ranges outlined within this section are provided in **Table 14.**

TABLE 14 SUMMARY OF VISITOR PARKING RATIOS

	Resident Visitor Parking (spaces/unit)
Visitor parking reduction approvals (in area of site)	0.12 – 0.15
Visitor parking reduction approvals (with similar transit context)[1]	0.10 – 0.17
Visitor parking demand proxy studies (Oakville)	0.03 - 0.16

Notes:
1. Includes Hamilton and the Greater Toronto Area (GTA)

The availability of existing and future travel alternatives within the vicinity of the site, including excellent transit service, reduces the need for visitors of the site to use a car, hence the parking demand is reduced.

5.3.3 Existing Site - Observed Parking Demand

Parking demand data received from rent roll information (March 2022) for the existing residential building on the site is summarized in **Table 15**.

The observed overall residential and visitor parking demand at the existing site is 1.08 spaces per unit. The proposed blended parking rate of 1.0 spaces per unit, inclusive of resident and visitor parking, is slightly below the observed range. However with the evolving and future connectivity anticipated in the area, given the planned improvements and the proposed TDM measures outlined in **Section 6.0**, the proposed blended rate of 1.0 spaces per unit will appropriately accommodate the needs of the site.

TABLE 15 EXISTING RESIDENTIAL BUILDING PARKING DEMAND (RENT ROLL DATA)

Site Address	Rent Roll Date	Number of Units	Parking Supply		Parking Demand	
			Spaces	Ratio (spaces/unit)	Spaces	Ratio (spaces/unit)
50 Speers Road	March 2022	59	67	1.14	64	**1.08**

5.4 PROPOSED PARKING STRATEGY

The proposed parking strategy for the site recommends a blended parking rate of a minimum of 1.0 spaces per unit, inclusive of resident and visitor parking, and is appropriate for the following reasons:

- In consideration that the tenure of the building is purpose-built rental apartments, a blended parking rate of a minimum of 1.0 spaces per unit, inclusive of resident and visitor parking, will accommodate the combined resident and visitor parking demands and will provide flexibility for the rental operator to manage parking demands as required;
- It is noted that 84% of the proposed rental units are small units (less than 75 m^2). The minimum parking requirement of Zoning By-law 2014-014 for units less than 75 m^2, is a blended rate of 1.0 spaces per unit, inclusive of resident and visitor parking. The proposed minimum resident parking rate for the site largely aligns with the minimum requirements of Zoning By-law 2014-014;
- The proposed blended parking rate is consistent with other approvals in the Town. For example, a Site-Specific Zoning By-law 2017-124 was approved for a condominium at 278 Dundas Street East, with a blended minimum parking rate of 1.0 spaces per unit, inclusive of resident and visitor parking;
- The availability of excellent transit service in the area, including the proximity of the Oakville GO Station (750 metres away from the site) and adjacent local bus routes, support the proposed parking rates for the site, through the provision of convenient and sustainable travel options;
- The proposed blended parking rate is well within the range of the observed / recorded for parking reduction approvals, when the ranges of both resident and visitor parking are considered, and suggest that the proposed blended parking rate is reasonable;
- Recent reduced parking supply ratio approvals for buildings in the surrounding area and with similar transit connections, suggest that the proposed blended parking rate is reasonable;
- The site is well-situated close to various land uses that support shorter travel distances that are easily made by walking, cycling or transit, as opposed to the private automobile.
- Proposed Transportation Demand Management Plan for the site that includes a separate fee for parking, provision of a bicycle repair station and bicycle parking supply that meets the Zoning By-law requirements and provision of on-site communication / information to generate awareness of sustainable modes of travel in the site vicinity;
- Ontario's Five-Year Climate Change Action Plan; and
- Transportation planning principles.

As shown in **Table 16,** when the range of parking reduction approvals and parking demand studies previously discussed, are summarized as a range of blended rates, inclusive of resident and visitor parking, the proposed blended rate for the site of 1.0 spaces per unit is well within the ranges.

TABLE 16 SUMMARY OF PARKING RATIOS

	Resident Parking (spaces/unit)	Resident Visitor Parking (spaces/unit)	Blended Range (spaces/unit)
Parking reduction approvals (in area of site)	0.75 – 1.15	0.12 – 0.15	**0.87 – 1.3**
Parking reduction approvals (with similar transit context)[1]	0.74 - 0.90	0.10 – 0.17	**0.84 – 1.07**
Parking demand proxy studies (Oakville)	0.46 – 0.83	0.03 - 0.16	**0.49 – 0.99**

Notes:
1. Includes Hamilton and the Greater Toronto Area (GTA)

Based on the foregoing, the proposed parking supply of a blended rate of a minimum of 1.0 spaces per unit, inclusive of resident and visitor parking, is appropriate and will accommodate the needs of the site.

5.5 SUMMARY OF PROPOSED PARKING SUPPLY

The proposed parking supply for the site is summarized in **Table 17** and is based on a blended rate of 1.0 spaces per unit, inclusive of resident and visitor parking. The total proposed parking supply includes 314 spaces.

TABLE 17 PROPOSED PARKING SUPPLY

Description	Number of Units	Proposed Minimum Blended Parking Rate (spaces/unit)[2]	Proposed Number of Spaces
Site Total	314	1.0	314

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.
2. Proposed parking rate is inclusive of resident and visitor parking.

The proposed parking supply will meet the practical requirements of the site and will promote the use of non-auto modes of travel.

Accessible Parking

The Town of Oakville Zoning By-law 2014-014 requires that accessible spaces be provided for non-resident visitor uses at a minimum rate of 4% of the total number of visitor parking spaces, for a visitor parking supply within the range of 26 to 100 spaces.

Furthermore, the By-law states that where there are an even number of total accessible parking spaces, an equal number of Type 'A' and Type 'B' spaces must be provided. The two types of spaces must adhere to the following dimensions:

- Type A space: 5.7 metres (length) x 3.65 metres (width)
- Type B space: 5.7 metres (length) x 2.7 metres (width)

Both types must include a 1.5-metre pedestrian aisle adjacent to the accessible space.

As a blended parking rate of 1.0 spaces per unit is being proposed, inclusive of resident and visitor parking, for the purpose of the accessible parking requirement calculation only, it is assumed that a conservative number of 47 spaces would be provided for visitors. As summarized in **Table 18,** the Zoning By-law would require a minimum of 2 accessible parking spaces for non- residents.

TABLE 18 ZONING BY-LAW 2014-014: ACCESSIBLE PARKING REQUIREMENTS

Non-residential Parking Supply	Range	Minimum Rate	Minimum Requirement	Type Allocation
47 spaces[3]	26 - 100 spaces	4% of total visitor parking supply	2 spaces	1 Type A 1 Type B

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.
2. Accessible parking rates as per Town of Oakville Zoning By-law 2014-014 Table 5.3.1 & Table 5.3.2
3. Assumed 47 spaces only for the accessible parking requirement.

The development plans illustrates a total of 3 accessible parking spaces, which exceeds the minimum requirements. The proposed accessible parking supply complies with the Zoning By-law dimensional requirements. Furthermore, accessible parking spaces are proposed to be provided within the below-grade parking facilities and will be located in proximity to the elevator cores.

The proposed accessible parking supply meets the requirements of Zoning By-law 2014-014 requirements and will meet the practical needs of the site.

6.0 BICYCLE PARKING CONSIDERATIONS

6.1 ZONING BY-LAW REQUIREMENTS

The site is subject to the minimum bicycle parking requirements of the Town of Oakville Zoning By-law 2014-014. Application of the minimum bicycle parking requirements based on this Zoning By-law is summarized in **Table 19**.

A total of 314 bicycle parking spaces are required, including 236 spaces located in secure, weather-protected areas for long-term use and 78 spaces located in convenient accessible locations for short-term use.

TABLE 19 ZONING BY-LAW 2014-014 - MINIMUM BICYCLE PARKING REQUIREMENTS

Use	Number of dwelling units	Minimum Parking Rate (spaces/unit)		Minimum # of Bicycle Parking Spaces Required	
Apartment Building	314	Resident	0.75	Long-term	236
		Visitor	0.25	Short-term	78
		Total	**1.0**	**--**	**314**

Notes:
1. Site statistics based on site plans prepared by BDP Quadrangle Architects dated October 10, 2022.
2. As per Zoning By-law 2014-014 (Table 5.4.1) "*Of the total number of bicycle parking spaces required (1.0 spaces/unit), 0.25 of the bicycle parking spaces required per dwelling shall be designated as visitors bicycle parking*".
3. As per Zoning By-law 2014-014 (Section 5.1.5), should the calculation of the number of parking spaces required end in a fraction, the "*the minimum number of spaces shall be increased to the next highest whole number if the fraction is greater than 0.25.*"

6.2 PROPOSED BICYCLE PARKING SUPPLY

The current architectural drawings for the includes 78 short-term spaces and 236 long-term spaces for a total of 314 spaces. The 78 short-term spaces will be provided in a publicly accessible location and the 236 long-term spaces will be provided in the below-grade parking facility. The proposed bicycle parking supply meets the requirements of Zoning By-law 2014-014.

The location of the bicycle parking areas is illustrated in the site plan included in **Appendix B.**

7.0 LOADING CONSIDERATIONS

7.1 ZONING BY-LAW REQUIREMENTS

The Town's Zoning By-law 2014-014, does not include a requirement for a minimum number of loading spaces.

The By-law (Section 5.6) does however require the following:

- The minimum dimensions of a loading space are: 3.5 m width, 12.0 m length and 4.2 m vertical clearance
- A loading space shall abut the building for which the loading space is provided
- A loading space shall be set back 7.5 m from any Residential Zone, except if entirely within a structure.

7.2 PROPOSED LOADING FACILITIES

The proposed loading facilities are located on the ground floor of the building and are accessed from the driveway on the west limits of the site. A total of 1 loading space is proposed for the site to accommodate the servicing needs of the proposed residential development.

The proposed loading facilities have been designed to accommodate the in/out manoeuvring of the loading space for a Halton Region front loading refuse truck and a single unit (SU) truck (which will undertake both residential moving operations and deliveries to the proposed building). The proposed loading facilities incorporate adequate turnaround area to ensure that refuse collection vehicles can enter/exit the site in a forward motion. Vehicle Manoeuvring Diagrams illustrating the turning movement requirements of these vehicles entering and exiting the site, as well as manoeuvring in and out of the proposed loading space are included in **Appendix C.**

The loading facilities, turnaround area and access to the proposed loading facilities, are designed to accommodate a minimum unencumbered height clearance of 4.4 metres throughout the entire area, with the exception that a minimum height clearance of 7.5 metres is maintained throughout the entire collection point (including the loading and staging area), satisfying the minimum requirements of the Halton Region Waste Collection Standards. A minimum height clearance of 7.5 metres is provided above the entire length of the loading space to enable compacted bulk lift bin collection.

For the above-noted reasons, the proposed loading facilities are appropriate will meet the practical needs of the site.

8.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

8.1 TDM OBJECTIVES

The Transportation Demand Management (TDM) Plan strives to reduce automobile use through an on-going strategy that supports and promotes the use of non-auto transportation modes.

The key objective of the TDM Plan is to reduce peak hour single occupant automobile traffic by focusing on four specific policy areas:

1. Encourage the use of alternate travel modes (transit, cycling, walking);
2. Increase vehicle occupancy;
3. Shift travel to off-peak periods; and
4. Reduce vehicle kilometres travelled.

The physical infrastructure components or TDM measures outlined in this Plan (i.e. bicycle parking spaces) will be incorporated into the development design. The implementation of these elements and the associated costs will be the responsibility of the developer. The operational measures of the TDM plan (i.e. travel mode choice information packages) will be implemented by the developer.

8.2 PROPOSED TDM STRATEGIES

The existing and future area context provides for excellent public transit service as well as travel by active transportation. Proposed TDM strategies, including a reduced parking supply with “unbundled” parking, active transportation facilities and travel mode information packages, have been developed to further support the use of non-auto modes of travel.

8.2.1 Reduced Parking Supply

As discussed in Section **5.0,** when compared to the minimum requirements of Zoning By-law 2014-014, a reduced parking supply of 314 spaces is being proposed for the site. As shown in **Table 20,** this results in a parking supply decrease of 8%.

TABLE 20 SUMMARY OF PARKING SUPPLY AND REQUIREMENTS

Land Use	Minimum Requirement Zoning By-law 2014-014 (spaces)	Proposed Parking Supply (spaces)
Resident	261	267
Resident Visitor	79	47
Site Total	**340**	**314**
Reduction compared to Zoning By-law 2014-014		***-8%***

8.2.2 Summary of Proposed TDM Strategies

Proposed TDM measures for the site are summarized in **Table 21**. The measures being proposed for the site are supportive of alternative transportation modes.

TABLE 21 TDM STRATEGIES

Measure	Description	Cost Estimate	Implementation Strategy
Physical Measures			
Pedestrian Facilities	Provide walkway connection from the new building to the adjacent property & formalize the connection on the west side of the building to provide connectivity to the existing sidewalk on Bartos Drive.	Integrated into overall development cost.	Construct as part of development.
Bicycle Parking	Long and short-term bicycle parking spaces to be provided in accordance Zoning By-law 2014-014.	Integrated into overall development cost.	Construct as part of development.
Bicycle Repair Station	Provide bicycle repair stations in long-term bicycle parking area(s).	Integrated into overall development cost.	Construct as part of development.
Vehicle Parking	Proposed reduced parking supply of 314 spaces is 8% less than the Zoning By-law 2014-014 requirement of 340 spaces.	Integrated into overall development cost.	Construct as part of development.
Operational Measures			
Travel Mode Information Packages	Implement programs to inform new residents of available travel mode choices and existing mobile apps providing transit information.	To be determined.	Travel mode information packages will be distributed at the rental office.
Unbundled Parking	Parking spaces to be unbundled from rent	n/a	Charge a separate fee for parking

9.0 TRAVEL DEMAND FORECASTS

9.1 EXISTING TRAFFIC VOLUMES

Traffic counts were conducted in November 2021 at all the intersections being assessed within the study area. These volumes have been adjusted and balanced where necessary in order to account for pre-pandemic traffic conditions on the major corridors. The balanced 2021 turning movement counts have been used as a baseline for existing traffic volumes at the intersections considered for this study. The intersections and sources of survey data used are summarized below in **Table 22**. Existing traffic volumes are illustrated in **Figure 11**.

TABLE 22 EXISTING TRAFFIC COUNT SUMMARY

Intersection	Control Type	Date of Count	Source
Kerr Street / Speers Road	Signalized	Wednesday, Nov 24th, 2021	Spectrum Traffic Data Inc.
Speers Road / Cross Avenue			
Kerr Street / Sheppard Road			
Kerr Street / Stewart Street			
Kerr Street / Wyecroft Road	Unsignalized		
Prince Charles Drive / Kerr Street			
Elmwood Road / Kerr Street			
Speers Road / St. Augustine Drive			
Speers Road / Speers Service Road (West Access)			
Speers Road / Speers Service Road (East Access)			
Speers Service Road / 80 Speers Site Access			
Speers Service Road / 50 Speers PUDO			
Speers Service Road / Underground Access			
Speers Service Road / PUDO exit / Site Access			

Detailed existing turning movement count for all the intersections are shown in **Appendix D**.

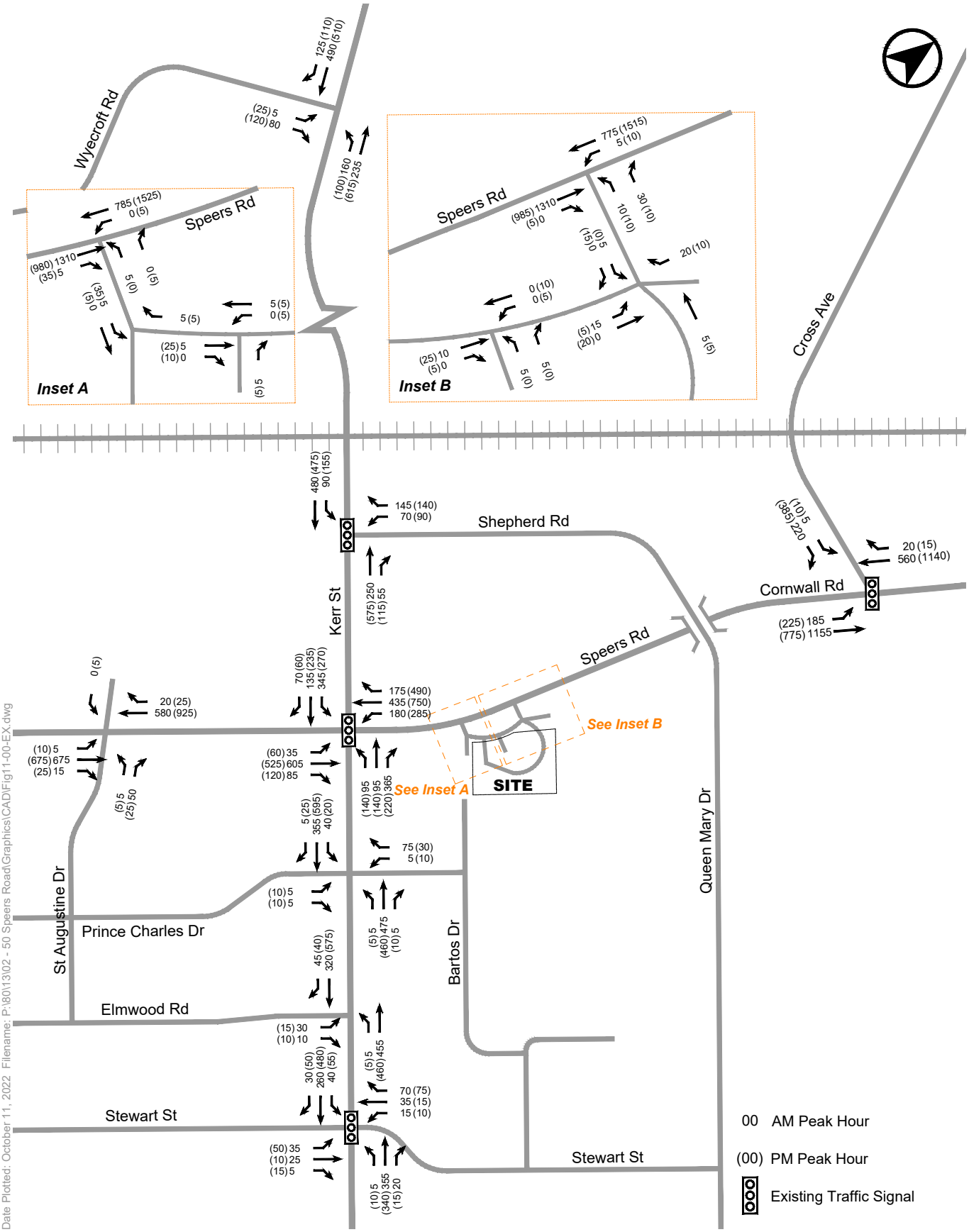


FIGURE 11 EXISTING TRAFFIC VOLUMES

9.2 HORIZON YEARS

The traffic analysis was undertaken for the following horizon years;

- Existing conditions (2022);
- Future background conditions (2026) – with corridor growth and area background development traffic;
- Future total conditions (2026) – at build-out of site and inclusive of site generated traffic;
- Future total conditions (2031) – 5 years beyond build-out with site-generated traffic.

The traffic analysis was completed for a typical weekday for both the morning and afternoon peak periods.

9.3 BACKGROUND TRAFFIC VOLUMES

Traffic growth in the site vicinity has been considered based upon an evaluation of traffic volume changes related to:

- general corridor growth on the area arterial roads (i.e. Speers Road and Kerr Street); and
- specific area development traffic (i.e. background development traffic);

9.3.1 Corridor Growth

In addition to considering specific allowances for area developments, historic traffic volumes for the weekday morning and afternoon peak hours at several key intersections within the study area were reviewed to determine whether the area has sustained any general growth along the major corridors of Speers Road and Kerr Street. This review suggested that over the course of 8 years (2011 – 2019), there was average growth on Speers Road of 1.3% while Kerr Street recorded negative traffic growth. As a result, a general growth rate of 1.3% was applied on all through movements on both corridors consistent with other BA Group submissions around the study area.

The intersections of Speers Road / Cross Avenue, Kerr Street / Shepherd Road, Kerr Street / Wyecroft Road and Kerr Street / Stewart Street, were also reviewed during the weekday morning and afternoon peak hours.

Detailed corridor growth analysis calculations are included in **Appendix E.**

9.3.2 Background Developments

Background traffic includes specific allowances for traffic activity related to development proposals in the area that are either approved but not yet built, or are being reviewed by the Town of Oakville.

The Town of Oakville Development Applications website was reviewed for other active development applications in the area. A total of six developments, including a total of 1,240 residential units and 2,304 m^2 GFA of commercial space, were included in the future background traffic forecast. The proposed developments, land uses and their respective sources of transportation study are summarized in **Table 23** and illustrated in **Figure 12**.

Background development traffic volumes are illustrated in **Figure 13**.

ID	Location/Name Residential
1	58 Shepherd Road
2	62 Shepherd Road
3	66 Shepherd Road
4	70 Shepherd Road
5	65 Speers Road
6	157 Cross Avenue
7	271 Cornwall Road
8	485 Trafalgar Road
9	550 Kerr Street
10	224 Kerr Street
	234 Kerr Street
	110 Deane Avenue
	118 Deane Avenue
	120 Deane Avenue
	124 Deane Avenue

FIGURE 12 AREA BACKGROUND DEVELOPMENT

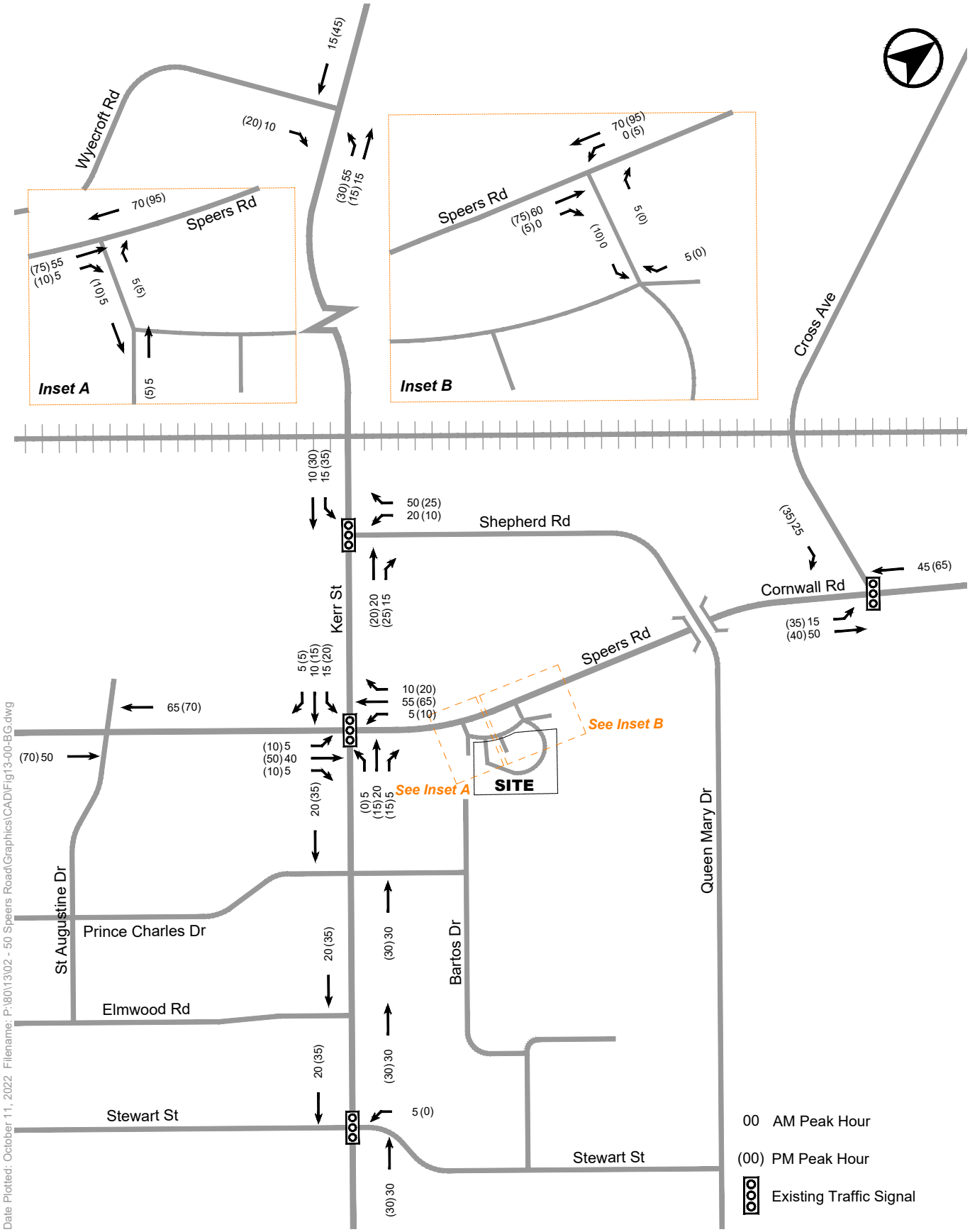


FIGURE 13 BACKGROUND DEVELOPMENT TRAFFIC VOLUMES

TABLE 23 SUMMARY OF BACKGROUND DEVELOPMENTS

Background Development	Statistics	Transportation Study
58 and 62 Shepherd Road	192 condominium units, 587m^2 retail	BA Group, December 2019
224 and 234 Kerr Street and 110, 118, 120 and 124 Deane Avenue	123 apartment units	NextTrans, October 2017
65 Speers Road, 66 and 70 Shepherd	252 apartment units	LEA Consulting Ltd., October 2018
271 Cornwall Road and 485 Trafalgar Road	292 apartment units	LEA Consulting Ltd., June 2020
157 Cross Avenue	252 condominium units, 289m^2 retail, 579m^2 office	Trans-Plan, January 2019
550 Kerr Street	216 condominium units	BA Group, January 2022

9.3.3 Future Background Traffic

Total future background traffic volumes reflect a combination of existing road network volumes and future area development related traffic activity.

Future background traffic volumes on the area road network for the weekday morning and afternoon peak hours are illustrated in **Figure 14**.

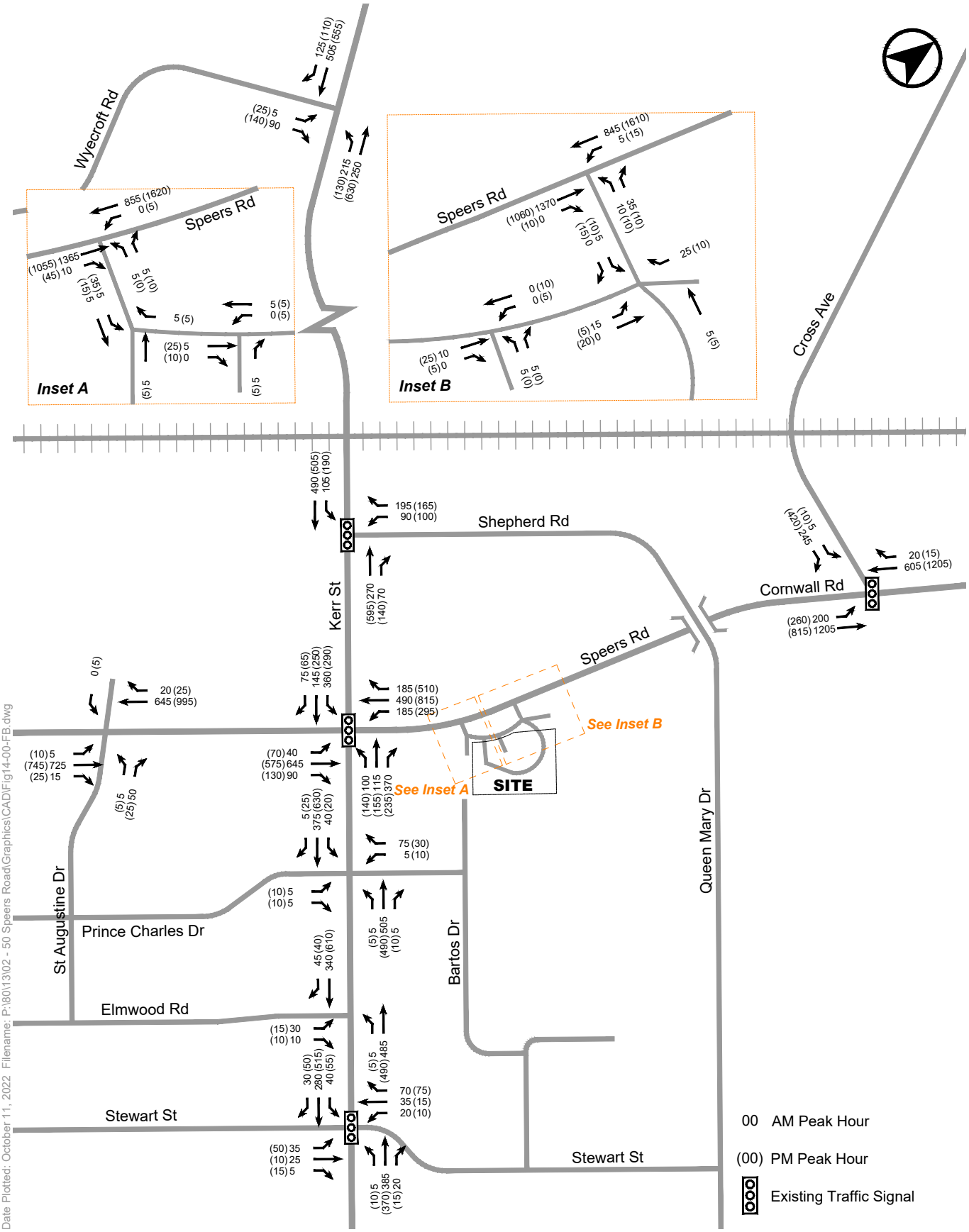


FIGURE 14 FUTURE BACKGROUND TRAFFIC VOLUMES

9.4 SITE TRAFFIC VOLUMES

The impacts of the site on traffic operations in the study area include the removal of traffic associated with the existing 59 residential units and the addition of traffic associated with proposed residential redevelopment.

9.4.1 Existing Site Traffic

The existing site generates approximately 20 and 35 two-way vehicle trips during the weekday morning and afternoon peak hours, respectively, split between all of the site accesses. Traffic volumes associated with the existing site removed from the network are illustrated in **Figure 15**.

9.4.2 Trip Generation

9.4.2.1 Vehicle Trip Generation

Residential vehicle trip generation was established based upon a review of trip generation rates from the ITE Trip Generation Manual (11th Edition) for General Urban/Suburban settings, as well as proxy trip generation counts of residential developments undertaken by BA Group at comparable sites with similar contexts within the Greater Toronto Area (GTA) and Oakville. The results of the Weekday morning and afternoon residential site vehicle traffic volumes are summarized in **Table 24**.

TABLE 24 PROXY RESIDENTIAL VEHICLE TRIP GENERATION RATE REVIEW

Proxy Site Location	Survey Date	Number of Units	AM Peak Hour			PM Peak Hour		
			In	Out	2-Way	In	Out	2-Way
1297 Marlborough Crt & 1360 White Oaks Blvd Oakville	Thu, Sept 26, 2019	266	0.09	0.17	0.26	0.19	0.13	0.32
75-95 Charolais Blvd Brampton	Thu, Aug 29, 2019	574	0.07	0.17	0.24	0.20	0.10	0.29
430 McMurchy Ave S Brampton	Thu, Aug 29, 2019	271	0.04	0.15	0.18	0.12	0.10	0.22
440 McMurchy Ave S Brampton	Thu, Aug 29, 2019	271	0.09	0.17	0.25	0.22	0.13	0.35
210-220 Steeles Ave W Brampton	Thu, Aug 29, 2019	508	0.02	0.17	0.19	0.16	0.07	0.24
	Tue, May 14, 2019		0.04	0.20	0.25	0.15	0.07	0.22
ITE222 – Multifamily Housing (High-Rise) *General Urban/Suburban – Not Close to Rail Transit*			0.10	0.19	0.29	0.19	0.14	0.33
Average Vehicle Trip Rate (Including ITE)			**0.06**	**0.17**	**0.23**	**0.17**	**0.11**	**0.28**
Adopted Vehicle Trip Rate			**0.06**	**0.17**	**0.23**	**0.17**	**0.11**	**0.28**
Residential Site Vehicle Trips (314 units)			**20**	**55**	**75**	**55**	**35**	**90**

The proposed development is anticipated to generate in the order of **75 and 90 two-way vehicle trips,** during the weekday morning and afternoon peak hours, respectively.

9.4.2.2 Residential Mode Share

Modal share characteristics for resident (home-based) travel during the morning and afternoon peak periods are summarized in **Table 25** and are based on a 2016 Transportation Tomorrow Survey (TTS) data query.

TABLE 25 RESIDENTIAL MODE SHARE (TTS 2016)

Mode	Morning Peak Period Outbound	Afternoon Peak Period Inbound
Auto Driver	57%	64%
Auto Passenger	13%	8%
Transit	21%	17%
Walk	7%	9%
Cycle	1%	2%

Notes:
1. Based on 2016 TTS results for morning (6:00 - 8:59) and afternoon (15:00 - 17:59) peak traffic periods for 2006 GTA Zones 4009, and 4011–4013.
2. Auto passenger trips (includes auto passengers, school bus passengers and taxi passengers).

The TTS travel data demonstrates that site study area has an auto driver mode share in the order of 57% for morning outbound and 64% for afternoon inbound home-based trips, during the peak travel periods. Non-auto trips (i.e. transit, walking and cycling) account for approximately 29% of all home-based trips made in the morning outbound and 28% in the afternoon inbound, during the peak travel periods.

9.4.3 Total Site Vehicle Trip Forecast

Total automobile trips associated with the site are summarized in **Table 26**, including trips associated with residential uses, as well as the removal of trips associated with the existing site.

TABLE 26 VEHICLE TRIP GENERATION

Site	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Adopted Residential Vehicle Trip Generation Rate (per Unit)	**0.06**	**0.17**	**0.23**	**0.17**	**0.11**	**0.28**
Total New Residential Vehicle Trips (314 Units)	20	55	75	55	35	90
Total New Site Trips (number of vehicles)	**20**	**55**	**75**	**55**	**35**	**90**
Existing Site Trips to be Removed	0	-20	-20	-25	-10	-35
Net New Site Traffic Volumes (number of vehicles)	**20**	**35**	**55**	**30**	**25**	**55**

The redevelopment of the site is forecasted to have a net impact of approximately 55 two-way vehicle trips during both the weekday morning and afternoon peak hours.

9.4.4 Trip Distribution and Assignment

Trip distribution patterns and traffic route assignment were derived from the 2016 Transportation Tomorrow Survey (TTS) for 2006 GTA Zones 4009, and 4011-4013. Queries for residential trips are provided in **Appendix F**. The adopted distribution of inbound and outbound vehicle traffic is presented in **Table 27.**

TABLE 27 SITE TRIP DISTRIBUTION

Directions	Residential	
	Outbound[1]	Inbound[2]
To/From East on Highway 403	38%	31%
To/From West on Highway 403	21%	10%
To/From North on Kerr St	7%	9%
To/From South on Kerr St	8%	10%
To/From South on Dorval Dr	6%	2%
To/From East on Speers Rd	8%	16%
To/From West on Speers Rd	4%	12%
To/From West on Wyecroft Rd	4%	5%
To/From South on Queen Mary Dr	4%	5%
Total	**100%**	**100%**

Notes:
1. Based upon morning peak period residential outbound trips
2. Based upon afternoon peak period residential inbound trips
3. Based upon afternoon peak period retail outbound trips
4. Based upon afternoon peak period retail inbound trips
5. Based on trips to/from TTS zones 4009 and 4011-4013

Existing trips to be removed are summarized in **Figure 15**. New site trips associated with the residential development are illustrated in **Figure 16** while the net new trips resulting from the redevelopment of the site are illustrated in **Figure 17**.

9.5 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes during the weekday morning and afternoon peak hours, reflect the sum of future background traffic volumes and new site traffic volumes and are illustrated in **Figure 18**.

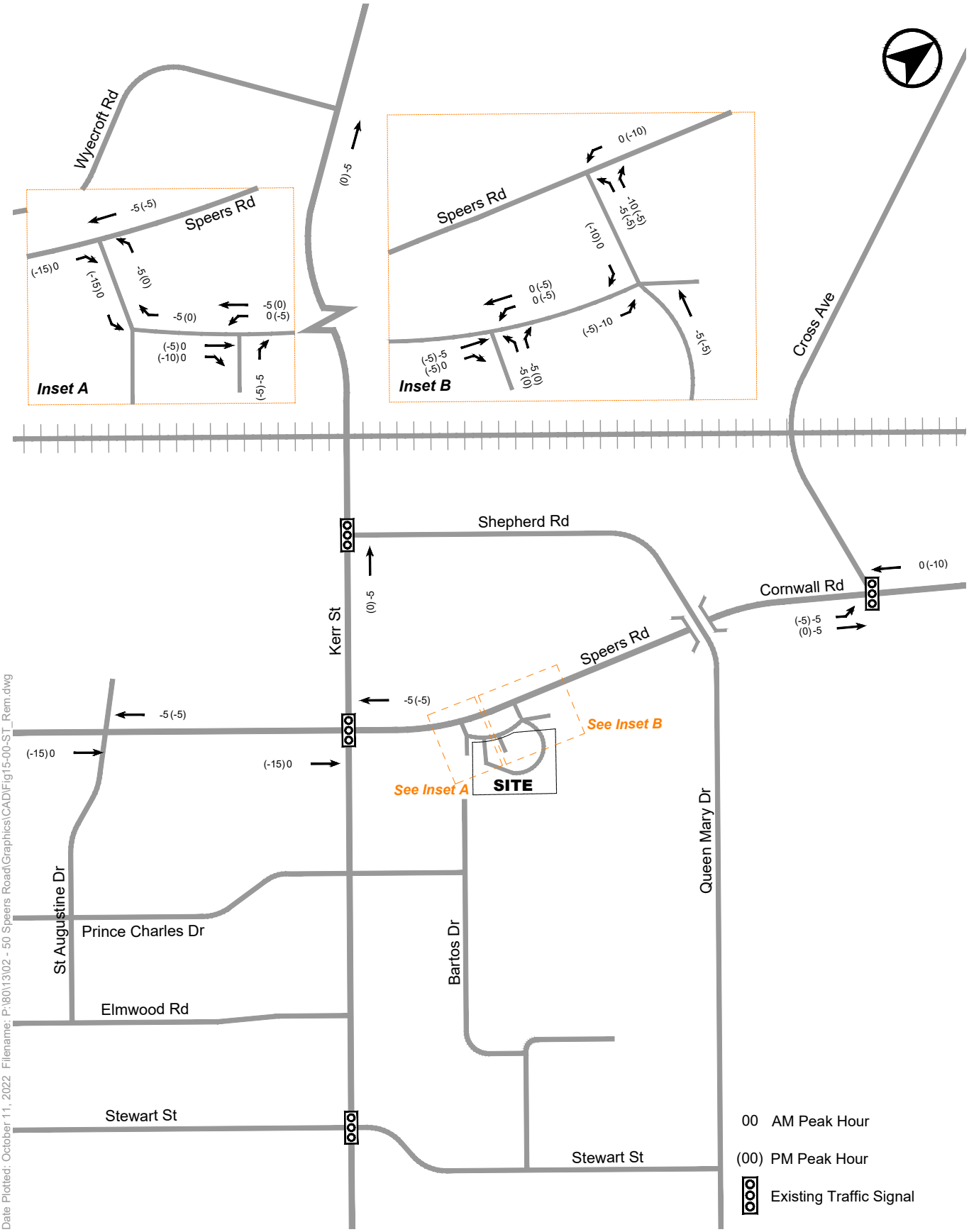


FIGURE 15 EXISTING SITE TRAFFIC VOLUMES TO BE REMOVED

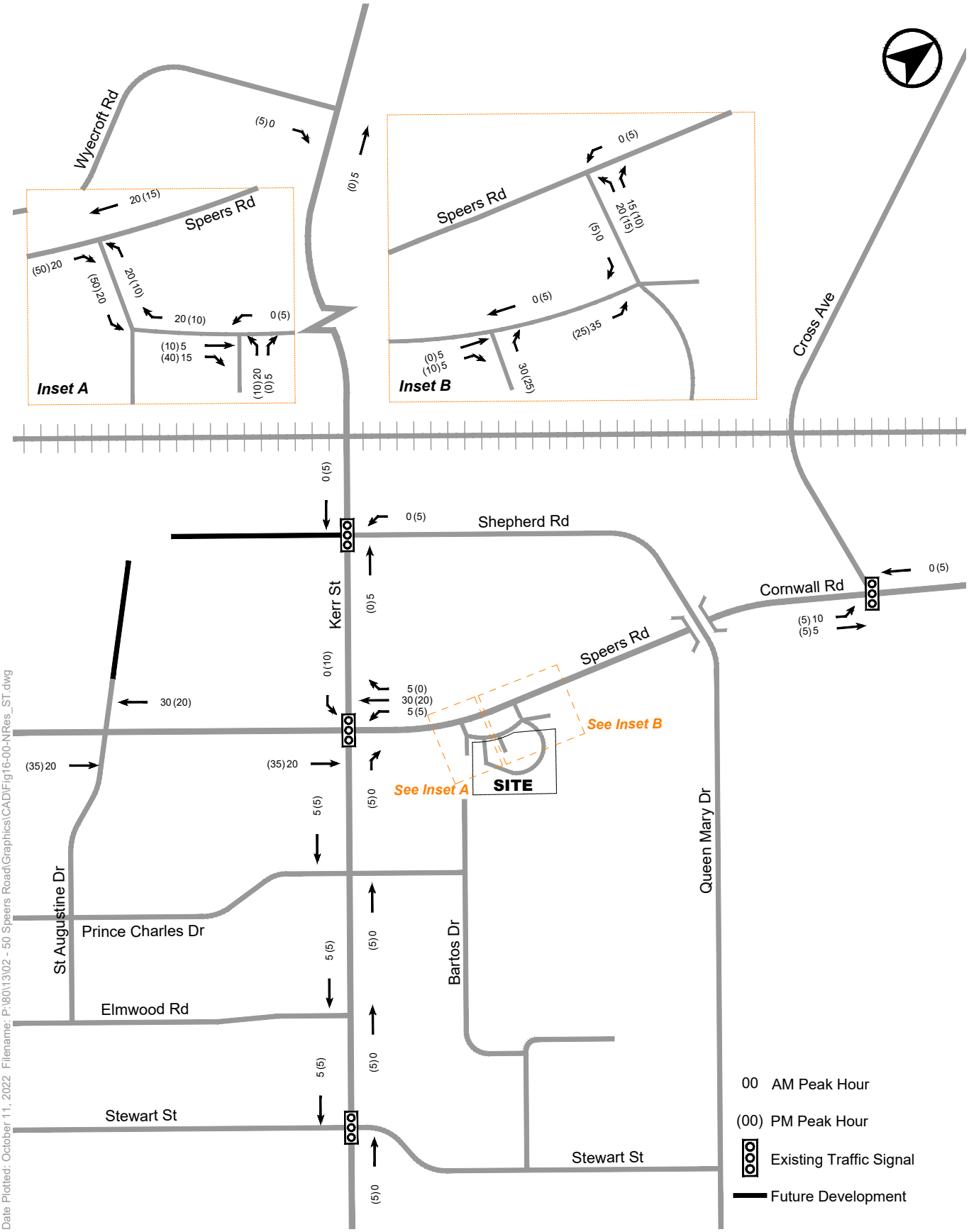


FIGURE 16 NEW RESIDENTIAL SITE TRAFFIC VOLUMES

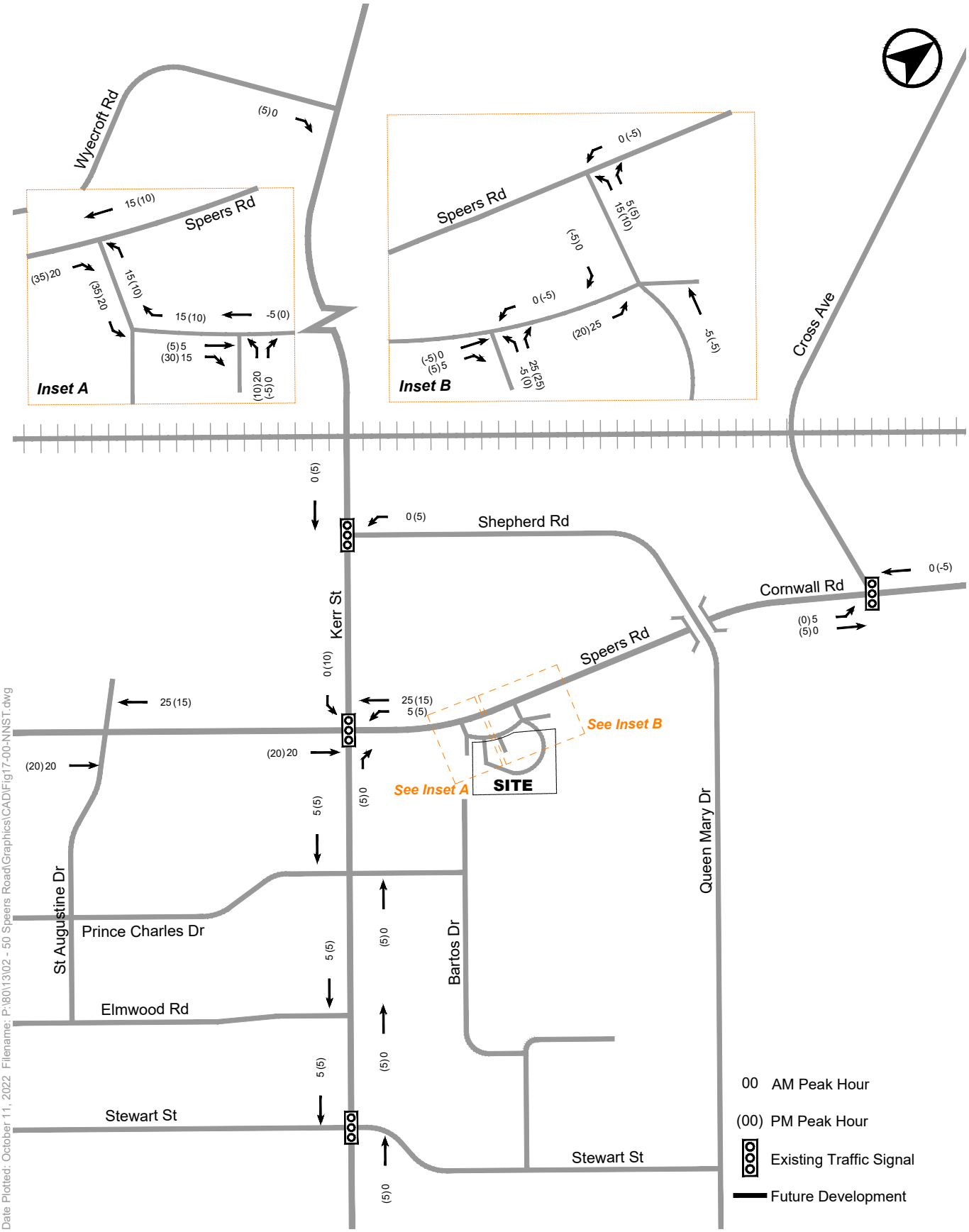


FIGURE 17 NET NEW SITE TRAFFIC VOLUMES

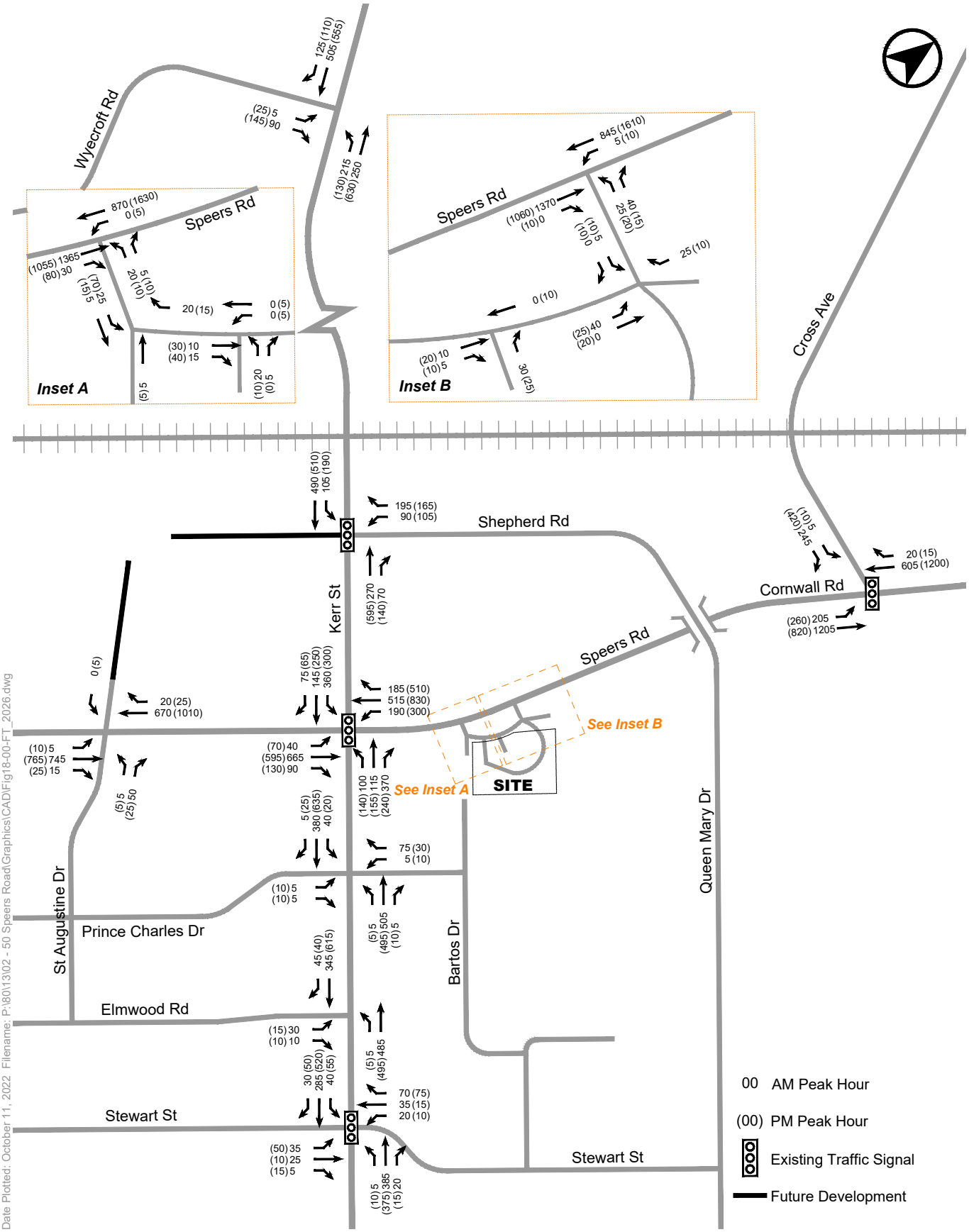


FIGURE 18 FUTURE TOTAL TRAFFIC VOLUMES

10.0 TRAFFIC OPERATIONS ANALYSIS

The traffic operations analysis has been undertaken during the weekday morning and afternoon street peak hours under the following traffic conditions:

- Existing conditions (2022);
- Future background conditions (2026) – with corridor growth and area background development traffic;
- Future total conditions (2026) – at build-out of site and inclusive of site generated traffic;
- Future total conditions (2031) – 5 years beyond build-out with site-generated traffic.

A brief overview of the software, analysis parameters and assumptions is provided below.

10.1 ANALYSIS METHODOLOGY AND ASSUMPTIONS

10.1.1 Intersection Capacity Analysis Methodology

The traffic operations analysis has been completed using the Synchro (Version 11) software package in accordance with the methodologies outlined in the *Highway Capacity Manual* (*HCM 2000*).

The key performance indicator of the signalized intersection evaluation is an intersection performance index (volume to capacity, or v/c), where the v/c index of 1.00 indicates 'at or near capacity' conditions.

The key performance indicator of unsignalized intersection / driveway analyses is the average delay per vehicle (in seconds) and a level of service (LOS) designation, ranging from LOS A (little delay) to LOS F (extended delay), with respect to the relative time for a motorist to complete a travel movement at an intersection or driveway.

10.1.2 Base Saturation Flow Rates

A base saturation flow rate of 1,900 passenger cars per hour of green time per lane (pcphgpl) has been adopted as the base assumption within all Synchro analysis detailed in this study.

10.1.3 Heavy Vehicle Assumptions

Heavy and medium truck percentage incorporated into the analysis were based upon information obtained from the existing intersection turning movement counts.

10.1.4 Traffic Signal Timing Plans

Existing traffic signal timing plans for all signalized intersections within the study area were obtained from the Town of Oakville. Analyses were undertaken using these signal timing plans for existing, future background and future total traffic conditions. Where necessary, traffic signal timing plans were optimized in the future scenarios.

The existing traffic signal timing plans are provide in **Appendix G**.

10.1.5 Road Network

The existing road network configuration was assumed for the existing horizon. The future horizon years considers the planned road net improvements identified along Kerr Street, consistent with what has been recommended in the 2009 Kerr Village Transportation Assessment and the 2009 Speers Road Environmental Study Report as mentioned in **Section 2.1.2**.

The existing and future road network intersection lane configurations are shown in **Figure 6**.

10.2 STUDY AREA INTERSECTIONS

Traffic operations and impacts related to the net new traffic volumes generated by the site, have been reviewed at the following area intersections:

Signalized Intersections

- Kerr Street / Speers Road
- Speers Road / Cross Avenue
- Kerr Street / Sheppard Road
- Kerr Street / Stewart Street

Unsignalized Intersections

- Kerr Street / Wyecroft Road
- Kerr Street / Prince Charles Drive
- Kerr Street / Elmwood Road
- St. Augustine Drive / Speers Road
- Speers Service Road (East Access) / Speers Road / 41 Speers Driveways
- Speers Service Road (West Access) / Speers Road
- 80 Speers Parking Lot / Speers Service Road
- 50 Speers PUDO / Speers Service Road
- Speers Service Road / 50 Speers Underground Access
- Speers Service Road / 30 Speers Site Access / 50 Speers PUDO

10.3 TRAFFIC ANALYSIS SUMMARY

Detailed Synchro analysis worksheets are provided in **Appendix H**. A discussion of the analysis results is provided herein.

10.3.1 Signalized Intersection Analysis

A summary of the traffic analysis results for the signalized intersections within the study area is provided in the following sections.

Kerr Street / Speers Road

The **Kerr Street / Speers Road** intersection operates under traffic signal control with a cycle length of 120 seconds, during the weekday morning and afternoon peak hour. The existing cycle lengths were maintained in all analysis scenarios, with minor adjustments to traffic signal phase splits. A summary of the traffic analysis results for this intersection is provided in **Table 28**.

Under existing traffic conditions, the intersection operates at an acceptable level of service during the weekday morning peak hours with overall v/c ratios of 0.74. The weekday afternoon peak hour has an overall v/c ratio of 0.73.

Under future background with the allowances of specific area developments, along with the change in lane configuration following the planned road network improvements, the intersection operates at an acceptable level of service, during the weekday morning and afternoon peak hours with overall v/c ratios of 0.65 and 0.65, respectively.

With the addition of site-related traffic under future total traffic conditions, the intersection continues to operate at an acceptable level of service, with all movement v/c ratios remaining below 1.0 during the weekday morning and afternoon peak hours for both the 2026 and the 2031 horizon years.

TABLE 28 KERR STREET / SPEERS ROAD CAPACITY ANALYSIS RESULTS

Movement	Existing Traffic		Future Background (2026)		Future Total (2026)		Future Total (2031)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.10 (0.18)	C (B)	0.11 (0.21)	B (B)	0.12 (0.21)	B (B)	0.24 (0.43)	B (B)
EBT	0.65 (0.45)	C (C)	0.55 (0.37)	C (C)	0.57 (0.39)	C (C)	0.58 (0.38)	C (C)
EBR	-- (--)	-- (--)	0.07 (0.09)	C (B)	0.07 (0.09)	C (B)	0.07 (0.09)	C (B)
WBL	0.66 (0.68)	C (B)	0.60 (0.61)	B (B)	0.62 (0.62)	C (B)	0.63 (0.61)	C (B)
WBT	0.35 (0.45)	C (C)	0.36 (0.46)	C (B)	0.38 (0.47)	C (B)	0.41 (0.53)	C (C)
WBR	0.14 (0.35)	C (C)	0.14 (0.36)	B (B)	0.14 (0.36)	B (B)	0.14 (0.40)	C (C)
NBL	0.34 (0.55)	D (D)	0.32 (0.57)	C (D)	0.32 (0.57)	C (D)	0.32 (0.57)	C (D)
NBT	0.30 (0.45)	D (D)	0.33 (0.50)	D (D)	0.33 (0.50)	D (D)	0.34 (0.56)	D (D)
NBR	0.81 (0.16)	E (D)	0.81 (0.17)	E (D)	0.81 (0.17)	E (D)	0.82 (0.17)	E (D)
SBL	0.75 (0.68)	C (D)	0.48 (0.46)	C (C)	0.48 (0.48)	C (C)	0.50 (0.51)	C (C)
SBT	0.42 (0.76)	C (D)	0.34 (0.73)	D (D)	0.33 (0.73)	D (D)	0.36 (0.71)	D (D)
SBR	-- (--)	-- (--)	0.06 (0.05)	C (D)	0.06 (0.05)	C (D)	0.05 (0.03)	C (D)
Overall	**0.74 (0.73)**	**D (C)**	**0.65 (0.65)**	**C (C)**	**0.67 (0.67)**	**C (C)**	**0.67 (0.65)**	**C (C)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Blank cells reflect intersection movements that do not exist under that particular scenario.

Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the **Kerr Street / Speers Road** intersection. No mitigation measures or improvements are recommended at this intersection.

Speers Road / Cross Avenue

The **Speers Road / Cross Avenue** intersection operates under traffic signal control with a cycle length of 140 seconds, during the weekday morning and afternoon peak hour. The existing cycle lengths were maintained in all analysis scenarios, with minor adjustment to traffic signal phase splits. A summary of traffic analysis results for this intersection is provided in **Table 29**.

Under existing traffic conditions, the intersection operates at an acceptable level of service, during the weekday morning peak hours with overall v/c ratios of 0.46. The weekday afternoon peak hour has an overall v/c ratio of 0.60.

Under future background with the allowances of specific area development, the intersection operates at an acceptable level of service, during the weekday morning and afternoon peak hours with overall v/c ratios of 0.48 and 0.65, respectively.

With the addition of site-related traffic under future total traffic conditions, the intersection continues to operate at an acceptable level of service, with all movement v/c ratios remaining below 1.0, during the weekday morning and afternoon peak hours for both the 2026 and the 2031 horizon years.

TABLE 29 SPEERS ROAD / CROSS AVENUE CAPACITY ANALYSIS RESULTS

Movement	Existing Traffic		Future Background (2026)		Future Total (2026)		Future Total (2031)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.36 (0.60)	A (A)	0.41 (0.65)	A (B)	0.42 (0.65)	A (B)	0.42 (0.56)	A (B)
EBT	0.47 (0.27)	A (A)	0.49 (0.29)	A (A)	0.49 (0.29)	A (A)	0.49 (0.29)	A (A)
WBTR	0.27 (0.48)	A (B)	0.29 (0.56)	A (B)	0.29 (0.56)	A (B)	0.30 (0.62)	A (C)
SBL	0.05 (0.07)	E (E)	0.04 (0.06)	E (E)	0.04 (0.06)	E (E)	0.04 (0.06)	E (E)
SBR	0.10 (0.42)	E (E)	0.11 (0.57)	E (E)	0.11 (0.57)	E (E)	0.11 (0.57)	E (E)
Overall	**0.46 (0.60)**	**B (B)**	**0.48 (0.65)**	**B (B)**	**0.48 (0.65)**	**B (B)**	**0.48 (0.60)**	**B (C)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the **Speers Road / Cross Avenue** intersection. No mitigation measures or improvements are recommended at this intersection

Kerr Street / Shepherd Road

The **Kerr Street / Shepherd Road** intersection operates under traffic signal control with a cycle length of 86 seconds during the weekday morning and afternoon peak hour. The existing cycle lengths were maintained in all analysis scenarios, with minor adjustment to traffic signal phase splits. A summary of traffic analysis results for this intersection is provided in **Table 30**.

Under future background with the allowances of specific area development, along with the change in lane configuration following the planned road network improvements, the intersection operates at an acceptable level of service, during the weekday morning peak hours with overall v/c ratios of 0.47. The weekday afternoon peak hour has an overall v/c ratio of 0.57.

Under future background with the allowances of specific area development, the intersection operates at an acceptable level of service, during the weekday morning and afternoon peak hours with overall v/c ratios of 0.34 and 0.45, respectively.

With the addition of site-related traffic under future total traffic conditions, the intersection continues to operate at an acceptable level of service, with all movement v/c ratios remaining below 1.0 during the weekday morning and afternoon peak hours for both the 2026 and the 2031 horizon years.

TABLE 30 KERR STREET / SHEPHERD ROAD CAPACITY ANALYSIS RESULTS

Movement	Existing Traffic		Future Background (2026)		Future Total (2026)		Future Total (2031)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.35 (0.31)	C (C)
EBTR	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.07 (0.05)	C (C)
WBL	0.34 (0.38)	B (B)	0.41 (0.40)	C (C)	0.41 (0.42)	C (C)	0.44 (0.43)	C (C)
WBTR	-- (--)	-- (--)	0.13 (0.11)	B (B)	0.13 (0.11)	B (B)	0.14 (0.13)	B (B)
NBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.21 (0.40)	B (B)
NBT	0.20 (0.41)	A (A)	0.23 (0.49)	B (B)	0.23 (0.50)	B (B)	0.25 (0.47)	B (B)
NBR	-- (--)	-- (--)	0.05 (0.09)	B (B)	0.05 (0.09)	B (B)	0.05 (0.08)	B (B)
SBL	-- (--)	-- (--)	0.20 (0.39)	A (A)	0.20 (0.40)	A (A)	0.22 (0.40)	A (A)
SBT	0.45 (0.56)	A (A)	0.28 (0.26)	A (A)	0.28 (0.26)	A (A)	0.31 (0.26)	A (A)
SBR	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.01 (0.03)	A (A)
Overall	**0.47 (0.57)**	**A (A)**	**0.34 (0.45)**	**B (B)**	**0.34 (0.45)**	**B (B)**	**0.37 (0.43)**	**B (B)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Blank cells reflect intersection movements that do not exist under that particular scenario.

Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the **Kerr Street / Shepherd Road** intersection. No mitigation measures or improvements are recommended at this intersection

Kerr Street / Stewart Street

The **Kerr Street / Stewart Street** intersection operates under traffic signal control with a cycle length of 75 seconds, during the weekday morning and afternoon peak hour. The existing cycle lengths were maintained in all analysis scenarios, with minor adjustment to traffic signal phase splits. A summary of traffic analysis results for this intersection is provided in **Table 31**.

Under existing traffic conditions, the intersection operates at an acceptable level of service during the weekday morning peak hours with overall v/c ratios of 0.38. The weekday afternoon peak hour has an overall v/c ratio of 0.52.

Under future background with the allowances of specific area development, the intersection operates at an acceptable level of service during the weekday morning and afternoon peak hours with overall v/c ratios of 0.41 and 0.54, respectively.

With the addition of site-related traffic under future total traffic conditions, the intersection continues to operate at an acceptable level of service, with all movement v/c ratios remaining below 1.0, during the weekday morning and afternoon peak hours for both the 2026 and the 2031 horizon years.

TABLE 31 KERR STREET / STEWART STREET CAPACITY ANALYSIS RESULTS

Movement	Existing Traffic		Future Background (2026)		Future Total (2026)		Future Total (2031)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBLTR	0.26 (0.29)	C (C)	0.26 (0.29)	C (C)	0.26 (0.29)	C (C)	0.26 (0.29)	C (C)
WBLTR	0.25 (0.15)	C (C)	0.27 (0.15)	C (C)	0.27 (0.15)	C (C)	0.27 (0.15)	C (C)
NBLTR	0.40 (0.32)	A (A)	0.43 (0.34)	A (A)	0.43 (0.35)	A (A)	0.44 (0.36)	A (A)
SBLTR	0.38 (0.55)	A (A)	0.40 (0.58)	A (A)	0.41 (0.58)	A (A)	0.43 (0.57)	A (A)
Overall	**0.38 (0.52)**	**B (A)**	**0.41 (0.54)**	**B (A)**	**0.41 (0.55)**	**B (A)**	**0.42 (0.54)**	**B (A)**

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

Based on the foregoing, the traffic generated by the proposed development can be acceptably accommodated at the **Kerr Street / Stewart Street** intersection. No mitigation measures or improvements are recommended at this intersection.

10.3.2 Unsignalized Intersection Analysis

Traffic operations at all unsignalized intersections within the study area are at acceptable level of service under all scenarios, without any need for road improvements or mitigation measures, with the exception of the site access points at **Speers Service Road (West Access & East Access) / Speers Road,** which are expected to continue to experience delays for northbound left-turning vehicles. It is noted that delays related to the left-turning movements are an existing condition and that the left-turning traffic volumes from the site to Speers Road are expected to continue to be low under future total traffic conditions. The additional delays

related to the northbound left-turning movements as a result of this development, are expected to be negligible when compared to existing and future background conditions, and will not impact the traffic operations along Speers Road.

The results of the capacity analysis undertaken at the unsignalized intersections are summarized in **Table 32**.

TABLE 32 UNSIGNALIZED INTERSECTIONS CAPACITY ANALYSIS RESULTS

Intersection / Movement	Existing Traffic Conditions		Future Background Traffic (2026)		Future Total Traffic (2026)		Future Total Traffic (2031)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
St. Augustine Drive / Speers Road								
EBL	8.6 (9.6)	A (A)	8.8 (9.9)	A (A)	8.9 (9.9)	A (A)	9.3 (9.8)	A (A)
NBR	13.3 (13.4)	B (B)	14.0 (14.5)	B (B)	14.2 (14.8)	B (B)	14.8 (14.9)	B (B)
SBLTR	0.0 (33.2)	A (D)	0.0 (39.8)	A (E)	0.0 (41.4)	A (E)	0.0 (39.9)	A (E)
Kerr Street / Wyecroft Road								
EBL	14.8 (25.9)	B (D)	32.4 (37.7)	D (E)	32.4 (37.7)	D (E)	39.5 (41.5)	E (E)
EBR	-- (--)	-- (--)	11.4 (12.5)	B (B)	11.4 (12.6)	B (B)	11.7 (13.0)	B (B)
NBL	9.7 (9.5)	A (A)	10.2 (10.0)	B (B)	10.2 (10.0)	B (B)	10.7 (10.1)	B (B)
Kerr Street / Prince Charles Drive								
EBLTR	20.3 (23.6)	C (C)	20.8 (24.8)	C (C)	21.0 (25.0)	C (D)	21.6 (24.6)	C (C)
WBLTR	15.2 (17.9)	C (C)	15.8 (18.6)	C (C)	15.8 (18.8)	C (C)	16.0 (18.7)	C (C)
NBLTR	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)
SBLTR	1.5 (0.6)	A (A)	1.5 (0.6)	A (A)	1.5 (0.6)	A (A)	1.5 (0.6)	A (A)
Kerr Street / Elmwood Road								
EBLR	16.8 (17.6)	C (C)	16.3 (18.5)	C (C)	16.3 (18.7)	C (C)	16.1 (18.5)	C (C)
NBLT	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)	0.2 (0.2)	A (A)
Speers Service Road (West Access) / Speers Road								
WBT	0.0 (0.2)	A (A)	0.0 (0.2)	A (A)	0.0 (0.2)	A (A)	0.0 (0.2)	A (A)
NBLR	52.9 (9.9)	F (A)	32.1 (9.3)	D (A)	59.5 (14.6)	F (B)	60.7 (15.5)	F (C)
80 Speers Parking Lot / Speers Service Road								
WBLR	8.4 (8.4)	A (A)	8.4 (8.4)	A (A)	8.5 (8.4)	A (A)	8.5 (8.4)	A (A)
SBLT	7.2 (6.4)	A (A)	3.6 (5.1)	A (A)	6.0 (6.1)	A (A)	6.0 (6.9)	A (A)
50 Speers Pick-up / Drop-off / Speers Service Road								
WBLT	0.0 (3.7)	A (A)	0.0 (3.7)	A (A)	0.0 (3.7)	A (A)	0.0 (3.7)	A (A)
NBLR	8.4 (8.5)	A (A)	8.4 (8.5)	A (A)	8.8 (9.1)	A (A)	8.8 (9.1)	A (A)
Speers Service Road / 50 Speers Underground Access								
WBLT	0.0 (2.3)	A (A)	0.0 (2.3)	A (A)	-- (--)	-- (--)	-- (--)	-- (--)
NBLR	8.5 (0.0)	A (A)	8.5 (0.0)	A (A)	8.5 (8.6)	A (A)	8.5 (8.6)	A (A)
Speers Service Road / 30 Speers Site Access / 50 Speers Pick-up / Drop-off								

Intersection / Movement	Existing Traffic Conditions		Future Background Traffic (2026)		Future Total Traffic (2026)		Future Total Traffic (2031)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
EBLTR	9.0 (9.4)	A (A)	9.1 (9.6)	A (A)	9.2 (9.7)	A (A)	9.2 (9.4)	A (A)
WBLTR	8.5 (8.5)	A (A)	8.5 (8.5)	A (A)	8.5 (8.4)	A (A)	8.5 (8.4)	A (A)
SBLTR	7.3 (0.0)	-- (--)	7.3 (2.9)	A (A)	7.2 (3.7)	A (A)	7.2 (0.0)	-- (--)
Speers Service Road (East Access) / Speers Road / 41 Speers Driveway								
WBT	0.4 (0.4)	A (A)	0.4 (0.6)	A (A)	0.4 (0.4)	A (A)	0.4 (0.2)	A (A)
NBLR	31.4 (25.8)	D (D)	28.3 (20.7)	D (C)	56.8 (22.9)	F (C)	58.1 (20.8)	F (C)
SBLTR	0.0 (38.4)	A (E)	0.0 (31.0)	A (D)	0.0 (30.5)	A (D)	0.0 (28.3)	A (D)

Notes:
1. XX (XX) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Blank cells reflect intersection movements that do not exist under that particular scenario.

Based on the foregoing, the proposed development can be accommodated on the future transportation network.

10.4 TRAFFIC SIGNAL ASSESSMENT ON SPEERS ROAD

In order to determine if a new traffic signal is required on Speers Road, as a result of the proposed development, a traffic signal warrant analysis was undertaken based on the Ontario Traffic Manual (OTM) Book 12 methodology (Justification 7) at the intersection of Speers Road and Speers Service Road (East Access) to the site. As the Speers Service Road (West Access) to the site on Speers Road is less than 100 metres away from the existing traffic signal at Kerr Street, the spacing is not adequate for consideration of a new traffic signal. For this reason, the traffic signal warrant assessment was only undertaken on Speers Road at the east access to the site.

The results of the traffic signal warrant analysis are summarized in **Table 33**, with the relevant excerpts and detailed analysis provided in **Appendix I**.

A traffic signal is not required at the intersection of Speers Road and the east driveway to the site, as the traffic signal warrants are only 19%.

TABLE 33 TRAFFIC SIGNAL WARRANTS (2031 FUTURE)– SPEERS ROAD & SPEERS SERVICE ROAD (EAST ACCESS)

Justification	Description	Minimum Requirement 2 Lane Highways [Restricted Flow] 4-legged	Compliance		
			Sectional		Entire % (≥120)[1]
		Base	Actual Traffic Volumes	% of Required	
Speers Road & Speers Service Road (East Access)					
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	900	1260	140%	**19%**
	B. Vehicle volume, along minor streets (average hour)	170	27	16%	
2. Delay to Cross Traffic	A. Vehicle volume, major street (average hour)	900	1231	137%	
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)- left + highest through +peds	75	14	19%	

Notes:
1. For existing intersections with future peak hour volumes only, the warrant should be met with 120% (as opposed to 100% for an existing intersection with an 8-hour count estimate).
2. Average hourly volumes were derived based on the formula presented in the OTM Book 12.
   AHV = (weekday morning peak hour volumes + weekday afternoon peak hour volumes) ÷ 4
3. Relevant OTM excerpts are provided in **Appendix I**.

11.0 SAFETY ANALYSIS

11.1 LEFT-TURN LANE ASSESSMENT

Although the presence of westbound left-turning vehicles into Speers Service Road from Speers Road is an existing condition and a dedicated left-turn lane is currently not present, a dedicated left-turn lane was considered as part of the safety analysis.

The traffic analysis for this study indicates that there are expected to be a future total maximum of 5 westbound left-turning vehicles from Speers Road, at both the east or west access points to the site, during the peak hours of the day.

As Speers Road is a 4-lane road with 2 lanes in each direction, it is likely that a westbound left-turning vehicle on Speers Road would remain in the median lane while waiting to turn left, while westbound through vehicles would bypass the left-turning vehicle and travel in the curb lane.

Due to the expected low number of left-turning vehicles from Speers Road into either of the site driveways, a left-turn lane on Speers Road is deemed to be not required.

11.2 SIGHT DISTANCE (FROM SPEERS ROAD SERVICE ROAD)

The sight distance for the two existing access points to the site from Speers Service Road to Speers Road has been evaluated based on Transportation Association of Canada (TAC) design criteria. As summarized in **Table 34**, both access points meet the minimum sight distance requirements as outlined in the TAC Manual. The relevant sight distance figures are provided in **Appendix J**.

As vehicles exiting with a left turn from the access points from Speers Service Road onto Speers Road would need to turn across more than two lanes, the TAC manual requires that an additional 0.5 second time gap for a passenger car be added to the calculation, hence the time gap increases from 7.5 to 8.0 seconds in the assessed scenario.

- Posted Speed = 60 km/h
- V major (design speed) = 70 km/h
- Time gap (tg)= 8 seconds

Substituting parameters into equation 9.9.1 of the TAC manual results in the following intersection sight distance (ISD) requirements:

- ISD = 0.278 V major × tg
- ISD = 0.278 × 70 × 8
- ISD = 155.68 m ≈ 160 m

TABLE 34 TAC MINIMUM SIGHT DISTANCE REQUIREMENTS

Speers Service Road to Speers Road	Posted Speed Limit	Design Speed Assumption	Intersection Control	TAC Minimum Sight Distance Required (ISD)	Requirements Satisfied
East Access	60 km/h	70 km/h	Case B1 – Left turn from the minor road	160 m	Yes
West Access	60 km/h	70 km/h	Case B1 – Left turn from the minor road	160 m	Yes

11.3 QUEUING ANALYSIS

An analysis of the existing and projected future vehicle queues was undertaken at all signalized intersections in order to confirm that queues would be acceptably accommodated under the study horizon years.

The results of the queuing analysis indicate that the development proposal is expected to have negligible impacts on intersection queuing in the study area. As a result, there are no safety-related concerns in relation to the development and intersection queuing in the study area.

11.3.1.1 Kerr Street / Speers Road

Under existing traffic conditions, the average and 95th percentile queues for all turning movements would be comfortably accommodated within the existing storage lengths, during the morning and afternoon peak hours.

Under the 2026 horizon year future background condition, there is a change in lane configuration due to the planned road network improvements. As a result, some of the newly implemented turning movements also have proposed storage lengths in order to minimize delays to through movements. An example is the EBR turning lane (75 metres of storage), which reduces the average and 95th percentile queues along the EBT, during the morning peak hours to 73.3 and 99.1 metres respectively.

Under the future total horizon years (2026 and 2031), the proposed storage lengths for left and right-turning movements are the same as the 2026 future background horizon year. Also, the average and 95th percentile queues would all be comfortably accommodated within the proposed storage length during the morning and afternoon peak hours.

The results of the detailed queuing analysis at this intersection is illustrated in **Table 35.**

11.3.1.2 Speers Road / Cross Avenue

Under existing traffic conditions, the average and 95th percentile queues for all turning movements would be comfortably accommodated within the existing storage lengths, during the morning and afternoon peak hours.

Under the 2026 horizon year future background condition, the average and 95th percentile queues for all turning movements would be comfortably accommodated within the proposed storage lengths during the morning and afternoon peak hours.

Under the future total horizon years (2026 and 2031), the proposed storage lengths for left turning movement are the same as the 2026 future background horizon year. Also, the average and 95th percentile queues would all be comfortably accommodated within the proposed storage lengths during the morning and afternoon peak hours.

The results of the detailed queuing analysis at this intersection is illustrated in **Table 35.**

11.3.1.3 Kerr Street / Shepherd Road

Under existing traffic conditions, no storage is provide for the left and right-turning movements during the morning and afternoon peak hours.

Under the 2026 horizon year future background condition, there is a change in lane configuration due to the planned road network improvements along both Kerr Street and Shepherd Road. As a result, some of the newly implemented turning movements also have proposed storage lengths in order to minimize delays to through movements. The average and 95th percentile queues would all be comfortably accommodated within the proposed storage lengths, during the morning and afternoon peak hours.

Under the future total horizon years (2026 and 2031), the proposed storage lengths for both the northbound and southbound left and right-turning movement are the same as the 2026 future background horizon year. Also, the average and 95th percentile queues would all be comfortably accommodated within the proposed storage lengths during the morning and afternoon peak hours.

The results of the detailed queuing analysis at this intersection is illustrated in **Table 35.**

11.3.1.4 Kerr Street / Stewart Street

Under existing and all future traffic conditions, no storage is provide for the left and right-turning movements, during the morning and afternoon peak hours.

The results of the detailed queuing analysis at this intersection is illustrated in **Table 35.**

TABLE 35 QUEUEING SUMMARY

Movement	Existing			Future Background 2026			Future Total 2026		Future Total 2031	
	50th Queue	95th Queue	Existing Storage	50th Queue	95th Queue	Proposed Storage	50th Queue	95th Queue	50th Queue	95th Queue
Kerr Street / Speers Road										
EBL	4.7 (6.4)	11.5 (13.6)	105 (105)	4.9 (6.7)	12.8 (14.2)	105 (105)	5.0 (6.7)	12.8 (14.2)	11.0 (16.4)	23.1 (29.0)
EBT	84.7 (62.0)	106.7 (76.4)	-- (--)	73.3 (51.0)	99.1 (69.0)	-- (--)	78.3 (53.3)	102.8 (71.6)	78.1 (51.2)	101.9 (69.7)
EBR	-- (--)	-- (--)	-- (--)	0.0 (0.0)	9.8 (11.9)	75 (75)	0.0 (0.0)	9.8 (11.9)	0.0 (0.0)	9.8 (11.9)
WBL	26.4 (35.3)	#49.2 (#59.6)	75 (75)	25.2 (32.8)	46.6 (53.3)	75 (75)	26.3 (33.2)	#50.4 (54.1)	26.7 (32.8)	#50.2 (53.2)
WBT	43.0 (66.5)	61.7 (90.5)	-- (--)	46.5 (68.0)	69.8 (94.5)	-- (--)	49.9 (69.2)	73.8 (96.7)	52.5 (78.8)	75.2 (108.2)
WBR	0.0 (0.0)	13.7 (20.4)	100(100)	0.0 (0.0)	13.9 (18.7)	100(100)	0.0 (0.0)	13.9 (18.7)	0.0 (7.4)	13.9 (37.1)
NBL	15.3 (23.0)	21.8 (36.2)	50 (50)	17.3 (24.7)	23.0 (38.3)	50 (50)	17.1 (24.8)	23.0 (38.3)	16.9 (24.9)	23.0 (38.8)
NBT	22.0 (31.3)	32.7 (46.5)	-- (--)	26.5 (34.4)	37.0 (53.5)	-- (--)	26.5 (34.7)	37.0 (53.5)	27.6 (37.6)	38.8 (57.6)
NBR	43.5 (0.0)	70.1 (19.2)	45 (45)	48.4 (0.0)	72.5 (21.0)	45 (45)	48.9 (0.0)	73.1 (21.0)	50.1 (0.0)	74.9 (21.3)
SBL	68.1 (48.4)	79.0 (68.8)	-- (--)	34.2 (26.5)	35.4 (35.3)	80 (80)	33.9 (27.7)	35.4 (36.5)	35.1 (28.4)	36.9 (37.6)
SBT	39.3 (65.2)	51.8 (90.5)	-- (--)	32.2 (58.9)	40.3 (81.1)	-- (--)	31.6 (59.0)	40.3 (81.1)	34.8 (55.7)	44.2 (78.5)
SBR	-- (--)	-- (--)	-- (--)	0.0 (0.0)	8.9 (8.6)	75 (75)	0.0 (0.0)	8.9 (8.6)	0.0 (0.0)	8.6 (3.1)
Speers Road / Cross Avenue										
EBL	8.4 (9.1)	12.9 (19.3)	80 (80)	9.2 (13.3)	14.3 (48.2)	80 (80)	9.4 (12.8)	14.5 (47.6)	9.4 (20.6)	14.5 (54.1)
EBT	40.8 (18.9)	47.9 (32.9)	-- (--)	43.7 (23.0)	52.2 (39.9)	-- (--)	43.7 (23.3)	52.2 (40.1)	44.3 (23.2)	52.9 (39.9)
WBT	29.6 (66.3)	38.4 (113.7)	-- (--)	33.0 (94.7)	43.0 (148.3)	-- (--)	33.1 (94.0)	43.1 (147.2)	33.4 (109.7)	43.6 (156.6)
SBL	1.6 (2.7)	5.8 (8.1)	45 (45)	1.6 (2.6)	5.7 (7.8)	45 (45)	1.6 (2.6)	5.7 (7.8)	1.6 (2.6)	5.7 (7.8)
SBR	0.0 (10.3)	11.3 (27.7)	-- (--)	0.0 (18.2)	11.7 (37.1)	-- (--)	0.0 (18.1)	11.7 (37.0)	0.0 (18.1)	11.7 (36.9)
Kerr Street / Shepherd Road										
EBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	6.4 (4.0)	18.4 (14.5)
EBT	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	1.1 (0.5)	9.9 (9.1)
WBL	5.7 (7.6)	20.5 (27.7)	-- (--)	7.5 (7.8)	19.6 (20.9)	-- (--)	7.5 (8.3)	19.6 (21.7)	9.7 (10.6)	25.2 (29.4)
WBT	-- (--)	-- (--)	-- (--)	0.0 (0.0)	0.0 (0.0)	-- (--)	0.0 (0.0)	0.0 (0.0)	0.3 (0.8)	12.4 (14.2)
NBT	5.3 (13.6)	11.2 (28.5)	-- (--)	9.2 (21.4)	16.7 (36.9)	-- (--)	9.2 (21.4)	16.7 (37.4)	13.8 (31.1)	27.2 (52.0)
NBR	-- (--)	-- (--)	-- (--)	0.0 (0.0)	4.2 (8.7)	50 (50)	0.0 (0.0)	4.2 (8.7)	0.0 (0.0)	5.7 (10.1)
NBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	50 (50)	-- (--)	-- (--)	5.3 (11.9)	16.0 (28.9)
SBT	12.8 (14.6)	24.1 (32.1)	-- (--)	10.3 (9.9)	17.0 (17.0)	-- (--)	10.3 (10.0)	17.0 (17.4)	19.2 (17.2)	34.8 (30.8)
SBL	-- (--)	-- (--)	-- (--)	3.5 (6.2)	8.1 (13.5)	50 (50)	3.5 (6.2)	8.1 (13.8)	6.8 (11.6)	17.0 (25.6)
SBR	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	50 (50)	-- (--)	-- (--)	0.0 (0.0)	0.3 (3.7)

Movement	Existing			Future Background 2026			Future Total 2026		Future Total 2031	
	50th Queue	95th Queue	Existing Storage	50th Queue	95th Queue	Proposed Storage	50th Queue	95th Queue	50th Queue	95th Queue
Kerr Street / Stewart Street										
EBT	9.6 (8.5)	15.4 (16.4)	-- (--)	9.6 (8.5)	15.4 (16.4)	-- (--)	9.6 (8.5)	15.4 (16.4)	9.6 (8.5)	15.4 (16.4)
WBT	7.9 (3.4)	15.9 (13.0)	-- (--)	8.7 (3.4)	16.7 (13.0)	-- (--)	8.7 (3.4)	16.7 (13.0)	8.7 (3.4)	16.7 (13.0)
NBT	19.5 (15.8)	50.4 (47.3)	-- (--)	21.7 (17.4)	55.5 (52.1)	-- (--)	21.7 (17.8)	55.5 (52.9)	22.1 (18.3)	56.4 (54.4)
SBT	16.4 (31.1)	43.9 (93.8)	-- (--)	17.8 (34.1)	47.3 (103.6)	-- (--)	18.2 (34.7)	48.1 (104.7)	19.2 (33.8)	50.6 (102.5)

Notes:
1. xx (xx) AM peak hour (PM peak hour)
2. All queues and storage lengths are in metres.
3. Blank cells reflect intersection movements that do not exist under that particular scenario.

12.0 CONCLUSIONS AND RECOMMENDATIONS

- The development proposal includes the demolition of the existing residential building and the construction of a new residential building with 314 purpose-built residential rental units. Site access is proposed with a new driveway that connects to the existing Speers Service Road at the front of the building, with 2 existing access points at Speers Road. There are a total of three pick-up/drop off spaces proposed along the new site driveway. Parking is to be provided within a new 3-level below-grade parking facility. It is expected that site will most likely be build-out by 2027.

- The proposed parking strategy for the site recommends a blended parking rate of a minimum of 1.0 spaces per unit, inclusive of resident and visitor parking. The proposed parking supply includes a total of 314 spaces. The parking supply is deemed appropriated based on several factors such as the area transportation context, the proximity of the Oakville GO station (only 750 m from the site), consideration for Transportation Demand Management, the proposed unit mix (84% of the proposed rental units are less than 75 m^2), parking demand surveys and recent parking approvals.

- The bicycle parking supply includes a total of 314 spaces, inclusive of 236 long-term spaces and 78 visitor spaces and meets the requirements of the Zoning By-law.

- A total of one loading space is proposed at-grade to accommodate the servicing needs of the residential development. The proposed loading facilities are appropriate will meet the practical needs of the site and the requirements of the Zoning By-law.

- Proposed TDM strategies include a reduced parking supply with “unbundled” parking, active transportation facilities (pedestrian connection, bike parking and bike repair station) and travel mode information packages.

- The TTS travel data demonstrates that the site study area has an auto driver mode share in the order of 57% for morning outbound and 64% for afternoon inbound home-based trips, during the peak travel periods. Non-auto trips (i.e. transit, walking and cycling) account for approximately 29% of all home-based trips made in the morning outbound and 28% in the afternoon inbound, during the peak travel periods. The proposed development is anticipated to generate in the order of **75 and 90 two-way vehicle trips,** during the weekday morning and afternoon peak hours, respectively. In consideration of the existing trips generated by the site, the development is forecasted to have a net impact of approximately **55 two-way vehicle trips,** during both the weekday morning and afternoon peak hours.

- The traffic operations analysis was undertaken during the weekday morning and afternoon street peak hours for existing conditions and the horizons of 2026 and 2031. The study area and analysis considered four signalized intersections and ten unsignalized intersections.

- Overall, area signalized intersections operate well under existing conditions, with volume to capacity (v/c) ratios of less than 1.0 for all movements. Considering future traffic conditions with redevelopment of the site and the planned road network improvements at the Kerr Street / Speers

Road intersection, all signalized intersections will continue to operate acceptably with (v/c) ratios of less than 1.0 for all movements in the future horizon years.

- Traffic operations at all unsignalized intersections within the study area are at acceptable level of service under all scenarios, without any need for road improvements or mitigation measures, with the exception of the site access points at Speers Service Road (West Access & East Access) / Speers Road, which are expected to continue to experience delays for northbound left-turning vehicles. It is noted that delays related to the left-turning movements are an existing condition and that the left-turning traffic volumes from the site to Speers Road are expected to continue to be low under future total traffic conditions. The additional delays related to the northbound left-turning movements as a result of this development, are expected to be negligible when compared to existing and future background conditions, and will not impact the traffic operations along Speers Road.

- The traffic analysis for this study indicates that there are expected to be a future total maximum of 5 westbound left-turning vehicles from Speers Road, at both the east or west access point to the site, during the peak hours of the day. Due to the expected low number of left-turning vehicles from Speers Road into either of the site driveways, a left-turn lane on Speers Road is deemed to be not required.

- The sight distance for the two existing access points from Speers Service Road to Speers Road was evaluated based on Transportation Association of Canada (TAC) design criteria and confirmed that the access points meet the minimum sight distance requirements.

- An analysis of the existing and projected future vehicle queues was undertaken at all signalized intersections in order to confirm that queues would be acceptably accommodated under the study horizon years. The results of the queuing analysis indicate that the development proposal is expected to have negligible impacts on intersection queuing in the study area. As a result, there are no safety-related concerns in relation to the development and intersection queuing in the study area.

- **Based on the foregoing, the proposed development can be acceptably accommodated on the existing and future transportation network.**

Appendix A
Terms of Reference

Memorandum

TO:

Syed Rizvi
Transportation Engineer
Town of Oakville
Email: syed.rizvi@oakville.ca

FROM:	**PROJECT:**	**DATE:**
Deanna Green, P.Eng.	Proposed Residential Redevelopment	November 23, 2021

SUBJECT: Traffic Impact Study Terms of Reference - 50 Speers Road, Town of Oakville, Proposed Residential Redevelopment

1.0 INTRODUCTION

BA Group has been retained by Helberg Properties Limited to provide transportation consulting services related to the proposed redevelopment of a site (herein referred to as "the site") municipally known as 50 Speers Road, in the Town of Oakville ("the Town"), in the Region of Halton.

This letter outlines the proposed terms of reference for the Traffic Impact Study (TIS) that is being prepared as part of the **Zoning By-law Amendment (ZBA)** application being submitted to the Town.

The redevelopment proposal includes the demolition of an existing 7-storey residential building with 59 residential units and the construction of a new residential building with approximately 334 residential units. A circular driveway is proposed at the front of the building with 2 access points at Speers Road. Parking is to be provided in a new 3-level below-grade parking facility. The site will most likely be build-out by early 2025.

2.0 PROPOSED SCOPE OF WORK

The traffic impact study will be completed in accordance with Halton Region's Transportation Impact Study Guidelines as outlined in the following sections.

2.1 DESCRIPTION OF THE PROPOSAL & STUDY AREA

The Transportation Impact Study will provide a full description of the proposed redevelopment and will include elements such as:

- Municipal address;
- Existing land uses or permitted use provisions in an Official Plan, Official Plan Amendments, Zoning By-law etc.;
- Proposed land uses and relevant planning regulations to be used in the study;
- Total building size and building location;
- Floor space including a summary of each type of use/number of residential units;
- Expected date of occupancy;
- Near-by intersections and accesses to adjacent developments and those on the opposite side of the road including type of traffic control;
- Proposed access points and type of access (full movement, right-in-right-out, turning movement restrictions, etc.);
- Nearby transit facilities/stops;
- Near-by Active Transportation Facilities – sidewalks, multi-use trails, bike lanes, etc.,

The study area and traffic analysis will include the following intersections:

Signalized Intersections

- Speers Road & Kerr Street
- Speers Road & Cross Avenue
- Speers Road & Sheppard Drive/ Queen Mary Drive
- Stewart Street & Kerr Street

Unsignalized Intersections

- Speers Road & St. Augustine Drive
- Kerr Street & Wyecroft Road
- Prince Charles Drive & Kerr Street
- Elmwood Road & Kerr Street
- Site Access 1 & Speers Road (and internal driveways)
- Site Access 2 & Speers Road (and internal driveways)

2.2 TRANSPORTATION CONTEXT

A description of the existing transportation system in the study area, will identify relevant information, such as the following:

- All adjacent and nearby roads, indicating the number of lanes, and posted speed;
- All adjacent/across and affected intersections/access, indicating type of control, access type, lane configurations, lane widths, and any turning or similar restrictions;
- If appropriate, on-street parking spaces/standing/stopping restrictions in the vicinity of the site and those which would affect the operation of key intersections being analyzed;
- Transit routes and stops;
- Heavy vehicle prohibitions and restrictions;
- All pedestrian and cyclist routes; and
- Other transportation facilities as appropriate.

Potential future transportation improvements that are currently being considered that may facilitate the traffic demand generated by the site will be identified. These improvements will be described to a level of detail sufficient to assess implications for travel to/from the site. In each case, the status and expected date of implementation will be identified.

2.3 PARKING & LOADING CONTEXT

2.3.1.1 Parking

The requirements of the prevailing Town Zoning By-law will be reviewed for both motor vehicles and bicycles in order to confirm the parking needs of the proposed redevelopment. If reduced parking rates are proposed, appropriate proxy data will be provided along with justification for any reductions.

2.3.1.2 Loading

The requirements of the prevailing Town Zoning By-law will be reviewed to confirm the redevelopment's loading supply requirements. An appropriate loading facility supply for site will be provided.

2.4 TRANSPORTATION DEMAND MANAGEMENT (TDM)

The TDM Plan will be included with the TIS and will include a wide variety of initiatives aimed at reducing the amount of travel by single occupant vehicles to achieve a more sustainable travel mode share, particularly during the peak travel hours of the day.

The TDM Plan will consider initiatives such as but not limited to the following:

- Promotion and support for reduced single occupant vehicle use through carpool programs;
- Promotion of transit:
- Consideration of bicycle/pedestrian facilities and connectivity;
- Information for residents regarding sustainable travel options;
- Potential for a reduced parking supply.

2.5 HORIZON YEAR AND TIME PERIODS FOR ANALYSIS

As the site will likely be build-out by 2025, it is proposed that the traffic analysis includes the following scenarios:

- Existing conditions (2022);
- Future background conditions (2025) – with corridor growth and area background development traffic;
- Future total conditions (2025) – at build-out of site and inclusive of site generated traffic;
- Future total conditions (2030) – 5-years beyond build-out with site generated traffic.

The analysis will be completed for both the AM and PM peak periods of the day, during a typical weekday.

2.6 TRAFFIC ANALYSIS

2.6.1 Existing Traffic Conditions

The traffic analysis will include a representative picture of the existing transportation conditions with exhibits that show the existing traffic volumes and turning movements for all modes of transportation for roadways and intersections in the study area including pedestrian/cyclist volumes and heavy truck movements.

All traffic data collection undertaken will include pedestrians, cyclists and motor vehicles on a typical weekday, during typical morning and afternoon peak periods. BA Group will work with the Town to obtain historical counts and supplement available data with new traffic counts to be completed by Spectrum, on behalf of BA Group. Traffic counts more than 2 years old will be updated if possible to ensure that they reflect current traffic levels.

Given the current COVID-19 conditions, it is recognized that 2020 & 2021 traffic counts may not be representative. For this reason, 2020 & 2021 traffic counts will be calibrated and balanced utilizing traffic counts from pre-COVID conditions. The analysis will utilize conservative allowances for pre-COVID existing conditions.

2.6.2 Background Traffic

2.6.2.1 Corridor Growth

The background traffic growth rate in traffic along corridors in the study area, will be established in consultation with Town staff.

2.6.2.2 Background Developments

All significant developments under construction, approved, or in the approval process within the study area and are likely to occur by the specific horizon years will be identified and recognized in the study. The land-use type and magnitude of the probable future developments in the horizon years will be identified through consultation with Town staff.

2.6.2.3 Transportation Network Improvements

Changes to the present or planned transportation network will be determined from the approved Town capital improvement programs. A realistic assessment of timing and certainty will be made. The impacts of the transportation system changes will be identified.

2.6.2.4 Transit/HOV Considerations

The TIS will evaluate the impacts of site generated transit demand for the relevant time periods and scenarios on all transit services and transit stops/stations/terminals where ridership will be increased by 5% or more by site generated transit demand.

For HOV analysis, the lane analysis must use a lane utilization factor of 0.80 for the assumption that 20% is assumed as the HOV lane usage.

2.6.3 Estimation of Travel Demand

2.6.3.1 Trip Generation

Traffic volumes expected to be generated by the site will be forecast using the latest edition of the ITE Trip Generation Manual, unless local & more reliable trip generation data is available.

Trip generation parameters will be selected using the principles as described in Chapter 3 of the ITE Trip Generation Handbook. The estimation of traffic volumes generated by the site will be based on the full build-out of the proposed residential redevelopment.

All trip generation assumptions and adjustments assumed in the calculation of "new" vehicle trips will be documented and justified in terms of previous research or proxy surveys.

2.6.3.2 Trip Distribution

All trip distribution assumptions will be documented and justified. Due consideration will be given to potential differences in trip distribution patterns associated with different time periods.

2.6.3.3 Trip Assignments

Traffic assignments will consider logical routings, available and projected roadway capacities and travel times. Traffic assignments will be estimated using “hand assignment” based on knowledge of the proposed/future road network in the study area.

2.6.3.4 Summary of Traffic Demand Estimates

Traffic volume figures will be provided that illustrate the assignment of all site-generated traffic volumes and pass-by volumes (if applicable) separately to the local road network, as well as to the individual site access locations by direction and by turning movement where required.

For both the AM and PM peak period, the traffic volumes figures will summarize:

- Existing Conditions: existing traffic/transit volumes;
- Future Background: existing plus background growth for each horizon year; and
- Future Total: existing plus background growth plus site generated volumes for each horizon year.

A summary of the future traffic demands (each combination of horizon year and peak period for both site generated and total future traffic conditions) will be provided in the figures. Pass-by traffic assumptions will be clearly identified and illustrated on the figures.

2.6.3.5 Evaluation of Impacts of Site Traffic

The evaluation of the impacts of site traffic will be undertaken for both the AM and PM Peak of each horizon year. The existing volumes, existing plus background growth and existing plus background growth plus site-generated traffic by direction and by turning movement will be included, as well as the scenarios with and without any relevant major transportation system improvements.

2.6.4 Capacity Analysis

A capacity analysis at the study intersections will assess the operations of individual intersections and movements expected to be impacted by the proposed redevelopment. The evaluation of signalized and unsignalized intersections impacted by site traffic volumes will be provided in a tabular format. The objective will be to maintain existing levels of service as best as possible.

The intersection capacity analysis will be completed using Synchro Version 11 and a combination of Highway Capacity Manual (HCM) 2000 and HCM 6 methodologies. A saturation flow rate of 1,900 vehicles per hour will be utilized in the analysis.

The analysis will include the mitigation of impacts to signalized intersection operations where:

- Volume/capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above:
- V/C ratios for exclusive movements increased to 0.95 or above; or
- Queues for an individual movement are projected to exceed available turning lane storage.

The analysis will also include mitigation at unsignalized intersections where:

- Level of service (LOS), based on average delay per vehicle, on individual movements exceeds LOS “D”, or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Town staff will be contacted to obtain current traffic signal timings at existing signalized intersections in the study area. All proposed adjustments to traffic signal timings, phasing and cycle lengths will be evaluated in terms of pedestrian crossing time, effect on queue lengths, adequacy of existing storage and effects on the existing traffic signal co-ordination.

2.6.5 Safety Analysis

Potential safety or operational issues associated with the following, as applicable, will be identified:

- Weaving;
- Merging;
- Transit operational conflicts
- Corner clearances;
- Sight distances;
- Vehicle-pedestrian conflicts;
- Traffic infiltration;
- Access conflicts;
- Cyclist movements;
- Heavy truck movement conflicts;
- Queuing

2.6.6 Collision Analysis

If requested by the Town, if there is a collision history at any of the study area intersections that could be impacted by site generated traffic, a request to the Town will be made to obtain the relevant collision data. The collision data will be reviewed and assessed, with respect to the impact of the proposed redevelopment.

2.6.7 Site Access and Circulation

All proposed site access points on Town roads will be evaluated in terms of capacity, safety and sight distance & adequacy of queue storage capacity. This evaluation will be similar in scope to that for the signalized and unsignalized intersections described previously.

Proposed access points will be evaluated with respect to existing access points and intersections, on-street weaving problems, need for acceleration or deceleration lanes and pedestrian and cycling safety.

On-site parking and circulation systems will be evaluated to demonstrate appropriate clear throat distances and avoid any possible queuing onto Town roads.

Sight lines will be evaluated based on the Transportation Association of Canada (TAC Manual).

Proposed truck/courier loading facilities and access to these facilities will be evaluated to ensure that they are adequately sized, designed and provided with suitable access so that they will not adversely affect traffic and transit operations on Town roads.

Any required turning or other restrictions will be identified.

2.6.8 Transportation System Mitigation Measures

2.6.8.1 Required Roadway Improvements

If any physical and operational road network deficiencies are identified in the TIS, solutions will be provided that are feasible and economic to implement.

Functional design plans will be provided for any recommended physical improvements.

2.6.8.2 Traffic Signal Improvements

Any traffic signal operational deficiencies that are identified in the TIS will be addressed and solutions will be provided that are feasible to implement.

2.6.8.3 Preliminary Cost Estimate

A preliminary cost estimate will be provided for all recommended infrastructure improvements.

2.7 RECOMMENDATIONS

A summary of the key findings with respect to the transportation impact of the proposed redevelopment will be presented along with a summary of the recommended improvements if necessary.

Any recommendations for improvements will consider the following:

- Timing of short-range and long-range network improvements that are already planned and scheduled;
- Expected time schedule of adjacent developments;
- Logical sequencing of various improvements or segments;
- Right-of-way needs and availability of additional right-of-way within the appropriate time frames;

2.8 DOCUMENTATION AND REPORTING

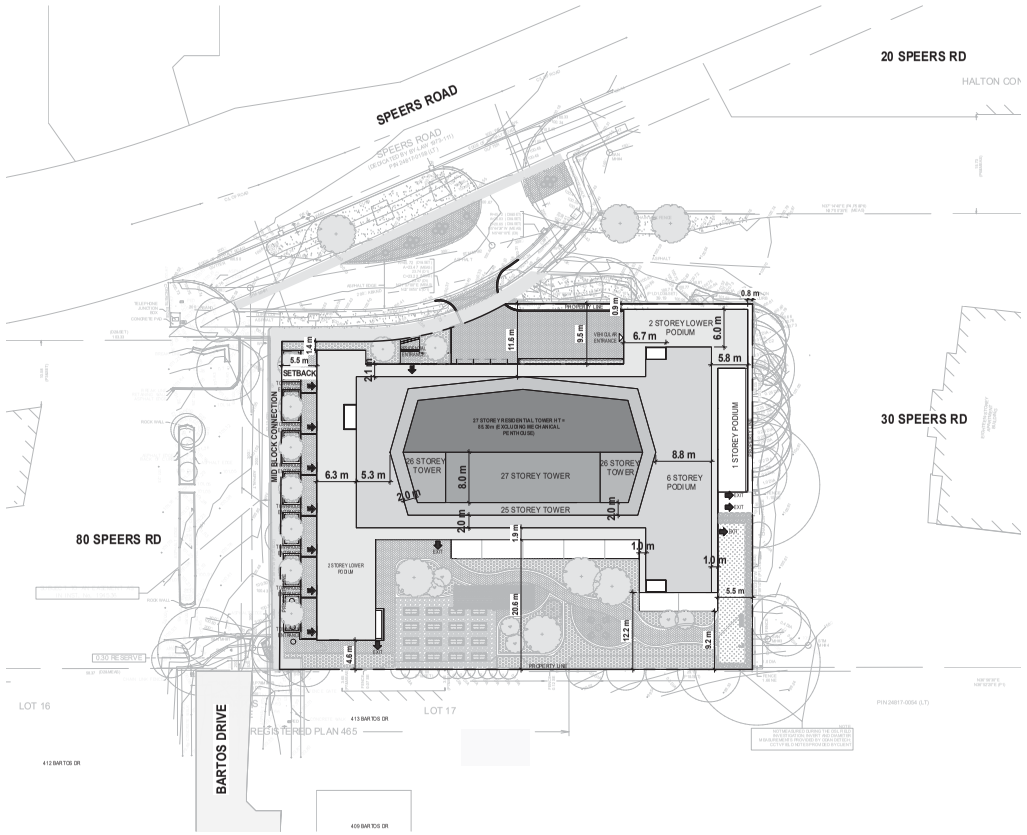
The structure and format of the TIS will adhere to the scope of work outlined in this document and include the following:

- Executive Summary
- Site/Development Description (Site plan to be provided);
- Study Area (Map identifying the study area and site to be provided);
- Parking and Loading Context
- Transportation Demand Management (TDM) Plan
- Existing Conditions (Exhibit to be provided);
- Analysis Periods;
- Background Traffic Demand – Existing and Future Background (Exhibits to be provided);
- Site Generated Traffic (Exhibits to be provided);
- Level of Service Analysis;
- Total Traffic Demand – Future Background plus Site Generated Traffic (Exhibits to be provided);
- Improvement Alternatives Required to Mitigate Traffic Impacts
- Traffic Impacts for Future Background and Total Traffic with and without mitigation measures (Tabular summaries to be provided);
- Access Considerations; and
- Recommendations.

The TIS will include a main document, supplemented by a technical appendices containing detailed analysis worksheets, traffic counts data, traffic signal timings and other data as required.

Appendix B
Reduced Scale Architectural Drawings

5 A101.S Context Plan



4 A101.S SITE PLAN
SCALE: 1 : 300

	Floor	Residential Floor Area	Unit Breakdown					Notes
			Bach	1B	2B	3B+2DT	Total Units	
TOWER / PODIUM	Mech Penthouse	520	0	0	0	0	0	
	27	505	0	0	4	0	4	
	26	581	0	2	6	0	8	
	25	715	0	2	6	0	8	
	24	715	0	2	6	1	9	
	23	715	0	2	6	1	9	
	22	715	0	2	6	1	9	
	21	715	0	2	6	1	9	
	20	715	0	2	6	1	9	
	19	769	0	2	6	1	9	
	18	769	0	2	6	1	9	
	17	769	0	2	6	1	9	
	16	769	0	2	6	1	9	
	15	769	0	2	6	1	9	
	14	769	0	2	6	1	9	
	13	769	0	2	6	1	9	
	12	769	0	2	6	1	9	
	11	769	0	2	6	1	9	
	10	769	0	2	6	1	9	
	9	769	0	2	6	1	9	
	8	769	0	2	6	1	9	
	7	769	0	2	6	1	9	
	6	1,380	1	13	2	3	19	
	5	1,380	1	13	2	3	19	
	4	1,380	1	13	2	3	19	
	3	1,380	1	13	2	3	19	
	2	1,380	1	13	2	3	19	
	Ground	2,040	0	0	0	14	14	
BELOW GRADE	P1	3,674	0	0	0	0	0	
	P2	3,674	0	0	0	0	0	
	P3	3,674	0	0	0	0	0	
TOTALS	Above Grade	28,752 sqm / 277,197 sf	22,340 sqm / 240,738 sf	26	147	107	16	314
				8%	47%	34%	5%	100%
Site Area & FSI	Gross Site Area		4,180 sm	439	576	775	1523	1230
	Lot Coverage %		51%					
	FSI (Net Floor Area / Gross Site Area)		5.4					

Average Unit Size by Unit Type (SF)

Total Below Grade GFA= 11,222 sm
Total Above + Below Grade GFA= 39,778 sm

% of Unit Type

Floor Area: means the aggregate area of a building contained within the exterior walls, but does not include attic or basement space

Residential Floor Area: means the aggregate area of a residential building containing a dwelling measured from the exterior of the outside walls, but shall not include a private garage, basement, or attic.

Net Floor Area: "means the total area of all floors of a building measured from the interior faces of the exterior walls or demising walls, but does not include the area of stair wells, elevators, escalators, ventilation shafts, attics, concourses, washrooms, attached enclosed and covered loading docks and related enclosed corridors used for loading purposes, above and below grade parking structures, storage rooms, rooms for garbage containment and mechanical rooms."

NOTE: *All open to below areas are included in Floor Area and Net Floor Area, unless otherwise indicated in the Notes column above.*

3 A101.S Building Statistics

VEHICULAR PARKING

	Required	Provided
Refer to Traffic Report prepared by Bill Group, for additional information.		
Residential (0.75 spaces/unit <70sm NFA)	0.75 x 264	198
Residential (1.25 spaces/unit >70sm NFA)	1.25 x 50	63
Visitor (0.25 spaces/unit <70sm NFA)	0.25 x 264	66
Visitor (0.25 spaces/unit >70sm NFA)	0.25 x 50	13
Accessible Parking Spaces (included in Total Parking)		10
TOTAL PARKING	366	314

BICYCLE PARKING

		Required	Provided
Residential (Long-term)	(0.75/unit)	0.75 x 314	236
Visitor (Short-term)	(0.25/residential Unit)	0.25 x 314	79
TOTAL BICYCLES		316	315

LOADING / GARBAGE

	Provided
Loading Spaces	
Refer to Traffic Report prepared by Bill Group, for additional information.	
Residential (Loading Space 3.5m x 12m, 4.2m vertical clearance)	1
TOTAL LOADING SPACES	1
Garbage Room Size	60
Bulk Waste Storage Room	30
Garbage Staging Area	30

AMENITY AREA

	Provided
Indoor Amenity	629 sm
Outdoor Amenity Level 07	1,348 sm

2 A101.S Parking and Amenity Stats

AB	Air barrier	FIN	Finish	PS	Pressure set
AC	Air conditioner	FL	Floor	PT	Paint, painted
AD	Area drain	FLUOR	Fluorescent	PVC	Polyvinyl chloride
AFF	Above Finish Floor	FP	Fireplace	(R)	Relocated
AL	Aluminum	FPL	Flush pull	R	Radius
AN	Anodized	FRCG	Fire Rated Ceramic Glass	RB	Resilient base
AO	Automatic door operator	FRR	Fire resistance rating	RC	Roller catch
AP	Acoustic panel	FSI	Floor space index	RD	Roof drain
APC	Architectural precast concrete	GA	Gauge	REF	Reference
APPROX	Approximate	GALV	Galvanized	REV	Revision
AS	Acoustic seal	GB	Gypsum board	RF	Resilient flooring
AST	Ashlagal	GFA	Gross Floor area	RFM	Recessed floor mat
ASTM	American Society for Testing Materials	GFI	Ground fault interrupter	RH	Right hand
AT	Acoustic ceiling tile	GK	Gasket	RM	Room
AVB	Air vapour barrier	GL	Glazing glass	RO	Rough opening
AVG	Average	GLB	Glass - back painted	RR	Remote release
BF	Barrier free	GLL	Glass - laminated	RVR	Reverse
BLDG	Building	GLT	Glass - tempered	RWL	Rain water leader
BOLF	Bollard, fixed	GLTF	Glass - tempered and frosted	SAFB	Sound attenuation fire Barriers
BOLR	Bollard, fixed	GLS	Glass - safety	SB	Site bollards
BR	Brick	GLFC	Glass - fire-rated ceramic	SBO	Supplied by others, contractor installed
CACF	Central Alarm Control Facility	GRB	Grab bar	SC	Solid core
CB	Catch basin	GWG	Georgian wire glass	SD	Stopper drain
CCMPA	Can. Concrete Masonry Produces Assoc.	H	Height/high	SI	Site instruction
CCN	Contemplated change notice	HB	Hose bib	SG	Spandrel glass
CG	Corner guard	HC	Hollow core	SIM	Similar
CH	Coathook	HCC	Honeycomb core	SK	Sketch
CID	Clear inside dimension	HDF	High density fibreboard	SL	Sealer, seal
CIP	Cast in place	HG	Hinge	SP	Spandrel panel
CJ	Construction joint	HGPC	Hinge, centre pivot	SPT	Spray texture
CL	Closet	HGPO	Hinge, offset pivot	SS	Stainless steel
CLC	Closet, Concealed	HM	Hollow metal	SSM	Solid surface material
CLG	Ceiling	HP	High point	ST	Stone
CLR	Clear finish	HR	Hour	STC	Sound transmission classification
CLT	Closet	HSS	Hollow steel section	STD	Stained, stain
CMU	Concrete masonry unit	HTP	Heat pump	STL	Steel
COL	Column	ID	Interior design	STRUC	Structural
CONC	Concrete	IFP	Inducement fireproofing	T	Tile
CP	Communications panel	IN SUL	Insulated, insulation	TB	Tack board
CPT	Carpet	INT	Interior	TBD	To be determined
CR	Card reader	JAN	Janitor	TC	Traffic coating
CSA	Canadian Standards Association	KP	Kick plate	TD	Terrace drain
CT	Ceramic tile	L	Length/long	TEL	Telephone
CW	Complete with	LA	Latch	TEMP	Temporary
CYL	Cylinder	LAV	Lavatory	TER	Terrazzo
D	Depth/Deep	LEV	Low emitting vehicle	TERR	Terrace
DB	Dead bolt	LIN	Linen closet/shelves	TH	Threshold
DC	Door contact	LN	Linoleum	THK	Thick
DIA or ø	Diameter	LP	Low point	TOC	Top of curb
DIM	Dimension	LS	Lock set	TOF	Top of finish
DN	Down	LV	Louvre	TOFR	Top of finished roof
DP	Door pull	MAG	Magnetic lock	TOG	Top of glass
DPR	Door pull - recessed	MAX	Maximum	TOP	Top of parapet
DSD	Door stop - door mounted	MDF	Medium density fibreboard	TOS	Top of stairs/level
DSF	Door stop - floor mounted	MECH	Mechanical	TOW	Top of wall
DSO	Door stop - overhead recessed	MFR	Manufacturer	TRR	Temperature rise rating
DSW	Door stop - wall mounted	MIN	Minimum	TT	Thumb turn
DW	Dishwasher	MISC	Miscellaneous	TYP	Typical
DWG	Drawing	MLL	Millwork	UH	Unit heater
ED	Exit device	MR	Mirror	UR	Urinal
EIFS	Exterior insulating finish system	MP	Metal panel	U/S	Underside
EJ	Expansion joint	MRGB	Moisture resistant gypsum board	ULC	Underwriter's Laboratories of Canada
ELEC	Electrical	MTL	Metal	UNO	Unless noted otherwise
ELEV	Elevator	MW	Microwave	VB	Vapour barrier
EOS	Edge of slab	(N)	New	VCT	Vinyl composite tile
EP	Electrical panel	N/A	Not applicable	VEST	Vestibule
ESP	Escutcheon plate	NBC	National Building Code	VPI	Vinyl-faced insulation
EQ	Equal	NIC	Not in contract	VG	Vision glass
EV	Electrical vehicle	NTS	Not to scale	VGF	Vinyl graphic film
EVSE	Electrical vehicle supply equipment	OBC	Ontario Building Code	VNR	Veneer
EQUIP	Equipment	OC	On centre	VP	Visitor's parking
ES	Electric strike	OP	Operable panel	W	Width/wide
(E)	Existing	OSB	Oriented strand board	WB	White board
(E/R)	Existing/relocated	OSD	Overflow scupper drain	WC	Water closet
EXT	Exterior	PB	Push button	WCV	Wall covering
FAP	Fire alarm pull	PCT	Porcelain tile	WD	Wood
FC	Fan coil	PEWF	Perforated	WED	Washer/Dryer
FD	Floor drain	PLAM	Plastic laminate	WIC	Walk-in closet
FFE	Fire fighter's elevator	PLY	Plywood	WPS	Waterproof surface
FFH	Fire fighter's handset	PNL	Panel	WR	Waste receptacle
FFL	Finished floor level	PP	Push plates	WS	Weatherstripping
FG	Fixed glazing	PQ	Parquet flooring	WT	Window treatment
FH	Fire hydrant				
FHC	Fire hose cabinet				

1 A101.S Abbreviations

SITE PLAN LEGEND

- PROPERTY LINE
- LINE OF UNDERGROUND GARAGE BELOW
- MAIN BUILDING ENTRANCE
- RETAIL ENTRANCE
- EXIT
- VEHICLE / LOADING ENTRANCE / EXIT
- FIRE HYDRANT
- BARRIER CONNECTION
- MANHOLE COVER
- AREA DRAIN
- CATCH BASIN
- FD FLOOR DRAIN (PARKING SLAB)
- FD FLOOR DRAIN (INTERIOR)
- EXISTING LIGHT
- TYPICAL PARKING SPACE
- TYPICAL B.F.P. PARKING SPACE
- F.F.E. FINISH FLOOR ELEVATION
- 99.9 EXF EXISTING ELEVATION
- 99.9 PRF PROPOSED ELEVATION
- 000.00 TOP OF ROOF
- BUILDING ENVELOPE
- FIRE ACCESS ROUTE HEAVY DUTY PAVING. ASSEMBLY TO BE DESIGNED TO MEET THE LOADS IMPOSED BY FIRE FIGHTING EQUIPMENT.
- GREEN ROOF
- TERRACE PAVERS

Date	No.	Description
REVISION RECORD		
2022-10-12	2	Rezoning & Official Plan Amendment
ISSUE RECORD		

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H6
t. 416 598 1240 www.bdpquadrangle.com

50 Speers Road

Oakville, ON

for

Helberg Properties Limited

20023	ED	AT
PROJECT	DRAWN	REVIEWED

Context, Site Plan & Statistics

A101.S

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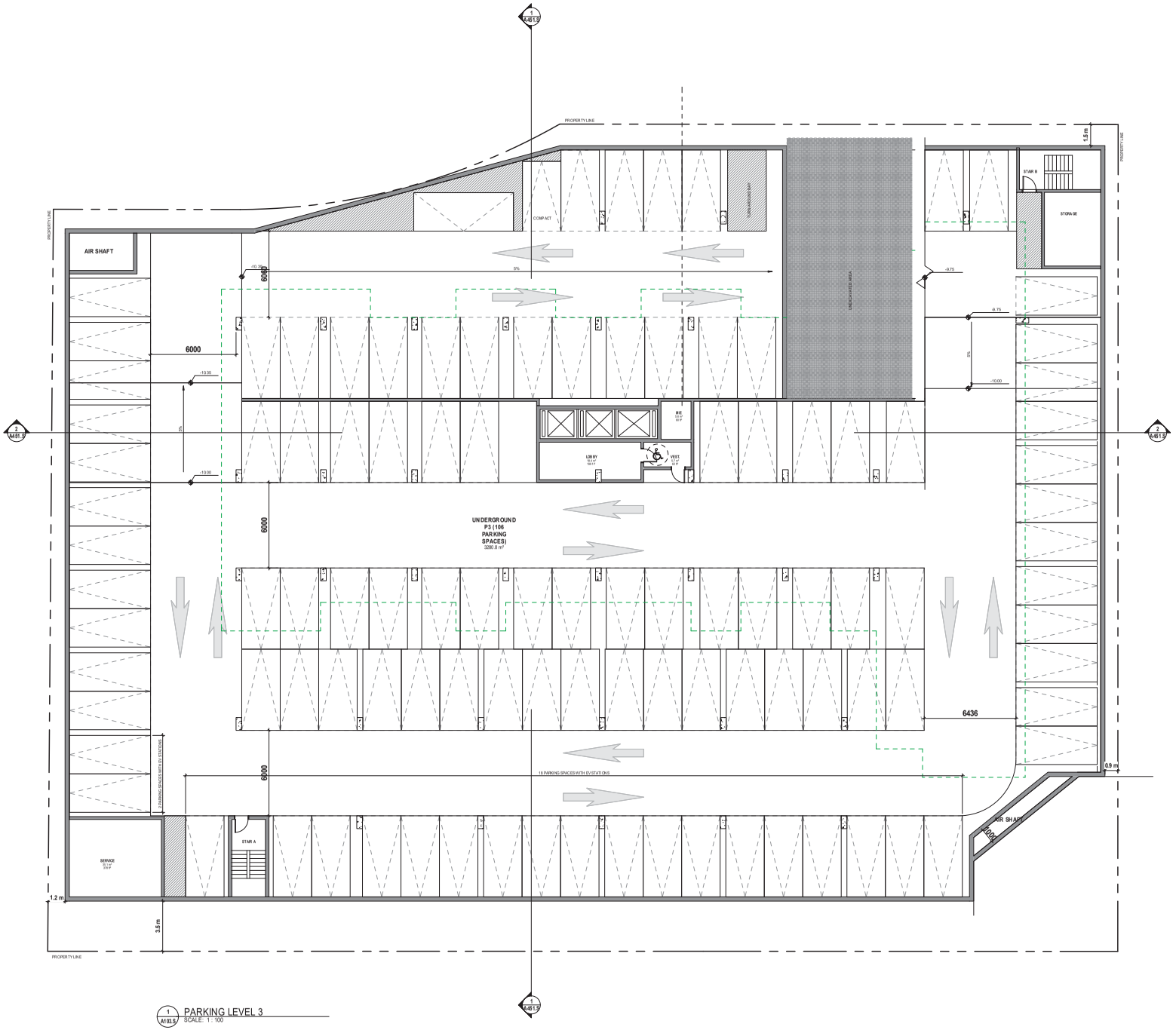


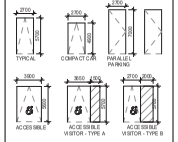
1 PARKING LEVEL 3
A103.S SCALE: 1 : 100

PARKING NOTES:

1. MINIMUM PARKING SPACE SIZES (UNLESS OTHERWISE NOTED):
   - 2600mm WIDE X 5600mm LONG (NO SIDE OBSTRUCTED)
   - 2900mm WIDE X 5600mm LONG (ONE SIDE OBSTRUCTED)
   - 3200mm WIDE X 5600mm LONG (TWO SIDES OBSTRUCTED)
2. MAINTAIN MINIMUM DRIVEABLE WIDTH OF 6000mm UNLESS OTHERWISE NOTED.
3. MAINTAIN MINIMUM HEADROOM CLEARANCE OF 2100mm THROUGHOUT

PARKING LEGEND:

- C — COMMERCIAL PARKING SPACE
- R — RESIDENTIAL PARKING SPACE
- V — VISITOR PARKING SPACE
- E — EXISTING PARKING SPACE
- BIKE LOCKER
- BIKE PARKING (STACKED)
- BIKE PARKING (VERTICAL)
- CONVEX MIRROR
- ELECTRIC VEHICLE
- LIGHT STANDARD
- PAINTED LINES
- FIRE-RATED BULKHEAD



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P3 Underground

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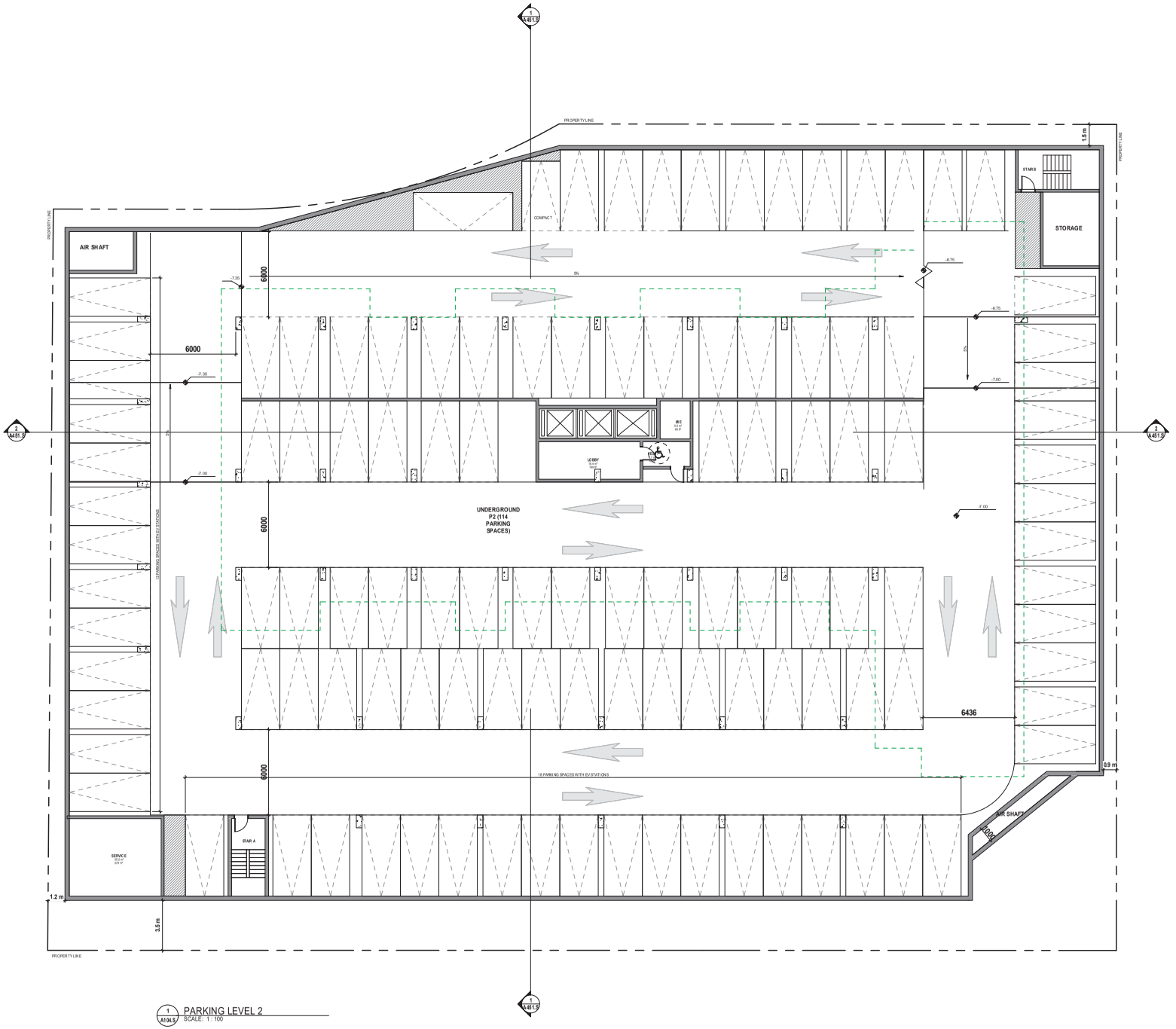


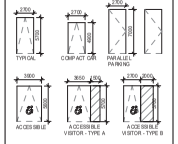
1 A104.S PARKING LEVEL 2
SCALE: 1 : 100

PARKING NOTES:

1. MINIMUM PARKING SPACE SIZES (UNLESS OTHERWISE NOTED):
   - 2600mm WIDE X 5600mm LONG (NO SIDES OBSTRUCTED)
   - 2600mm WIDE X 5600mm LONG (ONE SIDE OBSTRUCTED)
   - 3200mm WIDE X 5600mm LONG (TWO SIDES OBSTRUCTED)
2. MAINTAIN MINIMUM DRIVE AISLE WIDTH OF 6000mm UNLESS OTHERWISE NOTED.
3. MAINTAIN MINIMUM HEADROOM CLEARANCE OF 2100mm THROUGHOUT.

PARKING LEGEND:

- C COMMERCIAL PARKING SPACE
- R RESIDENTIAL PARKING SPACE
- V VISITOR PARKING SPACE
- E EXISTING PARKING SPACE
- BIKE LOCKER
- BIKE PARKING (STACKED)
- BIKE PARKING (VERTICAL)
- CONVEX MIRROR
- ELECTRIC VEHICLE
- LIGHT STANDARD
- PAINTED LINES
- FIRE-RATED BULKHEAD



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Oakville, ON

for

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P2 Underground

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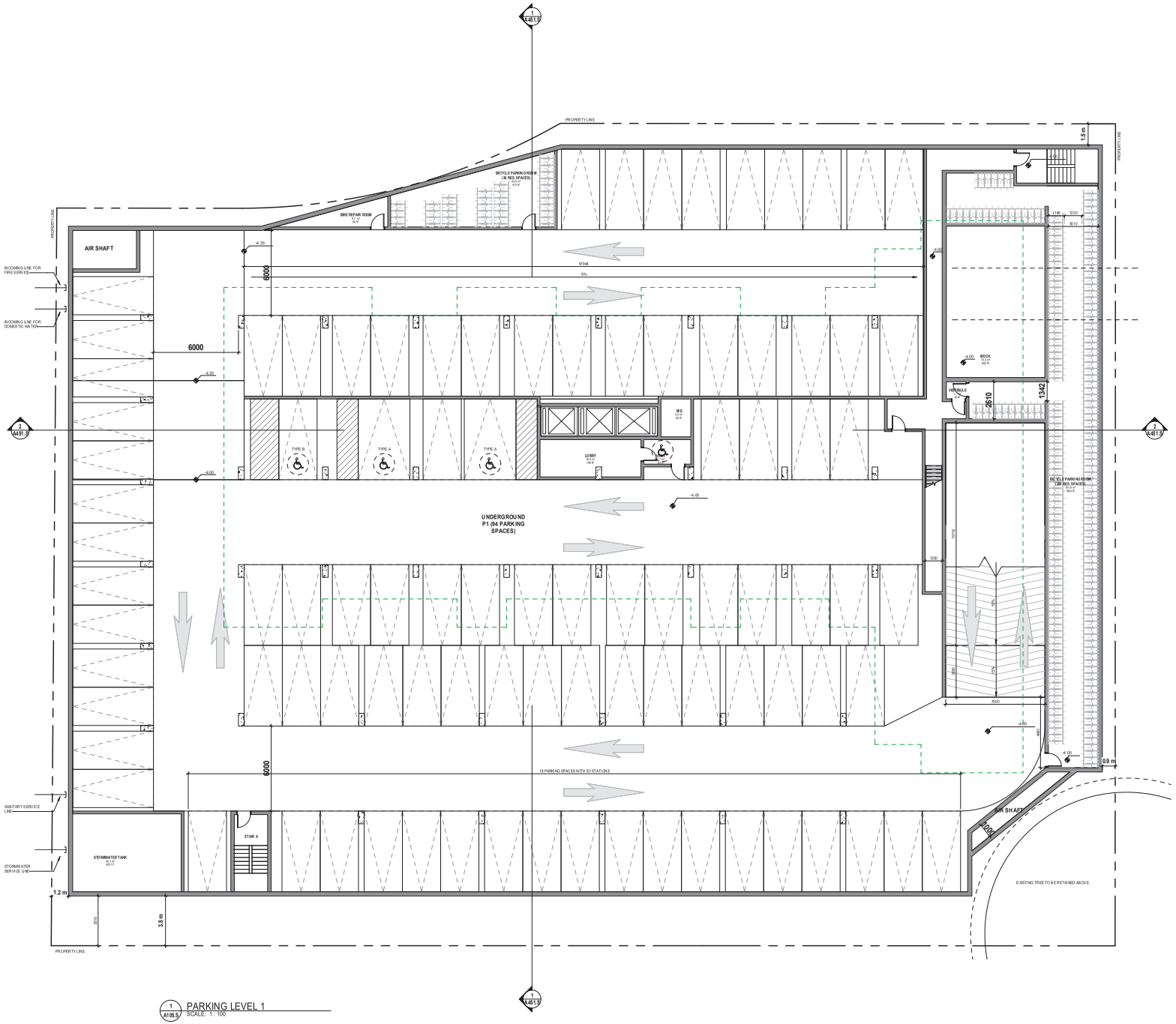

1 A105.S PARKING LEVEL 1
SCALE: 1 : 100

PARKING NOTES:

1. MINIMUM PARKING SPACE SIZES (UNLESS OTHERWISE NOTED):
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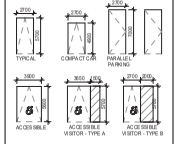
   - 2800mm WIDE X 5800mm LONG (ONE SIDE OBSTRUCTED)
   - 3200mm WIDE X 5800mm LONG (TWO SIDES OBSTRUCTED)
2. MAINTAIN MINIMUM DRIVEABLE WIDTH OF 6000mm UNLESS OTHERWISE NOTED.
3. MAINTAIN MINIMUM HEADROOM CLEARANCE OF 2100mm THROUGHOUT

PARKING LEGEND:

- C COMMERCIAL PARKING SPACE
- R RESIDENTIAL PARKING SPACE
- V VISITOR PARKING SPACE
- E EXISTING PARKING SPACE
- BIKE LOCKER
- BIKE PARKING (STACKED)
- BIKE PARKING (VERTICAL)
- CONVEX MIRROR
- ELECTRIC VEHICLE
- LIGHT STANDARD
- PAINTED LINES
- FIRE-RATED BULKHEAD



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50 Speers Road

Oakville, ON

for

Helberg Properties Limited

20023 As indicated ED, AT
PROJECT SCALE DRAWN REVIEWED

P1 Underground

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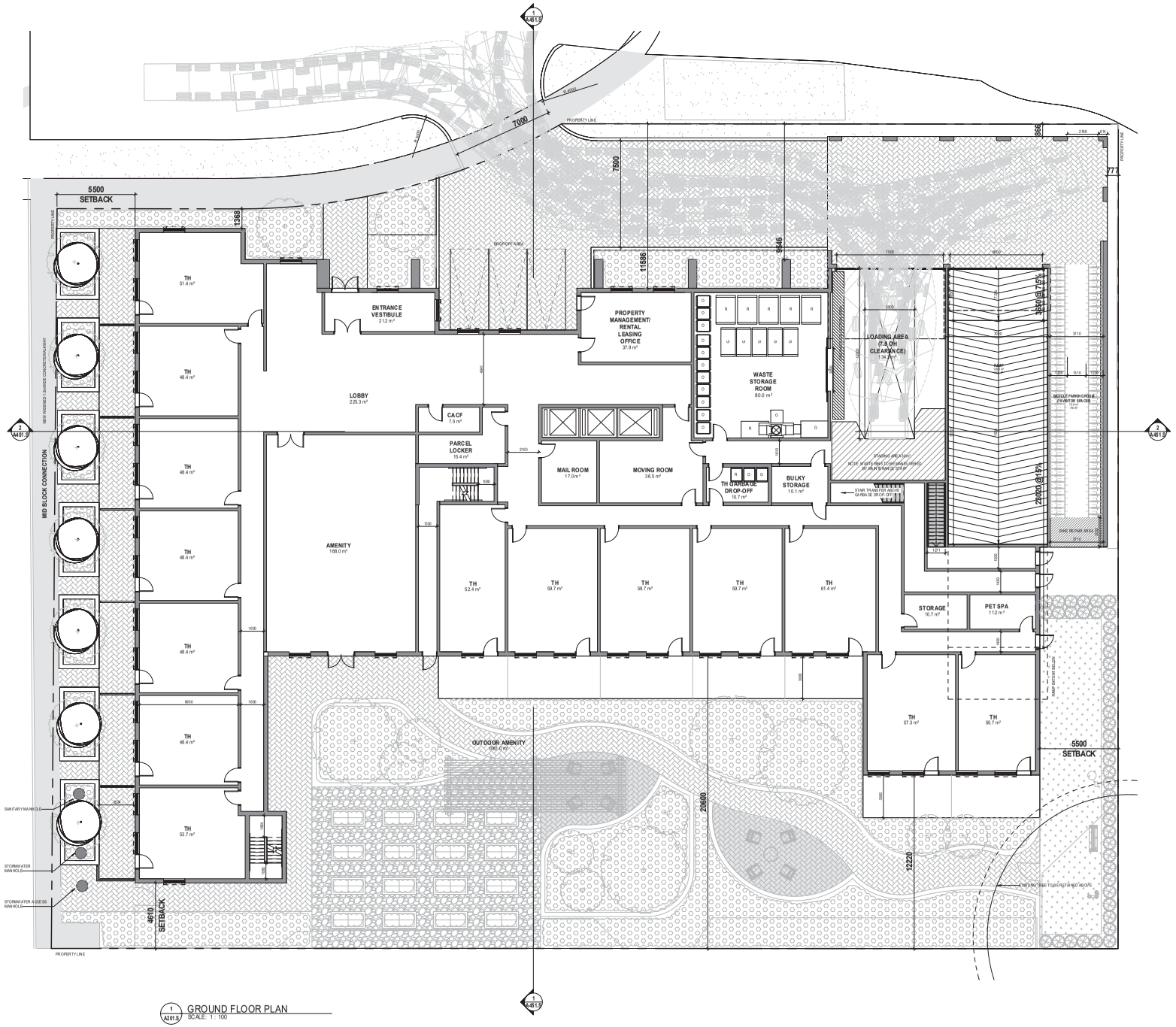

1 GROUND FLOOR PLAN
A201.S SCALE: 1 : 100

SITE PLAN LEGEND

- PROPERTY LINE
- LINE OF UNDER GROUND GARAGE BELOW
- MAIN BUILDING ENTRANCE
- RETAIL ENTRANCE
- EXIT
- VEHICLE / LOADING ENTRANCE / EXIT
- FIRE HYDRANT
- SIAMESE CONNECTION
- MH MANHOLE COVER
- AD AREA DRAIN
- CB CATCH BASIN
- FD FLOOR DRAIN (PARKING SLAB)
- FD FLOOR DRAIN (INTERIOR)
- EXISTING LIGHT
- TYPICAL PARKING SPACE
- TYPICAL B.F. PARKING SPACE
- F.F.E. FINISH FLOOR ELEVATION
- EXISTING ELEVATION
- PROPOSED ELEVATION
- TOP OF ROOF
- BUILDING ENVELOPE
- FIRE ACCESS ROUTE HEAVY DUTY PAVING. ASSEMBLY TO BE DESIGNED TO MEET THE LOADS IMPOSED BY FIRE FIGHTING EQUIPMENT.
- GREEN ROOF
- TERRACE PAVERS

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50 Speers Road

Oakville, ON

for

Helberg Properties Limited

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Ground Floor Plan

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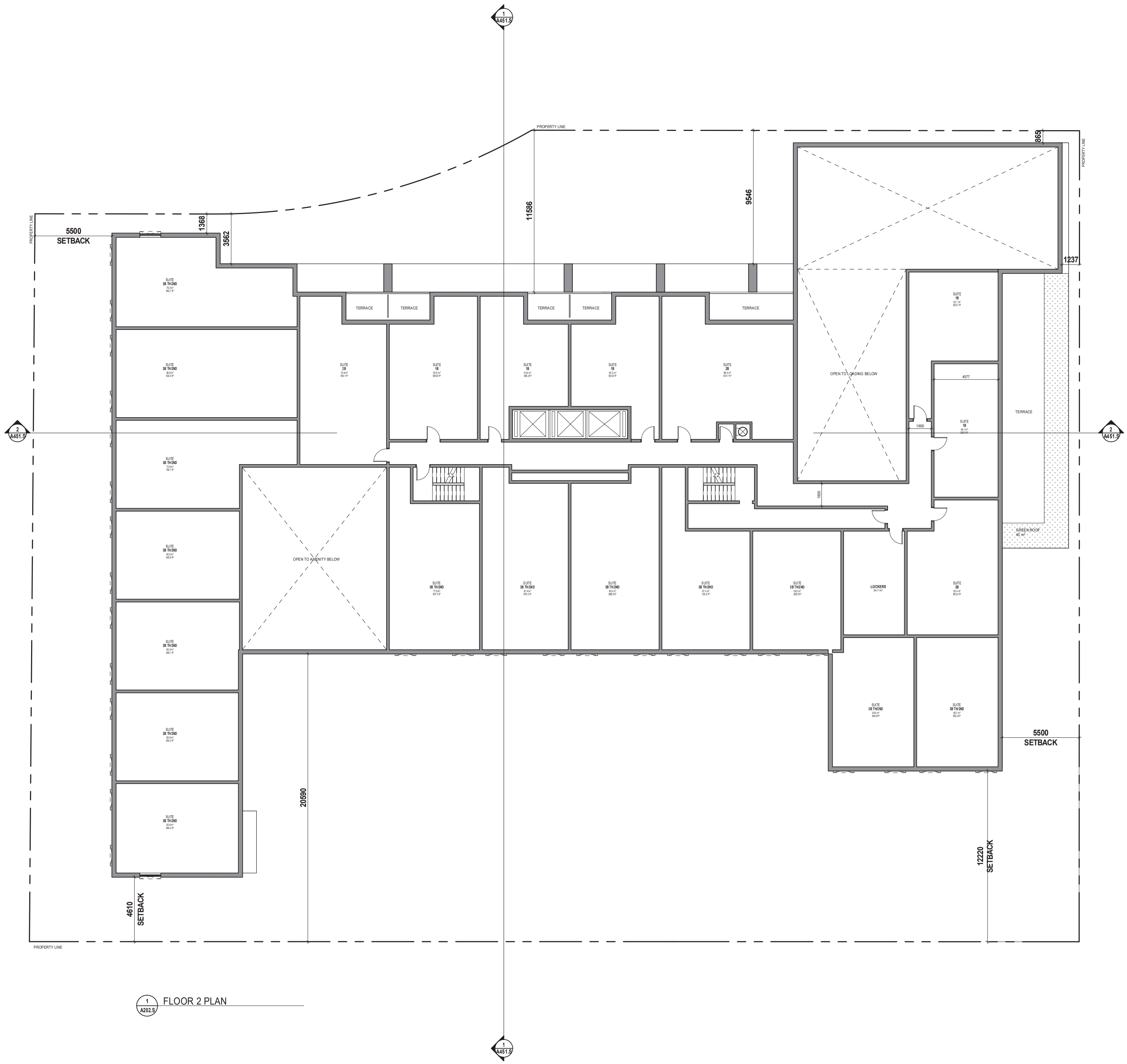


1 A202.S FLOOR 2 PLAN

Date	No.	Description

REVISION RECORD

2022-10-12 Rezoning & Official Plan Amendment

ISSUE RECORD

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H5
t 416 598 1240 www.bdpquadrangle.com

50 Speers Road

Oakville, ON

for
Helberg Properties Limited

20023 1 : 100 ED, VG AT
PROJECT SCALE DRAWN REVIEWED

Floor 2 Plan

A202.S

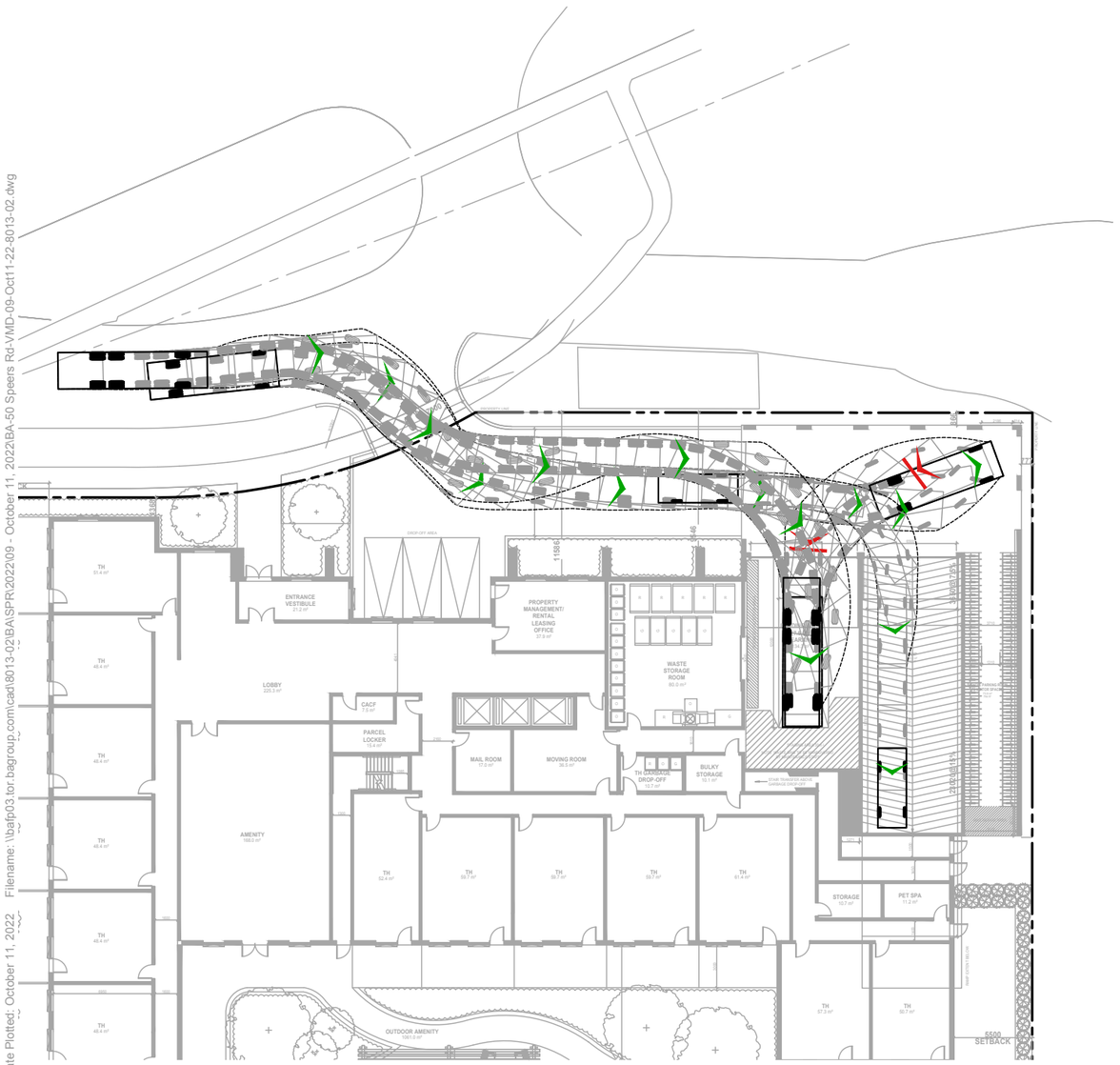
2022-10-12 4:38:33 PM

C:\Users\AT4532\Documents\BDPQ_AR_20023_50 Speers Rd_R2022_AT4532.rvt

Appendix C
Vehicle Manoeuvring Diagrams

INBOUND

OUTBOUND



BA Group

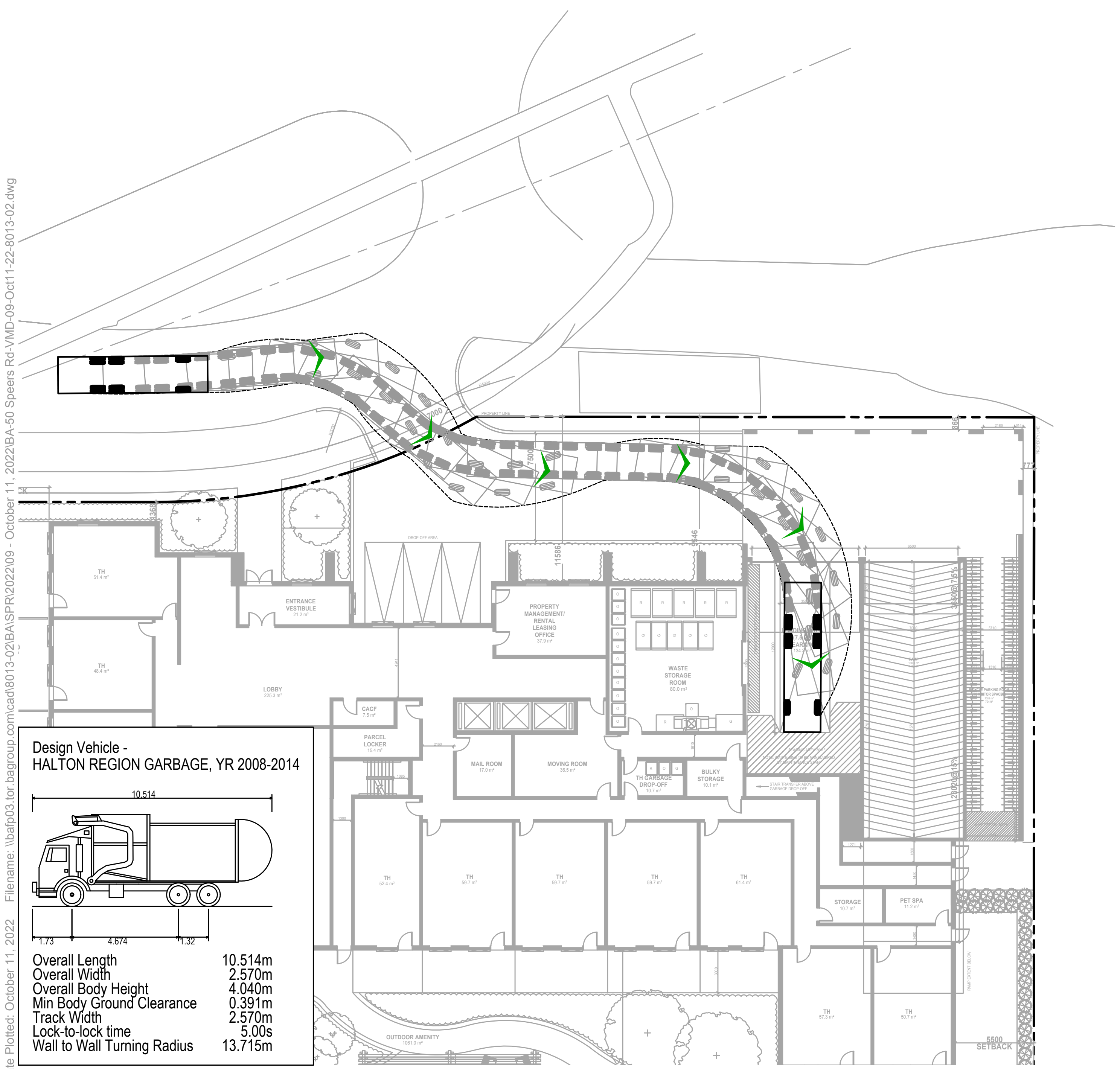
50 SPEERS ROAD

VEHICLE MANOEUVRING DIAGRAM
ALL VEHICLE MANOEUVRES

Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	June 7, 2022
Revised:	October 11, 2022

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-01

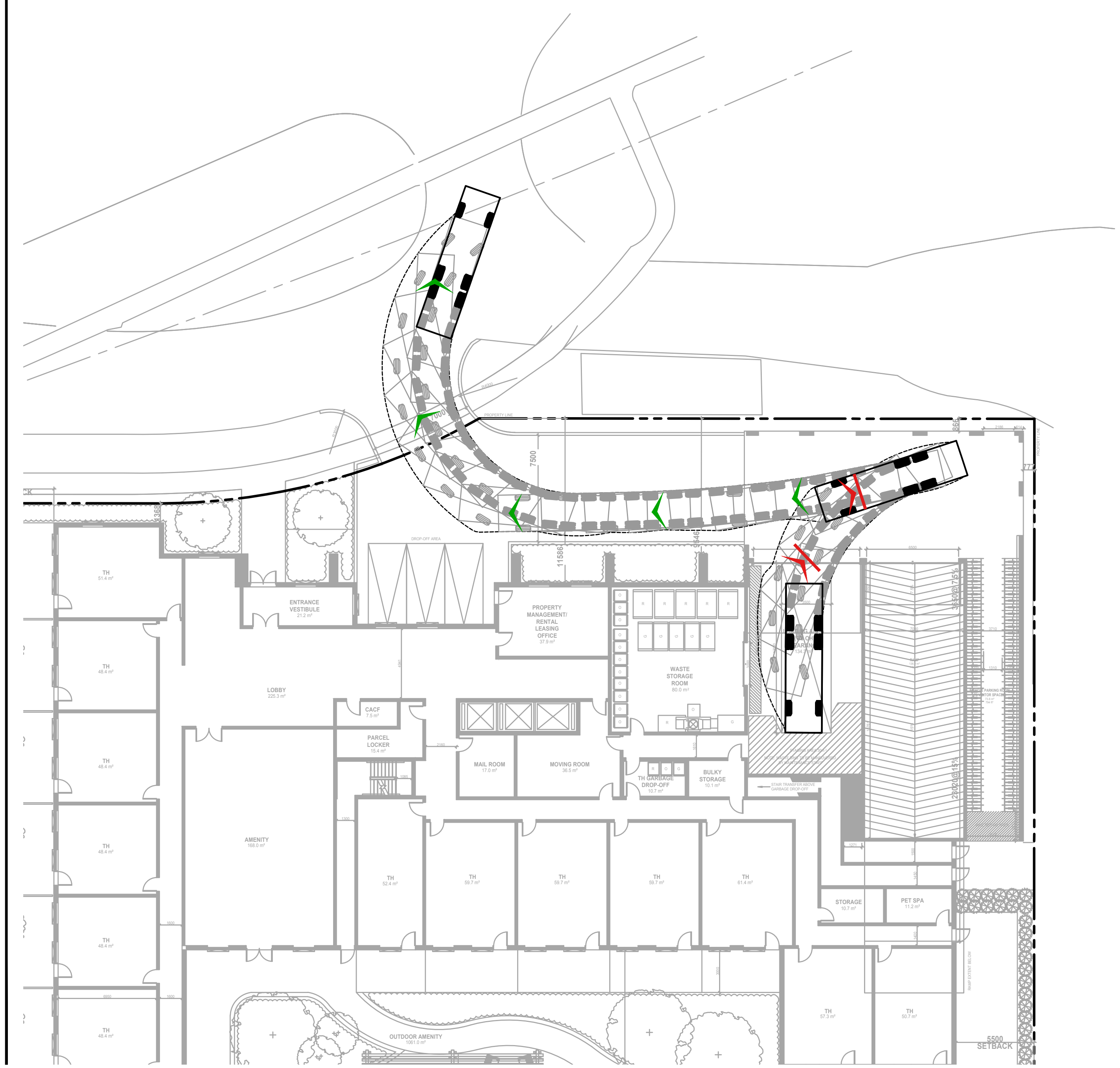


Design Vehicle -
HALTON REGION GARBAGE, YR 2008-2014

10.514

1.73 4.674 1.32

Overall Length	10.514m
Overall Width	2.570m
Overall Body Height	4.040m
Min Body Ground Clearance	0.391m
Track Width	2.570m
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	13.715m



Date Plotted: October 11, 2022 Filename: \\bafp03.tor.bagroup.com\cad\8013-02\BA\SPR\2022\09 - October 11, 2022\BA-50 Speers Rd-VMD-09-Oct11-22-8013-02.dwg

BA Group

50 SPEERS ROAD

VEHICLE MANOEUVRING DIAGRAM
HALTON REGION GARBAGE TRUCK

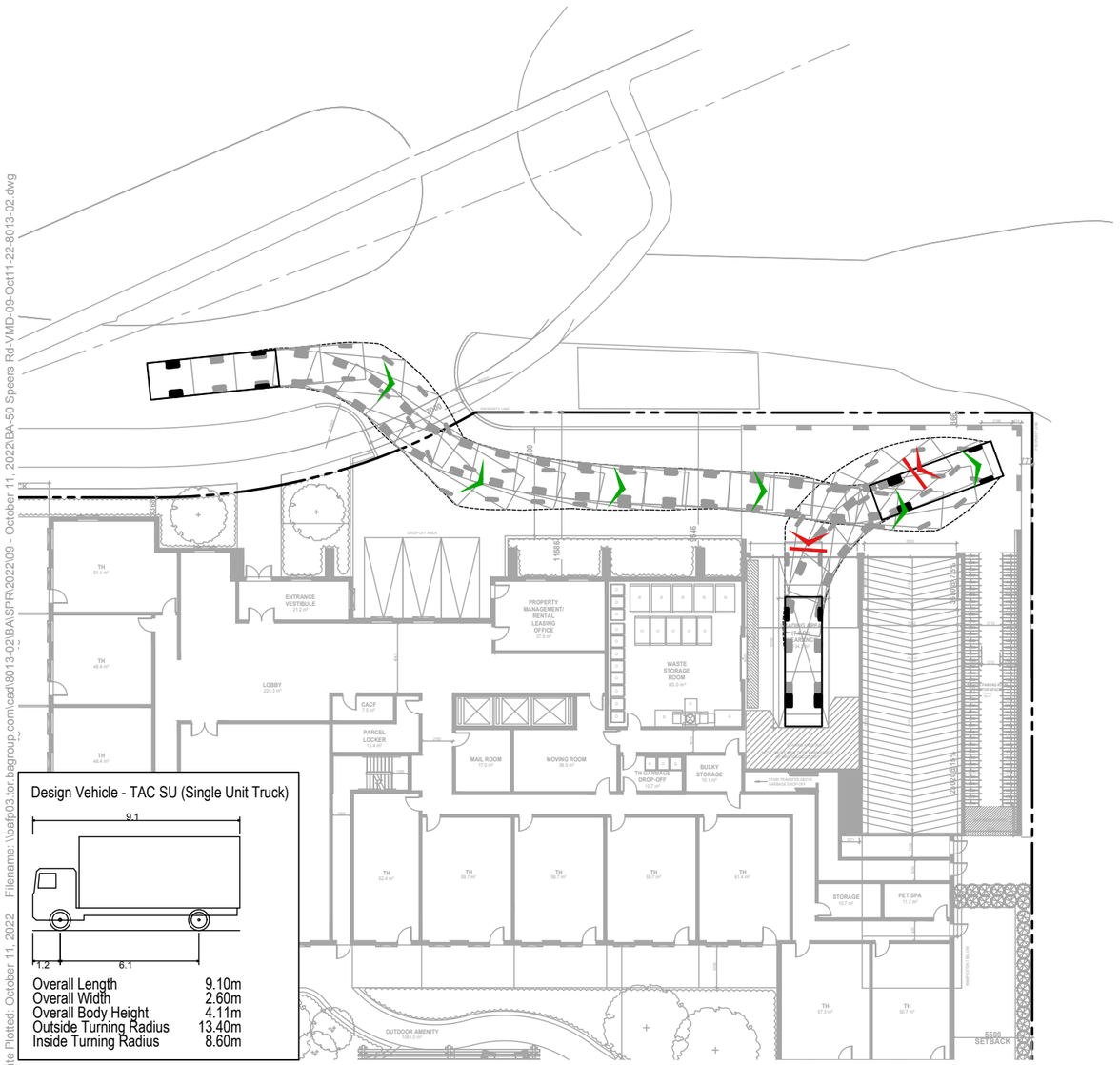
Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	June 7, 2022
Revised:	October 11, 2022

Scale 1:400 (0 2 4 6 8 10 20m)

Drawing No. VMD-02

INBOUND

OUTBOUND



Design Vehicle - TAC SU (Single Unit Truck)

Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

Date Plotted: October 11, 2022 Filename: \\bafp03.tor.bagroup.com\cad\8013-02\BA\SPR\2022\09 - October 11, 2022\BA-50 Speers Rd-VMD-09-Oct11-22-8013-02.dwg

BA Group

50 SPEERS ROAD

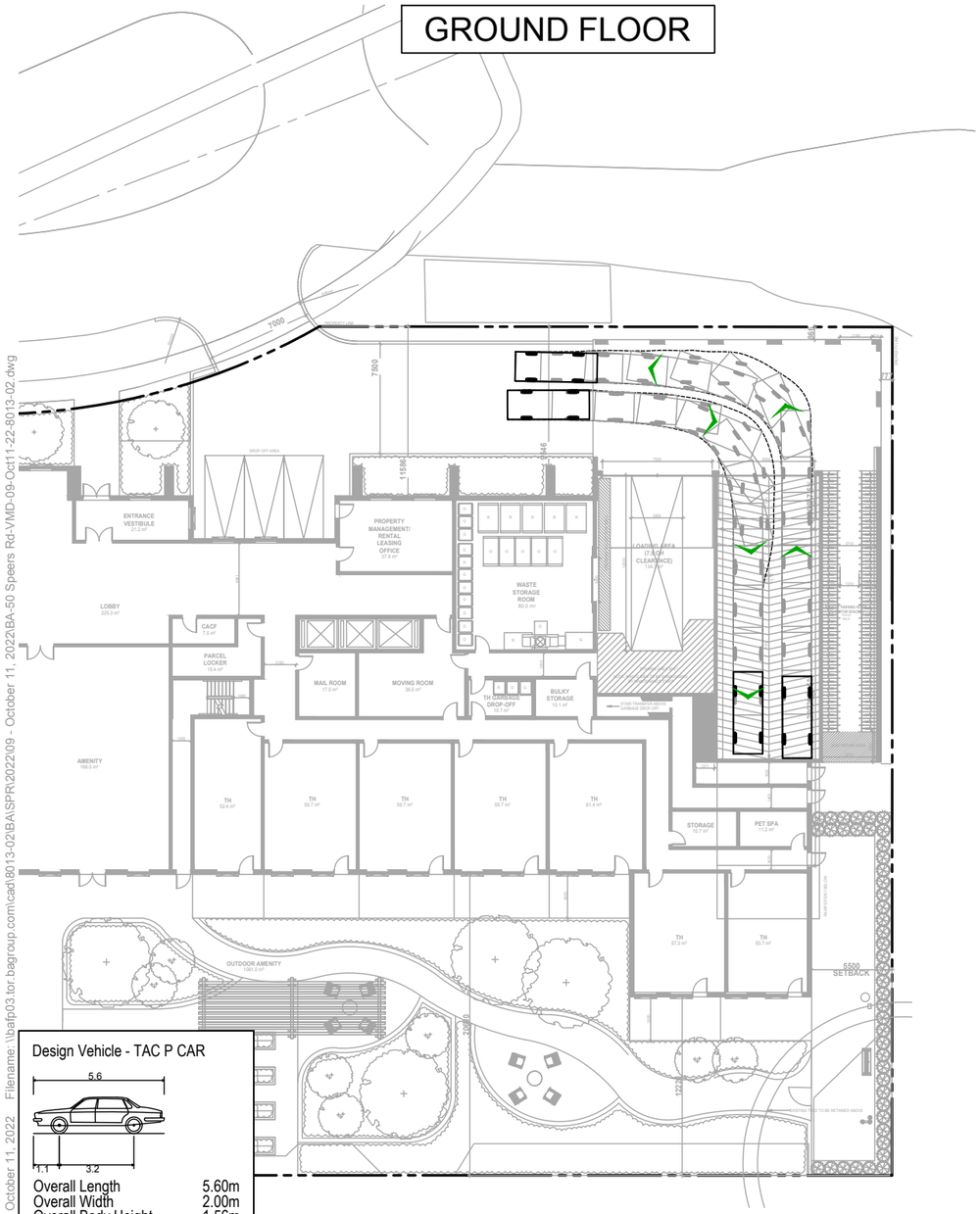
VEHICLE MANOEUVRING DIAGRAM
TAC SINGLE UNIT (SU) TRUCK

Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	June 7, 2022
Revised:	October 11, 2022

Scale 1:400 — 0 2 4 6 8 10 20m

Drawing No. VMD-03

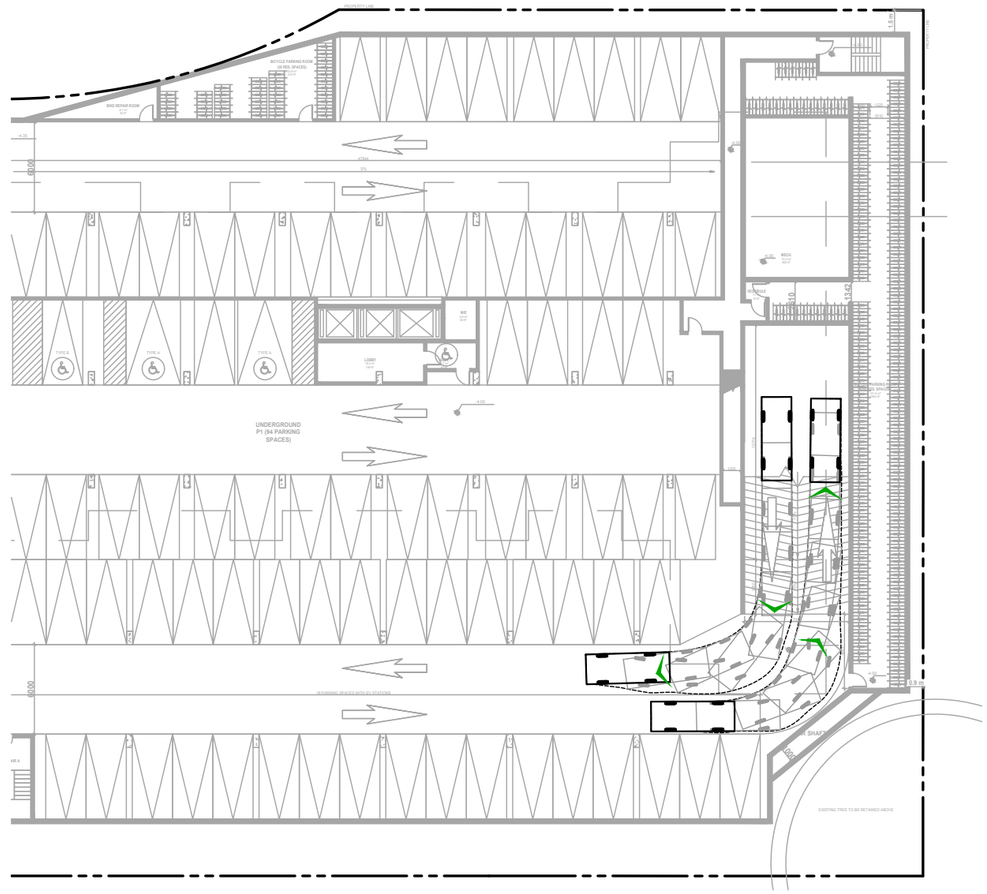
GROUND FLOOR



Design Vehicle - TAC P CAR

Overall Length	5.60m
Overall Width	2.00m
Overall Body Height	1.56m
Outside Turning Radius	6.90m
Inside Turning Radius	3.40m

P1 PARKING LEVEL



BA Group

50 SPEERS ROAD

VEHICLE MANOEUVRING DIAGRAM
GROUND FLOOR & P1 PARKING LEVEL
TAC P CAR - PARKING RAMP

Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	June 7, 2022
Revised:	October 11, 2022

Scale 1:400 — 0 2 4 6 8 10 20m

Drawing No. VMD-04

Appendix D
Turning Movement Counts

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (2 . SPEERS RD & CROSS AVE)

Start Time	N Approach CROSS AVE					E Approach CORNWALL RD					W Approach SPEERS RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	15	0	0	0	15	0	43	0	0	43	61	22	0	0	83	141	
07:15:00	26	0	0	0	26	3	47	0	1	50	103	42	0	0	145	221	
07:30:00	27	1	0	1	28	2	52	0	0	54	104	47	0	0	151	233	
07:45:00	40	2	0	8	42	4	79	0	0	83	137	59	0	0	196	321	916
08:00:00	37	2	0	0	39	5	113	0	0	118	131	36	0	0	167	324	1099
08:15:00	72	1	0	2	73	6	143	0	1	149	167	66	0	0	233	455	1333
08:30:00	63	1	0	0	64	4	144	1	0	149	140	29	0	1	169	382	1482
08:45:00	48	1	0	3	49	5	135	0	1	140	139	53	0	0	192	381	1542
BREAK																	
16:00:00	98	5	0	1	103	7	180	0	2	187	156	36	2	0	194	484	
16:15:00	110	0	0	1	110	4	173	0	0	177	172	63	0	0	235	522	
16:30:00	75	5	0	2	80	4	166	0	0	170	163	58	2	0	223	473	
16:45:00	98	0	0	1	98	3	194	0	2	197	158	57	0	0	215	510	1989
17:00:00	96	2	0	2	98	4	175	0	0	179	178	56	0	0	234	511	2016
17:15:00	114	1	0	2	115	5	190	0	0	195	161	56	0	0	217	527	2021
17:30:00	75	2	0	6	77	6	158	0	0	164	158	53	1	0	212	453	2001
17:45:00	84	0	0	4	84	7	133	0	0	140	119	48	0	0	167	391	1882
Grand Total	1078	23	0	33	1101	69	2125	1	7	2195	2247	781	5	1	3033	**6329**	-
Approach%	97.9%	2.1%	0%		-	3.1%	96.8%	0%		-	74.1%	25.8%	0.2%		-	**-**	-
Totals %	17%	0.4%	0%		17.4%	1.1%	33.6%	0%		34.7%	35.5%	12.3%	0.1%		47.9%	**-**	-
Heavy	75	0	0		-	1	63	0		-	64	65	0		-	**-**	-
Heavy %	7%	0%	0%		-	1.4%	3%	0%		-	2.8%	8.3%	0%		-	**-**	-
Bicycles	0	0	0		-	0	3	0		-	2	0	0		-	**-**	-
Bicycle %	0%	0%	0%		-	0%	0.1%	0%		-	0.1%	0%	0%		-	**-**	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach CROSS AVE					E Approach CORNWALL RD					W Approach SPEERS RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	37	2	0	0	39	5	113	0	0	118	131	36	0	0	167	324
08:15:00	72	1	0	2	73	6	143	0	1	149	167	66	0	0	233	455
08:30:00	63	1	0	0	64	4	144	1	0	149	140	29	0	1	169	382
08:45:00	48	1	0	3	49	5	135	0	1	140	139	53	0	0	192	381
Grand Total	220	5	0	5	225	20	535	1	2	556	577	184	0	1	761	**1542**
Approach%	97.8%	2.2%	0%		-	3.6%	96.2%	0.2%		-	75.8%	24.2%	0%		-	**-**
Totals %	14.3%	0.3%	0%		14.6%	1.3%	34.7%	0.1%		36.1%	37.4%	11.9%	0%		49.4%	**-**
PHF	0.76	0.63	0		0.77	0.83	0.93	0.25		0.93	0.86	0.7	0		0.82	**-**
Heavy	21	0	0		21	1	24	0		25	27	14	0		41	**-**
Heavy %	9.5%	0%	0%		9.3%	5%	4.5%	0%		4.5%	4.7%	7.6%	0%		5.4%	**-**
Lights	199	5	0		204	19	511	1		531	550	170	0		720	**-**
Lights %	90.5%	100%	0%		90.7%	95%	95.5%	100%		95.5%	95.3%	92.4%	0%		94.6%	**-**
Single-Unit Trucks	3	0	0		3	1	15	0		16	16	1	0		17	**-**
Single-Unit Trucks %	1.4%	0%	0%		1.3%	5%	2.8%	0%		2.9%	2.8%	0.5%	0%		2.2%	**-**
Buses	17	0	0		17	0	7	0		7	9	13	0		22	**-**
Buses %	7.7%	0%	0%		7.6%	0%	1.3%	0%		1.3%	1.6%	7.1%	0%		2.9%	**-**
Articulated Trucks	1	0	0		1	0	2	0		2	2	0	0		2	**-**
Articulated Trucks %	0.5%	0%	0%		0.4%	0%	0.4%	0%		0.4%	0.3%	0%	0%		0.3%	**-**
Pedestrians	-	-	-	5	-	-	-	-	2	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	62.5%		-	-	-	25%		-	-	-	12.5%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	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: Overcast Clouds (7.39 °C)

Start Time	N Approach CROSS AVE					E Approach CORNWALL RD					W Approach SPEERS RD					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	75	5	0	2	80	4	166	0	0	170	163	58	2	0	223	473
16:45:00	98	0	0	1	98	3	194	0	2	197	158	57	0	0	215	510
17:00:00	96	2	0	2	98	4	175	0	0	179	178	56	0	0	234	511
17:15:00	114	1	0	2	115	5	190	0	0	195	161	56	0	0	217	527
Grand Total	383	8	0	7	391	16	725	0	2	741	660	227	2	0	889	**2021**
Approach%	98%	2%	0%		-	2.2%	97.8%	0%		-	74.2%	25.5%	0.2%		-	**-**
Totals %	19%	0.4%	0%		19.3%	0.8%	35.9%	0%		36.7%	32.7%	11.2%	0.1%		44%	**-**
PHF	0.84	0.4	0		0.85	0.8	0.93	0		0.94	0.93	0.98	0.25		0.95	**-**
Heavy	18	0	0		18	0	8	0		8	3	15	0		18	**-**
Heavy %	4.7%	0%	0%		4.6%	0%	1.1%	0%		1.1%	0.5%	6.6%	0%		2%	**-**
Lights	365	8	0		373	16	717	0		733	657	212	2		871	**-**
Lights %	95.3%	100%	0%		95.4%	100%	98.9%	0%		98.9%	99.5%	93.4%	100%		98%	**-**
Single-Unit Trucks	2	0	0		2	0	5	0		5	3	0	0		3	**-**
Single-Unit Trucks %	0.5%	0%	0%		0.5%	0%	0.7%	0%		0.7%	0.5%	0%	0%		0.3%	**-**
Buses	15	0	0		15	0	2	0		2	0	15	0		15	**-**
Buses %	3.9%	0%	0%		3.8%	0%	0.3%	0%		0.3%	0%	6.6%	0%		1.7%	**-**
Articulated Trucks	1	0	0		1	0	1	0		1	0	0	0		0	**-**
Articulated Trucks %	0.3%	0%	0%		0.3%	0%	0.1%	0%		0.1%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	5	-	-	-	-	2	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	55.6%		-	-	-	22.2%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	22.2%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

	Bicycles on Crosswalk	Pedestrians
N	0	5
E	0	2
W	0	1

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)

	Bicycles on Crosswalk	Pedestrians
N	2	5
E	0	2
W	0	0

Spectrum

Turning Movement Count
Location Name: SPEERS RD & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (1 . SPEERS RD & KERR ST)

Start Time	N Approach KERR ST						E Approach SPEERS RD						S Approach KERR ST						W Approach SPEERS RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	7	10	20	0	1	37	11	39	18	0	1	68	26	10	16	0	0	52	16	39	2	0	0	57	214	
07:15:00	5	15	29	0	1	49	23	43	17	0	2	83	43	4	14	0	1	61	14	72	1	0	1	87	280	
07:30:00	6	17	29	0	4	52	19	34	19	0	6	72	51	6	24	0	3	81	16	61	1	0	7	78	283	
07:45:00	11	26	33	0	2	70	33	70	24	0	11	127	47	20	18	0	4	85	16	99	9	0	0	124	406	1183
08:00:00	11	23	39	0	5	73	31	83	43	0	14	157	41	16	18	0	2	75	11	80	5	0	5	96	401	1370
08:15:00	4	40	41	0	3	85	49	123	49	0	11	221	63	23	22	0	2	108	22	133	10	0	10	165	579	1669
08:30:00	18	29	40	0	5	87	55	130	38	0	4	223	45	19	15	0	3	79	26	81	7	0	6	114	503	1889
08:45:00	13	42	46	0	3	101	40	98	48	0	8	186	55	15	18	0	1	88	24	94	11	1	1	130	505	1988
BREAK																										
16:00:00	15	51	48	0	10	114	87	121	60	0	6	268	62	31	43	0	6	136	28	92	14	0	13	134	652	
16:15:00	10	66	69	0	6	145	86	159	44	0	10	289	62	34	39	0	0	135	34	109	9	0	7	152	721	
16:30:00	13	41	75	0	10	129	51	125	45	1	9	222	50	33	34	0	1	117	33	116	7	0	10	156	624	
16:45:00	20	70	60	0	3	150	89	149	61	0	5	299	52	39	27	0	2	118	23	99	12	0	5	134	701	2698
17:00:00	17	55	64	0	12	136	82	130	43	0	11	255	54	30	29	0	4	113	30	136	16	0	14	182	686	2732
17:15:00	8	60	63	0	4	131	65	178	57	0	4	300	49	44	27	0	3	120	26	110	21	0	5	157	708	2719
17:30:00	15	49	66	0	16	130	60	113	46	0	8	219	52	33	28	0	4	113	34	99	7	0	15	140	602	2697
17:45:00	12	52	47	0	9	111	63	109	57	0	6	229	50	32	22	0	6	104	36	81	10	0	6	127	571	2567
Grand Total	185	646	769	0	94	1600	844	1704	669	1	116	3218	802	389	394	0	42	1585	389	1501	142	1	105	2033	**8436**	-
Approach%	11.6%	40.4%	48.1%	0%		-	26.2%	53%	20.8%	0%		-	50.6%	24.5%	24.9%	0%		-	19.1%	73.8%	7%	0%		-	-	-
Totals %	2.2%	7.7%	9.1%	0%		19%	10%	20.2%	7.9%	0%		38.1%	9.5%	4.6%	4.7%	0%		18.8%	4.6%	17.8%	1.7%	0%		24.1%	-	-
Heavy	2	12	31	0		-	32	71	34	0		-	36	1	12	0		-	18	70	1	0		-	-	-
Heavy %	1.1%	1.9%	4%	0%		-	3.8%	4.2%	5.1%	0%		-	4.5%	0.3%	3%	0%		-	4.6%	4.7%	0.7%	0%		-	-	-
Bicycles	0	0	2	0		-	0	0	1	0		-	0	0	0	0		-	2	1	0	0		-	-	-
Bicycle %	0%	0%	0.3%	0%		-	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0.5%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: SPEERS RD & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach KERR ST						E Approach SPEERS RD						S Approach KERR ST						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	11	23	39	0	5	73	31	83	43	0	14	157	41	16	18	0	2	75	11	80	5	0	5	96	401
08:15:00	4	40	41	0	3	85	49	123	49	0	11	221	63	23	22	0	2	108	22	133	10	0	10	165	579
08:30:00	18	29	40	0	5	87	55	130	38	0	4	223	45	19	15	0	3	79	26	81	7	0	6	114	503
08:45:00	13	42	46	0	3	101	40	98	48	0	8	186	55	15	18	0	1	88	24	94	11	1	1	130	505
Grand Total	46	134	166	0	16	346	175	434	178	0	37	787	204	73	73	0	8	350	83	388	33	1	22	505	**1988**
Approach%	13.3%	38.7%	48%	0%		-	22.2%	55.1%	22.6%	0%		-	58.3%	20.9%	20.9%	0%		-	16.4%	76.8%	6.5%	0.2%		-	**-**
Totals %	2.3%	6.7%	8.4%	0%		17.4%	8.8%	21.8%	9%	0%		39.6%	10.3%	3.7%	3.7%	0%		17.6%	4.2%	19.5%	1.7%	0.1%		25.4%	**-**
PHF	0.64	0.8	0.9	0		0.86	0.8	0.83	0.91	0		0.88	0.81	0.79	0.83	0		0.81	0.8	0.73	0.75	0.25		0.77	**-**
Heavy	1	5	9	0		15	8	22	13	0		43	11	1	5	0		17	6	25	0	0		31	**-**
Heavy %	2.2%	3.7%	5.4%	0%		4.3%	4.6%	5.1%	7.3%	0%		5.5%	5.4%	1.4%	6.8%	0%		4.9%	7.2%	6.4%	0%	0%		6.1%	**-**
Lights	45	129	157	0		331	167	412	165	0		744	193	72	68	0		333	77	363	33	1		474	**-**
Lights %	97.8%	96.3%	94.6%	0%		95.7%	95.4%	94.9%	92.7%	0%		94.5%	94.6%	98.6%	93.2%	0%		95.1%	92.8%	93.6%	100%	100%		93.9%	**-**
Single-Unit Trucks	1	2	2	0		5	1	13	4	0		18	4	0	2	0		6	5	11	0	0		16	**-**
Single-Unit Trucks %	2.2%	1.5%	1.2%	0%		1.4%	0.6%	3%	2.2%	0%		2.3%	2%	0%	2.7%	0%		1.7%	6%	2.8%	0%	0%		3.2%	**-**
Buses	0	2	7	0		9	7	8	9	0		24	7	0	3	0		10	1	12	0	0		13	**-**
Buses %	0%	1.5%	4.2%	0%		2.6%	4%	1.8%	5.1%	0%		3%	3.4%	0%	4.1%	0%		2.9%	1.2%	3.1%	0%	0%		2.6%	**-**
Articulated Trucks	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	0	2	0	0		2	**-**
Articulated Trucks %	0%	0.7%	0%	0%		0.3%	0%	0.2%	0%	0%		0.1%	0%	1.4%	0%	0%		0.3%	0%	0.5%	0%	0%		0.4%	**-**
Pedestrians	-	-	-	-	14	-	-	-	-	-	37	-	-	-	-	-	8	-	-	-	-	-	20	-	**-**
Pedestrians%	-	-	-	-	16.9%		-	-	-	-	44.6%		-	-	-	-	9.6%		-	-	-	-	24.1%		**-**
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	**-**
Bicycles on Crosswalk%	-	-	-	-	2.4%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	2.4%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

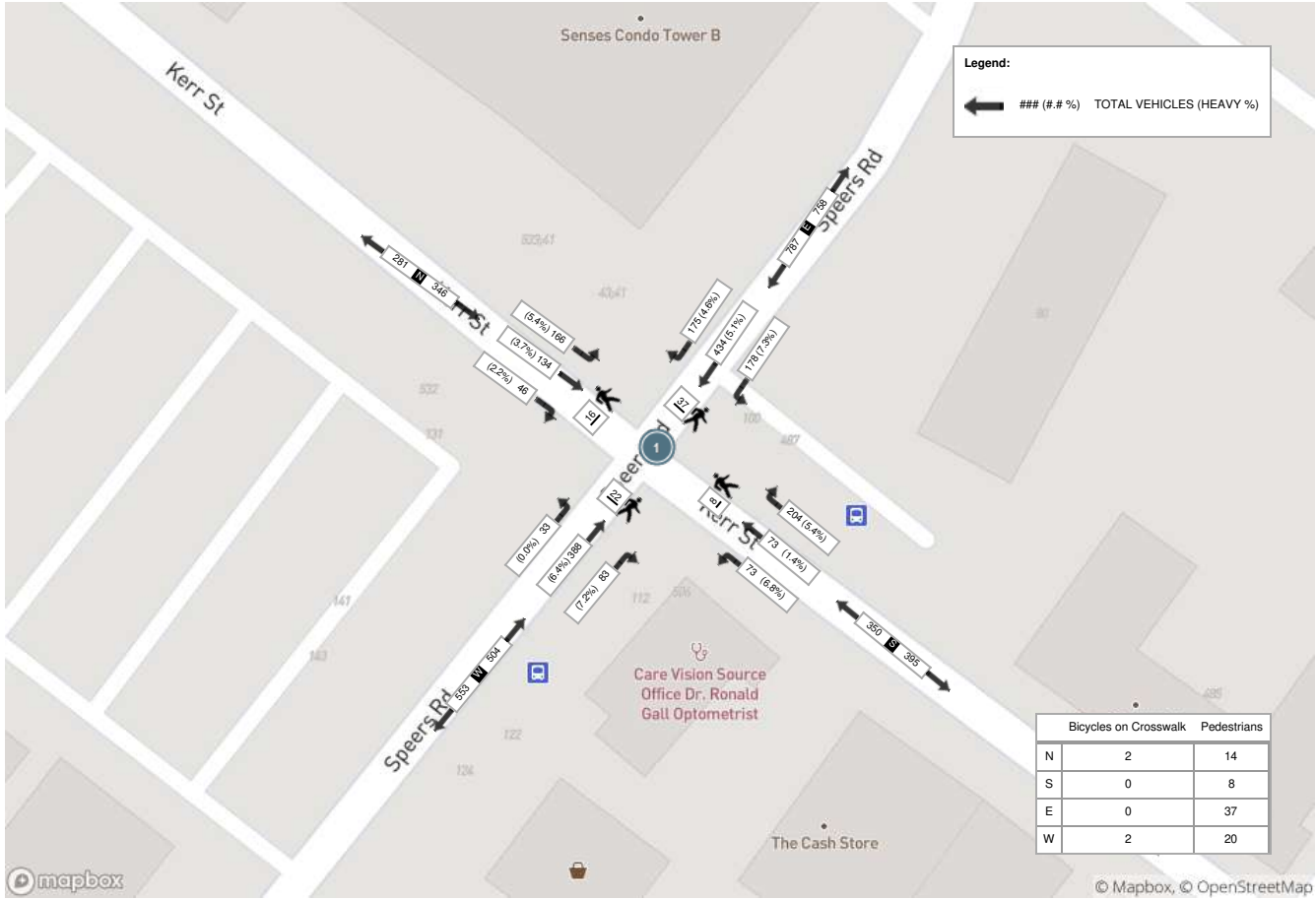
Turning Movement Count
Location Name: SPEERS RD & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (7.39 °C)

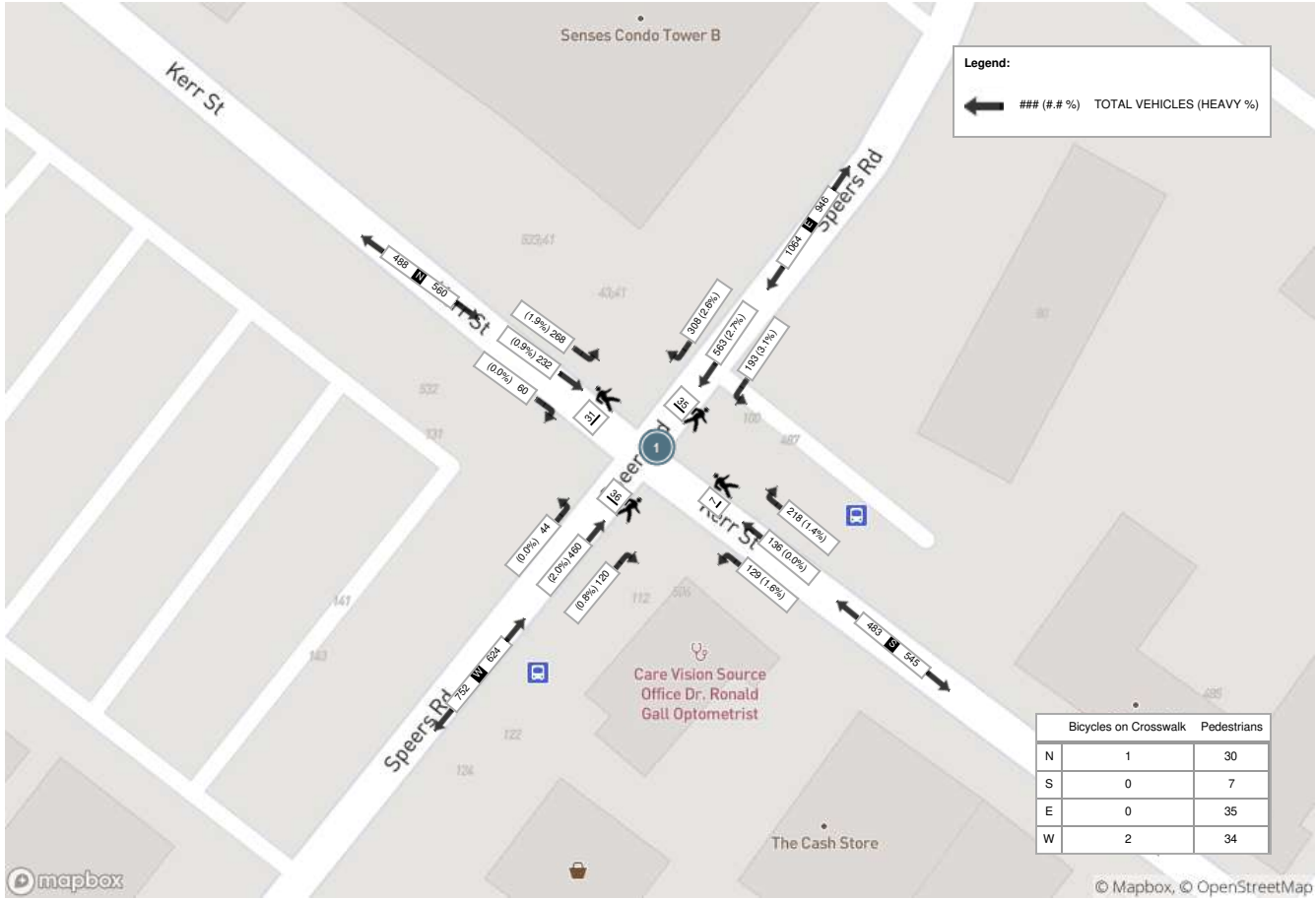
Start Time	N Approach KERR ST						E Approach SPEERS RD						S Approach KERR ST						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	10	66	69	0	6	145	86	159	44	0	10	289	62	34	39	0	0	135	34	109	9	0	7	152	721
16:30:00	13	41	75	0	10	129	51	125	45	1	9	222	50	33	34	0	1	117	33	116	7	0	10	156	624
16:45:00	20	70	60	0	3	150	89	149	61	0	5	299	52	39	27	0	2	118	23	99	12	0	5	134	701
17:00:00	17	55	64	0	12	136	82	130	43	0	11	255	54	30	29	0	4	113	30	136	16	0	14	182	686
Grand Total	60	232	268	0	31	560	308	563	193	1	35	1065	218	136	129	0	7	483	120	460	44	0	36	624	**2732**
Approach%	10.7%	41.4%	47.9%	0%		-	28.9%	52.9%	18.1%	0.1%		-	45.1%	28.2%	26.7%	0%		-	19.2%	73.7%	7.1%	0%		-	**-**
Totals %	2.2%	8.5%	9.8%	0%		20.5%	11.3%	20.6%	7.1%	0%		39%	8%	5%	4.7%	0%		17.7%	4.4%	16.8%	1.6%	0%		22.8%	**-**
PHF	0.75	0.83	0.89	0		0.93	0.87	0.89	0.79	0.25		0.89	0.88	0.87	0.83	0		0.89	0.88	0.85	0.69	0		0.86	**-**
Heavy	0	2	5	0		7	8	15	6	0		29	3	0	2	0		5	1	9	0	0		10	**-**
Heavy %	0%	0.9%	1.9%	0%		1.3%	2.6%	2.7%	3.1%	0%		2.7%	1.4%	0%	1.6%	0%		1%	0.8%	2%	0%	0%		1.6%	**-**
Lights	60	230	263	0		553	300	548	187	1		1036	215	136	127	0		478	119	451	44	0		614	**-**
Lights %	100%	99.1%	98.1%	0%		98.8%	97.4%	97.3%	96.9%	100%		97.3%	98.6%	100%	98.4%	0%		99%	99.2%	98%	100%	0%		98.4%	**-**
Single-Unit Trucks	0	2	0	0		2	1	6	2	0		9	1	0	2	0		3	0	2	0	0		2	**-**
Single-Unit Trucks %	0%	0.9%	0%	0%		0.4%	0.3%	1.1%	1%	0%		0.8%	0.5%	0%	1.6%	0%		0.6%	0%	0.4%	0%	0%		0.3%	**-**
Buses	0	0	5	0		5	7	7	4	0		18	2	0	0	0		2	1	7	0	0		8	**-**
Buses %	0%	0%	1.9%	0%		0.9%	2.3%	1.2%	2.1%	0%		1.7%	0.9%	0%	0%	0%		0.4%	0.8%	1.5%	0%	0%		1.3%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	30	-	-	-	-	-	35	-	-	-	-	-	7	-	-	-	-	-	34	-	**-**
Pedestrians%	-	-	-	-	27.5%		-	-	-	-	32.1%		-	-	-	-	6.4%		-	-	-	-	31.2%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0.9%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	1.8%		**-**
Bicycles on Road	0	0	1	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: Scattered Clouds (-0.83 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	14
S	0	8
E	0	37
W	2	20

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (7.39 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	30
S	0	7
E	0	35
W	2	34

Spectrum

Turning Movement Count
Location Name: SPEERS RD & ST. AUGUSTINE DR
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (3 . SPEERS RD & ST. AUGUSTINE DR)

Start Time	N Approach NORTH DRIVEWAY						E Approach SPEERS RD						S Approach ST AUGUSTINE DR						W Approach SPEERS RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	0	0	0	1	0	1	49	0	0	0	50	1	0	0	0	0	1	1	59	1	0	0	61	112	
07:15:00	0	0	0	0	0	0	2	61	0	0	0	63	3	0	1	0	1	4	2	94	3	0	0	99	166	
07:30:00	0	0	0	0	0	0	2	73	1	0	1	76	2	0	2	0	1	4	3	80	1	0	2	84	164	
07:45:00	0	0	1	0	2	1	4	101	0	0	1	105	9	0	3	0	2	12	6	116	1	0	1	123	241	683
08:00:00	0	0	0	0	1	0	3	114	0	0	0	117	4	0	1	0	1	5	4	108	0	0	0	112	234	805
08:15:00	0	0	0	0	0	0	2	127	0	0	0	129	4	0	0	0	3	4	2	164	0	0	0	166	299	938
08:30:00	1	0	0	0	1	1	3	177	0	0	0	180	6	0	1	0	1	7	6	122	2	0	0	130	318	1092
08:45:00	0	0	0	0	1	0	9	121	0	0	0	130	4	0	1	0	0	5	1	129	1	0	0	131	266	1117
BREAK																										
16:00:00	4	0	3	0	2	7	5	190	1	0	2	196	14	0	0	0	2	14	3	125	2	0	0	130	347	
16:15:00	7	0	1	0	3	8	2	195	1	0	0	198	5	1	0	0	1	6	11	165	0	0	0	176	388	
16:30:00	0	0	0	0	0	0	1	189	0	0	0	190	5	0	0	0	1	5	8	167	2	0	0	177	372	
16:45:00	6	0	1	0	0	7	1	202	1	0	0	204	7	1	1	0	1	9	4	149	6	1	1	160	380	1487
17:00:00	1	0	1	0	7	2	3	179	0	0	1	182	10	0	2	0	3	12	11	176	0	0	0	187	383	1523
17:15:00	3	0	5	0	1	8	3	201	0	0	1	204	3	1	0	0	0	4	2	181	1	0	0	184	400	1535
17:30:00	1	0	3	0	1	4	1	187	0	0	0	188	6	0	1	0	0	7	11	126	0	0	0	137	336	1499
17:45:00	3	0	3	0	1	6	0	133	0	0	1	133	6	0	0	0	2	6	1	129	1	0	0	131	276	1395
Grand Total	26	0	18	0	21	44	42	2299	4	0	7	2345	89	3	13	0	19	105	76	2090	21	1	4	2188	**4682**	-
Approach%	59.1%	0%	40.9%	0%		-	1.8%	98%	0.2%	0%		-	84.8%	2.9%	12.4%	0%		-	3.5%	95.5%	1%	0%		-	-	-
Totals %	0.6%	0%	0.4%	0%		0.9%	0.9%	49.1%	0.1%	0%		50.1%	1.9%	0.1%	0.3%	0%		2.2%	1.6%	44.6%	0.4%	0%		46.7%	-	-
Heavy	0	0	0	0		-	2	88	0	0		-	5	0	1	0		-	3	86	0	0		-	-	-
Heavy %	0%	0%	0%	0%		-	4.8%	3.8%	0%	0%		-	5.6%	0%	7.7%	0%		-	3.9%	4.1%	0%	0%		-	-	-
Bicycles	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	1	1	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	1.3%	0%	0%	0%		-	-	-

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach NORTH DRIVEWAY						E Approach SPEERS RD						S Approach ST AUGUSTINE DR						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	0	0	0	0	1	0	3	114	0	0	0	117	4	0	1	0	1	5	4	108	0	0	0	112	234
08:15:00	0	0	0	0	0	0	2	127	0	0	0	129	4	0	0	0	3	4	2	164	0	0	0	166	299
08:30:00	1	0	0	0	1	1	3	177	0	0	0	180	6	0	1	0	1	7	6	122	2	0	0	130	318
08:45:00	0	0	0	0	1	0	9	121	0	0	0	130	4	0	1	0	0	5	1	129	1	0	0	131	266
Grand Total	1	0	0	0	3	1	17	539	0	0	0	556	18	0	3	0	5	21	13	523	3	0	0	539	**1117**
Approach%	100%	0%	0%	0%		-	3.1%	96.9%	0%	0%		-	85.7%	0%	14.3%	0%		-	2.4%	97%	0.6%	0%		-	**-**
Totals %	0.1%	0%	0%	0%		0.1%	1.5%	48.3%	0%	0%		49.8%	1.6%	0%	0.3%	0%		1.9%	1.2%	46.8%	0.3%	0%		48.3%	**-**
PHF	0.25	0	0	0		0.25	0.47	0.76	0	0		0.77	0.75	0	0.75	0		0.75	0.54	0.8	0.38	0		0.81	**-**
Heavy	0	0	0	0		0	1	28	0	0		29	1	0	0	0		1	0	29	0	0		29	**-**
Heavy %	0%	0%	0%	0%		0%	5.9%	5.2%	0%	0%		5.2%	5.6%	0%	0%	0%		4.8%	0%	5.5%	0%	0%		5.4%	**-**
Lights	1	0	0	0		1	16	511	0	0		527	17	0	3	0		20	13	494	3	0		510	**-**
Lights %	100%	0%	0%	0%		100%	94.1%	94.8%	0%	0%		94.8%	94.4%	0%	100%	0%		95.2%	100%	94.5%	100%	0%		94.6%	**-**
Single-Unit Trucks	0	0	0	0		0	1	16	0	0		17	0	0	0	0		0	0	14	0	0		14	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	5.9%	3%	0%	0%		3.1%	0%	0%	0%	0%		0%	0%	2.7%	0%	0%		2.6%	**-**
Buses	0	0	0	0		0	0	11	0	0		11	1	0	0	0		1	0	12	0	0		12	**-**
Buses %	0%	0%	0%	0%		0%	0%	2%	0%	0%		2%	5.6%	0%	0%	0%		4.8%	0%	2.3%	0%	0%		2.2%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	3	0	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	25%		-	-	-	-	0%		-	-	-	-	62.5%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	12.5%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: SPEERS RD & ST. AUGUSTINE DR
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

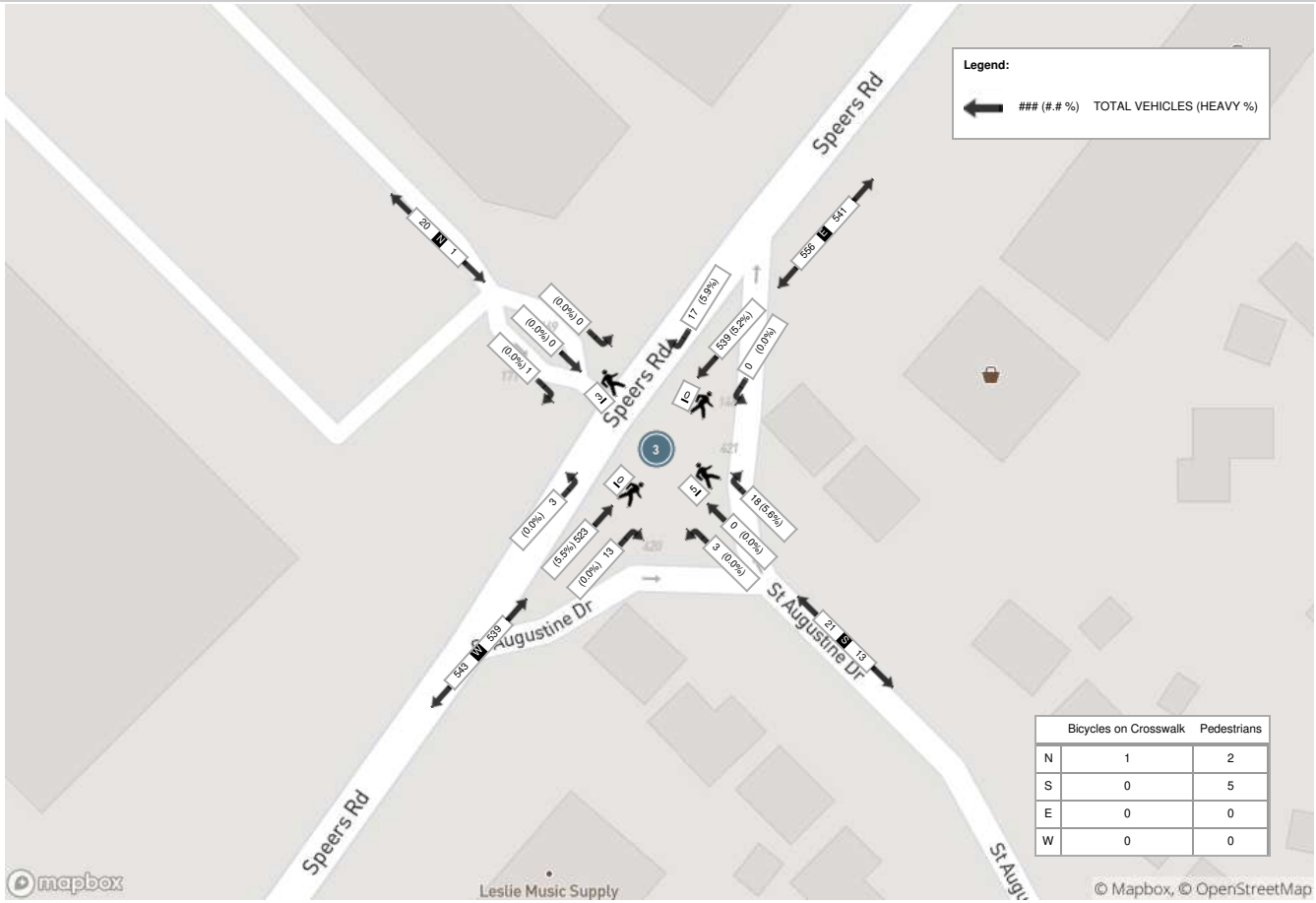
BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)

Start Time	N Approach NORTH DRIVEWAY						E Approach SPEERS RD						S Approach ST AUGUSTINE DR						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	0	0	0	0	0	0	1	189	0	0	0	190	5	0	0	0	1	5	8	167	2	0	0	177	372
16:45:00	6	0	1	0	0	7	1	202	1	0	0	204	7	1	1	0	1	9	4	149	6	1	1	160	380
17:00:00	1	0	1	0	7	2	3	179	0	0	1	182	10	0	2	0	3	12	11	176	0	0	0	187	383
17:15:00	3	0	5	0	1	8	3	201	0	0	1	204	3	1	0	0	0	4	2	181	1	0	0	184	400
Grand Total	10	0	7	0	8	17	8	771	1	0	2	780	25	2	3	0	5	30	25	673	9	1	1	708	**1535**
Approach%	58.8%	0%	41.2%	0%		-	1%	98.8%	0.1%	0%		-	83.3%	6.7%	10%	0%		-	3.5%	95.1%	1.3%	0.1%		-	**-**
Totals %	0.7%	0%	0.5%	0%		1.1%	0.5%	50.2%	0.1%	0%		50.8%	1.6%	0.1%	0.2%	0%		2%	1.6%	43.8%	0.6%	0.1%		46.1%	**-**
PHF	0.42	0	0.35	0		0.53	0.67	0.95	0.25	0		0.96	0.63	0.5	0.38	0		0.63	0.57	0.93	0.38	0.25		0.95	**-**
Heavy	0	0	0	0		0	0	15	0	0		15	0	0	0	0		0	1	10	0	0		11	**-**
Heavy %	0%	0%	0%	0%		0%	0%	1.9%	0%	0%		1.9%	0%	0%	0%	0%		0%	4%	1.5%	0%	0%		1.6%	**-**
Lights	10	0	7	0		17	8	756	1	0		765	25	2	3	0		30	24	663	9	1		697	**-**
Lights %	100%	0%	100%	0%		100%	100%	98.1%	100%	0%		98.1%	100%	100%	100%	0%		100%	96%	98.5%	100%	100%		98.4%	**-**
Single-Unit Trucks	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	1	3	0	0		4	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	0%	0%	0%	0%		0%	4%	0.4%	0%	0%		0.6%	**-**
Buses	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	6	0	0		6	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.8%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	**-**
Pedestrians	-	-	-	-	8	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	50%		-	-	-	-	6.3%		-	-	-	-	31.3%		-	-	-	-	6.3%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	6.3%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

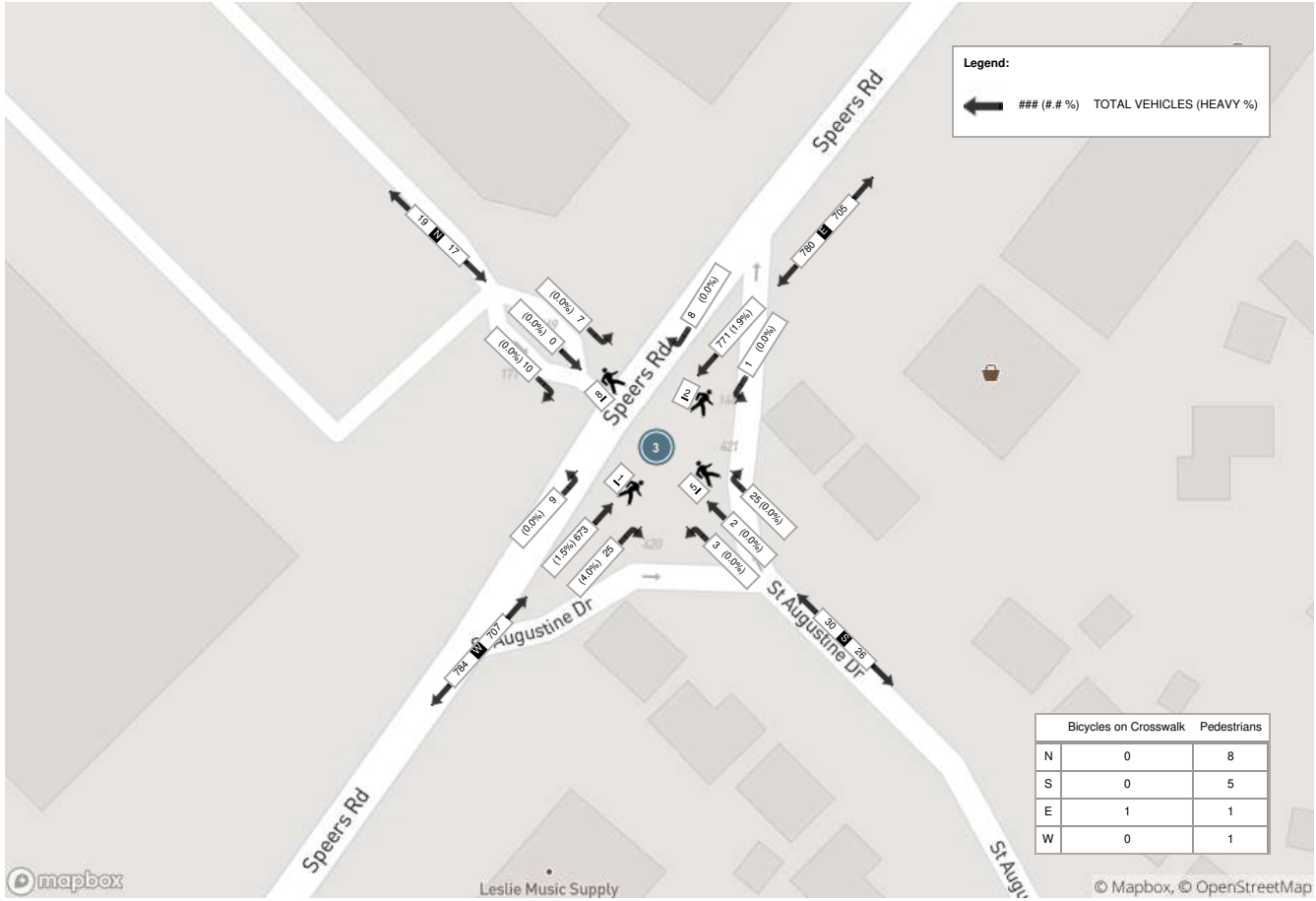
Peak Hour: 08:00 AM - 09:00 AM **Weather: Scattered Clouds (-0.83 °C)**



	Bicycles on Crosswalk	Pedestrians
N	1	2
S	0	5
E	0	0
W	0	0

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	8
S	0	5
E	1	1
W	0	1

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (7 . ELMWOOD RD & KERR ST)

Start Time	N Approach KERR ST					S Approach KERR ST					W Approach ELMWOOD RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	1	35	0	0	36	39	0	0	2	39	1	1	0	1	2	77	
07:15:00	1	31	0	0	32	43	1	0	0	44	3	7	0	1	10	86	
07:30:00	6	40	0	1	46	74	0	0	3	74	3	3	0	4	6	126	
07:45:00	4	52	0	0	56	66	1	0	2	67	1	4	0	3	5	128	417
08:00:00	7	62	0	1	69	56	1	0	2	57	0	4	0	3	4	130	470
08:15:00	7	88	0	0	95	86	3	0	0	89	4	7	0	8	11	195	579
08:30:00	6	76	0	0	82	65	1	0	1	66	2	5	0	2	7	155	608
08:45:00	12	84	0	0	96	77	2	0	1	79	2	4	0	5	6	181	661
BREAK																	
16:00:00	11	115	0	0	126	130	1	0	1	131	2	1	0	7	3	260	
16:15:00	9	130	0	0	139	117	0	0	0	117	2	4	0	7	6	262	
16:30:00	11	97	0	1	108	109	3	0	0	112	4	5	0	10	9	229	
16:45:00	11	128	0	0	139	97	1	0	1	98	2	4	0	11	6	243	994
17:00:00	9	110	1	0	120	104	1	0	0	105	3	3	0	5	6	231	965
17:15:00	17	111	0	0	128	115	3	0	1	118	1	5	0	6	6	252	955
17:30:00	8	115	0	1	123	102	4	0	2	106	3	3	0	4	6	235	961
17:45:00	14	115	0	0	129	91	1	0	2	92	4	4	0	8	8	229	947
Grand Total	134	1389	1	4	1524	1371	23	0	18	1394	37	64	0	85	101	**3019**	-
Approach%	8.8%	91.1%	0.1%		-	98.4%	1.6%	0%		-	36.6%	63.4%	0%		-	**-**	-
Totals %	4.4%	46%	0%		50.5%	45.4%	0.8%	0%		46.2%	1.2%	2.1%	0%		3.3%	**-**	-
Heavy	5	52	0		-	46	3	0		-	3	0	0		-	**-**	-
Heavy %	3.7%	3.7%	0%		-	3.4%	13%	0%		-	8.1%	0%	0%		-	**-**	-
Bicycles	1	1	0		-	0	0	0		-	0	0	0		-	**-**	-
Bicycle %	0.7%	0.1%	0%		-	0%	0%	0%		-	0%	0%	0%		-	**-**	-

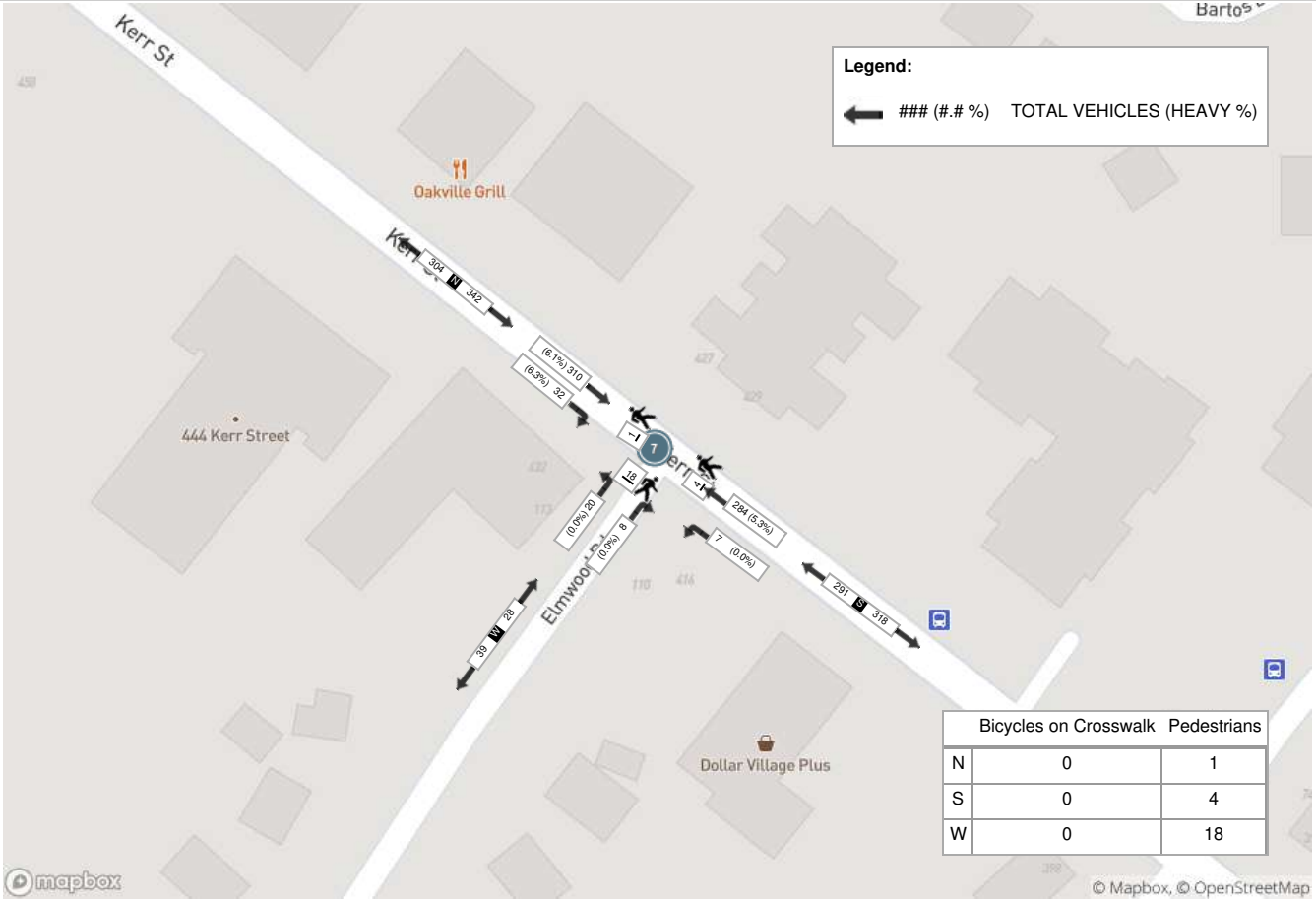
Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach KERR ST					S Approach KERR ST					W Approach ELMWOOD RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:00:00	7	62	0	1	69	56	1	0	2	57	0	4	0	3	4	130
08:15:00	7	88	0	0	95	86	3	0	0	89	4	7	0	8	11	195
08:30:00	6	76	0	0	82	65	1	0	1	66	2	5	0	2	7	155
08:45:00	12	84	0	0	96	77	2	0	1	79	2	4	0	5	6	181
Grand Total	32	310	0	1	342	284	7	0	4	291	8	20	0	18	28	**661**
Approach%	9.4%	90.6%	0%		-	97.6%	2.4%	0%		-	28.6%	71.4%	0%		-	**-**
Totals %	4.8%	46.9%	0%		51.7%	43%	1.1%	0%		44%	1.2%	3%	0%		4.2%	**-**
PHF	0.67	0.88	0		0.89	0.83	0.58	0		0.82	0.5	0.71	0		0.64	**-**
Heavy	2	19	0		21	15	0	0		15	0	0	0		0	**-**
Heavy %	6.3%	6.1%	0%		6.1%	5.3%	0%	0%		5.2%	0%	0%	0%		0%	**-**
Lights	30	291	0		321	269	7	0		276	8	20	0		28	**-**
Lights %	93.8%	93.9%	0%		93.9%	94.7%	100%	0%		94.8%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	8	0		8	7	0	0		7	0	0	0		0	**-**
Single-Unit Trucks %	0%	2.6%	0%		2.3%	2.5%	0%	0%		2.4%	0%	0%	0%		0%	**-**
Buses	2	10	0		12	8	0	0		8	0	0	0		0	**-**
Buses %	6.3%	3.2%	0%		3.5%	2.8%	0%	0%		2.7%	0%	0%	0%		0%	**-**
Articulated Trucks	0	1	0		1	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0.3%	0%		0.3%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	18	-	**-**
Pedestrians%	-	-	-	4.3%		-	-	-	17.4%		-	-	-	78.3%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	1	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (7.39 °C)

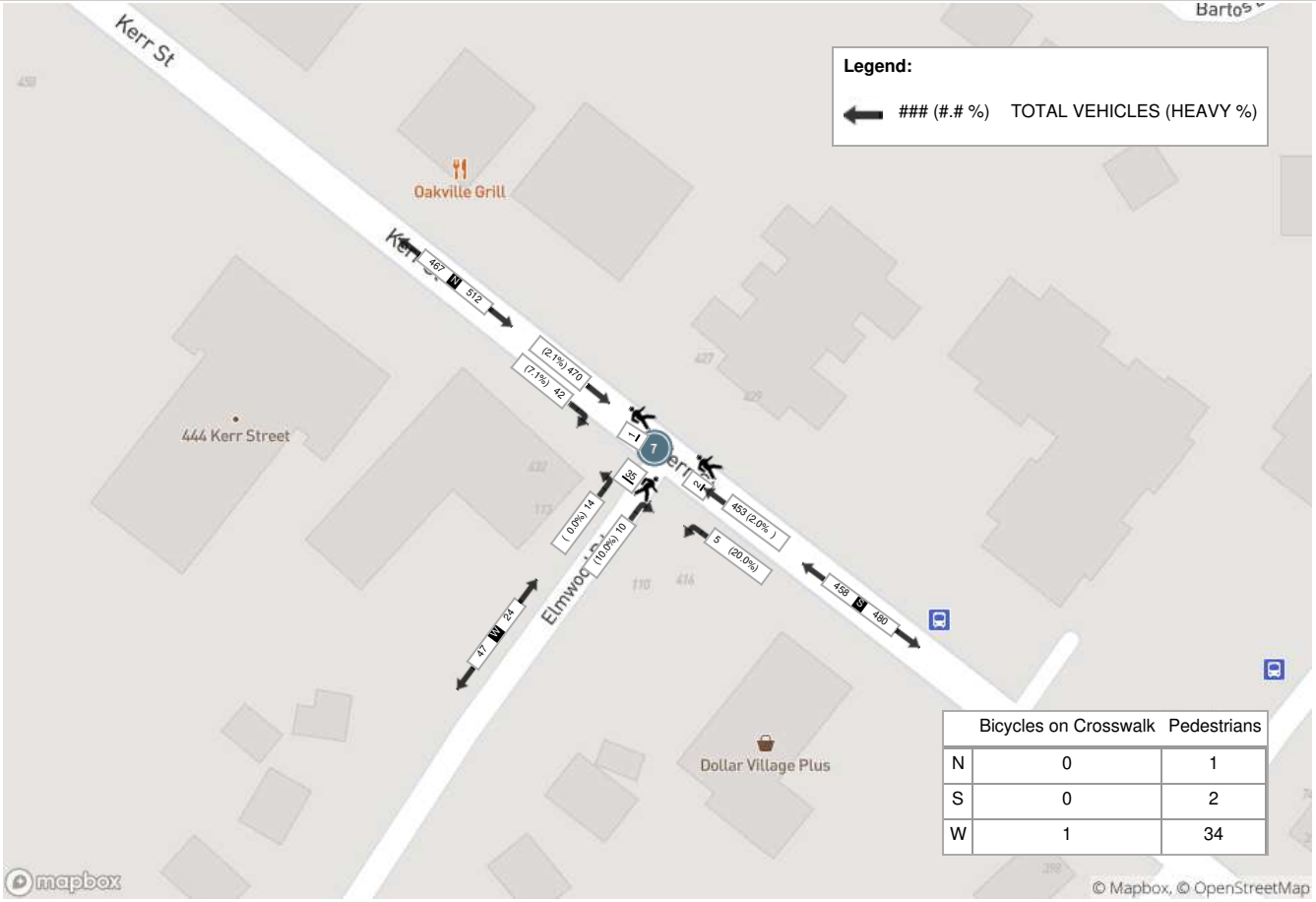
Start Time	N Approach KERR ST					S Approach KERR ST					W Approach ELMWOOD RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:00:00	11	115	0	0	126	130	1	0	1	131	2	1	0	7	3	260
16:15:00	9	130	0	0	139	117	0	0	0	117	2	4	0	7	6	262
16:30:00	11	97	0	1	108	109	3	0	0	112	4	5	0	10	9	229
16:45:00	11	128	0	0	139	97	1	0	1	98	2	4	0	11	6	243
Grand Total	42	470	0	1	512	453	5	0	2	458	10	14	0	35	24	**994**
Approach%	8.2%	91.8%	0%		-	98.9%	1.1%	0%		-	41.7%	58.3%	0%		-	**-**
Totals %	4.2%	47.3%	0%		51.5%	45.6%	0.5%	0%		46.1%	1%	1.4%	0%		2.4%	**-**
PHF	0.95	0.9	0		0.92	0.87	0.42	0		0.87	0.63	0.7	0		0.67	**-**
Heavy	3	10	0		13	9	1	0		10	1	0	0		1	**-**
Heavy %	7.1%	2.1%	0%		2.5%	2%	20%	0%		2.2%	10%	0%	0%		4.2%	**-**
Lights	39	460	0		499	444	4	0		448	9	14	0		23	**-**
Lights %	92.9%	97.9%	0%		97.5%	98%	80%	0%		97.8%	90%	100%	0%		95.8%	**-**
Single-Unit Trucks	1	4	0		5	6	1	0		7	0	0	0		0	**-**
Single-Unit Trucks %	2.4%	0.9%	0%		1%	1.3%	20%	0%		1.5%	0%	0%	0%		0%	**-**
Buses	2	6	0		8	3	0	0		3	1	0	0		1	**-**
Buses %	4.8%	1.3%	0%		1.6%	0.7%	0%	0%		0.7%	10%	0%	0%		4.2%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	1	-	-	-	-	2	-	-	-	-	34	-	**-**
Pedestrians%	-	-	-	2.6%		-	-	-	5.3%		-	-	-	89.5%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	2.6%		**-**
Bicycles on Road	1	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)



BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (7.39 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	2
W	1	34

Spectrum

Turning Movement Count
Location Name: PRINCE CHARLES DR & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (6 . PRINCE CHARLES DR & KERR ST)

Start Time	N Approach KERR ST						E Approach PRINCE CHARLES DR						S Approach KERR ST						W Approach PRINCE CHARLES DR						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	2	34	8	0	0	44	2	0	0	0	1	2	0	41	0	0	0	41	0	0	3	0	0	3	90	
07:15:00	0	35	12	0	1	47	5	0	1	0	3	6	0	53	0	0	0	53	1	0	4	0	3	5	111	
07:30:00	0	46	5	0	2	51	7	0	0	0	4	7	2	83	1	0	2	86	0	0	1	0	4	1	145	
07:45:00	0	55	15	0	1	70	7	0	2	0	14	9	1	69	0	0	4	70	1	0	6	0	1	7	156	502
08:00:00	2	63	10	0	0	75	16	1	4	0	13	21	0	66	0	0	0	66	1	0	1	0	3	2	164	576
08:15:00	2	99	11	0	1	112	12	0	1	0	4	13	3	93	2	0	0	98	2	0	1	0	5	3	226	691
08:30:00	1	80	9	0	0	90	6	0	0	0	6	6	0	67	2	0	0	69	0	0	1	0	7	1	166	712
08:45:00	2	97	9	0	0	108	6	0	0	0	7	6	2	80	2	0	1	84	0	0	2	0	1	2	200	756
BREAK																										
16:00:00	8	129	8	0	0	145	7	0	5	0	6	12	0	125	2	0	0	127	0	1	2	0	4	3	287	
16:15:00	2	131	4	0	0	137	8	0	2	0	11	10	2	127	2	0	0	131	4	0	2	0	4	6	284	
16:30:00	7	110	5	0	1	122	8	0	1	0	9	9	3	105	1	0	1	109	3	1	3	0	4	7	247	
16:45:00	7	139	3	0	3	149	7	0	1	0	6	8	4	102	0	0	0	106	4	0	2	0	10	6	269	1087
17:00:00	5	120	8	0	0	133	9	0	2	0	6	11	2	107	2	0	0	111	2	0	0	0	7	2	257	1057
17:15:00	6	130	5	0	1	141	3	0	0	0	1	3	2	108	2	0	2	112	2	1	2	0	4	5	261	1034
17:30:00	3	121	6	0	0	130	6	0	1	0	7	7	0	103	1	0	1	104	2	0	4	0	5	6	247	1034
17:45:00	4	130	10	0	0	144	8	0	0	0	4	8	1	99	2	1	0	103	0	0	2	0	7	2	257	1022
Grand Total	51	1519	128	0	10	1698	117	1	20	0	102	138	22	1428	19	1	11	1470	22	3	36	0	69	61	**3367**	-
Approach%	3%	89.5%	7.5%	0%		-	84.8%	0.7%	14.5%	0%		-	1.5%	97.1%	1.3%	0.1%		-	36.1%	4.9%	59%	0%		-	**-**	-
Totals %	1.5%	45.1%	3.8%	0%		50.4%	3.5%	0%	0.6%	0%		4.1%	0.7%	42.4%	0.6%	0%		43.7%	0.7%	0.1%	1.1%	0%		1.8%	**-**	-
Heavy	1	56	7	0		-	7	0	1	0		-	2	41	2	0		-	1	1	1	0		-	**-**	-
Heavy %	2%	3.7%	5.5%	0%		-	6%	0%	5%	0%		-	9.1%	2.9%	10.5%	0%		-	4.5%	33.3%	2.8%	0%		-	**-**	-
Bicycles	0	2	1	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	**-**	-
Bicycle %	0%	0.1%	0.8%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: PRINCE CHARLES DR & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach KERR ST						E Approach PRINCE CHARLES DR						S Approach KERR ST						W Approach PRINCE CHARLES DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	2	63	10	0	0	75	16	1	4	0	13	21	0	66	0	0	0	66	1	0	1	0	3	2	164
08:15:00	2	99	11	0	1	112	12	0	1	0	4	13	3	93	2	0	0	98	2	0	1	0	5	3	226
08:30:00	1	80	9	0	0	90	6	0	0	0	6	6	0	67	2	0	0	69	0	0	1	0	7	1	166
08:45:00	2	97	9	0	0	108	6	0	0	0	7	6	2	80	2	0	1	84	0	0	2	0	1	2	200
Grand Total	7	339	39	0	1	385	40	1	5	0	30	46	5	306	6	0	1	317	3	0	5	0	16	8	**756**
Approach%	1.8%	88.1%	10.1%	0%		-	87%	2.2%	10.9%	0%		-	1.6%	96.5%	1.9%	0%		-	37.5%	0%	62.5%	0%		-	**-**
Totals %	0.9%	44.8%	5.2%	0%		50.9%	5.3%	0.1%	0.7%	0%		6.1%	0.7%	40.5%	0.8%	0%		41.9%	0.4%	0%	0.7%	0%		1.1%	**-**
PHF	0.88	0.86	0.89	0		0.86	0.63	0.25	0.31	0		0.55	0.42	0.82	0.75	0		0.81	0.38	0	0.63	0		0.67	**-**
Heavy	0	20	3	0		23	4	0	0	0		4	1	13	1	0		15	1	0	0	0		1	**-**
Heavy %	0%	5.9%	7.7%	0%		6%	10%	0%	0%	0%		8.7%	20%	4.2%	16.7%	0%		4.7%	33.3%	0%	0%	0%		12.5%	**-**
Lights	7	319	36	0		362	36	1	5	0		42	4	293	5	0		302	2	0	5	0		7	**-**
Lights %	100%	94.1%	92.3%	0%		94%	90%	100%	100%	0%		91.3%	80%	95.8%	83.3%	0%		95.3%	66.7%	0%	100%	0%		87.5%	**-**
Single-Unit Trucks	0	8	2	0		10	1	0	0	0		1	0	5	0	0		5	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	2.4%	5.1%	0%		2.6%	2.5%	0%	0%	0%		2.2%	0%	1.6%	0%	0%		1.6%	0%	0%	0%	0%		0%	**-**
Buses	0	11	1	0		12	3	0	0	0		3	0	7	1	0		8	1	0	0	0		1	**-**
Buses %	0%	3.2%	2.6%	0%		3.1%	7.5%	0%	0%	0%		6.5%	0%	2.3%	16.7%	0%		2.5%	33.3%	0%	0%	0%		12.5%	**-**
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	1	1	0	0		2	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	20%	0.3%	0%	0%		0.6%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	30	-	-	-	-	-	1	-	-	-	-	-	15	-	**-**
Pedestrians%	-	-	-	-	2.1%		-	-	-	-	62.5%		-	-	-	-	2.1%		-	-	-	-	31.3%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	2.1%		**-**
Bicycles on Road	0	1	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%		**-**

Spectrum

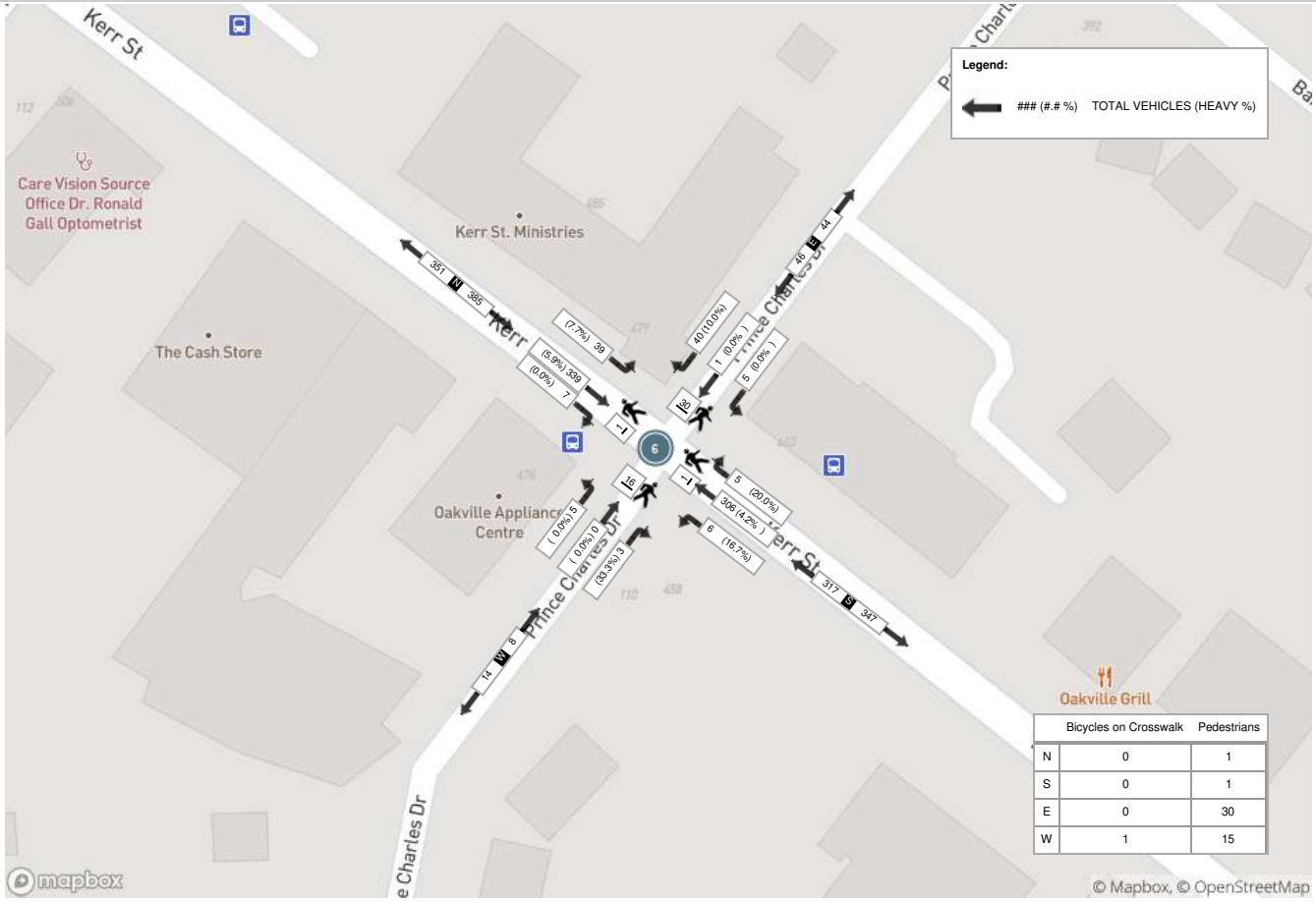
Turning Movement Count
Location Name: PRINCE CHARLES DR & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

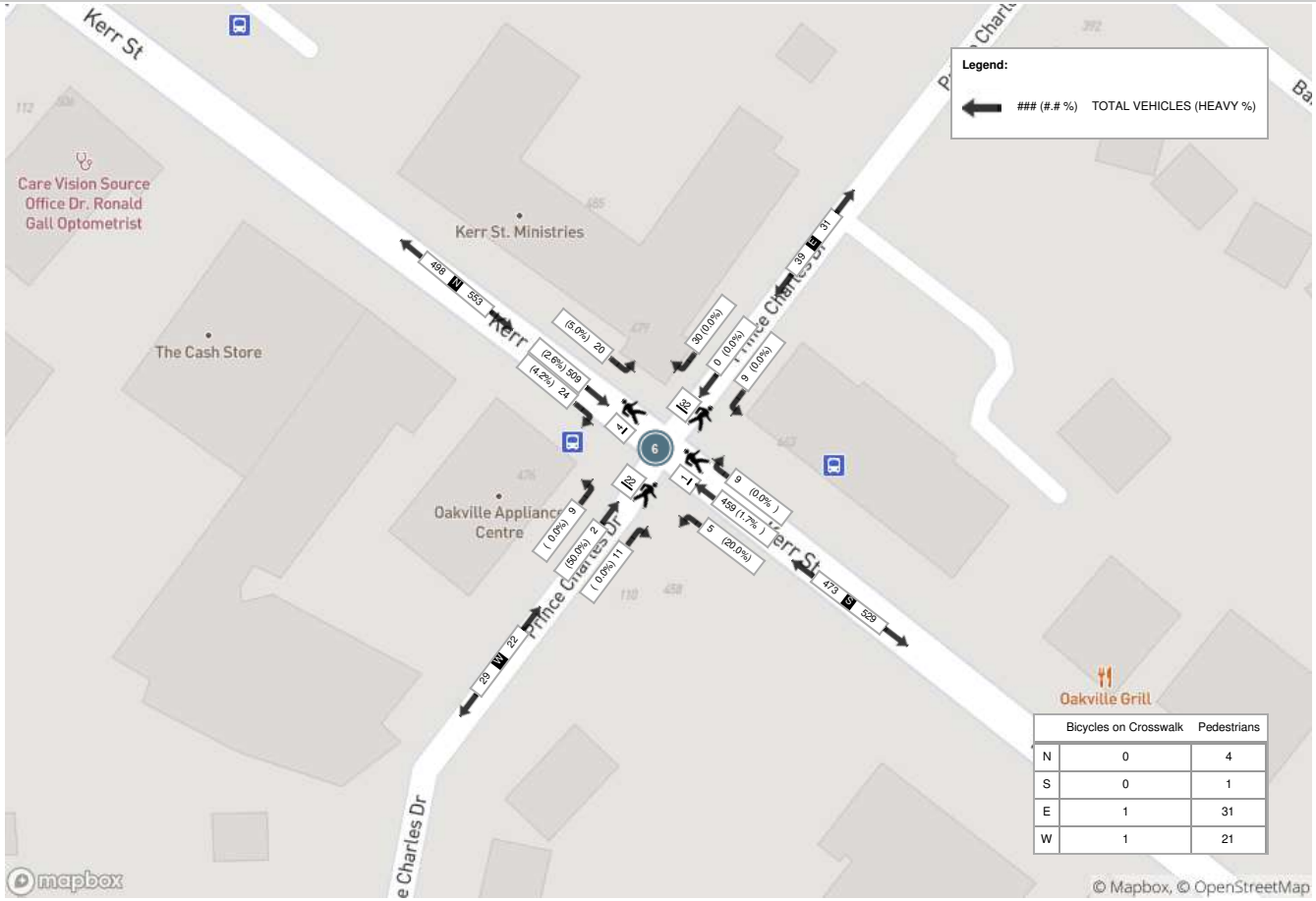
Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (7.39 °C)

Start Time	N Approach KERR ST						E Approach PRINCE CHARLES DR						S Approach KERR ST						W Approach PRINCE CHARLES DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	8	129	8	0	0	145	7	0	5	0	6	12	0	125	2	0	0	127	0	1	2	0	4	3	287
16:15:00	2	131	4	0	0	137	8	0	2	0	11	10	2	127	2	0	0	131	4	0	2	0	4	6	284
16:30:00	7	110	5	0	1	122	8	0	1	0	9	9	3	105	1	0	1	109	3	1	3	0	4	7	247
16:45:00	7	139	3	0	3	149	7	0	1	0	6	8	4	102	0	0	0	106	4	0	2	0	10	6	269
Grand Total	24	509	20	0	4	553	30	0	9	0	32	39	9	459	5	0	1	473	11	2	9	0	22	22	**1087**
Approach%	4.3%	92%	3.6%	0%		-	76.9%	0%	23.1%	0%		-	1.9%	97%	1.1%	0%		-	50%	9.1%	40.9%	0%		-	**-**
Totals %	2.2%	46.8%	1.8%	0%		50.9%	2.8%	0%	0.8%	0%		3.6%	0.8%	42.2%	0.5%	0%		43.5%	1%	0.2%	0.8%	0%		2%	**-**
PHF	0.75	0.92	0.63	0		0.93	0.94	0	0.45	0		0.81	0.56	0.9	0.63	0		0.9	0.69	0.5	0.75	0		0.79	**-**
Heavy	1	13	1	0		15	0	0	0	0		0	0	8	1	0		9	0	1	0	0		1	**-**
Heavy %	4.2%	2.6%	5%	0%		2.7%	0%	0%	0%	0%		0%	0%	1.7%	20%	0%		1.9%	0%	50%	0%	0%		4.5%	**-**
Lights	23	496	19	0		538	30	0	9	0		39	9	451	4	0		464	11	1	9	0		21	**-**
Lights %	95.8%	97.4%	95%	0%		97.3%	100%	0%	100%	0%		100%	100%	98.3%	80%	0%		98.1%	100%	50%	100%	0%		95.5%	**-**
Single-Unit Trucks	1	5	1	0		7	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	**-**
Single-Unit Trucks %	4.2%	1%	5%	0%		1.3%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	0%	0%	0%	0%		0%	**-**
Buses	0	8	0	0		8	0	0	0	0		0	0	2	1	0		3	0	1	0	0		1	**-**
Buses %	0%	1.6%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	0.4%	20%	0%		0.6%	0%	50%	0%	0%		4.5%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	4	-	-	-	-	-	31	-	-	-	-	-	1	-	-	-	-	-	21	-	**-**
Pedestrians%	-	-	-	-	6.8%		-	-	-	-	52.5%		-	-	-	-	1.7%		-	-	-	-	35.6%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	1.7%		-	-	-	-	0%		-	-	-	-	1.7%		**-**
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:00 AM - 09:00 AM **Weather: Scattered Clouds (-0.83 °C)**



Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (7.39 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	1
E	1	31
W	1	21

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (4 . KERR ST & SHEPHERD RD)

Start Time	N Approach KERR ST					E Approach SHEPHERD RD					S Approach KERR ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
07:00:00	27	5	0	0	32	27	5	0	0	32	3	20	0	0	23	87	
07:15:00	41	9	0	0	50	37	10	0	0	47	7	21	0	0	28	125	
07:30:00	39	16	0	0	55	33	11	0	0	44	2	23	0	0	25	124	
07:45:00	52	14	0	0	66	38	23	0	0	61	9	49	0	0	58	185	521
08:00:00	48	14	0	1	62	43	18	0	1	61	5	46	0	1	51	174	608
08:15:00	69	22	0	1	91	31	13	0	2	44	19	67	0	0	86	221	704
08:30:00	69	22	0	0	91	36	16	0	1	52	16	61	0	1	77	220	800
08:45:00	79	33	0	2	112	35	23	0	2	58	14	49	0	5	63	233	848
BREAK																	
16:00:00	102	37	0	5	139	37	16	0	0	53	24	111	0	2	135	327	
16:15:00	105	30	0	4	135	21	13	0	2	34	29	88	0	2	117	286	
16:30:00	94	45	0	3	139	27	18	0	1	45	19	79	0	3	98	282	
16:45:00	100	34	0	0	134	37	23	0	1	60	27	108	0	1	135	329	1224
17:00:00	109	37	0	1	146	40	19	0	1	59	30	94	0	3	124	329	1226
17:15:00	88	44	0	4	132	30	23	0	1	53	31	104	0	3	135	320	1260
17:30:00	95	38	0	1	133	35	24	0	1	59	25	84	0	6	109	301	1279
17:45:00	79	28	0	2	107	31	28	0	2	59	20	86	0	6	106	272	1222
Grand Total	1196	428	0	24	1624	538	283	0	15	821	280	1090	0	33	1370	**3815**	-
Approach%	73.6%	26.4%	0%		-	65.5%	34.5%	0%		-	20.4%	79.6%	0%		-	**-**	-
Totals %	31.3%	11.2%	0%		42.6%	14.1%	7.4%	0%		21.5%	7.3%	28.6%	0%		35.9%	**-**	-
Heavy	29	6	0		-	6	15	0		-	12	22	0		-	**-**	-
Heavy %	2.4%	1.4%	0%		-	1.1%	5.3%	0%		-	4.3%	2%	0%		-	**-**	-
Bicycles	2	0	0		-	1	0	0		-	0	0	0		-	**-**	-
Bicycle %	0.2%	0%	0%		-	0.2%	0%	0%		-	0%	0%	0%		-	**-**	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

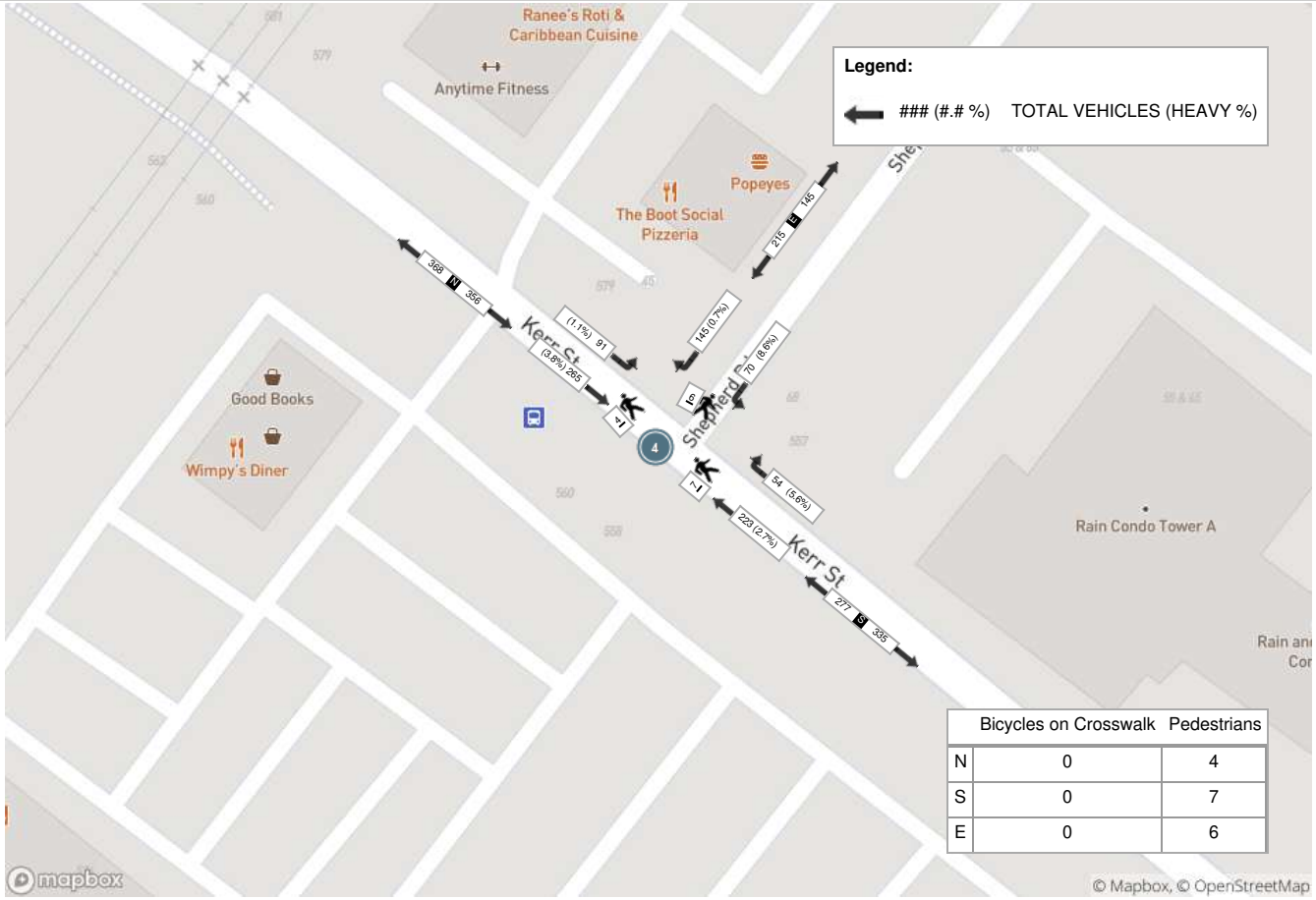
Start Time	N Approach KERR ST					E Approach SHEPHERD RD					S Approach KERR ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
08:00:00	48	14	0	1	62	43	18	0	1	61	5	46	0	1	51	174
08:15:00	69	22	0	1	91	31	13	0	2	44	19	67	0	0	86	221
08:30:00	69	22	0	0	91	36	16	0	1	52	16	61	0	1	77	220
08:45:00	79	33	0	2	112	35	23	0	2	58	14	49	0	5	63	233
Grand Total	265	91	0	4	356	145	70	0	6	215	54	223	0	7	277	**848**
Approach%	74.4%	25.6%	0%		-	67.4%	32.6%	0%		-	19.5%	80.5%	0%		-	**-**
Totals %	31.3%	10.7%	0%		42%	17.1%	8.3%	0%		25.4%	6.4%	26.3%	0%		32.7%	**-**
PHF	0.84	0.69	0		0.79	0.84	0.76	0		0.88	0.71	0.83	0		0.81	**-**
Heavy	10	1	0		11	1	6	0		7	3	6	0		9	**-**
Heavy %	3.8%	1.1%	0%		3.1%	0.7%	8.6%	0%		3.3%	5.6%	2.7%	0%		3.2%	**-**
Lights	255	90	0		345	144	64	0		208	51	217	0		268	**-**
Lights %	96.2%	98.9%	0%		96.9%	99.3%	91.4%	0%		96.7%	94.4%	97.3%	0%		96.8%	**-**
Single-Unit Trucks	4	0	0		4	1	1	0		2	0	0	0		0	**-**
Single-Unit Trucks %	1.5%	0%	0%		1.1%	0.7%	1.4%	0%		0.9%	0%	0%	0%		0%	**-**
Buses	5	1	0		6	0	5	0		5	2	5	0		7	**-**
Buses %	1.9%	1.1%	0%		1.7%	0%	7.1%	0%		2.3%	3.7%	2.2%	0%		2.5%	**-**
Articulated Trucks	1	0	0		1	0	0	0		0	1	1	0		2	**-**
Articulated Trucks %	0.4%	0%	0%		0.3%	0%	0%	0%		0%	1.9%	0.4%	0%		0.7%	**-**
Pedestrians	-	-	-	4	-	-	-	-	6	-	-	-	-	7	-	**-**
Pedestrians%	-	-	-	23.5%		-	-	-	35.3%		-	-	-	41.2%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (7.39 °C)

Start Time	N Approach KERR ST					E Approach SHEPHERD RD					S Approach KERR ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:45:00	100	34	0	0	134	37	23	0	1	60	27	108	0	1	135	329
17:00:00	109	37	0	1	146	40	19	0	1	59	30	94	0	3	124	329
17:15:00	88	44	0	4	132	30	23	0	1	53	31	104	0	3	135	320
17:30:00	95	38	0	1	133	35	24	0	1	59	25	84	0	6	109	301
Grand Total	392	153	0	6	545	142	89	0	4	231	113	390	0	13	503	**1279**
Approach%	71.9%	28.1%	0%		-	61.5%	38.5%	0%		-	22.5%	77.5%	0%		-	**-**
Totals %	30.6%	12%	0%		42.6%	11.1%	7%	0%		18.1%	8.8%	30.5%	0%		39.3%	**-**
PHF	0.9	0.87	0		0.93	0.89	0.93	0		0.96	0.91	0.9	0		0.93	**-**
Heavy	5	1	0		6	2	3	0		5	3	5	0		8	**-**
Heavy %	1.3%	0.7%	0%		1.1%	1.4%	3.4%	0%		2.2%	2.7%	1.3%	0%		1.6%	**-**
Lights	387	152	0		539	140	86	0		226	110	385	0		495	**-**
Lights %	98.7%	99.3%	0%		98.9%	98.6%	96.6%	0%		97.8%	97.3%	98.7%	0%		98.4%	**-**
Single-Unit Trucks	1	1	0		2	2	1	0		3	1	0	0		1	**-**
Single-Unit Trucks %	0.3%	0.7%	0%		0.4%	1.4%	1.1%	0%		1.3%	0.9%	0%	0%		0.2%	**-**
Buses	4	0	0		4	0	2	0		2	2	5	0		7	**-**
Buses %	1%	0%	0%		0.7%	0%	2.2%	0%		0.9%	1.8%	1.3%	0%		1.4%	**-**
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	6	-	-	-	-	4	-	-	-	-	13	-	**-**
Pedestrians%	-	-	-	26.1%		-	-	-	17.4%		-	-	-	56.5%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	1	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

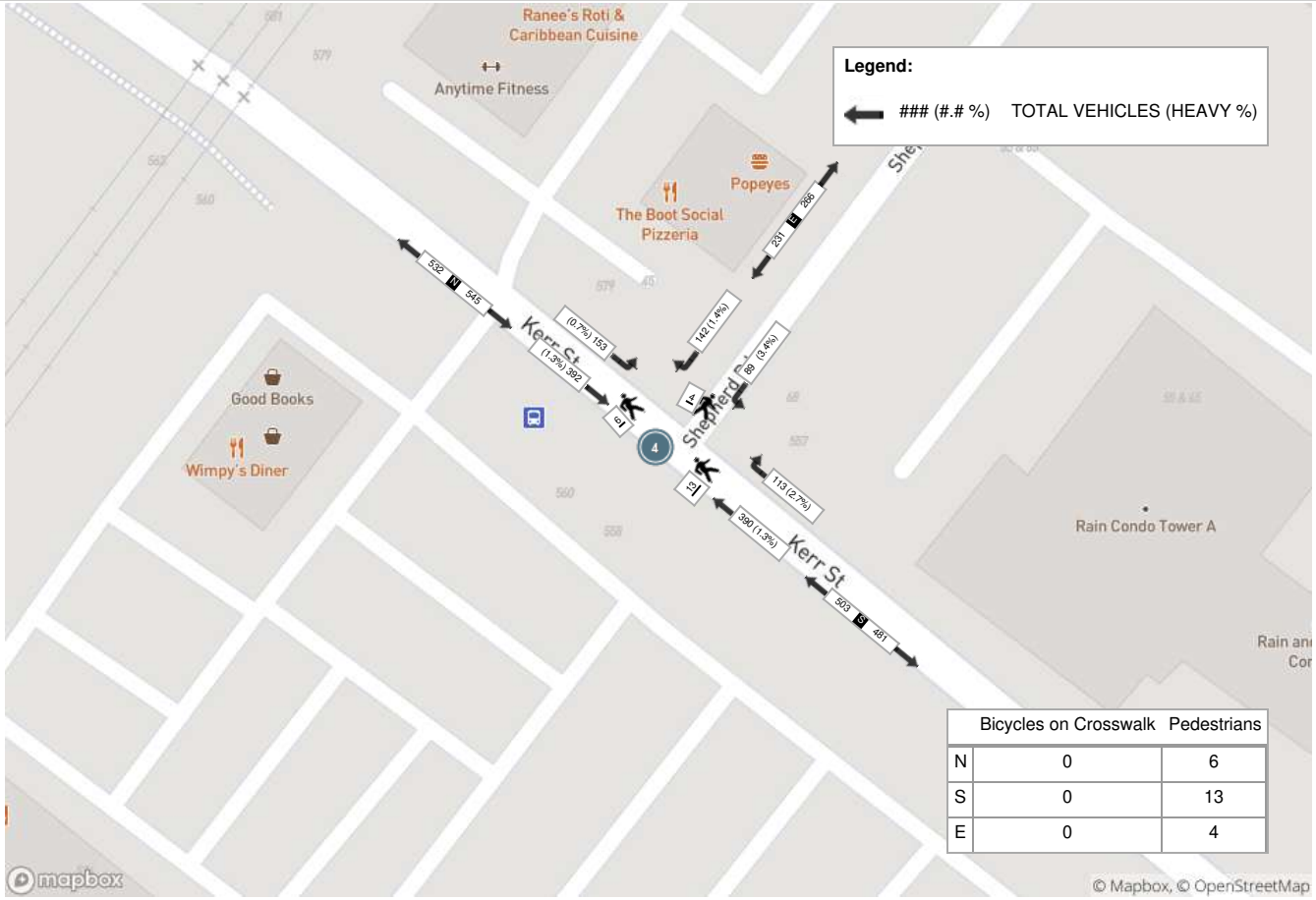
Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	7
E	0	6

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (7.39 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	6
S	0	13
E	0	4

Spectrum

Turning Movement Count
Location Name: STEWART ST & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (8 . STEWART ST & KERR ST)

Start Time	N Approach KERR ST						E Approach STEWART ST						S Approach KERR ST						W Approach STEWART ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	4	28	4	0	0	36	13	0	2	0	1	15	1	20	1	0	1	22	3	1	1	0	2	5	78	
07:15:00	2	25	6	0	1	33	13	2	0	0	1	15	1	25	1	0	5	27	0	2	6	0	2	8	83	
07:30:00	5	27	10	0	5	42	24	1	2	0	3	27	1	43	0	0	3	44	1	2	6	0	6	9	122	
07:45:00	3	47	5	0	8	55	19	6	0	0	11	25	4	39	1	0	6	44	0	4	4	0	7	8	132	415
08:00:00	6	48	9	0	14	63	14	15	2	0	15	31	8	37	2	0	7	47	1	13	6	0	6	20	161	498
08:15:00	8	65	14	0	5	87	19	13	7	0	12	39	6	59	3	0	4	68	1	8	12	0	7	21	215	630
08:30:00	8	65	7	0	0	80	18	3	3	0	5	24	1	40	1	0	5	42	0	3	4	0	7	7	153	661
08:45:00	10	64	11	0	3	85	19	3	2	0	4	24	5	46	1	0	2	52	4	2	13	0	10	19	180	709
BREAK																										
16:00:00	14	95	11	0	4	120	25	4	1	0	2	30	3	89	3	0	5	95	7	3	18	0	8	28	273	
16:15:00	14	93	13	0	4	120	19	2	1	0	8	22	7	94	3	0	4	104	1	0	10	0	3	11	257	
16:30:00	15	71	16	0	5	102	19	6	2	0	11	27	4	73	4	0	3	81	5	3	10	0	9	18	228	
16:45:00	9	100	16	0	5	125	10	3	5	0	5	18	3	78	2	0	3	83	2	4	10	0	13	16	242	1000
17:00:00	23	71	14	0	2	108	13	3	2	0	7	18	2	78	0	0	4	80	3	3	19	0	8	25	231	958
17:15:00	19	85	15	0	4	119	23	2	1	0	5	26	5	79	1	0	4	85	0	3	11	0	6	14	244	945
17:30:00	12	88	15	0	2	115	18	2	2	0	4	22	2	72	0	0	2	74	4	3	11	0	6	18	229	946
17:45:00	17	87	14	0	3	118	9	5	3	0	4	17	2	70	1	0	2	73	7	2	14	0	5	23	231	935
Grand Total	169	1059	180	0	65	1408	275	70	35	0	98	380	55	942	24	0	60	1021	39	56	155	0	105	250	**3059**	-
Approach%	12%	75.2%	12.8%	0%		-	72.4%	18.4%	9.2%	0%		-	5.4%	92.3%	2.4%	0%		-	15.6%	22.4%	62%	0%		-	**-**	-
Totals %	5.5%	34.6%	5.9%	0%		46%	9%	2.3%	1.1%	0%		12.4%	1.8%	30.8%	0.8%	0%		33.4%	1.3%	1.8%	5.1%	0%		8.2%	**-**	-
Heavy	2	47	7	0		-	11	8	0	0		-	4	34	3	0		-	1	10	3	0		-	**-**	-
Heavy %	1.2%	4.4%	3.9%	0%		-	4%	11.4%	0%	0%		-	7.3%	3.6%	12.5%	0%		-	2.6%	17.9%	1.9%	0%		-	**-**	-
Bicycles	0	1	0	0		-	1	0	0	0		-	0	0	0	0		-	0	1	0	0		-	**-**	-
Bicycle %	0%	0.1%	0%	0%		-	0.4%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	1.8%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: STEWART ST & KERR ST
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

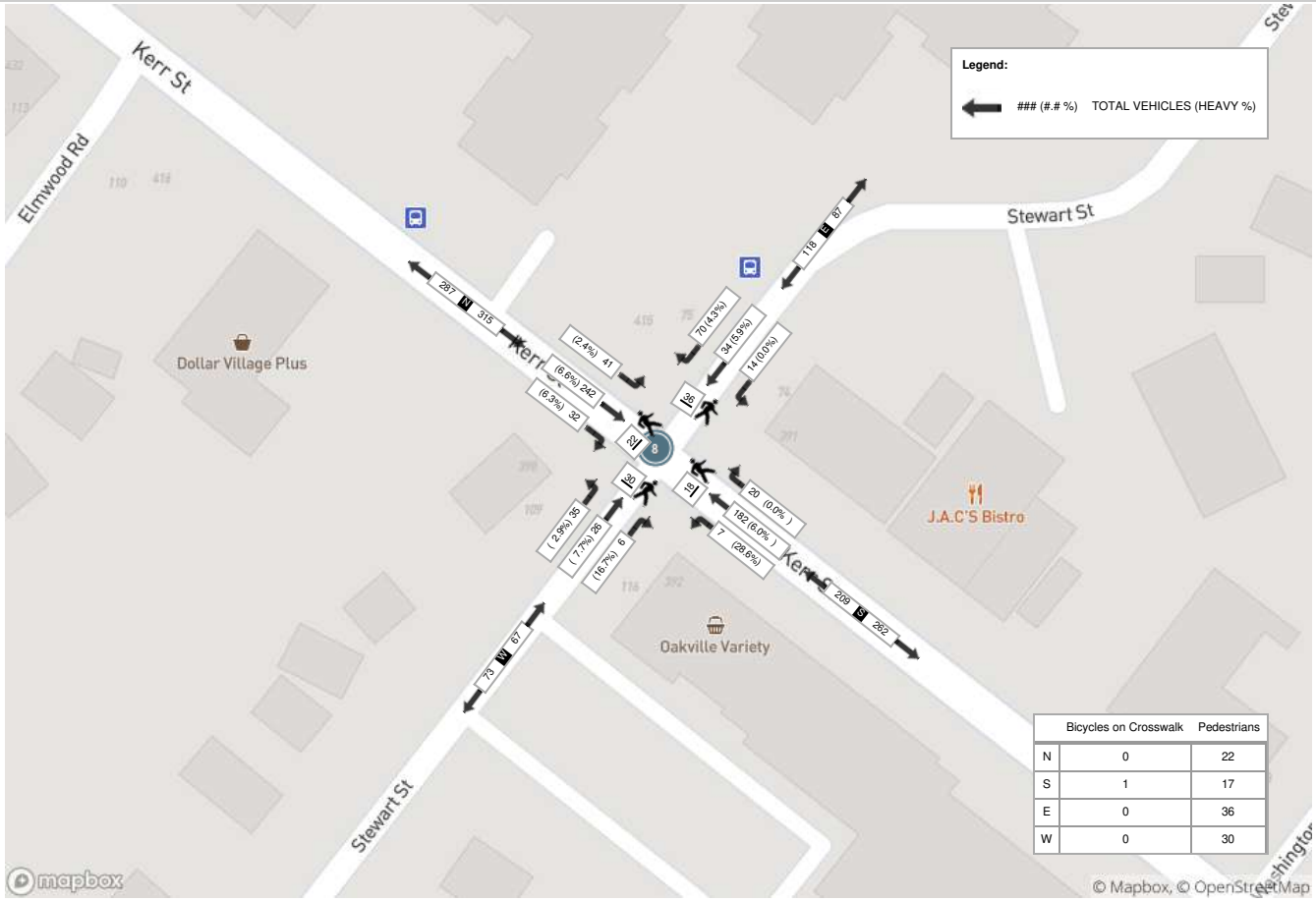
Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	N Approach KERR ST						E Approach STEWART ST						S Approach KERR ST						W Approach STEWART ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	6	48	9	0	14	63	14	15	2	0	15	31	8	37	2	0	7	47	1	13	6	0	6	20	161
08:15:00	8	65	14	0	5	87	19	13	7	0	12	39	6	59	3	0	4	68	1	8	12	0	7	21	215
08:30:00	8	65	7	0	0	80	18	3	3	0	5	24	1	40	1	0	5	42	0	3	4	0	7	7	153
08:45:00	10	64	11	0	3	85	19	3	2	0	4	24	5	46	1	0	2	52	4	2	13	0	10	19	180
Grand Total	32	242	41	0	22	315	70	34	14	0	36	118	20	182	7	0	18	209	6	26	35	0	30	67	**709**
Approach%	10.2%	76.8%	13%	0%		-	59.3%	28.8%	11.9%	0%		-	9.6%	87.1%	3.3%	0%		-	9%	38.8%	52.2%	0%		-	**-**
Totals %	4.5%	34.1%	5.8%	0%		44.4%	9.9%	4.8%	2%	0%		16.6%	2.8%	25.7%	1%	0%		29.5%	0.8%	3.7%	4.9%	0%		9.4%	**-**
PHF	0.8	0.93	0.73	0		0.91	0.92	0.57	0.5	0		0.76	0.63	0.77	0.58	0		0.77	0.38	0.5	0.67	0		0.8	**-**
Heavy	2	16	1	0		19	3	2	0	0		5	0	11	2	0		13	1	2	1	0		4	**-**
Heavy %	6.3%	6.6%	2.4%	0%		6%	4.3%	5.9%	0%	0%		4.2%	0%	6%	28.6%	0%		6.2%	16.7%	7.7%	2.9%	0%		6%	**-**
Lights	30	226	40	0		296	67	32	14	0		113	20	171	5	0		196	5	24	34	0		63	**-**
Lights %	93.8%	93.4%	97.6%	0%		94%	95.7%	94.1%	100%	0%		95.8%	100%	94%	71.4%	0%		93.8%	83.3%	92.3%	97.1%	0%		94%	**-**
Single-Unit Trucks	0	8	0	0		8	3	0	0	0		3	0	3	0	0		3	0	0	1	0		1	**-**
Single-Unit Trucks %	0%	3.3%	0%	0%		2.5%	4.3%	0%	0%	0%		2.5%	0%	1.6%	0%	0%		1.4%	0%	0%	2.9%	0%		1.5%	**-**
Buses	2	7	1	0		10	0	2	0	0		2	0	8	2	0		10	1	2	0	0		3	**-**
Buses %	6.3%	2.9%	2.4%	0%		3.2%	0%	5.9%	0%	0%		1.7%	0%	4.4%	28.6%	0%		4.8%	16.7%	7.7%	0%	0%		4.5%	**-**
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	22	-	-	-	-	-	36	-	-	-	-	-	17	-	-	-	-	-	30	-	**-**
Pedestrians%	-	-	-	-	20.8%		-	-	-	-	34%		-	-	-	-	16%		-	-	-	-	28.3%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0.9%		-	-	-	-	0%		**-**
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (7.39 °C)

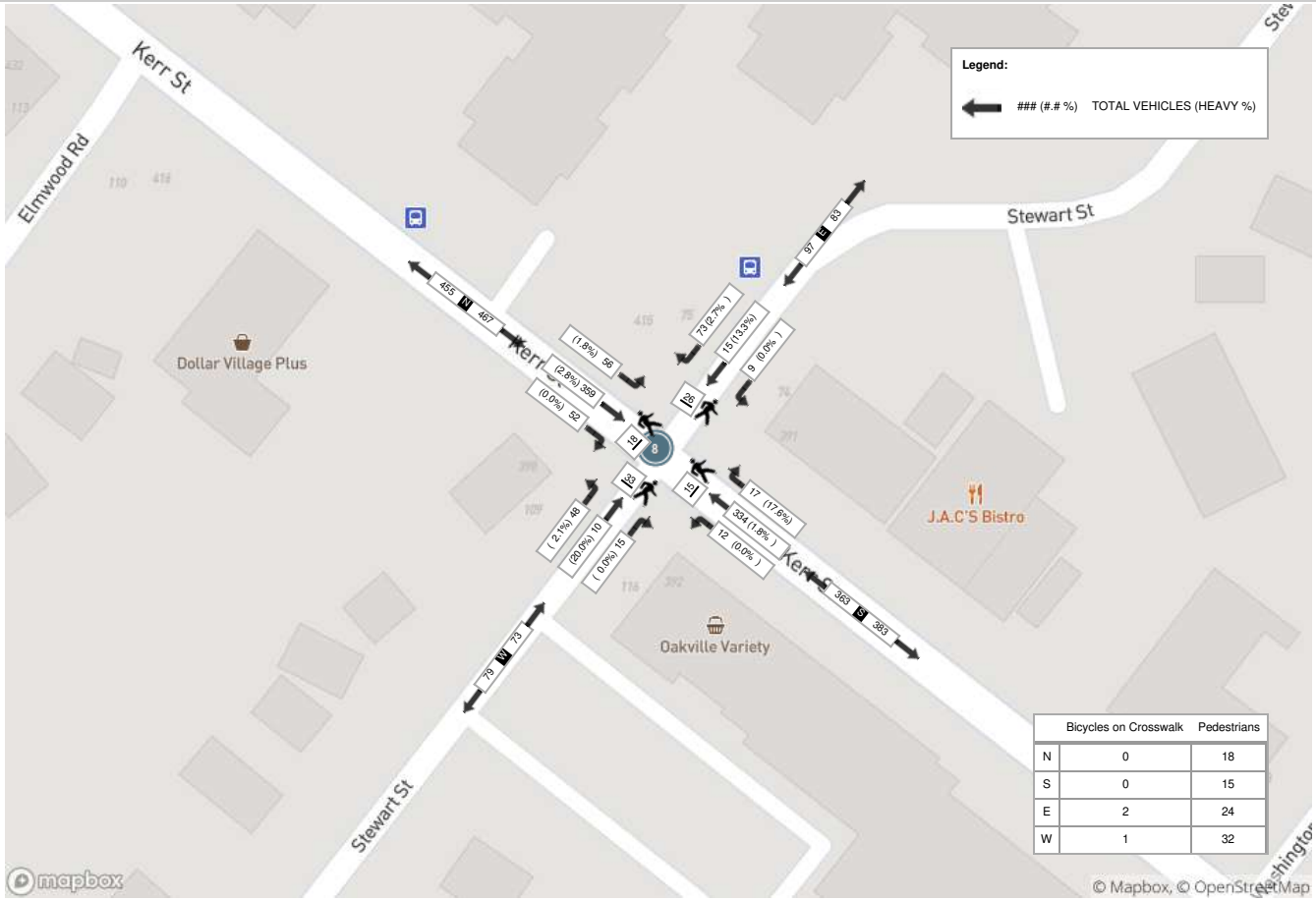
Start Time	N Approach KERR ST						E Approach STEWART ST						S Approach KERR ST						W Approach STEWART ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	14	95	11	0	4	120	25	4	1	0	2	30	3	89	3	0	5	95	7	3	18	0	8	28	273
16:15:00	14	93	13	0	4	120	19	2	1	0	8	22	7	94	3	0	4	104	1	0	10	0	3	11	257
16:30:00	15	71	16	0	5	102	19	6	2	0	11	27	4	73	4	0	3	81	5	3	10	0	9	18	228
16:45:00	9	100	16	0	5	125	10	3	5	0	5	18	3	78	2	0	3	83	2	4	10	0	13	16	242
Grand Total	52	359	56	0	18	467	73	15	9	0	26	97	17	334	12	0	15	363	15	10	48	0	33	73	**1000**
Approach%	11.1%	76.9%	12%	0%		-	75.3%	15.5%	9.3%	0%		-	4.7%	92%	3.3%	0%		-	20.5%	13.7%	65.8%	0%		-	**-**
Totals %	5.2%	35.9%	5.6%	0%		46.7%	7.3%	1.5%	0.9%	0%		9.7%	1.7%	33.4%	1.2%	0%		36.3%	1.5%	1%	4.8%	0%		7.3%	**-**
PHF	0.87	0.9	0.88	0		0.93	0.73	0.63	0.45	0		0.81	0.61	0.89	0.75	0		0.87	0.54	0.63	0.67	0		0.65	**-**
Heavy	0	10	1	0		11	2	2	0	0		4	3	6	0	0		9	0	2	1	0		3	**-**
Heavy %	0%	2.8%	1.8%	0%		2.4%	2.7%	13.3%	0%	0%		4.1%	17.6%	1.8%	0%	0%		2.5%	0%	20%	2.1%	0%		4.1%	**-**
Lights	52	349	55	0		456	71	13	9	0		93	14	328	12	0		354	15	8	47	0		70	**-**
Lights %	100%	97.2%	98.2%	0%		97.6%	97.3%	86.7%	100%	0%		95.9%	82.4%	98.2%	100%	0%		97.5%	100%	80%	97.9%	0%		95.9%	**-**
Single-Unit Trucks	0	4	0	0		4	2	0	0	0		2	3	4	0	0		7	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	1.1%	0%	0%		0.9%	2.7%	0%	0%	0%		2.1%	17.6%	1.2%	0%	0%		1.9%	0%	0%	0%	0%		0%	**-**
Buses	0	6	1	0		7	0	2	0	0		2	0	2	0	0		2	0	2	1	0		3	**-**
Buses %	0%	1.7%	1.8%	0%		1.5%	0%	13.3%	0%	0%		2.1%	0%	0.6%	0%	0%		0.6%	0%	20%	2.1%	0%		4.1%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	18	-	-	-	-	-	24	-	-	-	-	-	15	-	-	-	-	-	32	-	**-**
Pedestrians%	-	-	-	-	19.6%		-	-	-	-	26.1%		-	-	-	-	16.3%		-	-	-	-	34.8%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2.2%		-	-	-	-	0%		-	-	-	-	1.1%		**-**
Bicycles on Road	0	0	0	0	0	-	1	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: Scattered Clouds (-0.83 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	22
S	1	17
E	0	36
W	0	30

Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (7.39 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	18
S	0	15
E	2	24
W	1	32

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (5 . KERR ST & WYECROFT RD)

Start Time	N Approach KERR ST					S Approach KERR ST					W Approach WYECROFT RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	9	30	0	0	39	24	22	0	0	46	15	1	0	0	16	101	
07:15:00	16	40	0	0	56	29	34	0	0	63	13	0	0	0	13	132	
07:30:00	17	55	0	0	72	24	24	0	0	48	13	2	0	3	15	135	
07:45:00	37	63	0	0	100	44	45	0	0	89	13	0	0	1	13	202	570
08:00:00	36	67	0	0	103	42	50	0	0	92	16	3	0	1	19	214	683
08:15:00	42	89	0	0	131	59	38	0	0	97	16	1	0	0	17	245	796
08:30:00	29	76	0	0	105	59	37	0	0	96	24	2	0	1	26	227	888
08:45:00	20	98	0	0	118	60	33	0	0	93	25	1	0	0	26	237	923
BREAK																	
16:00:00	20	142	0	0	162	123	41	0	0	164	22	4	0	2	26	352	
16:15:00	15	115	1	0	131	90	26	0	0	116	31	4	0	3	35	282	
16:30:00	18	127	0	0	145	88	36	0	0	124	31	5	0	2	36	305	
16:45:00	38	119	0	0	157	133	29	0	0	162	25	4	1	1	30	349	1288
17:00:00	22	123	0	0	145	124	29	0	0	153	31	13	1	1	45	343	1279
17:15:00	28	107	0	0	135	114	20	0	0	134	28	5	0	1	33	302	1299
17:30:00	21	121	0	0	142	115	20	0	0	135	26	2	0	1	28	305	1299
17:45:00	28	100	0	0	128	95	34	0	0	129	22	3	0	0	25	282	1232
Grand Total	396	1472	1	0	1869	1223	518	0	0	1741	351	50	2	17	403	**4013**	-
Approach%	21.2%	78.8%	0.1%		-	70.2%	29.8%	0%		-	87.1%	12.4%	0.5%		-	**-**	-
Totals %	9.9%	36.7%	0%		46.6%	30.5%	12.9%	0%		43.4%	8.7%	1.2%	0%		10%	**-**	-
Heavy	19	24	0		-	13	23	0		-	16	1	0		-	**-**	-
Heavy %	4.8%	1.6%	0%		-	1.1%	4.4%	0%		-	4.6%	2%	0%		-	**-**	-
Bicycles	0	0	0		-	0	2	0		-	2	0	0		-	**-**	-
Bicycle %	0%	0%	0%		-	0%	0.4%	0%		-	0.6%	0%	0%		-	**-**	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

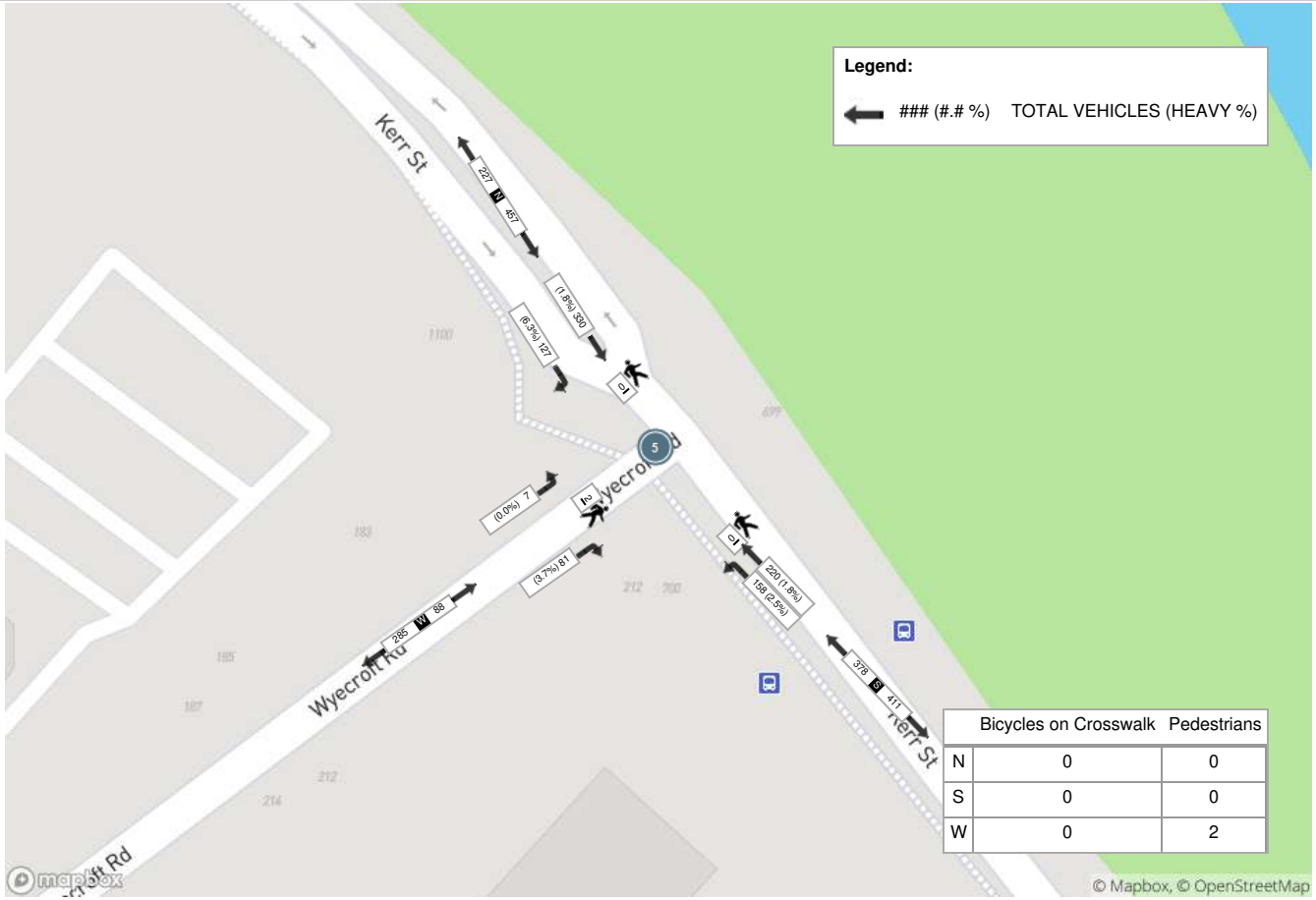
Start Time	N Approach KERR ST					S Approach KERR ST					W Approach WYECROFT RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:00:00	36	67	0	0	103	42	50	0	0	92	16	3	0	1	19	214
08:15:00	42	89	0	0	131	59	38	0	0	97	16	1	0	0	17	245
08:30:00	29	76	0	0	105	59	37	0	0	96	24	2	0	1	26	227
08:45:00	20	98	0	0	118	60	33	0	0	93	25	1	0	0	26	237
Grand Total	127	330	0	0	457	220	158	0	0	378	81	7	0	2	88	**923**
Approach%	27.8%	72.2%	0%		-	58.2%	41.8%	0%		-	92%	8%	0%		-	**-**
Totals %	13.8%	35.8%	0%		49.5%	23.8%	17.1%	0%		41%	8.8%	0.8%	0%		9.5%	**-**
PHF	0.76	0.84	0		0.87	0.92	0.79	0		0.97	0.81	0.58	0		0.85	**-**
Heavy	8	6	0		14	4	4	0		8	3	0	0		3	**-**
Heavy %	6.3%	1.8%	0%		3.1%	1.8%	2.5%	0%		2.1%	3.7%	0%	0%		3.4%	**-**
Lights	119	324	0		443	216	154	0		370	78	7	0		85	**-**
Lights %	93.7%	98.2%	0%		96.9%	98.2%	97.5%	0%		97.9%	96.3%	100%	0%		96.6%	**-**
Single-Unit Trucks	7	3	0		10	0	2	0		2	0	0	0		0	**-**
Single-Unit Trucks %	5.5%	0.9%	0%		2.2%	0%	1.3%	0%		0.5%	0%	0%	0%		0%	**-**
Buses	0	2	0		2	3	2	0		5	3	0	0		3	**-**
Buses %	0%	0.6%	0%		0.4%	1.4%	1.3%	0%		1.3%	3.7%	0%	0%		3.4%	**-**
Articulated Trucks	1	1	0		2	1	0	0		1	0	0	0		0	**-**
Articulated Trucks %	0.8%	0.3%	0%		0.4%	0.5%	0%	0%		0.3%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	100%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (7.39 °C)

Start Time	N Approach KERR ST					S Approach KERR ST					W Approach WYECROFT RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:45:00	38	119	0	0	157	133	29	0	0	162	25	4	1	1	30	349
17:00:00	22	123	0	0	145	124	29	0	0	153	31	13	1	1	45	343
17:15:00	28	107	0	0	135	114	20	0	0	134	28	5	0	1	33	302
17:30:00	21	121	0	0	142	115	20	0	0	135	26	2	0	1	28	305
Grand Total	109	470	0	0	579	486	98	0	0	584	110	24	2	4	136	**1299**
Approach%	18.8%	81.2%	0%		-	83.2%	16.8%	0%		-	80.9%	17.6%	1.5%		-	**-**
Totals %	8.4%	36.2%	0%		44.6%	37.4%	7.5%	0%		45%	8.5%	1.8%	0.2%		10.5%	**-**
PHF	0.72	0.96	0		0.92	0.91	0.84	0		0.9	0.89	0.46	0.5		0.76	**-**
Heavy	5	4	0		9	3	6	0		9	4	0	0		4	**-**
Heavy %	4.6%	0.9%	0%		1.6%	0.6%	6.1%	0%		1.5%	3.6%	0%	0%		2.9%	**-**
Lights	104	466	0		570	483	92	0		575	106	24	2		132	**-**
Lights %	95.4%	99.1%	0%		98.4%	99.4%	93.9%	0%		98.5%	96.4%	100%	100%		97.1%	**-**
Single-Unit Trucks	2	0	0		2	0	3	0		3	2	0	0		2	**-**
Single-Unit Trucks %	1.8%	0%	0%		0.3%	0%	3.1%	0%		0.5%	1.8%	0%	0%		1.5%	**-**
Buses	0	3	0		3	3	2	0		5	2	0	0		2	**-**
Buses %	0%	0.6%	0%		0.5%	0.6%	2%	0%		0.9%	1.8%	0%	0%		1.5%	**-**
Articulated Trucks	3	1	0		4	0	1	0		1	0	0	0		0	**-**
Articulated Trucks %	2.8%	0.2%	0%		0.7%	0%	1%	0%		0.2%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	100%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

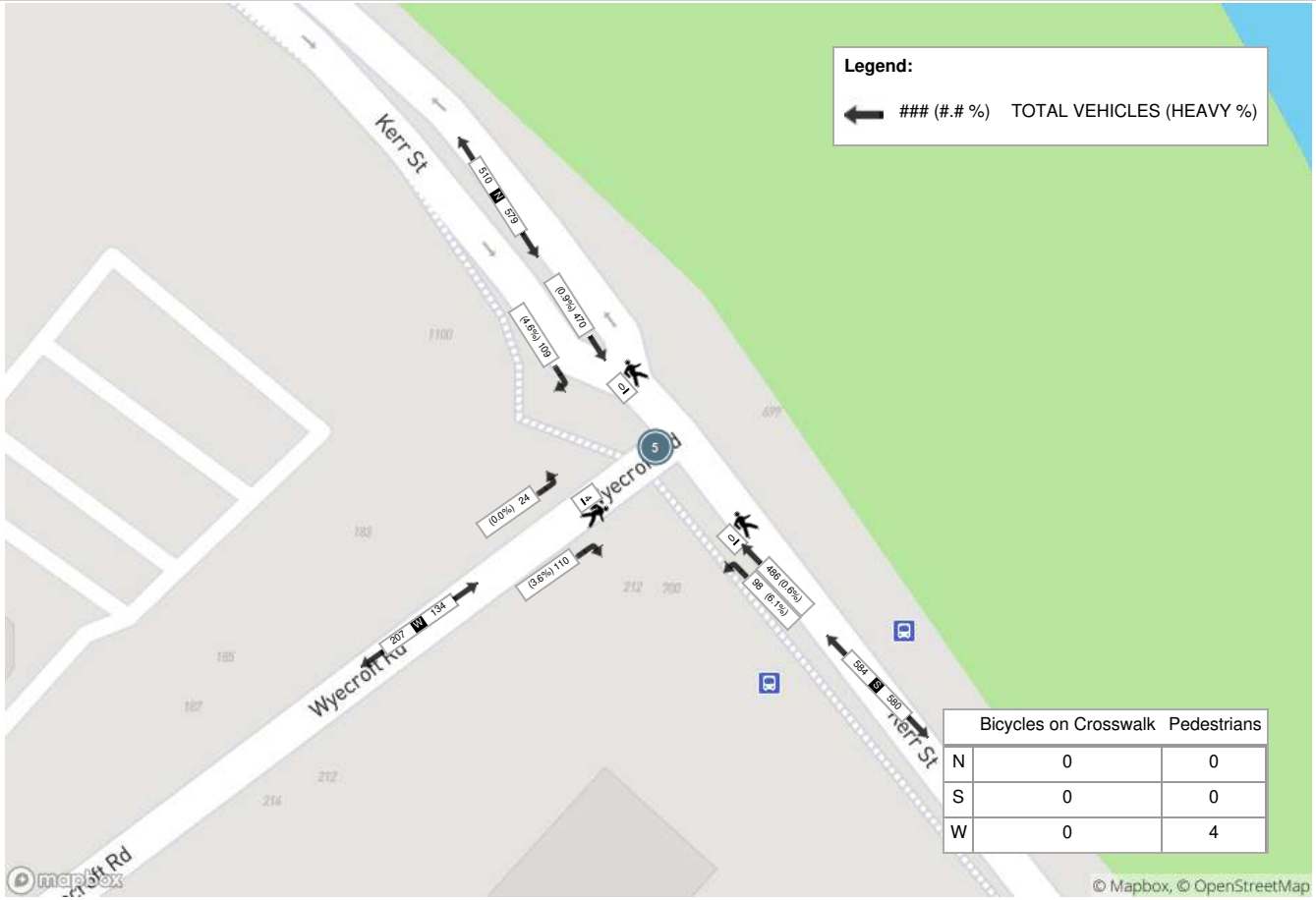
BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)



BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (7.39 °C)



Spectrum

Turning Movement Count
Location Name: SPEERS RD & 50 SPEERS RD (EAST / WEST PUDO ACCESS)
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (10 . SPEERS RD & 50 SPEERS RD (EAST / WEST PUDO ACCESS))

Start Time	N Approach 41 SPEERS RD						E Approach SPEERS RD						S Approach 50 SPEERS RD (EAST ACCESS)						W Approach SPEERS RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	0	0	0	1	0	0	57	1	0	0	58	4	0	1	0	4	5	0	81	0	0	0	81	144	
07:15:00	0	0	0	0	5	0	0	71	1	0	1	72	5	0	3	0	4	8	0	136	0	0	2	136	216	
07:30:00	1	0	0	0	6	1	0	82	2	0	0	84	6	0	1	0	3	7	0	140	0	0	1	140	232	
07:45:00	0	0	0	0	10	0	0	118	4	0	0	122	7	0	3	0	2	10	0	186	0	0	2	186	318	910
08:00:00	0	0	0	0	1	0	0	152	1	0	1	153	6	0	3	0	6	9	1	157	0	0	2	158	320	1086
08:15:00	0	0	1	0	7	1	0	207	0	0	0	207	2	0	3	0	3	5	0	233	0	0	1	233	446	1316
08:30:00	0	0	0	0	2	0	0	213	2	0	0	215	2	0	5	0	1	7	0	164	0	0	0	164	386	1470
08:45:00	1	0	0	0	3	1	0	184	0	0	0	184	3	0	1	0	1	4	0	193	0	0	0	193	382	1534
BREAK																										
16:00:00	0	0	1	0	9	1	0	270	1	0	0	271	2	0	2	0	4	4	0	196	0	0	1	196	472	
16:15:00	2	0	1	0	7	3	0	290	2	0	0	292	4	0	1	0	3	5	1	234	0	0	0	235	535	
16:30:00	0	0	0	0	5	0	0	230	2	0	0	232	5	0	5	0	1	10	0	231	0	0	0	231	473	
16:45:00	1	0	1	0	8	2	0	296	3	0	0	299	1	0	0	0	5	1	0	208	0	0	0	208	510	1990
17:00:00	0	0	1	0	4	1	0	263	2	0	0	265	1	0	4	0	0	5	1	239	0	0	0	240	511	2029
17:15:00	0	0	0	0	2	0	0	292	1	0	1	293	2	0	2	0	2	4	1	215	0	0	0	216	513	2007
17:30:00	0	0	1	0	4	1	0	239	4	0	0	243	2	0	1	0	0	3	0	208	0	0	0	208	455	1989
17:45:00	0	0	0	0	6	0	0	217	4	0	0	221	2	0	3	0	1	5	2	169	0	0	0	171	397	1876
Grand Total	5	0	6	0	80	11	0	3181	30	0	3	3211	54	0	38	0	40	92	6	2990	0	0	9	2996	**6310**	-
Approach%	45.5%	0%	54.5%	0%		-	0%	99.1%	0.9%	0%		-	58.7%	0%	41.3%	0%		-	0.2%	99.8%	0%	0%		-	-	-
Totals %	0.1%	0%	0.1%	0%		0.2%	0%	50.4%	0.5%	0%		50.9%	0.9%	0%	0.6%	0%		1.5%	0.1%	47.4%	0%	0%		47.5%	-	-
Heavy	0	0	0	0		-	0	138	0	0		-	0	0	2	0		-	2	133	0	0		-	-	-
Heavy %	0%	0%	0%	0%		-	0%	4.3%	0%	0%		-	0%	0%	5.3%	0%		-	33.3%	4.4%	0%	0%		-	-	-
Bicycles	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	0	4	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: SPEERS RD & 50 SPEERS RD (EAST / WEST PUDO ACCESS)
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (-0.83 °C)

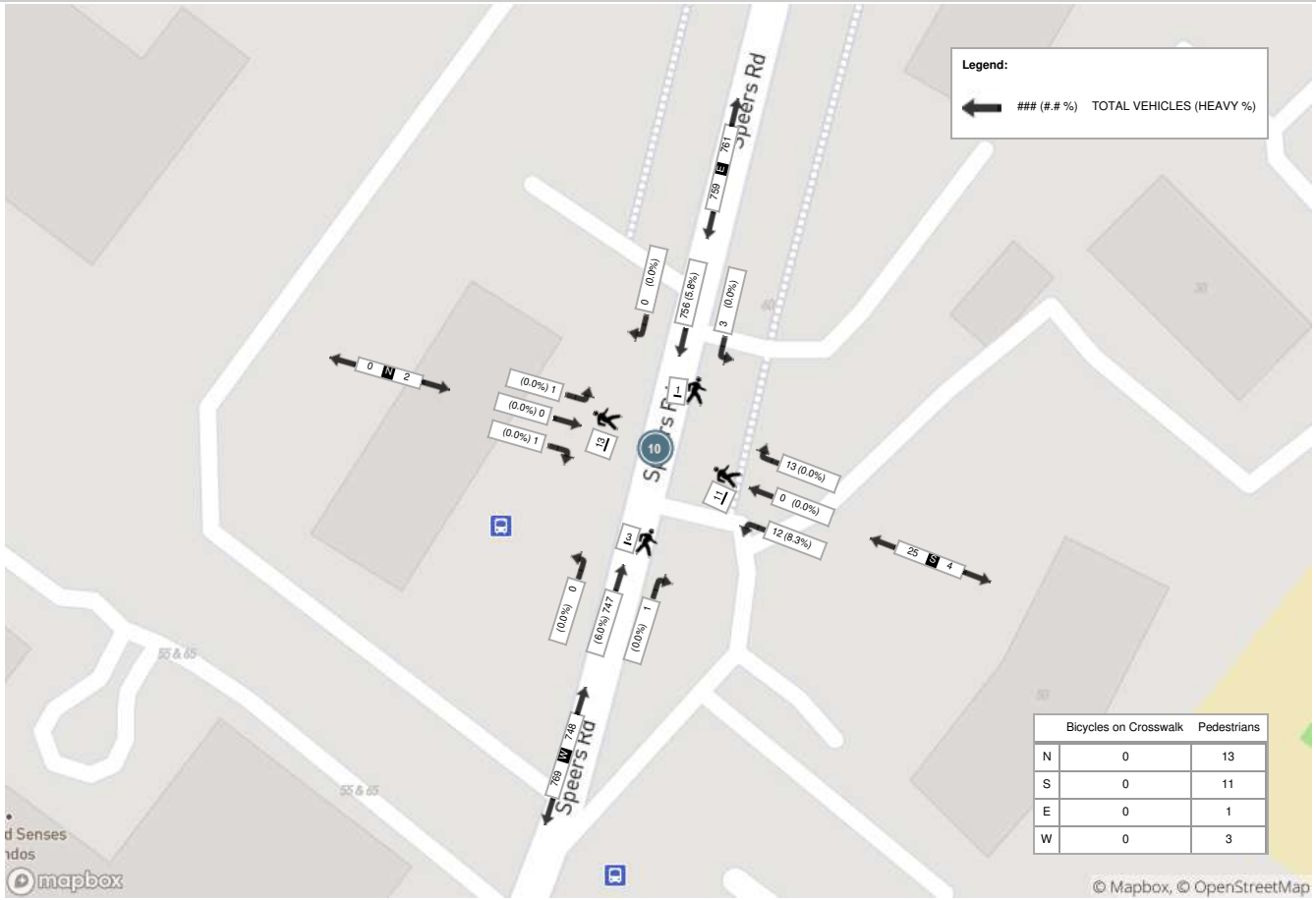
Start Time	N Approach 41 SPEERS RD						E Approach SPEERS RD						S Approach 50 SPEERS RD (EAST ACCESS)						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	0	0	0	0	1	0	0	152	1	0	1	153	6	0	3	0	6	9	1	157	0	0	2	158	320
08:15:00	0	0	1	0	7	1	0	207	0	0	0	207	2	0	3	0	3	5	0	233	0	0	1	233	446
08:30:00	0	0	0	0	2	0	0	213	2	0	0	215	2	0	5	0	1	7	0	164	0	0	0	164	386
08:45:00	1	0	0	0	3	1	0	184	0	0	0	184	3	0	1	0	1	4	0	193	0	0	0	193	382
Grand Total	1	0	1	0	13	2	0	756	3	0	1	759	13	0	12	0	11	25	1	747	0	0	3	748	**1534**
Approach%	50%	0%	50%	0%		-	0%	99.6%	0.4%	0%		-	52%	0%	48%	0%		-	0.1%	99.9%	0%	0%		-	**-**
Totals %	0.1%	0%	0.1%	0%		0.1%	0%	49.3%	0.2%	0%		49.5%	0.8%	0%	0.8%	0%		1.6%	0.1%	48.7%	0%	0%		48.8%	**-**
PHF	0.25	0	0.25	0		0.5	0	0.89	0.38	0		0.88	0.54	0	0.6	0		0.69	0.25	0.8	0	0		0.8	**-**
Heavy	0	0	0	0		0	0	44	0	0		44	0	0	1	0		1	0	45	0	0		45	**-**
Heavy %	0%	0%	0%	0%		0%	0%	5.8%	0%	0%		5.8%	0%	0%	8.3%	0%		4%	0%	6%	0%	0%		6%	**-**
Lights	1	0	1	0		2	0	712	3	0		715	13	0	11	0		24	1	702	0	0		703	**-**
Lights %	100%	0%	100%	0%		100%	0%	94.2%	100%	0%		94.2%	100%	0%	91.7%	0%		96%	100%	94%	0%	0%		94%	**-**
Single-Unit Trucks	0	0	0	0		0	0	18	0	0		18	0	0	0	0		0	0	19	0	0		19	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		2.4%	0%	0%	0%	0%		0%	0%	2.5%	0%	0%		2.5%	**-**
Buses	0	0	0	0		0	0	24	0	0		24	0	0	1	0		1	0	24	0	0		24	**-**
Buses %	0%	0%	0%	0%		0%	0%	3.2%	0%	0%		3.2%	0%	0%	8.3%	0%		4%	0%	3.2%	0%	0%		3.2%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	**-**
Pedestrians	-	-	-	-	13	-	-	-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	46.4%		-	-	-	-	3.6%		-	-	-	-	39.3%		-	-	-	-	10.7%		**-**
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	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (7.39 °C)

Start Time	N Approach 41 SPEERS RD						E Approach SPEERS RD						S Approach 50 SPEERS RD (EAST ACCESS)						W Approach SPEERS RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	2	0	1	0	7	3	0	290	2	0	0	292	4	0	1	0	3	5	1	234	0	0	0	235	535
16:30:00	0	0	0	0	5	0	0	230	2	0	0	232	5	0	5	0	1	10	0	231	0	0	0	231	473
16:45:00	1	0	1	0	8	2	0	296	3	0	0	299	1	0	0	0	5	1	0	208	0	0	0	208	510
17:00:00	0	0	1	0	4	1	0	263	2	0	0	265	1	0	4	0	0	5	1	239	0	0	0	240	511
Grand Total	3	0	3	0	24	6	0	1079	9	0	0	1088	11	0	10	0	9	21	2	912	0	0	0	914	**2029**
Approach%	50%	0%	50%	0%		-	0%	99.2%	0.8%	0%		-	52.4%	0%	47.6%	0%		-	0.2%	99.8%	0%	0%		-	**-**
Totals %	0.1%	0%	0.1%	0%		0.3%	0%	53.2%	0.4%	0%		53.6%	0.5%	0%	0.5%	0%		1%	0.1%	44.9%	0%	0%		45%	**-**
PHF	0.38	0	0.75	0		0.5	0	0.91	0.75	0		0.91	0.55	0	0.5	0		0.53	0.5	0.95	0	0		0.95	**-**
Heavy	0	0	0	0		0	0	31	0	0		31	0	0	0	0		0	0	18	0	0		18	**-**
Heavy %	0%	0%	0%	0%		0%	0%	2.9%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	2%	0%	0%		2%	**-**
Lights	3	0	3	0		6	0	1048	9	0		1057	11	0	10	0		21	2	894	0	0		896	**-**
Lights %	100%	0%	100%	0%		100%	0%	97.1%	100%	0%		97.2%	100%	0%	100%	0%		100%	100%	98%	0%	0%		98%	**-**
Single-Unit Trucks	0	0	0	0		0	0	11	0	0		11	0	0	0	0		0	0	3	0	0		3	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	**-**
Buses	0	0	0	0		0	0	19	0	0		19	0	0	0	0		0	0	15	0	0		15	**-**
Buses %	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1.7%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	23	-	-	-	-	-	0	-	-	-	-	-	8	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	69.7%		-	-	-	-	0%		-	-	-	-	24.2%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	3%		-	-	-	-	0%		-	-	-	-	3%		-	-	-	-	0%		**-**
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

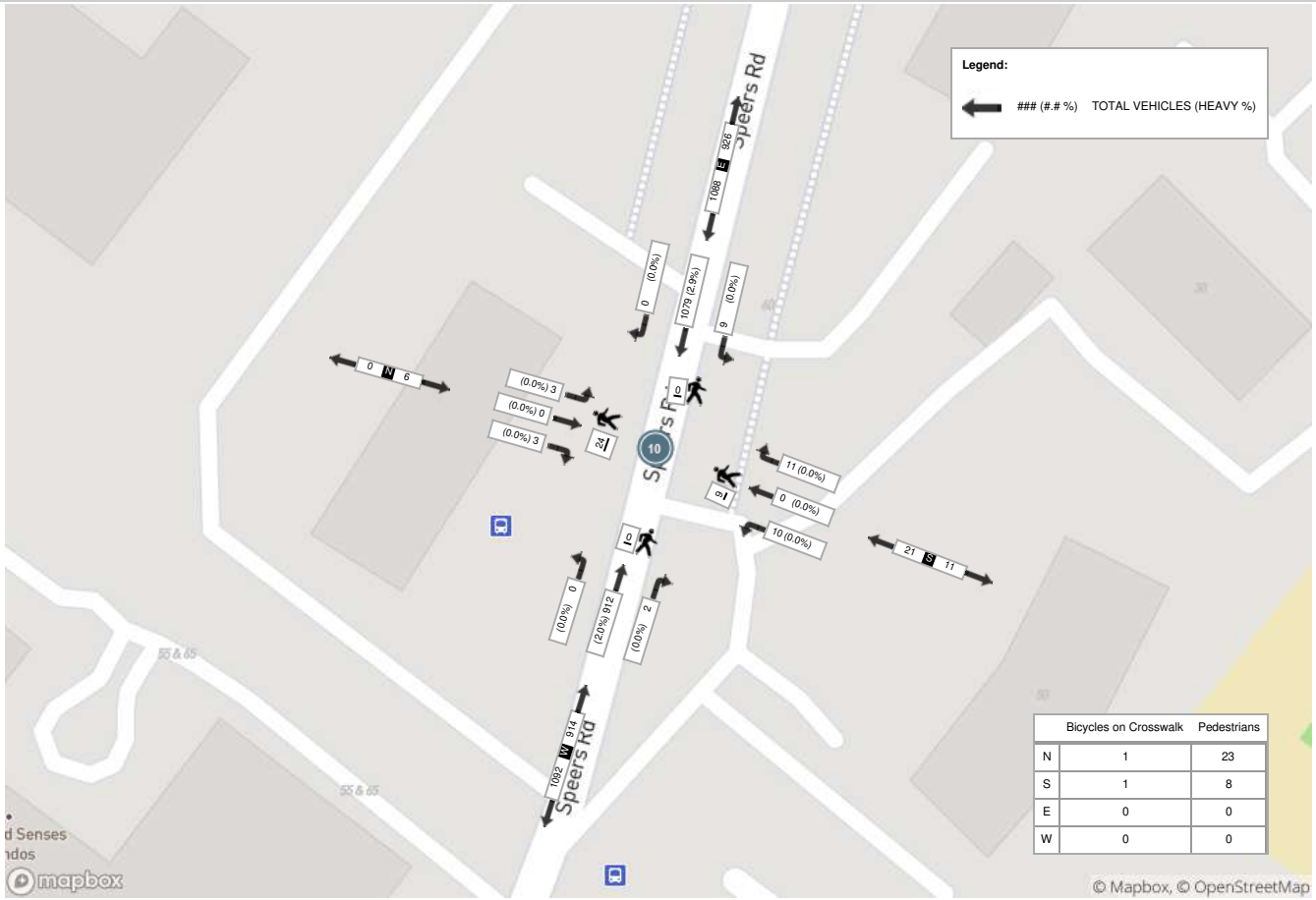
Peak Hour: 08:00 AM - 09:00 AM **Weather: Scattered Clouds (-0.83 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	13
S	0	11
E	0	1
W	0	3

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:15 PM - 05:15 PM **Weather: Overcast Clouds (7.39 °C)**



	Bicycles on Crosswalk	Pedestrians
N	1	23
S	1	8
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: 50 SPEERS RD & INTERNAL ACCESS / UG ACCESS
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (9 . 50 SPEERS RD & INTERNAL ACCESS / UG ACCESS)

Start Time	SE Approach UG ACCESS							SW Approach SW ACCESS							E Approach 50 SPEERS RD							S Approach INTERNAL ACCESS							W Approach 50 SPEERS RD							Int. Total (15 min)	Int. Total (1 hr)
	Hard Right SE:E	Bear Left SE:W	Left SE:SW	Hard Left SE:S	UTurn SE:SE	Peds SE:	Approach Total	Hard Right SW:S	Right SW:SE	Bear Right SW:E	Hard Left SW:W	UTurn SW:SW	Peds SW:	Approach Total	Thru E:W	Bear Left E:SW	Left E:S	Hard Left E:SE	UTurn E:E	Peds E:	Approach Total	Hard Right S:SE	Right S:E	Left S:W	Hard Left S:SW	UTurn S:S	Peds S:	Approach Total	Hard Right W:SW	Right W:S	Bear Right W:SE	Thru W:E	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	0	1	0	3	0	3	4	5	
07:15:00	1	1	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	2	1	0	0	0	1	0	5	1	4	
07:30:00	0	0	0	0	0	8	0	0	0	1	1	0	7	2	0	0	1	0	0	2	1	0	2	0	0	0	9	2	0	0	1	0	0	0	1	6	
07:45:00	2	1	0	0	0	1	3	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	2	0	0	0	2	2	1	1	0	0	0	2	2	8	23
08:00:00	0	2	0	0	0	2	2	0	0	0	0	0	6	0	1	0	0	0	0	1	1	0	0	0	0	0	3	0	0	0	1	3	0	6	4	7	25
08:15:00	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	3	2	0	0	1	0	0	2	1	3	24
08:30:00	1	0	0	0	0	6	1	0	0	0	2	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2	0	1	2	5	23
08:45:00	2	1	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	2	2	5	20
BREAK																																					
16:00:00	0	0	0	0	0	2	0	0	0	1	1	0	2	2	0	0	0	0	0	0	0	0	1	0	0	0	4	1	0	1	1	2	0	7	4	7	
16:15:00	0	0	0	0	0	2	0	0	0	2	0	0	3	2	0	1	1	0	0	0	2	0	0	0	0	0	3	0	0	1	0	2	0	3	3	7	
16:30:00	1	1	0	0	0	2	2	0	0	0	0	0	2	0	0	0	3	1	0	0	4	0	1	0	0	0	2	1	0	2	1	7	0	2	10	17	
16:45:00	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	3	0	1	3	0	0	0	0	0	3	0	3	3	1	3	0	5	10	13	44
17:00:00	0	0	0	0	0	4	0	0	0	0	0	0	3	0	1	0	1	0	0	0	2	0	1	0	0	0	4	1	2	2	1	5	0	0	10	13	50
17:15:00	0	0	0	0	0	3	0	0	0	0	0	0	2	0	1	0	0	0	1	1	2	0	1	0	0	0	4	1	0	2	2	4	0	1	8	11	54
17:30:00	0	0	0	0	0	4	0	0	0	0	0	0	6	0	0	0	0	1	0	0	1	0	0	0	0	0	6	0	1	1	1	2	0	1	5	6	43
17:45:00	1	0	0	0	0	2	1	0	0	0	0	0	4	0	1	0	2	0	0	0	3	0	0	0	0	0	2	0	1	1	0	3	0	0	5	9	39
Grand Total	8	6	0	0	0	40	14	0	0	4	5	0	52	9	4	1	9	5	1	9	20	0	11	0	0	0	54	11	8	15	10	39	0	40	72	**126**	-
Approach%	57.1%	42.9%	0%	0%	0%		-	0%	0%	44.4%	55.6%	0%		-	20%	5%	45%	25%	5%		-	0%	100%	0%	0%	0%		-	11.1%	20.8%	13.9%	54.2%	0%		-	**-**	-
Totals %	6.3%	4.8%	0%	0%	0%		11.1%	0%	0%	3.2%	4%	0%		7.1%	3.2%	0.8%	7.1%	4%	0.8%		15.9%	0%	8.7%	0%	0%	0%		8.7%	6.3%	11.9%	7.9%	31%	0%		57.1%	**-**	-
Heavy	0	0	0	0	0		-	0	0	0	0	0		-	0	0	0	0	1		-	0	0	0	0	0		-	0	0	0	1	0		-	**-**	-
Heavy %	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	100%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	2.6%	0%		-	**-**	-
Bicycles	0	0	0	0	0		-	0	0	0	0	0		-	0	1	0	0	0		-	0	0	0	0	0		-	0	0	0	0	0		-	**-**	-
Bicycle %	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	100%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: 50 SPEERS RD & INTERNAL ACCESS / UG ACCESS
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Scattered Clouds (-0.83 °C)

Start Time	SE Approach UG ACCESS							SW Approach SW ACCESS							E Approach 50 SPEERS RD							S Approach INTERNAL ACCESS							W Approach 50 SPEERS RD							Int. Total (15 min)
	Hard Right	Bear Left	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Bear Right	Hard Left	UTurn	Peds	Approach Total	Thru	Bear Left	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Bear Right	Thru	UTurn	Peds	Approach Total	
07:15:00	1	1	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	2	1	0	0	0	1	0	5	1	4
07:30:00	0	0	0	0	0	8	0	0	0	1	1	0	7	2	0	0	1	0	0	2	1	0	2	0	0	0	9	2	0	0	1	0	0	0	1	6
07:45:00	2	1	0	0	0	1	3	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	2	0	0	0	2	2	1	1	0	0	0	2	2	8
08:00:00	0	2	0	0	0	2	2	0	0	0	0	0	6	0	1	0	0	0	0	1	1	0	0	0	0	0	3	0	0	0	1	3	0	6	4	7
Grand Total	3	4	0	0	0	11	7	0	0	1	2	0	18	3	1	0	1	0	0	4	2	0	5	0	0	0	16	5	1	1	2	4	0	13	8	**25**
Approach%	42.9%	57.1%	0%	0%	0%		-	0%	0%	33.3%	66.7%	0%		-	50%	0%	50%	0%	0%		-	0%	100%	0%	0%	0%		-	12.5%	12.5%	25%	50%	0%		-	-
Totals %	12%	16%	0%	0%	0%		28%	0%	0%	4%	8%	0%		12%	4%	0%	4%	0%	0%		8%	0%	20%	0%	0%	0%		20%	4%	4%	8%	16%	0%		32%	-
PHF	0.38	0.5	0	0	0		0.58	0	0	0.25	0.5	0		0.38	0.25	0	0.25	0	0		0.5	0	0.63	0	0	0		0.63	0.25	0.25	0.5	0.33	0		0.5	-
Heavy	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	-
Heavy %	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%	-
Lights	3	4	0	0	0		7	0	0	1	2	0		3	1	0	1	0	0		2	0	5	0	0	0		5	1	1	2	4	0		8	-
Lights %	100%	100%	0%	0%	0%		100%	0%	0%	100%	100%	0%		100%	100%	0%	100%	0%	0%		100%	0%	100%	0%	0%	0%		100%	100%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	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	-
Single-Unit Trucks %	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%	-
Buses	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	-
Buses %	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%	-
Pedestrians	-	-	-	-	-	11	-	-	-	-	-	-	18	-	-	-	-	-	-	4	-	-	-	-	-	-	16	-	-	-	-	-	-	13	-	-
Pedestrians%	-	-	-	-	-	17.7%		-	-	-	-	-	29%		-	-	-	-	-	6.5%		-	-	-	-	-	25.8%		-	-	-	-	-	21%		-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	-	0%		-	-	-	-	-	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	0	0	0	0	-	0	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: 50 SPEERS RD & INTERNAL ACCESS / UG ACCESS
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

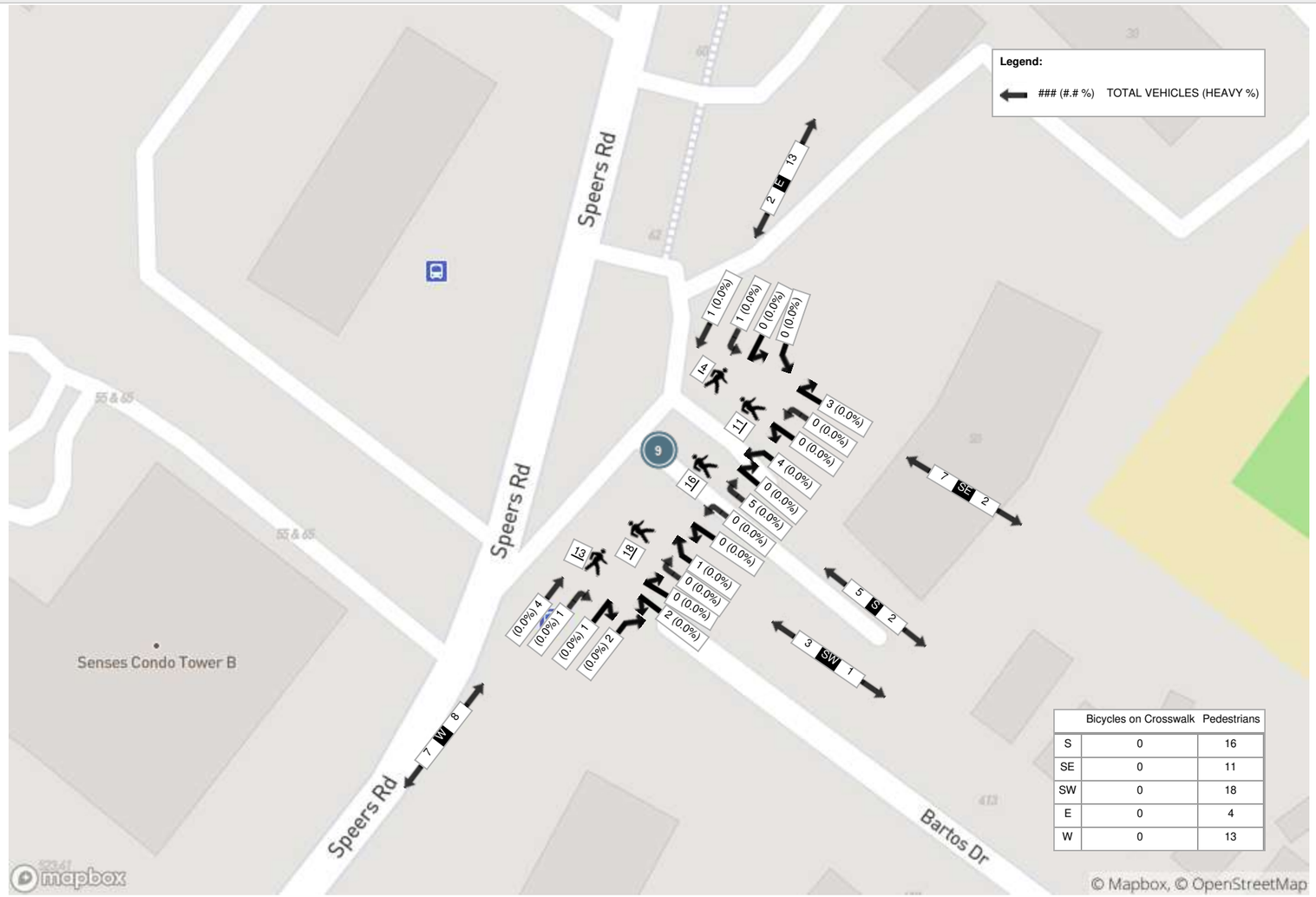
BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)

Start Time	SE Approach UG ACCESS							SW Approach SW ACCESS							E Approach 50 SPEERS RD							S Approach INTERNAL ACCESS							W Approach 50 SPEERS RD							Int. Total (15 min)
	Hard Right	Bear Left	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Bear Right	Hard Left	UTurn	Peds	Approach Total	Thru	Bear Left	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Left	Hard Left	UTurn	Peds	Approach Total	Hard Right	Right	Bear Right	Thru	UTurn	Peds	Approach Total	
16:30:00	1	1	0	0	0	2	2	0	0	0	0	0	2	0	0	0	3	1	0	0	4	0	1	0	0	0	2	1	0	2	1	7	0	2	10	17
16:45:00	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	3	0	1	3	0	0	0	0	0	3	0	3	3	1	3	0	5	10	13
17:00:00	0	0	0	0	0	4	0	0	0	0	0	0	3	0	1	0	1	0	0	0	2	0	1	0	0	0	4	1	2	2	1	5	0	0	10	13
17:15:00	0	0	0	0	0	3	0	0	0	0	0	0	2	0	1	0	0	0	1	1	2	0	1	0	0	0	4	1	0	2	2	4	0	1	8	11
Grand Total	1	1	0	0	0	10	2	0	0	0	0	0	11	0	2	0	4	4	1	2	11	0	3	0	0	0	13	3	5	9	5	19	0	8	38	**54**
Approach%	50%	50%	0%	0%	0%		-	0%	0%	0%	0%	0%		-	18.2%	0%	36.4%	36.4%	9.1%		-	0%	100%	0%	0%	0%		-	13.2%	23.7%	13.2%	50%	0%		-	-
Totals %	1.9%	1.9%	0%	0%	0%		3.7%	0%	0%	0%	0%	0%		0%	3.7%	0%	7.4%	7.4%	1.9%		20.4%	0%	5.6%	0%	0%	0%		5.6%	9.3%	16.7%	9.3%	35.2%	0%		70.4%	-
PHF	0.25	0.25	0	0	0		0.25	0	0	0	0	0		0	0.5	0	0.33	0.33	0.25		0.69	0	0.75	0	0	0		0.75	0.42	0.75	0.63	0.68	0		0.95	-
Heavy	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	1		1	0	0	0	0	0		0	0	0	0	0	0		0	-
Heavy %	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	100%		9.1%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	-
Lights	1	1	0	0	0		2	0	0	0	0	0		0	2	0	4	4	0		10	0	3	0	0	0		3	5	9	5	19	0		38	-
Lights %	100%	100%	0%	0%	0%		100%	0%	0%	0%	0%	0%		0%	100%	0%	100%	100%	0%		90.9%	0%	100%	0%	0%	0%		100%	100%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0	1		1	0	0	0	0	0		0	0	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	100%		9.1%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%		0%	-
Buses	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	-
Buses %	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%	-
Pedestrians	-	-	-	-	-	10	-	-	-	-	-	-	10	-	-	-	-	-	-	2	-	-	-	-	-	-	13	-	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	-	22.7%		-	-	-	-	-	22.7%		-	-	-	-	-	4.5%		-	-	-	-	-	29.5%		-	-	-	-	-	18.2%		-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	-	0%		-	-	-	-	-	2.3%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-
Bicycles on Road	0	0	0	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	-	-
Bicycles on Road%	-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%		-

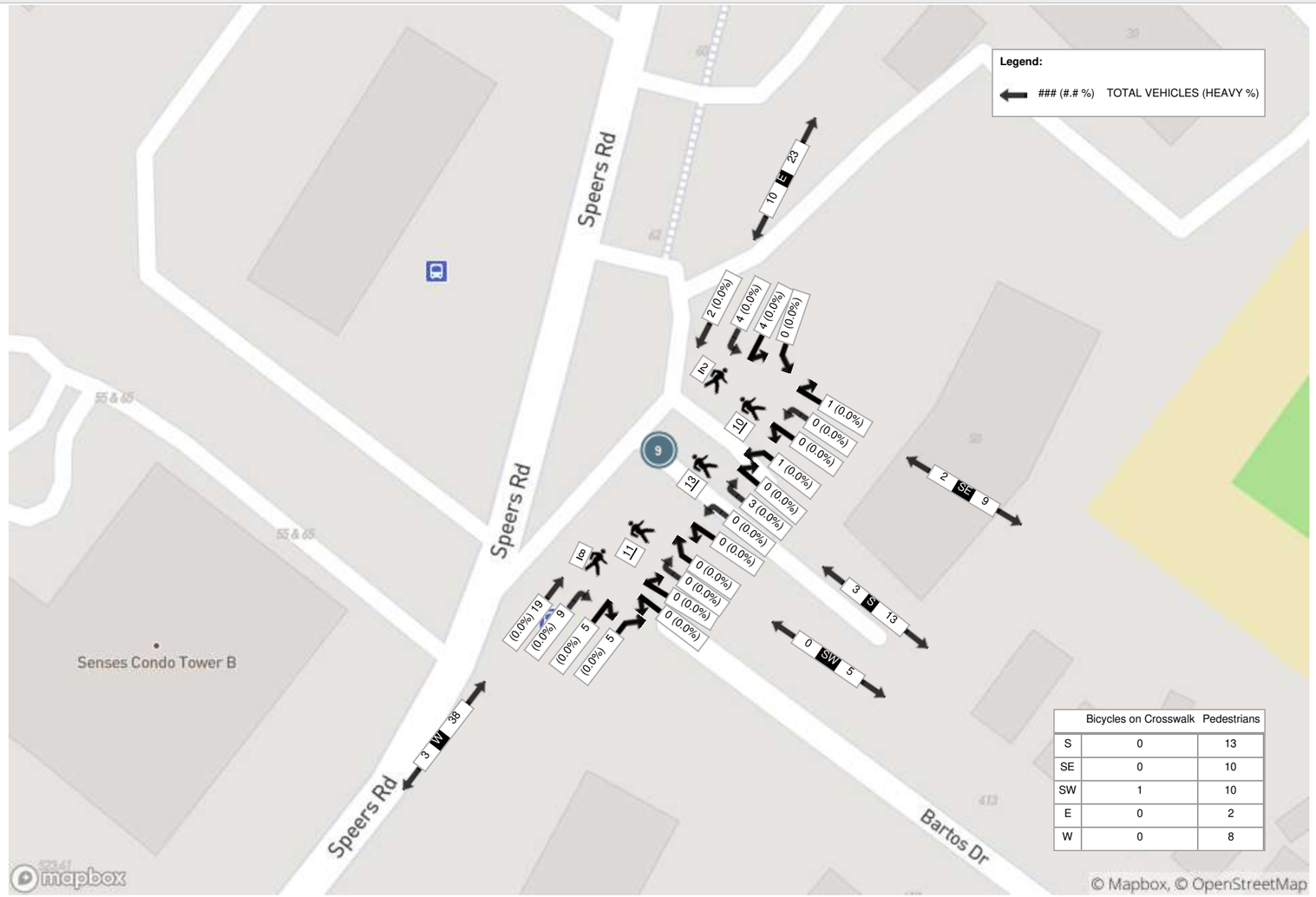
BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Scattered Clouds (-0.83 °C)



BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)



	Bicycles on Crosswalk	Pedestrians
S	0	13
SE	0	10
SW	1	10
E	0	2
W	0	8

Spectrum

Turning Movement Count
Location Name: 50 SPEERS RD & INTERNAL WEST DRIVEWAY
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Turning Movement Count (11 . 50 SPEERS RD & INTERNAL WEST DRIVEWAY)

Start Time	N Approach 50 SPEERS RD						E Approach EAST DRIVEWAY						S Approach SOUTH DRIVEWAY						W Approach INTERNAL WEST DRIVEWAY						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	1	0	0	0	1	1	5	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	3	9	
07:15:00	0	0	1	0	1	1	5	0	0	0	1	5	0	1	0	0	1	1	0	1	2	0	0	3	10	
07:30:00	1	0	1	0	1	2	4	0	0	0	1	4	0	1	0	0	6	1	0	0	3	0	1	3	10	
07:45:00	0	0	4	0	1	4	5	0	0	0	3	5	0	1	0	0	2	1	0	0	4	0	0	4	14	43
08:00:00	1	0	1	0	1	2	6	0	0	0	4	6	0	0	0	0	8	0	0	1	2	0	2	3	11	45
08:15:00	0	0	0	0	2	0	4	0	0	0	2	4	0	0	0	0	4	0	0	0	2	0	0	2	6	41
08:30:00	0	0	2	0	0	2	4	0	0	0	4	4	0	0	0	0	3	0	0	1	2	0	1	3	9	40
08:45:00	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	1	1	0	2	2	0	0	4	6	32
BREAK																										
16:00:00	0	0	1	0	0	1	2	0	0	0	1	2	0	0	0	0	2	0	0	2	2	0	0	4	7	
16:15:00	2	0	1	0	0	3	1	0	0	0	4	1	0	2	0	0	2	2	0	1	2	0	0	3	9	
16:30:00	2	0	0	0	0	2	6	0	0	1	1	7	0	2	1	0	2	3	0	7	2	0	0	9	21	
16:45:00	3	0	0	0	1	3	1	0	0	0	2	1	0	1	0	0	1	1	0	3	0	0	0	3	8	45
17:00:00	2	0	1	0	0	3	3	0	0	0	1	3	0	0	0	0	3	0	0	4	1	0	0	5	11	49
17:15:00	1	0	1	0	1	2	1	1	0	0	3	2	1	1	0	0	2	2	0	5	2	0	0	7	13	53
17:30:00	1	0	3	0	1	4	3	0	0	0	2	3	0	0	0	0	6	0	0	2	0	0	0	2	9	41
17:45:00	2	0	4	0	1	6	3	1	0	0	7	4	0	1	0	0	2	1	0	3	1	0	0	4	15	48
Grand Total	16	0	20	0	11	36	54	2	0	1	36	57	1	11	1	0	45	13	0	35	27	0	4	62	**168**	-
Approach%	44.4%	0%	55.6%	0%		-	94.7%	3.5%	0%	1.8%		-	7.7%	84.6%	7.7%	0%		-	0%	56.5%	43.5%	0%		-	**-**	-
Totals %	9.5%	0%	11.9%	0%		21.4%	32.1%	1.2%	0%	0.6%		33.9%	0.6%	6.5%	0.6%	0%		7.7%	0%	20.8%	16.1%	0%		36.9%	**-**	-
Heavy	1	0	1	0		-	0	0	0	0		-	0	0	0	0		-	0	0	2	0		-	**-**	-
Heavy %	6.3%	0%	5%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	7.4%	0%		-	**-**	-
Bicycles	1	0	0	0		-	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	**-**	-
Bicycle %	6.3%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: 50 SPEERS RD & INTERNAL WEST DRIVEWAY
Date: Wed, Nov 24, 2021 Deployment Lead: Theo Daglis

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Scattered Clouds (-0.83 °C)

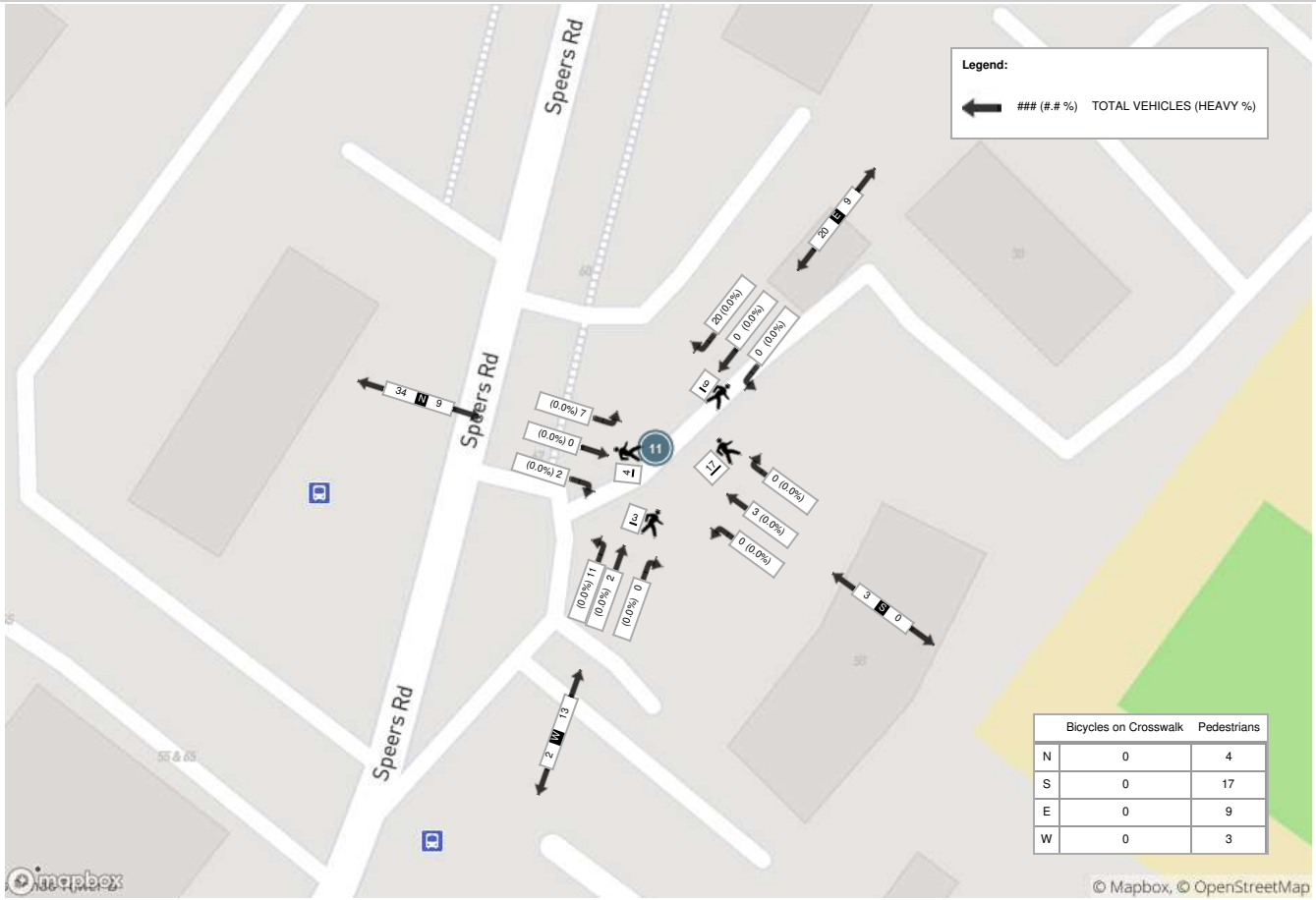
Start Time	N Approach 50 SPEERS RD						E Approach EAST DRIVEWAY						S Approach SOUTH DRIVEWAY						W Approach INTERNAL WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:15:00	0	0	1	0	1	1	5	0	0	0	1	5	0	1	0	0	1	1	0	1	2	0	0	3	10
07:30:00	1	0	1	0	1	2	4	0	0	0	1	4	0	1	0	0	6	1	0	0	3	0	1	3	10
07:45:00	0	0	4	0	1	4	5	0	0	0	3	5	0	1	0	0	2	1	0	0	4	0	0	4	14
08:00:00	1	0	1	0	1	2	6	0	0	0	4	6	0	0	0	0	8	0	0	1	2	0	2	3	11
Grand Total	2	0	7	0	4	9	20	0	0	0	9	20	0	3	0	0	17	3	0	2	11	0	3	13	**45**
Approach%	22.2%	0%	77.8%	0%		-	100%	0%	0%	0%		-	0%	100%	0%	0%		-	0%	15.4%	84.6%	0%		-	**-**
Totals %	4.4%	0%	15.6%	0%		20%	44.4%	0%	0%	0%		44.4%	0%	6.7%	0%	0%		6.7%	0%	4.4%	24.4%	0%		28.9%	**-**
PHF	0.5	0	0.44	0		0.56	0.83	0	0	0		0.83	0	0.75	0	0		0.75	0	0.5	0.69	0		0.81	**-**
Heavy	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Lights	2	0	7	0		9	20	0	0	0		20	0	3	0	0		3	0	2	11	0		13	**-**
Lights %	100%	0%	100%	0%		100%	100%	0%	0%	0%		100%	0%	100%	0%	0%		100%	0%	100%	100%	0%		100%	**-**
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	4	-	-	-	-	-	9	-	-	-	-	-	17	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	12.1%		-	-	-	-	27.3%		-	-	-	-	51.5%		-	-	-	-	9.1%		**-**
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%		**-**

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (7.39 °C)

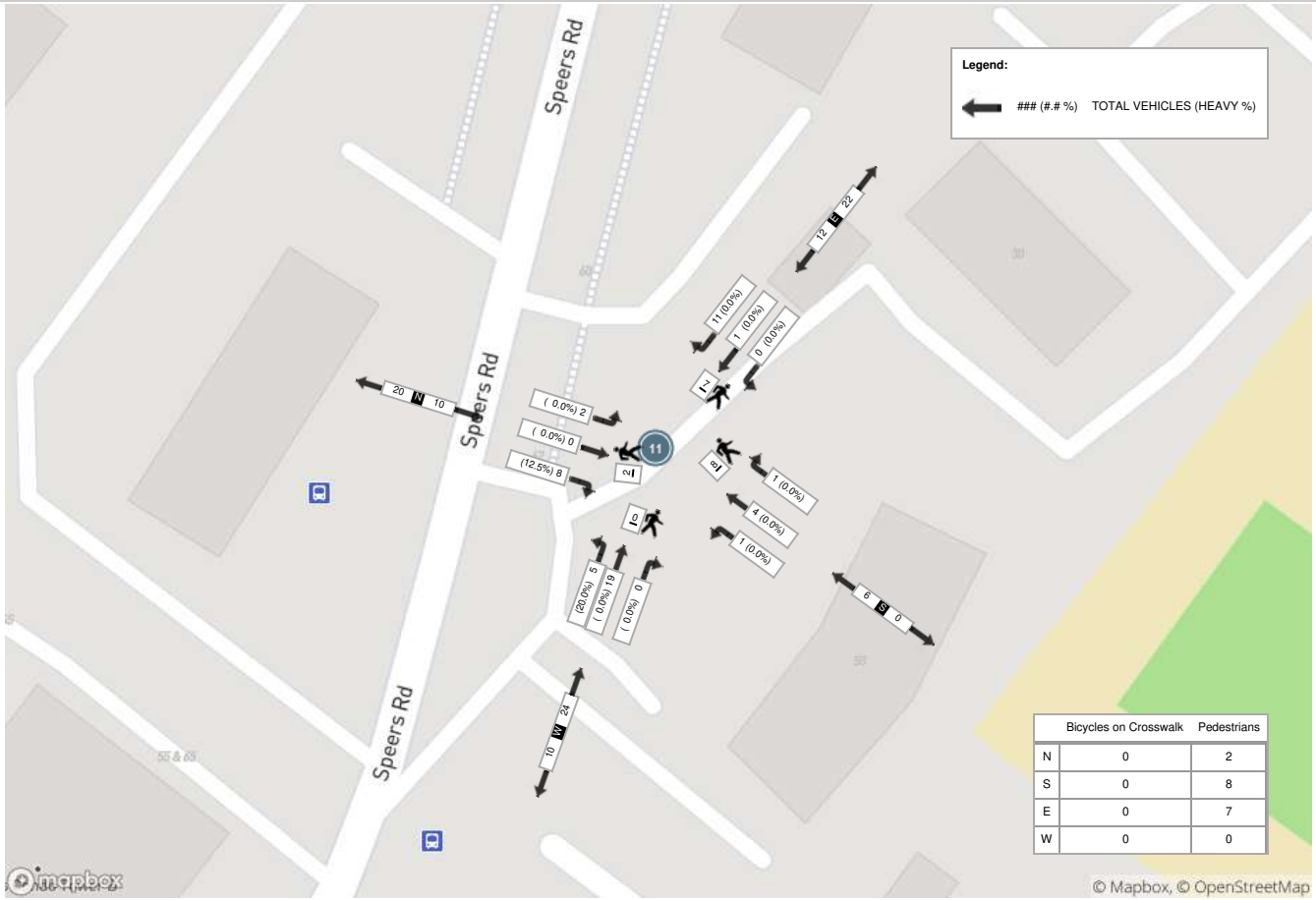
Start Time	N Approach 50 SPEERS RD						E Approach EAST DRIVEWAY						S Approach SOUTH DRIVEWAY						W Approach INTERNAL WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	2	0	0	0	0	2	6	0	0	1	1	7	0	2	1	0	2	3	0	7	2	0	0	9	21
16:45:00	3	0	0	0	1	3	1	0	0	0	2	1	0	1	0	0	1	1	0	3	0	0	0	3	8
17:00:00	2	0	1	0	0	3	3	0	0	0	1	3	0	0	0	0	3	0	0	4	1	0	0	5	11
17:15:00	1	0	1	0	1	2	1	1	0	0	3	2	1	1	0	0	2	2	0	5	2	0	0	7	13
Grand Total	8	0	2	0	2	10	11	1	0	1	7	13	1	4	1	0	8	6	0	19	5	0	0	24	**53**
Approach%	80%	0%	20%	0%		-	84.6%	7.7%	0%	7.7%		-	16.7%	66.7%	16.7%	0%		-	0%	79.2%	20.8%	0%		-	**-**
Totals %	15.1%	0%	3.8%	0%		18.9%	20.8%	1.9%	0%	1.9%		24.5%	1.9%	7.5%	1.9%	0%		11.3%	0%	35.8%	9.4%	0%		45.3%	**-**
PHF	0.67	0	0.5	0		0.83	0.46	0.25	0	0.25		0.46	0.25	0.5	0.25	0		0.5	0	0.68	0.63	0		0.67	**-**
Heavy	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	**-**
Heavy %	12.5%	0%	0%	0%		10%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	20%	0%		4.2%	**-**
Lights	7	0	2	0		9	11	1	0	1		13	1	4	1	0		6	0	19	4	0		23	**-**
Lights %	87.5%	0%	100%	0%		90%	100%	100%	0%	100%		100%	100%	100%	100%	0%		100%	0%	100%	80%	0%		95.8%	**-**
Single-Unit Trucks	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	**-**
Single-Unit Trucks %	12.5%	0%	0%	0%		10%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	20%	0%		4.2%	**-**
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	8	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	11.8%		-	-	-	-	41.2%		-	-	-	-	47.1%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Road	1	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: 07:15 AM - 08:15 AM **Weather: Scattered Clouds (-0.83 °C)**



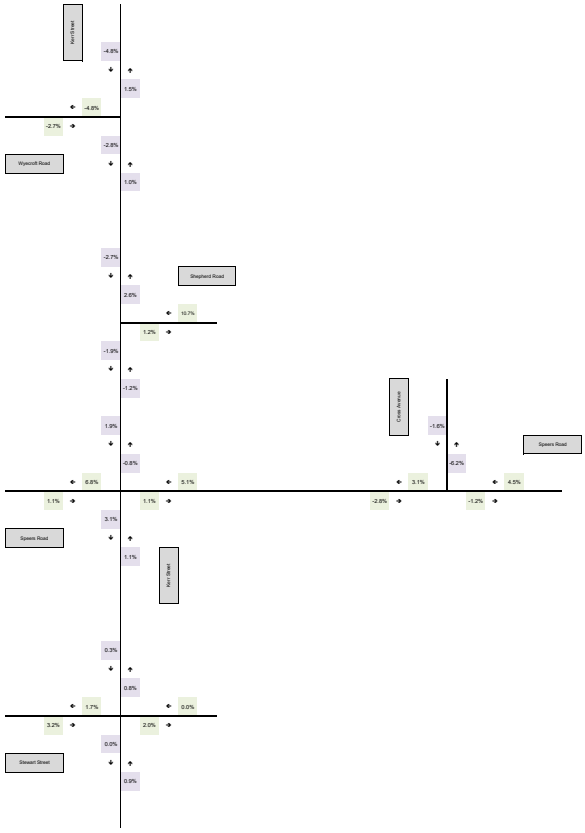
	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	17
E	0	9
W	0	3

Peak Hour: 04:30 PM - 05:30 PM **Weather: Overcast Clouds (7.39 °C)**

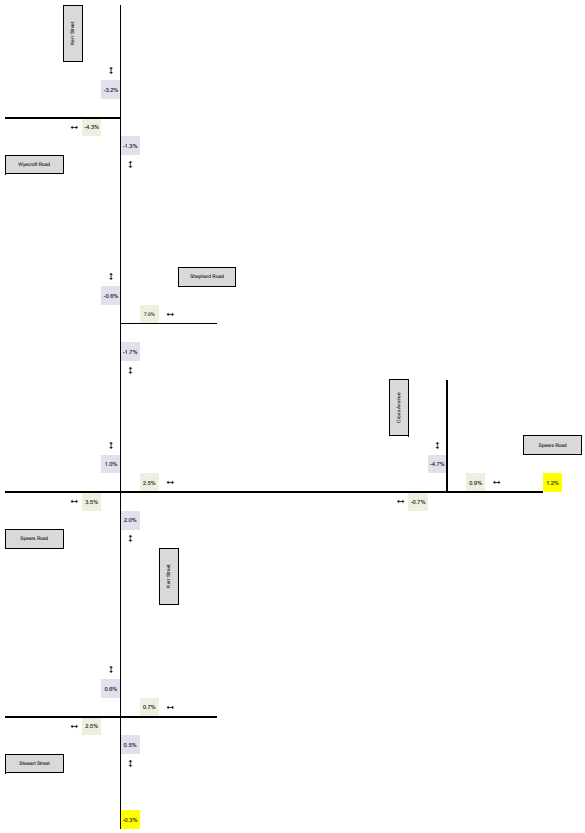


Appendix E
Corridor Growth Analysis

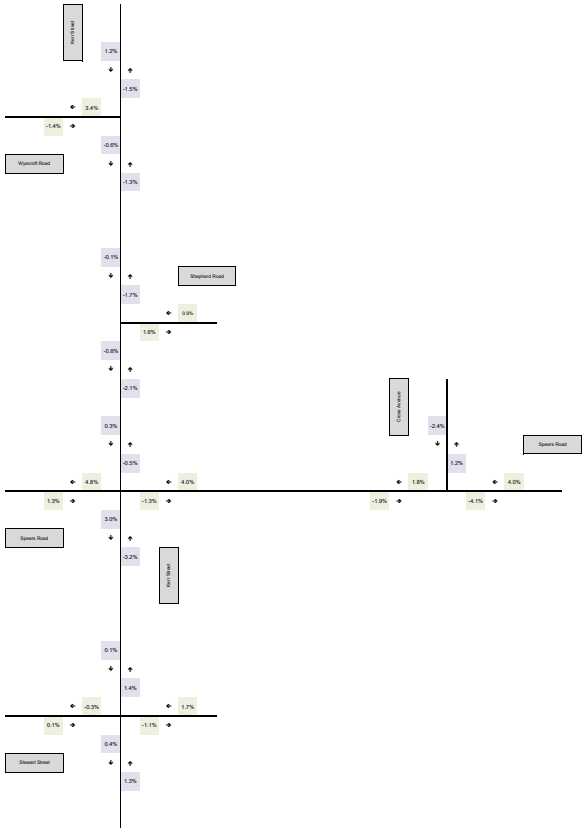
BACKGROUND TRAFFIC GROWTH RATES - AM PEAK



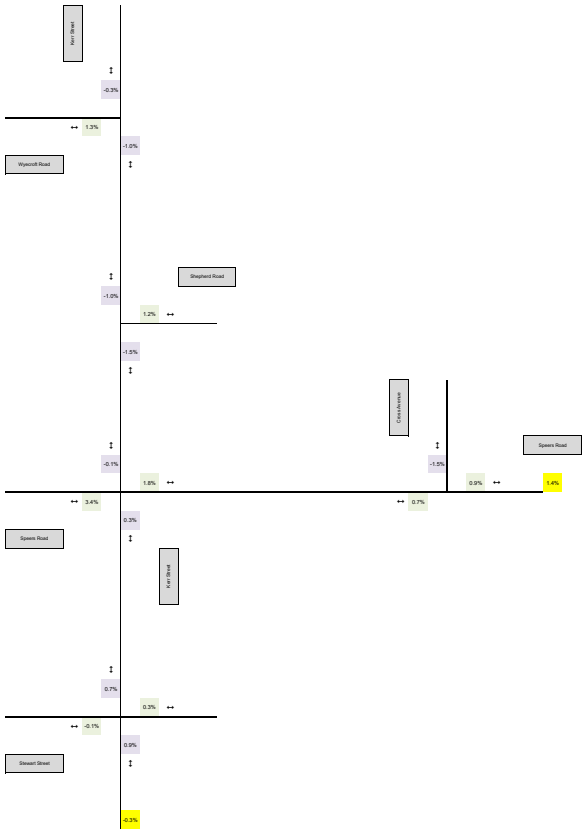
BACKGROUND TRAFFIC GROWTH RATES (2-WAY) - AM PEAK



BACKGROUND TRAFFIC GROWTH RATES - PM PEAK



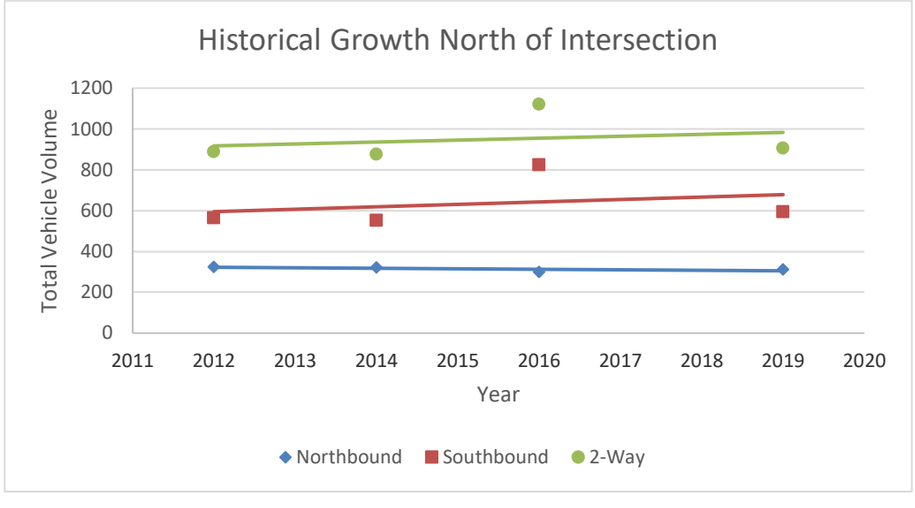
BACKGROUND TRAFFIC GROWTH RATES (2-WAY) - PM PEAK



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Speers Road / Kerr St
Peak Hour AM Peak

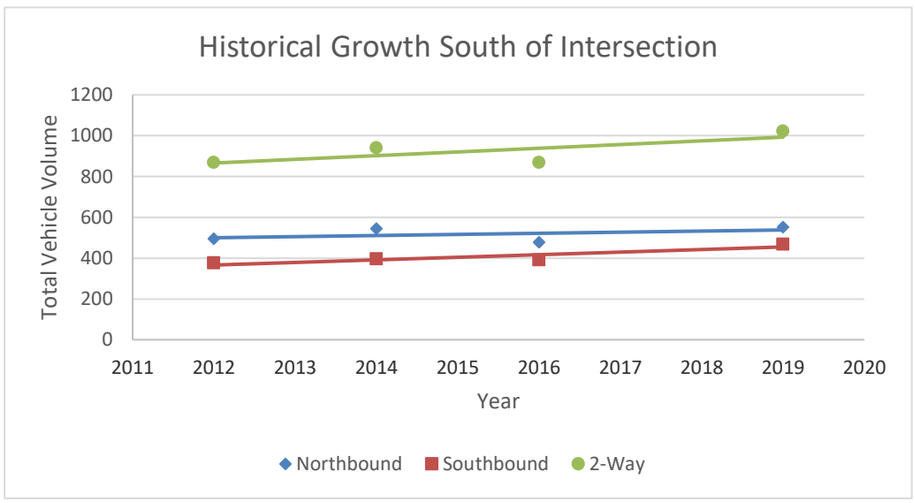
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Thursday May 17	2012	324	565	889
Monday September 29	2014	323	552	875
Tuesday November 15	2016	299	823	1122
Thursday May 9	2019	311	594	905

Trend Point at start		322.3	594.8	917.1
Trend Point at end		305.0	678.1	983.1
Slope		-2.5	11.9	9.4
Annual Growth		**-0.8%**	**1.9%**	**1.0%**



South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Thursday May 17	2012	494	375	869
Monday September 29	2014	545	395	940
Tuesday November 15	2016	478	390	868
Thursday May 9	2019	553	469	1022

Trend Point at start		499.8	366.1	865.9
Trend Point at end		537.9	454.7	992.6
Slope		5.4	12.7	18.1
Annual Growth		**1.1%**	**3.1%**	**2.0%**

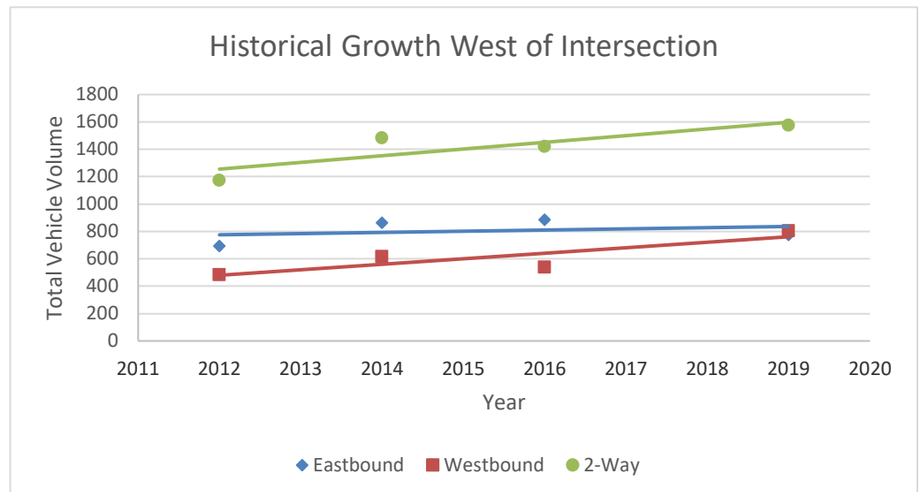


East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Thursday May 17	2012	1240	671	1911
Monday September 29	2014	1437	811	2248
Tuesday November 15	2016	1703	743	2446
Thursday May 9	2019	1323	987	2310

Trend Point at start		1375.7	673.7	2049.4
Trend Point at end		1483.5	952.2	2435.7
Slope		15.4	39.8	55.2
Annual Growth		**1.1%**	**5.1%**	**2.5%**

West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Thursday May 17	2012	692	483	1175
Monday September 29	2014	865	618	1483
Tuesday November 15	2016	885	537	1422
Thursday May 9	2019	773	804	1577

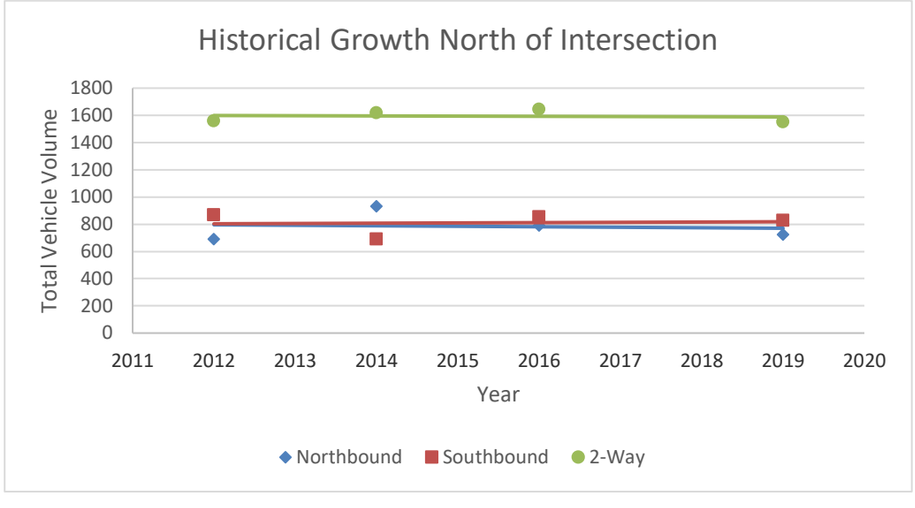
Trend Point at start		775.5	479.8	1255.4
Trend Point at end		836.3	761.3	1597.6
Slope		8.7	40.2	48.9
Annual Growth		**1.1%**	**6.8%**	**3.5%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Speers Road / Kerr St
Peak Hour PM Peak

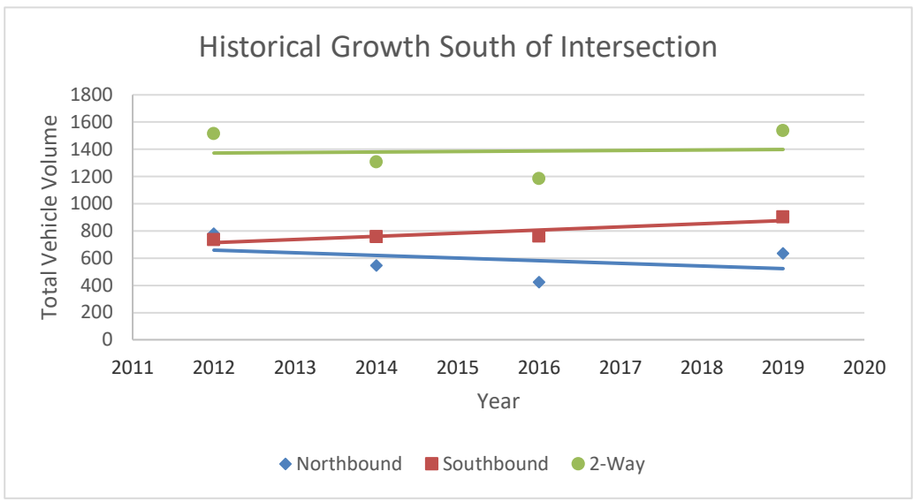
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Thursday May 17	2012	691	869	1560
Monday September 29	2014	930	689	1619
Tuesday November 15	2016	790	855	1645
Thursday May 9	2019	725	827	1552

Trend Point at start		795.8	803.1	1598.9
Trend Point at end		770.4	818.0	1588.4
Slope		-3.6	2.1	-1.5
Annual Growth		**-0.5%**	**0.3%**	**-0.1%**



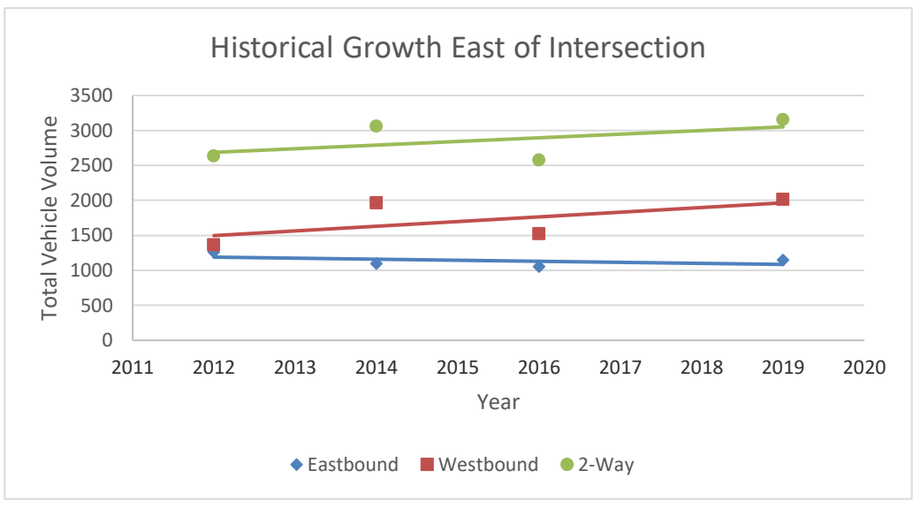
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Thursday May 17	2012	779	734	1513
Monday September 29	2014	546	759	1305
Tuesday November 15	2016	423	761	1184
Thursday May 9	2019	634	902	1536

Trend Point at start		658.6	713.8	1372.4
Trend Point at end		522.7	875.8	1398.4
Slope		-19.4	23.1	3.7
Annual Growth		**-3.2%**	**3.0%**	**0.3%**



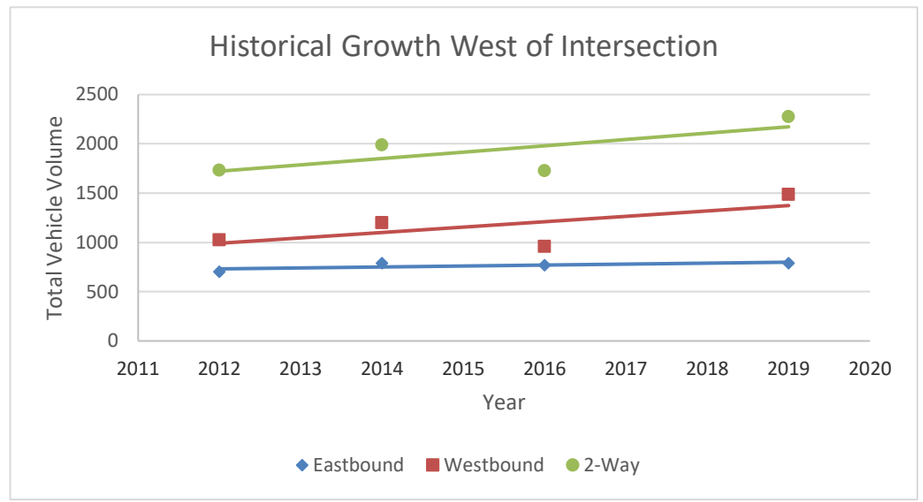
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Thursday May 17	2012	1266	1366	2632
Monday September 29	2014	1098	1962	3060
Tuesday November 15	2016	1055	1520	2575
Thursday May 9	2019	1146	2011	3157

Trend Point at start		1189.6	1497.4	2687.0
Trend Point at end		1085.4	1965.6	3051.0
Slope		-14.9	66.9	52.0
Annual Growth		**-1.3%**	**4.0%**	**1.8%**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Thursday May 17	2012	704	1027	1731
Monday September 29	2014	790	1200	1990
Tuesday November 15	2016	768	960	1728
Thursday May 9	2019	789	1488	2277

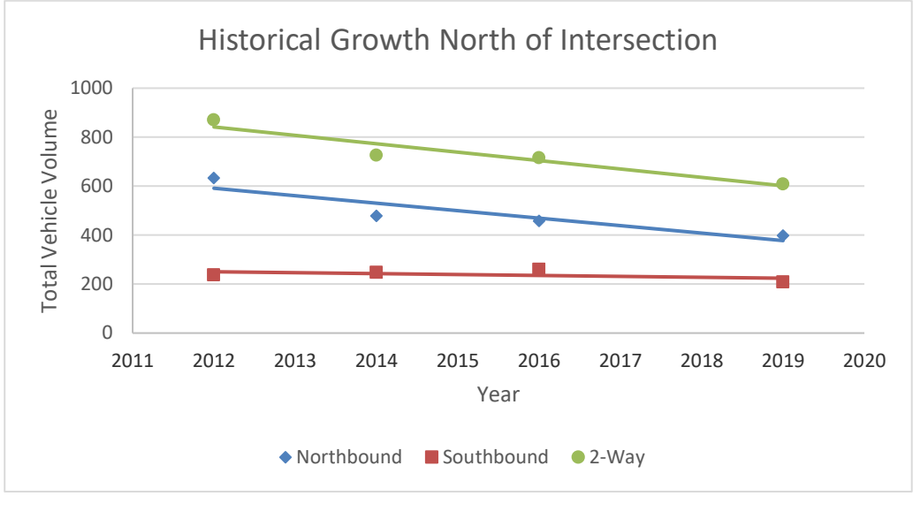
Trend Point at start		731.3	991.1	1722.3
Trend Point at end		799.1	1373.7	2172.8
Slope		9.7	54.7	64.4
Annual Growth		**1.3%**	**4.8%**	**3.4%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Speers Road / Cross Ave
Peak Hour AM Peak

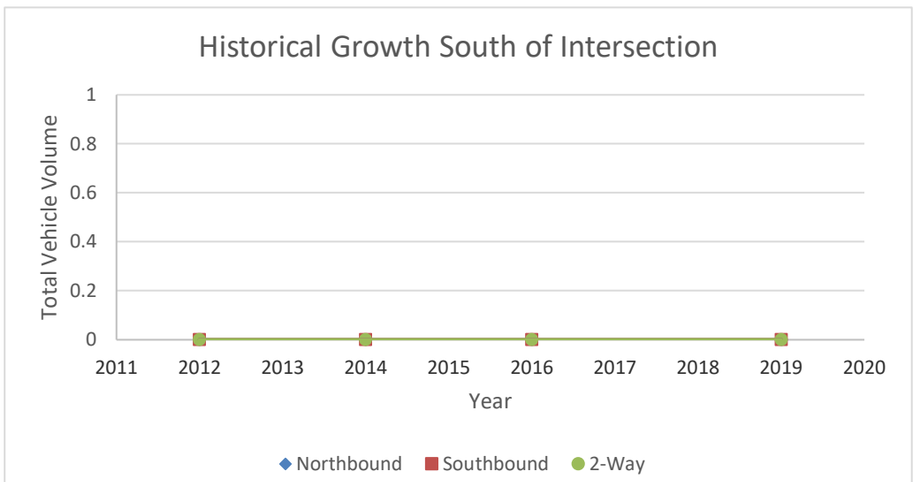
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Tuesday May 8	2012	633	237	870
Monday October 6	2014	479	247	726
Thursday November 3	2016	457	259	716
Monday May 27	2019	399	209	608

Trend Point at start		591.3	250.3	841.5
Trend Point at end		377.5	223.8	601.3
Slope		-30.5	-3.8	-34.3
Annual Growth		**-6.2%**	**-1.6%**	**-4.7%**



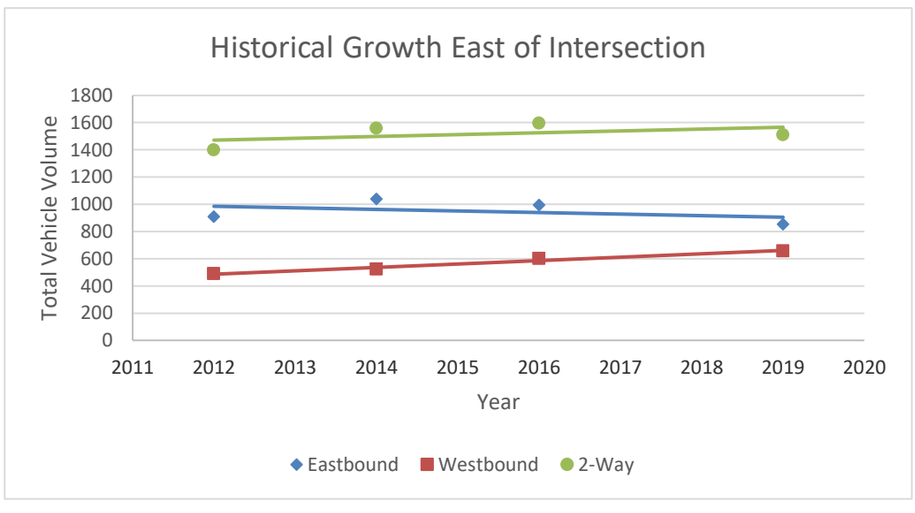
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Tuesday May 8	2012	0	0	0
Monday October 6	2014	0	0	0
Thursday November 3	2016	0	0	0
Monday May 27	2019	0	0	0

Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



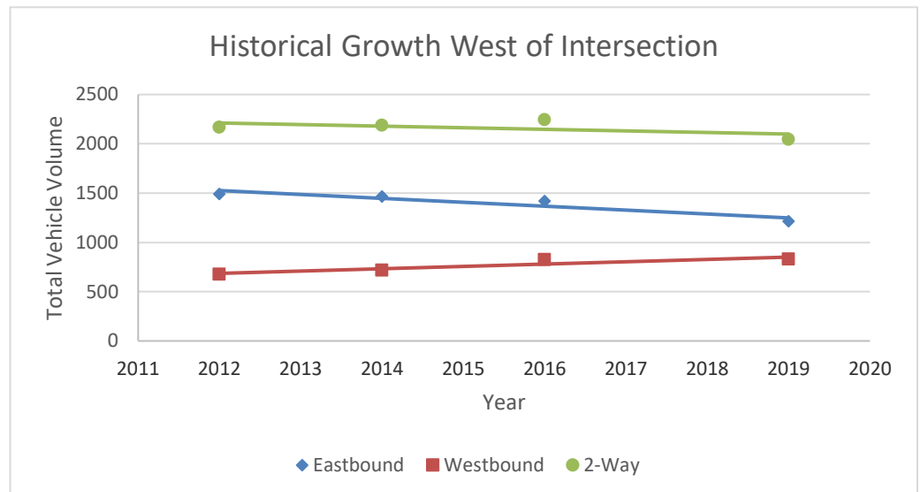
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Tuesday May 8	2012	908	490	1398
Monday October 6	2014	1038	522	1560
Thursday November 3	2016	995	601	1596
Monday May 27	2019	852	657	1509

Trend Point at start		985.6	486.2	1471.7
Trend Point at end		905.2	661.4	1566.5
Slope		-11.5	25.0	13.5
Annual Growth		**-1.2%**	**4.5%**	**0.9%**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Tuesday May 8	2012	1490	676	2166
Monday October 6	2014	1467	719	2186
Thursday November 3	2016	1417	825	2242
Monday May 27	2019	1214	829	2043

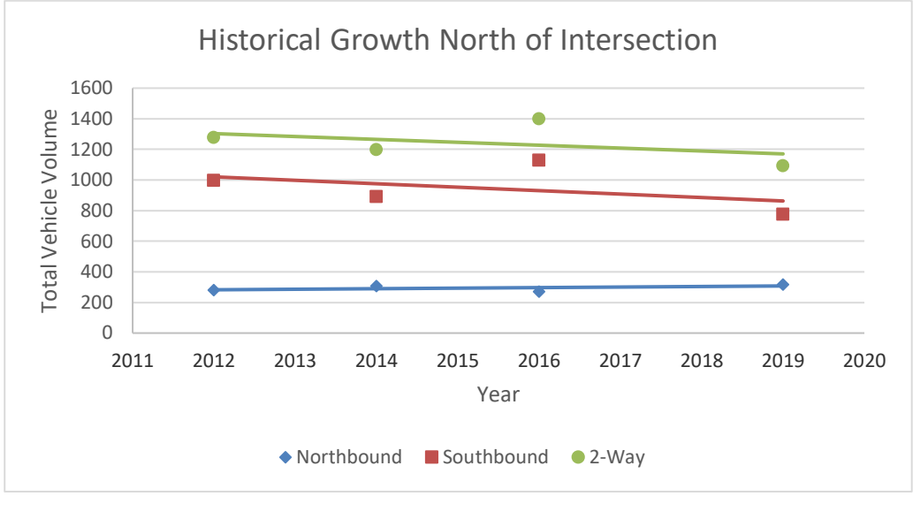
Trend Point at start		1525.9	685.5	2211.4
Trend Point at end		1248.3	850.8	2099.1
Slope		-39.7	23.6	-16.0
Annual Growth		**-2.8%**	**3.1%**	**-0.7%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Speers Road / Cross Ave
Peak Hour PM Peak

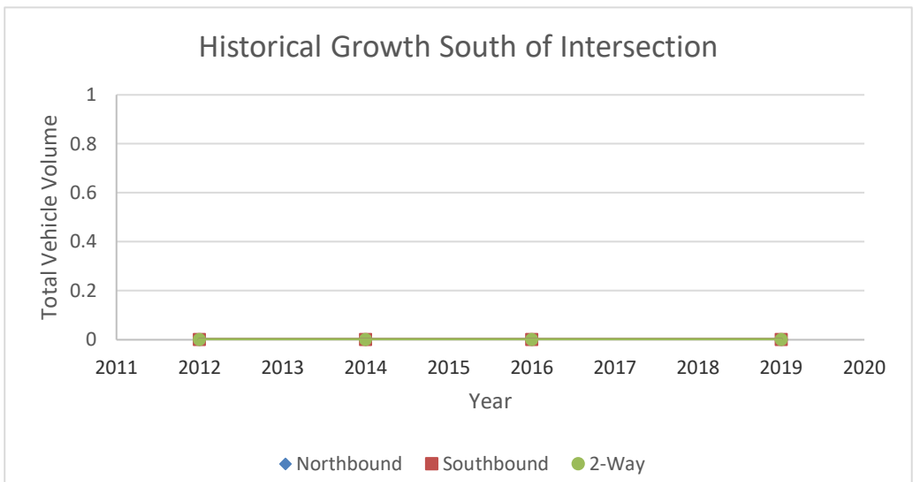
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Tuesday May 8	2012	281	996	1277
Monday October 6	2014	307	891	1198
Thursday November 3	2016	272	1128	1400
Monday May 27	2019	317	774	1091

Trend Point at start		282.6	1020.4	1303.0
Trend Point at end		307.7	862.8	1170.5
Slope		3.6	-22.5	-18.9
Annual Growth		**1.2%**	**-2.4%**	**-1.5%**



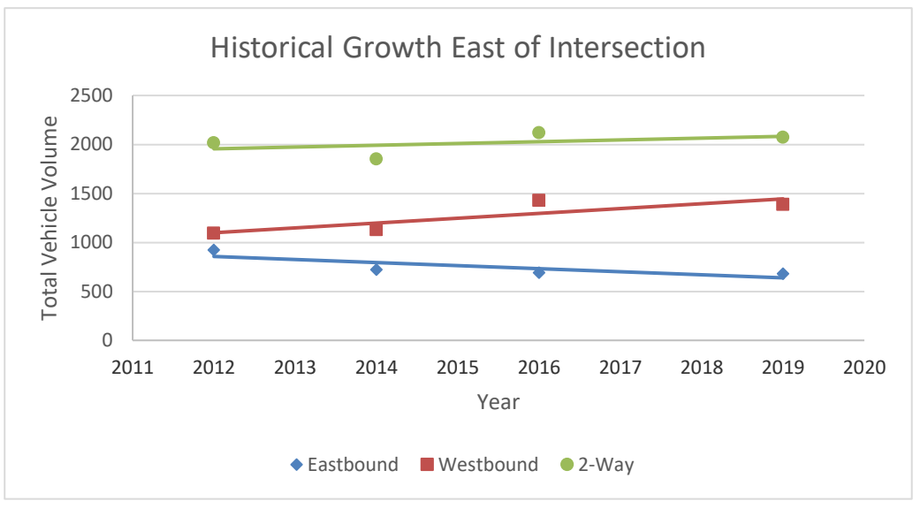
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Tuesday May 8	2012	0	0	0
Monday October 6	2014	0	0	0
Thursday November 3	2016	0	0	0
Monday May 27	2019	0	0	0

Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



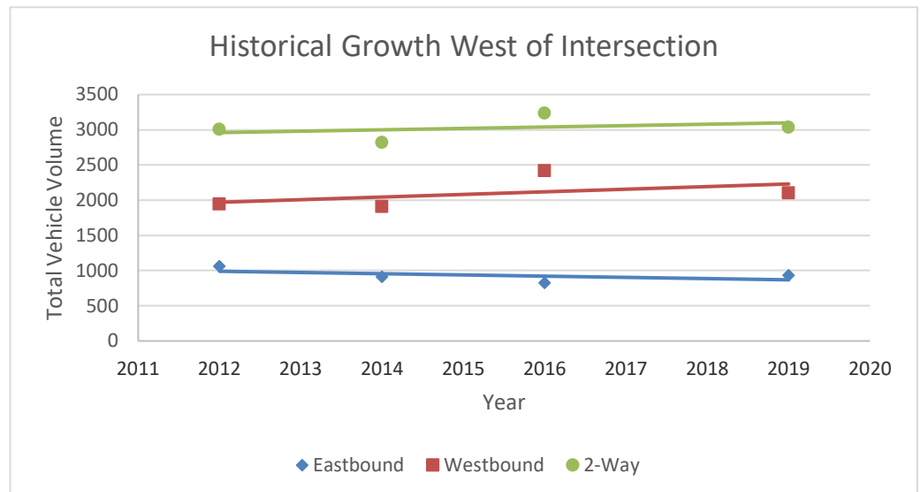
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Tuesday May 8	2012	925	1091	2016
Monday October 6	2014	723	1130	1853
Thursday November 3	2016	691	1427	2118
Monday May 27	2019	682	1389	2071

Trend Point at start		856.6	1098.8	1955.4
Trend Point at end		638.3	1444.4	2082.7
Slope		-31.2	49.4	18.2
Annual Growth		**-4.1%**	**4.0%**	**0.9%**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Tuesday May 8	2012	1061	1942	3003
Monday October 6	2014	914	1905	2819
Thursday November 3	2016	823	2415	3238
Monday May 27	2019	936	2100	3036

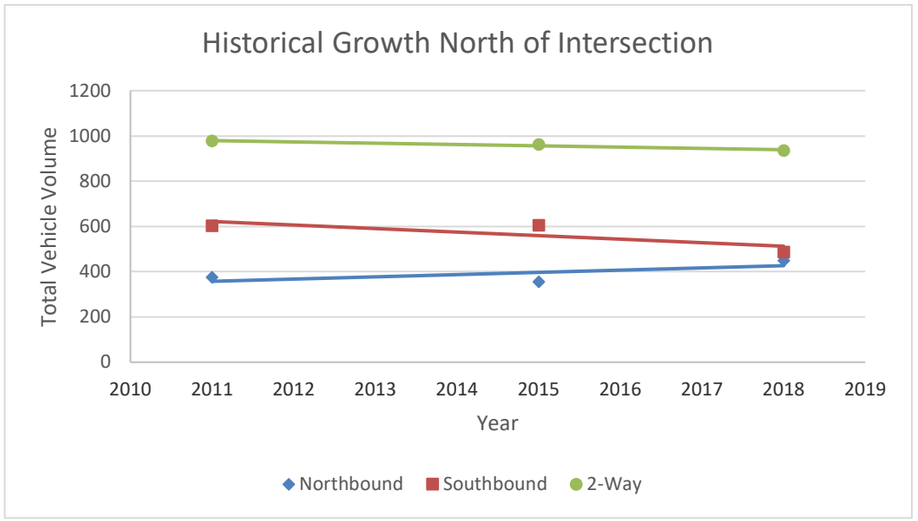
Trend Point at start		989.8	1969.8	2959.6
Trend Point at end		868.5	2229.8	3098.3
Slope		-17.3	37.1	19.8
Annual Growth		**-1.9%**	**1.8%**	**0.7%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St / Shepherd Road
Peak Hour AM Peak

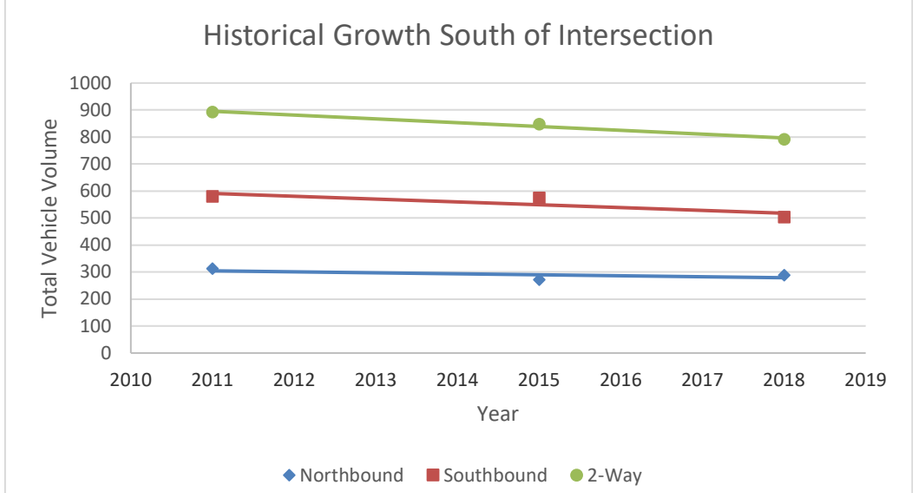
North of Intersection				
Date	**Year**	**Northbound**	**Soutbound**	**2-Way**
Wednesday November 2	2011	375	602	977
Thursday November 19	2015	356	606	962
Thursday April 19	2018	450	486	936

Trend Point at start		357.4	621.9	979.4
Trend Point at end		426.6	512.6	939.2
Slope		9.9	-15.6	-5.7
Annual Growth		**2.6%**	**-2.7%**	**-0.6%**



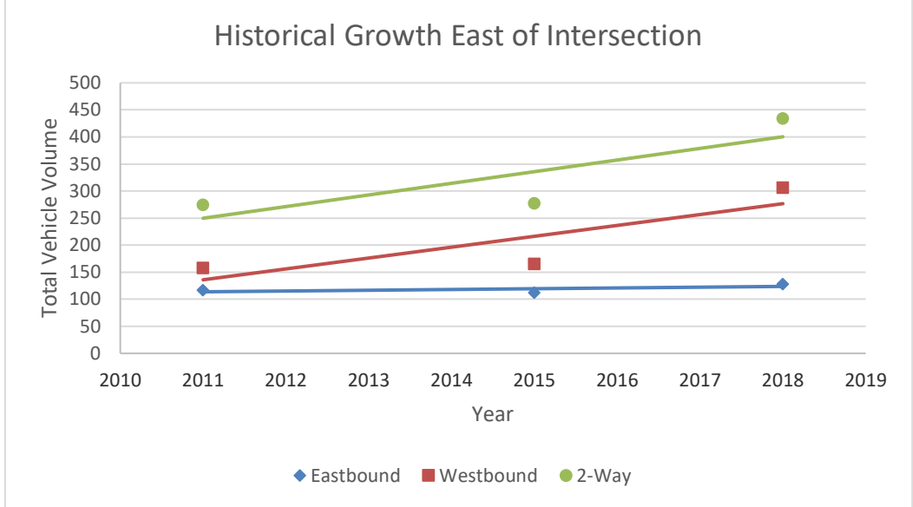
South of Intersection				
Date	**Year**	**Northbound**	**Soutbound**	**2-Way**
Wednesday November 2	2011	312	580	892
Thursday November 19	2015	272	575	847
Thursday April 19	2018	289	503	792

Trend Point at start		304.4	591.1	895.4
Trend Point at end		278.8	517.8	796.6
Slope		-3.6	-10.5	-14.1
Annual Growth		**-1.2%**	**-1.9%**	**-1.7%**



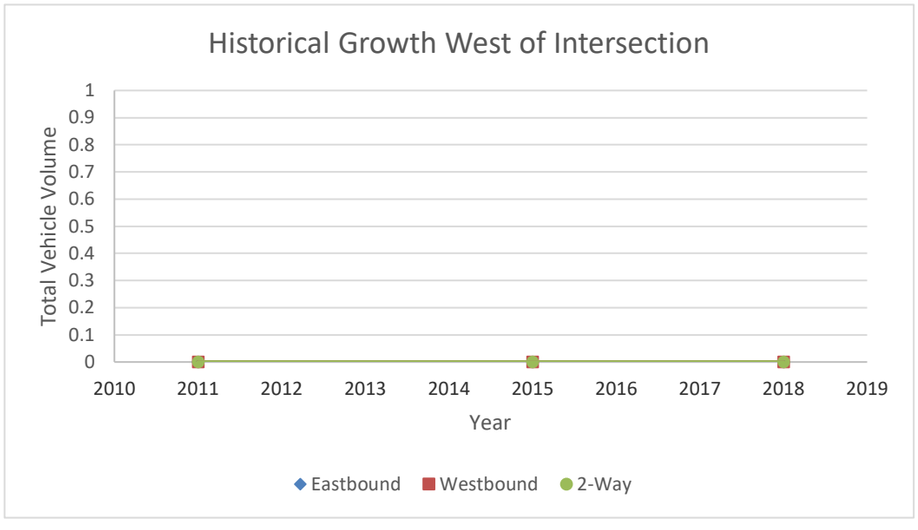
East of Intersection				
Date	**Year**	**Eastbound**	**Westbound**	**2-Way**
Wednesday November 2	2011	117	158	275
Thursday November 19	2015	112	165	277
Thursday April 19	2018	128	306	434

Trend Point at start		113.8	136.0	249.8
Trend Point at end		123.7	276.6	400.4
Slope		1.4	20.1	21.5
Annual Growth		**1.2%**	**10.7%**	**7.0%**



West of Intersection				
Date	**Year**	**Eastbound**	**Westbound**	**2-Way**
Wednesday November 2	2011	0	0	0
Thursday November 19	2015	0	0	0
Thursday April 19	2018	0	0	0

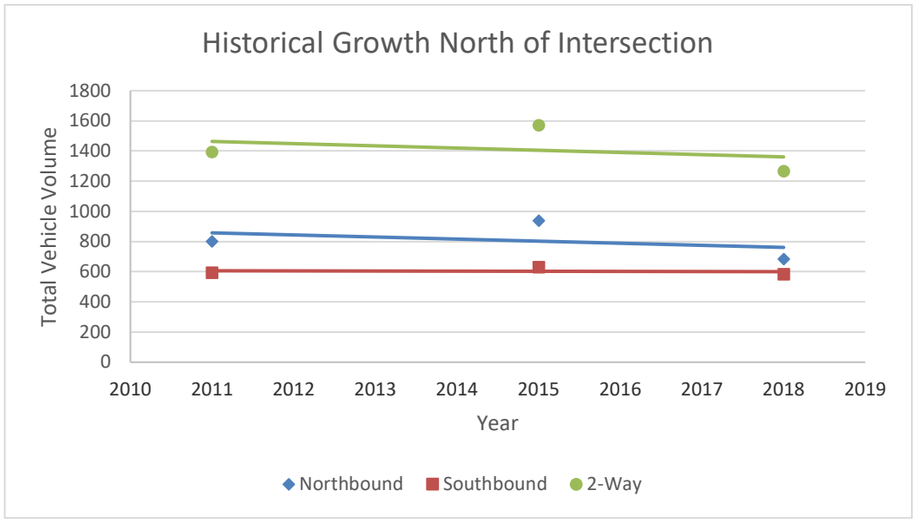
Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St / Shepherd Road
Peak Hour PM Peak

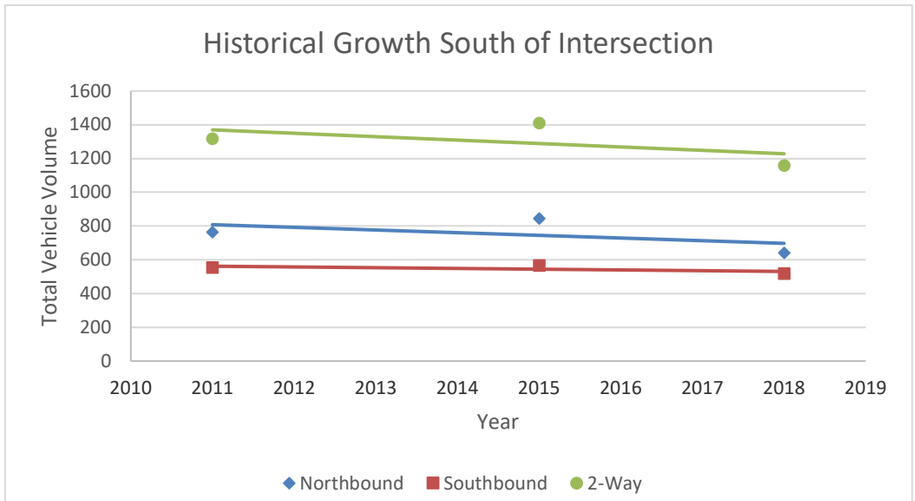
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday November 2	2011	799	594	1393
Thursday November 19	2015	939	631	1570
Thursday April 19	2018	683	584	1267

Trend Point at start		857.5	606.1	1463.7
Trend Point at end		761.1	600.2	1361.2
Slope		-13.8	-0.9	-14.6
Annual Growth		**-1.7%**	**-0.1%**	**-1.0%**



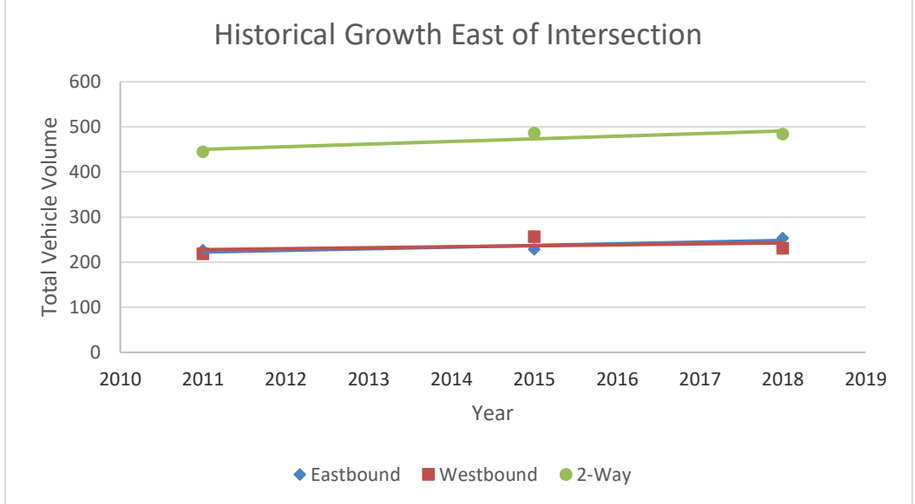
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday November 2	2011	765	553	1318
Thursday November 19	2015	845	565	1410
Thursday April 19	2018	640	519	1159

Trend Point at start		808.0	561.9	1369.9
Trend Point at end		697.3	530.9	1228.2
Slope		-15.8	-4.4	-20.2
Annual Growth		**-2.1%**	**-0.8%**	**-1.5%**



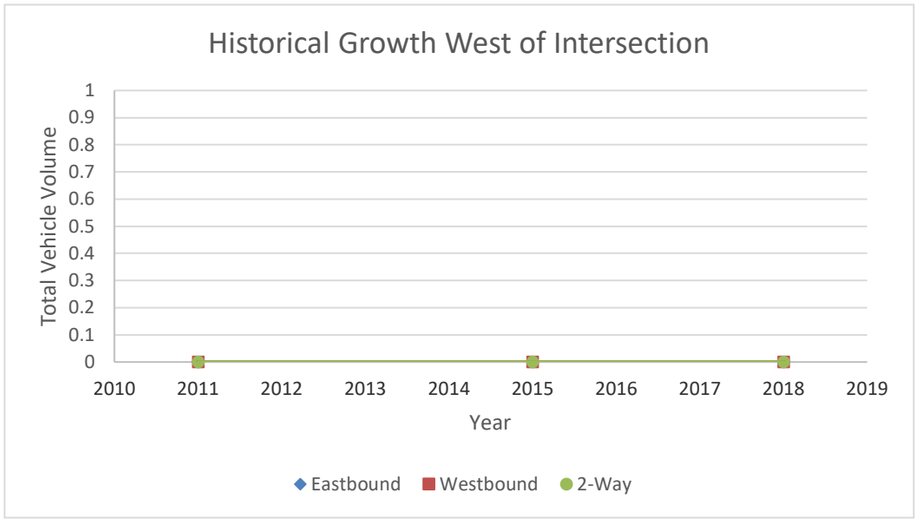
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday November 2	2011	226	219	445
Thursday November 19	2015	229	257	486
Thursday April 19	2018	253	231	484

Trend Point at start		222.5	227.8	450.3
Trend Point at end		248.3	242.8	491.1
Slope		3.7	2.1	5.8
Annual Growth		**1.6%**	**0.9%**	**1.2%**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday November 2	2011	0	0	0
Thursday November 19	2015	0	0	0
Thursday April 19	2018	0	0	0

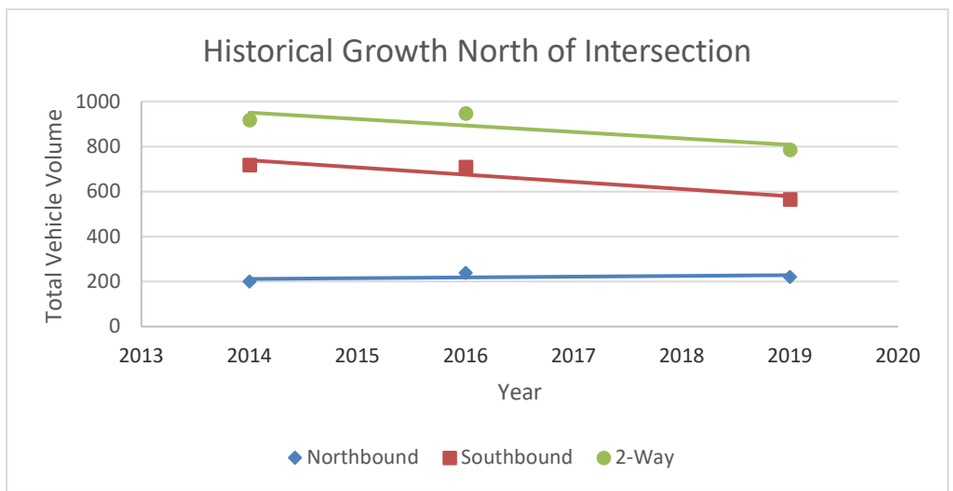
Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St. / Wyecroft Road
Peak Hour AM Peak

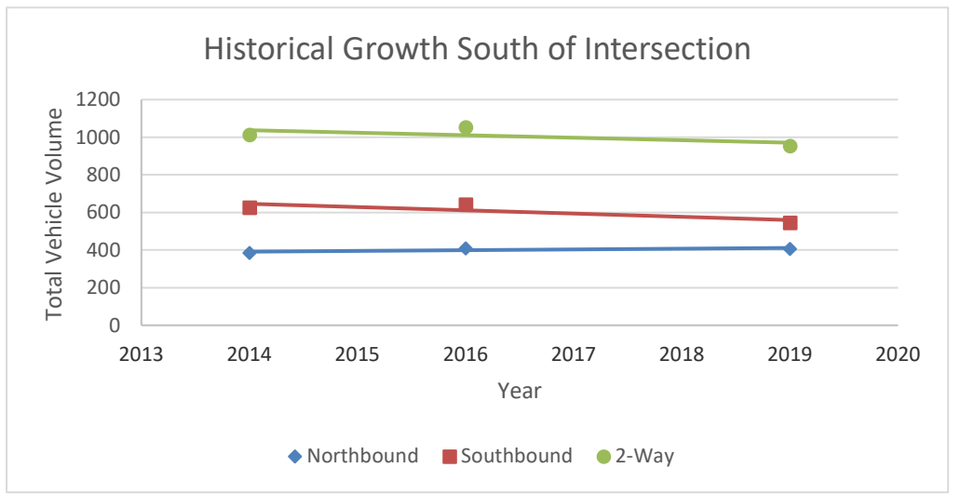
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday October 15	2014	199	718	917
Monday May 16	2016	239	709	948
Monday April 15	2019	220	565	785

Trend Point at start		211.5	738.6	950.1
Trend Point at end		228.3	578.7	807.1
Slope		3.4	-32.0	-28.6
Annual Growth		**1.5%**	**-4.8%**	**-3.2%**



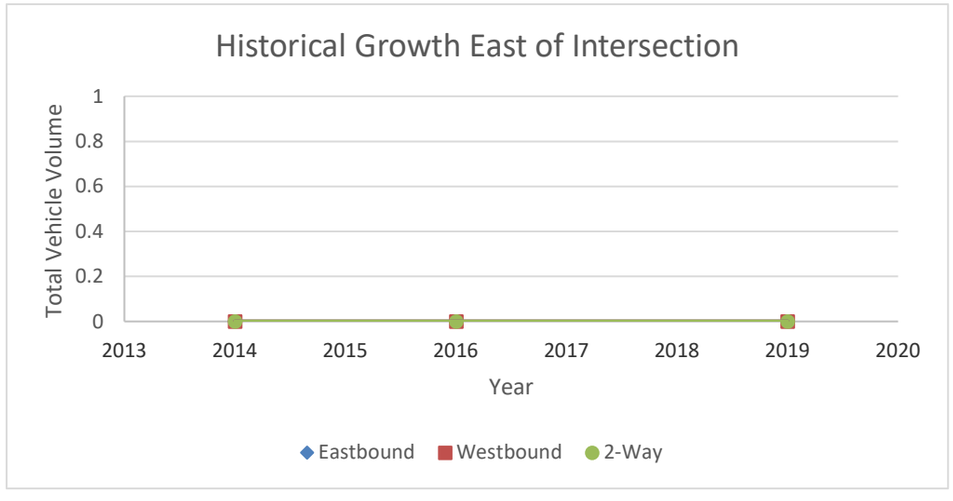
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday October 15	2014	385	627	1012
Monday May 16	2016	410	643	1053
Monday April 15	2019	407	547	954

Trend Point at start		391.4	645.9	1037.3
Trend Point at end		411.3	559.6	970.9
Slope		4.0	-17.3	-13.3
Annual Growth		**1.0%**	**-2.8%**	**-1.3%**



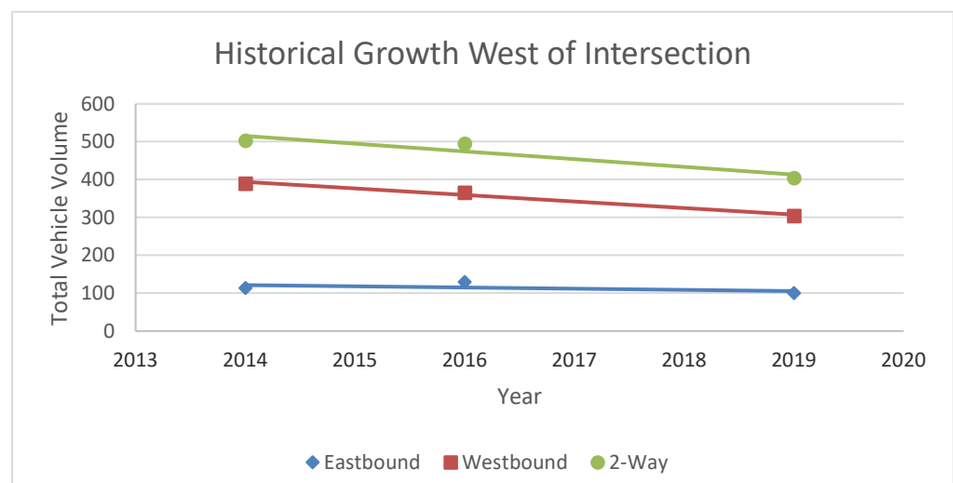
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday October 15	2014	0	0	0
Monday May 16	2016	0	0	0
Monday April 15	2019	0	0	0

Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday October 15	2014	113	390	503
Monday May 16	2016	129	366	495
Monday April 15	2019	100	305	405

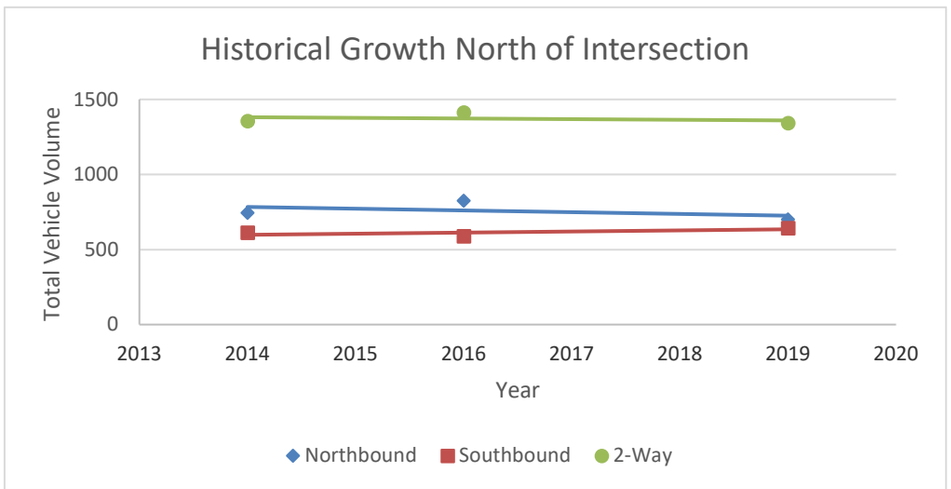
Trend Point at start		121.4	393.9	515.3
Trend Point at end		105.6	307.6	413.2
Slope		-3.2	-17.3	-20.4
Annual Growth		**-2.7%**	**-4.8%**	**-4.3%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St. / Wyecroft Road
Peak Hour PM Peak

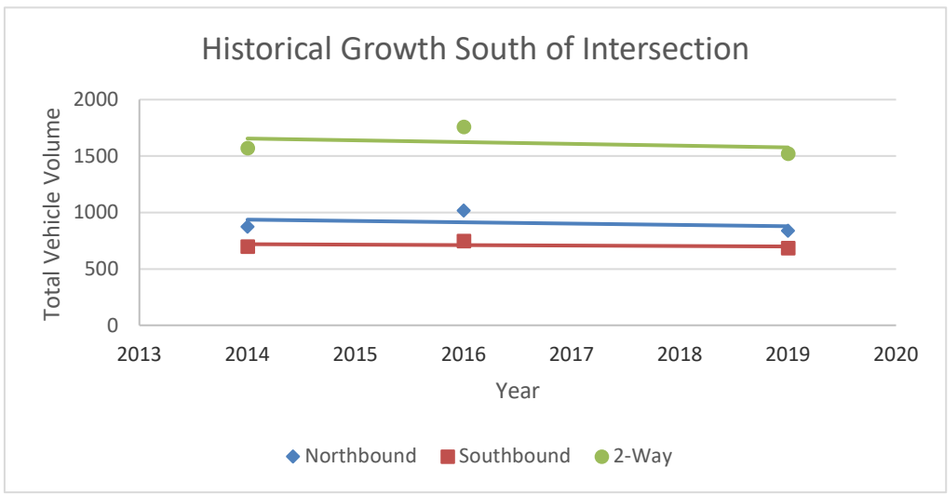
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday October 15	2014	744	612	1356
Monday May 16	2016	826	589	1415
Monday April 15	2019	699	644	1343

Trend Point at start		783.5	597.9	1381.3
Trend Point at end		725.3	634.6	1359.9
Slope		-11.6	7.3	-4.3
Annual Growth		**-1.5%**	**1.2%**	**-0.3%**



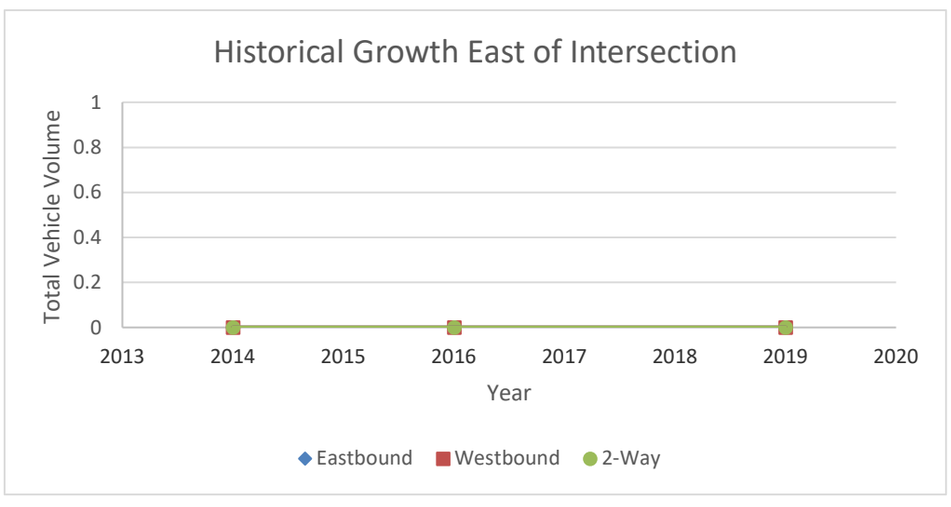
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday October 15	2014	875	697	1572
Monday May 16	2016	1015	747	1762
Monday April 15	2019	837	684	1521

Trend Point at start		936.3	718.8	1655.1
Trend Point at end		877.8	698.5	1576.4
Slope		-11.7	-4.1	-15.7
Annual Growth		**-1.3%**	**-0.6%**	**-1.0%**



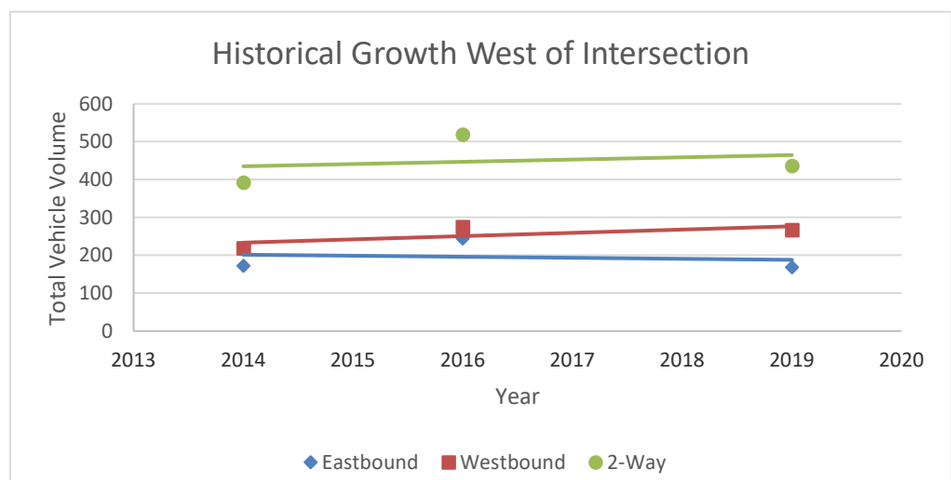
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday October 15	2014	0	0	0
Monday May 16	2016	0	0	0
Monday April 15	2019	0	0	0

Trend Point at start		0.0	0.0	0.0
Trend Point at end		0.0	0.0	0.0
Slope		0.0	0.0	0.0
Annual Growth		**#DIV/0!**	**#DIV/0!**	**#DIV/0!**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday October 15	2014	173	219	392
Monday May 16	2016	244	275	519
Monday April 15	2019	169	267	436

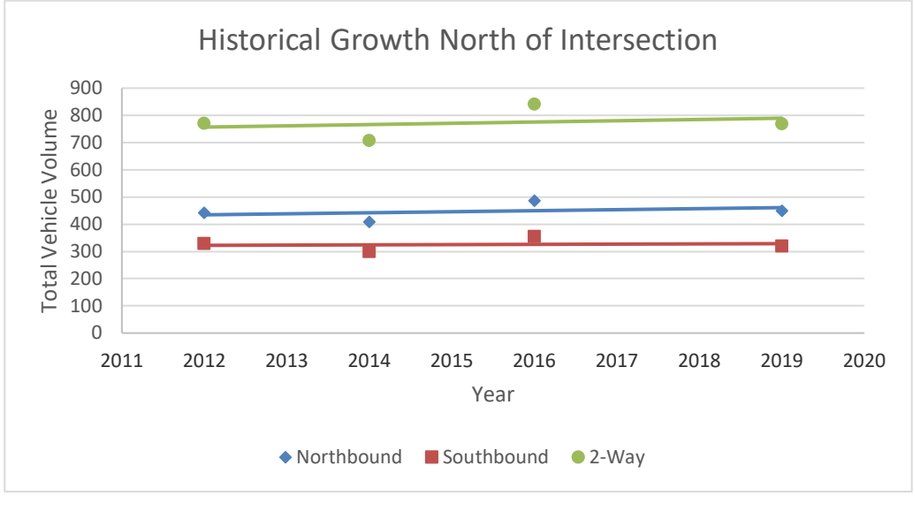
Trend Point at start		201.7	233.5	435.2
Trend Point at end		188.1	276.7	464.8
Slope		-2.7	8.6	5.9
Annual Growth		**-1.4%**	**3.4%**	**1.3%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St. / Stewart St.
Peak Hour AM Peak

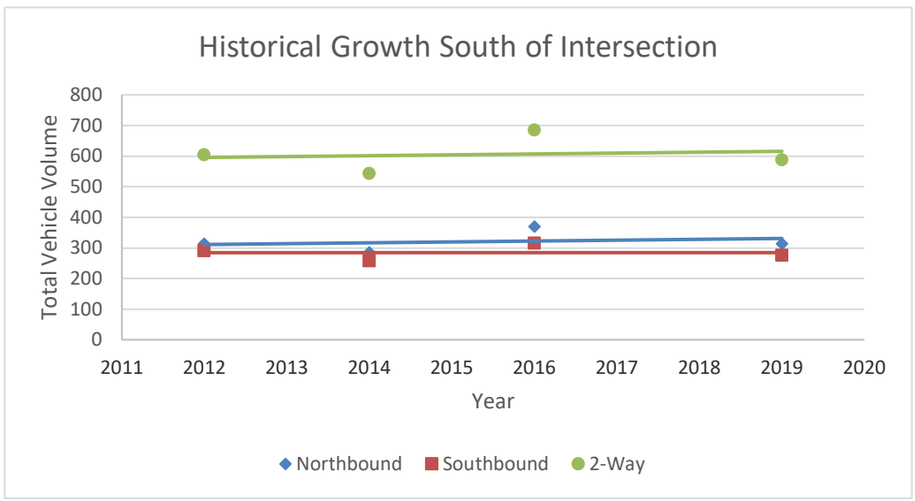
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday September 12	2012	442	329	771
Tuesday October 14	2014	409	298	707
Thursday October 27	2016	487	354	841
Wednesday May 8	2019	449	320	769

Trend Point at start		434.4	322.4	756.8
Trend Point at end		460.9	328.6	789.5
Slope		3.8	0.9	4.7
Annual Growth		**0.8%**	**0.3%**	**0.6%**



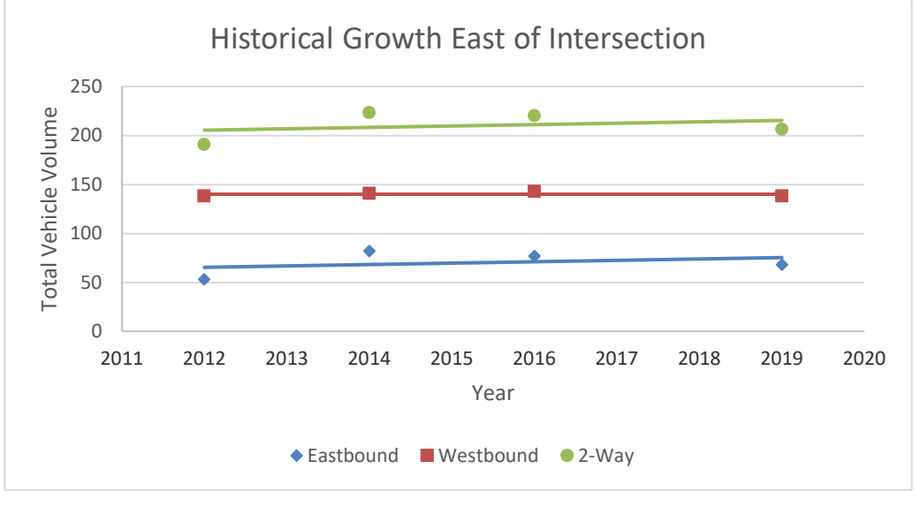
South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday September 12	2012	313	291	604
Tuesday October 14	2014	286	257	543
Thursday October 27	2016	369	315	684
Wednesday May 8	2019	313	275	588

Trend Point at start		311.0	284.4	595.5
Trend Point at end		330.9	284.6	615.4
Slope		2.8	0.0	2.9
Annual Growth		**0.9%**	**0.0%**	**0.5%**



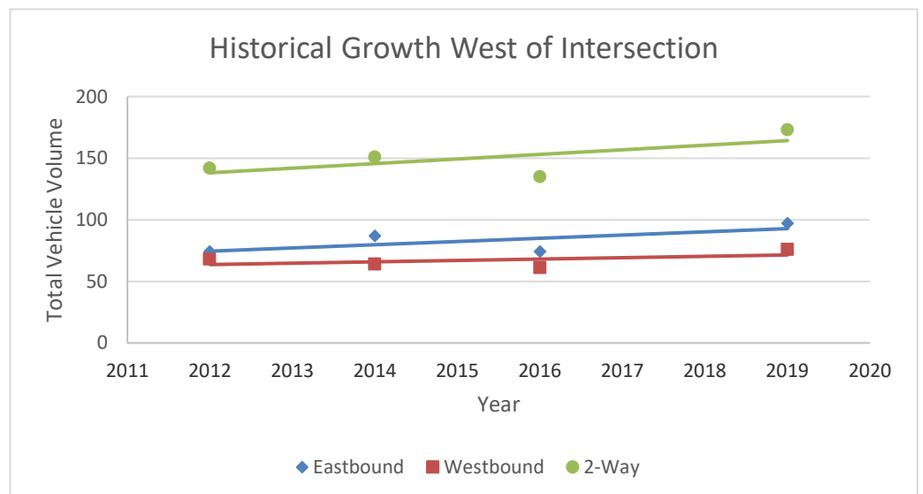
East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday September 12	2012	53	138	191
Tuesday October 14	2014	82	141	223
Thursday October 27	2016	77	143	220
Wednesday May 8	2019	68	138	206

Trend Point at start		65.4	140.0	205.4
Trend Point at end		75.3	140.0	215.3
Slope		1.4	0.0	1.4
Annual Growth		**2.0%**	**0.0%**	**0.7%**



West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday September 12	2012	74	68	142
Tuesday October 14	2014	87	64	151
Thursday October 27	2016	74	61	135
Wednesday May 8	2019	97	76	173

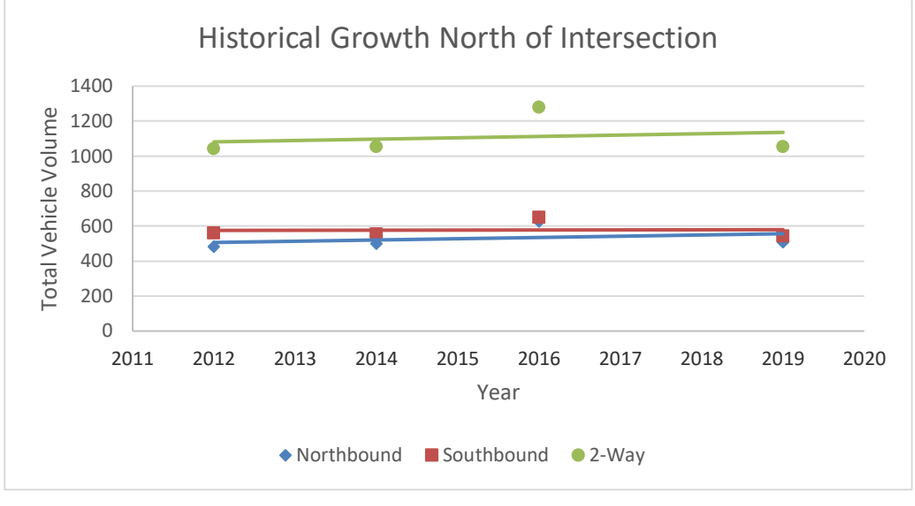
Trend Point at start		74.5	63.6	138.1
Trend Point at end		92.8	71.4	164.2
Slope		2.6	1.1	3.7
Annual Growth		**3.2%**	**1.7%**	**2.5%**



Project: 50 Speers Road, Oakville
Project ID: 8013-02
Intersection Kerr St. / Stewart St.
Peak Hour PM Peak

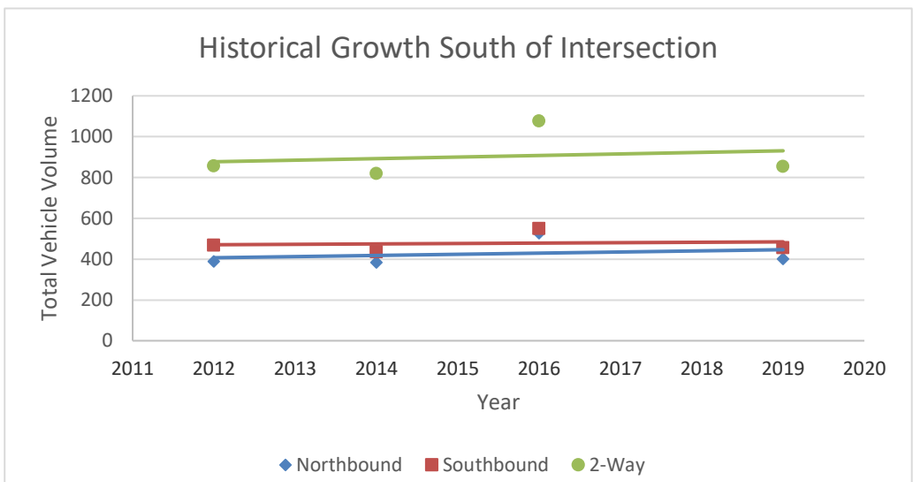
North of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday September 12	2012	481	560	1041
Tuesday October 14	2014	500	554	1054
Thursday October 27	2016	628	651	1279
Wednesday May 8	2019	509	544	1053

Trend Point at start		506.2	575.3	1081.6
Trend Point at end		556.3	579.5	1135.8
Slope		7.2	0.6	7.7
Annual Growth		**1.4%**	**0.1%**	**0.7%**



South of Intersection				
Date	Year	Northbound	Soutbound	2-Way
Wednesday September 12	2012	389	468	857
Tuesday October 14	2014	384	435	819
Thursday October 27	2016	527	550	1077
Wednesday May 8	2019	400	455	855

Trend Point at start		406.7	470.4	877.1
Trend Point at end		446.2	484.6	930.7
Slope		5.6	2.0	7.7
Annual Growth		**1.3%**	**0.4%**	**0.9%**

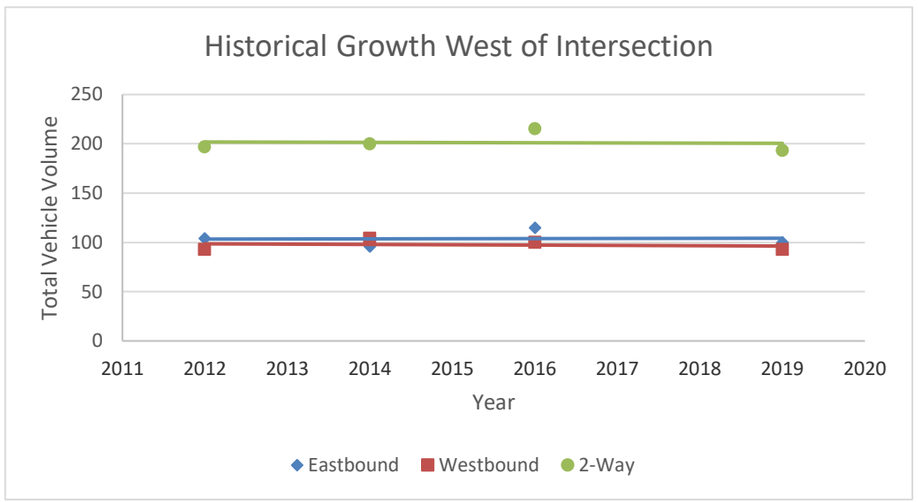


East of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday September 12	2012	84	73	157
Tuesday October 14	2014	88	93	181
Thursday October 27	2016	110	95	205
Wednesday May 8	2019	73	86	159

Trend Point at start		92.0	81.9	173.9
Trend Point at end		85.0	92.4	177.4
Slope		-1.0	1.5	0.5
Annual Growth		**-1.1%**	**1.7%**	**0.3%**

West of Intersection				
Date	Year	Eastbound	Westbound	2-Way
Wednesday September 12	2012	104	93	197
Tuesday October 14	2014	96	104	200
Thursday October 27	2016	115	100	215
Wednesday May 8	2019	100	93	193

Trend Point at start		103.4	98.5	201.9
Trend Point at end		104.2	96.3	200.5
Slope		0.1	-0.3	-0.2
Annual Growth		**0.1%**	**-0.3%**	**-0.1%**



Appendix F
TTS Data Queries

50 Speers Road

8013-02

Residential Vehicular Site Traffic Distribution (AM Peak Hour)

Outbound

BA Group - SUK

9/1/2022

Tue Feb 22 2022 16:14:40 GMT-0500 (Eastern Standard Time) - Run Time: 2884ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
Start time of trip - start_time In 600-859
and
Primary travel mode (M P T U
and
Trip purpose of origin
and
2006 GTA zone of ori 4011 4012 4013
and
Planning district of destination - pd_dest In 39

Trip 2016
Table:

	4011	4012	4013	**Total**
PD 1 of Toronto	18	60	0	**78**
PD 2 of Toronto	11	0	0	**11**
PD 3 of Toronto	0	34	4	**38**
PD 5 of Toronto	17	0	0	**17**
PD 6 of Toronto	29	0	0	**29**
PD 8 of Toronto	0	0	17	**17**
PD 9 of Toronto	16	0	0	**16**
PD 10 of Toronto	0	0	34	**34**
Brampton	42	0	0	**42**
Mississauga	400	144	125	**669**
Milton	34	11	21	**66**
Oakville	469	1023	116	**1608**
Burlington	77	68	0	**145**
Flamborough	0	52	0	**52**
Hamilton	180	58	6	**244**
St. Catharines	15	0	40	**55**
Cambridge	99	0	0	**99**
City of Guelph	0	4	0	**4**

Tue Feb 22 2022 16:26:08 GMT-0500 (Eastern Standard Time) - Run Tim

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:
Start time of trip - start_time In 600-859
and
Primary travel mode c M P T U
and
Trip purpose of origin
and
2006 GTA zone of ori 4011 4012 4013
and
Planning district of destination - pd_dest In 39

Trip 2016
Table:

	4011	4012	4013	**Total**
4001	0	22	0	**22**
4003	0	13	0	**13**
4005	0	0	21	**21**
4006	0	24	0	**24**
4008	25	61	0	**86**
4009	72	17	0	**89**
4011	47	272	0	**319**
4012	0	140	0	**140**
4014	33	25	0	**58**
4016	39	0	0	**39**
4017	89	0	0	**89**
4022	0	73	0	**73**
4024	0	48	18	**66**
4025	0	8	0	**8**
4027	29	0	0	**29**
4029	44	103	0	**147**
4030	9	64	0	**73**
4034	0	36	0	**36**
4040	58	21	0	**79**
4041	0	80	34	**114**
4042	0	0	6	**6**
4182	0	14	0	**14**
4184	23	0	0	**23**
4185	0	0	37	**37**
				1605

50 Speers Road

8013-02

Residential Vehicular Site Traffic Distribution (PM Peak Hour)

Inbound

BA Group - SUK

9/1/2022

Tue Feb 22 2022 16:41:17 GMT-0500 (Eastern Standard Time) - Run Time: 2610ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
Start time of trip - start_time In 1500-1759
and
Primary travel mode (M P T U
and
Trip purpose of destir
and
2006 GTA zone of de 4011 4012 4013

Trip 2016
Table:

	4011	4012	4013	**Total**
PD 1 of Toronto	0	54	0	**54**
PD 5 of Toronto	17	0	0	**17**
PD 9 of Toronto	16	0	0	**16**
PD 12 of Toronto	0	25	0	**25**
Aurora	22	0	0	**22**
Vaughan	15	0	0	**15**
Brampton	26	0	0	**26**
Mississauga	120	220	157	**497**
Halton Hills	0	36	0	**36**
Milton	7	15	0	**22**
Oakville	844	970	108	**1922**
Burlington	64	77	17	**158**
Flamborough	0	52	0	**52**
Hamilton	0	0	6	**6**
St. Catharines	0	0	40	**40**
Cambridge	99	0	0	**99**
City of Guelph	0	4	0	**4**
Tiny	0	21	0	**21**

Tue Feb 22 2022 16:43:56 GMT-0500 (Eastern Standard Time) - Run Tim

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
Start time of trip - start_time In 1500-1759
and
Primary travel mode c M P T U
and
Trip purpose of destin
and
2006 GTA zone of de: 4011 4012 4013
and
Planning district of ori

Trip 2016
Table:

	4011	4012	4013	**Total**
4001	0	22	0	**22**
4005	67	15	21	**103**
4006	0	24	0	**24**
4008	25	97	0	**122**
4009	110	14	16	**140**
4010	89	4	0	**93**
4011	93	192	8	**293**
4012	63	116	0	**179**
4014	41	161	0	**202**
4016	76	0	4	**80**
4017	33	0	0	**33**
4018	0	0	19	**19**
4019	4	0	0	**4**
4023	0	0	4	**4**
4024	0	48	4	**52**
4027	29	0	0	**29**
4029	44	141	0	**185**
4030	44	85	0	**129**
4037	49	0	0	**49**
4039	0	10	0	**10**
4040	76	13	25	**114**
4042	0	0	6	**6**
4182	0	14	0	**14**
4183	0	11	0	**11**
				1917

AM	**RESIDENTIAL VEHICLE TRIP DISTRIBUTION**
OUTBOUND	**Traffic Volume Allocation**
9/1/2022	

Zone	Trips	%	EAST	WEST	NORTH	SOUTH	NORTH	SOUTH	EAST	WEST	WEST	SOUTH	TOTAL
			Hwy 403	Hwy 403	Kerr Street	Kerr Street	Dorval Drive	Dorval Drive	Speers Road	Speers Road	Wyecroft Road	Queen Mary Drive	
PD 1 of Toronto	78	3%	100%										100.00%
PD 2 of Toronto	11	0%	100%										100.00%
PD 3 of Toronto	38	1%	100%										100.00%
PD 5 of Toronto	17	1%	100%										100.00%
PD 6 of Toronto	29	1%	100%										100.00%
PD 8 of Toronto	17	1%	100%										100.00%
PD 9 of Toronto	16	1%	100%										100.00%
PD 10 of Toronto	34	1%	100%										100.00%
Brampton	42	1%	100%										100.00%
Mississauga	669	22%	100%										100.00%
Milton	66	2%		50%	50%								100.00%
4001	22	1%		30%				40%		30%			100.00%
4003	13	0%		35%						35%	30%		100.00%
4005	21	1%				20%		70%		10%			100.00%
4006	24	1%				50%		50%					100.00%
4008	86	3%								50%	50%		100.00%
4009	89	3%								50%	50%		100.00%
4011	319	10%				25%		50%				25%	100.00%
4012	DOES NOT APPLY.												
4014	58	2%							100%				100.00%
4016	39	1%				50%			50%				100.00%
4017	89	3%				40%			60%				100.00%
4022	73	2%	100%										100.00%
4024	66	2%	100%										100.00%
4025	8	0%	35%				30%		35%				100.00%
4027	29	1%	50%						50%				100.00%
4029	147	5%	40%				20%		40%				100.00%
4030	73	2%	40%				20%		40%				100.00%
4034	36	1%	25%				25%		50%				100.00%
4040	79	3%			30%		50%				20%		100.00%
4041	114	4%		50%	50%								100.00%
4042	6	0%		50%							50%		100.00%
4182	14	0%			50%				50%				100.00%
4184	23	1%		60%							40%		100.00%
4185	37	1%		30%	40%						30%		100.00%
Burlington	145	5%		80%						20%			100.00%
Flamborough	52	2%		100%									100.00%
Hamilton	244	8%		100%									100.00%
St. Catharines	55	2%		100%									100.00%
Cambridge	99	3%	10%	90%									100.00%
City of Guelph	4	0%	10%	90%									100.00%
	3081	100%											

Route Split Totals

EAST	WEST	NORTH	SOUTH	NORTH	SOUTH	EAST	WEST	WEST	SOUTH	TOTAL
Hwy 403	Hwy 403	Kerr Street	Kerr Street	Dorval Drive	Dorval Drive	Speers Road	Speers Road	Wyecroft Road	Queen Mary Drive	
2.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.5%
0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.4%
1.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.2%
0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.6%
0.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.9%
0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.6%
0.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.5%
1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.1%
1.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.4%
21.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.7%
0.00%	1.07%	1.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.1%
0.00%	0.21%	0.00%	0.00%	0.00%	0.29%	0.00%	0.21%	0.00%	0.00%	0.7%
0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.13%	0.00%	0.4%
0.00%	0.00%	0.00%	0.14%	0.00%	0.48%	0.00%	0.07%	0.00%	0.00%	0.7%
0.00%	0.00%	0.00%	0.39%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.40%	1.40%	0.00%	2.8%
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.44%	1.44%	0.00%	2.9%
0.00%	0.00%	0.00%	2.59%	0.00%	5.18%	0.00%	0.00%	0.00%	2.59%	10.4%
DOES NOT APPLY.										
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.88%	0.00%	0.00%	0.00%	1.9%
0.00%	0.00%	0.00%	0.63%	0.00%	0.00%	0.63%	0.00%	0.00%	0.00%	1.3%
0.00%	0.00%	0.00%	1.16%	0.00%	0.00%	1.73%	0.00%	0.00%	0.00%	2.9%
2.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.4%
2.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.1%
0.09%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.09%	0.00%	0.00%	0.3%
0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%	0.9%
1.91%	0.00%	0.00%	0.00%	0.95%	0.00%	1.91%	0.00%	0.00%	0.00%	4.8%
0.95%	0.00%	0.00%	0.00%	0.47%	0.00%	0.95%	0.00%	0.00%	0.00%	2.4%
0.29%	0.00%	0.00%	0.00%	0.29%	0.00%	0.58%	0.00%	0.00%	0.00%	1.2%
0.00%	0.00%	0.77%	0.00%	1.28%	0.00%	0.00%	0.00%	0.51%	0.00%	2.6%
0.00%	1.85%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.7%
0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.2%
0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.5%
0.00%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.7%
0.00%	0.36%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%	0.00%	1.2%
0.00%	3.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	0.00%	0.00%	4.7%
0.00%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.7%
0.00%	7.92%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.9%
0.00%	1.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.8%
0.32%	2.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.2%
0.01%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%
39.4%	**22.4%**	**4.4%**	**4.9%**	**3.1%**	**6.3%**	**8.5%**	**4.2%**	**4.2%**	**2.6%**	**100.0%**

Rounded										
39.00%	**22.00%**	**5.00%**	**5.00%**	**3.00%**	**6.00%**	**9.00%**	**4.00%**	**4.00%**	**3.00%**	100%
x	x					x	x		x	

CARDINAL DIRECTION	
NORTH	8.00%
SOUTH	14.00%
EAST	48.00%
WEST	30.00%

AM
OUTBOUND
9/1/2022

RESIDENTIAL VEHICLE TRIP DISTRIBUTION

Traffic Volume Allocation

Zone	Trips	%	EAST Hwy 403	WEST Hwy 403	NORTH Kerr Street	SOUTH Kerr Street	NORTH Dorval Drive	SOUTH Dorval Drive	EAST Speers Road	WEST Speers Road	WEST Wyecroft Road	SOUTH Queen Mary Drive	TOTAL
PD 1 of Toronto	54	2%	100%										100.00%
PD 5 of Toronto	17	1%	100%										100.00%
PD 9 of Toronto	16	1%	100%										100.00%
PD 12 of Toronto	25	1%	100%										100.00%
Aurora	22	1%	100%										100.00%
Vaughan	15	1%	100%										100.00%
Brampton	26	1%	100%										100.00%
Mississauga	497	17%	100%										100.00%
Halton Hills	36	1%	10%	45%					45%				100.00%
Milton	22	1%	10%	45%	45%								100.00%
4001	22	1%		50%				50%					100.00%
4005	103	4%						50%		50%			100.00%
4006	24	1%				30%		40%		30%			100.00%
4008	122	4%								50%	50%		100.00%
4009	140	5%								50%	50%		100.00%
4010	93	3%				50%				50%			100.00%
4011	293	10%				20%	20%			30%		30%	100.00%
4012	DOES NOT APPLY.												
4014	202	7%							100%				100.00%
4016	80	3%				50%			50%				100.00%
4017	33	1%				40%			60%				100.00%
4018	19	1%				40%			60%				100.00%
4019	4	0%							100%				100.00%
4023	4	0%			40%	20%			40%				100.00%
4024	52	2%	100%										100.00%
4027	29	1%	50%						50%				100.00%
4029	185	6%	40%						40%	20%			100.00%
4030	129	5%	50%						50%				100.00%
4037	49	2%	50%						50%				100.00%
4039	10	0%		30%			40%				30%		100.00%
4040	114	4%			50%		50%						100.00%
4042	6	0%		60%							40%		100.00%
4182	14	0%			50%				50%				100.00%
4183	11	0%			50%				50%				100.00%
Burlington	158	6%		50%			50%						100.00%
Flamborough	52	2%		100%									100.00%
Hamilton	6	0%		100%									100.00%
St. Catharines	40	1%		100%									100.00%
Cambridge	99	3%	10%	90%									100.00%
City of Guelph	4	0%	10%	45%					45%				100.00%
Tiny	21	1%	100%										100.00%
	2848	100%											

Route Split Totals

EAST Hwy 403	WEST Hwy 403	NORTH Kerr Street	SOUTH Kerr Street	NORTH Dorval Drive	SOUTH Dorval Drive	EAST Speers Road	WEST Speers Road	WEST Wyecroft Road	SOUTH Queen Mary Drive	TOTAL
1.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.9%
0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.6%
0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.6%
0.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.9%
0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%
0.53%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.5%
0.91%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.9%
17.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.5%
0.13%	0.57%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%	0.00%	1.3%
0.08%	0.35%	0.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.39%	0.00%	0.00%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.8%
0.00%	0.00%	0.00%	0.00%	0.00%	1.81%	0.00%	1.81%	0.00%	0.00%	3.6%
0.00%	0.00%	0.00%	0.25%	0.00%	0.34%	0.00%	0.25%	0.00%	0.00%	0.8%
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.14%	2.14%	0.00%	4.3%
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.46%	2.46%	0.00%	4.9%
0.00%	0.00%	0.00%	1.63%	0.00%	0.00%	0.00%	1.63%	0.00%	0.00%	3.3%
0.00%	0.00%	0.00%	2.06%	2.06%	0.00%	0.00%	3.09%	0.00%	3.09%	10.3%
DOES NOT APPLY.										
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.09%	0.00%	0.00%	0.00%	7.1%
0.00%	0.00%	0.00%	1.40%	0.00%	0.00%	1.40%	0.00%	0.00%	0.00%	2.8%
0.00%	0.00%	0.00%	0.46%	0.00%	0.00%	0.70%	0.00%	0.00%	0.00%	1.2%
0.00%	0.00%	0.00%	0.27%	0.00%	0.00%	0.40%	0.00%	0.00%	0.00%	0.7%
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.1%
0.00%	0.00%	0.06%	0.03%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.1%
1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.8%
0.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	0.00%	0.00%	0.00%	1.0%
2.60%	0.00%	0.00%	0.00%	0.00%	0.00%	2.60%	1.30%	0.00%	0.00%	6.5%
2.26%	0.00%	0.00%	0.00%	0.00%	0.00%	2.26%	0.00%	0.00%	0.00%	4.5%
0.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.86%	0.00%	0.00%	0.00%	1.7%
0.00%	0.11%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.11%	0.00%	0.4%
0.00%	0.00%	2.00%	0.00%	2.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.0%
0.00%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.2%
0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.5%
0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.4%
0.00%	2.77%	0.00%	0.00%	2.77%	0.00%	0.00%	0.00%	0.00%	0.00%	5.5%
0.00%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.8%
0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%
0.00%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.4%
0.35%	3.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.5%
0.01%	0.06%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.1%
0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.7%
33.0%	**10.9%**	**2.8%**	**6.1%**	**7.0%**	**2.5%**	**17.1%**	**12.7%**	**4.8%**	**3.1%**	**100.0%**

Rounded											
	33.00%	**11.00%**	**3.00%**	**6.00%**	**7.00%**	**2.00%**	**17.00%**	**13.00%**	**5.00%**	**3.00%**	100%
	x	x					x	x		x	

CARDINAL DIRECTION	
NORTH	10.00%
SOUTH	11.00%
EAST	50.00%
WEST	29.00%

50 Speers Road

8013-02

Mode Split

Outbound - Inbound

BA Group - SUK

9/1/2022

2016 TTS DATA

Tue Feb 22 2022 18:40:53 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 600-859
and
Trip purpose of origin - purp_orig In H
and
2006 GTA zone of or 4011 4012 4013

Table: Trip 2016

Row:	Count:	Expanded:	
Transit excluding GC	8	203	4%
Cycle	3	45	1%
Auto driver	111	2611	57%
GO rail only	14	234	5%
Joint GO rail and loc	10	158	3%
Motorcycle	1	6	0%
Auto passenger	22	582	13%
School bus	12	387	8%
Paid rideshare	1	26	1%
Walk	15	316	7%
Total:	197	4568	100%

Driver	57%
Passenger	13%
Transit	21%
Walk	7%
Cycle	1%
Total	100%

Tue Feb 22 2022 18:42:04 GMT-0500 (Eastern Standa

Frequency Distribution Query Form - Trip - 2016 v1.1

Field: Primary travel mode of trip - mode_prime

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H
and
2006 GTA zone of (4011 4012 4013

Table: Trip 2016

Row:	Count:	Expanded:	
Transit excluding G	8	186	4%
Cycle	4	71	2%
Auto driver	127	2677	64%
GO rail only	12	216	5%
Joint GO rail and lo	5	88	2%
Motorcycle	1	14	0%
Auto passenger	17	340	8%
School bus	8	241	6%
Walk	17	358	9%
Total:	199	4192	100%

Driver	64%
Passenger	8%
Transit	17%
Walk	9%
Cycle	2%
Total	100%

Appendix G
Existing Traffic Signal Timings

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1010 - Kerr St @ Shepherd Rd - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	S-L	N-T	N	W-T	N	S-T	N	N	N	N	N	N	N	N	N	N
Min Green	7	18	0	10	0	18	0	0	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	13	0	16	0	13	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	2.5	3.5	5.0	3.0	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	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	0.0
Max1	10	35	0	22	0	35	0	0	35	35	35	35	35	35	35	35
Max2	10	50	0	22	0	50	0	0	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	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	0.0
Yellow	4.0	3.3	3.0	3.3	3.0	3.3	3.0	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	0.0	1.9	1.0	2.1	1.0	1.9	1.0	2.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	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	0.0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	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	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	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	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	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	0.0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1010 - Kerr St @ Shepherd Rd - Econolite Type - Cobalt

Coordination Options

Options (MM) 3-1

Manual Pattern	Auto	ECPI Coord	Yes
System Source	SYS	System Format	STD
Splits In	Percent	Offsets In	Percent
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Float
Offset Reference	Lead	Use Ped Time	Yes
Ped Recall	No	Ped Reservice	No
Local Zero Override	No	FO Added Ini Green	No
Re-sync Count	3	Multisync	No

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Demand 1																
Demand 2																

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1010 - Kerr St @ Shepherd Rd - Econolite Type - Cobalt

Coordination Pattern Data
Coordinator Pattern Data (MM) 3-2

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1010 - Kerr St @ Shepherd Rd - Econolite Type - Cobalt

Coordination Split Pattern
Split Pattern Data (MM) 3-3

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1010 - Kerr St @ Shepherd Rd - Econolite Type - Cobalt

Time Base Day Plan/Schedule
Day Plan (MM) 5-3

Schedule (MM) 5-4

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1009 - Speers Rd @ Kerr St - Econolite Type - ASC/3

Controller Timing Plan (MM) 2-1

Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Min Green	7	25	7	10	7	25	7	10	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	14	0	7	0	14	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	14	0	25	0	14	0	25	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	2.5	5.5	2.5	4.0	2.5	5.5	2.5	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	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	0.0
Max1	20	40	25	40	20	40	20	40	35	35	35	35	35	35	35	35
Max2	20	55	35	45	30	55	30	45	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	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	0.0
Yellow	3.0	3.7	3.0	3.3	3.0	3.7	3.0	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	0.0	2.2	0.0	3.0	0.0	2.2	0.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	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	0.0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	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	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	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	0.0

TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	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	0.0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1009 - Speers Rd @ Kerr St - Econolite Type - ASC/3

Coordination Options

Options (MM) 3-1

Manual Pattern	Auto	ECPI Coord	Yes
System Source	HDW	System Format	STD
Splits In	Percent	Offsets In	Percent
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Float
Offset Reference	Lead	Use Ped Time	Yes
Ped Recall	No	Ped Reservice	No
Local Zero Override	Yes	FO Added Ini Green	No
Re-sync Count	0	Multisync	No

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Demand 1																
Demand 2																

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1009 - Speers Rd @ Kerr St - Econolite Type - ASC/3

Coordination Pattern Data
Coordinator Pattern Data (MM) 3-2

Coordinator Pattern # 1

Split Pattern	1	TS2 (Pat-Off)	0-1	Splits In	Percent
Cycle	120	Std (COS)	9	Offsets In	Percent
Offset Value	36%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Splits (Split Pat 1)	9	38	20	33	12	35	9	44	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 2

Split Pattern	2	TS2 (Pat-Off)	0-2	Splits In	Percent
Cycle	120	Std (COS)	17	Offsets In	Percent
Offset Value	23%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Splits (Split Pat 2)	10	45	13	32	10	45	10	35	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 3

Split Pattern	3	TS2 (Pat-Off)	0-3	Splits In	Percent
Cycle	120	Std (COS)	25	Offsets In	Percent
Offset Value	41%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Splits (Split Pat 3)	10	45	15	30	15	40	10	35	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 4

Split Pattern	4	TS2 (Pat-Off)	1-1	Splits In	Percent
Cycle	120	Std (COS)	33	Offsets In	Percent
Offset Value	23%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Splits (Split Pat 4)	10	45	13	32	10	45	10	35	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1009 - Speers Rd @ Kerr St - Econolite Type - ASC/3

Coordination Split Pattern
Split Pattern Data (MM) 3-3

Split Pattern # 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Split (percent)	9	38	20	33	12	35	9	44	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Split Pattern # 2

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Split (percent)	10	45	13	32	10	45	10	35	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Split Pattern # 3

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Split (percent)	10	45	15	30	15	40	10	35	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																

Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Split Pattern # 4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	EBLT	WB	SBLT	NB	WBLT	EB	NBLT	SB								
Split (percent)	10	45	13	32	10	45	10	35	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1009 - Speers Rd @ Kerr St - Econolite Type - ASC/3

Time Base Day Plan/Schedule
Day Plan (MM) 5-3

Day Plan #1

Event	Action Plan	Start Time
1	1	06:00
2	2	10:00
3	3	15:15
4	4	19:00
5	5	22:00

Schedule (MM) 5-4

Schedule Number - 1

Day Plan No.: 1

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT
	X	X	X	X	X	X	X

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Town of Oakville

ECONOLITE

MOVING TRAFFIC FORWARD

OAK0219 - Kerr St @ Stewart St - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Min Green	6	24	0	10	0	24	0	10	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	14	0	13	0	14	0	13	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	3.0	4.0	0.0	4.0	0.0	4.0	0.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	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	0.0
Max1	10	30	0	25	0	30	0	25	35	35	35	35	35	35	35	35
Max2	10	40	0	25	0	40	0	25	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	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	0.0
Yellow	3.0	3.3	3.0	3.3	3.0	3.3	3.0	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	0.0	2.1	0.0	2.1	0.0	2.1	0.0	2.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	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	0.0
Red Revert	4.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	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	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	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	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	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	0.0

Town of Oakville

ECONOLITE

MOVING TRAFFIC FORWARD

OAK0219 - Kerr St @ Stewart St - Econolite Type - Cobalt

Coordination Options

Options (MM) 3-1

Manual Pattern	Auto	ECPI Coord	Yes
System Source	TBC	System Format	STD
Splits In	Percent	Offsets In	Percent
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Float
Offset Reference	Lag	Use Ped Time	Yes
Ped Recall	Yes	Ped Reservice	Yes
Local Zero Override	No	FO Added Ini Green	No
Re-sync Count	0	Multisync	No

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Demand 1																
Demand 2																

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

Town of Oakville

ECONOLITE

MOVING TRAFFIC FORWARD

OAK0219 - Kerr St @ Stewart St - Econolite Type - Cobalt

Coordination Pattern Data
Coordinator Pattern Data (MM) 3-2

Coordinator Pattern # 1

Split Pattern	1	TS2 (Pat-Off)	0-1	Splits In	Percent
Cycle	75	Std (COS)	9	Offsets In	Percent
Offset Value	17%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	1		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Splits (Split Pat 1)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 3

Split Pattern	3	TS2 (Pat-Off)	0-3	Splits In	Percent
Cycle	75	Std (COS)	25	Offsets In	Percent
Offset Value	17%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	3		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Splits (Split Pat 3)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 5

Split Pattern	5	TS2 (Pat-Off)	1-2	Splits In	Percent
Cycle	75	Std (COS)	41	Offsets In	Percent
Offset Value	17%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	0		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Splits (Split Pat 5)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	100%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Special Funciton Outputs								

Town of Oakville

ECONOLITE

MOVING TRAFFIC FORWARD

OAK0219 - Kerr St @ Stewart St - Econolite Type - Cobalt

Coordination Split Pattern
Split Pattern Data (MM) 3-3

Split Pattern # 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Split (percent)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Split Pattern # 3

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Split (percent)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Split Pattern # 5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	S-L	N-T	N	E-T	N	S-T	N	W-T	N	N	N	N	N	N	N	N
Split (percent)	14	46	0	40	0	60	0	40	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall		X				X										
Recall to Max. Time																
Omit Phase									X	X	X	X	X	X	X	X

Ring	1	2	3	4
Split Sum	100%	100%	0%	0%

Town of Oakville

ECONOLITE

MOVING TRAFFIC FORWARD

OAK0219 - Kerr St @ Stewart St - Econolite Type - Cobalt

Time Base Day Plan/Schedule
Day Plan (MM) 5-3

Day Plan #1 - "1"

Event	Action Plan	Start Time
1	1	07:30
2	2	09:15
3	3	11:00
4	4	13:15
5	5	16:00
6	6	18:15

Day Plan #2 - "2"

Event	Action Plan	Start Time
1	99	00:00
2	2	09:00
3	3	15:00
4	99	19:00

Schedule (MM) 5-4

Schedule Number - 1

Day Plan No.: 1

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT
	X	X	X	X	X	X	X

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Schedule Number - 2

Day Plan No.: 2

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	12	13	14	15	16	17	18	19	20	21	22
	23	24	25	26	27	28	29	30	31		

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Min Green	0	38	0	10	6	38	0	0	0	0	0	0	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	0	0	0	0	0	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	31	0	18	0	31	0	7	0	7	0	7	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	0.0	5.0	0.0	3.0	3.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	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	0.0
Max1	0	30	0	20	15	30	0	0	0	0	0	0	35	35	35	35
Max2	0	40	0	30	20	40	0	0	0	0	0	0	40	40	40	40
Max3	0	50	0	35	30	50	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	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	0.0
Yellow	3.0	3.7	3.0	3.3	4.0	3.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	0.0	2.9	0.0	2.5	2.0	2.9	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	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	0.0
Red Revert	2.0	2.6	2.0	2.5	2.0	2.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	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	0.0
Max Int	30	30	30	30	30	30	30	30	30	30	30	30	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	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	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Min Gap	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	0.0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Coordination Options

Options (MM) 3-1

Manual Pattern	Auto	ECPI Coord	Yes
System Source	TBC	System Format	STD
Splits In	Percent	Offsets In	Percent
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Float
Offset Reference	Lead	Use Ped Time	Yes
Ped Recall	Yes	Ped Reservice	Yes
Local Zero Override	No	FO Added Ini Green	No
Re-sync Count	3	Multisync	Yes

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Minimum Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Demand 1																
Demand 2																

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Coordination Pattern Data
Coordinator Pattern Data (MM) 3-2

Coordinator Pattern # 1

Split Pattern	1	TS2 (Pat-Off)	0-1	Splits In	Percent
Cycle	120	Std (COS)	9	Offsets In	Percent
Offset Value	19%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	1		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 1)	0	74	0	26	25	49	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	74%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 2

Split Pattern	2	TS2 (Pat-Off)	0-2	Splits In	Percent
Cycle	140	Std (COS)	17	Offsets In	Percent
Offset Value	71%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	2		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 2)	0	78	0	22	25	53	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	78%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 3

Split Pattern	3	TS2 (Pat-Off)	0-3	Splits In	Percent
Cycle	120	Std (COS)	25	Offsets In	Percent
Offset Value	76%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	3		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 3)	0	70	0	30	10	60	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	70%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 4

Split Pattern	4	TS2 (Pat-Off)	1-1	Splits In	Percent
Cycle	120	Std (COS)	33	Offsets In	Percent
Offset Value	3%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	4		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 4)	0	63	0	27	10	63	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	90%	73%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0	
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0	

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 5

Split Pattern	5	TS2 (Pat-Off)	1-2	Splits In	Percent
Cycle	140	Std (COS)	41	Offsets In	Percent
Offset Value	9%	Dwell/Add Time	0		
Actuated Coord	Yes	Timing Plan	1		
Actuated Walk Rest	Yes	Sequence	0		
Phase Reservice	No	Action Plan	5		
Max Select	MAXINH	Force Off	Float		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 5)	0	73	0	27	12	61	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	100%	73%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Coordinator Pattern # 6

Split Pattern	6	TS2 (Pat-Off)	1-3	Splits In	Percent
Cycle	255	Std (COS)	0	Offsets In	Percent
Offset Value	0%	Dwell/Add Time	0		
Actuated Coord	No	Timing Plan	0		
Actuated Walk Rest	No	Sequence	0		
Phase Reservice	No	Action Plan	0		
Max Select	None	Force Off	None		

Split Preference Phases

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Splits (Split Pat 6)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pref 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring	1	2	3	4
Ring Split Ext	0	0	0	0
Ring Displacement	-	0	0	0
Split Sum	0%	0%	0%	0%

Misc. Data

Veh Perm 1	0	Veh Perm 2	0	Veh Perm 2 Disp	0
Split Demand Pat 1	0	Split Demand Pat 2	0	Crossing Arterial Pat	0

Split Pattern

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coord Phase																
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X
Special Funciton Outputs																

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Coordination Split Pattern
Split Pattern Data (MM) 3-3

Split Pattern # 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Split (percent)	0	74	0	26	25	49	0	0	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X

Ring	1	2	3	4
Split Sum	100%	74%	0%	0%

Split Pattern # 2

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Split (percent)	0	78	0	22	25	53	0	0	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X

Ring	1	2	3	4
Split Sum	100%	78%	0%	0%

Split Pattern # 3

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Split (percent)	0	70	0	30	10	60	0	0	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																

Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X

Ring	1	2	3	4
Split Sum	100%	70%	0%	0%

Split Pattern # 4

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Split (percent)	0	63	0	27	10	63	0	0	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X

Ring	1	2	3	4
Split Sum	90%	73%	0%	0%

Split Pattern # 5

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	N	E-T	N	S-T	E-L	W-T	N	N	N	N	N	N	N	N	N	N
Split (percent)	0	73	0	27	12	61	0	0	0	0	0	0	0	0	0	0
Coord Phase		X				X										
Vehicle Recall																
Pedestrian Recall																
Recall to Max. Time																
Omit Phase													X	X	X	X

Ring	1	2	3	4
Split Sum	100%	73%	0%	0%

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Time Base Clock/Calendar

Clock/Calendar Data (MM) 5-1

Manual Action Plan:	0
SYNC Reference Time:	03:15
SYNC Reference:	Reference Time
Day Light Savings:	No
Time Reset Input Set Time:	3:30:00
Standard Time From GMT:	0

Town of Oakville, ON

ECONOLITE

MOVING TRAFFIC FORWARD

OAK1007 - Cornwall Rd @ Cross Ave - Econolite Type - Cobalt

Time Base Day Plan/Schedule
Day Plan (MM) 5-3

Day Plan #1 - "1"

Event	Action Plan	Start Time
1	1	06:00
2	2	07:00
3	1	09:00
4	3	10:00
5	4	15:15
6	5	17:00
7	3	19:00
8	6	22:00

Day Plan #2 - "2"

Event	Action Plan	Start Time
1	99	00:00
2	2	09:00
3	3	15:00
4	99	19:00

Schedule (MM) 5-4

Schedule Number - 1

Day Plan No.: 1

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT
	X	X	X	X	X	X	X

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Schedule Number - 2

Day Plan No.: 2

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	X	X	X	X	X	X	X	X	X	X	X	X

Day (DOW)	SUN	MON	TUE	WED	THU	FRI	SAT

Day (DOM)	1	2	3	4	5	6	7	8	9	10	11
	X	X	X	X	X	X	X	X	X	X	X
	12	13	14	15	16	17	18	19	20	21	22
	X	X	X	X	X	X	X	X	X	X	X
	23	24	25	26	27	28	29	30	31		
	X	X	X	X	X	X	X	X	X		

Appendix H
Synchro Analysis Worksheets

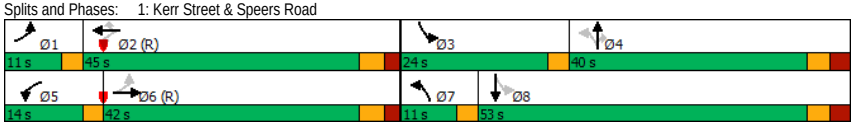
Existing Traffic Conditions

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	35	605	180	435	175	95	95	365	345	135
Future Volume (vph)	35	605	180	435	175	95	95	365	345	135
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	1	6	5	2		7	4		3	8
Permitted Phases	6		2		2	4		4	8	
Detector Phase	1	6	5	2	2	7	4	4	3	8
Switch Phase										
Minimum Initial (s)	7.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0
Minimum Split (s)	10.0	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3
Total Split (s)	11.0	42.0	14.0	45.0	45.0	11.0	40.0	40.0	24.0	53.0
Total Split (%)	9.2%	35.0%	11.7%	37.5%	37.5%	9.2%	33.3%	33.3%	20.0%	44.2%
Maximum Green (s)	8.0	36.1	11.0	39.1	39.1	8.0	33.7	33.7	21.0	46.7
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3
All-Red Time (s)	0.0	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0
Flash Dont Walk (s)		14.0		14.0	14.0		14.0	14.0		14.0
Pedestrian Calls (#/hr)		15		15	15		35	35		35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	41	802	209	506	203	110	110	424	401	238
v/c Ratio	0.09	0.65	0.64	0.34	0.27	0.31	0.30	0.89	0.71	0.43
Control Delay	17.9	35.8	28.7	26.1	4.8	22.8	40.6	39.9	32.3	30.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Total Delay	17.9	35.8	28.7	26.1	4.8	22.8	40.6	39.9	35.3	30.5
Queue Length 50th (m)	4.7	84.7	26.4	43.0	0.0	15.3	22.0	43.5	68.1	39.3
Queue Length 95th (m)	11.5	106.7	#49.2	61.7	13.7	21.8	32.7	70.1	79.0	51.8
Internal Link Dist (m)		211.8		123.2			103.4			143.2
Turn Bay Length (m)	105.0		75.0		100.0	50.0		45.0		
Base Capacity (vph)	465	1236	328	1483	760	353	528	577	566	688
Starvation Cap Reductn	0	0	0	0	0	0	0	0	85	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.65	0.64	0.34	0.27	0.31	0.21	0.73	0.83	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Kerr Street & Speers Road

Existing AM
50 Speers Road (8013-02)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	605	85	180	435	175	95	95	365	345	135	70
Future Volume (vph)	35	605	85	180	435	175	95	95	365	345	135	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9		3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.93	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1795	3319		1686	3438	1495	1678	1881	1429	1671	1729	
Flt Permitted	0.47	1.00		0.20	1.00	1.00	0.61	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	880	3319		354	3438	1495	1079	1881	1429	1070	1729	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	41	703	99	209	506	203	110	110	424	401	157	81
RTOR Reduction (vph)	0	8	0	0	0	116	0	0	197	0	17	0
Lane Group Flow (vph)	41	794	0	209	506	87	110	110	227	401	221	0
Confl. Peds. (#/hr)	15		10	10		15	20		35	35		20
Heavy Vehicles (%)	0%	6%	7%	7%	5%	4%	6%	1%	5%	5%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)	50.2	44.4		60.0	51.2	51.2	31.4	23.5	23.5	47.8	36.9	
Effective Green, g (s)	50.2	44.4		60.0	51.2	51.2	31.4	23.5	23.5	47.8	36.9	
Actuated g/C Ratio	0.42	0.37		0.50	0.43	0.43	0.26	0.20	0.20	0.40	0.31	
Clearance Time (s)	3.0	5.9		3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	
Vehicle Extension (s)	2.5	5.5		2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	
Lane Grp Cap (vph)	412	1228		316	1466	637	321	368	279	532	531	
v/s Ratio Prot	0.00	0.24		c0.07	0.15		0.02	0.06		c0.13	0.13	
v/s Ratio Perm	0.04			c0.26		0.06	0.07		0.16	c0.17		
v/c Ratio	0.10	0.65		0.66	0.35	0.14	0.34	0.30	0.81	0.75	0.42	
Uniform Delay, d1	20.8	31.3		19.7	23.1	20.9	35.0	41.2	46.2	28.8	33.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	2.6		4.6	0.6	0.4	0.5	0.6	17.2	5.7	0.7	
Delay (s)	20.9	33.9		24.3	23.8	21.4	35.5	41.8	63.3	34.5	33.7	
Level of Service	C	C		C	C	C	D	D	E	C	C	
Approach Delay (s)		33.3			23.4			54.9			34.2	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	81.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

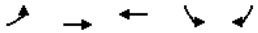
Timings
2: Speers Road & Cross Avenue

Existing AM
50 Speers Road (8013-02)

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	185	1155	560	5	220
Future Volume (vph)	185	1155	560	5	220
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	35.0	109.0	74.0	31.0	31.0
Total Split (%)	25.0%	77.9%	52.9%	22.1%	22.1%
Maximum Green (s)	29.0	102.4	67.4	25.2	25.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

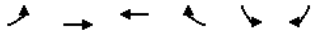
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 99 (71%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	218	1359	683	6	259
v/c Ratio	0.36	0.47	0.27	0.05	0.60
Control Delay	3.7	3.6	6.9	60.8	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.6	6.9	60.8	13.1
Queue Length 50th (m)	8.4	40.8	29.6	1.6	0.0
Queue Length 95th (m)	12.9	47.9	38.4	5.8	11.3
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	754	2907	2513	324	681
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	0.29	0.47	0.27	0.02	0.38

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	185	1155	560	20	5	220
Future Volume (vph)	185	1155	560	20	5	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1685	3471	3448		1805	2608
Flt Permitted	0.36	1.00	1.00		0.95	1.00
Satd. Flow (perm)	638	3471	3448		1805	2608
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	218	1359	659	24	6	259
RTOR Reduction (vph)	0	0	1	0	0	240
Lane Group Flow (vph)	218	1359	682	0	6	19
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	7%	4%	4%	5%	0%	9%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	117.3	117.3	102.0		10.3	10.3
Effective Green, g (s)	117.3	117.3	102.0		10.3	10.3
Actuated g/C Ratio	0.84	0.84	0.73		0.07	0.07
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	604	2908	2512		132	191
v/s Ratio Prot	0.02	c0.39	0.20		0.00	
v/s Ratio Perm	0.28					c0.01
v/c Ratio	0.36	0.47	0.27		0.05	0.10
Uniform Delay, d1	2.5	3.0	6.4		60.3	60.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.5	0.3		0.1	0.2
Delay (s)	3.0	3.6	6.7		60.4	60.8
Level of Service	A	A	A		E	E
Approach Delay (s)		3.5	6.7		60.7	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	675	15	0	580	20	5	0	50	0	0	0
Future Volume (Veh/h)	5	675	15	0	580	20	5	0	50	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	767	17	0	659	23	6	0	57	0	0	0
Pedestrians								5			2	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	684			789			1122	1476	397	1125	1474	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	461			789			941	1330	397	945	1327	88
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	90	100	100	100
cM capacity (veh/h)	1011			836			199	141	591	179	141	874

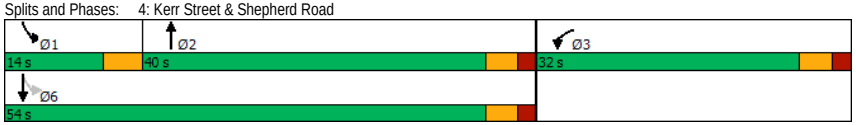
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	6	511	273	439	243	63	0
Volume Left	6	0	0	0	0	6	0
Volume Right	0	0	17	0	23	57	0
cSH	1011	1700	1700	1700	1700	498	1700
Volume to Capacity	0.01	0.30	0.16	0.26	0.14	0.13	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	3.3	0.0
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	13.3	0.0
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		13.3	0.0
Approach LOS						B	A

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization	Err%	ICU Level of Service		H
Analysis Period (min)	15			

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	70	250	90	480
Future Volume (vph)	70	250	90	480
Turn Type	Prot	NA	pm+pt	NA
Protected Phases	3	2	1	6
Permitted Phases			6	
Detector Phase	3	2	1	6
Switch Phase				
Minimum Initial (s)	10.0	18.0	7.0	18.0
Minimum Split (s)	31.4	28.2	11.0	28.2
Total Split (s)	32.0	40.0	14.0	54.0
Total Split (%)	37.2%	46.5%	16.3%	62.8%
Maximum Green (s)	26.6	34.8	10.0	48.8
Yellow Time (s)	3.3	3.3	4.0	3.3
All-Red Time (s)	2.1	1.9	0.0	1.9
Lost Time Adjust (s)	0.0	0.0		0.0
Total Lost Time (s)	5.4	5.2		5.2
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.5	2.5	3.5
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	Min
Walk Time (s)	10.0	10.0		10.0
Flash Dont Walk (s)	16.0	13.0		13.0
Pedestrian Calls (#/hr)	0	5		5

Intersection Summary
Cycle Length: 86
Actuated Cycle Length: 40.1
Natural Cycle: 75
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



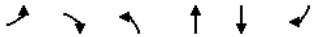
Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	236	335	626
v/c Ratio	0.45	0.21	0.45
Control Delay	9.9	5.9	8.4
Queue Delay	0.0	0.0	0.0
Total Delay	9.9	5.9	8.4
Queue Length 50th (m)	5.7	5.3	12.8
Queue Length 95th (m)	20.5	11.2	24.1
Internal Link Dist (m)	241.3	143.2	2.5
Turn Bay Length (m)			
Base Capacity (vph)	1134	2977	2947
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.11	0.21

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	70	145	250	55	90	480
Future Volume (vph)	70	145	250	55	90	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4		5.2			5.2
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.99		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.91		0.97			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1641		3411			3486
Flt Permitted	0.98		1.00			0.84
Satd. Flow (perm)	1641		3411			2949
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	159	275	60	99	527
RTOR Reduction (vph)	92	0	19	0	0	0
Lane Group Flow (vph)	144	0	316	0	0	626
Confl. Peds. (#/hr)	7	4		6	6	
Heavy Vehicles (%)	8%	0%	2%	5%	1%	3%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.5		19.0			19.0
Effective Green, g (s)	10.5		19.0			19.0
Actuated g/C Ratio	0.26		0.47			0.47
Clearance Time (s)	5.4		5.2			5.2
Vehicle Extension (s)	3.0		3.5			3.5
Lane Grp Cap (vph)	429		1616			1397
v/s Ratio Prot	c0.09		0.09			
v/s Ratio Perm						c0.21
v/c Ratio	0.34		0.20			0.45
Uniform Delay, d1	12.0		6.1			7.0
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.5		0.1			0.3
Delay (s)	12.4		6.2			7.3
Level of Service	B		A			A
Approach Delay (s)	12.4		6.2			7.3
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	40.1	Sum of lost time (s)	14.6
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

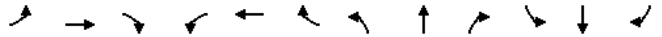
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	80	160	235	490	125
Future Volume (Veh/h)	5	80	160	235	490	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	85	170	250	521	133
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	1178	588	654			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1178	588	654			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	83	82			
cM capacity (veh/h)	174	507	933			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	90	170	250	654
Volume Left	5	170	0	0
Volume Right	85	0	0	133
cSH	459	933	1700	1700
Volume to Capacity	0.20	0.18	0.15	0.38
Queue Length 95th (m)	5.5	5.0	0.0	0.0
Control Delay (s)	14.8	9.7	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.8	3.9		0.0
Approach LOS	B			

Intersection Summary				
Average Delay		2.6		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	5	0	75	5	475	5	40	355	5
Future Volume (Veh/h)	5	0	5	5	0	75	5	475	5	40	355	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	6	0	6	6	0	89	6	565	6	48	423	6
Pedestrians		15			30			1			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.91	0.91	0.87	0.91	0.91	0.92	0.87			0.92		
vC, conflicting volume	1207	1150	442	1139	1150	599	444			601		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	979	916	280	904	916	521	282			523		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.3	4.3			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.0	3.4	2.3			2.3		
p0 queue free %	96	100	99	97	100	82	99			95		
cM capacity (veh/h)	156	225	590	210	225	483	1030			912		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	95	577	477
Volume Left	6	6	6	48
Volume Right	6	89	6	6
cSH	247	446	1030	912
Volume to Capacity	0.05	0.21	0.01	0.05
Queue Length 95th (m)	1.2	6.1	0.1	1.3
Control Delay (s)	20.3	15.2	0.2	1.5
Lane LOS	C	C	A	A
Approach Delay (s)	20.3	15.2	0.2	1.5
Approach LOS	C	C		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	10	5	455	320	45
Future Volume (Veh/h)	30	10	5	455	320	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	12	6	535	376	53
Pedestrians	18			4	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.91	0.96	0.96			
vC, conflicting volume	968	424	447			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	824	384	408			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	98	99			
cM capacity (veh/h)	306	631	1102			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	541	429
Volume Left	35	6	0
Volume Right	12	0	53
cSH	352	1102	1700
Volume to Capacity	0.13	0.01	0.25
Queue Length 95th (m)	3.5	0.1	0.0
Control Delay (s)	16.8	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.8	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		39.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	25	15	35	5	355	40	260
Future Volume (vph)	35	25	15	35	5	355	40	260
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	79	146	463	403
v/c Ratio	0.27	0.38	0.40	0.38
Control Delay	23.7	13.4	8.7	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	13.4	8.7	8.6
Queue Length 50th (m)	9.6	7.9	19.5	16.4
Queue Length 95th (m)	15.4	15.9	50.4	43.9
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	467	569	1154	1053
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	0.26	0.40	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	5	15	35	70	5	355	20	40	260	30
Future Volume (vph)	35	25	5	15	35	70	5	355	20	40	260	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.92			0.99			0.99	
Flt Protected		0.97			0.99			1.00			0.99	
Satd. Flow (prot)		1714			1620			1772			1751	
Flt Permitted		0.80			0.96			1.00			0.91	
Satd. Flow (perm)		1414			1561			1765			1605	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	30	6	18	43	85	6	433	24	49	317	37
RTOR Reduction (vph)	0	5	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	74	0	0	78	0	0	462	0	0	400	0
Confl. Peds. (#/hr)	20		20	20		20	30		35	35		30
Heavy Vehicles (%)	2%	7%	16%	0%	5%	4%	28%	6%	0%	2%	6%	6%
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)		15.2			15.2			49.0			49.0	
Effective Green, g (s)		15.2			15.2			49.0			49.0	
Actuated g/C Ratio		0.20			0.20			0.65			0.65	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		286			316			1153			1048	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.05			c0.26			0.25	
v/c Ratio		0.26			0.25			0.40			0.38	
Uniform Delay, d1		25.2			25.1			6.1			6.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.6			1.0			0.2	
Delay (s)		25.8			25.7			7.1			6.2	
Level of Service		C			C			A			A	
Approach Delay (s)		25.8			25.7			7.1			6.2	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1310	5	0	785	5	0
Future Volume (Veh/h)	1310	5	0	785	5	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1560	6	0	935	6	0
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.81		0.84	0.81
vC, conflicting volume			1566		2032	784
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1238		1610	276
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			464		81	591

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1040	526	468	468	6
Volume Left	0	0	0	0	6
Volume Right	0	6	0	0	0
cSH	1700	1700	1700	1700	81
Volume to Capacity	0.61	0.31	0.28	0.28	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.8
Control Delay (s)	0.0	0.0	0.0	0.0	52.9
Lane LOS					F
Approach Delay (s)	0.0		0.0		52.9
Approach LOS					F

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	0	0	5	0
Future Volume (Veh/h)	0	5	0	0	5	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	6	0	0	6	0
Pedestrians			2			13
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	14	13			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	14	13			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	1005	1060			1636	

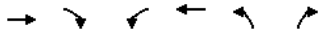
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	6	0	6
Volume Left	0	0	6
Volume Right	6	0	0
cSH	1060	1700	1636
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.1	0.0	0.1
Control Delay (s)	8.4	0.0	7.2
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	7.2
Approach LOS	A		

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	5	0	0	5	0	5
Future Volume (Veh/h)	5	0	0	5	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	6	0	0	6	0	6
Pedestrians	16			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			6		28	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			6		28	8
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1628		978	1078

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	6	6	6
Volume Left	0	0	0
Volume Right	0	0	6
cSH	1700	1628	1078
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	8.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.4
Approach LOS			A

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	0	0	0	5	5
Future Volume (Veh/h)	10	0	0	0	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	0	0	0	6	6
Pedestrians	11			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			11		22	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		22	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1621		990	1069

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	11	0	12
Volume Left	0	0	6
Volume Right	0	0	6
cSH	1700	1700	1028
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	8.5
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.5
Approach LOS			A

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	0	0	0	20	0	5	0	5	0	0
Future Volume (Veh/h)	15	0	0	0	0	20	0	5	0	5	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	0	0	0	0	25	0	6	0	6	0	0
Pedestrians		3			9			17			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	50	30	20	44	30	19	3			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50	30	20	44	30	19	3			15		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	98	100			100		
cM capacity (veh/h)	916	854	1044	930	854	1052	1628			1603		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	25	6	6
Volume Left	19	0	0	6
Volume Right	0	25	0	0
cSH	916	1052	1628	1603
Volume to Capacity	0.02	0.02	0.00	0.00
Queue Length 95th (m)	0.5	0.6	0.0	0.1
Control Delay (s)	9.0	8.5	0.0	7.3
Lane LOS	A	A		A
Approach Delay (s)	9.0	8.5	0.0	7.3
Approach LOS	A	A		

Intersection Summary				
Average Delay		7.6		
Intersection Capacity Utilization		22.6%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1310	0	5	775	0	10	0	30	0	0	0
Future Volume (Veh/h)	0	1310	0	5	775	0	10	0	30	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.86	0.86	0.86	0.92	0.86	0.92	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	1523	0	6	901	0	12	0	35	0	0	0
Pedestrians		4			4			11				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.94			0.83			0.85	0.85	0.83	0.85	0.85	0.94
vC, conflicting volume	901			1534			2000	2447	776	1714	2447	454
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	778			1228			1540	2063	312	1205	2063	306
tC, single (s)	4.1			4.1			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			80	100	94	100	100	100
cM capacity (veh/h)	788			471			61	45	563	110	45	650

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	762	762	306	601	47	0
Volume Left	0	0	6	0	12	0
Volume Right	0	0	0	0	35	0
cSH	1700	1700	471	1700	183	1700
Volume to Capacity	0.45	0.45	0.01	0.35	0.26	0.00
Queue Length 95th (m)	0.0	0.0	0.3	0.0	7.5	0.0
Control Delay (s)	0.0	0.0	0.4	0.0	31.4	0.0
Lane LOS			A		D	A
Approach Delay (s)	0.0		0.1		31.4	0.0
Approach LOS					D	A

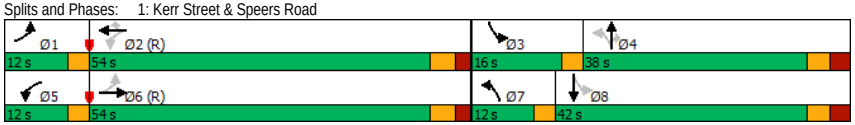
Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	60	525	285	750	490	140	140	220	270	235
Future Volume (vph)	60	525	285	750	490	140	140	220	270	235
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	1	6	5	2		7	4		3	8
Permitted Phases	6		2		2	4		4	8	
Detector Phase	1	6	5	2	2	7	4	4	3	8
Switch Phase										
Minimum Initial (s)	7.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0
Minimum Split (s)	10.0	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3
Total Split (s)	12.0	54.0	12.0	54.0	54.0	12.0	38.0	38.0	16.0	42.0
Total Split (%)	10.0%	45.0%	10.0%	45.0%	45.0%	10.0%	31.7%	31.7%	13.3%	35.0%
Maximum Green (s)	9.0	48.1	9.0	48.1	48.1	9.0	31.7	31.7	13.0	35.7
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3
All-Red Time (s)	0.0	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0		7.0
Flash Dont Walk (s)		14.0		14.0	14.0		14.0	14.0		14.0
Pedestrian Calls (#/hr)		15		15	15		35	35		35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	63	679	300	789	516	147	147	232	284	310
v/c Ratio	0.16	0.46	0.66	0.45	0.52	0.51	0.45	0.52	0.64	0.76
Control Delay	13.5	25.6	22.6	22.4	3.9	32.9	47.1	9.1	35.9	54.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	25.6	22.6	22.4	3.9	32.9	47.1	9.1	35.9	54.0
Queue Length 50th (m)	6.4	62.0	35.3	66.5	0.0	23.0	31.3	0.0	48.4	65.2
Queue Length 95th (m)	13.6	76.4	#59.6	90.5	20.4	36.2	46.5	19.2	68.8	90.5
Internal Link Dist (m)		211.8		123.2			103.4			143.2
Turn Bay Length (m)	105.0		75.0		100.0	50.0		45.0		
Base Capacity (vph)	407	1526	453	1758	997	288	501	563	443	547
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.44	0.66	0.45	0.52	0.51	0.29	0.41	0.64	0.57

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	525	120	285	750	490	140	140	220	270	235	60
Future Volume (vph)	60	525	120	285	750	490	140	140	220	270	235	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9		3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.94	1.00	1.00	0.93	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1797	3431		1751	3539	1485	1768	1900	1486	1750	1816	
Flt Permitted	0.32	1.00		0.29	1.00	1.00	0.36	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	603	3431		539	3539	1485	674	1900	1486	940	1816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	553	126	300	789	516	147	147	232	284	247	63
RTOR Reduction (vph)	0	15	0	0	0	262	0	0	192	0	9	0
Lane Group Flow (vph)	63	664	0	300	789	254	147	147	40	284	301	0
Confl. Peds. (#/hr)	30		5	5		30	35		35	35		35
Heavy Vehicles (%)	0%	2%	0%	3%	2%	2%	1%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		
Actuated Green, G (s)	57.7	51.6		68.1	59.0	59.0	31.2	20.9	20.9	39.7	26.4	
Effective Green, g (s)	57.7	51.6		68.1	59.0	59.0	31.2	20.9	20.9	39.7	26.4	
Actuated g/C Ratio	0.48	0.43		0.57	0.49	0.49	0.26	0.17	0.17	0.33	0.22	
Clearance Time (s)	3.0	5.9		3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	
Vehicle Extension (s)	2.5	5.5		2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	
Lane Grp Cap (vph)	350	1475		442	1740	730	269	330	258	417	399	
v/s Ratio Prot	0.01	0.19		c0.08	0.22		0.05	0.08		c0.09	c0.17	
v/s Ratio Perm	0.08			c0.31		0.17	0.10		0.03	0.14		
v/c Ratio	0.18	0.45		0.68	0.45	0.35	0.55	0.45	0.16	0.68	0.76	
Uniform Delay, d1	16.9	24.2		14.9	20.0	18.7	36.1	44.4	42.1	32.2	43.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.0		3.7	0.9	1.3	1.8	1.3	0.4	4.2	8.4	
Delay (s)	17.1	25.2		18.7	20.8	20.0	37.9	45.7	42.5	36.4	52.2	
Level of Service	B	C		B	C	C	D	D	D	D	D	
Approach Delay (s)		24.5			20.2			42.1			44.6	
Approach LOS		C			C			D			D	

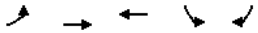
Intersection Summary				
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	83.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	225	775	1140	10	385
Future Volume (vph)	225	775	1140	10	385
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	17.0	102.0	85.0	38.0	38.0
Total Split (%)	12.1%	72.9%	60.7%	27.1%	27.1%
Maximum Green (s)	11.0	95.4	78.4	32.2	32.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

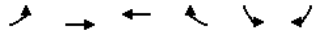
Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 13 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	234	807	1204	10	401
v/c Ratio	0.60	0.27	0.48	0.07	0.75
Control Delay	9.4	3.1	11.2	58.1	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	3.1	11.2	58.1	21.3
Queue Length 50th (m)	9.1	18.9	66.3	2.7	10.3
Queue Length 95th (m)	19.3	32.9	113.7	8.1	27.7
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	398	2984	2488	415	885
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.27	0.48	0.02	0.45

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	225	775	1140	15	10	385
Future Volume (vph)	225	775	1140	15	10	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1703	3610	3566		1805	2733
Flt Permitted	0.18	1.00	1.00		0.95	1.00
Satd. Flow (perm)	328	3610	3566		1805	2733
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	234	807	1188	16	10	401
RTOR Reduction (vph)	0	0	1	0	0	305
Lane Group Flow (vph)	234	807	1203	0	10	96
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	6%	0%	1%	0%	0%	4%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	115.7	115.7	97.6		11.9	11.9
Effective Green, g (s)	115.7	115.7	97.6		11.9	11.9
Actuated g/C Ratio	0.83	0.83	0.70		0.09	0.09
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	389	2983	2486		153	232
v/s Ratio Prot	c0.05	0.22	0.34		0.01	
v/s Ratio Perm	c0.44					c0.04
v/c Ratio	0.60	0.27	0.48		0.07	0.42
Uniform Delay, d1	6.5	2.7	9.7		58.9	60.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.8	0.2	0.7		0.2	1.2
Delay (s)	9.3	2.9	10.4		59.1	62.0
Level of Service	A	A	B		E	E
Approach Delay (s)		4.4	10.4		61.9	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	675	25	0	925	25	5	0	25	5	0	0
Future Volume (Veh/h)	10	675	25	0	925	25	5	0	25	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	703	26	0	964	26	5	0	26	5	0	0
Pedestrians		1			1			5			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	998			734			1224	1739	370	1384	1739	504
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	662			734			926	1527	370	1112	1527	85
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	96	96	100	100
cM capacity (veh/h)	796			876			190	99	629	133	99	819

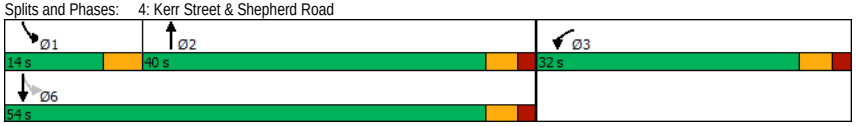
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	10	469	260	643	347	31	5
Volume Left	10	0	0	0	0	5	5
Volume Right	0	0	26	0	26	26	0
cSH	796	1700	1700	1700	1700	458	133
Volume to Capacity	0.01	0.28	0.15	0.38	0.20	0.07	0.04
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	1.6	0.9
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	13.4	33.2
Lane LOS	A					B	D
Approach Delay (s)	0.1			0.0		13.4	33.2
Approach LOS						B	D

Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	Err%	ICU Level of Service		H	
Analysis Period (min)	15				

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	90	575	155	475
Future Volume (vph)	90	575	155	475
Turn Type	Prot	NA	pm+pt	NA
Protected Phases	3	2	1	6
Permitted Phases			6	
Detector Phase	3	2	1	6
Switch Phase				
Minimum Initial (s)	10.0	18.0	7.0	18.0
Minimum Split (s)	31.4	28.2	11.0	28.2
Total Split (s)	32.0	40.0	14.0	54.0
Total Split (%)	37.2%	46.5%	16.3%	62.8%
Maximum Green (s)	26.6	34.8	10.0	48.8
Yellow Time (s)	3.3	3.3	4.0	3.3
All-Red Time (s)	2.1	1.9	0.0	1.9
Lost Time Adjust (s)	0.0	0.0		0.0
Total Lost Time (s)	5.4	5.2		5.2
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	
Vehicle Extension (s)	3.0	3.5	2.5	3.5
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	Min
Walk Time (s)	10.0	10.0		10.0
Flash Dont Walk (s)	16.0	13.0		13.0
Pedestrian Calls (#/hr)	0	5		5

Intersection Summary
Cycle Length: 86
Actuated Cycle Length: 43.5
Natural Cycle: 75
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	237	712	650
v/c Ratio	0.47	0.42	0.56
Control Delay	12.7	7.6	10.1
Queue Delay	0.0	0.0	0.0
Total Delay	12.7	7.6	10.1
Queue Length 50th (m)	7.6	13.6	14.6
Queue Length 95th (m)	27.7	28.5	32.1
Internal Link Dist (m)	241.3	143.2	2.5
Turn Bay Length (m)			
Base Capacity (vph)	1076	2841	2296
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.25	0.28

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	90	140	575	115	155	475
Future Volume (vph)	90	140	575	115	155	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.4		5.2			5.2
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.99		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		0.97			1.00
Flt Protected	0.98		1.00			0.99
Satd. Flow (prot)	1665		3465			3538
Flt Permitted	0.98		1.00			0.66
Satd. Flow (perm)	1665		3465			2364
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	144	593	119	160	490
RTOR Reduction (vph)	69	0	17	0	0	0
Lane Group Flow (vph)	168	0	695	0	0	650
Confl. Peds. (#/hr)	13	6		4	4	
Heavy Vehicles (%)	3%	1%	1%	2%	0%	1%
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	11.4		21.2			21.2
Effective Green, g (s)	11.4		21.2			21.2
Actuated g/C Ratio	0.26		0.49			0.49
Clearance Time (s)	5.4		5.2			5.2
Vehicle Extension (s)	3.0		3.5			3.5
Lane Grp Cap (vph)	439		1700			1160
v/s Ratio Prot	c0.10		0.20			
v/s Ratio Perm						c0.27
v/c Ratio	0.38		0.41			0.56
Uniform Delay, d1	13.0		7.0			7.7
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.6		0.2			0.7
Delay (s)	13.6		7.2			8.4
Level of Service	B		A			A
Approach Delay (s)	13.6		7.2			8.4
Approach LOS	B		A			A

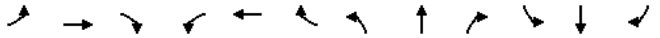
Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	43.2	Sum of lost time (s)	14.6
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	120	100	615	510	110
Future Volume (Veh/h)	25	120	100	615	510	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	27	128	106	654	543	117
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1472	606	665			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1472	606	665			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	78	74	88			
cM capacity (veh/h)	124	491	901			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	155	106	654	660
Volume Left	27	106	0	0
Volume Right	128	0	0	117
cSH	324	901	1700	1700
Volume to Capacity	0.48	0.12	0.38	0.39
Queue Length 95th (m)	18.7	3.0	0.0	0.0
Control Delay (s)	25.9	9.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	25.9	1.3		0.0
Approach LOS	D			

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	57.9%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	10	10	0	30	5	460	10	20	595	25
Future Volume (Veh/h)	10	0	10	10	0	30	5	460	10	20	595	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	11	11	0	32	5	484	11	21	626	26
Pedestrians		21			31			1			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.77	0.77	0.76	0.77	0.77	0.96	0.76			0.96		
vC, conflicting volume	1238	1238	661	1224	1246	524	673			526		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1054	1055	391	1036	1065	487	407			489		
tC, single (s)	7.1	7.0	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	92	100	98	93	100	94	99			98		
cM capacity (veh/h)	138	134	491	147	161	545	787			991		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	43	500	673
Volume Left	11	11	5	21
Volume Right	11	32	11	26
cSH	216	322	787	991
Volume to Capacity	0.10	0.13	0.01	0.02
Queue Length 95th (m)	2.6	3.5	0.1	0.5
Control Delay (s)	23.6	17.9	0.2	0.6
Lane LOS	C	C	A	A
Approach Delay (s)	23.6	17.9	0.2	0.6
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	56.6%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	10	5	460	575	40
Future Volume (Veh/h)	15	10	5	460	575	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	11	5	484	605	42
Pedestrians	34			2	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.85	0.81	0.81			
vC, conflicting volume	1155	662	681			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	889	464	488			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	94	98	99			
cM capacity (veh/h)	258	455	775			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	489	647
Volume Left	16	5	0
Volume Right	11	0	42
cSH	313	775	1700
Volume to Capacity	0.09	0.01	0.38
Queue Length 95th (m)	2.1	0.1	0.0
Control Delay (s)	17.6	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	17.6	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		43.5%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	10	10	15	10	340	55	480
Future Volume (vph)	50	10	10	15	10	340	55	480
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

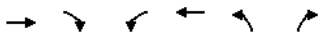
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	81	109	397	636
v/c Ratio	0.29	0.29	0.31	0.52
Control Delay	21.5	9.9	7.5	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	7.5	10.3
Queue Length 50th (m)	8.5	3.4	15.8	31.1
Queue Length 95th (m)	16.4	13.0	47.3	93.8
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	447	556	1293	1213
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	0.18	0.20	0.31	0.52

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	15	10	15	75	10	340	15	55	480	50
Future Volume (vph)	50	10	15	10	15	75	10	340	15	55	480	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			0.99	
Flpb, ped/bikes		0.98			1.00			1.00			1.00	
Frt		0.97			0.90			0.99			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1675			1575			1852			1822	
Flt Permitted		0.77			0.97			0.98			0.93	
Satd. Flow (perm)		1334			1530			1823			1707	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	16	11	16	82	11	370	16	60	522	54
RTOR Reduction (vph)	0	13	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	68	0	0	41	0	0	396	0	0	633	0
Confl. Peds. (#/hr)	20		15	15		20	35		25	25		35
Heavy Vehicles (%)	2%	20%	0%	0%	13%	2%	0%	1%	17%	1%	2%	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)		13.2			13.2			51.0			51.0	
Effective Green, g (s)		13.2			13.2			51.0			51.0	
Actuated g/C Ratio		0.18			0.18			0.68			0.68	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		234			269			1239			1160	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.03			0.22			c0.37	
v/c Ratio		0.29			0.15			0.32			0.55	
Uniform Delay, d1		26.8			26.2			4.9			6.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			0.4			0.7			0.5	
Delay (s)		27.8			26.5			5.6			6.6	
Level of Service		C			C			A			A	
Approach Delay (s)		27.8			26.5			5.6			6.6	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8		
Intersection Capacity Utilization	78.4%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	980	35	5	1525	0	5
Future Volume (Veh/h)	980	35	5	1525	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1000	36	5	1556	0	5
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.88		0.90	0.88
vC, conflicting volume			1036		1807	519
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			771		1088	184
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			751		191	733

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	667	369	524	1037	5
Volume Left	0	0	5	0	0
Volume Right	0	36	0	0	5
cSH	1700	1700	751	1700	733
Volume to Capacity	0.39	0.22	0.01	0.61	0.01
Queue Length 95th (m)	0.0	0.0	0.2	0.0	0.2
Control Delay (s)	0.0	0.0	0.2	0.0	9.9
Lane LOS			A		A
Approach Delay (s)	0.0		0.1		9.9
Approach LOS					A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	55.6%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	0	0	35	5
Future Volume (Veh/h)	0	5	0	0	35	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	6	0	0	44	6
Pedestrians			2			8
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	96	8			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	96	8			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			97	
cM capacity (veh/h)	882	1072			1636	

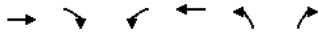
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	6	0	50
Volume Left	0	0	44
Volume Right	6	0	0
cSH	1072	1700	1636
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.1	0.0	0.6
Control Delay (s)	8.4	0.0	6.4
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	6.4
Approach LOS	A		

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	15.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	5	0	5
Future Volume (Veh/h)	25	10	5	5	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	32	13	6	6	0	6
Pedestrians	13			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			45		70	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			45		70	40
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1576		925	1035

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	45	12	6
Volume Left	0	6	0
Volume Right	13	0	6
cSH	1700	1576	1035
Volume to Capacity	0.03	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.1
Control Delay (s)	0.0	3.7	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	8.5
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



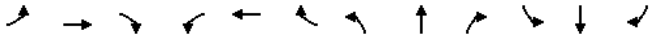
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	5	10	0	0
Future Volume (Veh/h)	25	5	5	10	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	32	6	6	13	0	0
Pedestrians	10			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		70	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		70	38
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1585		927	1037

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	19	0
Volume Left	0	6	0
Volume Right	6	0	0
cSH	1700	1585	1700
Volume to Capacity	0.02	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0
Control Delay (s)	0.0	2.3	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	2.3	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	8.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: PUDO Exit/Speers Internal Road 2 & Speers Internal Road/30 Speers

Existing PM
50 Speers Road (8013-02)



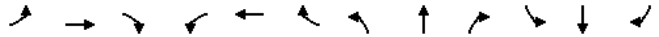
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	20	0	0	0	10	0	5	0	0	0	15
Future Volume (Veh/h)	5	20	0	0	0	10	0	5	0	0	0	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	8	32	0	0	0	16	0	8	0	0	0	24
Pedestrians		3			7			8			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	42	30	23	51	42	18	27			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	42	30	23	51	42	18	27			15		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	100	100	100	98	100			100		
cM capacity (veh/h)	893	859	1049	907	846	1057	1596			1606		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	16	8	24
Volume Left	8	0	0	0
Volume Right	0	16	0	24
cSH	866	1057	1596	1606
Volume to Capacity	0.05	0.02	0.00	0.00
Queue Length 95th (m)	1.1	0.4	0.0	0.0
Control Delay (s)	9.4	8.5	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.4	8.5	0.0	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay			5.8	
Intersection Capacity Utilization			19.3%	ICU Level of Service
Analysis Period (min)			15	A

HCM Unsignalized Intersection Capacity Analysis
14: Speers Internal Road 2/41 Speers Driveways & Speers Road

Existing PM
50 Speers Road (8013-02)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	985	5	10	1515	0	10	0	10	5	0	5
Future Volume (Veh/h)	0	985	5	10	1515	0	10	0	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Hourly flow rate (vph)	0	1037	5	11	1595	0	11	0	11	5	0	5
Pedestrians		4			4			8				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.84			0.90			0.89	0.89	0.90	0.89	0.89	0.84
vC, conflicting volume	1595			1050			1876	2664	533	2150	2667	802
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1327			838			1239	2126	265	1548	2129	381
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			90	100	98	92	100	99
cM capacity (veh/h)	434			721			115	43	660	66	43	516

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	691	351	543	1063	22	10
Volume Left	0	0	11	0	11	5
Volume Right	0	5	0	0	11	5
cSH	1700	1700	721	1700	195	118
Volume to Capacity	0.41	0.21	0.02	0.63	0.11	0.09
Queue Length 95th (m)	0.0	0.0	0.4	0.0	2.8	2.1
Control Delay (s)	0.0	0.0	0.4	0.0	25.8	38.4
Lane LOS			A		D	E
Approach Delay (s)	0.0		0.1		25.8	38.4
Approach LOS					D	E

Intersection Summary				
Average Delay			0.4	
Intersection Capacity Utilization			Err%	ICU Level of Service
Analysis Period (min)			15	H

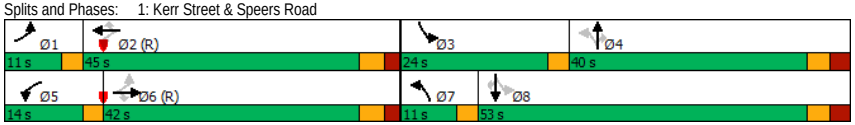
Future Background Traffic Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	645	90	185	490	185	100	115	370	360	145	75
Future Volume (vph)	40	645	90	185	490	185	100	115	370	360	145	75
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	11.0	42.0	42.0	14.0	45.0	45.0	11.0	40.0	40.0	24.0	53.0	53.0
Total Split (%)	9.2%	35.0%	35.0%	11.7%	37.5%	37.5%	9.2%	33.3%	33.3%	20.0%	44.2%	44.2%
Maximum Green (s)	8.0	36.1	36.1	11.0	39.1	39.1	8.0	33.7	33.7	21.0	46.7	46.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	750	105	215	570	215	116	134	430	419	169	87
v/c Ratio	0.10	0.55	0.16	0.58	0.36	0.27	0.29	0.33	0.88	0.46	0.34	0.18
Control Delay	16.9	32.1	5.6	24.0	24.6	4.6	23.6	39.5	39.8	25.6	34.6	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	32.1	5.6	24.0	24.6	4.6	23.6	39.5	39.8	25.6	34.6	6.0
Queue Length 50th (m)	4.9	73.3	0.0	25.2	46.5	0.0	17.3	26.5	48.4	34.2	32.2	0.0
Queue Length 95th (m)	12.8	99.1	9.8	46.6	69.8	13.9	23.0	37.0	72.5	35.4	40.3	8.9
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	468	1369	644	374	1592	808	397	541	574	989	718	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.55	0.16	0.57	0.36	0.27	0.29	0.25	0.75	0.42	0.24	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	645	90	185	490	185	100	115	370	360	145	75
Future Volume (vph)	40	645	90	185	490	185	100	115	370	360	145	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.93	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1797	3406	1437	1685	3438	1495	1674	1881	1429	3198	1845	1511
Flt Permitted	0.43	1.00	1.00	0.24	1.00	1.00	0.65	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	821	3406	1437	431	3438	1495	1146	1881	1429	1924	1845	1511
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	47	750	105	215	570	215	116	134	430	419	169	87
RTOR Reduction (vph)	0	0	63	0	0	117	0	0	181	0	0	63
Lane Group Flow (vph)	47	750	42	215	570	98	116	134	249	419	169	24
Confl. Peds. (#/hr)	15		10	10		15	20		35	35		20
Heavy Vehicles (%)	0%	6%	7%	7%	5%	4%	6%	1%	5%	5%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	54.1	48.2	48.2	63.8	54.9	54.9	34.3	25.8	25.8	44.0	32.5	32.5
Effective Green, g (s)	54.1	48.2	48.2	63.8	54.9	54.9	34.3	25.8	25.8	44.0	32.5	32.5
Actuated g/C Ratio	0.45	0.40	0.40	0.53	0.46	0.46	0.29	0.22	0.22	0.37	0.27	0.27
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	418	1368	577	360	1572	683	364	404	307	866	499	409
v/s Ratio Prot	0.01	0.22		c0.06	0.17		0.02	0.07		c0.06	0.09	
v/s Ratio Perm	0.05		0.03	c0.25		0.07	0.07		c0.17	0.12		0.02
v/c Ratio	0.11	0.55	0.07	0.60	0.36	0.14	0.32	0.33	0.81	0.48	0.34	0.06
Uniform Delay, d1	18.6	27.5	22.1	16.9	21.2	18.9	32.9	39.8	44.8	27.8	35.1	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.6	0.2	2.2	0.6	0.4	0.4	0.7	15.7	0.3	0.6	0.1
Delay (s)	18.7	29.1	22.4	19.2	21.8	19.3	33.3	40.5	60.5	28.1	35.7	32.5
Level of Service	B	C	C	B	C	B	C	D	E	C	D	C
Approach Delay (s)		27.8			20.7			51.9			30.6	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	72.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	200	1205	605	5	245
Future Volume (vph)	200	1205	605	5	245
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	35.0	109.0	74.0	31.0	31.0
Total Split (%)	25.0%	77.9%	52.9%	22.1%	22.1%
Maximum Green (s)	29.0	102.4	67.4	25.2	25.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 99 (71%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	235	1418	736	6	288
v/c Ratio	0.41	0.49	0.29	0.05	0.63
Control Delay	4.2	3.8	7.2	60.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	3.8	7.2	60.6	12.9
Queue Length 50th (m)	9.2	43.7	33.0	1.6	0.0
Queue Length 95th (m)	14.3	52.2	43.0	5.7	11.7
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	729	2905	2503	324	705
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	0.32	0.49	0.29	0.02	0.41

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	200	1205	605	20	5	245
Future Volume (vph)	200	1205	605	20	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1686	3471	3450		1805	2608
Flt Permitted	0.34	1.00	1.00		0.95	1.00
Satd. Flow (perm)	599	3471	3450		1805	2608
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	235	1418	712	24	6	288
RTOR Reduction (vph)	0	0	1	0	0	267
Lane Group Flow (vph)	235	1418	735	0	6	21
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	7%	4%	4%	5%	0%	9%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	117.2	117.2	101.6		10.4	10.4
Effective Green, g (s)	117.2	117.2	101.6		10.4	10.4
Actuated g/C Ratio	0.84	0.84	0.73		0.07	0.07
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	575	2905	2503		134	193
v/s Ratio Prot	0.03	c0.41	0.21		0.00	
v/s Ratio Perm	0.31					c0.01
v/c Ratio	0.41	0.49	0.29		0.04	0.11
Uniform Delay, d1	2.7	3.1	6.7		60.2	60.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.6	0.3		0.1	0.3
Delay (s)	3.3	3.7	7.0		60.3	60.7
Level of Service	A	A	A		E	E
Approach Delay (s)		3.7	7.0		60.7	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	725	15	0	645	20	5	0	50	0	0	0
Future Volume (Veh/h)	5	725	15	0	645	20	5	0	50	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	824	17	0	733	23	6	0	57	0	0	0
Pedestrians								5			2	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	758			846			1216	1608	426	1228	1604	380
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			846			1023	1457	426	1035	1453	96
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	90	100	100	100
cM capacity (veh/h)	955			796			171	117	566	151	117	854

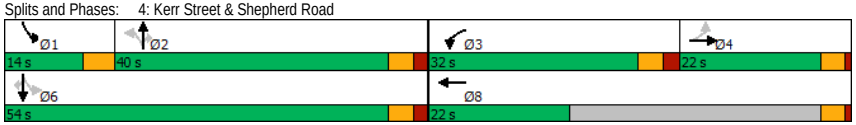
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	6	549	292	489	267	63	0
Volume Left	6	0	0	0	0	6	0
Volume Right	0	0	17	0	23	57	0
cSH	955	1700	1700	1700	1700	465	1700
Volume to Capacity	0.01	0.32	0.17	0.29	0.16	0.14	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	3.5	0.0
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	14.0	0.0
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		14.0	0.0
Approach LOS						B	A

Intersection Summary					
Average Delay			0.6		
Intersection Capacity Utilization			Err%	ICU Level of Service	H
Analysis Period (min)			15		

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	90	0	270	70	105	490	
Future Volume (vph)	90	0	270	70	105	490	
Turn Type	Prot	NA	NA	Perm	pm+pt	NA	
Protected Phases	3	8	2		1	6	4
Permitted Phases				2	6		
Detector Phase	3	8	2	2	1	6	
Switch Phase							
Minimum Initial (s)	10.0	5.0	18.0	18.0	7.0	18.0	5.0
Minimum Split (s)	31.4	22.0	28.2	28.2	11.0	28.2	22.0
Total Split (s)	32.0	22.0	40.0	40.0	14.0	54.0	22.0
Total Split (%)	29.6%	20.4%	37.0%	37.0%	13.0%	50.0%	20%
Maximum Green (s)	26.6	18.0	34.8	34.8	10.0	48.8	18.0
Yellow Time (s)	3.3	3.0	3.3	3.3	4.0	3.3	3.0
All-Red Time (s)	2.1	1.0	1.9	1.9	0.0	1.9	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.4	4.0	5.2	5.2	4.0	5.2	
Lead/Lag	Lead		Lag	Lag	Lead		Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.5	3.5	2.5	3.5	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	Min	Min	None	Min	None
Walk Time (s)	10.0	7.0	10.0	10.0		10.0	7.0
Flash Dont Walk (s)	16.0	11.0	13.0	13.0		13.0	11.0
Pedestrian Calls (#/hr)	0	0	5	5		5	0

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 47.6
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



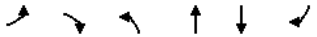
Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	99	214	297	77	115	538
v/c Ratio	0.27	0.30	0.21	0.11	0.17	0.26
Control Delay	20.2	1.0	11.0	2.3	4.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	1.0	11.0	2.3	4.7	5.3
Queue Length 50th (m)	7.5	0.0	9.2	0.0	3.5	10.3
Queue Length 95th (m)	19.6	0.0	16.7	4.2	8.1	17.0
Internal Link Dist (m)		241.3	143.2			36.7
Turn Bay Length (m)				50.0	50.0	
Base Capacity (vph)	966	1558	2632	1131	734	3373
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	0.10	0.14	0.11	0.07	0.16	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	195	0	270	70	105	490	0
Future Volume (vph)	0	0	0	90	0	195	0	270	70	105	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Lane Util. Factor				1.00	1.00			0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	0.98			1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1671	1590			3539	1497	1784	3505	
Flt Permitted				0.95	1.00			1.00	1.00	0.47	1.00	
Satd. Flow (perm)				1671	1590			3539	1497	889	3505	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	99	0	214	0	297	77	115	538	0
RTOR Reduction (vph)	0	0	0	0	155	0	0	0	49	0	0	0
Lane Group Flow (vph)	0	0	0	99	59	0	0	297	28	115	538	0
Confl. Peds. (#/hr)	4		7	7		4			6	6		
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	2%	5%	1%	3%	0%
Turn Type	Perm			Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)				7.6	14.6			19.5	19.5	28.9	28.9	
Effective Green, g (s)				7.6	14.6			19.5	19.5	28.9	28.9	
Actuated g/C Ratio				0.14	0.28			0.37	0.37	0.55	0.55	
Clearance Time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Vehicle Extension (s)				3.0	3.0			3.5	3.5	2.5	3.5	
Lane Grp Cap (vph)				240	440			1309	553	579	1922	
v/s Ratio Prot				c0.06	c0.04			0.08		0.02	c0.15	
v/s Ratio Perm									0.02	0.09		
v/c Ratio				0.41	0.13			0.23	0.05	0.20	0.28	
Uniform Delay, d1				20.5	14.3			11.4	10.7	5.9	6.3	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				1.2	0.1			0.1	0.0	0.1	0.1	
Delay (s)				21.7	14.4			11.5	10.7	6.0	6.4	
Level of Service				C	B			B	B	A	A	
Approach Delay (s)		0.0			16.7			11.4			6.4	
Approach LOS		A			B			B			A	

Intersection Summary					
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	52.7	Sum of lost time (s)		18.6	
Intersection Capacity Utilization	54.8%	ICU Level of Service		A	
Analysis Period (min)	15				

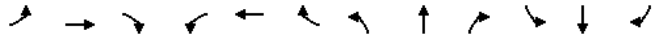
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	90	215	250	505	125
Future Volume (Veh/h)	5	90	215	250	505	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	96	229	266	537	133
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	1194	335	670			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1194	335	670			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	85	75			
cM capacity (veh/h)	137	658	916			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	5	96	229	133	133	358	312
Volume Left	5	0	229	0	0	0	0
Volume Right	0	96	0	0	0	0	133
cSH	137	658	916	1700	1700	1700	1700
Volume to Capacity	0.04	0.15	0.25	0.08	0.08	0.21	0.18
Queue Length 95th (m)	0.9	3.9	7.5	0.0	0.0	0.0	0.0
Control Delay (s)	32.4	11.4	10.2	0.0	0.0	0.0	0.0
Lane LOS	D	B	B				
Approach Delay (s)	12.4		4.7			0.0	
Approach LOS	B						

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	43.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	5	0	75	5	505	5	40	375	5
Future Volume (Veh/h)	5	0	5	5	0	75	5	505	5	40	375	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	6	0	6	6	0	89	6	601	6	48	446	6
Pedestrians		15			30			1			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.91	0.91	0.86	0.91	0.91	0.90	0.86			0.90		
vC, conflicting volume	1266	1209	465	1198	1209	635	467			637		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	994	931	296	919	931	538	298			540		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.3	4.3			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.0	3.4	2.3			2.3		
p0 queue free %	96	100	99	97	100	81	99			95		
cM capacity (veh/h)	151	221	573	205	221	461	1007			878		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	95	613	500
Volume Left	6	6	6	48
Volume Right	6	89	6	6
cSH	239	428	1007	878
Volume to Capacity	0.05	0.22	0.01	0.05
Queue Length 95th (m)	1.2	6.4	0.1	1.3
Control Delay (s)	20.8	15.8	0.2	1.5
Lane LOS	C	C	A	A
Approach Delay (s)	20.8	15.8	0.2	1.5
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	58.4%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	10	5	485	340	45
Future Volume (Veh/h)	30	10	5	485	340	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	12	6	571	400	53
Pedestrians	18			4	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.91	0.92	0.92			
vC, conflicting volume	1028	448	471			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	363	387			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	98	99			
cM capacity (veh/h)	319	622	1075			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	577	453
Volume Left	35	6	0
Volume Right	12	0	53
cSH	364	1075	1700
Volume to Capacity	0.13	0.01	0.27
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	16.3	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.3	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay			0.8	
Intersection Capacity Utilization			40.8%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	25	20	35	5	385	40	280
Future Volume (vph)	35	25	20	35	5	385	40	280
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	79	152	500	427
v/c Ratio	0.27	0.40	0.43	0.41
Control Delay	23.8	14.2	9.1	8.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.8	14.2	9.1	8.9
Queue Length 50th (m)	9.6	8.7	21.7	17.8
Queue Length 95th (m)	15.4	16.7	55.5	47.3
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	463	563	1156	1052
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	0.27	0.43	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	5	20	35	70	5	385	20	40	280	30
Future Volume (vph)	35	25	5	20	35	70	5	385	20	40	280	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.92			0.99			0.99	
Flt Protected		0.97			0.99			1.00			0.99	
Satd. Flow (prot)		1714			1625			1773			1754	
Flt Permitted		0.79			0.94			1.00			0.91	
Satd. Flow (perm)		1400			1545			1767			1606	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	30	6	24	43	85	6	470	24	49	341	37
RTOR Reduction (vph)	0	5	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	74	0	0	84	0	0	499	0	0	424	0
Confl. Peds. (#/hr)	20		20	20		20	30		35	35		30
Heavy Vehicles (%)	2%	7%	16%	0%	5%	4%	28%	6%	0%	2%	6%	6%
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)		15.2			15.2			49.0			49.0	
Effective Green, g (s)		15.2			15.2			49.0			49.0	
Actuated g/C Ratio		0.20			0.20			0.65			0.65	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		283			313			1154			1049	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.05			c0.28			0.26	
v/c Ratio		0.26			0.27			0.43			0.40	
Uniform Delay, d1		25.2			25.2			6.3			6.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.6			1.2			0.3	
Delay (s)		25.9			25.8			7.5			6.4	
Level of Service		C			C			A			A	
Approach Delay (s)		25.9			25.8			7.5			6.4	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		13.8	
Intersection Capacity Utilization	65.6%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1365	10	0	855	5	5
Future Volume (Veh/h)	1365	10	0	855	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1625	12	0	1018	6	6
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.74		0.76	0.74
vC, conflicting volume			1637		2141	820
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1149		1559	39
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	99
cM capacity (veh/h)			453		80	758

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1083	554	509	509	12
Volume Left	0	0	0	0	6
Volume Right	0	12	0	0	6
cSH	1700	1700	1700	1700	145
Volume to Capacity	0.64	0.33	0.30	0.30	0.08
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.0
Control Delay (s)	0.0	0.0	0.0	0.0	32.1
Lane LOS					D
Approach Delay (s)	0.0		0.0		32.1
Approach LOS					D

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	48.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	5	0	5	5
Future Volume (Veh/h)	0	5	5	0	5	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	6	6	0	6	6
Pedestrians			2			13
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	19			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	19			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	989	1052			1628	

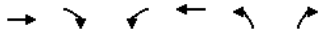
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	6	6	12
Volume Left	0	0	6
Volume Right	6	0	0
cSH	1052	1700	1628
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.1	0.0	0.1
Control Delay (s)	8.4	0.0	3.6
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	3.6
Approach LOS	A		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	18.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	5	0	0	5	0	5
Future Volume (Veh/h)	5	0	0	5	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	6	0	0	6	0	6
Pedestrians	16			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			6		28	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			6		28	8
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1628		978	1078

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	6	6	6
Volume Left	0	0	0
Volume Right	0	0	6
cSH	1700	1628	1078
Volume to Capacity	0.00	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	8.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.4
Approach LOS			A

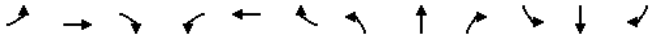
Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	0	0	0	5	5
Future Volume (Veh/h)	10	0	0	0	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	0	0	0	6	6
Pedestrians	11			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			11		22	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			11		22	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1621		990	1069

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	11	0	12
Volume Left	0	0	6
Volume Right	0	0	6
cSH	1700	1700	1028
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	8.5
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.5
Approach LOS			A

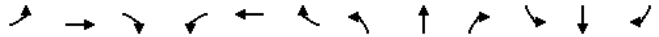
Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	0	0	0	25	0	5	0	5	0	0
Future Volume (Veh/h)	15	0	0	0	0	25	0	5	0	5	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	0	0	0	0	31	0	6	0	6	0	0
Pedestrians		3			9			17			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	56	30	20	44	30	19	3			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	56	30	20	44	30	19	3			15		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	97	100			100		
cM capacity (veh/h)	902	854	1044	930	854	1052	1628			1603		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	31	6	6
Volume Left	19	0	0	6
Volume Right	0	31	0	0
cSH	902	1052	1628	1603
Volume to Capacity	0.02	0.03	0.00	0.00
Queue Length 95th (m)	0.5	0.7	0.0	0.1
Control Delay (s)	9.1	8.5	0.0	7.3
Lane LOS	A	A		A
Approach Delay (s)	9.1	8.5	0.0	7.3
Approach LOS	A	A		

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	22.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1370	0	5	845	0	10	0	35	0	0	0
Future Volume (Veh/h)	0	1370	0	5	845	0	10	0	35	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.86	0.86	0.86	0.92	0.86	0.92	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	1593	0	6	983	0	12	0	41	0	0	0
Pedestrians		4			4			11				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.94			0.75			0.79	0.79	0.75	0.79	0.79	0.94
vC, conflicting volume	983			1604			2112	2599	812	1836	2599	496
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	844			1146			1499	2120	93	1149	2120	323
tC, single (s)	4.1			4.1			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			80	100	94	100	100	100
cM capacity (veh/h)	737			460			61	38	707	111	38	627

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	796	796	334	655	53	0
Volume Left	0	0	6	0	12	0
Volume Right	0	0	0	0	41	0
cSH	1700	1700	460	1700	207	1700
Volume to Capacity	0.47	0.47	0.01	0.39	0.26	0.00
Queue Length 95th (m)	0.0	0.0	0.3	0.0	7.5	0.0
Control Delay (s)	0.0	0.0	0.4	0.0	28.3	0.0
Lane LOS			A		D	A
Approach Delay (s)	0.0		0.1		28.3	0.0
Approach LOS					D	A

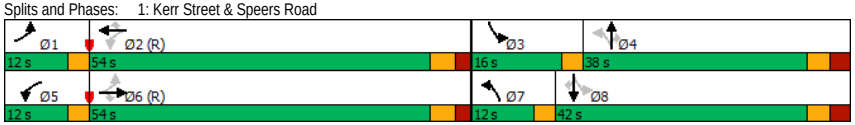
Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	575	130	295	815	510	140	155	235	290	250	65
Future Volume (vph)	70	575	130	295	815	510	140	155	235	290	250	65
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	12.0	54.0	54.0	12.0	54.0	54.0	12.0	38.0	38.0	16.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	45.0%	10.0%	31.7%	31.7%	13.3%	35.0%	35.0%
Maximum Green (s)	9.0	48.1	48.1	9.0	48.1	48.1	9.0	31.7	31.7	13.0	35.7	35.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	605	137	311	858	537	147	163	247	305	263	68
v/c Ratio	0.19	0.37	0.17	0.59	0.46	0.52	0.53	0.50	0.54	0.44	0.73	0.19
Control Delay	11.7	23.5	4.3	16.1	20.0	3.6	36.8	49.6	9.6	31.3	57.5	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	23.5	4.3	16.1	20.0	3.6	36.8	49.6	9.6	31.3	57.5	7.1
Queue Length 50th (m)	6.7	51.0	0.0	32.8	68.0	0.0	24.7	34.4	0.0	26.5	58.9	0.0
Queue Length 95th (m)	14.2	69.0	11.9	53.3	94.5	18.7	38.3	53.5	21.0	35.3	81.1	8.6
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	407	1615	786	528	1876	1039	278	501	574	728	565	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.37	0.17	0.59	0.46	0.52	0.53	0.33	0.43	0.42	0.47	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	575	130	295	815	510	140	155	235	290	250	65
Future Volume (vph)	70	575	130	295	815	510	140	155	235	290	250	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1798	3539	1560	1750	3539	1485	1768	1900	1486	3355	1900	1501
Flt Permitted	0.30	1.00	1.00	0.34	1.00	1.00	0.36	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	568	3539	1560	629	3539	1485	663	1900	1486	1741	1900	1501
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	605	137	311	858	537	147	163	247	305	263	68
RTOR Reduction (vph)	0	0	74	0	0	255	0	0	204	0	0	55
Lane Group Flow (vph)	74	605	63	311	858	282	147	163	43	305	263	13
Confl. Peds. (#/hr)	30		5	5		30	35		35	35		35
Heavy Vehicles (%)	0%	2%	0%	3%	2%	2%	1%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	61.0	54.8	54.8	72.2	63.0	63.0	30.6	20.7	20.7	34.6	22.7	22.7
Effective Green, g (s)	61.0	54.8	54.8	72.2	63.0	63.0	30.6	20.7	20.7	34.6	22.7	22.7
Actuated g/C Ratio	0.51	0.46	0.46	0.60	0.52	0.52	0.26	0.17	0.17	0.29	0.19	0.19
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	352	1616	712	512	1857	779	260	327	256	662	359	283
v/s Ratio Prot	0.01	0.17		c0.07	0.24		c0.05	0.09		c0.05	c0.14	
v/s Ratio Perm	0.10		0.04	c0.29		0.19	0.10		0.03	0.09		0.01
v/c Ratio	0.21	0.37	0.09	0.61	0.46	0.36	0.57	0.50	0.17	0.46	0.73	0.05
Uniform Delay, d1	15.2	21.4	18.5	12.4	17.9	16.7	36.7	45.0	42.3	33.6	45.8	39.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.7	0.2	1.7	0.8	1.3	2.3	1.6	0.4	0.4	8.0	0.1
Delay (s)	15.5	22.0	18.7	14.2	18.7	18.0	38.9	46.6	42.7	33.9	53.8	39.9
Level of Service	B	C	B	B	B	B	D	D	D	C	D	D
Approach Delay (s)		20.9			17.7			42.9			42.8	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	77.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	260	815	1205	10	420
Future Volume (vph)	260	815	1205	10	420
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	17.0	102.0	85.0	38.0	38.0
Total Split (%)	12.1%	72.9%	60.7%	27.1%	27.1%
Maximum Green (s)	11.0	95.4	78.4	32.2	32.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 13 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	271	849	1271	10	438
v/c Ratio	0.65	0.29	0.56	0.06	0.79
Control Delay	16.8	3.7	17.0	55.2	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	3.7	17.0	55.2	27.8
Queue Length 50th (m)	13.3	23.0	94.7	2.6	18.2
Queue Length 95th (m)	48.2	39.9	148.3	7.8	37.1
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	420	2939	2258	415	873
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	0.65	0.29	0.56	0.02	0.50

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	260	815	1205	15	10	420
Future Volume (vph)	260	815	1205	15	10	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1703	3610	3567		1805	2733
Flt Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	267	3610	3567		1805	2733
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	271	849	1255	16	10	438
RTOR Reduction (vph)	0	0	0	0	0	287
Lane Group Flow (vph)	271	849	1271	0	10	151
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	6%	0%	1%	0%	0%	4%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	114.0	114.0	88.3		13.6	13.6
Effective Green, g (s)	114.0	114.0	88.3		13.6	13.6
Actuated g/C Ratio	0.81	0.81	0.63		0.10	0.10
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	419	2939	2249		175	265
v/s Ratio Prot	c0.09	0.24	0.36		0.01	
v/s Ratio Perm	c0.43					c0.06
v/c Ratio	0.65	0.29	0.56		0.06	0.57
Uniform Delay, d1	13.6	3.2	14.8		57.4	60.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.6	0.2	1.0		0.1	2.8
Delay (s)	17.1	3.4	15.9		57.5	63.2
Level of Service	B	A	B		E	E
Approach Delay (s)		6.7	15.9		63.1	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	745	25	0	995	25	5	0	25	5	0	0
Future Volume (Veh/h)	10	745	25	0	995	25	5	0	25	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	776	26	0	1036	26	5	0	26	5	0	0
Pedestrians		1			1			5			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	1070			807			1333	1884	407	1492	1884	540
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	727			807			1036	1685	407	1224	1685	102
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	96	95	100	100
cM capacity (veh/h)	747			823			156	79	596	109	79	791

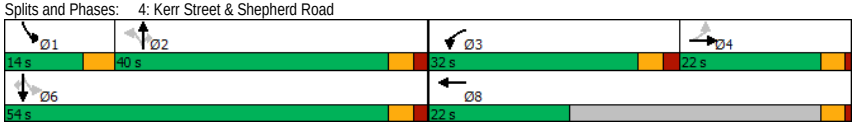
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	10	517	285	691	371	31	5
Volume Left	10	0	0	0	0	5	5
Volume Right	0	0	26	0	26	26	0
cSH	747	1700	1700	1700	1700	410	109
Volume to Capacity	0.01	0.30	0.17	0.41	0.22	0.08	0.05
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	1.9	1.1
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	14.5	39.8
Lane LOS	A					B	E
Approach Delay (s)	0.1			0.0		14.5	39.8
Approach LOS						B	E

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	Err%	ICU Level of Service		H
Analysis Period (min)	15			

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	100	0	595	140	190	505	
Future Volume (vph)	100	0	595	140	190	505	
Turn Type	Prot	NA	NA	Perm	pm+pt	NA	
Protected Phases	3	8	2		1	6	4
Permitted Phases				2	6		
Detector Phase	3	8	2	2	1	6	
Switch Phase							
Minimum Initial (s)	10.0	5.0	18.0	18.0	7.0	18.0	5.0
Minimum Split (s)	31.4	22.0	28.2	28.2	11.0	28.2	22.0
Total Split (s)	32.0	22.0	40.0	40.0	14.0	54.0	22.0
Total Split (%)	29.6%	20.4%	37.0%	37.0%	13.0%	50.0%	20%
Maximum Green (s)	26.6	18.0	34.8	34.8	10.0	48.8	18.0
Yellow Time (s)	3.3	3.0	3.3	3.3	4.0	3.3	3.0
All-Red Time (s)	2.1	1.0	1.9	1.9	0.0	1.9	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.4	4.0	5.2	5.2	4.0	5.2	
Lead/Lag	Lead		Lag	Lag	Lead		Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.5	3.5	2.5	3.5	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	Min	Min	None	Min	None
Walk Time (s)	10.0	7.0	10.0	10.0		10.0	7.0
Flash Dont Walk (s)	16.0	11.0	13.0	13.0		13.0	11.0
Pedestrian Calls (#/hr)	0	0	5	5		5	0

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 50.7
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	103	170	613	144	196	521
v/c Ratio	0.29	0.30	0.46	0.22	0.36	0.24
Control Delay	20.9	1.4	13.8	3.7	6.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	1.4	13.8	3.7	6.1	5.1
Queue Length 50th (m)	7.8	0.0	21.4	0.0	6.2	9.9
Queue Length 95th (m)	20.9	0.0	36.9	8.7	13.5	17.0
Internal Link Dist (m)		241.3	143.2			50.1
Turn Bay Length (m)				50.0	50.0	
Base Capacity (vph)	927	1519	2475	1109	606	3388
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	0.11	0.11	0.25	0.13	0.32	0.15

Intersection Summary

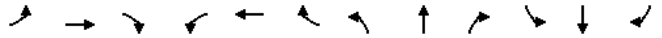
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	0	165	0	595	140	190	505	0
Future Volume (vph)	0	0	0	100	0	165	0	595	140	190	505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Lane Util. Factor				1.00	1.00			0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	0.98			1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1752	1571			3574	1544	1804	3574	
Flt Permitted				0.95	1.00			1.00	1.00	0.30	1.00	
Satd. Flow (perm)				1752	1571			3574	1544	568	3574	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	103	0	170	0	613	144	196	521	0
RTOR Reduction (vph)	0	0	0	0	124	0	0	0	94	0	0	0
Lane Group Flow (vph)	0	0	0	103	46	0	0	613	50	196	521	0
Confl. Peds. (#/hr)	6		13	13		6			4	4		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	3%	0%	1%	0%	1%	2%	0%	1%	0%
Turn Type	Perm			Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)				8.1	14.8			19.1	19.1	31.0	31.0	
Effective Green, g (s)				8.1	14.8			19.1	19.1	31.0	31.0	
Actuated g/C Ratio				0.15	0.27			0.35	0.35	0.56	0.56	
Clearance Time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Vehicle Extension (s)				3.0	3.0			3.5	3.5	2.5	3.5	
Lane Grp Cap (vph)				258	422			1241	536	497	2014	
v/s Ratio Prot				c0.06	c0.03			c0.17		c0.06	0.15	
v/s Ratio Perm									0.03	0.17		
v/c Ratio				0.40	0.11			0.49	0.09	0.39	0.26	
Uniform Delay, d1				21.2	15.1			14.1	12.1	6.4	6.1	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				1.0	0.1			0.4	0.1	0.4	0.1	
Delay (s)				22.3	15.2			14.5	12.2	6.8	6.2	
Level of Service				C	B			B	B	A	A	
Approach Delay (s)		0.0			17.9			14.1			6.4	
Approach LOS		A			B			B			A	

Intersection Summary					
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.45				
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	18.6		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A		
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	140	130	630	555	110
Future Volume (Veh/h)	25	140	130	630	555	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	27	149	138	670	590	117
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1264	358	712			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1264	358	712			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	80	76	84			
cM capacity (veh/h)	137	629	853			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	27	149	138	335	335	393	314
Volume Left	27	0	138	0	0	0	0
Volume Right	0	149	0	0	0	0	117
cSH	137	629	853	1700	1700	1700	1700
Volume to Capacity	0.20	0.24	0.16	0.20	0.20	0.23	0.18
Queue Length 95th (m)	5.3	7.0	4.4	0.0	0.0	0.0	0.0
Control Delay (s)	37.7	12.5	10.0	0.0	0.0	0.0	0.0
Lane LOS	E	B	B				
Approach Delay (s)	16.3		1.7			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	10	10	0	30	5	490	10	20	630	25
Future Volume (Veh/h)	10	0	10	10	0	30	5	490	10	20	630	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	11	11	0	32	5	516	11	21	663	26
Pedestrians		21			31			1			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.80	0.80	0.77	0.80	0.80	0.95	0.77			0.95		
vC, conflicting volume	1306	1307	698	1292	1314	556	710			558		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1105	1106	458	1088	1116	503	474			505		
tC, single (s)	7.1	7.0	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	92	100	98	92	100	94	99			98		
cM capacity (veh/h)	131	127	458	139	155	525	755			961		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	43	532	710
Volume Left	11	11	5	21
Volume Right	11	32	11	26
cSH	204	307	755	961
Volume to Capacity	0.11	0.14	0.01	0.02
Queue Length 95th (m)	2.7	3.7	0.2	0.5
Control Delay (s)	24.8	18.6	0.2	0.6
Lane LOS	C	C	A	A
Approach Delay (s)	24.8	18.6	0.2	0.6
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	10	5	490	610	40
Future Volume (Veh/h)	15	10	5	490	610	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	11	5	516	642	42
Pedestrians	34			2	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.85	0.80	0.80			
vC, conflicting volume	1224	699	718			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	939	500	524			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	93	97	99			
cM capacity (veh/h)	240	430	743			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	521	684
Volume Left	16	5	0
Volume Right	11	0	42
cSH	293	743	1700
Volume to Capacity	0.09	0.01	0.40
Queue Length 95th (m)	2.3	0.2	0.0
Control Delay (s)	18.5	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	18.5	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		45.4%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	10	10	15	10	370	55	515
Future Volume (vph)	50	10	10	15	10	370	55	515
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	81	109	429	674
v/c Ratio	0.29	0.29	0.33	0.56
Control Delay	21.5	9.9	7.7	10.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	7.7	10.9
Queue Length 50th (m)	8.5	3.4	17.4	34.1
Queue Length 95th (m)	16.4	13.0	52.1	103.6
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	447	556	1294	1213
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	0.18	0.20	0.33	0.56

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	15	10	15	75	10	370	15	55	515	50
Future Volume (vph)	50	10	15	10	15	75	10	370	15	55	515	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			0.99	
Flpb, ped/bikes		0.98			1.00			1.00			1.00	
Frt		0.97			0.90			0.99			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1675			1575			1854			1825	
Flt Permitted		0.77			0.97			0.98			0.93	
Satd. Flow (perm)		1334			1530			1825			1709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	16	11	16	82	11	402	16	60	560	54
RTOR Reduction (vph)	0	13	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	68	0	0	41	0	0	428	0	0	671	0
Confl. Peds. (#/hr)	20		15	15		20	35		25	25		35
Heavy Vehicles (%)	2%	20%	0%	0%	13%	2%	0%	1%	17%	1%	2%	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)		13.2			13.2			51.0			51.0	
Effective Green, g (s)		13.2			13.2			51.0			51.0	
Actuated g/C Ratio		0.18			0.18			0.68			0.68	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		234			269			1241			1162	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.03			0.23			c0.39	
v/c Ratio		0.29			0.15			0.34			0.58	
Uniform Delay, d1		26.8			26.2			5.0			6.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			0.4			0.8			0.7	
Delay (s)		27.8			26.5			5.8			7.0	
Level of Service		C			C			A			A	
Approach Delay (s)		27.8			26.5			5.8			7.0	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1055	45	5	1620	0	10
Future Volume (Veh/h)	1055	45	5	1620	0	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1077	46	5	1653	0	10
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.82		0.88	0.82
vC, conflicting volume			1123		1938	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			716		883	34
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			734		253	852

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	718	405	556	1102	10
Volume Left	0	0	5	0	0
Volume Right	0	46	0	0	10
cSH	1700	1700	734	1700	852
Volume to Capacity	0.42	0.24	0.01	0.65	0.01
Queue Length 95th (m)	0.0	0.0	0.2	0.0	0.3
Control Delay (s)	0.0	0.0	0.2	0.0	9.3
Lane LOS			A		A
Approach Delay (s)	0.0		0.1		9.3
Approach LOS					A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	58.3%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	5	5	0	35	15
Future Volume (Veh/h)	0	5	5	0	35	15
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	6	6	0	44	19
Pedestrians			2			8
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	115	14			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	115	14			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			97	
cM capacity (veh/h)	861	1064			1628	

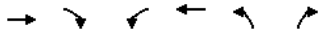
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	6	6	63
Volume Left	0	0	44
Volume Right	6	0	0
cSH	1064	1700	1628
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.1	0.0	0.6
Control Delay (s)	8.4	0.0	5.1
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	5.1
Approach LOS	A		

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	21.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	5	0	5
Future Volume (Veh/h)	25	10	5	5	0	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	32	13	6	6	0	6
Pedestrians	13			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			45		70	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			45		70	40
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1576		925	1035

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	45	12	6
Volume Left	0	6	0
Volume Right	13	0	6
cSH	1700	1576	1035
Volume to Capacity	0.03	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.1
Control Delay (s)	0.0	3.7	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	8.5
Approach LOS			A

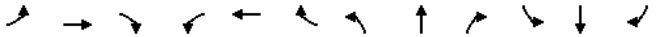
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	5	10	0	0
Future Volume (Veh/h)	25	5	5	10	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	32	6	6	13	0	0
Pedestrians	10			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		70	38
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		70	38
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1585		927	1037

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	19	0
Volume Left	0	6	0
Volume Right	6	0	0
cSH	1700	1585	1700
Volume to Capacity	0.02	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0
Control Delay (s)	0.0	2.3	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	2.3	0.0
Approach LOS			A

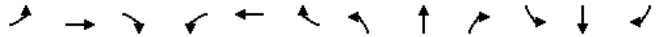
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	8.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	20	0	0	0	10	0	5	0	10	0	15
Future Volume (Veh/h)	5	20	0	0	0	10	0	5	0	10	0	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	8	32	0	0	0	16	0	8	0	16	0	24
Pedestrians		3			7			8			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	74	62	23	83	74	18	27			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74	62	23	83	74	18	27			15		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	100	100	100	98	100			99		
cM capacity (veh/h)	844	817	1049	857	805	1057	1596			1606		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	16	8	40
Volume Left	8	0	0	16
Volume Right	0	16	0	24
cSH	822	1057	1596	1606
Volume to Capacity	0.05	0.02	0.00	0.01
Queue Length 95th (m)	1.2	0.4	0.0	0.2
Control Delay (s)	9.6	8.5	0.0	2.9
Lane LOS	A	A		A
Approach Delay (s)	9.6	8.5	0.0	2.9
Approach LOS	A	A		

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	22.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1060	10	15	1610	0	10	0	10	5	0	5
Future Volume (Veh/h)	0	1060	10	15	1610	0	10	0	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Hourly flow rate (vph)	0	1116	11	16	1695	0	11	0	11	5	0	5
Pedestrians		4			4			8				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.79			0.84			0.87	0.87	0.84	0.87	0.87	0.79
vC, conflicting volume	1695			1135			2018	2856	576	2300	2862	852
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1343			793			1058	2027	130	1384	2034	272
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			93	100	99	94	100	99
cM capacity (veh/h)	401			702			151	48	753	85	47	570

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	744	383	581	1130	22	10
Volume Left	0	0	16	0	11	5
Volume Right	0	11	0	0	11	5
cSH	1700	1700	702	1700	251	148
Volume to Capacity	0.44	0.23	0.02	0.66	0.09	0.07
Queue Length 95th (m)	0.0	0.0	0.5	0.0	2.2	1.6
Control Delay (s)	0.0	0.0	0.6	0.0	20.7	31.0
Lane LOS			A		C	D
Approach Delay (s)	0.0		0.2		20.7	31.0
Approach LOS					C	D

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

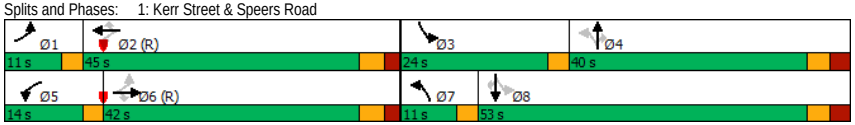
Future Total Traffic Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	665	90	190	515	185	100	115	370	360	145	75
Future Volume (vph)	40	665	90	190	515	185	100	115	370	360	145	75
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	11.0	42.0	42.0	14.0	45.0	45.0	11.0	40.0	40.0	24.0	53.0	53.0
Total Split (%)	9.2%	35.0%	35.0%	11.7%	37.5%	37.5%	9.2%	33.3%	33.3%	20.0%	44.2%	44.2%
Maximum Green (s)	8.0	36.1	36.1	11.0	39.1	39.1	8.0	33.7	33.7	21.0	46.7	46.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	773	105	221	599	215	116	134	430	419	169	87
v/c Ratio	0.11	0.57	0.17	0.61	0.38	0.27	0.30	0.33	0.88	0.45	0.33	0.18
Control Delay	17.1	33.1	5.6	25.2	25.0	4.6	23.6	39.4	39.9	25.5	34.2	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	33.1	5.6	25.2	25.0	4.6	23.6	39.4	39.9	25.5	34.2	6.0
Queue Length 50th (m)	5.0	78.3	0.0	26.3	49.9	0.0	17.1	26.5	48.9	33.9	31.6	0.0
Queue Length 95th (m)	12.8	102.8	9.8	#50.4	73.8	13.9	23.0	37.0	73.1	35.4	40.3	8.9
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	452	1346	635	367	1586	805	396	541	573	993	718	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.57	0.17	0.60	0.38	0.27	0.29	0.25	0.75	0.42	0.24	0.14

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	665	90	190	515	185	100	115	370	360	145	75
Future Volume (vph)	40	665	90	190	515	185	100	115	370	360	145	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.93	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1797	3406	1437	1685	3438	1495	1674	1881	1429	3198	1845	1511
Flt Permitted	0.42	1.00	1.00	0.23	1.00	1.00	0.65	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	794	3406	1437	405	3438	1495	1146	1881	1429	1928	1845	1511
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	47	773	105	221	599	215	116	134	430	419	169	87
RTOR Reduction (vph)	0	0	64	0	0	117	0	0	179	0	0	63
Lane Group Flow (vph)	47	773	41	221	599	98	116	134	251	419	169	24
Confl. Peds. (#/hr)	15		10	10		15	20		35	35		20
Heavy Vehicles (%)	0%	6%	7%	7%	5%	4%	6%	1%	5%	5%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	53.3	47.4	47.4	63.6	54.7	54.7	34.2	26.0	26.0	44.2	33.0	33.0
Effective Green, g (s)	53.3	47.4	47.4	63.6	54.7	54.7	34.2	26.0	26.0	44.2	33.0	33.0
Actuated g/C Ratio	0.44	0.39	0.39	0.53	0.46	0.46	0.29	0.22	0.22	0.37	0.28	0.28
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	401	1345	567	355	1567	681	362	407	309	871	507	415
v/s Ratio Prot	0.01	0.23		c0.07	0.17		0.02	0.07		c0.06	0.09	
v/s Ratio Perm	0.05		0.03	c0.26		0.07	0.07		c0.18	0.12		0.02
v/c Ratio	0.12	0.57	0.07	0.62	0.38	0.14	0.32	0.33	0.81	0.48	0.33	0.06
Uniform Delay, d1	19.0	28.4	22.6	17.4	21.5	19.0	33.0	39.6	44.7	27.6	34.7	32.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.8	0.3	2.9	0.7	0.4	0.4	0.6	15.7	0.3	0.5	0.1
Delay (s)	19.1	30.2	22.9	20.3	22.2	19.5	33.3	40.3	60.4	27.9	35.3	32.1
Level of Service	B	C	C	C	C	B	C	D	E	C	D	C
Approach Delay (s)		28.8			21.2			51.8			30.3	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	73.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	205	1205	605	5	245
Future Volume (vph)	205	1205	605	5	245
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	35.0	109.0	74.0	31.0	31.0
Total Split (%)	25.0%	77.9%	52.9%	22.1%	22.1%
Maximum Green (s)	29.0	102.4	67.4	25.2	25.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 99 (71%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	241	1418	736	6	288
v/c Ratio	0.42	0.49	0.29	0.05	0.63
Control Delay	4.3	3.8	7.2	60.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	3.8	7.2	60.6	12.9
Queue Length 50th (m)	9.4	43.7	33.1	1.6	0.0
Queue Length 95th (m)	14.5	52.2	43.1	5.7	11.7
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	729	2905	2501	324	705
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	0.33	0.49	0.29	0.02	0.41

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	205	1205	605	20	5	245
Future Volume (vph)	205	1205	605	20	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1686	3471	3450		1805	2608
Flt Permitted	0.34	1.00	1.00		0.95	1.00
Satd. Flow (perm)	599	3471	3450		1805	2608
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	241	1418	712	24	6	288
RTOR Reduction (vph)	0	0	1	0	0	267
Lane Group Flow (vph)	241	1418	735	0	6	21
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	7%	4%	4%	5%	0%	9%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	117.2	117.2	101.5		10.4	10.4
Effective Green, g (s)	117.2	117.2	101.5		10.4	10.4
Actuated g/C Ratio	0.84	0.84	0.72		0.07	0.07
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	576	2905	2501		134	193
v/s Ratio Prot	0.03	c0.41	0.21		0.00	
v/s Ratio Perm	0.32					c0.01
v/c Ratio	0.42	0.49	0.29		0.04	0.11
Uniform Delay, d1	2.7	3.1	6.7		60.2	60.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.6	0.3		0.1	0.3
Delay (s)	3.3	3.7	7.0		60.3	60.7
Level of Service	A	A	A		E	E
Approach Delay (s)		3.7	7.0		60.7	
Approach LOS		A	A		E	

Intersection Summary				
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	745	15	0	670	20	5	0	50	0	0	0
Future Volume (Veh/h)	5	745	15	0	670	20	5	0	50	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	847	17	0	761	23	6	0	57	0	0	0
Pedestrians								5			2	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.89						0.89	0.89		0.89	0.89	0.89
vC, conflicting volume	786			869			1253	1658	437	1267	1656	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	525			869			1047	1501	437	1063	1497	87
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	100	90	100	100	100
cM capacity (veh/h)	939			780			163	109	557	143	109	858

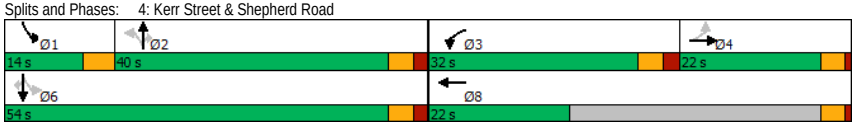
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	6	565	299	507	277	63	0
Volume Left	6	0	0	0	0	6	0
Volume Right	0	0	17	0	23	57	0
cSH	939	1700	1700	1700	1700	453	1700
Volume to Capacity	0.01	0.33	0.18	0.30	0.16	0.14	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	3.7	0.0
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	14.2	0.0
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		14.2	0.0
Approach LOS						B	A

Intersection Summary					
Average Delay			0.6		
Intersection Capacity Utilization			Err%	ICU Level of Service	H
Analysis Period (min)			15		

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	90	0	270	70	105	490	
Future Volume (vph)	90	0	270	70	105	490	
Turn Type	Prot	NA	NA	Perm	pm+pt	NA	
Protected Phases	3	8	2		1	6	4
Permitted Phases				2	6		
Detector Phase	3	8	2	2	1	6	
Switch Phase							
Minimum Initial (s)	10.0	5.0	18.0	18.0	7.0	18.0	5.0
Minimum Split (s)	31.4	22.0	28.2	28.2	11.0	28.2	22.0
Total Split (s)	32.0	22.0	40.0	40.0	14.0	54.0	22.0
Total Split (%)	29.6%	20.4%	37.0%	37.0%	13.0%	50.0%	20%
Maximum Green (s)	26.6	18.0	34.8	34.8	10.0	48.8	18.0
Yellow Time (s)	3.3	3.0	3.3	3.3	4.0	3.3	3.0
All-Red Time (s)	2.1	1.0	1.9	1.9	0.0	1.9	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.4	4.0	5.2	5.2	4.0	5.2	
Lead/Lag	Lead		Lag	Lag	Lead		Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.5	3.5	2.5	3.5	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	Min	Min	None	Min	None
Walk Time (s)	10.0	7.0	10.0	10.0		10.0	7.0
Flash Dont Walk (s)	16.0	11.0	13.0	13.0		13.0	11.0
Pedestrian Calls (#/hr)	0	0	5	5		5	0

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 47.6
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	99	214	297	77	115	538
v/c Ratio	0.27	0.30	0.21	0.11	0.17	0.26
Control Delay	20.2	1.0	11.0	2.3	4.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	1.0	11.0	2.3	4.7	5.3
Queue Length 50th (m)	7.5	0.0	9.2	0.0	3.5	10.3
Queue Length 95th (m)	19.6	0.0	16.7	4.2	8.1	17.0
Internal Link Dist (m)		241.3	143.2			36.7
Turn Bay Length (m)				50.0	50.0	
Base Capacity (vph)	966	1558	2632	1131	734	3373
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	0.10	0.14	0.11	0.07	0.16	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	90	0	195	0	270	70	105	490	0
Future Volume (vph)	0	0	0	90	0	195	0	270	70	105	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Lane Util. Factor				1.00	1.00			0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	0.98			1.00	0.97	1.00	1.00	
Flpb, ped/bikes				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1671	1590			3539	1497	1784	3505	
Flt Permitted				0.95	1.00			1.00	1.00	0.47	1.00	
Satd. Flow (perm)				1671	1590			3539	1497	889	3505	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	99	0	214	0	297	77	115	538	0
RTOR Reduction (vph)	0	0	0	0	155	0	0	0	49	0	0	0
Lane Group Flow (vph)	0	0	0	99	59	0	0	297	28	115	538	0
Confl. Peds. (#/hr)	4		7	7		4			6	6		
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	2%	5%	1%	3%	0%
Turn Type	Perm			Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)				7.6	14.6			19.5	19.5	28.9	28.9	
Effective Green, g (s)				7.6	14.6			19.5	19.5	28.9	28.9	
Actuated g/C Ratio				0.14	0.28			0.37	0.37	0.55	0.55	
Clearance Time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Vehicle Extension (s)				3.0	3.0			3.5	3.5	2.5	3.5	
Lane Grp Cap (vph)				240	440			1309	553	579	1922	
v/s Ratio Prot				c0.06	c0.04			0.08		0.02	c0.15	
v/s Ratio Perm									0.02	0.09		
v/c Ratio				0.41	0.13			0.23	0.05	0.20	0.28	
Uniform Delay, d1				20.5	14.3			11.4	10.7	5.9	6.3	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				1.2	0.1			0.1	0.0	0.1	0.1	
Delay (s)				21.7	14.4			11.5	10.7	6.0	6.4	
Level of Service				C	B			B	B	A	A	
Approach Delay (s)		0.0			16.7			11.4			6.4	
Approach LOS		A			B			B			A	

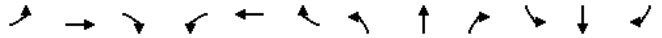
Intersection Summary					
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	52.7	Sum of lost time (s)		18.6	
Intersection Capacity Utilization	54.8%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	90	215	250	505	125
Future Volume (Veh/h)	5	90	215	250	505	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	96	229	266	537	133
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	1194	335	670			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1194	335	670			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	85	75			
cM capacity (veh/h)	137	658	916			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	5	96	229	133	133	358	312
Volume Left	5	0	229	0	0	0	0
Volume Right	0	96	0	0	0	0	133
cSH	137	658	916	1700	1700	1700	1700
Volume to Capacity	0.04	0.15	0.25	0.08	0.08	0.21	0.18
Queue Length 95th (m)	0.9	3.9	7.5	0.0	0.0	0.0	0.0
Control Delay (s)	32.4	11.4	10.2	0.0	0.0	0.0	0.0
Lane LOS	D	B	B				
Approach Delay (s)	12.4		4.7			0.0	
Approach LOS	B						

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	43.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	5	0	75	5	505	5	40	380	5
Future Volume (Veh/h)	5	0	5	5	0	75	5	505	5	40	380	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	6	0	6	6	0	89	6	601	6	48	452	6
Pedestrians		15			30			1			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.91	0.91	0.86	0.91	0.91	0.90	0.86			0.90		
vC, conflicting volume	1272	1215	471	1204	1215	635	473			637		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	999	936	299	924	936	538	301			540		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.3	4.3			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.0	3.4	2.3			2.3		
p0 queue free %	96	100	99	97	100	81	99			95		
cM capacity (veh/h)	150	219	568	203	219	461	1001			878		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	95	613	506
Volume Left	6	6	6	48
Volume Right	6	89	6	6
cSH	237	427	1001	878
Volume to Capacity	0.05	0.22	0.01	0.05
Queue Length 95th (m)	1.2	6.4	0.1	1.3
Control Delay (s)	21.0	15.8	0.2	1.5
Lane LOS	C	C	A	A
Approach Delay (s)	21.0	15.8	0.2	1.5
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	58.7%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	10	5	485	345	45
Future Volume (Veh/h)	30	10	5	485	345	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	12	6	571	406	53
Pedestrians	18			4	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.91	0.92	0.92			
vC, conflicting volume	1034	454	477			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	365	390			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	98	99			
cM capacity (veh/h)	320	618	1069			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	577	459
Volume Left	35	6	0
Volume Right	12	0	53
cSH	365	1069	1700
Volume to Capacity	0.13	0.01	0.27
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	16.3	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.3	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		40.8%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	25	20	35	5	385	40	285
Future Volume (vph)	35	25	20	35	5	385	40	285
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	79	152	500	434
v/c Ratio	0.27	0.40	0.43	0.41
Control Delay	23.8	14.2	9.1	9.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.8	14.2	9.1	9.0
Queue Length 50th (m)	9.6	8.7	21.7	18.2
Queue Length 95th (m)	15.4	16.7	55.5	48.1
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	463	563	1156	1053
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	0.27	0.43	0.41

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	5	20	35	70	5	385	20	40	285	30
Future Volume (vph)	35	25	5	20	35	70	5	385	20	40	285	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.92			0.99			0.99	
Flt Protected		0.97			0.99			1.00			0.99	
Satd. Flow (prot)		1714			1625			1773			1755	
Flt Permitted		0.79			0.94			1.00			0.91	
Satd. Flow (perm)		1400			1545			1767			1608	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	30	6	24	43	85	6	470	24	49	348	37
RTOR Reduction (vph)	0	5	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	74	0	0	84	0	0	499	0	0	431	0
Confl. Peds. (#/hr)	20		20	20		20	30		35	35		30
Heavy Vehicles (%)	2%	7%	16%	0%	5%	4%	28%	6%	0%	2%	6%	6%
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)		15.2			15.2			49.0			49.0	
Effective Green, g (s)		15.2			15.2			49.0			49.0	
Actuated g/C Ratio		0.20			0.20			0.65			0.65	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		283			313			1154			1050	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.05			c0.28			0.27	
v/c Ratio		0.26			0.27			0.43			0.41	
Uniform Delay, d1		25.2			25.2			6.3			6.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.6			1.2			0.3	
Delay (s)		25.9			25.8			7.5			6.4	
Level of Service		C			C			A			A	
Approach Delay (s)		25.9			25.8			7.5			6.4	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8		
Intersection Capacity Utilization	65.8%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1365	30	0	870	20	5
Future Volume (Veh/h)	1365	30	0	870	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1625	36	0	1036	24	6
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.73		0.76	0.73
vC, conflicting volume			1661		2162	832
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1161		1570	22
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		69	99
cM capacity (veh/h)			443		78	768

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1083	578	518	518	30
Volume Left	0	0	0	0	24
Volume Right	0	36	0	0	6
cSH	1700	1700	1700	1700	95
Volume to Capacity	0.64	0.34	0.30	0.30	0.32
Queue Length 95th (m)	0.0	0.0	0.0	0.0	9.2
Control Delay (s)	0.0	0.0	0.0	0.0	59.5
Lane LOS					F
Approach Delay (s)	0.0		0.0		59.5
Approach LOS					F

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	48.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	20	5	0	25	5
Future Volume (Veh/h)	0	20	5	0	25	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	22	6	0	28	6
Pedestrians			2			13
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	70	19			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70	19			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	922	1052			1628	

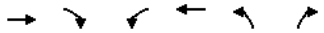
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	22	6	34
Volume Left	0	0	28
Volume Right	22	0	0
cSH	1052	1700	1628
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (m)	0.5	0.0	0.4
Control Delay (s)	8.5	0.0	6.0
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	6.0
Approach LOS	A		

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	21.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	15	0	0	20	5
Future Volume (Veh/h)	10	15	0	0	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	17	0	0	22	6
Pedestrians	16			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			28		36	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			28		36	22
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1599		968	1060

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	28	0	28
Volume Left	0	0	22
Volume Right	17	0	6
cSH	1700	1700	986
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

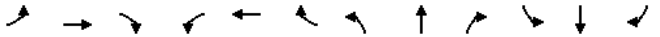


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	5	0	0	0	30
Future Volume (Veh/h)	10	5	0	0	0	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	6	0	0	0	34
Pedestrians	11			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			17		25	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		25	17
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1613		986	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	0	34
Volume Left	0	0	0
Volume Right	6	0	34
cSH	1700	1700	1065
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	8.5
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.5
Approach LOS			A

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Total AM
13: PUDO Exit/Speers Internal Road 2 & Speers Internal Road/30 Speers — 50 Speers Road (8013-02)

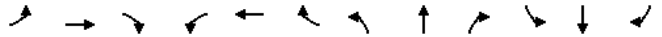


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	0	0	0	0	25	0	0	0	5	0	0
Future Volume (Veh/h)	40	0	0	0	0	25	0	0	0	5	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	50	0	0	0	0	31	0	0	0	6	0	0
Pedestrians		3			9			17			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	50	24	20	38	24	13	3			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50	24	20	38	24	13	3			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	100	100	100	97	100			100		
cM capacity (veh/h)	911	861	1044	939	861	1060	1628			1611		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	31	0	6
Volume Left	50	0	0	6
Volume Right	0	31	0	0
cSH	911	1060	1700	1611
Volume to Capacity	0.05	0.03	0.00	0.00
Queue Length 95th (m)	1.3	0.7	0.0	0.1
Control Delay (s)	9.2	8.5	0.0	7.2
Lane LOS	A	A		A
Approach Delay (s)	9.2	8.5	0.0	7.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	8.8			
Intersection Capacity Utilization	23.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Future Total AM
14: Speers Internal Road 2/41 Speers Driveways & Speers Road — 50 Speers Road (8013-02)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1370	0	5	845	0	25	0	40	0	0	0
Future Volume (Veh/h)	0	1370	0	5	845	0	25	0	40	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.86	0.86	0.86	0.92	0.86	0.92	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	1593	0	6	983	0	29	0	47	0	0	0
Pedestrians		4			4			11				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.94			0.75			0.78	0.78	0.75	0.78	0.78	0.94
vC, conflicting volume	983			1604			2112	2599	812	1842	2599	496
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	844			1133			1489	2114	73	1144	2114	323
tC, single (s)	4.1			4.1			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			53	100	94	100	100	100
cM capacity (veh/h)	737			462			61	38	723	111	38	627

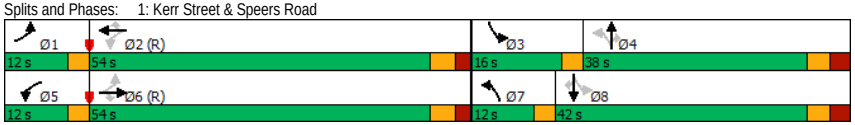
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	796	796	334	655	76	0
Volume Left	0	0	6	0	29	0
Volume Right	0	0	0	0	47	0
cSH	1700	1700	462	1700	141	1700
Volume to Capacity	0.47	0.47	0.01	0.39	0.54	0.00
Queue Length 95th (m)	0.0	0.0	0.3	0.0	20.0	0.0
Control Delay (s)	0.0	0.0	0.4	0.0	56.8	0.0
Lane LOS			A		F	A
Approach Delay (s)	0.0		0.1		56.8	0.0
Approach LOS					F	A

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	595	130	300	830	510	140	155	240	300	250	65
Future Volume (vph)	70	595	130	300	830	510	140	155	240	300	250	65
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	12.0	54.0	54.0	12.0	54.0	54.0	12.0	38.0	38.0	16.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	45.0%	10.0%	31.7%	31.7%	13.3%	35.0%	35.0%
Maximum Green (s)	9.0	48.1	48.1	9.0	48.1	48.1	9.0	31.7	31.7	13.0	35.7	35.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	626	137	316	874	537	147	163	253	316	263	68
v/c Ratio	0.20	0.39	0.17	0.61	0.47	0.52	0.53	0.50	0.55	0.45	0.73	0.19
Control Delay	11.8	23.9	4.3	16.6	20.1	3.6	36.9	49.9	9.7	31.6	57.6	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	23.9	4.3	16.6	20.1	3.6	36.9	49.9	9.7	31.6	57.6	7.1
Queue Length 50th (m)	6.7	53.3	0.0	33.2	69.2	0.0	24.8	34.7	0.0	27.7	59.0	0.0
Queue Length 95th (m)	14.2	71.6	11.9	54.1	96.7	18.7	38.3	53.5	21.0	36.5	81.1	8.6
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	401	1606	783	520	1879	1040	277	501	578	723	565	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.39	0.17	0.61	0.47	0.52	0.53	0.33	0.44	0.44	0.47	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	595	130	300	830	510	140	155	240	300	250	65
Future Volume (vph)	70	595	130	300	830	510	140	155	240	300	250	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1799	3539	1560	1750	3539	1485	1768	1900	1486	3358	1900	1501
Flt Permitted	0.29	1.00	1.00	0.33	1.00	1.00	0.36	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	558	3539	1560	607	3539	1485	669	1900	1486	1720	1900	1501
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	626	137	316	874	537	147	163	253	316	263	68
RTOR Reduction (vph)	0	0	75	0	0	255	0	0	210	0	0	55
Lane Group Flow (vph)	74	626	62	316	874	282	147	163	43	316	263	13
Confl. Peds. (#/hr)	30		5	5		30	35		35	35		35
Heavy Vehicles (%)	0%	2%	0%	3%	2%	2%	1%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	60.7	54.5	54.5	72.3	63.1	63.1	30.3	20.5	20.5	34.7	22.7	22.7
Effective Green, g (s)	60.7	54.5	54.5	72.3	63.1	63.1	30.3	20.5	20.5	34.7	22.7	22.7
Actuated g/C Ratio	0.51	0.45	0.45	0.60	0.53	0.53	0.25	0.17	0.17	0.29	0.19	0.19
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	346	1607	708	506	1860	780	258	324	253	661	359	283
v/s Ratio Prot	0.01	0.18		c0.08	0.25		c0.05	0.09		c0.05	c0.14	
v/s Ratio Perm	0.10		0.04	c0.30		0.19	0.10		0.03	0.09		0.01
v/c Ratio	0.21	0.39	0.09	0.62	0.47	0.36	0.57	0.50	0.17	0.48	0.73	0.05
Uniform Delay, d1	15.4	21.7	18.6	12.6	17.9	16.7	36.9	45.1	42.5	33.6	45.8	39.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.7	0.2	2.1	0.9	1.3	2.3	1.7	0.4	0.4	8.0	0.1
Delay (s)	15.6	22.4	18.9	14.6	18.8	18.0	39.2	46.8	42.9	34.0	53.8	39.9
Level of Service	B	C	B	B	B	B	D	D	D	C	D	D
Approach Delay (s)		21.2			17.8			43.1			42.7	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	78.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	260	820	1200	10	420
Future Volume (vph)	260	820	1200	10	420
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	17.0	102.0	85.0	38.0	38.0
Total Split (%)	12.1%	72.9%	60.7%	27.1%	27.1%
Maximum Green (s)	11.0	95.4	78.4	32.2	32.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 13 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	271	854	1266	10	438
v/c Ratio	0.64	0.29	0.56	0.06	0.79
Control Delay	16.5	3.7	16.9	55.2	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	3.7	16.9	55.2	27.7
Queue Length 50th (m)	12.8	23.3	94.0	2.6	18.1
Queue Length 95th (m)	47.6	40.1	147.2	7.8	37.0
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	421	2940	2259	415	874
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	0.64	0.29	0.56	0.02	0.50

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	260	820	1200	15	10	420
Future Volume (vph)	260	820	1200	15	10	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1703	3610	3567		1805	2733
Flt Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	270	3610	3567		1805	2733
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	271	854	1250	16	10	438
RTOR Reduction (vph)	0	0	0	0	0	288
Lane Group Flow (vph)	271	854	1266	0	10	150
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	6%	0%	1%	0%	0%	4%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	114.0	114.0	88.4		13.6	13.6
Effective Green, g (s)	114.0	114.0	88.4		13.6	13.6
Actuated g/C Ratio	0.81	0.81	0.63		0.10	0.10
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	420	2939	2252		175	265
v/s Ratio Prot	c0.09	0.24	0.35		0.01	
v/s Ratio Perm	c0.44					c0.05
v/c Ratio	0.65	0.29	0.56		0.06	0.57
Uniform Delay, d1	13.1	3.2	14.7		57.4	60.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	0.3	1.0		0.1	2.8
Delay (s)	16.6	3.4	15.8		57.5	63.1
Level of Service	B	A	B		E	E
Approach Delay (s)		6.6	15.8		63.0	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	765	25	0	1010	25	5	0	25	5	0	0
Future Volume (Veh/h)	10	765	25	0	1010	25	5	0	25	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	797	26	0	1052	26	5	0	26	5	0	0
Pedestrians		1			1			5			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	1086			828			1362	1921	418	1518	1921	548
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	735			828			1062	1723	418	1247	1723	99
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	96	95	100	100
cM capacity (veh/h)	738			808			149	74	587	104	74	792

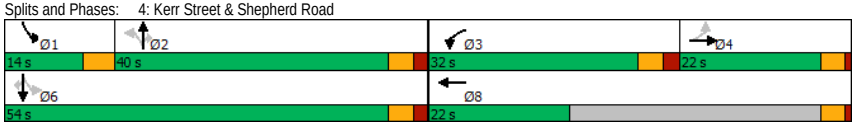
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	10	531	292	701	377	31	5
Volume Left	10	0	0	0	0	5	5
Volume Right	0	0	26	0	26	26	0
cSH	738	1700	1700	1700	1700	398	104
Volume to Capacity	0.01	0.31	0.17	0.41	0.22	0.08	0.05
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	1.9	1.1
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	14.8	41.4
Lane LOS	A					B	E
Approach Delay (s)	0.1			0.0		14.8	41.4
Approach LOS						B	E

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	Err%	ICU Level of Service		H
Analysis Period (min)	15			

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	105	0	595	140	190	510	
Future Volume (vph)	105	0	595	140	190	510	
Turn Type	Prot	NA	NA	Perm	pm+pt	NA	
Protected Phases	3	8	2		1	6	4
Permitted Phases				2	6		
Detector Phase	3	8	2	2	1	6	
Switch Phase							
Minimum Initial (s)	10.0	5.0	18.0	18.0	7.0	18.0	5.0
Minimum Split (s)	31.4	22.0	28.2	28.2	11.0	28.2	22.0
Total Split (s)	32.0	22.0	40.0	40.0	14.0	54.0	22.0
Total Split (%)	29.6%	20.4%	37.0%	37.0%	13.0%	50.0%	20%
Maximum Green (s)	26.6	18.0	34.8	34.8	10.0	48.8	18.0
Yellow Time (s)	3.3	3.0	3.3	3.3	4.0	3.3	3.0
All-Red Time (s)	2.1	1.0	1.9	1.9	0.0	1.9	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.4	4.0	5.2	5.2	4.0	5.2	
Lead/Lag	Lead		Lag	Lag	Lead		Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.5	3.5	2.5	3.5	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	Min	Min	None	Min	None
Walk Time (s)	10.0	7.0	10.0	10.0		10.0	7.0
Flash Dont Walk (s)	16.0	11.0	13.0	13.0		13.0	11.0
Pedestrian Calls (#/hr)	0	0	5	5		5	0

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 50.8
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



Lane Group	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	108	170	613	144	196	526
v/c Ratio	0.30	0.30	0.46	0.22	0.36	0.24
Control Delay	21.1	1.3	13.9	3.7	6.2	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	1.3	13.9	3.7	6.2	5.2
Queue Length 50th (m)	8.3	0.0	21.4	0.0	6.2	10.0
Queue Length 95th (m)	21.7	0.0	37.4	8.7	13.8	17.4
Internal Link Dist (m)		241.3	143.2			50.1
Turn Bay Length (m)				50.0	50.0	
Base Capacity (vph)	926	1517	2472	1107	605	3384
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	0.12	0.11	0.25	0.13	0.32	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	105	0	165	0	595	140	190	510	0
Future Volume (vph)	0	0	0	105	0	165	0	595	140	190	510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Lane Util. Factor				1.00	1.00			0.95	1.00	1.00	0.95	
Frpb, ped/bikes				1.00	0.98			1.00	0.98	1.00	1.00	
Flpb, ped/bikes				1.00	1.00			1.00	1.00	1.00	1.00	
Frt				1.00	0.85			1.00	0.85	1.00	1.00	
Flt Protected				0.95	1.00			1.00	1.00	0.95	1.00	
Satd. Flow (prot)				1752	1571			3574	1544	1804	3574	
Flt Permitted				0.95	1.00			1.00	1.00	0.30	1.00	
Satd. Flow (perm)				1752	1571			3574	1544	567	3574	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	108	0	170	0	613	144	196	526	0
RTOR Reduction (vph)	0	0	0	0	124	0	0	0	94	0	0	0
Lane Group Flow (vph)	0	0	0	108	46	0	0	613	50	196	526	0
Confl. Peds. (#/hr)	6		13	13		6			4	4		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	3%	0%	1%	0%	1%	2%	0%	1%	0%
Turn Type	Perm			Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)				8.2	14.9			19.1	19.1	31.0	31.0	
Effective Green, g (s)				8.2	14.9			19.1	19.1	31.0	31.0	
Actuated g/C Ratio				0.15	0.27			0.35	0.35	0.56	0.56	
Clearance Time (s)				5.4	4.0			5.2	5.2	4.0	5.2	
Vehicle Extension (s)				3.0	3.0			3.5	3.5	2.5	3.5	
Lane Grp Cap (vph)				260	424			1238	535	496	2010	
v/s Ratio Prot				c0.06	c0.03			c0.17		c0.06	0.15	
v/s Ratio Perm									0.03	0.17		
v/c Ratio				0.42	0.11			0.50	0.09	0.40	0.26	
Uniform Delay, d1				21.3	15.1			14.2	12.2	6.4	6.2	
Progression Factor				1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2				1.1	0.1			0.4	0.1	0.4	0.1	
Delay (s)				22.4	15.2			14.6	12.2	6.8	6.3	
Level of Service				C	B			B	B	A	A	
Approach Delay (s)		0.0			18.0			14.1			6.4	
Approach LOS		A			B			B			A	

Intersection Summary

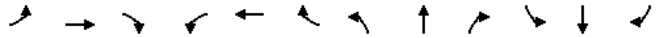
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	18.6
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	145	130	630	555	110
Future Volume (Veh/h)	25	145	130	630	555	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	27	154	138	670	590	117
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1264	358	712			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1264	358	712			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	80	76	84			
cM capacity (veh/h)	137	629	853			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	27	154	138	335	335	393	314
Volume Left	27	0	138	0	0	0	0
Volume Right	0	154	0	0	0	0	117
cSH	137	629	853	1700	1700	1700	1700
Volume to Capacity	0.20	0.24	0.16	0.20	0.20	0.23	0.18
Queue Length 95th (m)	5.3	7.3	4.4	0.0	0.0	0.0	0.0
Control Delay (s)	37.7	12.6	10.0	0.0	0.0	0.0	0.0
Lane LOS	E	B	B				
Approach Delay (s)	16.3		1.7			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	10	10	0	30	5	495	10	20	635	25
Future Volume (Veh/h)	10	0	10	10	0	30	5	495	10	20	635	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	11	11	0	32	5	521	11	21	668	26
Pedestrians		21			31			1			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.80	0.80	0.77	0.80	0.80	0.94	0.77			0.94		
vC, conflicting volume	1316	1317	703	1302	1324	562	715			563		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1110	1111	462	1092	1120	505	477			507		
tC, single (s)	7.1	7.0	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	92	100	98	92	100	94	99			98		
cM capacity (veh/h)	130	127	454	138	153	522	751			956		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	43	537	715
Volume Left	11	11	5	21
Volume Right	11	32	11	26
cSH	202	305	751	956
Volume to Capacity	0.11	0.14	0.01	0.02
Queue Length 95th (m)	2.7	3.7	0.2	0.5
Control Delay (s)	25.0	18.8	0.2	0.6
Lane LOS	D	C	A	A
Approach Delay (s)	25.0	18.8	0.2	0.6
Approach LOS	D	C		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	10	5	495	615	40
Future Volume (Veh/h)	15	10	5	495	615	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	11	5	521	647	42
Pedestrians	34			2	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.84	0.80	0.80			
vC, conflicting volume	1234	704	723			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	944	503	527			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	93	97	99			
cM capacity (veh/h)	238	427	739			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	526	689
Volume Left	16	5	0
Volume Right	11	0	42
cSH	290	739	1700
Volume to Capacity	0.09	0.01	0.41
Queue Length 95th (m)	2.3	0.2	0.0
Control Delay (s)	18.7	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	18.7	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		45.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	10	10	15	10	375	55	520
Future Volume (vph)	50	10	10	15	10	375	55	520
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	81	109	435	679
v/c Ratio	0.29	0.29	0.34	0.56
Control Delay	21.5	9.9	7.8	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	7.8	11.0
Queue Length 50th (m)	8.5	3.4	17.8	34.7
Queue Length 95th (m)	16.4	13.0	52.9	104.7
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	447	556	1294	1213
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	0.18	0.20	0.34	0.56

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	15	10	15	75	10	375	15	55	520	50
Future Volume (vph)	50	10	15	10	15	75	10	375	15	55	520	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			0.99	
Flpb, ped/bikes		0.98			1.00			1.00			1.00	
Frt		0.97			0.90			1.00			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1675			1575			1854			1825	
Flt Permitted		0.77			0.97			0.98			0.93	
Satd. Flow (perm)		1334			1530			1826			1708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	16	11	16	82	11	408	16	60	565	54
RTOR Reduction (vph)	0	13	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	68	0	0	41	0	0	434	0	0	676	0
Confl. Peds. (#/hr)	20		15	15		20	35		25	25		35
Heavy Vehicles (%)	2%	20%	0%	0%	13%	2%	0%	1%	17%	1%	2%	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)		13.2			13.2			51.0			51.0	
Effective Green, g (s)		13.2			13.2			51.0			51.0	
Actuated g/C Ratio		0.18			0.18			0.68			0.68	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		234			269			1241			1161	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.03			0.24			c0.40	
v/c Ratio		0.29			0.15			0.35			0.58	
Uniform Delay, d1		26.8			26.2			5.0			6.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			0.4			0.8			0.7	
Delay (s)		27.8			26.5			5.8			7.1	
Level of Service		C			C			A			A	
Approach Delay (s)		27.8			26.5			5.8			7.1	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8		
Intersection Capacity Utilization	81.3%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1055	80	5	1630	10	10
Future Volume (Veh/h)	1055	80	5	1630	10	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1077	82	5	1663	10	10
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.81		0.89	0.81
vC, conflicting volume			1159		1960	580
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			736		879	25
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	99
cM capacity (veh/h)			714		256	855

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	718	441	559	1109	20
Volume Left	0	0	5	0	10
Volume Right	0	82	0	0	10
cSH	1700	1700	714	1700	394
Volume to Capacity	0.42	0.26	0.01	0.65	0.05
Queue Length 95th (m)	0.0	0.0	0.2	0.0	1.2
Control Delay (s)	0.0	0.0	0.2	0.0	14.6
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		14.6
Approach LOS					B

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	58.5%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	15	5	0	70	15
Future Volume (Veh/h)	0	15	5	0	70	15
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	19	6	0	89	19
Pedestrians			2			8
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	205	14			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	205	14			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			95	
cM capacity (veh/h)	744	1064			1628	

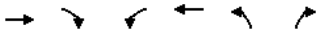
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	19	6	108
Volume Left	0	0	89
Volume Right	19	0	0
cSH	1064	1700	1628
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (m)	0.4	0.0	1.3
Control Delay (s)	8.4	0.0	6.1
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	6.1
Approach LOS	A		

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	23.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	30	40	5	5	10	0
Future Volume (Veh/h)	30	40	5	5	10	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	38	51	6	6	13	0
Pedestrians	13			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			89		94	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			89		94	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1519		896	1002

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	89	12	13
Volume Left	0	6	13
Volume Right	51	0	0
cSH	1700	1519	896
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.3
Control Delay (s)	0.0	3.7	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



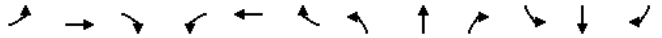
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	10	0	10	0	25
Future Volume (Veh/h)	20	10	0	10	0	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	25	13	0	13	0	32
Pedestrians	10			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		54	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		54	34
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1585		950	1041

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	13	32
Volume Left	0	0	0
Volume Right	13	0	32
cSH	1700	1585	1041
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: PUDO Exit/Speers Internal Road 2 & Speers Internal Road/30 Speers

Future Total PM
50 Speers Road (8013-02)



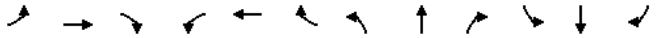
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	20	0	0	0	10	0	0	0	10	0	10
Future Volume (Veh/h)	25	20	0	0	0	10	0	0	0	10	0	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	40	32	0	0	0	16	0	0	0	16	0	16
Pedestrians		3			7			8			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	62	50	19	71	58	10	19			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	62	50	19	71	58	10	19			7		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	96	100	100	100	99	100			99		
cM capacity (veh/h)	860	829	1054	873	821	1067	1606			1616		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	16	0	32
Volume Left	40	0	0	16
Volume Right	0	16	0	16
cSH	846	1067	1700	1616
Volume to Capacity	0.09	0.01	0.00	0.01
Queue Length 95th (m)	2.1	0.3	0.0	0.2
Control Delay (s)	9.7	8.4	0.0	3.7
Lane LOS	A	A		A
Approach Delay (s)	9.7	8.4	0.0	3.7
Approach LOS	A	A		

Intersection Summary				
Average Delay		7.9		
Intersection Capacity Utilization		22.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Speers Internal Road 2/41 Speers Driveway & Speers Road

Future Total PM
50 Speers Road (8013-02)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1060	10	10	1610	0	20	0	15	5	0	5
Future Volume (Veh/h)	0	1060	10	10	1610	0	20	0	15	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Hourly flow rate (vph)	0	1116	11	11	1695	0	21	0	16	5	0	5
Pedestrians		4			4			8				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.79			0.84			0.87	0.87	0.84	0.87	0.87	0.79
vC, conflicting volume	1695			1135			2008	2846	576	2295	2852	852
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1347			787			1041	2007	123	1372	2013	278
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			87	100	98	94	100	99
cM capacity (veh/h)	400			704			156	50	760	87	49	566

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	744	383	576	1130	37	10
Volume Left	0	0	11	0	21	5
Volume Right	0	11	0	0	16	5
cSH	1700	1700	704	1700	238	151
Volume to Capacity	0.44	0.23	0.02	0.66	0.16	0.07
Queue Length 95th (m)	0.0	0.0	0.4	0.0	4.1	1.6
Control Delay (s)	0.0	0.0	0.4	0.0	22.9	30.5
Lane LOS			A		C	D
Approach Delay (s)	0.0		0.1		22.9	30.5
Approach LOS					C	D

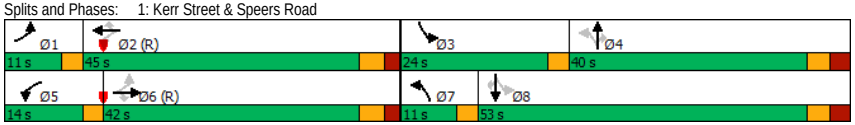
Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	660	90	190	525	180	100	120	370	375	160	70
Future Volume (vph)	85	660	90	190	525	180	100	120	370	375	160	70
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	11.0	42.0	42.0	14.0	45.0	45.0	11.0	40.0	40.0	24.0	53.0	53.0
Total Split (%)	9.2%	35.0%	35.0%	11.7%	37.5%	37.5%	9.2%	33.3%	33.3%	20.0%	44.2%	44.2%
Maximum Green (s)	8.0	36.1	36.1	11.0	39.1	39.1	8.0	33.7	33.7	21.0	46.7	46.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	99	767	105	221	610	209	116	140	430	436	186	81
v/c Ratio	0.23	0.58	0.17	0.61	0.41	0.27	0.30	0.34	0.88	0.47	0.36	0.17
Control Delay	17.6	33.3	5.6	25.7	26.8	4.8	23.3	39.5	40.8	25.3	34.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	33.3	5.6	25.7	26.8	4.8	23.3	39.5	40.8	25.3	34.4	6.1
Queue Length 50th (m)	11.0	78.1	0.0	26.7	52.5	0.0	16.9	27.6	50.1	35.1	34.8	0.0
Queue Length 95th (m)	23.1	101.9	9.8	#50.2	75.2	13.9	23.0	38.8	74.9	36.9	44.2	8.6
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	428	1333	630	364	1489	766	394	539	568	997	718	637
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.58	0.17	0.61	0.41	0.27	0.29	0.26	0.76	0.44	0.26	0.13

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	660	90	190	525	180	100	120	370	375	160	70
Future Volume (vph)	85	660	90	190	525	180	100	120	370	375	160	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.93	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1799	3406	1437	1685	3438	1495	1675	1881	1429	3203	1845	1511
Flt Permitted	0.39	1.00	1.00	0.23	1.00	1.00	0.64	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	731	3406	1437	406	3438	1495	1129	1881	1429	1897	1845	1511
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	99	767	105	221	610	209	116	140	430	436	186	81
RTOR Reduction (vph)	0	0	64	0	0	119	0	0	174	0	0	58
Lane Group Flow (vph)	99	767	41	221	610	90	116	140	256	436	186	23
Confl. Peds. (#/hr)	15		10	10		15	20		35	35		20
Heavy Vehicles (%)	0%	6%	7%	7%	5%	4%	6%	1%	5%	5%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	54.9	46.9	46.9	62.9	51.9	51.9	34.6	26.3	26.3	44.9	33.6	33.6
Effective Green, g (s)	54.9	46.9	46.9	62.9	51.9	51.9	34.6	26.3	26.3	44.9	33.6	33.6
Actuated g/C Ratio	0.46	0.39	0.39	0.52	0.43	0.43	0.29	0.22	0.22	0.37	0.28	0.28
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	405	1331	561	351	1486	646	363	412	313	879	516	423
v/s Ratio Prot	0.02	0.23		c0.07	0.18		0.02	0.07		c0.06	0.10	
v/s Ratio Perm	0.10		0.03	c0.26		0.06	0.07		c0.18	0.12		0.02
v/c Ratio	0.24	0.58	0.07	0.63	0.41	0.14	0.32	0.34	0.82	0.50	0.36	0.05
Uniform Delay, d1	18.8	28.7	22.9	17.8	23.5	20.6	32.6	39.5	44.6	27.3	34.6	31.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.8	0.3	3.0	0.8	0.5	0.4	0.7	15.8	0.3	0.6	0.1
Delay (s)	19.0	30.6	23.2	20.8	24.3	21.0	33.0	40.2	60.4	27.6	35.2	31.7
Level of Service	B	C	C	C	C	C	C	D	E	C	D	C
Approach Delay (s)		28.6			22.9			51.7			30.1	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	73.5%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	205	1215	610	5	245
Future Volume (vph)	205	1215	610	5	245
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	35.0	109.0	74.0	31.0	31.0
Total Split (%)	25.0%	77.9%	52.9%	22.1%	22.1%
Maximum Green (s)	29.0	102.4	67.4	25.2	25.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 99 (71%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	241	1429	742	6	288
v/c Ratio	0.42	0.49	0.30	0.05	0.63
Control Delay	4.4	3.8	7.3	60.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	3.8	7.3	60.6	12.9
Queue Length 50th (m)	9.4	44.3	33.4	1.6	0.0
Queue Length 95th (m)	14.5	52.9	43.6	5.7	11.7
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	725	2905	2501	324	705
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	0.33	0.49	0.30	0.02	0.41

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	205	1215	610	20	5	245
Future Volume (vph)	205	1215	610	20	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1686	3471	3450		1805	2608
Flt Permitted	0.34	1.00	1.00		0.95	1.00
Satd. Flow (perm)	595	3471	3450		1805	2608
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	241	1429	718	24	6	288
RTOR Reduction (vph)	0	0	1	0	0	267
Lane Group Flow (vph)	241	1429	741	0	6	21
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	7%	4%	4%	5%	0%	9%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	117.2	117.2	101.5		10.4	10.4
Effective Green, g (s)	117.2	117.2	101.5		10.4	10.4
Actuated g/C Ratio	0.84	0.84	0.72		0.07	0.07
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	573	2905	2501		134	193
v/s Ratio Prot	0.03	c0.41	0.21		0.00	
v/s Ratio Perm	0.32					c0.01
v/c Ratio	0.42	0.49	0.30		0.04	0.11
Uniform Delay, d1	2.7	3.2	6.7		60.2	60.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.6	0.3		0.1	0.3
Delay (s)	3.3	3.8	7.0		60.3	60.7
Level of Service	A	A	A		E	E
Approach Delay (s)		3.7	7.0		60.7	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	765	15	0	775	20	5	0	50	0	0	0
Future Volume (Veh/h)	5	765	15	0	775	20	5	0	50	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	869	17	0	881	23	6	0	57	0	0	0
Pedestrians								5			2	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	906			891			1335	1800	448	1398	1798	454
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	632			891			1117	1644	448	1189	1640	121
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	100	90	100	100	100
cM capacity (veh/h)	848			766			143	88	547	114	88	807

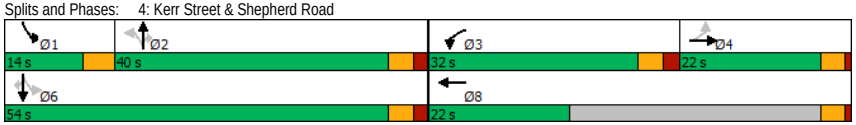
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	6	579	307	587	317	63	0
Volume Left	6	0	0	0	0	6	0
Volume Right	0	0	17	0	23	57	0
cSH	848	1700	1700	1700	1700	432	1700
Volume to Capacity	0.01	0.34	0.18	0.35	0.19	0.15	0.00
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	3.9	0.0
Control Delay (s)	9.3	0.0	0.0	0.0	0.0	14.8	0.0
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		14.8	0.0
Approach LOS						B	A

Intersection Summary					
Average Delay		0.5			
Intersection Capacity Utilization	Err%		ICU Level of Service		H
Analysis Period (min)		15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	55	10	85	5	55	270	70	105	490	20
Future Volume (vph)	55	10	85	5	55	270	70	105	490	20
Turn Type	Perm	NA	Prot	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8		2		1	6	
Permitted Phases	4				2		2	6		6
Detector Phase	4	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	10.0	5.0	18.0	18.0	18.0	7.0	18.0	18.0
Minimum Split (s)	22.0	22.0	31.4	22.0	28.2	28.2	28.2	11.0	28.2	28.2
Total Split (s)	22.0	22.0	32.0	22.0	40.0	40.0	40.0	14.0	54.0	54.0
Total Split (%)	20.4%	20.4%	29.6%	20.4%	37.0%	37.0%	37.0%	13.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	26.6	18.0	34.8	34.8	34.8	10.0	48.8	48.8
Yellow Time (s)	3.0	3.0	3.3	3.0	3.3	3.3	3.3	4.0	3.3	3.3
All-Red Time (s)	1.0	1.0	2.1	1.0	1.9	1.9	1.9	0.0	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.4	4.0	5.2	5.2	5.2	4.0	5.2	5.2
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	2.5	3.5	3.5
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	10.0	7.0	10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	11.0	11.0	16.0	11.0	13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	5	5	5		5	5

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 59.9
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



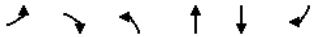
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	49	93	219	60	297	77	115	538	22
v/c Ratio	0.34	0.18	0.29	0.32	0.21	0.25	0.13	0.20	0.32	0.03
Control Delay	32.3	13.8	28.6	4.0	21.4	18.7	3.3	10.6	11.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	13.8	28.6	4.0	21.4	18.7	3.3	10.6	11.2	0.1
Queue Length 50th (m)	6.4	1.1	9.7	0.3	5.3	13.8	0.0	6.8	19.2	0.0
Queue Length 95th (m)	18.4	9.9	25.2	12.4	16.0	27.2	5.7	17.0	34.8	0.3
Internal Link Dist (m)		47.8		241.3		143.2			36.7	
Turn Bay Length (m)					50.0		50.0	50.0		50.0
Base Capacity (vph)	384	565	809	1323	534	2200	963	616	2773	1291
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.09	0.11	0.17	0.11	0.14	0.08	0.19	0.19	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	10	35	85	5	195	55	270	70	105	490	20
Future Volume (vph)	55	10	35	85	5	195	55	270	70	105	490	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		5.4	4.0		5.2	5.2	5.2	4.0	5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1800	1654		1671	1596		1805	3539	1495	1783	3505	1615
Flt Permitted	0.62	1.00		0.95	1.00		0.45	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	1177	1654		1671	1596		858	3539	1495	895	3505	1615
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	60	11	38	93	5	214	60	297	77	115	538	22
RTOR Reduction (vph)	0	32	0	0	137	0	0	0	52	0	0	11
Lane Group Flow (vph)	60	17	0	93	82	0	60	297	25	115	538	11
Confl. Peds. (#/hr)	4		7	7		4			6	6		
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	2%	5%	1%	3%	0%
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)	9.0	9.0		7.8	22.2		20.4	20.4	20.4	30.3	30.3	30.3
Effective Green, g (s)	9.0	9.0		7.8	22.2		20.4	20.4	20.4	30.3	30.3	30.3
Actuated g/C Ratio	0.15	0.15		0.13	0.36		0.33	0.33	0.33	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		5.4	4.0		5.2	5.2	5.2	4.0	5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.5	3.5	3.5	2.5	3.5	3.5
Lane Grp Cap (vph)	171	241		211	574		283	1170	494	524	1721	793
v/s Ratio Prot		0.01		c0.06	0.05			0.08		0.02	c0.15	
v/s Ratio Perm	c0.05						0.07		0.02	0.09		0.01
v/c Ratio	0.35	0.07		0.44	0.14		0.21	0.25	0.05	0.22	0.31	0.01
Uniform Delay, d1	23.7	22.7		24.9	13.3		14.9	15.1	14.1	8.7	9.4	8.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1		1.5	0.1		0.4	0.1	0.1	0.2	0.1	0.0
Delay (s)	25.0	22.9		26.4	13.4		15.3	15.2	14.1	8.8	9.6	8.1
Level of Service	C	C		C	B		B	B	B	A	A	A
Approach Delay (s)		24.0			17.3			15.0			9.4	
Approach LOS		C			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	18.6	
Intersection Capacity Utilization	62.5%	ICU Level of Service	B	
Analysis Period (min)	15			

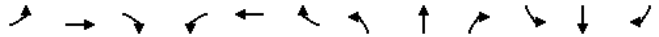
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	105	255	255	520	125
Future Volume (Veh/h)	5	105	255	255	520	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	112	271	271	553	133
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	1297	343	686			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1297	343	686			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	83	70			
cM capacity (veh/h)	109	650	904			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	5	112	271	136	136	369	317
Volume Left	5	0	271	0	0	0	0
Volume Right	0	112	0	0	0	0	133
cSH	109	650	904	1700	1700	1700	1700
Volume to Capacity	0.05	0.17	0.30	0.08	0.08	0.22	0.19
Queue Length 95th (m)	1.1	4.7	9.6	0.0	0.0	0.0	0.0
Control Delay (s)	39.5	11.7	10.7	0.0	0.0	0.0	0.0
Lane LOS	E	B	B				
Approach Delay (s)	12.9		5.3			0.0	
Approach LOS	B						

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	45.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	5	0	75	5	510	5	40	395	5
Future Volume (Veh/h)	5	0	5	5	0	75	5	510	5	40	395	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	6	0	6	6	0	89	6	607	6	48	470	6
Pedestrians		15			30			1			1	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.90	0.90	0.84	0.90	0.90	0.90	0.84			0.90		
vC, conflicting volume	1296	1239	489	1228	1239	641	491			643		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1012	948	303	936	948	541	306			544		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.3	4.3			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.6	3.5	4.0	3.4	2.3			2.3		
p0 queue free %	96	100	99	97	100	81	99			94		
cM capacity (veh/h)	145	212	557	197	212	458	983			872		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	95	619	524
Volume Left	6	6	6	48
Volume Right	6	89	6	6
cSH	229	422	983	872
Volume to Capacity	0.05	0.22	0.01	0.06
Queue Length 95th (m)	1.3	6.5	0.1	1.3
Control Delay (s)	21.6	16.0	0.2	1.5
Lane LOS	C	C	A	A
Approach Delay (s)	21.6	16.0	0.2	1.5
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	59.4%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	10	5	490	360	45
Future Volume (Veh/h)	30	10	5	490	360	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	12	6	576	424	53
Pedestrians	18			4	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.92	0.91	0.91			
vC, conflicting volume	1058	472	495			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	786	365	390			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	98	99			
cM capacity (veh/h)	326	607	1050			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	582	477
Volume Left	35	6	0
Volume Right	12	0	53
cSH	370	1050	1700
Volume to Capacity	0.13	0.01	0.28
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	16.1	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.1	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		41.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	25	20	35	5	390	40	300
Future Volume (vph)	35	25	20	35	5	390	40	300
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	79	152	506	452
v/c Ratio	0.27	0.40	0.44	0.43
Control Delay	23.8	14.2	9.2	9.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.8	14.2	9.2	9.1
Queue Length 50th (m)	9.6	8.7	22.1	19.2
Queue Length 95th (m)	15.4	16.7	56.4	50.6
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	463	563	1156	1057
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	0.27	0.44	0.43

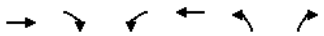
Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	25	5	20	35	70	5	390	20	40	300	30
Future Volume (vph)	35	25	5	20	35	70	5	390	20	40	300	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.97			1.00			0.99	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.99			0.92			0.99			0.99	
Flt Protected		0.97			0.99			1.00			0.99	
Satd. Flow (prot)		1714			1625			1774			1756	
Flt Permitted		0.79			0.94			1.00			0.91	
Satd. Flow (perm)		1400			1545			1767			1613	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	30	6	24	43	85	6	476	24	49	366	37
RTOR Reduction (vph)	0	5	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	74	0	0	84	0	0	505	0	0	449	0
Confl. Peds. (#/hr)	20		20	20		20	30		35	35		30
Heavy Vehicles (%)	2%	7%	16%	0%	5%	4%	28%	6%	0%	2%	6%	6%
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)		15.2			15.2			49.0			49.0	
Effective Green, g (s)		15.2			15.2			49.0			49.0	
Actuated g/C Ratio		0.20			0.20			0.65			0.65	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		283			313			1154			1053	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.05			c0.29			0.28	
v/c Ratio		0.26			0.27			0.44			0.43	
Uniform Delay, d1		25.2			25.2			6.3			6.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			0.6			1.2			0.3	
Delay (s)		25.9			25.8			7.5			6.5	
Level of Service		C			C			A			A	
Approach Delay (s)		25.9			25.8			7.5			6.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1375	30	0	875	20	5
Future Volume (Veh/h)	1375	30	0	875	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1637	36	0	1042	24	6
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.72		0.75	0.72
vC, conflicting volume			1673		2177	838
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1169		1578	16
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		69	99
cM capacity (veh/h)			438		77	772

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1091	582	521	521	30
Volume Left	0	0	0	0	24
Volume Right	0	36	0	0	6
cSH	1700	1700	1700	1700	94
Volume to Capacity	0.64	0.34	0.31	0.31	0.32
Queue Length 95th (m)	0.0	0.0	0.0	0.0	9.3
Control Delay (s)	0.0	0.0	0.0	0.0	60.7
Lane LOS					F
Approach Delay (s)	0.0		0.0		60.7
Approach LOS					F

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	49.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	20	5	0	25	5
Future Volume (Veh/h)	0	20	5	0	25	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	0	22	6	0	28	6
Pedestrians			2			13
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	70	19			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70	19			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	922	1052			1628	

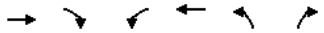
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	22	6	34
Volume Left	0	0	28
Volume Right	22	0	0
cSH	1052	1700	1628
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (m)	0.5	0.0	0.4
Control Delay (s)	8.5	0.0	6.0
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	6.0
Approach LOS	A		

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	21.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	15	0	0	20	5
Future Volume (Veh/h)	10	15	0	0	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	17	0	0	22	6
Pedestrians	16			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			28		36	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			28		36	22
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1599		968	1060

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	28	0	28
Volume Left	0	0	22
Volume Right	17	0	6
cSH	1700	1700	986
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	8.8
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.8
Approach LOS			A

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			



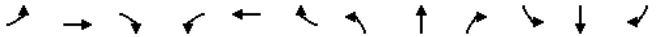
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	5	0	0	0	30
Future Volume (Veh/h)	10	5	0	0	0	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	6	0	0	0	34
Pedestrians	11			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			17		25	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		25	17
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1613		986	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	0	34
Volume Left	0	0	0
Volume Right	6	0	34
cSH	1700	1700	1065
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	8.5
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.5
Approach LOS			A

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
13: PUDO Exit/Speers Internal Road 2 & Speers Internal Road/30 Speers

Future Total AM
50 Speers Road (8013-02)



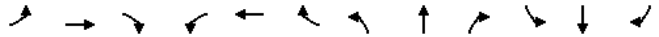
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	0	0	0	0	25	0	0	0	5	0	0
Future Volume (Veh/h)	40	0	0	0	0	25	0	0	0	5	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	50	0	0	0	0	31	0	0	0	6	0	0
Pedestrians		3			9			17			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			2			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	50	24	20	38	24	13	3			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50	24	20	38	24	13	3			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	100	100	100	97	100			100		
cM capacity (veh/h)	911	861	1044	939	861	1060	1628			1611		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	31	0	6
Volume Left	50	0	0	6
Volume Right	0	31	0	0
cSH	911	1060	1700	1611
Volume to Capacity	0.05	0.03	0.00	0.00
Queue Length 95th (m)	1.3	0.7	0.0	0.1
Control Delay (s)	9.2	8.5	0.0	7.2
Lane LOS	A	A		A
Approach Delay (s)	9.2	8.5	0.0	7.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	8.8			
Intersection Capacity Utilization	23.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Speers Internal Road 2/41 Speers Driveway & Speers Road

Future Total AM
50 Speers Road (8013-02)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1380	0	5	850	0	25	0	40	0	0	0
Future Volume (Veh/h)	0	1380	0	5	850	0	25	0	40	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.86	0.86	0.86	0.86	0.92	0.86	0.92	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	1605	0	6	988	0	29	0	47	0	0	0
Pedestrians		4			4			11				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.93			0.74			0.78	0.78	0.74	0.78	0.78	0.93
vC, conflicting volume	988			1616			2126	2616	818	1854	2616	498
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	847			1139			1495	2126	65	1144	2126	323
tC, single (s)	4.1			4.1			7.7	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			52	100	94	100	100	100
cM capacity (veh/h)	734			457			60	37	727	110	37	626

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	802	802	335	659	76	0
Volume Left	0	0	6	0	29	0
Volume Right	0	0	0	0	47	0
cSH	1700	1700	457	1700	139	1700
Volume to Capacity	0.47	0.47	0.01	0.39	0.55	0.00
Queue Length 95th (m)	0.0	0.0	0.3	0.0	20.4	0.0
Control Delay (s)	0.0	0.0	0.4	0.0	58.1	0.0
Lane LOS			A		F	A
Approach Delay (s)	0.0		0.1		58.1	0.0
Approach LOS					F	A

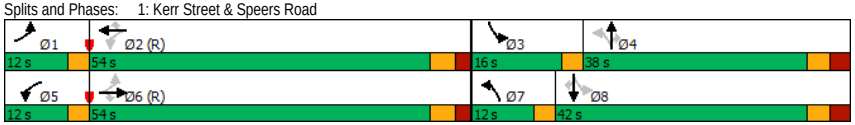
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	580	130	300	845	505	140	165	235	305	240	45
Future Volume (vph)	165	580	130	300	845	505	140	165	235	305	240	45
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	25.0	25.0	7.0	25.0	25.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	10.0	30.9	30.9	10.0	30.9	30.9	10.0	34.3	34.3	10.0	34.3	34.3
Total Split (s)	12.0	54.0	54.0	12.0	54.0	54.0	12.0	38.0	38.0	16.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	45.0%	10.0%	31.7%	31.7%	13.3%	35.0%	35.0%
Maximum Green (s)	9.0	48.1	48.1	9.0	48.1	48.1	9.0	31.7	31.7	13.0	35.7	35.7
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.3	3.3	3.0	3.3	3.3
All-Red Time (s)	0.0	2.2	2.2	0.0	2.2	2.2	0.0	3.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		15	15		15	15		35	35		35	35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kerr Street & Speers Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	174	611	137	316	889	532	147	174	247	321	253	47
v/c Ratio	0.45	0.38	0.17	0.60	0.50	0.54	0.53	0.56	0.55	0.48	0.72	0.14
Control Delay	14.2	23.3	4.3	15.9	22.7	5.4	37.2	52.4	10.0	32.5	57.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.2	23.3	4.3	15.9	22.7	5.4	37.2	52.4	10.0	32.5	57.6	2.9
Queue Length 50th (m)	16.4	51.1	0.0	32.7	73.8	6.4	25.0	37.6	0.0	28.4	56.6	0.0
Queue Length 95th (m)	29.0	69.7	11.9	53.2	105.0	34.6	38.8	57.6	21.3	37.6	78.5	3.1
Internal Link Dist (m)		211.8			123.2			103.4			143.2	
Turn Bay Length (m)	105.0		75.0	75.0		100.0	50.0		45.0	80.0		75.0
Base Capacity (vph)	394	1625	790	530	1765	981	279	501	574	689	565	503
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.38	0.17	0.60	0.50	0.54	0.53	0.35	0.43	0.47	0.45	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	580	130	300	845	505	140	165	235	305	240	45
Future Volume (vph)	165	580	130	300	845	505	140	165	235	305	240	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.94	1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1801	3539	1560	1750	3539	1485	1765	1900	1486	3371	1900	1501
Flt Permitted	0.26	1.00	1.00	0.34	1.00	1.00	0.38	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	491	3539	1560	625	3539	1485	707	1900	1486	1591	1900	1501
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	174	611	137	316	889	532	147	174	247	321	253	47
RTOR Reduction (vph)	0	0	74	0	0	241	0	0	206	0	0	38
Lane Group Flow (vph)	174	611	63	316	889	291	147	174	41	321	253	9
Confl. Peds. (#/hr)	30		5	5		30	35		35	35		35
Heavy Vehicles (%)	0%	2%	0%	3%	2%	2%	1%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	65.0	55.0	55.0	72.8	59.8	59.8	29.6	19.8	19.8	34.4	22.2	22.2
Effective Green, g (s)	65.0	55.0	55.0	72.8	59.8	59.8	29.6	19.8	19.8	34.4	22.2	22.2
Actuated g/C Ratio	0.54	0.46	0.46	0.61	0.50	0.50	0.25	0.17	0.17	0.29	0.18	0.18
Clearance Time (s)	3.0	5.9	5.9	3.0	5.9	5.9	3.0	6.3	6.3	3.0	6.3	6.3
Vehicle Extension (s)	2.5	5.5	5.5	2.5	5.5	5.5	2.5	4.0	4.0	2.5	4.0	4.0
Lane Grp Cap (vph)	375	1622	715	517	1763	740	260	313	245	637	351	277
v/s Ratio Prot	0.04	0.17		c0.08	0.25		c0.05	0.09		c0.05	c0.13	
v/s Ratio Perm	0.21		0.04	c0.30		0.20	0.09		0.03	0.09		0.01
v/c Ratio	0.46	0.38	0.09	0.61	0.50	0.39	0.57	0.56	0.17	0.50	0.72	0.03
Uniform Delay, d1	14.6	21.3	18.3	12.2	20.2	18.8	37.4	46.1	43.0	34.0	46.0	40.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.7	0.2	1.8	1.0	1.6	2.3	2.6	0.4	0.5	7.6	0.1
Delay (s)	15.3	21.9	18.6	14.0	21.2	20.4	39.7	48.7	43.5	34.4	53.6	40.1
Level of Service	B	C	B	B	C	C	D	D	D	C	D	D
Approach Delay (s)		20.2			19.6			44.1			42.7	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	260	815	1200	10	420
Future Volume (vph)	260	815	1200	10	420
Turn Type	pm+pt	NA	NA	Prot	Perm
Protected Phases	5	2	6	4	
Permitted Phases	2				4
Detector Phase	5	2	6	4	4
Switch Phase					
Minimum Initial (s)	6.0	38.0	38.0	10.0	10.0
Minimum Split (s)	12.0	47.6	47.6	15.8	15.8
Total Split (s)	17.0	102.0	85.0	38.0	38.0
Total Split (%)	12.1%	72.9%	60.7%	27.1%	27.1%
Maximum Green (s)	11.0	95.4	78.4	32.2	32.2
Yellow Time (s)	4.0	3.7	3.7	3.3	3.3
All-Red Time (s)	2.0	2.9	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.6	6.6	5.8	5.8
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Vehicle Extension (s)	3.5	5.0	5.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None
Walk Time (s)		10.0	10.0		
Flash Dont Walk (s)		31.0	31.0		
Pedestrian Calls (#/hr)		5	5		

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 13 (9%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Speers Road & Cross Avenue

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	271	849	1266	10	438
v/c Ratio	0.64	0.29	0.56	0.06	0.79
Control Delay	16.5	3.7	16.9	55.2	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	3.7	16.9	55.2	27.7
Queue Length 50th (m)	12.8	23.0	94.0	2.6	18.1
Queue Length 95th (m)	47.6	39.7	147.2	7.8	37.0
Internal Link Dist (m)		209.1	77.5	60.0	
Turn Bay Length (m)	80.0			45.0	
Base Capacity (vph)	421	2940	2259	415	874
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	0.64	0.29	0.56	0.02	0.50

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	260	815	1200	15	10	420
Future Volume (vph)	260	815	1200	15	10	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6	6.6		5.8	5.8
Lane Util. Factor	1.00	0.95	0.95		1.00	0.88
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1703	3610	3567		1805	2733
Flt Permitted	0.15	1.00	1.00		0.95	1.00
Satd. Flow (perm)	270	3610	3567		1805	2733
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	271	849	1250	16	10	438
RTOR Reduction (vph)	0	0	0	0	0	288
Lane Group Flow (vph)	271	849	1266	0	10	150
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	6%	0%	1%	0%	0%	4%
Turn Type	pm+pt	NA	NA		Prot	Perm
Protected Phases	5	2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	114.0	114.0	88.4		13.6	13.6
Effective Green, g (s)	114.0	114.0	88.4		13.6	13.6
Actuated g/C Ratio	0.81	0.81	0.63		0.10	0.10
Clearance Time (s)	6.0	6.6	6.6		5.8	5.8
Vehicle Extension (s)	3.5	5.0	5.0		3.0	3.0
Lane Grp Cap (vph)	420	2939	2252		175	265
v/s Ratio Prot	c0.09	0.24	0.35		0.01	
v/s Ratio Perm	c0.44					c0.05
v/c Ratio	0.65	0.29	0.56		0.06	0.57
Uniform Delay, d1	13.1	3.2	14.7		57.4	60.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	0.2	1.0		0.1	2.8
Delay (s)	16.6	3.4	15.8		57.5	63.1
Level of Service	B	A	B		E	E
Approach Delay (s)		6.6	15.8		63.0	
Approach LOS		A	B		E	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	785	25	0	1005	25	5	0	25	5	0	0
Future Volume (Veh/h)	10	785	25	0	1005	25	5	0	25	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	818	26	0	1047	26	5	0	26	5	0	0
Pedestrians		1			1			5			8	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					236							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	1081			849			1380	1937	428	1524	1937	546
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	693			849			1053	1722	428	1225	1722	49
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	95	95	100	100
cM capacity (veh/h)	753			794			149	73	578	106	73	838

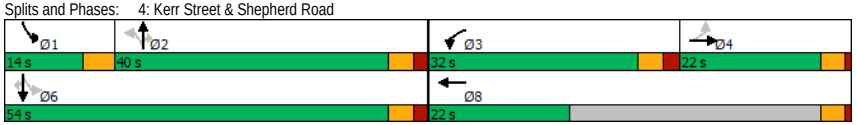
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	10	545	299	698	375	31	5
Volume Left	10	0	0	0	0	5	5
Volume Right	0	0	26	0	26	26	0
cSH	753	1700	1700	1700	1700	394	106
Volume to Capacity	0.01	0.32	0.18	0.41	0.22	0.08	0.05
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	1.9	1.1
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	14.9	40.7
Lane LOS	A					B	E
Approach Delay (s)	0.1			0.0		14.9	40.7
Approach LOS						B	E

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	Err%	ICU Level of Service		H
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	35	5	95	10	120	580	125	190	495	50
Future Volume (vph)	35	5	95	10	120	580	125	190	495	50
Turn Type	Perm	NA	Prot	NA	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	3	8		2		1	6	
Permitted Phases	4				2		2	6		6
Detector Phase	4	4	3	8	2	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	10.0	5.0	18.0	18.0	18.0	7.0	18.0	18.0
Minimum Split (s)	22.0	22.0	31.4	22.0	28.2	28.2	28.2	11.0	28.2	28.2
Total Split (s)	22.0	22.0	32.0	22.0	40.0	40.0	40.0	14.0	54.0	54.0
Total Split (%)	20.4%	20.4%	29.6%	20.4%	37.0%	37.0%	37.0%	13.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	26.6	18.0	34.8	34.8	34.8	10.0	48.8	48.8
Yellow Time (s)	3.0	3.0	3.3	3.0	3.3	3.3	3.3	4.0	3.3	3.3
All-Red Time (s)	1.0	1.0	2.1	1.0	1.9	1.9	1.9	0.0	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	5.4	4.0	5.2	5.2	5.2	4.0	5.2	5.2
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	2.5	3.5	3.5
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	10.0	7.0	10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	11.0	11.0	16.0	11.0	13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0	0	0	5	5	5		5	5

Intersection Summary
Cycle Length: 108
Actuated Cycle Length: 61.2
Natural Cycle: 95
Control Type: Semi Act-Uncoord

Splits and Phases: 4: Kerr Street & Shepherd Road



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	36	36	98	180	124	598	129	196	510	52
v/c Ratio	0.24	0.16	0.31	0.31	0.42	0.49	0.21	0.39	0.26	0.06
Control Delay	32.4	15.1	29.0	5.1	24.3	19.7	5.1	10.9	9.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	15.1	29.0	5.1	24.3	19.7	5.1	10.9	9.2	2.4
Queue Length 50th (m)	3.9	0.5	10.3	0.7	11.8	31.0	0.0	11.5	17.2	0.0
Queue Length 95th (m)	13.4	8.6	26.9	12.7	29.5	52.4	10.7	25.9	31.2	3.9
Internal Link Dist (m)		75.4		241.3		143.2			50.1	
Turn Bay Length (m)					50.0		50.0	50.0		50.0
Base Capacity (vph)	374	516	798	1338	525	2130	968	532	2904	1297
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.07	0.12	0.13	0.24	0.28	0.13	0.37	0.18	0.04

Intersection Summary

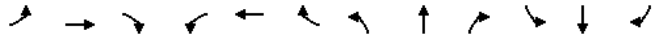
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	30	95	10	165	120	580	125	190	495	50
Future Volume (vph)	35	5	30	95	10	165	120	580	125	190	495	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		5.4	4.0		5.2	5.2	5.2	4.0	5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.98		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
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1796	1618		1752	1588		1805	3574	1543	1804	3574	1582
Flt Permitted	0.65	1.00		0.95	1.00		0.46	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1220	1618		1752	1588		882	3574	1543	558	3574	1582
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	36	5	31	98	10	170	124	598	129	196	510	52
RTOR Reduction (vph)	0	28	0	0	116	0	0	0	86	0	0	24
Lane Group Flow (vph)	36	8	0	98	64	0	124	598	43	196	510	28
Confl. Peds. (#/hr)	6		13	13		6			4	4		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	0%	3%	0%	1%	0%	1%	2%	0%	1%	0%
Turn Type	Perm	NA		Prot	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4						2		2	6		6
Actuated Green, G (s)	6.2	6.2		8.4	20.0		20.9	20.9	20.9	33.8	33.8	33.8
Effective Green, g (s)	6.2	6.2		8.4	20.0		20.9	20.9	20.9	33.8	33.8	33.8
Actuated g/C Ratio	0.10	0.10		0.13	0.32		0.33	0.33	0.33	0.54	0.54	0.54
Clearance Time (s)	4.0	4.0		5.4	4.0		5.2	5.2	5.2	4.0	5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.5	3.5	3.5	2.5	3.5	3.5
Lane Grp Cap (vph)	120	159		233	504		292	1185	511	475	1917	848
v/s Ratio Prot		0.00		c0.06	0.04			c0.17		c0.06	0.14	
v/s Ratio Perm	c0.03						0.14		0.03	0.16		0.02
v/c Ratio	0.30	0.05		0.42	0.13		0.42	0.50	0.08	0.41	0.27	0.03
Uniform Delay, d1	26.4	25.7		25.1	15.3		16.4	16.9	14.5	8.2	7.9	6.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1		1.2	0.1		1.2	0.4	0.1	0.4	0.1	0.0
Delay (s)	27.8	25.9		26.3	15.4		17.6	17.3	14.6	8.6	8.0	6.9
Level of Service	C	C		C	B		B	B	B	A	A	A
Approach Delay (s)		26.8			19.2			16.9			8.1	
Approach LOS		C			B			B			A	

Intersection Summary				
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	18.6	
Intersection Capacity Utilization	62.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	175	150	640	545	110
Future Volume (Veh/h)	25	175	150	640	545	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	27	186	160	681	580	117
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.1					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1304	354	702			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1304	354	702			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	78	71	81			
cM capacity (veh/h)	125	634	861			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	27	186	160	340	340	387	310
Volume Left	27	0	160	0	0	0	0
Volume Right	0	186	0	0	0	0	117
cSH	125	634	861	1700	1700	1700	1700
Volume to Capacity	0.22	0.29	0.19	0.20	0.20	0.23	0.18
Queue Length 95th (m)	5.9	9.3	5.2	0.0	0.0	0.0	0.0
Control Delay (s)	41.5	13.0	10.1	0.0	0.0	0.0	0.0
Lane LOS	E	B	B				
Approach Delay (s)	16.6		1.9			0.0	
Approach LOS	C						

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	10	10	0	30	5	505	10	20	625	25
Future Volume (Veh/h)	10	0	10	10	0	30	5	505	10	20	625	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	11	11	0	32	5	532	11	21	658	26
Pedestrians		21			31			1			4	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			3			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								238			127	
pX, platoon unblocked	0.80	0.80	0.77	0.80	0.80	0.94	0.77			0.94		
vC, conflicting volume	1318	1318	693	1304	1326	572	705			574		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1096	1097	448	1079	1106	511	463			513		
tC, single (s)	7.1	7.0	6.2	7.1	6.5	6.2	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.5	3.3	3.5	4.0	3.3	2.4			2.2		
p0 queue free %	92	100	98	92	100	94	99			98		
cM capacity (veh/h)	133	129	462	141	157	515	760			946		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	43	548	705
Volume Left	11	11	5	21
Volume Right	11	32	11	26
cSH	206	307	760	946
Volume to Capacity	0.11	0.14	0.01	0.02
Queue Length 95th (m)	2.7	3.7	0.2	0.5
Control Delay (s)	24.5	18.6	0.2	0.6
Lane LOS	C	C	A	A
Approach Delay (s)	24.5	18.6	0.2	0.6
Approach LOS	C	C		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	10	5	505	605	40
Future Volume (Veh/h)	15	10	5	505	605	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	11	5	532	637	42
Pedestrians	34			2	1	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				103	262	
pX, platoon unblocked	0.84	0.80	0.80			
vC, conflicting volume	1235	694	713			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936	490	514			
tC, single (s)	6.4	6.3	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.4			
p0 queue free %	93	97	99			
cM capacity (veh/h)	241	434	747			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	537	679
Volume Left	16	5	0
Volume Right	11	0	42
cSH	294	747	1700
Volume to Capacity	0.09	0.01	0.40
Queue Length 95th (m)	2.3	0.2	0.0
Control Delay (s)	18.5	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	18.5	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		45.1%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	10	10	15	10	385	55	510
Future Volume (vph)	50	10	10	15	10	385	55	510
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	24.0	24.0	6.0	24.0
Minimum Split (s)	30.0	30.0	30.0	30.0	32.0	32.0	10.0	32.0
Total Split (s)	30.0	30.0	30.0	30.0	35.0	35.0	10.0	45.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	46.7%	46.7%	13.3%	60.0%
Maximum Green (s)	24.6	24.6	24.6	24.6	29.6	29.6	7.0	39.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.4		5.4		5.4		5.4
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	C-Min	C-Min	None	C-Min
Walk Time (s)	10.0	10.0	10.0	10.0	10.0	10.0		10.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	20	20	20	20	35	35		35

Intersection Summary
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 13 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 8: Kerr Street & Stewart Street

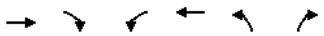
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	81	109	445	668
v/c Ratio	0.29	0.29	0.34	0.55
Control Delay	21.5	9.9	7.8	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	7.8	10.8
Queue Length 50th (m)	8.5	3.4	18.3	33.8
Queue Length 95th (m)	16.4	13.0	54.4	102.5
Internal Link Dist (m)	71.6	36.6	141.0	79.0
Turn Bay Length (m)				
Base Capacity (vph)	447	556	1295	1211
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	0.18	0.20	0.34	0.55

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	15	10	15	75	10	385	15	55	510	50
Future Volume (vph)	50	10	15	10	15	75	10	385	15	55	510	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.4			5.4			5.4			5.4	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.96			1.00			0.99	
Flpb, ped/bikes		0.98			1.00			1.00			1.00	
Frt		0.97			0.90			1.00			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1675			1575			1855			1825	
Flt Permitted		0.77			0.97			0.98			0.93	
Satd. Flow (perm)		1334			1530			1827			1704	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	16	11	16	82	11	418	16	60	554	54
RTOR Reduction (vph)	0	13	0	0	68	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	68	0	0	41	0	0	444	0	0	665	0
Confl. Peds. (#/hr)	20		15	15		20	35		25	25		35
Heavy Vehicles (%)	2%	20%	0%	0%	13%	2%	0%	1%	17%	1%	2%	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)		13.2			13.2			51.0			51.0	
Effective Green, g (s)		13.2			13.2			51.0			51.0	
Actuated g/C Ratio		0.18			0.18			0.68			0.68	
Clearance Time (s)		5.4			5.4			5.4			5.4	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		234			269			1242			1158	
v/s Ratio Prot												
v/s Ratio Perm		c0.05			0.03			0.24			c0.39	
v/c Ratio		0.29			0.15			0.36			0.57	
Uniform Delay, d1		26.8			26.2			5.1			6.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.9			0.4			0.8			0.7	
Delay (s)		27.8			26.5			5.9			7.0	
Level of Service		C			C			A			A	
Approach Delay (s)		27.8			26.5			5.9			7.0	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		13.8	
Intersection Capacity Utilization	81.1%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1050	70	5	1640	10	5
Future Volume (Veh/h)	1050	70	5	1640	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1071	71	5	1673	10	5
Pedestrians	1			1		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	147			347		
pX, platoon unblocked			0.82		0.88	0.82
vC, conflicting volume			1142		1954	572
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			723		880	24
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	99
cM capacity (veh/h)			725		255	858

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	714	428	563	1115	15
Volume Left	0	0	5	0	10
Volume Right	0	71	0	0	5
cSH	1700	1700	725	1700	333
Volume to Capacity	0.42	0.25	0.01	0.66	0.05
Queue Length 95th (m)	0.0	0.0	0.2	0.0	1.1
Control Delay (s)	0.0	0.0	0.2	0.0	16.3
Lane LOS			A		C
Approach Delay (s)	0.0		0.1		16.3
Approach LOS					C

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	58.8%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	15	0	0	70	5
Future Volume (Veh/h)	0	15	0	0	70	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	19	0	0	89	6
Pedestrians			2			8
Lane Width (m)			3.6			3.6
Walking Speed (m/s)			1.1			1.1
Percent Blockage			0			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	186	8			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	8			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			95	
cM capacity (veh/h)	762	1072			1636	

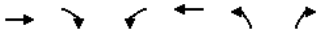
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	19	0	95
Volume Left	0	0	89
Volume Right	19	0	0
cSH	1072	1700	1636
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (m)	0.4	0.0	1.3
Control Delay (s)	8.4	0.0	6.9
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	6.9
Approach LOS	A		

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	16.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	30	40	5	5	10	0
Future Volume (Veh/h)	30	40	5	5	10	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	38	51	6	6	13	0
Pedestrians	13			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			89		94	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			89		94	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1519		896	1002

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	89	12	13
Volume Left	0	6	13
Volume Right	51	0	0
cSH	1700	1519	896
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.3
Control Delay (s)	0.0	3.7	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	3.7	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



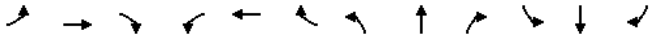
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	10	0	10	0	25
Future Volume (Veh/h)	20	10	0	10	0	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	25	13	0	13	0	32
Pedestrians	10			3		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		54	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		54	34
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1585		950	1041

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	13	32
Volume Left	0	0	0
Volume Right	13	0	32
cSH	1700	1585	1041
Volume to Capacity	0.02	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	8.6
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: PUDO Exit/Speers Internal Road 2 & Speers Internal Road/30 Speers

Future Total PM
50 Speers Road (8013-02)



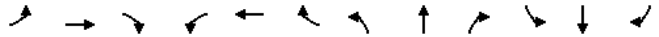
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	20	0	0	0	10	0	0	0	0	0	10
Future Volume (Veh/h)	25	20	0	0	0	10	0	0	0	0	0	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	40	32	0	0	0	16	0	0	0	0	0	16
Pedestrians		3			7			8			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	30	18	19	39	26	10	19			7		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30	18	19	39	26	10	19			7		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	96	100	100	100	99	100			100		
cM capacity (veh/h)	909	872	1054	924	863	1067	1606			1616		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	16	0	16
Volume Left	40	0	0	0
Volume Right	0	16	0	16
cSH	892	1067	1700	1616
Volume to Capacity	0.08	0.01	0.00	0.00
Queue Length 95th (m)	2.0	0.3	0.0	0.0
Control Delay (s)	9.4	8.4	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.4	8.4	0.0	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	7.8			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
14: Speers Internal Road 2/41 Speers Driveway & Speers Road

Future Total PM
50 Speers Road (8013-02)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1055	5	5	1620	0	20	0	15	5	0	5
Future Volume (Veh/h)	0	1055	5	5	1620	0	20	0	15	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.95	0.95	0.95	0.95	0.92	0.95	0.92	0.95	0.92	0.92	0.92
Hourly flow rate (vph)	0	1111	5	5	1705	0	21	0	16	5	0	5
Pedestrians		4			4			8				
Lane Width (m)		3.6			3.6			3.6				
Walking Speed (m/s)		1.1			1.1			1.1				
Percent Blockage		0			0			1				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		261			233							
pX, platoon unblocked	0.79			0.84			0.87	0.87	0.84	0.87	0.87	0.79
vC, conflicting volume	1705			1124			1993	2836	570	2290	2839	856
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1359			775			1027	1999	119	1370	2002	284
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			87	100	98	94	100	99
cM capacity (veh/h)	396			711			161	51	765	88	50	560

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	741	375	573	1137	37	10
Volume Left	0	0	5	0	21	5
Volume Right	0	5	0	0	16	5
cSH	1700	1700	711	1700	245	152
Volume to Capacity	0.44	0.22	0.01	0.67	0.15	0.07
Queue Length 95th (m)	0.0	0.0	0.2	0.0	4.0	1.6
Control Delay (s)	0.0	0.0	0.2	0.0	22.3	30.3
Lane LOS			A		C	D
Approach Delay (s)	0.0		0.1		22.3	30.3
Approach LOS					C	D

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	Err%	ICU Level of Service	H	
Analysis Period (min)	15			

Appendix I
OTM Book 12 Excerpts – Traffic Signal Warrant

4.4 Justification 1 – Minimum Vehicle Volume

Purpose

The Minimum Vehicle Volume Justification is intended for applications where the principal reason for installing a traffic signal is the cumulative delay produced by a large volume of intersecting traffic at an unsignalized intersection.

Justification 1A reflects the lowest total traffic on all approaches, and Justification 1B reflects the lowest volume on the minor road for which the average delay is similar for both signalized and unsignalized conditions. Therefore, this justification is intended to address the minimum volume conditions for which signalization can be used to minimize total average vehicle delay at the intersection.

As volumes increase beyond threshold criteria, delay to traffic on the minor road will increase, and the overall delay for the intersection will be greater than would be the case if minor delays were distributed between both main and minor roadways.

Standard

The need for a traffic signal must be considered if both Justification 1A and Justification 1B are 100% fulfilled.

If Justifications 1A and 1B do not reach or exceed 100%, but are at least 80% fulfilled, the lesser fulfilled of the Justifications 1A or 1B can be used in the assessment of Justification 3, the Combination Justification.

In applying Justification 1 (Minimum Vehicle Volume) for "T" intersections, the justification values for the minor street are increased by 50%. This approach reflects the reduction in traffic volumes due to the lack of one of the approaches.

Table 12 may be used for Justification 1: Minimum Vehicle Volume. Restricted Flow is applicable to Urban Conditions, while Free Flow is applicable to Rural conditions (see Section 4.2 for definitions).

Guidelines

Justification 1 evaluates total intersection volume and total minor road volume. The hours selected should represent the eight highest hours of the 24-hour traffic volume, and they do not have to be consecutive hours. Each one of the highest eight hours of the entering volumes is compared to the justification value. The justification should be met for each of the eight hours. "Sectional Percent" is calculated in Table 12 for reference purposes, and may indicate how close an intersection is to achieving full justification. "Total Across" is calculated by adding all 8-hour compliance percentages. The Compliance % figures used in Table 12 must not exceed 100%.

Table 12 – Justification 1 – Minimum Vehicle Volume

100% SATISFIED – YES ☐ NO ☐
80% SATISFIED – YES ☐ NO ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				PERCENTAGE WARRANT									
APPROACH LANES	1		2 or MORE		HOUR ENDING									
FLOW CONDITION	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐									TOTAL ACROSS	
A. ALL APPROACH LANES	480 (385)	720 (575)	600 (480)	900 (720)										
100% FULFILLED														SECTIONAL PERCENT
80% FULFILLED														
ACTUAL % IF BELOW 80% VALUE														
													TOTAL DOWN / 8 =	
B. MINOR STREET BOTH APPROACHES	120* (95)*	170* (135)*	120* (95)*	170* (135)*									TOTAL ACROSS	
100% FULFILLED														SECTIONAL PERCENT
80% FULFILLED														
ACTUAL % IF BELOW 80% VALUE														
													TOTAL DOWN / 8 =	

* For "T" intersections, these values should be increased by 50%.

4.5 Justification 2 – Delay to Cross Traffic

Purpose

The Delay to Cross Traffic Justification is intended for applications where the traffic volume on the main road is so heavy that traffic on the minor road suffers excessive delay or hazard in entering or crossing the main road.

Standard

The need for a traffic signal must be considered if both Justification 2A and Justification 2B are 100% fulfilled. If Justifications 2A or 2B do not meet or exceed 100%, but both are at least 80% fulfilled, the lesser fulfilled of the justifications 2A or 2B can be used in the assessment of Justification 3, the Combination Justification.

Table 13 may be used for Justification 2: Delay to Cross Traffic. Restricted Flow is applicable to Urban Conditions, while Free Flow is applicable to Rural Conditions (see Section 4.2 for definitions).

Table 13 – Justification 2 – Delay to Cross Traffic

100% SATISFIED – YES ☐ NO ☐
80% SATISFIED – YES ☐ NO ☐

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)				PERCENTAGE WARRANT								
APPROACH LANES	1		2 or MORE		HOUR ENDING								TOTAL ACROSS
FLOW CONDITION	FREE FLOW ☐	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐									
A. MAJOR STREET BOTH APPROACHES	480 (385)	720 (575)	600 (480)	900 (720)									
100% FULFILLED													SECTIONAL PERCENT
80% FULFILLED													
ACTUAL % IF BELOW 80% VALUE													
												TOTAL DOWN / 8 =	

B. TRAFFIC CROSSING MAJOR STREET	50 (40)	75 (60)	50 (40)	75 (60)									TOTAL ACROSS
100% FULFILLED													SECTIONAL PERCENT
80% FULFILLED													
ACTUAL % IF BELOW 80% VALUE													
												TOTAL DOWN / 8 =	

Guidelines

Justification 2 evaluates major road volume and minor road movements that cross the intersection. The hours selected should represent the eight highest hours of the 24-hour traffic volume, and they do not have to be consecutive hours. The entering volumes of each of the highest eight hours are compared to the justification value. The justification is met if the justification value is 100% and fulfilled by each of the eight hours.

"Sectional Percent" is calculated in Table 13 for reference purposes, and may indicate how close an intersection is to achieving full justification. "Total Across" is calculated by adding all 8-hour compliance percentages. The Compliance % figures used in Table 13 must not exceed 100%.

As right turns are not considered as traffic crossing a road, they should be deleted from the combined pedestrian and vehicle volume in the Delay to Cross Traffic Justification. In one-way street systems, left turns from a one-way street into another one-way street should be treated in a similar manner to right turns, and be deleted from the justification.

When applying Justification 2B, the crossing volume consists of the sum of:

1. The number of pedestrians crossing the main road
2. Total left turns from both the side road approaches
3. The highest through volume from one of the side road approaches
4. Fifty percent of the heavier left-turn traffic movement from the main road when both of the following criteria are met:

   a) The left-turn volume is greater than 120 vehicles per hour

   b) The total of the heavier left-turn volume plus its opposing volume is greater than 720 vehicles per hour

e) Pedestrian Grade Separations In cases of very heavy pedestrian and traffic volumes, it may be economically viable to construct pedestrian bridges or tunnels.

4. The priority placed on implementing a new pedestrian crossing device should reflect the proximity and convenience of existing crossings; a higher priority should be placed on crossings where no reasonable alternatives exist within walking distance.

4.10 Justification 7 – Projected Volumes

In some cases, it is desired to determine the future need for traffic signals at an existing or planned intersection. There are two basic scenarios. The first is that the intersection may exist and all that is changing is the addition of one or more developments which will add traffic to the intersection. The second is a development which will require, or be associated with, the construction of one or more new legs at an existing intersection or a completely new intersection or roadway.

The prediction of future traffic demands is based on knowledge of growth in roadway usage, growth of local traffic generators and predicted traffic volumes, obtained from a traffic impact study, transportation planning study, environmental assessment or other similar evaluation. The preferred approach is that eight-hour volume projections are estimated as part of the engineering study and evaluated against Justifications 1, 2 or 3. It is incumbent upon the road authority to ensure that the calculation methodology is sound and is based on good data, so that there is a high level of confidence in the predicted traffic volumes.

For future development, especially where the intersection or road may not exist, eight-hour volumes may be difficult to obtain or predict with the necessary accuracy. If eight-hour volumes are unavailable or not considered to be of sufficient accuracy, Peak Hour Volumes (PHV) may be estimated as part of the transportation studies and reduced to Average Hourly Volumes (AHV) for comparison with traffic signal justifications for projected volumes.

Table 21 – Justification 7 – Projected Volumes

Justification	Description	Minimum Requirement 1 Lane Highways		Minimum Requirement 2 or more lanes		Compliance		
						Sectional		Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900			
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170			
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	720	600	900			
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	120	170			

*Note: For "T" intersections, these values should be increased by 50%.

The Average Hourly Volume for a typical day can be estimated from the Peak Hour Volumes using the following relationships:

$$AHV = \frac{PHV}{2} \quad \textbf{or} \quad AHV = \frac{amPHV + pmPHV}{4}$$

Alternately, the Average Hourly Volume for the eight highest hours of an average day can be estimated from Annual Average Daily Traffic (AADT) volume using the following relationship:

$$AHV = \frac{AADT}{16}$$

Where:

AHV = Average hourly volume

AADT = Annual average daily traffic

Analysis Using Eight-hour Volumes

If eight-hour projections are available, Justifications 1, 2 or 3 should be used. For the situation of an existing intersection with new development, Justifications 1 or 2 need to be met to 100%, or Justification 3 needs to be met to 80%.

For developments where new intersections or roadways are to be built, there is more uncertainty in the volume projections as the estimate requires projections of background traffic as well as development traffic. For this reason, where new intersection or roadway construction is required, Justifications 1 or 2 must be met to 120%.

Analysis Using Average Hour Volume

In the case that the volume estimates are based on the expansion of peak hour volumes or average daily traffic, the effect on Justifications 1 or 2 of the requirement to meet the warrant for each of eight hours would be lessened by averaging. As well, increased uncertainty is introduced by estimating from as little as one hour of traffic volume. For this reason, the thresholds are raised and, for traffic signals to be considered, Justification 7 as per Table 21 is used but with a 20% increase over the required volumes for an existing intersection and a 50% increase for a future intersection or roadway. For example, under restricted flow and two lanes, the AHV for Part 1A of Justification 7 must be met to 900 x 1.20 = 1080 vph.

Note that future volumes may include side street traffic attracted to the new traffic signal since the signal may provide a significant reduction in delay.

Table 22 – Future Development: Volume Expansion Required to Meet Justifications

Roadway Condition	Full Eight-hour Count Estimate Available		AHV Only Available
	Justification 1 or 2	Justification 3	Justification 7
Both Intersecting Roads Exist; Development is Future	100%	80%	120%
One Road, Both Roads and/or Intersection are Future; Development is Future	120%	N/A	150%

Speers Road / East Driveways

Existing Traffic Volumes

	N Approach 41 SPEERS RD						E Approach SPEERS RD						S Approach 50 SPEERS RD (EAST ACCESS)						W Approach SPEERS RD					
Hour Ending	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Total
9:00:00	1	0	1	0	13	2	3	756	0	0	1	759	12	0	13	0	11	25	0	748	1	0	3	749
17:15:00	3	0	3	0	24	6	9	1080	0	0	0	1089	10	0	11	0	9	21	0	913	2	0	0	915
AHV	1	0	1	0	9.25	2	3	459	0	0	0.25	462	5.5	0	6	0	5	11.5	0	415.25	0.75	0	0.75	416

AHV 1 0 1 0 9.25 2 3 459 0 0 0.25 462 5.5 0 6 0 5 11.5 0 415.25 0.75 0 0.75 416 15.25

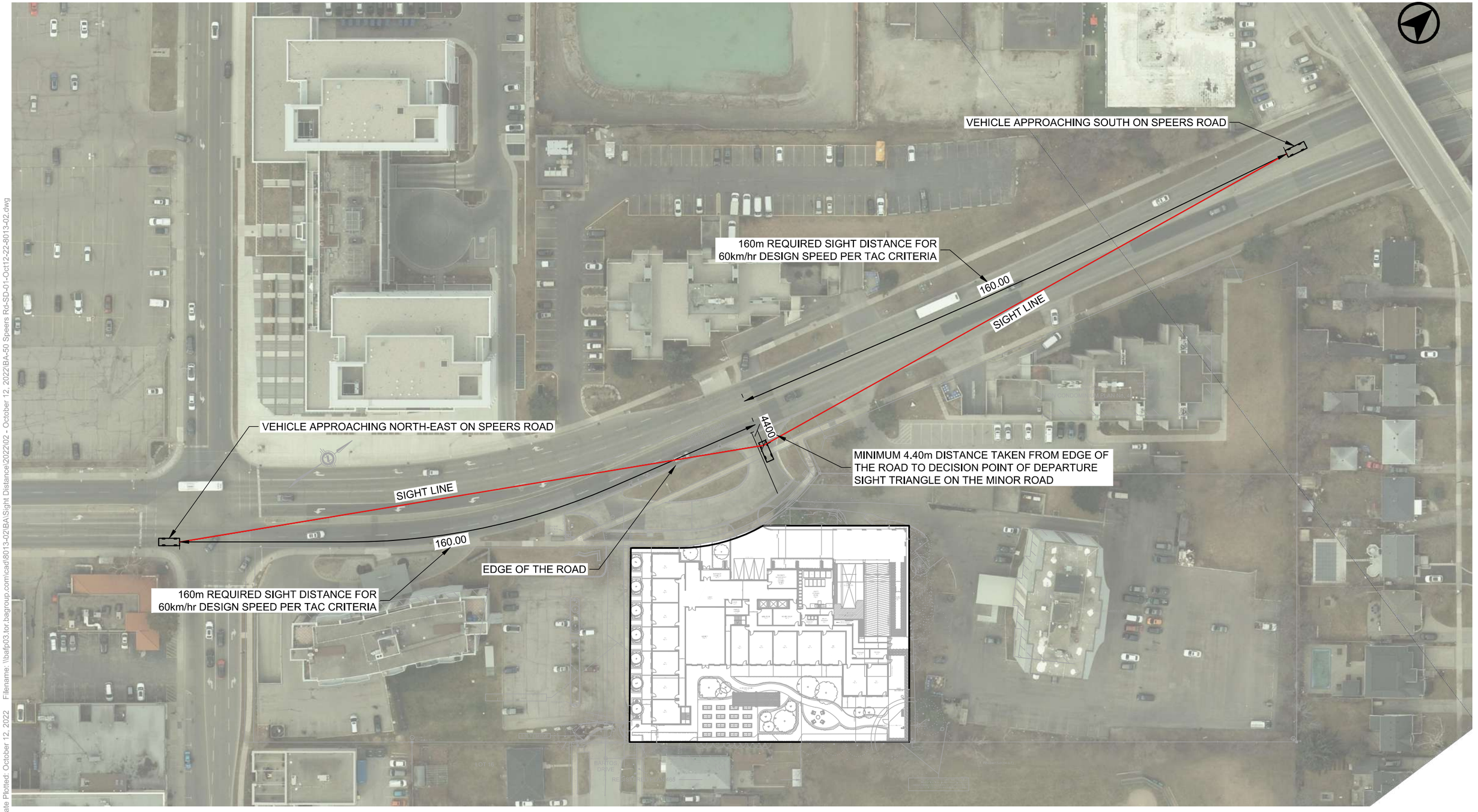
Speers Road / East Driveways

2031 Future Total Traffic Volumes

	N Approach 41 SPEERS RD						E Approach SPEERS RD						S Approach 50 SPEERS RD (EAST ACCESS)						W Approach SPEERS RD					
Hour Ending	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Tot	Left	Thru	Right	UTurn	Peds	pproach Total
AM Peak Hour	0	0	0		13	0	5	850	0		1	855	25	0	40		11	65	0	1380	0		3	1380
PM Peak Hour	5	0	5		24	10	5	1620	0		0	1625	20	0	15		9	35	0	1055	5		0	1060
AHV	1.25	0	1.25	0	9.25	2.5	2.5	617.5	0	0	0.25	620	11.25	0	13.75	0	5	25	0	608.75	1.25	0	0.75	610

1257.5

Appendix J
Sight Distance Assessment



BA Group

50 SPEERS ROAD

ALL MANOEUVRE ACCESS

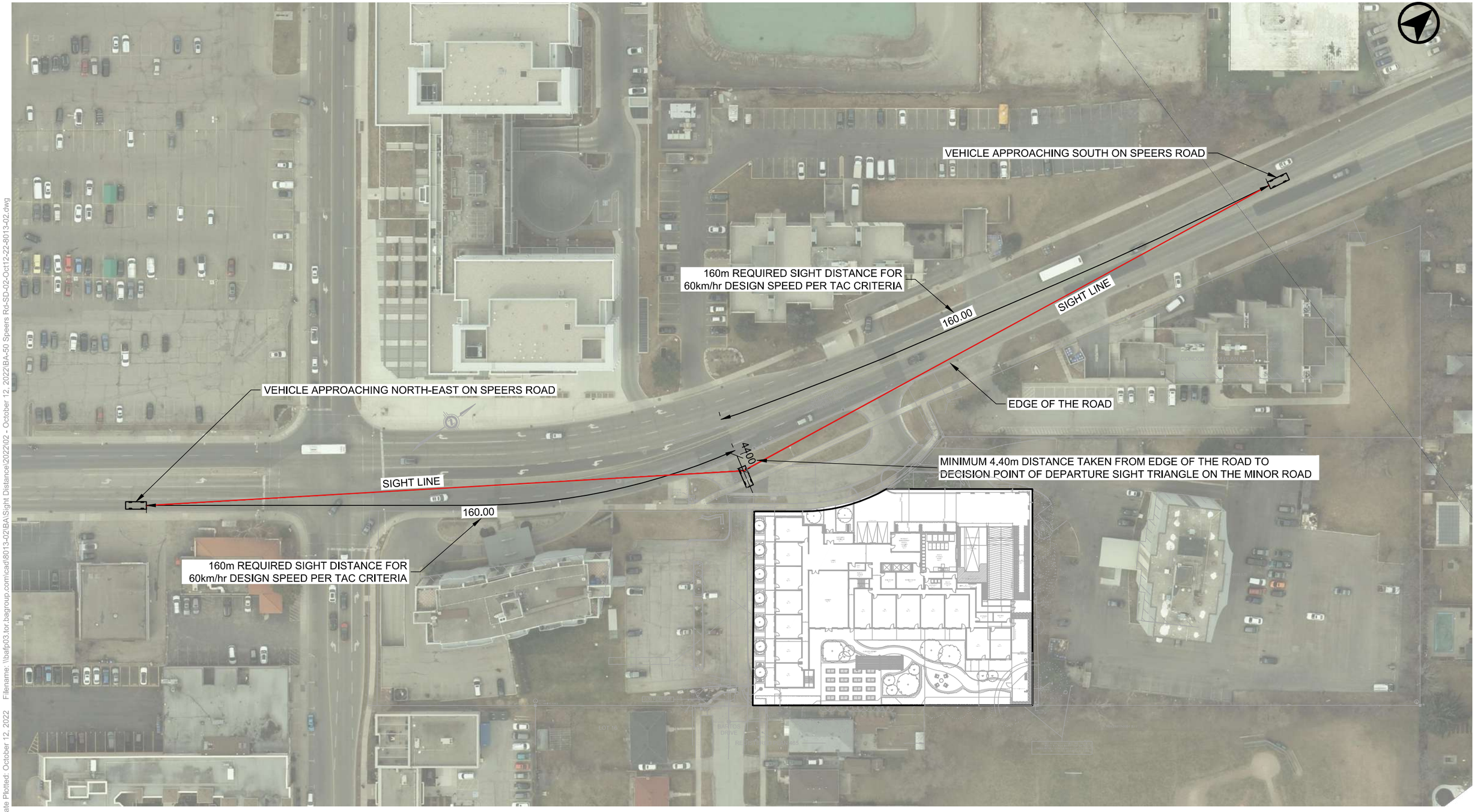
TAC MINIMUM SIGHT LINE REVIEW

CASE B1 - LEFT TURN FROM THE MINOR ROAD

Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	OCTOBER 3, 2022
Revised:	OCTOBER 12, 2022

Scale 1:1,000 — 0 10 20 30 40 50m

Drawing No. SD-01



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BA Group

50 SPEERS ROAD

ALL MANOEUVRE ACCESS

TAC MINIMUM SIGHT LINE REVIEW

CASE B1 - LEFT TURN FROM THE MINOR ROAD

Project:	50 SPEERS ROAD
Project No.	8013-02
Date:	OCTOBER 3, 2022
Revised:	OCTOBER 12, 2022

Scale 1:1,000 (0 10 20 30 40 50m)

Drawing No. SD-02