Transportation Impact Assessment

W3 Sunset Creek

ARCADIS
IBI GROUP

Prepared for W3 Lambeth Farms Inc.
by Arcadis IBI Group
November 30, 2023

Document Control Page

IBI GROUP CLIENT:	W3 Lambeth Farms Inc.
PROJECT NAME:	W3 Sunset Creek
REPORT TITLE:	Transportation Impact Assessment
IBI REFERENCE:	143384
VERSION:	Final
DIGITAL MASTER:	https://arcadiso365.sharepoint.com/sites/Projects3/143384/Internal Documents/6.0_Technical/6.23_Traffic/03_Reports/TTR_W3SunsetCreek_TIA_Master_2023-11-29.docx
ORIGINATOR:	Eric McLaren/Isabel Loewen
REVIEWER:	David Hook/Ben Pascolo-Neveu
AUTHORIZATION:	David Hook
CIRCULATION LIST:	David Ailles – York Developments Sarah Grady – City of London Dhaval Harpal – City of London Juan Chamorra – City of London
HISTORY:	Submitted to York Developments – September 20, 2023 Submitted to York Developments for Submission to City of London – November 30, 2023

Table of Contents

Table of Contents

Table of Contents

List of Tables

List of Figures

Table of Contents

List of Exhibits

List of Appendices

Executive Summary

Arcadis IBI Group was retained by W3 Lambeth Farms Inc. to prepare a Transportation Impact Assessment (TIA) in support of a Draft Plan of Subdivision application for a proposed residential subdivision located east of Colonel Talbot Road in London, Ontario, on lands municipally known as 3680, 3690 & 3700 Colonel Talbot Road.

The proposed subdivision will include a mix of low-density, medium-density and higher density residential land uses as well as some limited neighbourhood-oriented commercial land uses. Access to the proposed development will be provided via Royal Magnolia Avenue, which has been partially constructed as part of the W3 Farms Residential Development, as well as the future Colonel Talbot & Street 'N' intersection which aligns with Clayton Walk. Future internal connections to the Hudson Park development to the north will also eventually provide access to Pack Road, however, this is not expected to occur within the timeframe of this study. The proposed development will be built in a single phase with full buildout anticipated for 2033 and therefore a horizon year of 2038 was assumed for this study.

It is estimated that the proposed development will generate 650 and 702 two-way person-trips during the weekday morning and weekday afternoon peak hours, respectively, of which 407 and 439 will be vehicle-trips. These vehicle-trips were distributed and assigned to the adjacent road network based on the City of London 2016 Household Travel Survey and engineering judgement.

An intersection capacity analysis was completed for all study area intersections under both background and total traffic conditions. The results of the analysis indicate that the Colonel Talbot Road corridor will experience capacity issues as a two-lane roadway due to background traffic demand. Mitigation measures were proposed to address these capacity issues but without any plans for future widening, significant congestion is expected by the horizon year of the study. Capacity issues are also anticipated at the Main/Wharncliffe & Campbell intersection as a result of high background traffic demand. It is recommended that the City review the need for capital improvements with the broader area (i.e., road widenings) to ensure that sufficient capacity is provided to accommodate projected growth.

To address background capacity issues, the following mitigation measures are recommended to be implemented:

- **Colonel Talbot & Pack:** Optimize the signal timing plan and add a protected-permitted westbound left-turn phase in the weekday morning and afternoon peak hour. When reconstructing the intersection during the urbanization of Colonel Talbot Road, it is also recommended that the westbound left-turn lane be extended to provide a minimum of 160m of storage and that northbound and westbound right-turn lanes be provided. A minimum of 40m and 75m of storage is required for the northbound and westbound right-turn lane, respectively. *Required in approximately 5 years.*
- **Colonel Talbot & Clayton/Street 'N':** Give consideration to implementing peak period eastbound and westbound left-turn prohibitions or restrict the side streets to right-in/right-out only. Given the high traffic volumes on the main street, left-turn movements from the sidestreets could be hazardous and would be subject to significant delays. *Required in approximately 5 years.*
- **Colonel Talbot & Diane/Royal Magnolia:** The Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) suggests that the intersection will remain unsignalized when Colonel Talbot Road is urbanized in 2024-2025. Based on the results of this study, however, it is recommended that the intersection be signalized and that a minimum of 100m of storage be provided for the southbound left-turn movement

rather than the 75m recommended in the AECOM report. It is further recommended that a combined pedestrian/bicycle crossing facility be provided on the north side of this intersection to provide system connectivity for the planned multi-use path network. *Required within 5 years and prior to first occupancy of the proposed development.*

- **Colonel Talbot & Kilbourne:** Optimize the signal timing plan on a regular basis.
- **Main/Wharncliffe & Campbell:** Optimize the signal timing plan, add a protected-permitted southbound and eastbound left-turn phase in the weekday morning and afternoon peak hour, respectively, and add a westbound right-turn lane with a minimum of 25m of storage capacity. *Required imminently.*

In addition to the above mitigation measures, the addition of site-generated traffic also triggers the need for a protected-permitted southbound left-turn phase at the Colonel Talbot & Diane/Royal Magnolia intersection within 5 years and prior to first occupancy of the proposed development, assuming it is signalized as recommended previously.

The proposed site access on Colonel Talbot Road (Street 'N') was reviewed for conformance with the City of London Access Management Guidelines and the results of the desktop review indicate that the proposed access will meet both sightline and access spacing requirements. Furthermore, this secondary site access connection is aligned with the existing Clayton Walk intersection.

The internal transportation network of the proposed development was also reviewed. The major internal intersection of Royal Magnolia & Campbell is located adjacent to mixed-use residential/commercial blocks and is therefore expected to experience moderate volumes of vehicular and pedestrian demand. Based on a review of anticipated volumes, it is recommended that the intersection be configured as an all-way stop-controlled intersection. Intersection capacity analysis confirms that the intersection would operate at an acceptable Level of Service (i.e., LOS 'D') in this configuration.

The existing segment of Royal Magnolia Avenue (Colonel Talbot Road to Big Leaf Trail) does not include cycling facilities but cycling facilities may be included (by others) for the remaining segment east to Bostwick Road. The City has identified the need for bicycle infrastructure on both Campbell Street North and Street 'R'. Based on Ontario Traffic Manual (OTM) Book 18: Cycling Facilities, bike lanes are warranted on Campbell Street North while mixed-traffic conditions are considered adequate for Street 'R' given the lower speeds and traffic volumes projected along this roadway.

Within the proposed development, a multi-use path (MUP) will be provided within the open space adjacent to the creek that traverses the site from west to east. This MUP will cross Campbell Street North and is therefore a candidate for a pedestrian crossover (PXO) to provide network connectivity. Based on a review of projected traffic volumes at this crossing location, a Level 2 Type D PXO is recommended. Recommendations have also been made for the realignment of the MUP so that it crosses Colonel Talbot Road at its intersection with Diane Crescent/Royal Magnolia Avenue instead of 120m north of this intersection. If the MUP were realigned as recommended, the mid-block pedestrian signals recommended in AECOM's report would no longer be required. The proposed MUP network realignment is shown in **Exhibit 11**.

Based on a review of the internal roadway network, it is also recommended that traffic calming measures be provided along Campbell Street North to encourage lower operating speeds. A conceptual traffic calming plan has been provided in **Exhibit 12** which includes traffic calming measures such as curb extensions and the use of a raised crosswalk at the PXO. This exhibit also illustrates potential locations for bus stops within the vicinity of the proposed development.

There is currently no transit service within reasonable walking distance of the proposed development. It is recommended that transit service be extended to the surrounding area and bus stops be provided along Colonel Talbot Road, Pack Road and Royal Magnolia Avenue to provide residents with access to transit.

The overall conclusion of this TIA is that traffic generated by the proposed W3 Sunset Creek subdivision can be safely accommodated on the adjacent road network with consideration of the mitigation measures identified above. It is recommended that the City of London review the need for capital improvements in the area to ensure that sufficient roadway capacity is provided to accommodate projected growth.

1 Introduction

Arcadis IBI Group has been retained by W3 Lambeth Farms Inc. to undertake a Transportation Impact Assessment (TIA) in support of Draft Plan of Subdivision application for a proposed residential subdivision located east of Colonel Talbot Road, north of Royal Magnolia Avenue, in London, Ontario.

1.1 Study Objectives

The key objectives of the TIA are identified below:

- Determine the impact of the proposed development on the study area intersections;
- Confirm the timing of the planned roadway modifications; and
- Identify any deficiencies in the road network and develop recommendations to mitigate these deficiencies.

1.2 Study Methodology

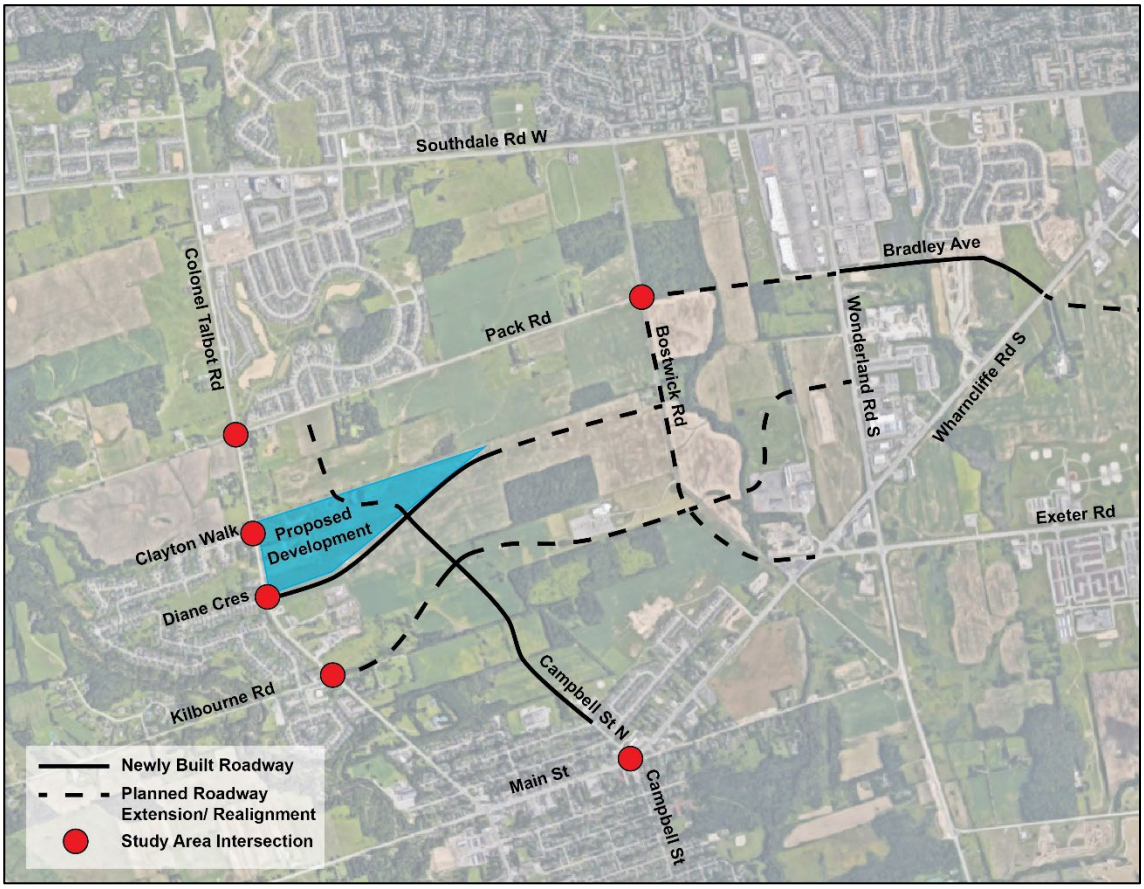
The TIA approach and methodology is based on the City of London Transportation Impact Assessment Guidelines (April 2012). City of London staff were consulted to confirm the following study parameters and assumptions:

- Study Area Intersections
- Analysis Time Periods
- Analysis Years
- Trip Generation
- Background Traffic Growth Rate
- Adjacent Developments

The above study parameters and assumptions were communicated to the City of London staff via email on May 16, 2023. City staff provided approval of these parameters on July 10, 2023, with a request for some minor modifications to the proposed study area. Approval of the proposed background traffic growth rate was provided on August 3, 2023.

Figure 1 illustrates the study area intersections that will be assessed as part of this study.

Figure 1 - Study Area Intersections



1.3 Reference Material

The following reference material was used in the preparation of this report:

- City of London Transportation Impact Assessment Guidelines (2012)
- City of London Access Management Guidelines (2015)
- City of London Official Plan (2016)
- City of London Transportation Master Plan (Aecom, 2013)
- City of London Cycling Master Plan (MMM Group, 2016)
- City of London 2021 Development Charges Background Study Update (2020)
- City of London 2016 Household Travel Survey Summary Report (IBI Group, 2018)
- W3 Subdivision Study (BT Engineering, 2016)
- 3493 Colonel Talbot TIS (Paradigm, 2015)
- Colonel Talbot Subdivision TIS (Stantec, 2016)
- 3080 Bostwick TIS (IBI Group, 2016 & 2018)
- 3510-3524 Colonel Talbot Road TIA (SBM, 2021)
- Southwest Secondary Plan (2019)
- Southwest Area Plan Transportation Servicing Report (Aecom, 2010)
- Draft Colonel Talbot Road Two-Lane Upgrade Traffic Analysis Memo (Aecom, 2023)

2 Proposed Development

2.1 Land Uses

The subject site is currently occupied by agricultural land uses, including a single farmhouse and outlying farm structures. It is generally bound by Colonel Talbot Road to the west, Royal Magnolia Avenue to the south and east and agricultural land uses to the north. The property is municipally known as 3680, 3690 & 3700 Colonel Talbot Road. Based on the zoning CityMap, the lands are currently zoned as NF (Neighbourhood Facility), OS4 (Open Space) and UR4 (Urban Reserve).

The proposed development will be composed of a mix of low-density, medium-density and higher density residential land uses as well as some limited neighbourhood-oriented commercial land uses. Access to Colonel Talbot Road will be provided via Royal Magnolia Avenue and Street 'N'. In the future, it is expected that connections with the planned Hudson Park development to the north via Campbell Street North and Street 'R' will provide residents of the development access to Pack Road, however, these connections are not expected to be completed within the horizon year of this study. The proposed development is bisected by a natural corridor along which a multi-use path (MUP) will be provided.

Table 1 presents a summary of the proposed land uses and **Exhibit 1** illustrates the layout of the proposed development.

Table 1 - Proposed Land Uses

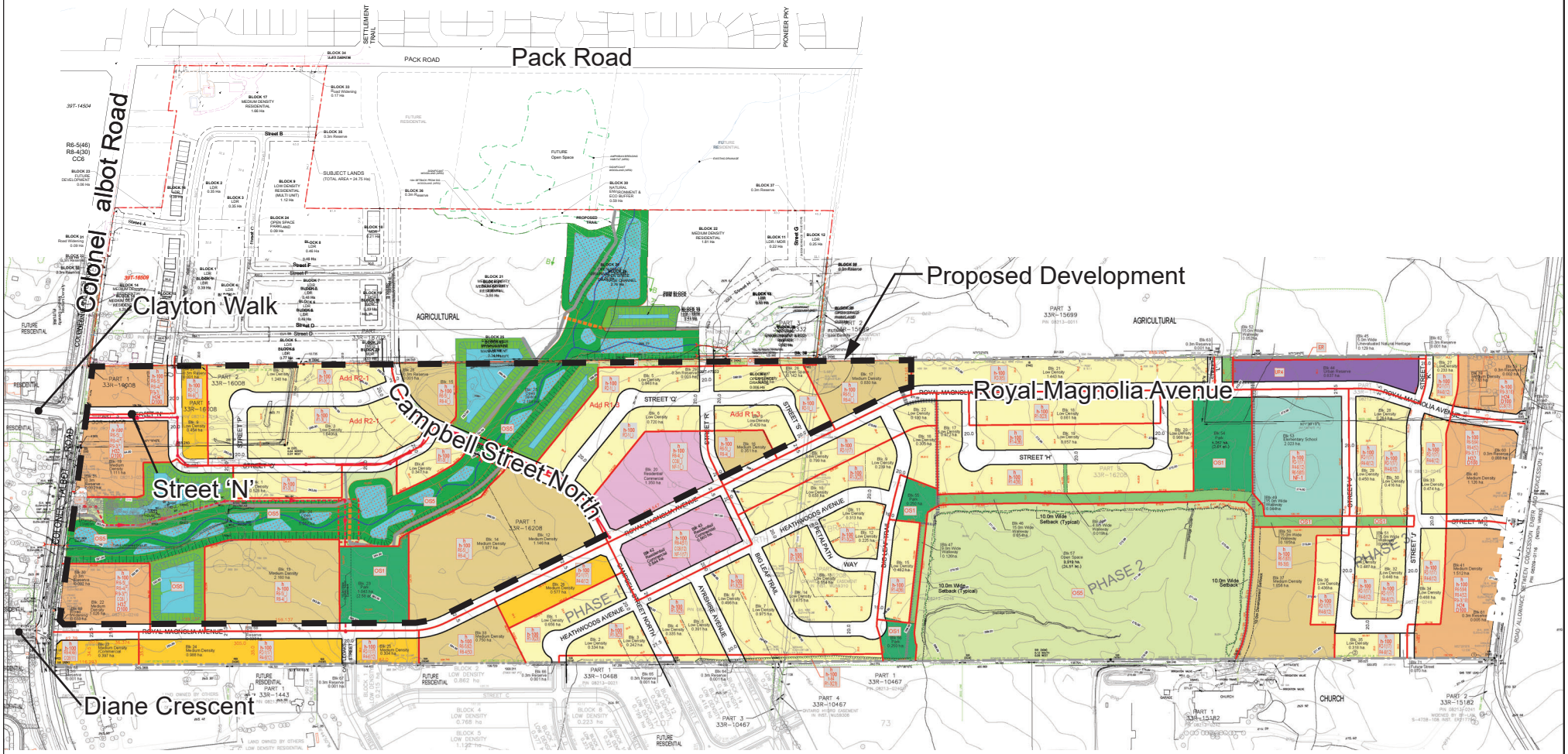
LAND USE	SIZE
Single Family Homes	163 units
Street Townhomes	16 units
Cluster Housing	522 units
Mid-Rise Apartments	276 units
High-Rise Apartments	338 units

In addition to the above, the higher density blocks proposed near the Royal Magnolia & Campbell intersection are intended to include small-scale ground level retail and services for the local community.

2.2 Phasing

The proposed development is expected to be built in a single phase with full buildout anticipated for 2033. This study will therefore analyze traffic conditions at the following analysis years:

- Existing Traffic
- Future (2033) Background and Total Traffic
- Future (2038) Background and Total Traffic



ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 1:
Proposed Development

PROJECT No. 143384

SCALE: 0m 100m 200m

2.3 Transportation Demand Management

The City of London TMP outlines several active transportation and Transportation Demand Management (TDM) policies as the City shifts towards more sustainable modes, such as walking, cycling and transit. TDM plays a significant role in this process as it often involves low-cost, but high-benefit initiatives or improvements. The Transportation Master Plan (TMP) outlines 28 priority actions for the City to undertake in support of sustainable travel modes, ranging from short-term to long-term measures.

Within the proposed developments, sustainable transportation modes will be encouraged through the provision of active transportation facilities such as sidewalks and bicycle facilities, as discussed in Section 8 of this report.

3 Existing Transportation Network

3.1 Existing Road Network

3.1.1 Roadways

Table 2 provides a summary of all existing roadways within the study area. All of these roads are under the jurisdiction of the City of London.

Table 2 - Existing Road Network Details

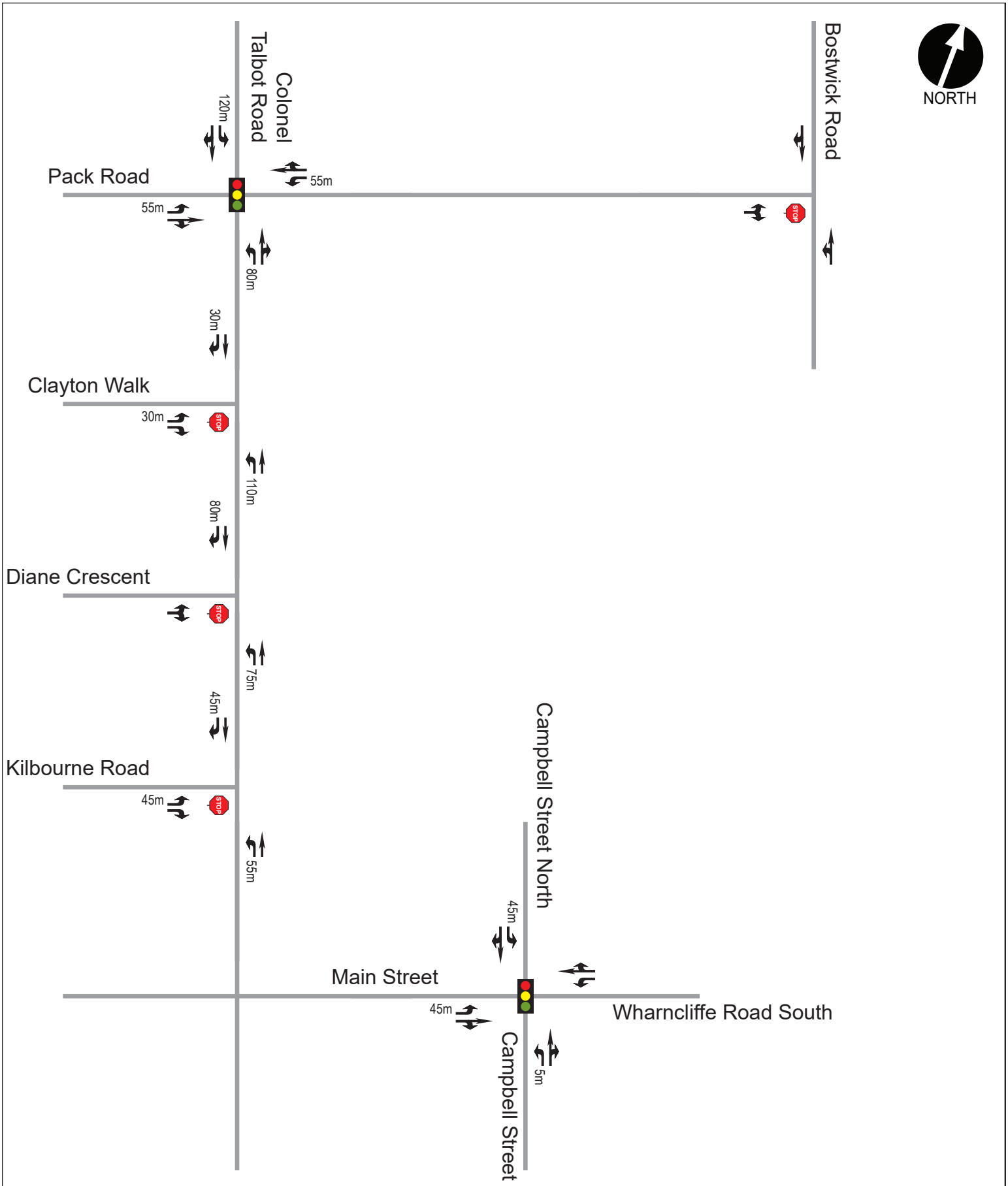
ROADWAY	POSTED SPEED LIMIT	CLASSIFICATION	CROSS SECTION	EXTENTS
Main Street	50 km/h	Civic Boulevard/ Main Street	Urban, 3-lane, undivided	Colonel Talbot to Campbell
Wharncliffe Road South	60 km/h	Civic Boulevard	Rural, 4-lane, undivided	Campbell to Riverside
Colonel Talbot Road	60 km/h	Civic Boulevard	Rural, 2-lane, undivided	Byron Baseline to Southminster Bourne
Bostwick Road	70 km/h	Civic Boulevard	Rural, 2-lane, undivided	Southdale to Wharncliffe
Pack Road	60 km/h	Civic Boulevard	Rural, 2-lane, undivided	Holmwood to Bostwick
Kilbourne Road	60 km/h	Neighbourhood Connector	Urban, 2-lane, undivided	Longwoods to Colonel Talbot
Campbell Street North	50 km/h	Neighbourhood Connector	Urban, 2-lane, undivided	North of Main/ Wharncliffe
Campbell Street	50 km/h	Neighbourhood Connector	Urban, 2-lane, undivided	Main/ Wharncliffe to Sunray
Clayton Walk	50 km/h	Local	Urban, 2-lane, undivided	West Graham to Colonel Talbot
Diane Crescent	50 km/h	Local	Urban, 2-lane, undivided	Malpass to Colonel Talbot

3.1.2 Intersections

The following key intersections are located within the study area:

- Main Street/Wharncliffe Road South & Campbell Street/Campbell Street North (signalized)
- Colonel Talbot Road & Pack Road (signalized)
- Colonel Talbot Road & Clayton Walk (unsignalized)
- Colonel Talbot Road & Diane Crescent (unsignalized)
- Colonel Talbot Road & Kilbourne Road (unsignalized)
- Bostwick Road & Pack Road (unsignalized)

The existing lane configurations and parallel lane lengths are shown in **Exhibit 2**.



ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 2:
Existing Lane Configuration & Traffic Control

PROJECT No. 143384

SCALE: N.T.S.

3.2 Existing Pedestrian and Bicycle Facilities

Within the study area, sidewalks currently exist at the following locations:

- East side of Campbell Street North and west side of Campbell Street
- West side of Colonel Talbot Road from Clayton Walk to Pack Road and east side of Colonel Talbot Road north of Pack Road
- South side of Pack Road west of Colonel Talbot Road and north side of Pack Road from Colonel Talbot Road to Frontier Avenue
- Both sides of Main Street, Clayton Walk, Kilbourne Road, Settlement Trail, and Pioneer Parkway
- South side of Diane Crescent

In addition to the above pedestrian infrastructure, there is also a network of multi-use paths (MUPs) in the northeast and southwest quadrants of the Colonel Talbot & Pack intersection. With the exception of bike lanes on the existing segment of Campbell Street North and isolated measures at the Main/Wharncliffe & Campbell intersection, there are otherwise no exclusive cycling facilities anywhere within the study area.

3.3 Existing Transit Service and Facilities

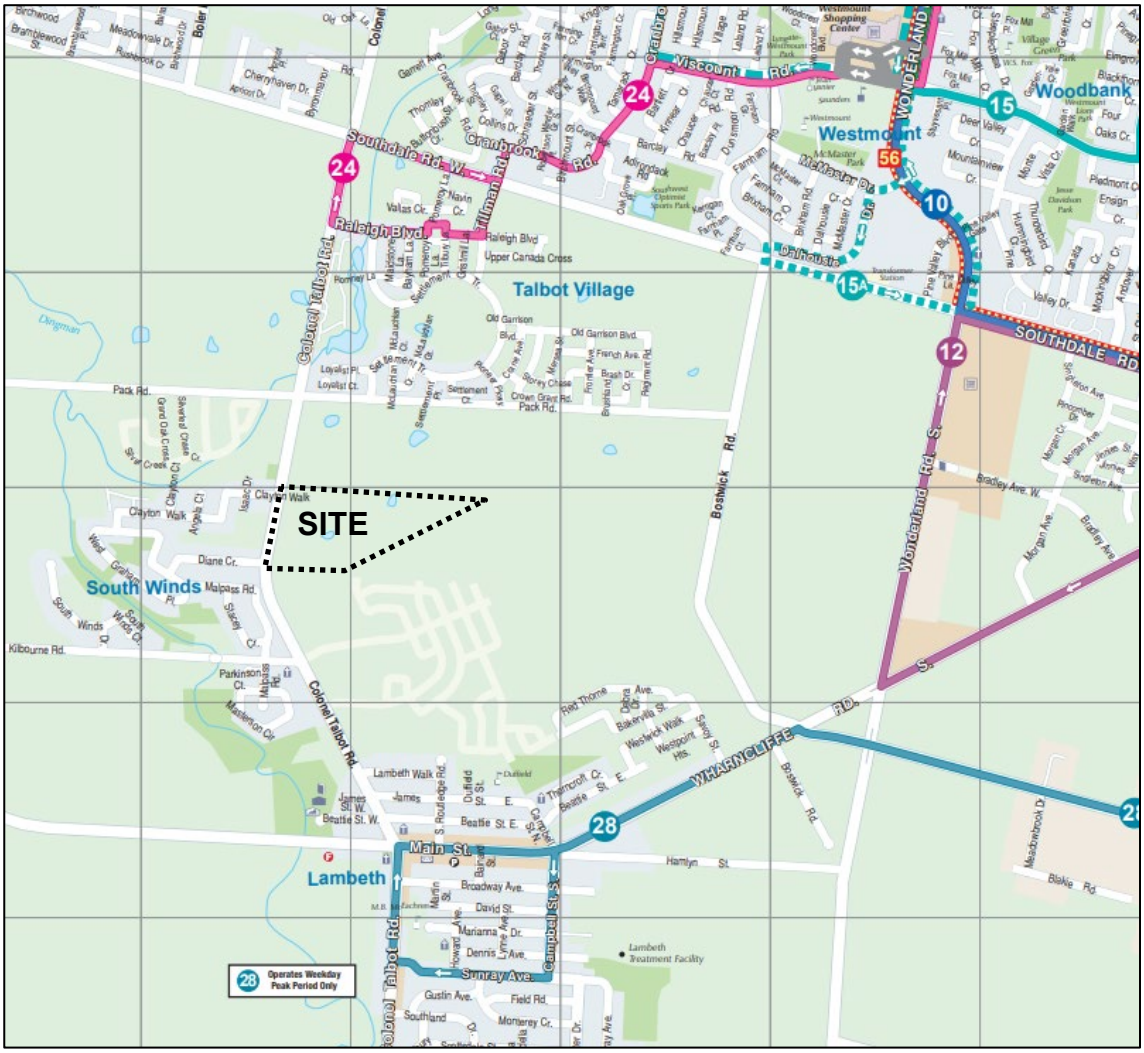
The nearest transit routes are Route #24 on Raleigh Boulevard (~1,200m north of the proposed development) and Route #28 on Main Street (~1,450m south of the proposed development). The details of these two transit routes are summarized below in **Table 3**.

Table 3 - Transit Routes

ROUTE NUMBER	TERMINI	FREQUENCY
24	Talbot Village to Summerside	45-minute headways (Monday to Friday), 40- to 45-minute headways (Saturday) and 40-minute headways (Sunday)
28	White Oaks Mall to Lambeth	40-minute headways (Monday to Friday), peak period service only

Figure 2 illustrates the transit routes that operate in the vicinity of the study area. The transit service maps for each of the above routes are provided in **Appendix A**.

Figure 2 - Transit Routes



3.4 Collision Analysis

Historical collision data for the period of January 2015 to May 2023 was provided by the City of London for all of the study area road segments and intersections. The subsequent sections discuss the results of the collision analysis.

Detailed collision records are provided in **Appendix B**.

3.4.1 Roadway Segments

Table 4 below summarizes the number of collisions per type that have occurred along each roadway segment. Particular collision types that have occurred eight times or more (i.e., on average once a year) along a particular roadway segment have been emphasized as these collisions warrant further review to establish if there is a repeating pattern of collisions.

Table 4 - Number of Collisions: Roadway Segments

ROADWAY SEGMENT	COLLISION TYPE							
	Approaching	Rear End	Sideswipe	SMV Run Off Road	SMV Animal	SMV Other	Other	Total
Colonel Talbot - Pack to Clayton	1	1		1	**8**		2	13
Colonel Talbot - Clayton to Diane		1	1	1	4			7
Colonel Talbot - Diane to Kilbourne	1	1	2	1	2			7
Pack - Bostwick to Regiment					**10**			10
Pack - Regiment to Frontier					3	1		4
Pack - Frontier to Pioneer					1			1
Pack - Pioneer to Settlement								
Pack - Settlement to Colonel Talbot				1				1
Total	2	3	3	4	28	1	2	43

Notes: SMV = Single Motor Vehicle

As shown above, animal-related collisions on Colonel Talbot Road between Pack Road and Clayton Walk and on Pack Road between Bostwick Road and Regiment Road are occurring relatively frequently. A review of these collisions indicates that approximately 50% and 60% of these collisions on Colonel Talbot Road and Pack Road, respectively, are occurring under dark conditions (i.e., before 7am and after 9pm). As such, providing illumination along these roadways (if not currently provided) may help reduce the frequency of these collisions.

3.4.2 Intersections

Table 5 below summarizes the number of collisions per collision type that have occurred at each study area intersection. Particular collision types that have occurred eight times or more (i.e., on average once a year) along a particular roadway segment have been emphasized as these collisions warrant further review to establish if there is a repeating pattern of collisions. Additionally, the number of collisions per million vehicles entering (MVE) has also been calculated for each intersection. Generally, a rate of 1.0 or more collisions per MVE is considered significant.

Table 5 - Number of Collisions: Intersections

INTERSECTION	COLLISION TYPE								COLLISIONS PER MVE
	Approaching	Rear End	Sideswipe	Turning Movement	Angle	SMV Other	Other	Total	
Colonel Talbot & Pack		4	3	1	**14**	2	3	27	0.72
Colonel Talbot & Clayton							1	1	0.03
Colonel Talbot & Diane		1						1	0.04
Colonel Talbot & Kilbourne		2				1		3	0.10
Bostwick & Pack		2	2	3	**6**	1	2	16	0.83
Main/Wharncliffe & Campbell	1	**12**	4	1	**6**		1	25	0.60
Total	1	21	9	5	26	4	7	73	-

Notes: SMV = Single Motor Vehicle, MVE = Million Vehicles Entering

As illustrated above, there is a high frequency of angle collisions at three of the intersections and a high frequency of rear end collisions at the Main/Wharncliffe & Campbell intersection. None of the intersections experience a collision rate per MVE higher than 1.0 indicating that the rate of collisions observed at these intersections is normal for the volume of traffic passing through.

It is noteworthy that the Colonel Talbot & Pack intersection was signalized in 2021 but this doesn't appear to have had any impact on the rate at which angle collisions occur at the intersection.

A detailed review of these collisions indicates that improper driver behaviour accounts for 50% of angle collisions at all three intersections and 58% of rear end collisions at the Main/Wharncliffe & Campbell intersection. For angle collisions, drivers generally failed to yield the right of way, failed to stop at the red light or stop sign, or performed improper turns. For rear end collisions, following too close was a frequent cause of collisions.

Poor roadway conditions were also a major contributing factor to many of these collisions, as summarized below:

- Colonel Talbot & Pack (Angle): 14% of collisions
- Bostwick & Pack (Angle): 50% of collisions
- Main/Wharncliffe & Campbell (Angle): 33% of collisions
- Main/Wharncliffe & Campbell (Rear End): 17% of collisions

A number of collisions had no obvious cause (i.e., neither weather, road condition nor driver behaviour contributed to these collisions).

With respect to the travel direction of vehicles involved in the collisions, collisions at the Main/Wharncliffe & Campbell intersection were generally caused by vehicles travelling in the eastbound and westbound directions which corresponds with the movements with the highest traffic volumes. This may indicate that congestion and/or high speeds at the intersection could be contributing to these collisions. No obvious directional patterns were observed at the other two intersections.

4 Future Transportation Network

The City of London is currently in the midst of developing its Mobility Master Plan which will establish how the City will prioritize transportation and mobility infrastructure until 2050. The development of the Plan is currently at Phase 1 of 3. As such, this study has referenced the 2013 City of London Transportation Master Plan (TMP) to determine how the transportation network will change within the timeframe of this study. The TMP projections have been supplemented by the more recent 2021 Development Charges (DC) Background Study Update (October 2020), which allocates funds and assigns expected completion dates to specific capital projects.

4.1 Future Road Network

The TMP and 2021 DC study outline future capital projects throughout the City. Projects that may impact traffic patterns near the proposed development have been documented below:

Southdale Road West & Colonel Talbot Road Intersection

The Southdale Road West & Colonel Talbot Road intersection is currently being replaced with a two-lane roundabout.

Colonel Talbot Road

The 2021 DC study indicates that Colonel Talbot Road will undergo an upgrade from a rural to an urban cross-section from 300m south of Southdale Road West to James Street in 2023. The City of London webpage for this project suggests that the timeline for this project has recently been revised to 2024-2025. The Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) was provided by City staff and recommends the following traffic controls and lane configurations:

- **Colonel Talbot & Pack:** It was recommended that the existing lane configuration be maintained but that optimized signal timings and a protected-permitted southbound left-turn phase during the weekday afternoon peak hour be implemented.
- **Colonel Talbot & Clayton Walk:** Two-way stop-controlled intersection with left-turn and shared through-right lanes on the northbound and southbound approaches, left-turn and shared through-right lanes on the eastbound approach and shared all-movements lane on the westbound approach. The memorandum recommends a minimum of 45m of storage for the southbound left-turn lane.
- **Colonel Talbot & Diane/Royal Magnolia:** Two-way stop-controlled intersection with left-turn and shared through-right lanes on the northbound and southbound approaches, a shared all-movements lane on the eastbound approach and right-turn and shared through-left lane on the westbound approach.
- **Colonel Talbot & Kilbourne/Hayward:** Signalized intersection with left-turn lanes on all approaches, separate through and right-turn lanes on the northbound approach and shared through-right lanes on all other approaches.

The memorandum further recommends that mid-block pedestrian signals be installed on Colonel Talbot Road approximately 120m north of Diane Crescent/Royal Magnolia Avenue. As noted in Section 8.2, this report recommends that pedestrian/bicycle crossing facilities be provided at the Colonel Talbot & Diane/Royal Magnolia intersection instead to avoid having two closely spaced traffic signals.

The City project webpage indicates that, in addition to these intersection modifications, the urbanization of Colonel Talbot Road will include the addition of concrete curbs and gutters, new streetlights, boulevard bike paths, sidewalks and localized medians.

Southdale Road West

The TMP indicates that Southdale Road West will be widened to 4 lanes between Colonel Talbot Road and Wharncliffe Road South. Southdale Road West has since been widened to 4 lanes from west of Pine Valley Boulevard to Wharncliffe Road South and the segment from Bostwick Road/Farnham Road to west of Pine Valley Boulevard has recently been widened to four lanes with substantial completion planned for end of 2023. The remainder will be widened in 2031.

Bostwick Road

The TMP does not identify any widenings for Bostwick Road, however, the 2021 DC study indicates that the segment between Southdale Road West and Pack Road will be urbanized in 2025 and the segment between Pack Road and Wharncliffe Road South will be widened to four lanes and realigned in 2026. The Bostwick Road Realignment Municipal Class Environmental Assessment Study Report (Parsons, March 2019) outlines the planned roadway configuration for Bostwick Road and indicates that both the two-lane and four-lane roadway cross-sections will feature a centre median as well as concrete sidewalks and cycle tracks on both side of the roadway.

Bradley Avenue

Based on the TMP, Bradley Avenue is planned to be extended from White Oak Road to Bostwick Road. Since the TMP was completed, the segment of Bradley Avenue between Wharncliffe Road South and Wonderland Road South has been constructed. The 2021 DC study indicates that the segment between White Oak Road and Wharncliffe Road South was originally planned to be constructed in 2023, followed by the segment between Bostwick Road and Wonderland Road South in 2028, however there is no indication that the works between White Oak and Wharncliffe have started at the time of this study. The existing segment of Bradley Avenue between Wonderland Road and Wharncliffe Road has a centre median, sidewalks on both sides of the road and a two-way cycle track on the south side of the road. It is assumed that this roadway cross-section configuration will be maintained as the road is extended west to Bostwick Road.

Pack Road

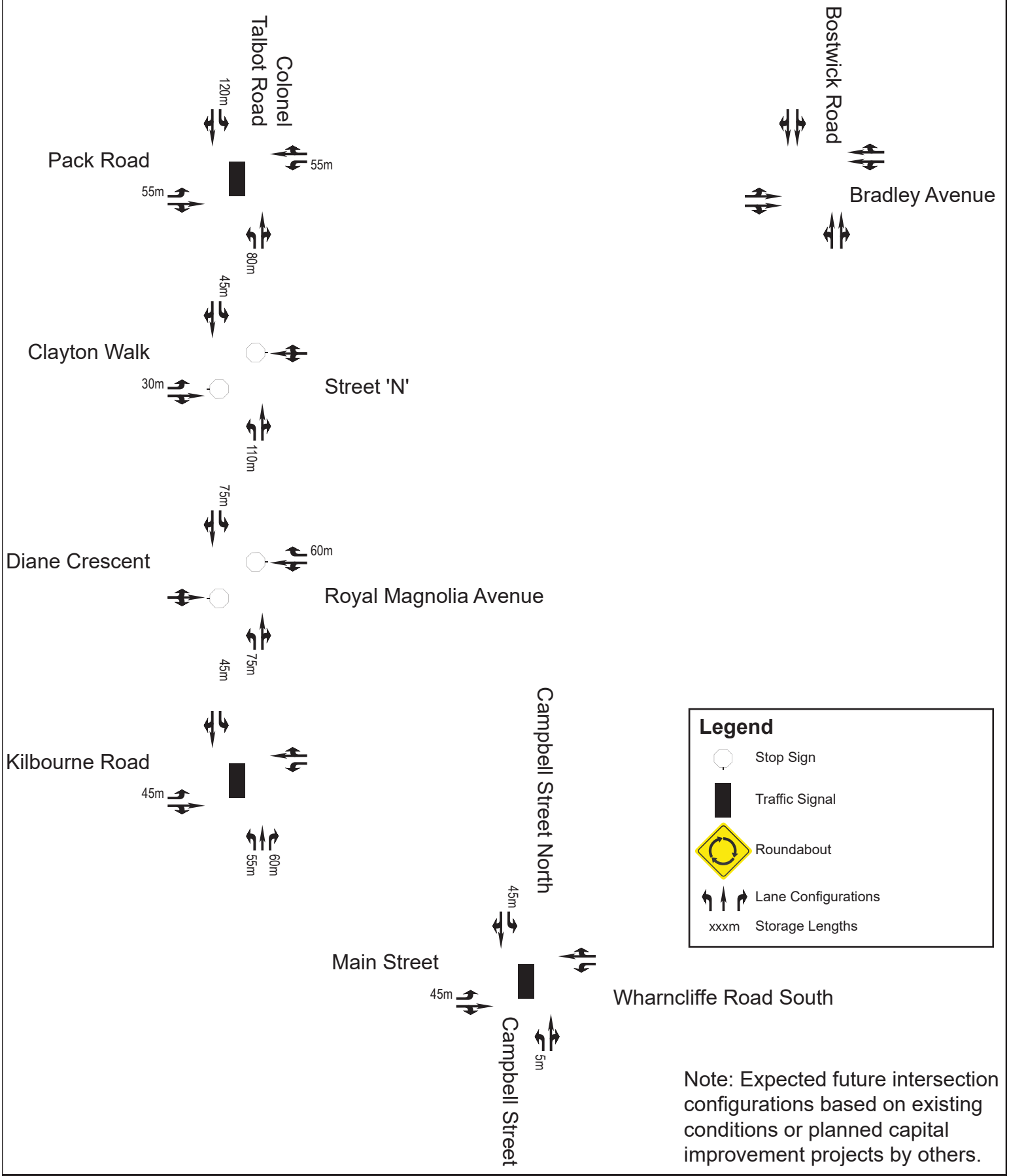
The 2021 DC study indicates that Pack Road is anticipated to be urbanized between Colonel Talbot Road and Bostwick Road in 2032.

Bostwick Road & Pack Road/Bradley Avenue Intersection

The Bostwick Road Realignment Municipal Class Environmental Assessment Study Report (Parsons, March 2019) indicates that the Bostwick & Pack/Bradley intersection will be configured as a two-lane roundabout with dual entry and exit lanes on all approaches. The cycle tracks on Bostwick Road and Bradley Avenue will transition to MUPs at the roundabout in order to allow bicyclists to cross together with pedestrians.

Overall, the above roadway network improvements will facilitate travel to/from the east, particularly the Bradley Avenue extension which will provide an alternative east-west route in this part of the city.

Exhibit 3 illustrates the future planned intersection lane configuration and traffic controls based on the above City projects.



Note: Expected future intersection configurations based on existing conditions or planned capital improvement projects by others.

ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 3:
Planned Lane Configuration & Traffic Control

PROJECT No. 143384

SCALE: N.T.S.

4.2 Future Pedestrian and Bicycle Facilities

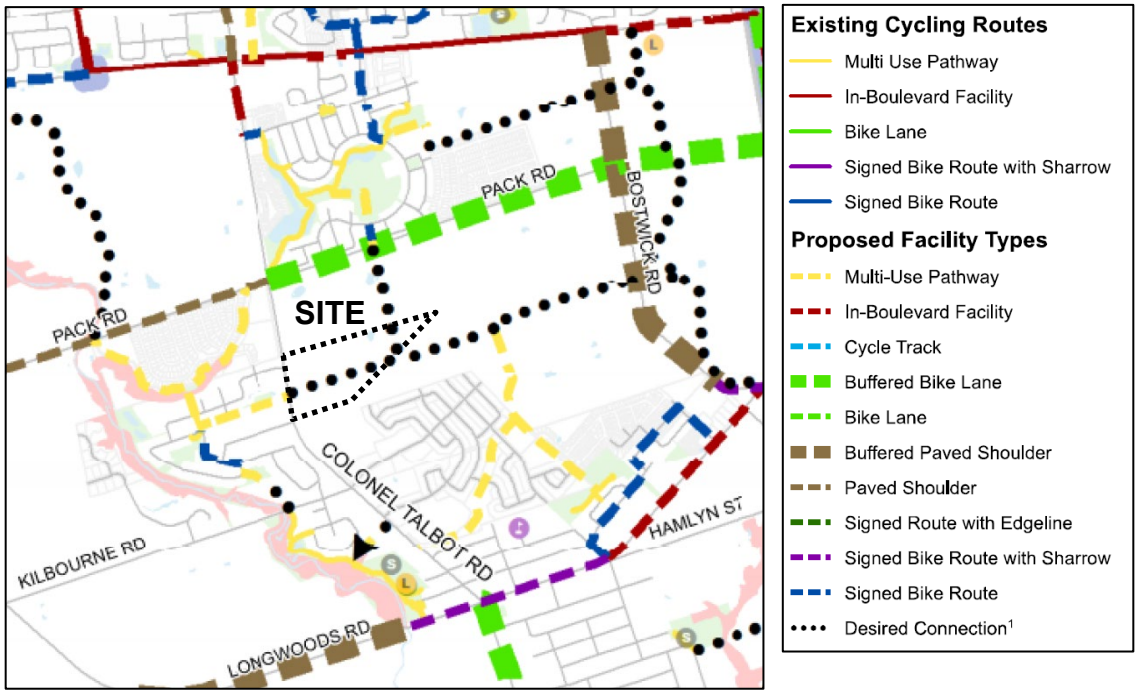
The City of London TMP has identified active transportation (i.e., walking and cycling) as a critical element of the future transportation network. In September 2016, the City approved the Cycling Master Plan (CMP), which provides details regarding the planning, design and staging of cycling infrastructure in the City. The CMP indicates that a buffered bike lane will be provided on the portion of Pack Road east of Colonel Talbot Road and a buffered paved shoulder will be provided on the portion west of Colonel Talbot Road. The CMP indicates that the proposed cycling facilities on Pack Road are planned to be implemented by 2031.

A recent technical amendment to the CMP has also identified the need for cycling facilities along Campbell Street North (Pack Road to James Street), Street 'R' (Pack Road to Royal Magnolia Avenue) and Royal Magnolia Avenue (Colonel Talbot Road to Bostwick Road). It should be noted that cycling facilities are not included in the design of the existing section of Royal Magnolia Avenue from Colonel Talbot Road to Big Leaf Trail but cycling facilities may be included (by others) for the remaining segment east to Bostwick Road. The portions of Campbell Street North and Street 'R' within the proposed development have been reviewed as part of this study to determine the recommended type of cycling facility for each of these roads. The results of this review are provided in Section 8.2.

A number of multi-use paths are planned within the surrounding area and cycling desire lines have been identified that pass through the proposed development.

Figure 3 illustrates the planned cycling network within the study area.

Figure 3 - Future Cycling Network

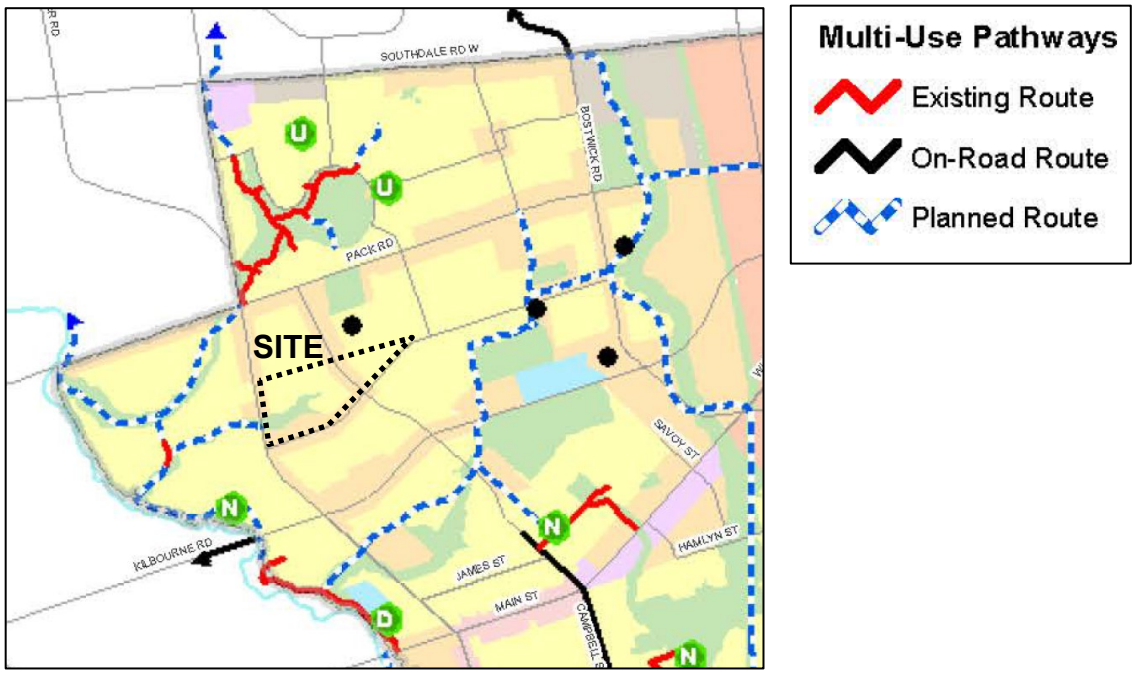


Source: City of London Cycling Master Plan (September 2016)

The Official Plan (OP) and Southwest Area Plan (SWAP) also identify the planned multi-use path (MUP) network within the study area which generally conforms to the MUP network outlined in the TMP.

Figure 4 illustrates the future multi-use path (MUP) network within the study area.

Figure 4 - Future Multi-Use Path Network

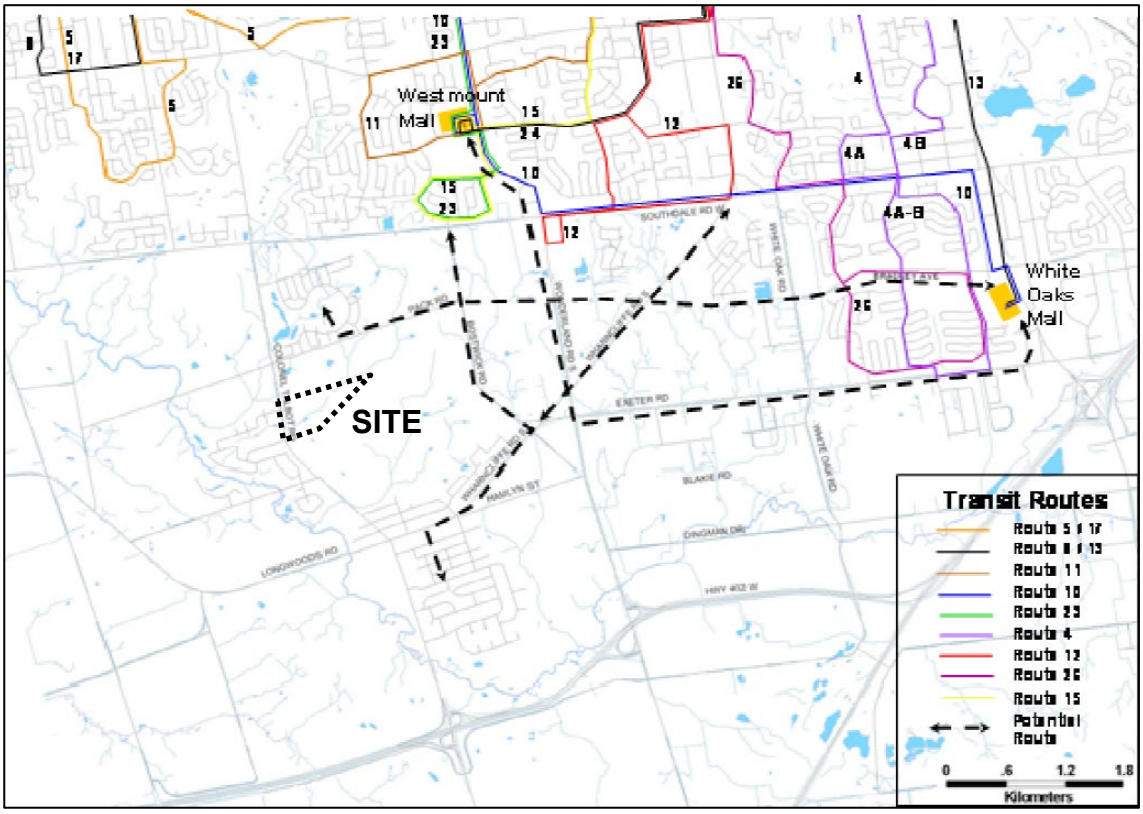


Source: City of London Southwest Area Plan (December 2019)

4.3 Future Transit Service and Facilities

The TMP does not identify any transit service improvements which will have a direct impact on the study area. The Southwest Area Plan (SWAP) Transportation Servicing Report (TSR), however, recommended future transit routes in the study area, including a route along Pack Road, as illustrated in **Figure 5**.

Figure 5 - Potential Transit Routes



Source: City of London Southwest Area Plan Transportation Servicing Report (May 2010)

4.4 Future Adjacent Developments

The City of London noted that the following adjacent developments are anticipated to contribute traffic volumes to the study area intersections:

Table 6 - Adjacent Developments

ADJACENT DEVELOPMENT	BUILDOUT YEAR	LAND USES
3080 Bostwick Road	Prior to 2033[1]	16 townhomes 48 stacked townhomes 2,464 high-rise residential units 21,528 ft^2 of commercial space 43,056 ft^2 of office space
W3 Farms Residential Development	Prior to 2033[1]	376 single family homes 238 street townhomes 113 cluster townhomes 476 apartment units with convenience commercial and small-scale offices 32 mixed-use residential/commercial units 2.0-hectare elementary school

ADJACENT DEVELOPMENT	BUILDOUT YEAR	LAND USES
Colonel Talbot Subdivision[2]	Prior to 2033[1]	538 single family homes 776 condominium/townhome units
3493 Colonel Talbot Road	2024	177 single family homes 314 condominium/townhome units 10,765 ft^2 of group floor auxiliary commercial space
Westwinds Subdivision	2024 to 2030	46 single family homes 37 street townhomes 56 cluster townhomes 610 mid-rise apartment units
Kilbourne Subdivision	2024 to 2035	488 single family homes 213 street townhomes 602 cluster housing units 762 mid-rise apartment units 1,076 high-rise apartment units
Foxwood Development	2024 to 2028	462 mid-rise apartment units
3510-3524 Colonel Talbot Road	Imminently	37 mid-rise apartment units 434 m^2 of ground floor commercial space
Hudson Park Subdivision[3]	Prior to 2033[1]	192 single family homes 339 multi-family housing units

Notes:

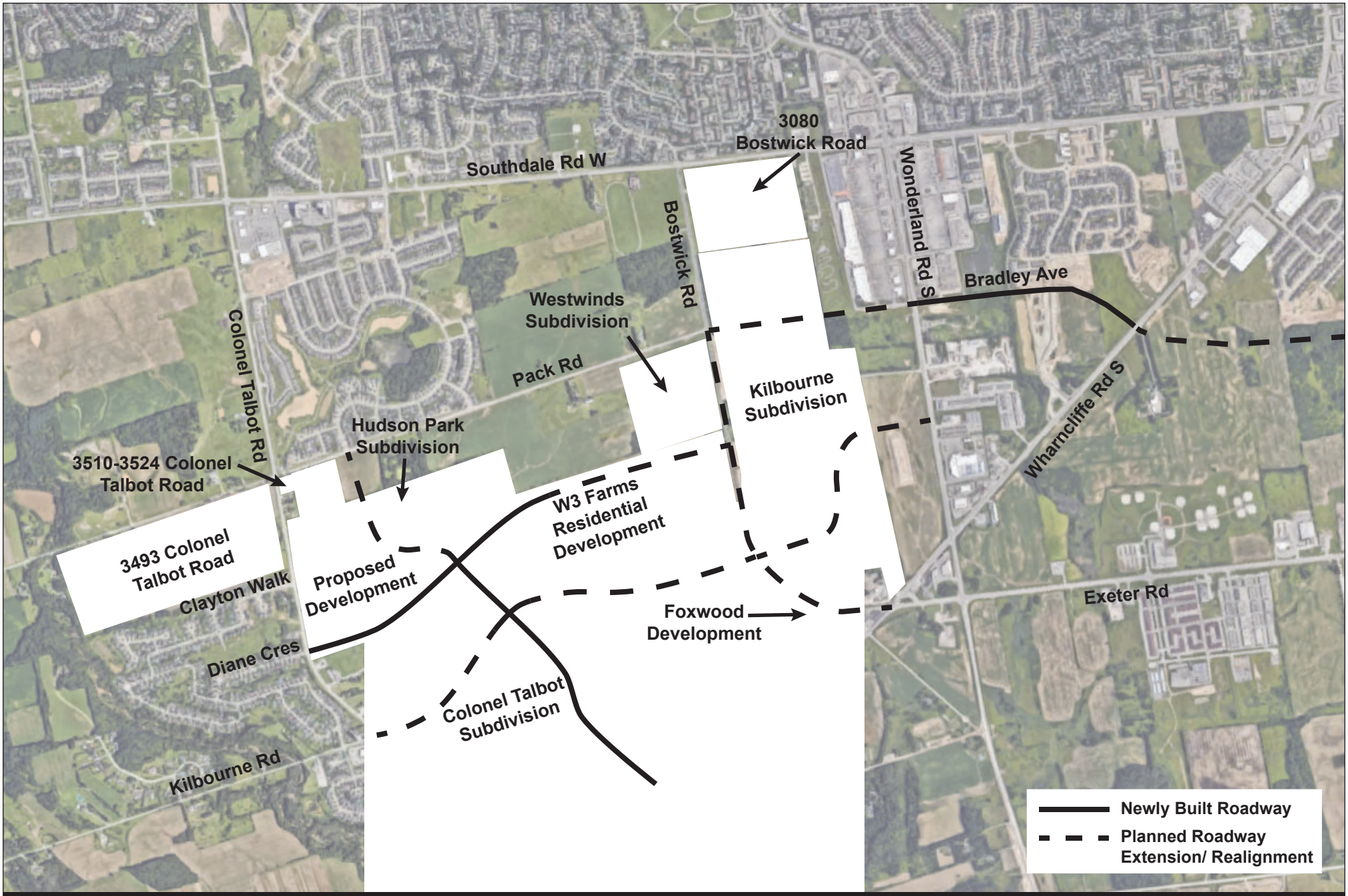
[1] – The stated buildout years for these developments are no longer expected to be accurate. It is assumed that these developments will be fully built-out prior to 2033.

[2] – The traffic generation for this development has been based on the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) as the 2015 Paradigm TIA used outdated land use statistics for the site.

[3] – A TIA has yet not been prepared for this development. The land use statistics and trip generation for this development are based on the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023).

The buildout dates identified above are conservative estimates based on the latest information available, however, market conditions will ultimately dictate when these future adjacent developments will be built out.

Exhibit 4 illustrates the locations of the future adjacent developments identified above.



ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 4:
Adjacent Developments

PROJECT No. 143384

SCALE: 0m 250m 500m

5 Traffic Volumes

5.1 Existing Traffic Volumes

Weekday morning and afternoon peak hour traffic counts were obtained for the following intersections:

- Main/Wharncliffe & Campbell (City of London, November 2021)
- Bostwick & Pack (Arcadis IBI Group c/o Horizon Data Services, November 2021)
- Colonel Talbot & Pack (City of London, September 2022)
- Colonel Talbot & Clayton (City of London, November 2022)
- Colonel Talbot & Diane (City of London, November 2022)
- Colonel Talbot & Kilbourne (City of London, September 2022)

Given that two of the traffic counts were completed in 2021 during the COVID-19 pandemic, supplementary traffic counts were obtained for nearby adjacent intersections to determine whether any adjustment factors are required to account for the impact of the pandemic on traffic volumes. The supplementary traffic counts obtained were:

- Colonel Talbot & Main (City of London, September 2022)
- Wharncliffe & Exeter (City of London, March 2023)
- Southdale & Bostwick (City of London, May 2019)

Compared to the adjacent intersection volumes, traffic volumes at the Bostwick & Pack intersection did not appear to have been notably impacted by the COVID-19 pandemic. As such, no adjustment factors were applied to the traffic volumes at that intersection.

Traffic volumes and travel patterns at the Main/Wharncliffe & Campbell intersection appear to have been impacted by the COVID-19 pandemic with weekday morning peak hour volumes 30% higher and weekday afternoon peak hour volumes 8% lower than would be expected. As such, an adjustment factor has been conservatively applied to the weekday afternoon peak hour volumes to better estimate typical conditions. No adjustment factor has been applied to weekday morning peak hour volumes as a conservative measure.

Traffic volumes representative of Existing Traffic conditions are provided in **Exhibit 5**. The turning movement counts collected for this study have been provided in **Appendix C**.

ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 5:
Existing Traffic

PROJECT No. 143384

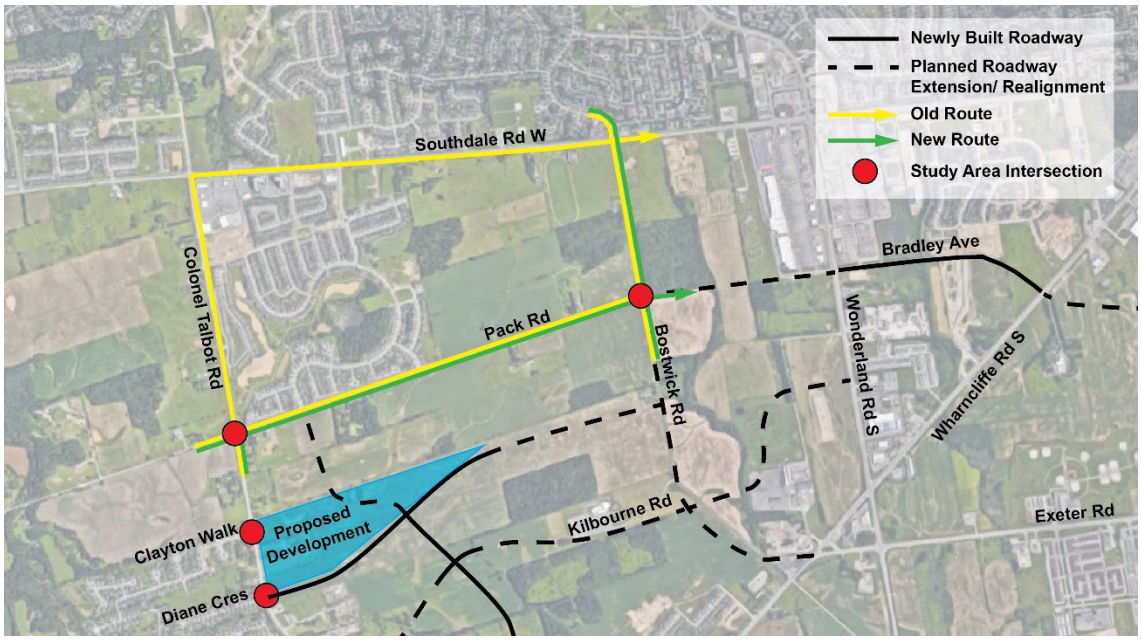
SCALE: N.T.S.

5.2 Future Background Traffic Volumes

As agreed with City of London staff [1], a 1.5% linear annual growth rate has been applied to the study area intersections in order to account for regional traffic growth passing through the study area. The background traffic growth rate has not been applied to Clayton Walk, Diane Crescent, Campbell Street or Campbell Street North as these streets are not expected to experience growth in regional traffic. All traffic growth along these streets has been accounted for explicitly through the inclusion of adjacent development traffic projections.

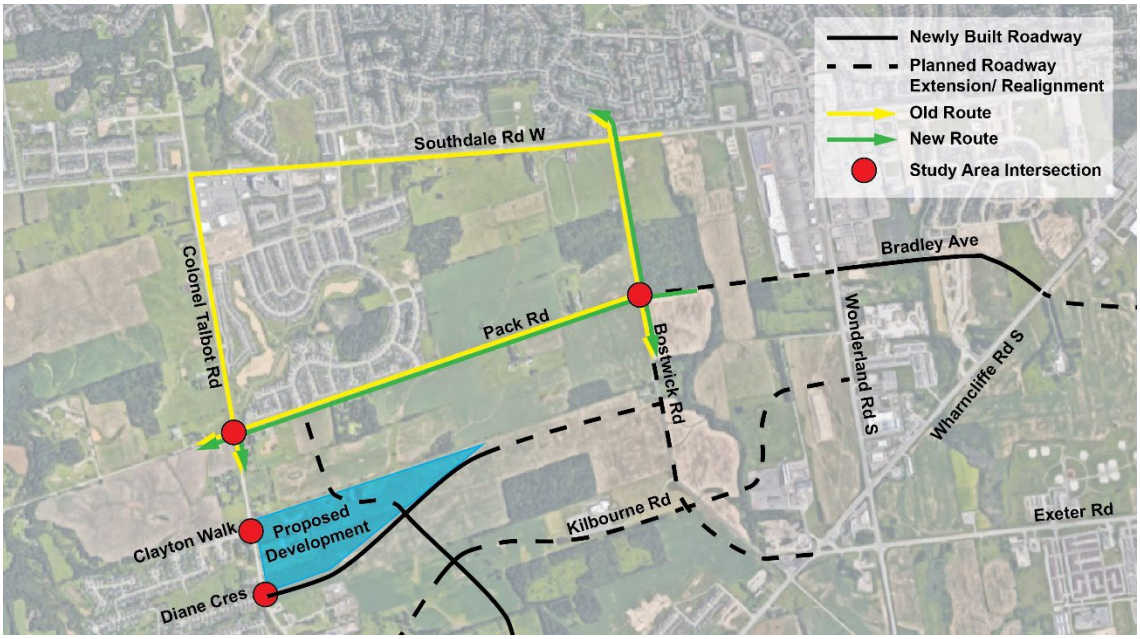
The extension of Bradley Avenue to Bostwick Road is expected to result in a significant shift in traffic in the study area as it will provide an alternative east-west route. Consistent with the City of London's future traffic model projections, approximately 20% of traffic on Southdale Road east of Bostwick Road is expected to reroute to the Bradley Avenue extension. **Figure 6** and **Figure 7** illustrates how this diversion of eastbound and westbound traffic on Southdale Road to the Bradley Avenue extension will impact the study area intersections.

Figure 6 - Eastbound Traffic Rerouting

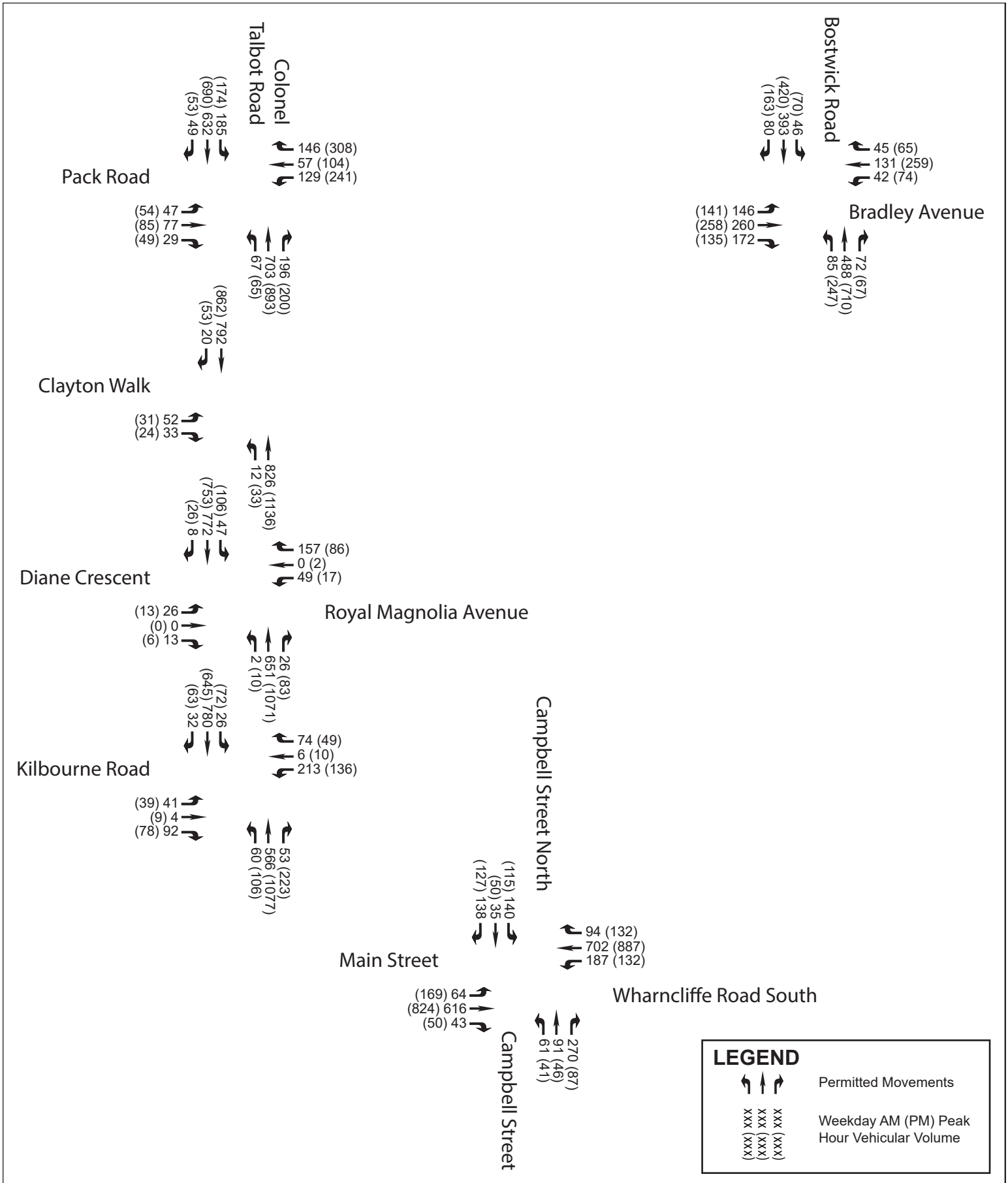


[1] City of London staff agreed to the use of a 1.5% linear traffic growth rate via email on August 3, 2023.

Figure 7 - Westbound Traffic Rerouting



The background traffic volumes were calculated by applying the growth rates to the existing traffic volumes, superimposing these volumes with adjacent development traffic, and adjusting the volumes to account for the projected rerouting of traffic due to the Bradley Avenue extension. The resulting Future (2033 & 2038) Background Traffic volumes are presented in **Exhibit 6** and **Exhibit 7**.



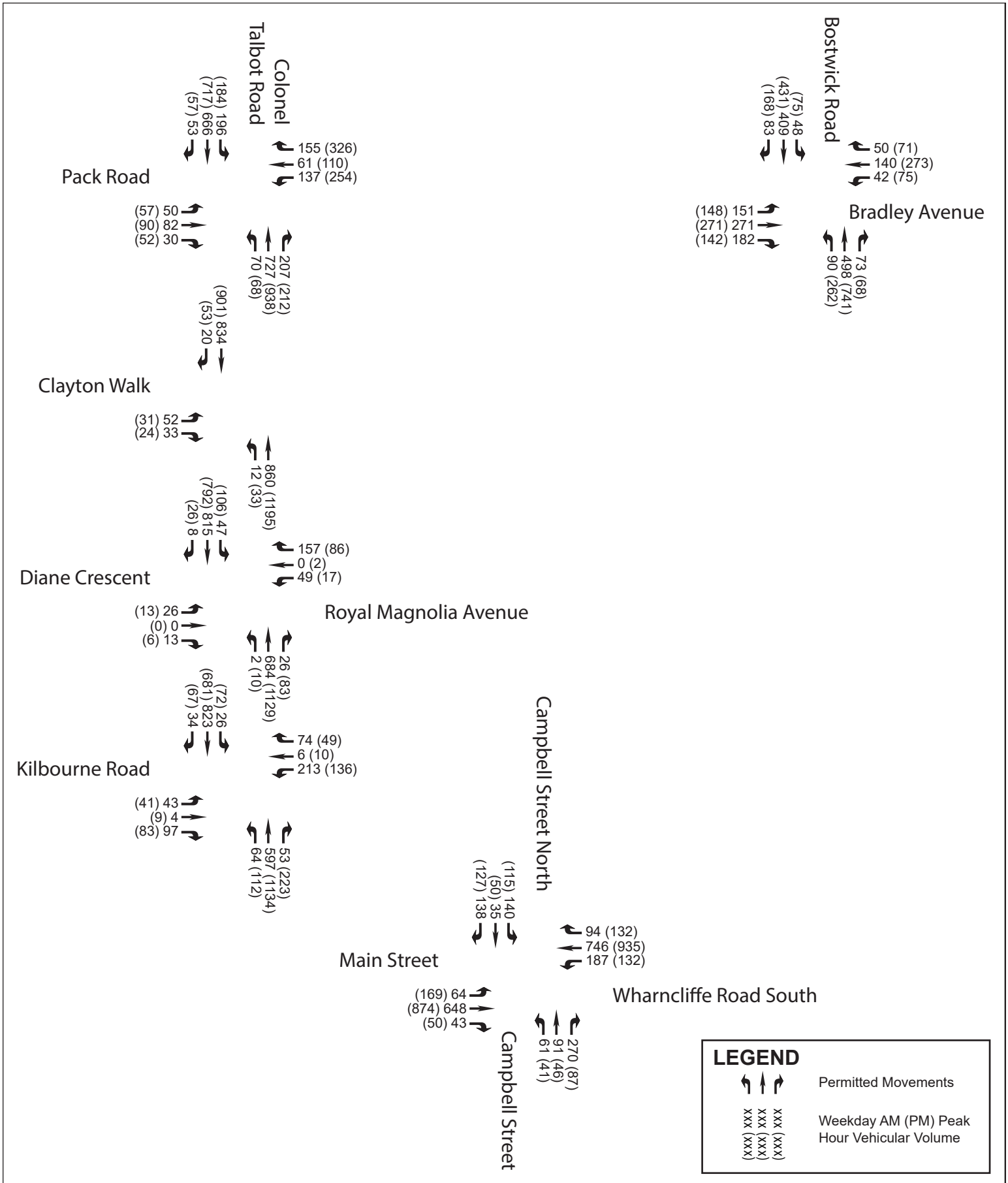
ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 6:
Future (2033)
Background Traffic

PROJECT No. 143384

SCALE: N.T.S.



ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 7:
Future (2038)
Background Traffic

PROJECT No. 143384

SCALE: N.T.S.

5.3 Trip Generation

The baseline traffic generation of the proposed developments was estimated using peak hour trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition). These baseline vehicle-trips were subsequently converted into person-trips using the methodology outlined in the ITE Trip Generation Handbook (3rd Edition) and were then subdivided into auto driver, auto passenger, transit, pedestrian, bicycle, and 'other' trips based on existing mode share distributions.

5.3.1 Baseline Vehicle Trip Generation

Based on the ITE Trip Generation Manual, the baseline vehicle trip generation of the proposed development has been calculated and is summarized below in **Table 7**.

Extracts from the ITE Trip Generation Manual have been provided in **Appendix D**.

Table 7 - Baseline Vehicle Trip Generation

LAND USE	SIZE	AM PEAK HOUR			PM PEAK HOUR		
		In	Out	Total	In	Out	Total
Single Family Homes	163 units	29	87	116	99	58	157
Street Townhomes	16 units	2	6	8	5	4	9
Cluster Housing	522 units	50	168	218	124	80	204
Mid-Rise Apartments	276 units	25	85	110	66	42	108
High-Rise Apartments	338 units	24	69	93	69	42	111
	Total	**130**	**415**	**545**	**363**	**226**	**589**

5.3.2 Person Trip Generation

The ITE trip generation rates for residential land uses are based on data collected from traffic surveys conducted across North America over the past 20-30 years in mostly suburban areas where transit usage is traditionally very low. The ITE Trip Generation Handbook (3rd Edition) provides the mode share distribution of several survey sites that were used for developing the trip generation rates. Based on these surveys, approximately 97% of trips generated by these developments were via private automobile (either as a driver or passenger) with an average vehicle occupancy of 1.15. Of the 3% of trips via sustainable modes of transportation (i.e., transit, walk or bike), only 0.1% of trips were transit trips. This indicates that these developments generate approximately 1.19 person-trips per baseline vehicle-trip.

Assuming 1.19 person-trips are generated per baseline vehicle-trip, the proposed development is expected to generate the following number of person-trips:

Table 8 - Person Trip Generation

LAND USE	AM PEAK HOUR			PM PEAK HOUR		
	In	Out	Total	In	Out	Total
Single Family Homes	35	104	139	118	69	187
Street Townhomes	2	7	9	6	5	11
Cluster Housing	60	200	260	148	95	243
Mid-Rise Apartments	30	101	131	79	50	129
High-Rise Apartments	29	82	111	82	50	132
Total	**156**	**494**	**650**	**433**	**269**	**702**

5.3.3 Mode Share

The 2016 Household Travel Survey Summary Report (IBI Group, July 2016) indicates that within the City of London, the current mode share distribution is as follows:

- Auto Driver: 62.5%
- Auto Passenger: 14.1%
- Transit: 7.6%
- Walk: 11.3%
- Bicycle: 1.4%
- Other: 3.2%

As the surrounding area becomes more developed, it is anticipated that transit service will be extended to the area. Additionally, the adjacent W3 Farms Residential Development will include an elementary school and some mixed-use commercial land uses. As such, future internal and adjacent land uses will provide amenities within walking/biking distance of the site. It is, therefore, expected that the mode share distribution described above will be achievable for the proposed development. The largely car-oriented nature of the surrounding area is unlikely to support higher non-auto mode shares, however.

5.3.4 Summary of Trip Generation

Applying the mode share distribution from Section 5.3.3 to the person-trip estimates from **Table 8**, the number of person-trips per mode was calculated and is summarized below in **Table 9**.

Table 9 – Person-Trips per Mode

TRAVEL MODE	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Auto Driver	97	309	407	270	168	439
Auto Passenger	22	69	92	61	38	99
Transit	12	37	50	33	20	53
Walk	18	56	74	49	30	79
Bicycle	2	7	9	6	4	10
Other	5	16	21	14	9	23
Total	**156**	**494**	**650**	**433**	**269**	**702**

5.4 Trip Distribution and Assignment

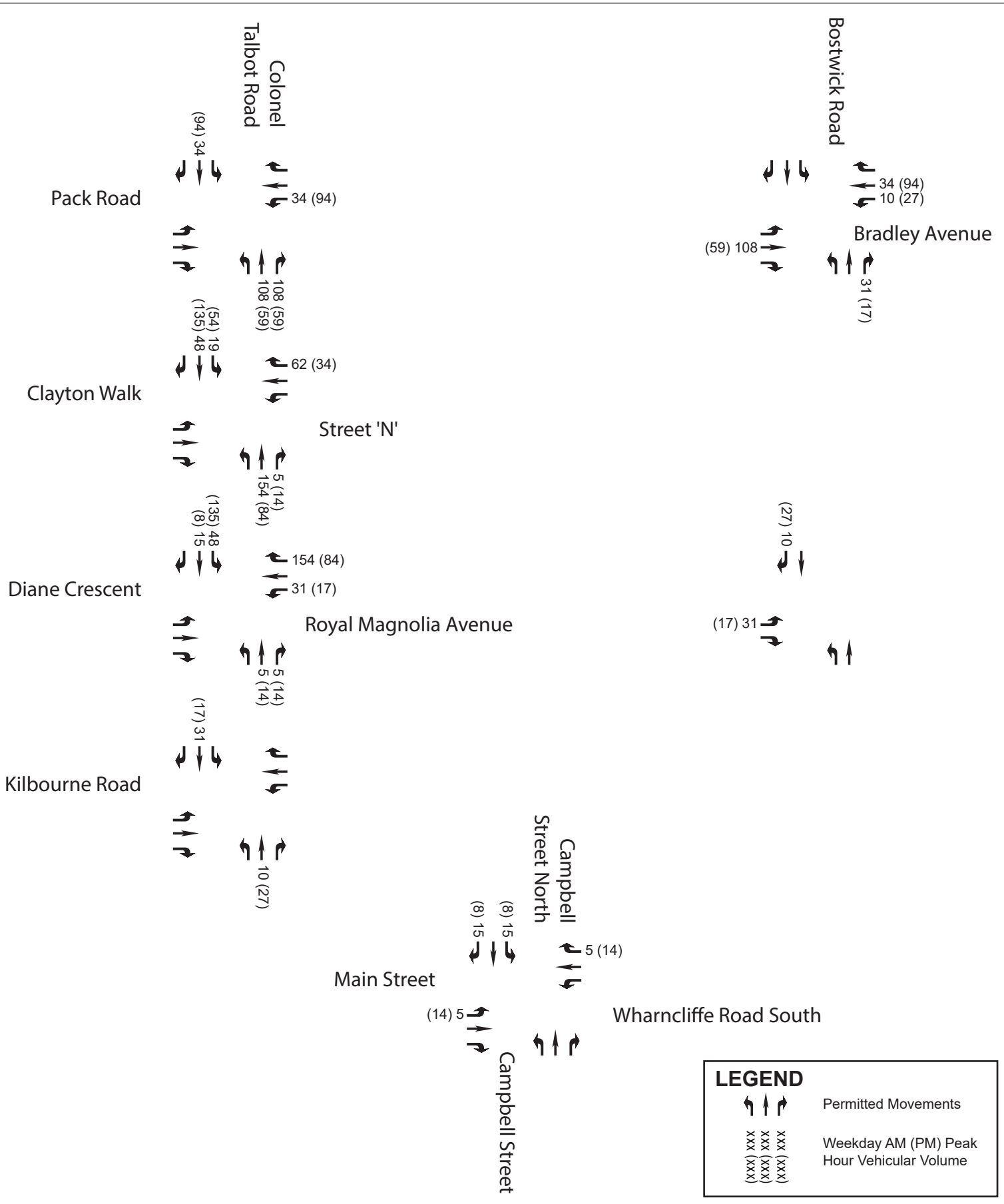
The distribution of development-generated traffic was based primarily on the City of London 2016 Household Travel Survey. It is estimated that site-generated traffic will distribute as follows:

- 35% to/from the North via Colonel Talbot Road
- 15% to/from the South
    - 10% via Colonel Talbot Road
    - 5% via Campbell Street North
- 50% to/from the East
    - 35% via Pack Road/Bradley Avenue
    - 10% via Royal Magnolia Avenue
    - 5% via Campbell Street North

Using the above distribution, development-generated traffic was assigned to the adjacent road network based on engineering judgement. Based on the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023), it is understood that left turns from side streets on Colonel Talbot Road will experience very high delays due to significant volumes of mainline traffic. As such, it is anticipated that all left-turns onto Colonel Talbot Road will be completed at the Colonel Talbot & Diane/Royal Magnolia intersection as this arterial-to-collector intersection is expected to ultimately be signalized in the future. **Exhibit 8** illustrates the projected development-generated traffic volumes.

5.5 Future Total Traffic Volumes

The future background traffic volumes were superimposed with the site-generated traffic volumes to estimate the future total traffic volumes, as presented in **Exhibit 9** and **Exhibit 10**.



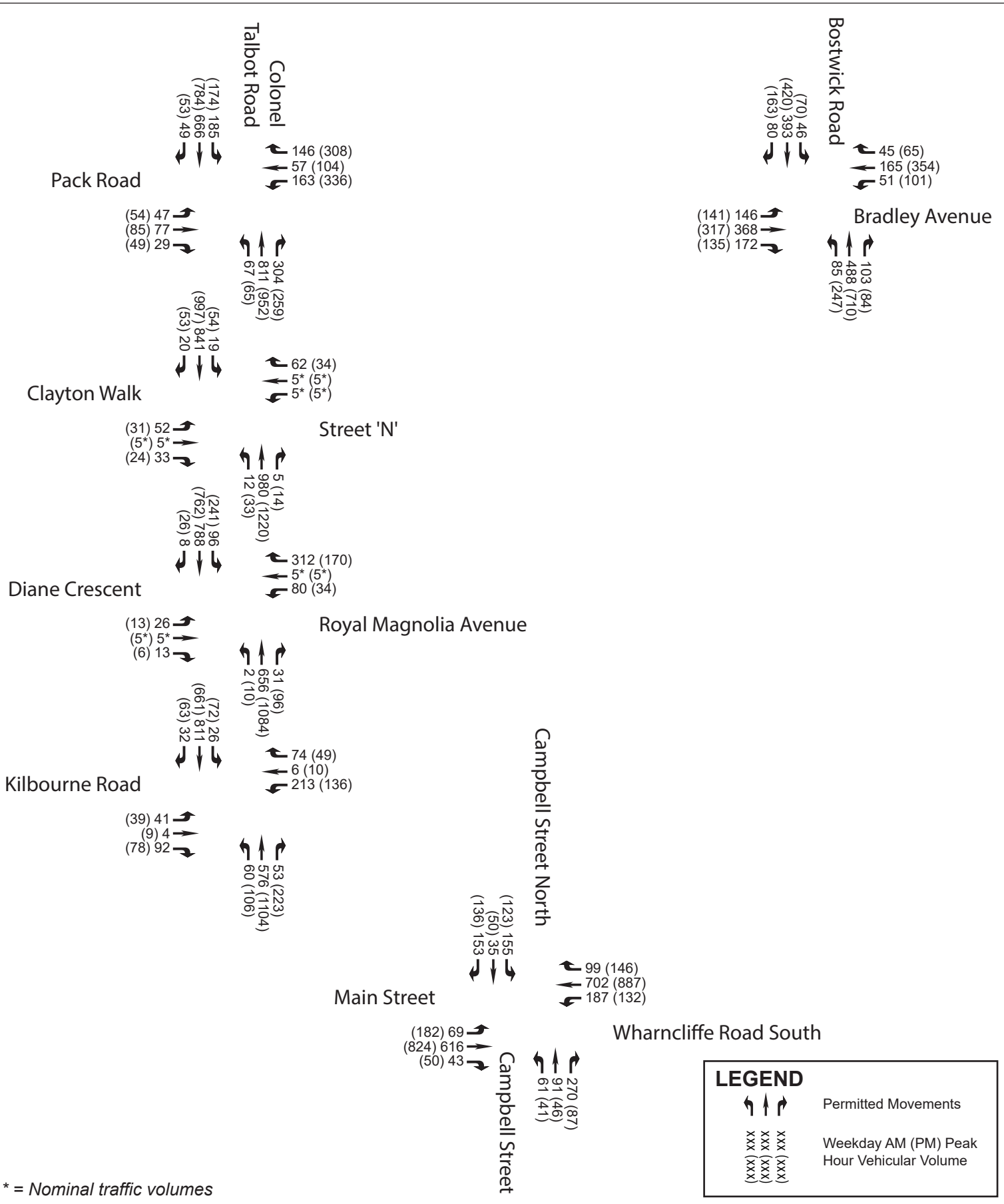
ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 8:
Site-Generated
Traffic

PROJECT No. 143384

SCALE: N.T.S.



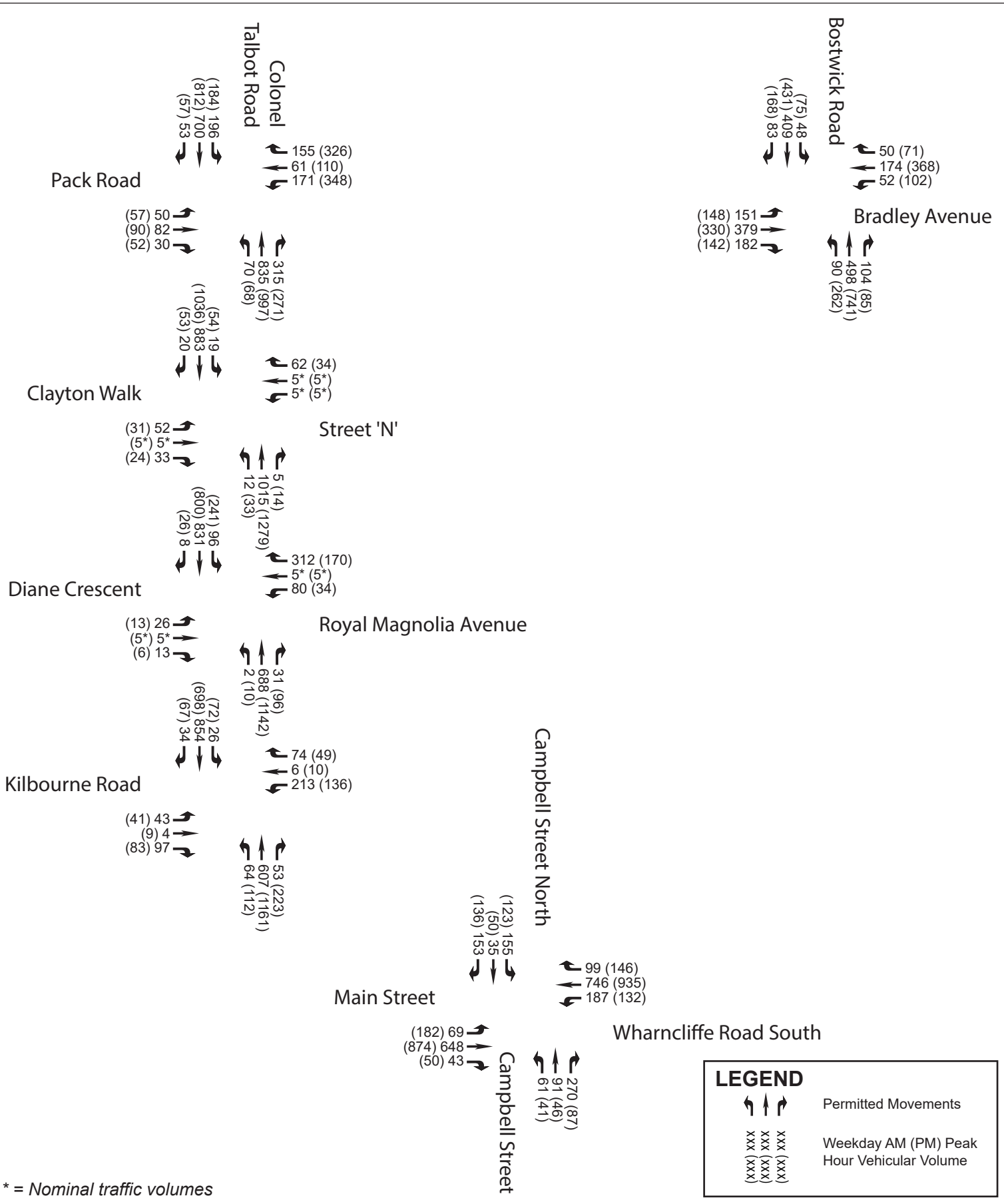
ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 9:
Future (2033)
Total Traffic

PROJECT No. 143384

SCALE: N.T.S.



* = *Nominal traffic volumes*

ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 10:
Future (2038)
Total Traffic

PROJECT No. 143384

SCALE: N.T.S.

6 Intersection Capacity Analysis

Traffic operations at all study area intersections were evaluated using Synchro v11 and SIDRA Intersections v9.0 for the weekday morning and afternoon peak hours under the following traffic conditions:

- Existing Traffic
- Future (2033) Background and Total Traffic
- Future (2038) Background and Total Traffic

6.1 Intersection Capacity Analysis Criteria

In qualitative terms, Level of Service (LOS) describes a user's perception of the operational conditions of a transportation facility. For vehicular LOS, these conditions are generally defined in terms of delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. The two key metrics used to evaluate vehicular LOS are as follows:

- **Volume to Capacity (v/c) Ratio:** The ratio of traffic volume (either measured or forecast) to the capacity of the intersection or roadway.
- **Average Delay:** The average elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line, including the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position.

LOS is given a letter designation from 'A' to 'F'. LOS 'A' represents the best operating conditions and LOS 'E' represents the level at which the intersection, or an approach to the intersection, is carrying the maximum traffic volume that can, practicably, be accommodated. LOS 'F' indicates that the facility is operating beyond its theoretical capacity.

The Highway Capacity Manual (HCM) 2010, prepared by the Transportation Research Board, includes the following Levels of Service criteria for signalized and unsignalized intersections, as indicated in **Table 10**.

Table 10 - Level of Service Thresholds

LEVEL OF SERVICE	SIGNALIZED	UNSIGNALIZED
	Delay (Seconds per Vehicle)	
A	<10	<10
B	>10 and <20	>10 and <15
C	>20 and <35	>15 and <25
D	>35 and <55	>25 and <35
E	>55 and <80	>35 and <50
F	>80	>50

The TIA Guidelines indicate that intersections and turning movements that exceed the following thresholds should be identified:

- LOS 'E' or worse.
- v/c ratio greater than 0.90.
- 95th percentile queues greater than the available storage capacity

6.2 Intersection Capacity Analysis Results

Based on the established intersection capacity analysis criteria described above, existing and future traffic conditions were analysed using the weekday morning and weekday afternoon peak hour traffic volumes derived in the previous sections of this report. The analysis results are progressive, in that any roadway modification required by a preceding traffic condition was assumed for future conditions. This format helps identify which modifications were triggered by the proposed development in each analysis year and which were triggered by background traffic.

Given the number of intersections within the study area, the following tables only illustrate the intersection capacity analysis results for movements which meet one or more of the thresholds described above.

For intersections where none of the movements meet any of the above criteria, only the overall intersection delay and LOS is shown.

The full intersection capacity analysis results have been provided in **Appendix E**.

6.2.1 Existing Traffic

The results of the intersection capacity analysis of Existing Traffic conditions are presented in **Table 11**.

Table 11 - Intersection Capacity Analysis: Existing Traffic

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Pack (signalized)	9.2 (12.7)	A (B)	-	- (-)	- (-)	- (-)	- (-)	-
Colonel Talbot & Clayton (unsignalized)	30.6 (36.6)	D (E)	EBL	30.6 (36.6)	D (E)	0.30 (0.22)	8.4 (5.6)	30
Colonel Talbot & Diane (unsignalized)	20.9 (27.3)	C (D)	-	- (-)	- (-)	- (-)	- (-)	-
Colonel Talbot & Kilbourne (unsignalized)	28.7 (47.1)	D (E)	EBL	28.7 (47.1)	D (E)	0.21 (0.30)	4.9 (8.4)	45
Bostwick & Pack (unsignalized)	14.1 (33.7)	B (D)	-	- (-)	- (-)	- (-)	- (-)	-
Main/Wharncliffe & Campbell (signalized)	19.0 (12.3)	B (B)	NBL	21.2 (38.1)	C (D)	0.21 (0.17)	**13.9 (12.3)**	5
			SBL	106.0 (59.7)	**F (E)**	**0.96** (0.66)	#35.6 (34.5)	45

Notes: Int. stands for Intersection. Only intersection capacity analysis results for critical movements are shown above.

As shown above, eastbound left movements at the intersections of Colonel Talbot & Clayton and Colonel Talbot & Kilbourne are currently approaching their theoretical capacity (i.e., LOS 'E'). At the Main/Wharncliffe & Campbell intersection, northbound left-turn queues are exceeding the storage capacity and the southbound left-turn movement is experiencing high delays during both peak hours and is approaching its theoretical capacity in the weekday morning peak hour.

6.2.2 Future (2033) Background Traffic

As noted in Section 4.1, Colonel Talbot Road is expected to be urbanized in 2024-2025 which will result in the reconstruction of all the study area intersections along this corridor. It is assumed that by 2033, the roadway configurations, traffic controls and signal timing plans outlined in the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) will be implemented and therefore represent the baseline roadway configuration at this analysis year. The results of the intersection capacity analysis of Future (2033) Background Traffic conditions are presented in **Table 12**.

Table 12 - Intersection Capacity Analysis: Future (2033) Background Traffic

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Pack (signalized)[1]	26.0 (59.3)	C (E)	EBL	101.9 (118.7)	F (F)	0.73 (0.85)	#35.0 (#36.5)	55
			WBL	112.3 (96.2)	F (F)	0.94 (0.98)	#76.1 (#105.5)	55
			WBTR	54.5 (69.1)	D (E)	0.80 (0.98)	#74.0 (#134.1)	-
			NBTR	13.5 (64.9)	B (E)	0.77 (1.05)	175.5 (#351.1)	-
			SBL	33.8 (166.1)	C (F)	0.79 (1.22)	#87.3 (#76.6)	120
Colonel Talbot & Pack (signalized)[2]	16.9 (30.6)	B (C)	WBL	53.5 (68.1)	D (E)	0.65 (0.88)	45.5 (#86.4)	55
Colonel Talbot & Clayton (unsignalized)[1]	339.8 (367.8)	F (F)	EBL	339.8 (367.8)	F (F)	1.23 (1.05)	38.5 (25.2)	30
Colonel Talbot & Diane/Royal Magnolia (unsignalized)[1]	259.4 (506.1)	F (F)	EBTRL	259.4 (506.1)	F (F)	0.96 (1.05)	28.0 (19.6)	-
			WBTL	201.3 (298.7)	F (F)	0.91 (0.74)	29.4 (16.1)	-
Colonel Talbot & Diane/Royal Magnolia (signalized)	10.9 (8.3)	B (A)	-	- (-)	- (-)	- (-)	- (-)	-
Colonel Talbot & Kilbourne (signalized)[1]	19.1 (15.3)	B (B)	WBL	57.8 (70.8)	E (E)	0.85 (0.77)	#68.7 (#55.9)	-

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Kilbourne (signalized)[3]	19.2 (16.7)	B (B)	-	- (-)	- (-)	- (-)	- (-)	-
Bostwick & Pack (roundabout)	8.1 (12.7)	A (B)	-	- (-)	- (-)	- (-)	- (-)	-
Main/Wharncliffe & Campbell (signalized)	30.0 (22.7)	C (C)	EBL	34.7 (90.1)	C **(F)**	0.53 **(1.01)**	#30.3 **(#50.4)**	45
			NBL	19.3 (42.4)	B (D)	0.20 (0.33)	**14.6 (17.1)**	5
			SBL	93.4 (60.5)	**F (E)**	**0.98** (0.71)	**#49.0** (39.5)	45
Main/Wharncliffe & Campbell (signalized)[4]	26.6 (20.8)	C (C)	NBL	32.7 (42.3)	C (D)	0.28 (0.33)	**20.8 (17.1)**	5
			SBL	45.1 (60.3)	D **(E)**	0.74 (0.71)	#41.1 (39.5)	45

Notes: Int. stands for Intersection. Only intersection capacity analysis results for critical movements are shown above.

[1] Lane configuration and traffic signal timing plan based on the preferred design of the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023).

[2] Optimized signal timings in AM peak hour, increased cycle length from 110s to 130s in PM peak hour, added a protected-permitted westbound left-turn phase in the AM and PM peak hour and added a northbound and westbound right-turn lane to the intersection.

[3] Optimized signal timings in AM and PM peak hour.

[4] Added a protected-permitted southbound left-turn phase and changed cycle length to 90s in AM peak hour, added a protected-permitted eastbound left-turn phase in the PM peak hour, added a westbound right-turn lane to the intersection.

As noted above, the analysis of the four Colonel Talbot Road intersections assumed that the baseline roadway configuration and traffic signal timing plans in 2033 would adhere to the preferred design of the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023). This memorandum had noted that in 2030:

- The Colonel Talbot & Pack intersection would be operating at capacity;
- The intersections of Colonel Talbot & Clayton and Colonel Talbot & Diane/Royal Magnolia would be experiencing very high delays (LOS 'F') on the side street approaches; and
- Some left-turn movements at the Colonel Talbot & Kilbourne intersection would be operating at LOS 'E'.

The results in **Table 12** are therefore consistent with the above results.

It should be noted that the traffic projections developed for both this study and the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) indicate that Colonel Talbot Road will be exceeding the theoretical capacity of a two-lane road (i.e., over a 1,000 vehicles per hour in the peak direction) in the near future. This therefore indicates that Colonel Talbot Road will likely require four-lane widening if it is to accommodate the projected traffic demand.

As the Colonel Talbot & Pack intersection was expected to be at capacity by 2030, it is not unexpected that its capacity would be exceeded after three years of background traffic growth. Adjustments to the signal timing plan may partially alleviate some of the capacity issues at the intersection, however, the addition of a protected-permitted westbound left-turn phase during both peak hours as well as the introduction of a northbound and westbound right-turn lane would ultimately be required in order to address the significant capacity issues anticipated under AECOM's preferred design. Consideration should be given to implementing these mitigation measures when Colonel Talbot Road is urbanized.

At the Colonel Talbot & Clayton intersection, delays on the side street are expected to be significant due to the volume of traffic travelling along Colonel Talbot Road. It is expected that background traffic demand on the eastbound approach will gradually decrease over time due to the high delays through changes to travel behaviour and the use alternative routes to travel northbound on Colonel Talbot. The City should give consideration to implementing a peak period eastbound left-turn prohibition at this intersection or to physically restricting Clayton Walk to right-in/right-out only.

Royal Magnolia Avenue is classified as a neighbourhood connector. The purpose of such streets is to connect neighbourhood streets (i.e., local roads) to the arterial road network. In order to do this effectively and minimize cut through traffic along neighbourhood streets, delays at intersections between neighbourhood connectors and the arterial road network must be reasonable. Excessive delays will cause drivers to seek alternative routes, thereby undermining this road's role within the hierarchy of the road network. Were the Colonel Talbot & Diane/Royal Magnolia intersection to remain unsignalized, it is expected that side street delays would be unacceptable and lead to unsafe driver behaviour. As such, there is a need to signalize this intersection when Colonel Talbot Road is urbanized rather than remain unsignalized as is recommended in the AECOM memorandum.

At the Colonel Talbot & Kilbourne intersection, some minor traffic signal timing optimization is required in order to reduce delays on the westbound left-turn movement.

The Main/Wharncliffe & Campbell intersection is expected to have some movements operate near or at capacity during both the weekday morning and afternoon peak hour in 2033. Although the intersection was only recently rebuilt, future traffic demand associated with adjacent developments will result in the need for a westbound right-turn lane to be introduced at this intersection, as well as protected-permitted southbound and eastbound left-turn phases in the weekday morning and afternoon peak hour, respectively, in order to address these capacity issues. Even with these mitigation measures, the southbound left-turn movement is still expected to operate at LOS 'E' during the weekday morning peak hour but as the intersection as a whole is expected to operate at LOS 'C' no further mitigation measures are necessary.

The Bostwick & Pack intersection is expected to have been reconstructed as a two-lane roundabout by 2033. The results of the intersection capacity analysis indicate that the intersection will operate at an acceptable Level of Service under this configuration.

6.2.3 Future (2038) Background Traffic

The results of the intersection capacity analysis of Future (2038) Background Traffic conditions are presented in **Table 13**. The analysis assumes that the required mitigation measures from the Future (2033) Background Traffic conditions analysis are implemented, and that signal timing optimization will occur on a regular basis.

Table 13 - Intersection Capacity Analysis: Future (2038) Background Traffic

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Pack (signalized)	18.5 (37.3)	B (D)	EBL	53.4 (59.5)	D (E)	0.39 (0.41)	23.5 (28.1)	55
			EBTR	54.4 (63.5)	D (E)	0.61 (0.70)	41.8 (53.7)	-
			WBL	51.0 (81.7)	D **(F)**	0.65 **(0.93)**	47.1 **(#105.9)**	55
			WBR	8.7 (22.3)	A (C)	0.42 (0.67)	16.7 **(60.8)**	60
			NBT	13.6 (41.4)	B (D)	0.67 **(0.93)**	148.1 (#334.8)	-
			SBL	26.6 (83.5)	C **(F)**	0.71 **(0.95)**	#79.8 (#83.1)	120
Colonel Talbot & Clayton (unsignalized)	445.2 (486.3)	**F (F)**	EBL	445.2 (486.3)	**F (F)**	**1.44 (1.26)**	**42.7** (27.3)	30
Colonel Talbot & Diane/Royal Magnolia (signalized)	12.2 (9.5)	B (A)	-	- (-)	- (-)	- (-)	- (-)	-
Colonel Talbot & Kilbourne (signalized)	20.8 (18.7)	C (B)	WBL	53.8 (60.0)	D (E)	0.83 (0.71)	#66.3 (48.4)	-
Bostwick & Pack (roundabout)	8.5 (14.2)	A (B)	-	- (-)	- (-)	- (-)	- (-)	-
Main/Wharncliffe & Campbell (signalized)	28.0 (23.9)	C (C)	EBL	18.8 (34.6)	B (C)	0.38 (0.69)	17.9 **(#65.4)**	45
			WBL	58.2 (24.3)	E (C)	0.89 (0.58)	#74.1 (39.8)	-
			NBL	32.7 (42.9)	C (D)	0.28 (0.34)	**20.8 (17.4)**	5
			SBL	57.0 (61.3)	E (E)	0.81 (0.71)	**#45.5** (40.0)	45

Notes: Int. stands for Intersection. Only intersection capacity analysis results for critical movements are shown above.

Under Future (2038) Background Traffic conditions, the study area intersections are expected to operate at an acceptable overall Level of Service, although some turning movements are expected to experience high delays and/or begin to approach their theoretical capacity.

At the Colonel Talbot & Pack intersection, the volume of traffic on the northbound through lane during the weekday afternoon peak hour is expected to approach the limit of a single lane, indicating that Colonel Talbot Road will likely require four-lane widening beyond 2038. A significant portion of the available green time is dedicated to the northbound through movement as a result of the heavy traffic demand, limiting the green time that can be allocated to the other turning movements. It is expected that increasing the northbound through capacity would allow additional green time to be allocated to other movements, thereby mitigating the capacity issues anticipated in 2038.

At the Colonel Talbot & Clayton intersection, the continued increase in background traffic is expected to further increase traffic delays for eastbound left-turning traffic. As noted previously, it is expected that vehicles will seek alternative travel routes in order to avoid these high delays, although the City should consider measures to restrict left-turns from Clayton Walk.

The intersections of Colonel Talbot & Diane/Royal Magnolia, Colonel Talbot & Kilbourne and Main/Wharncliffe & Campbell are all expected to operate at an acceptable Level of Service under Future (2038) Background Traffic conditions, assuming the required modifications previously identified as are in place. Some left-turn movements at the latter two intersections will begin to experience slightly high delays (i.e., LOS ‘E’) but as the intersections as a whole are operating well no mitigation measures are necessary.

The Bostwick & Pack roundabout is expected to continue operating at an acceptable Level of Service (i.e., LOS ‘D’ or better).

6.2.4 Future (2033) Total Traffic

The results of the intersection capacity analysis of Future (2033) Total Traffic conditions are presented in **Table 14**. To identify the direct impact of the subject development, the analysis assumes that the required mitigation measures from the Future (2033) Background Traffic conditions analysis are implemented, and that signal timing optimization will occur on a regular basis.

Table 14 - Intersection Capacity Analysis: Future (2033) Total Traffic

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Pack (signalized)	21.7 (43.7)	C (D)	EBL	53.9 (59.2)	D (E)	0.38 (0.40)	22.8 (26.5)	55
			EBTR	54.4 (62.0)	D (E)	0.60 (0.68)	40.3 (50.9)	-
			WBL	50.9 (81.7)	D **(F)**	0.69 **(0.98)**	54.4 **(#137.8)**	55
			NBT	17.6 (57.1)	B (E)	0.76 **(1.00)**	193.4 (#358.7)	-
			SBL	53.8 (87.5)	D **(F)**	0.88 **(0.97)**	#90.5 (#80.6)	120
Colonel Talbot & Clayton (unsignalized)	1312.6 (1276.1)	**F (F)**	EBL	1312.6 (1276.1)	**F (F)**	**3.02 (2.51)**	**55.3 (34.3)**	30
Colonel Talbot & Diane/Royal Magnolia (signalized)	19.6 (36.0)	B (D)	SBL	15.5 (247.4)	B **(F)**	0.41 **(1.44)**	23.5 **(#88.7)**	75
Colonel Talbot & Diane/Royal Magnolia (signalized)[1]	19.6 (28.7)	B (C)	WBTL	23.2 (63.7)	C (E)	0.30 (0.38)	19.2 (19.9)	-
			NBTR	16.8 (34.5)	B (C)	0.73 **(0.95)**	#150.8 (#391.8)	-
			SBL	15.5 (82.7)	B **(F)**	0.41 **(0.96)**	23.5 **(#100.0)**	75
Colonel Talbot & Kilbourne (signalized)	20.1 (17.9)	C (B)	-	- (-)	- (-)	- (-)	- (-)	-
Bostwick & Pack (roundabout)	9.3 (15.5)	A (C)	-	- (-)	- (-)	- (-)	- (-)	-
Main/Wharncliffe & Campbell (signalized)	27.1 (24.0)	C (C)	EBL	18.2 (30.9)	B (C)	0.36 (0.64)	18.5 **(#68.5)**	45
			NBL	32.8 (41.6)	C (D)	0.28 (0.33)	**20.8 (17.0)**	5
			SBL	54.2 (59.9)	D (E)	0.82 (0.72)	**#48.7** (41.3)	45

Notes: Int. stands for Intersection. Only intersection capacity analysis results for critical movements are shown above.

[1] Added a protected-permitted southbound left-turn phase and increased cycle length to 130s in PM peak hour.

The addition of site-generated traffic to the Colonel Talbot & Pack intersection is expected to result in a number of movements approaching their theoretical capacity during the weekday afternoon peak hour, despite the required modifications identified under Future (2033) Background Traffic conditions. This is similar to what was observed under Future (2038) Background Traffic conditions and can be attributed to a lack of through lane capacity in the northbound and southbound directions on Colonel Talbot Road. Although site-generated traffic will contribute between 12% to 13% of northbound and southbound through traffic at this intersection, the issue is largely due to background traffic demand and insufficient gaps to safely perform turning movements.

At the intersections of Colonel Talbot & Clayton, Colonel Talbot & Kilbourne and Main/Wharncliffe & Campbell, the addition of site-generated traffic is not expected to have a significant impact on traffic operations relative to background traffic conditions. The Colonel Talbot & Clayton intersection is expected to continue experiencing excessive delays on its eastbound approach due to heavy traffic in the north-south directions. As noted previously, it is expected that some drivers will choose alternate routes rather than attempt to turn left at this intersection. The assignment of site-generated traffic has already considered the excessive delays that westbound left-turning traffic would experience at this intersection and has therefore assigned the traffic to turn left at the Colonel Talbot & Diane/Royal Magnolia intersection instead. Given the high delays that eastbound and westbound left-turning traffic is expected to experience at the Colonel Talbot & Clayton intersection, the City should give consideration to implementing peak period eastbound and westbound left-turn restrictions at the intersection or physically restricting the side streets to right-in/right-out only.

During the weekday afternoon peak hour, the southbound left-turn movement at the Colonel Talbot & Diane/Royal Magnolia intersection is expected to exceed its theoretical capacity. Providing a protected-permitted phase for this movement is expected to improve traffic operations but at the expense of the northbound through movement. As noted previously for the Colonel Talbot & Pack intersection, these capacity issues can largely be attributed to a lack of north-south through lane capacity indicating that Colonel Talbot Road will require four-lane widening in the near future.

The Bostwick & Pack roundabout is expected to continue operating at an acceptable Level of Service (i.e., LOS ‘D’ or better).

6.2.5 Future (2038) Total Traffic

The results of the intersection capacity analysis of Future (2038) Total Traffic conditions are presented in **Table 15**. The analysis assumes that the required mitigation measures from the Future (2033) Total Traffic and Future (2038) Background Traffic conditions analyses are implemented, and that signal timing optimization will occur on a regular basis.

Table 15 - Intersection Capacity Analysis: Future (2038) Total Traffic

INTERSECTION	AM PEAK HOUR (PM PEAK HOUR)							PARALLEL LANE LENGTH (m)
	INT. DELAY (s)	INT. LOS	LANE GROUP	DELAY (s)	LOS	V/C RATIO	95TH PERCENTILE QUEUE (m)	
Colonel Talbot & Pack (signalized)	23.0 (50.6)	C (D)	EBL	55.5 (59.5)	E (E)	0.40 (0.41)	24.2 (28.1)	55
			EBTR	57.1 (63.5)	E (E)	0.62 (0.70)	43.4 (53.7)	-
			WBL	71.5 (106.1)	E **(F)**	0.84 **(1.06)**	**#66.4 (#160.0)**	55
			WBR	12.9 (23.3)	B (C)	0.44 (0.64)	22.7 **(65.4)**	60
			NBT	16.7 (66.3)	B (E)	0.76 **(1.03)**	199.4 (#381.0)	-
			SBL	56.3 (104.1)	E **(F)**	0.90 **(1.03)**	#97.6 (#87.3)	120
Colonel Talbot & Clayton (unsignalized)	1610.5 (1570.1)	**F (F)**	EBL	1610.5 (1570.1)	**F (F)**	**3.56 (2.97)**	**57.4 (35.7)**	30
Colonel Talbot & Diane/Royal Magnolia (signalized)	22.2 (33.7)	C (C)	WBTL	22.8 (63.7)	C (E)	0.29 (0.38)	19.2 (19.9)	-
			NBTR	18.9 (45.1)	B (D)	0.77 (1.00)	#165.9 (#423.9)	-
			SBL	19.4 (82.7)	B **(F)**	0.47 (0.96)	27.1 **(#100.0)**	75
Colonel Talbot & Kilbourne (signalized)	22.3 (18.4)	C (B)	WBL	53.8 (70.4)	D (E)	0.83 (0.77)	#66.3 (#55.3)	-
Bostwick & Pack (roundabout)	9.8 (17.6)	A (C)	-	- (-)	- (-)	- (-)	- (-)	-
Main/Wharncliffe & Campbell (signalized)	28.9 (24.2)	C (C)	EBL	19.8 (43.0)	B (D)	0.40 (0.77)	19.7 **(#70.8)**	45
			WBL	58.2 (24.5)	E (C)	0.89 (0.59)	#74.1 (39.9)	-
			NBL	32.8 (43.5)	C (D)	0.28 (0.35)	**20.8 (17.7)**	5
			SBL	71.6 (63.9)	E (E)	0.90 (0.74)	**#53.2** (43.2)	45

Notes: Int. stands for Intersection. Only intersection capacity analysis results for critical movements are shown above.

As shown above, the intersections of Colonel Talbot & Pack and Colonel Talbot & Diane/Royal Magnolia are both expected to operate at or above their theoretical capacity as a result of insufficient road capacity. The City should consider reviewing the need for additional

road network capacity in the area as the results of this study suggest that Colonel Talbot Road will not be sufficiently wide to accommodate the traffic demand associated with the development of the surrounding area.

The Colonel Talbot & Clayton intersection is expected to continue operating with significant delays on the eastbound approach. As a result of these delays, it is expected that drivers will instead choose to turn left at alternate locations with lower delays (e.g., Colonel Talbot & Diane/Royal Magnolia), however, without restriction of this movement, unsafe turning movements would still be possible.

Traffic operations at the intersections of Colonel Talbot & Kilbourne and Main/Wharncliffe & Campbell under Future (2038) Total Traffic conditions are largely the same as observed under background traffic conditions, indicating that site-generated traffic has a minimal impact on these intersections. Some left-turn movements at both intersection operate at LOS ‘E’ but as the intersections as a whole operate at an acceptable Level of Service (i.e., intersection LOS of ‘D’ or better) no mitigation measures are required.

The Bostwick & Pack roundabout is expected to continue operating at an acceptable Level of Service (i.e., LOS ‘D’ or better).

6.2.6 Summary of Results

Overall, the results of the intersection capacity analysis indicates that all study area intersections, with the exception of the Bostwick & Pack/Bradley roundabout, are expected to experience capacity issues under future background traffic conditions. Colonel Talbot Road in particular is expected to experience significant capacity issues due to heavy background traffic demand. The findings of the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) indicated that side street approaches would experience very high delays and key study area intersections would be operating at capacity by 2030. As such, the findings of this study are to be expected. These results suggest that Colonel Talbot Road will require four-lane widening in the future, although the City has not identified if or when this will occur. Until this widening is undertaken, it can be expected that significant congestion will occur along Colonel Talbot Road. **Table 16** summarizes the interim mitigation measures required to address some of the capacity issues identified.

Table 16 – Required Operational Improvements

YEAR	REQUIRED OPERATIONAL IMPROVEMENTS
2033	**Background Traffic** • **Colonel Talbot & Pack:** Optimize the signal timing plan, add a protected-permitted westbound left-turn phase in the weekday morning and afternoon peak hour and add a northbound and westbound right-turn lane. *Required in approximately 5 years.* • **Colonel Talbot & Clayton Walk:** Consider implementing peak period eastbound and westbound left-turn prohibitions or physically restricting the side streets to right-in/right-out only. Given the high traffic volumes on the main street, left-turn movements from the sidestreets could be hazardous and would be subject to significant delays. *Required in approximately 5 years.* • **Colonel Talbot & Diane/Royal Magnolia:** Signalize the intersection. *Required within 5 years and prior to first occupancy of the proposed development.* • **Colonel Talbot & Kilbourne:** Optimize the signal timing plan on a regular basis. • **Main/Wharncliffe & Campbell:** Optimize the signal timing plan, add a protected-permitted southbound and eastbound left-turn phase in the weekday morning and afternoon peak hour, respectively, and add a westbound right-turn lane. *Required imminently.* **Total Traffic** • **Colonel Talbot & Diane/Royal Magnolia:** Add a protected-permitted southbound left-turn phase in the weekday afternoon peak hour. *Required within 5 years.*
2038	**Background & Total Traffic** • No additional mitigation measures required.

As shown above, the majority of the above mitigation measures are required as a result of background traffic demand rather than site-generated traffic. The City should consider reviewing the need for the four-lane widening of Colonel Talbot Road given the significant capacity issues anticipated along this corridor.

6.3 Traffic Signal Warrants

Traffic signal warrant analysis was completed for both the Colonel Talbot & Clayton intersection and Colonel Talbot & Diane/Royal Magnolia intersection in accordance with the methodology outlined in Ontario Traffic Manual (OTM) Book 12: Traffic Signals. The results of the warrant

analysis are provided in **Appendix F** and indicate that neither intersection warrants signalization under Future (2038) Total Traffic conditions. Although not warranted, traffic signals are required at the Colonel Talbot & Diane/Royal Magnolia intersection in order to ensure that Royal Magnolia Avenue can fulfill its role as a neighbourhood connector road and alleviate projected side street delays that do not meet acceptable operating conditions.

7 Geometric Analyses

7.1 Site Access Review

The Colonel Talbot & Clayton Walk/Street 'N' intersection is the proposed development's only direct access intersection to the existing public roadway network. All other access points to the subject site will be provided via internal connections to other adjacent developments. As such, only this intersection requires geometric review of sightlines and access spacing. The City of London Access Management Guidelines classify access intersections, such as the Street 'N' access, as major access connections.

7.1.1 Sightlines

The Access Management Guidelines indicate that sightlines at a major access connection must meet the desirable decision sight distance requirements. For an assumed design speed of 70 km/h (posted speed limit plus 10 km/h), the desirable decision sight distance is 275m. Based on a desktop review of sightlines at the proposed access location, this sight distance requirement has been met.

7.1.2 Access Spacing

Colonel Talbot Road is classified as a Civic Boulevard (i.e., Urban Arterial) and, therefore, a minimum spacing of 150m is required between adjacent full movement unsignalized access intersections. Additionally, 400m of spacing is desirable between the Street 'N' access and any adjacent signalized intersection, although 300m of spacing is the minimum requirement.

The proposed Street 'N' access is approximately 485m south of Pack Road (signalized), 315m north of Diane Crescent/Royal Magnolia Avenue (future signalized) and 260m south of a potential future major access connection to the Hudson Park Subdivision (unsignalized). As such, the proposed access location meets the minimum spacing requirements outlined above. Furthermore, Street 'N' has been aligned with the existing Clayton Walk intersection.

7.2 Auxiliary Lane Analysis

The auxiliary lane analyses below have been completed in accordance with the City of London Access Management Guidelines and the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads.

7.2.1 Left-Turn Auxiliary Lane Analysis: Unsignalized Intersections

Auxiliary left-turn lane warrant analysis was completed for the Colonel Talbot & Clayton intersection under Future (2038) Total Traffic conditions and the results are provided in **Appendix G**. The results of the analysis indicate that a southbound left-turn lane with 35m of storage is warranted at the intersection. The northbound left-turn volume at this intersection is well below 5% and therefore does not meet the minimum threshold for a left-turn lane. As a southbound left-turn lane with 45m of storage is already planned for this intersection as part of the urbanization of Colonel Talbot Road, no auxiliary lane extensions are required to accommodate the development-generated demand.

7.2.2 Right-Turn Auxiliary Lane Analysis: Unsignalized Intersections

The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads indicates that auxiliary right-turn lanes should be considered at unsignalized intersections when "the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard". The City of London Access Management Guidelines (April 2012) further

suggest that right-turn lanes be considered when right-turn volumes exceed 60 vehicles per hour and represent 10% to 20% of approaching traffic.

Northbound and southbound right-turn volumes at the Colonel Talbot & Clayton intersection are expected to be relatively low (5 to 55 vehicles per hour) and represent a small proportion of approaching traffic (1% to 4%). As such, it is not expected that auxiliary right-turn lanes will be required at this intersection.

7.2.3 Left-Turn Auxiliary Lane Analysis: Signalized Intersections

The auxiliary left-turn lane storage requirements for all left-turn movements at signalized intersections that site-generated traffic will contribute to are shown below in **Table 17**. The maximum 95th percentile queue under Future (2038) Total Traffic conditions was compared with the existing or expected future storage lengths. Any deficiencies were identified, and additional storage recommendations were noted. The results do not consider taper length or deceleration requirements.

Table 17 - Auxiliary Left-Turn Lane Storage Requirements: Signalized Intersections

INTERSECTION	MOVEMENT	PARALLEL LANE LENGTH (m)	95TH PERCENTILE QUEUE[1] (m)	DEFICIENCY (m)
Colonel Talbot & Pack	WBL	55	160	105
Colonel Talbot & Diane/Royal Magnolia	SBL	75	100	25
Main/ Wharncliffe & Campbell	SBL	45	55	-[2]
	EBL	45	75	-[3]

Notes:

[1] – 95th percentile queue lengths have been rounded up to nearest multiple of 5m.

[2] – As this on a side street approach to the intersection, a small amount of queue spillback is not considered critical and therefore it is not recommended that the auxiliary lane be lengthened.

[3] – It is expected that the queue would spillback into the two-way left-turn lane rather than into the through lane and therefore would not impact through traffic on Main Street. As such, no auxiliary lane extension is recommended.

As illustrated above, additional auxiliary left-turn lane storage is required at two of the study area intersections. Consideration should be given to providing this additional storage when these intersections are reconstructed as part of the urbanization of Colonel Talbot Road.

7.2.4 Right-Turn Auxiliary Lane Analysis: Signalized Intersections

The City of London Access Management Guidelines indicate that auxiliary right-turn lanes should be considered when the volume of right-turning traffic represents between 10% and 20% of approaching traffic and exceeds 60 vehicles per hour during the peak hour. **Table 18** summarizes the right-turn movements which meet the right-turn warrants. Only movements to which site-generated traffic will contribute to were evaluated.

Table 18 - Auxiliary Right-Turn Lane Storage Requirements

INTERSECTION	MOVEMENT	RIGHT TURN WARRANTED?		PARALLEL LANE LENGTH (M)	95TH %ILE QUEUE[1] (M)	DEFICIENCY (M)
		FUTURE (2038) BACK GROUND TRAFFIC	FUTURE (2038) TOTAL TRAFFIC			
Colonel Talbot & Pack	NBR	Yes		TBD[2]	40	-
Colonel Talbot & Diane/Royal Magnolia	NBR			-	-	-
	WBR	Yes		60	50	-
Main/ Wharncliffe & Campbell	SBR	Yes[3]		-	-	-
	WBR	Yes		TBD[2]	25	-

Notes:

[1] – Maximum 95th percentile queue length under Future (2038) Total Traffic. Queue lengths have been rounded up to nearest multiple of 5m. Queue lengths are only reported for locations that currently have, or are proposed to have, auxiliary right-turn lanes.

[2] – These are proposed auxiliary right-turn lanes and therefore do not have an existing or planned parallel lane length.

[3] – Although warranted, an auxiliary southbound right-turn lane is not operationally required and therefore not recommended.

Based on the above, there are a number of locations that warrant a right-turn lane as a result of background traffic demand. The addition of site-generated traffic does not trigger the need for additional right-turn lanes.

At the Colonel Talbot & Pack intersection, the results of the intersection capacity analysis suggest that a minimum of 40m storage is required for the auxiliary northbound right-turn lane, however, insufficient property is currently available.

At the Main/Wharncliffe & Campbell intersection, a minimum of 25m of storage is required for the auxiliary westbound right-turn lane. This right-turn lane is required to provide additional capacity to the westbound approach. With this additional capacity, additional green time can be provided to the side street approaches which are expected to be nearing capacity (i.e., v/c ratio near 1.0) under Future (2033) Background Traffic conditions. There is the potential, however, that there may be insufficient property to implement this measure.

Note that the above measures are simply noted for future consideration by the City of London and are not required to accommodate the proposed development.

The westbound auxiliary right-turn lane at the Colonel Talbot & Diane/Royal Magnolia intersection is expected to have sufficient storage to accommodate the projected demand.

8 Internal Transportation Network Review

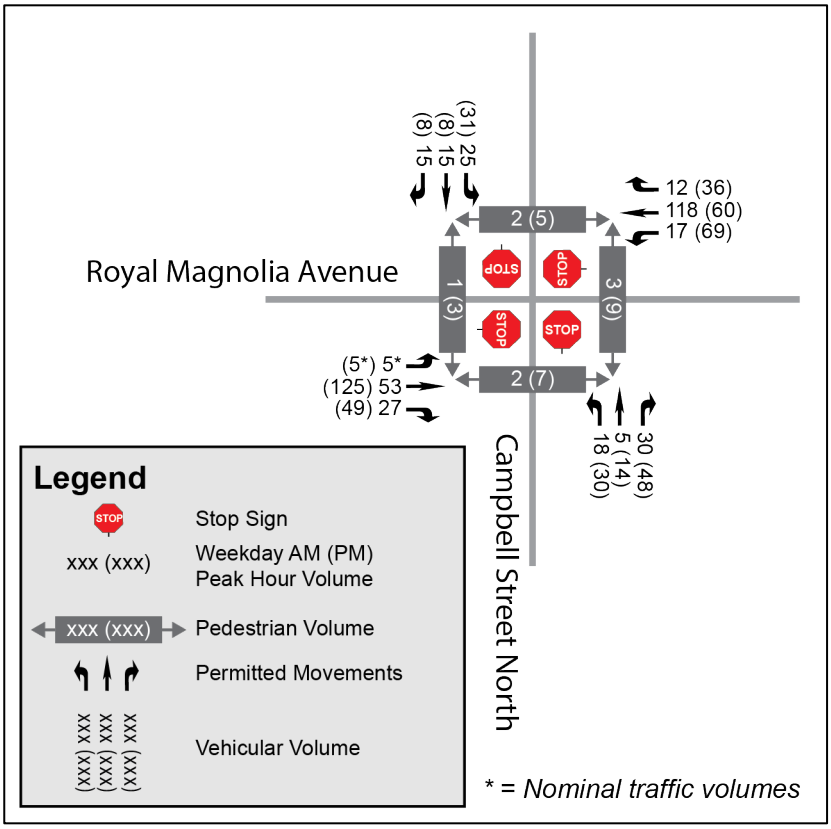
The internal transportation network has been reviewed to ensure that sufficient transit, pedestrian and cycling facilities will be provided to support the target mode share distribution. Additionally, the need for traffic calming measures has been assessed to ensure that the potential for cut-through traffic has been minimized to the greatest extent possible.

8.1 Royal Magnolia & Campbell Intersection

Both Royal Magnolia Avenue and Campbell Street North are classified as Neighbourhood Connectors and therefore the intersection of these two streets is expected to experience a moderate volume of traffic. The presence of mixed-use residential/commercial land uses on the northeast and southeast corners of this intersection is expected to contribute additional vehicular and pedestrian demand by attracting local residents from the surrounding neighbourhoods. The traffic control at this intersection has therefore been reviewed to ensure that the intersection can accommodate the projected vehicular and pedestrian demand.

Figure 8 illustrates the projected vehicle and pedestrian demand at the intersection based on the anticipated trip generation of the commercial land uses adjacent to the intersection and through traffic generated by both the proposed development and the adjacent W3 Farms Residential Development.

Figure 8 – Future (2038) Total Traffic Volumes at Royal Magnolia & Campbell Intersection



Ontario Traffic Manual (OTM) Book 5: Regulatory Signs indicates that all-way stop-control is warranted if a minimum of 30% of traffic at the intersection is from the minor street. Based on projected traffic volumes at this intersection, approximately 30% of total traffic at the intersection

during the weekday peak hours is expected to be from Campbell Street North and therefore the intersection warrants all-way stop-control.

Intersection capacity analysis was completed for this intersection and the results are shown below in **Table 19**. The intersection is expected to operate at an acceptable Level of Service (i.e., LOS 'D' or better) as an all-way stop-controlled intersection.

Table 19 - Intersection Capacity Analysis Results: Royal Magnolia & Campbell Intersection

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	OVERALL LOS (DELAY)	CRITICAL MOVEMENT (DELAY)
Royal Magnolia & Campbell	Unsignalized	AM	A (8.2s)	WBTRL (8.2s)
		PM	A (8.7s)	WBTRL (8.7s)

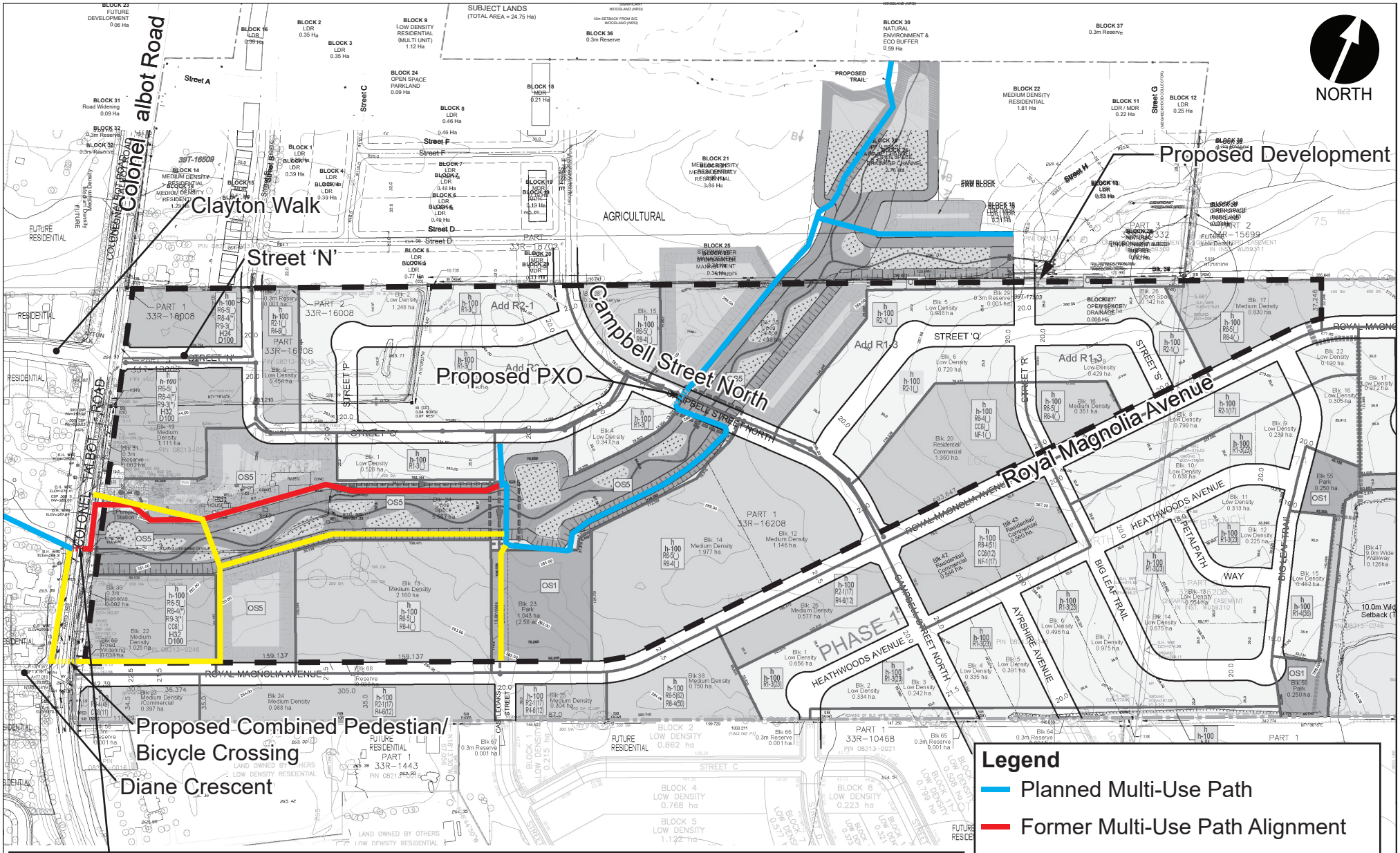
8.2 Pedestrian and Cycling Facilities

Concrete sidewalks will be provided on both sides of all internal streets. A multi-use path (MUP) will bisect the proposed development and follow the creek, crossing Campbell Street North approximately 250m north of Royal Magnolia Avenue. This crossing location is a potential candidate for implementation of a PXO and the results of the PXO warrant analysis are summarized in Section 8.3.

As previously discussed in Section 4.1, the Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2023) recommended the implementation of a mid-block pedestrian signal on Colonel Talbot Road approximately 120m north of Diane Crescent/Royal Magnolia Avenue to provide connectivity for the MUP network. Instead of providing mid-block pedestrian signals at this location, however, it is recommended that instead the MUP be realigned so that it crosses Colonel Talbot Road at its intersection with Diane Crescent and Royal Magnolia Avenue. This would eliminate the need for two closely spaced traffic signals on Colonel Talbot Road while still maintaining connectivity for active modes. The proposed realignment of the MUP network is illustrated in **Exhibit 11**.

As discussed previously in Section 4.2, a recent technical amendment to the Cycling Master Plan (CMP) indicates that both Campbell Street North and Street 'R' will require cycle facilities. OTM Book 18: Cycling Facilities provides a nomograph for selecting appropriate cycling facilities for a roadway based on the posted speed limit and average daily traffic (ADT) volumes.

Using equations from OTM Book 12, the future ADT volumes along Campbell Street North are estimated to range between 680 to 1,330 vehicles per day. Based on an assumed posted speed limit of 50 km/h, a dedicated cycling facility such as a bike lane is warranted along Campbell Street North. The speed limit and future ADT volumes on Street 'R' are expected to be lower than on Campbell Street North and therefore a shared street or neighbourhood bikeway is appropriate for this street.



* The Draft Colonel Talbot Road Two Lane Upgrade Traffic Analysis Memo (AECOM, April 2022) recommended providing mig-block pedestrian signals at this location.

ARCADIS
IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 11:
Multi-Use Path Network

PROJECT No. 143384

SCALE: 0m 50m 100m

8.3 Pedestrian Crossovers (PXOs)

There is one location within the proposed development that has been identified as a potential candidate for the implementation of a PXO:

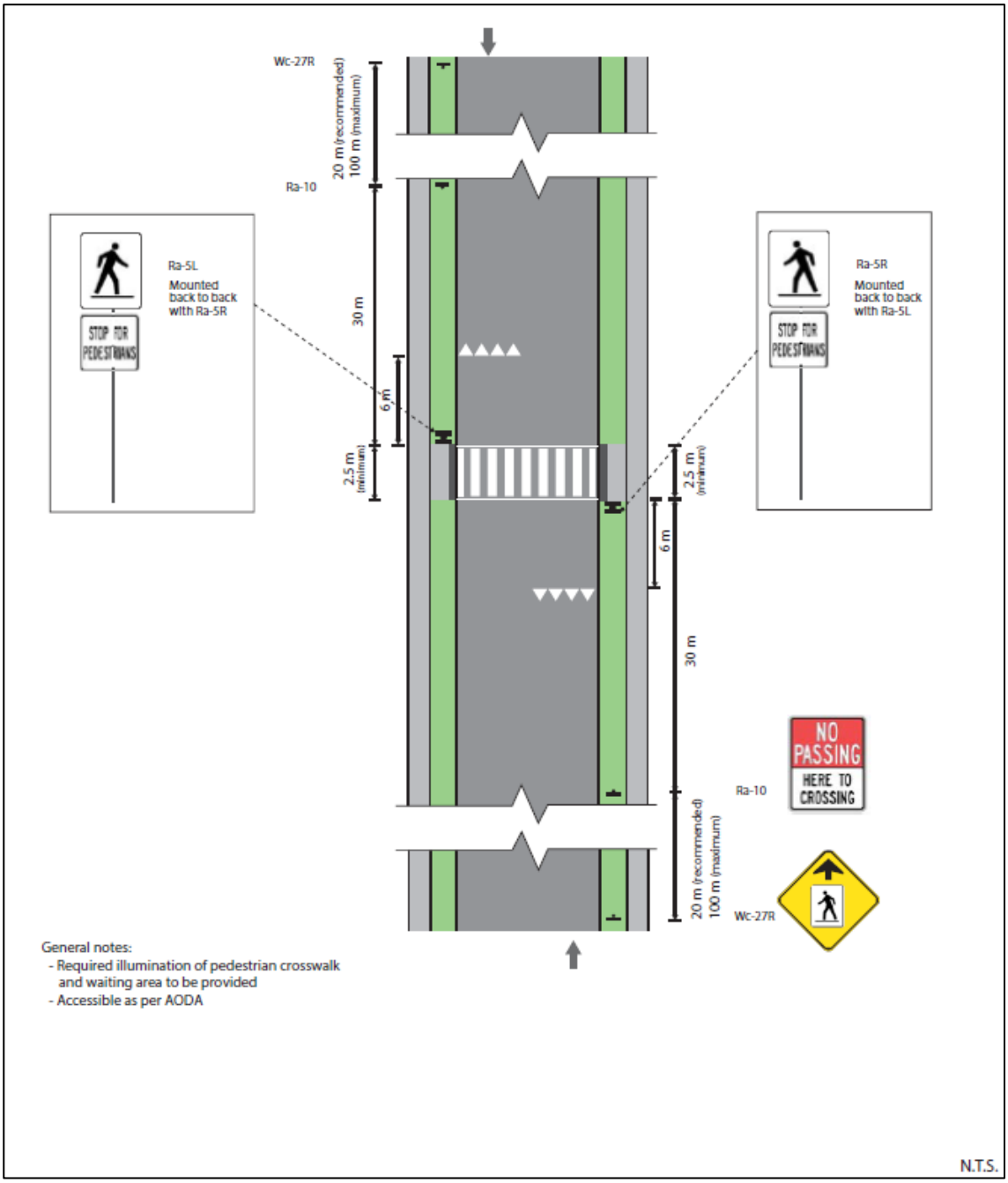
- **Campbell Street North, 250m North of Royal Magnolia Avenue:** A PXO may be required at this location in order to provide system connectivity for the MUP network.

OTM Book 15: Pedestrian Crossing Treatments, Figure 2 illustrates the process for determining whether a PXO is warranted at a given location. Based on this warrant, a PXO is warranted on Campbell Street North due to the need for system connectivity and the lack of another signal-controlled pedestrian crossing within 200m.

OTM Book 15 provides further guidance on the selection of the appropriate PXO type for a location based on two-way traffic volumes and the posted speed limit. Based on equations from OTM Book 12 and OTM Book 15, 8-hour two-way traffic volumes can be estimated by taking the sum of the weekday morning and afternoon peak hour traffic volumes and multiplying it by two. Using the traffic volume projections outlined above in **Figure 8**, it can be estimated that future 8-hour two-way volumes on Campbell Street North at the crossing location will be approximately 340 vehicles. Assuming a posted speed limit of 50 km/h or less, a Level 2 Type D PXO is recommended on Campbell Street North. It is further recommended that curb extensions be implemented at the crossing to narrow the roadway width to 7.5m or less. As PXOs are intended for pedestrians only, dismount and walk signs (Rb-70) should be installed to instruct cyclists to cross the street as a pedestrian.

Figure 9 illustrates the recommended PXO configuration.

Figure 9 - Recommended PXO on Campbell Street North, 250m North of Royal Magnolia Avenue



8.4 Transit Service and Facilities

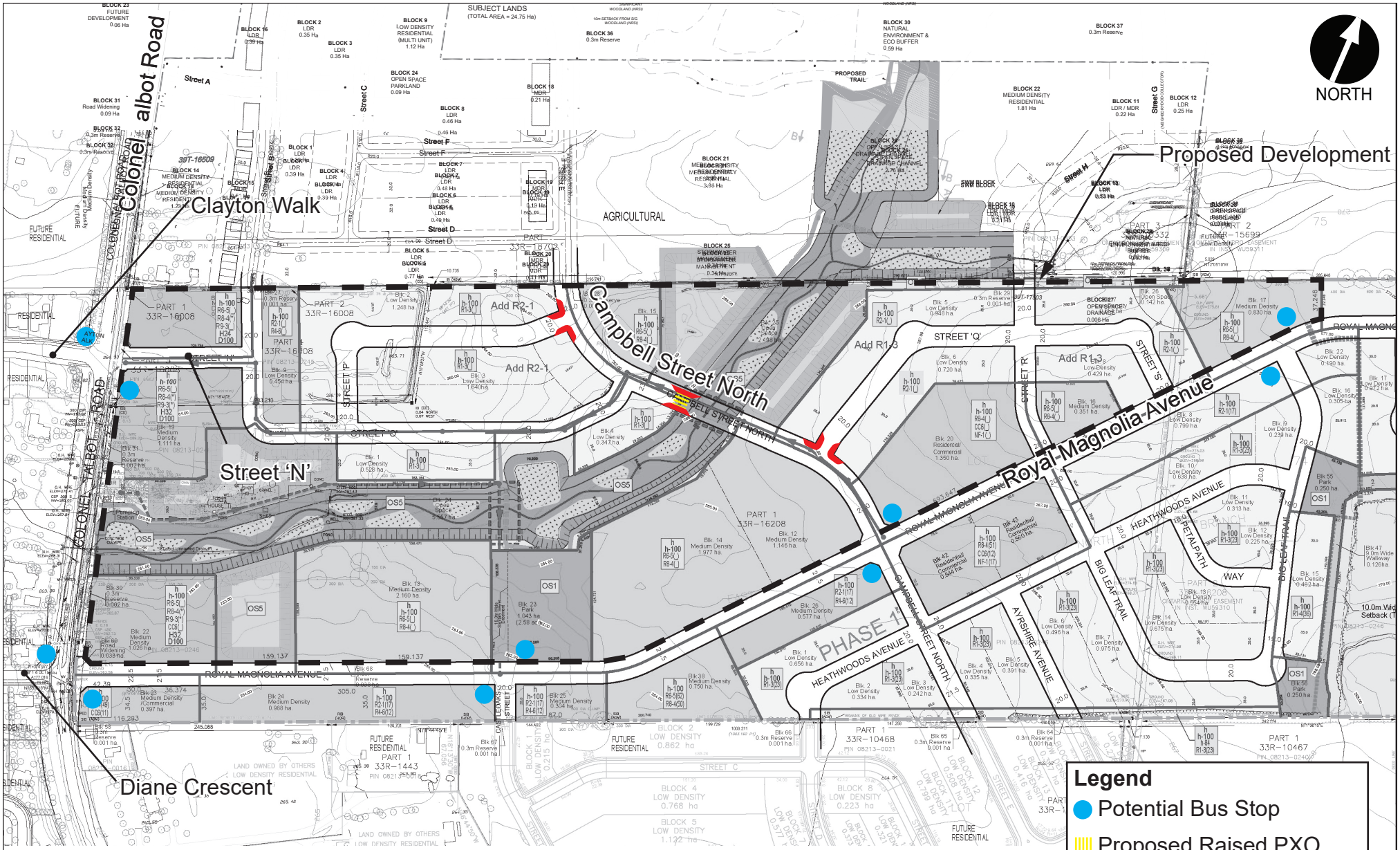
As noted previously in Section 3.3, there is currently no transit service within walking distance of the proposed development. It is recommended that the City of London extend transit service along Colonel Talbot Road, Pack Road and Royal Magnolia Avenue in order to provide residents of the proposed development, and residents of adjacent developments, access to transit service and support the TMP's objective of encouraging more trips via transit. Transit stops should be provided at regular intervals along these routes in order to ensure that residents live within a short walking

distance of transit. **Exhibit 12** identifies potential locations for transit stops in the vicinity of the proposed development.

8.5 Traffic Calming Measures

Given the short length of the majority of internal roadways, it is not expected that operating speeds will warrant the implementation of traffic calming measures. The exception is Campbell Street North which will ultimately extend to Pack Road and will be of sufficient length for higher operating speeds to occur. A conceptual traffic calming plan has therefore been developed for this street and is illustrated in **Exhibit 12**. It is recommended that curb extensions and a raised PXO be utilized to narrow the street at key locations and create vertical deflection to encourage lower operating speeds. In addition, the following curb radii are recommended to reduce high turning speeds and shorten pedestrian crossing distances while still accommodating heavy vehicles:

- As low as 5m at local-local and local-collector road intersections
- No less than 9m at collector-collector intersections or on arterial roads



ARCADIS

IBI GROUP

W3 Sunset Creek
Transportation Impact Assessment

Exhibit 12:
Conceptual Traffic Calming & Transit Plan

PROJECT No. 143384

SCALE: 0m 50m 100m

9 Conclusions and Recommendations

Based on the trip generation rates from the ITE Trip Generation Manual and the mode share data from the 2016 Household Travel Survey, it is expected that the proposed development will generate between 650 to 702 two-way person-trips during the weekday peak hours, of which 407 to 439 will be vehicle-trips. These vehicle-trips were distributed and assigned to the adjacent road network based on origin-destination data from the 2016 Household Travel Survey.

The results of the intersection capacity analysis indicate that the Colonel Talbot Road corridor is expected to experience significant congestion under background traffic conditions. Without four-lane widening, it is expected that the majority of study area intersections on Colonel Talbot Road will experience capacity issues at the horizon year of the study as a result of background traffic growth. The Main/Wharncliffe & Campbell intersection is also expected to experience capacity issues. Only the Bostwick & Pack roundabout is expected to operate at an acceptable Level of Service (i.e., LOS 'D' or better).

The following mitigation measures are recommended to be implemented to address background traffic capacity issues:

- **Colonel Talbot & Pack:** Optimize the signal timing plan, add a protected-permitted westbound left-turn phase in the weekday morning and afternoon peak hour, and add a northbound and westbound right-turn lane with a minimum of 40m and 70m of storage, respectively. *Required in approximately 5 years.*
- **Colonel Talbot & Clayton/Street 'N':** Give consideration to implementing peak period eastbound and westbound left-turn prohibitions or restricting the side streets to right-in/right-out only. Given the high traffic volumes on the main street, left-turn movements from the sidestreets could be hazardous and would be subject to significant delays. *Required in approximately 5 years.*
- **Colonel Talbot & Diane/Royal Magnolia:** Signalize the intersection and provide combined bicycle/pedestrian crossing facilities on the north leg. *Required within 5 years and prior to first occupancy of the proposed development.*
- **Colonel Talbot & Kilbourne:** Optimize the signal timing plan on a regular basis.
- **Main/Wharncliffe & Campbell:** Optimize the signal timing plan, add a protected-permitted southbound and eastbound left-turn phase in the weekday morning and afternoon peak hour, respectively, and add a westbound right-turn lane with a minimum of 25m of storage. *Required imminently.*

In addition to the above mitigation measures, the following is also recommended to be implemented prior to 2033 in order to accommodate site-generated traffic:

- **Colonel Talbot & Pack:** Extend the westbound left-turn lane to provide a minimum of 160m of storage. *Required in approximately 5 years.*
- **Colonel Talbot & Diane/Royal Magnolia:** Add a protected-permitted southbound left-turn phase in the weekday afternoon peak hour (assuming the intersection is signalized) and ensure that a minimum of 100m of storage is provided for the southbound left-turn movement when this intersection is constructed. *Required within 5 years and prior to first occupancy of the proposed development.*

Based on projected traffic volumes at the Royal Magnolia & Campbell intersection, all-way stop-control is warranted, and intersection capacity analysis results suggest that this intersection would operate at an acceptable Level of Service (i.e., LOS 'D' or better) in this configuration.

Given the capacity issues projected within the study area as a result of Colonel Talbot Road exceeding its theoretical capacity as a two-lane road, it is recommended that the City of London review roadway network capacity needs in the area as it is expected that this road will require four-lane widening within the timeframe of this study.

The review of the proposed Colonel Talbot & Street 'N' intersection has confirmed that the intersection complies with the sightline and access spacing requirements outlined in the Access Management Guidelines.

The internal transportation network was analyzed to ensure that sufficient facilities will be provided to support the pedestrian, cycling and transit mode share of the proposed development.

Bicycle lanes are recommended on Campbell Street North to support this street's role as a cycle route. Although Street 'R' is also expected to be part of a cycle route, no dedicated facilities are expected to be required due to the low speed and traffic volume projected on this roadway.

To ensure a continuous multi-use path (MUP) network through the proposed development, a Level 2 Type D pedestrian crossover (PXO) is recommended where the MUP crosses Campbell Street North. It is also recommended that the MUP network be realigned to cross Colonel Talbot Road at its intersection with Diane Crescent/Royal Magnolia Avenue, rather than 120m to the north.

Within the proposed development, only Campbell Street North is expected to be sufficiently long to warrant traffic calming measures. In order to encourage appropriate operating speeds, curb extensions and a raised crosswalk for the PXO are recommended.

To minimize the vehicular impact on the surrounding road network, it is recommended that transit service be extended to the area with bus stops on Colonel Talbot Road, Pack Road and Royal Magnolia Avenue to ensure future residents have access to public transportation as an alternative mode of travel.

The overall conclusion of this TIA is that traffic generated by the proposed W3 Sunset Creek subdivision can be safely accommodated on the adjacent road network with consideration of the mitigation measures identified above. It is recommended that the City of London review the need for capital improvements in the area to ensure that sufficient roadway capacity is provided to accommodate projected growth.

10 Professional Authorization

Report Prepared By:

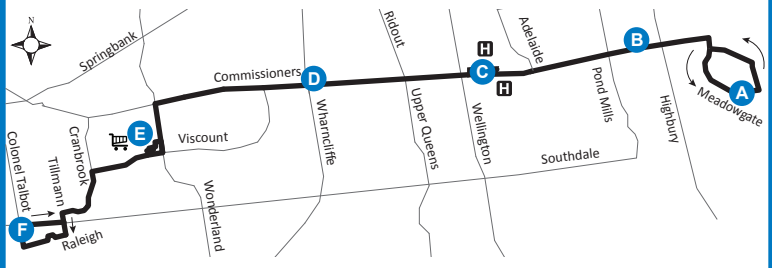
Eric McLaren, P.Eng.

Reviewed By:

David Hook, P.Eng.

Appendix A – Transit Service Maps

24 Talbot Village - Summerside



Map Legend			Effective: September 3, 2023		
A	Timepoint		Shopping Centre	→	Route Direction
H	Hospital				

london transit

519-451-1347
www.londontransit.ca

use realtime.londontransit.ca for up-to-date arrivals

ROUTE 24 - MONDAY TO FRIDAY

WESTBOUND							EASTBOUND							
Darnley at Meadowgate	Commissioners at	Commissioners at Deveron	Victoria Hospital Zone A	Commissioners at Wharncliffe	Wesmount Mall	Westmount Mall	Colonel Talbot at Southdale	Westmount Mall	Westmount Mall	Commissioners at Wharncliffe	Victoria Hospital Zone A	Commissioners at Deveron	Commissioners at Deveron	Darnley at Meadowgate
A	B	B	C	D	E	E	F	E	E	D	C	B	B	A
LVS	ARR	LVS			ARR	LVS		ARR	LVS			ARR	LVS	ARR
-	-	-	-	-	-	-	-	-	-	-	-	-	-	5:58
-	-	-	-	-	-	-	6:03	6:10	6:13	6:20	6:28	6:36	6:38	6:43
5:58	6:05	6:06	6:12	6:19	6:27	6:37	6:48	6:55	6:58	7:05	7:13	7:21	7:23	7:28
6:43	6:50	6:51	6:57	7:04	7:12	7:22	7:33	7:40	7:41	7:50	7:58	8:05	8:07	8:12
7:28	7:36	7:37	7:44	7:52	8:01	8:08	8:19	8:26	8:27	8:36	8:44	8:51	8:53	8:58
8:12	8:20	8:21	8:28	8:36	8:45	8:52	9:03	9:09	9:12	9:19	9:27	9:35	9:37	9:42
8:58	9:06	9:07	9:14	9:22	9:31	9:38	9:49	9:55	9:58	10:05	10:13	10:21	10:23	10:28
9:42	9:49	9:51	9:57	10:05	10:13	10:23	10:33	10:39	10:42	10:49	10:57	11:05	11:07	11:12
10:28	10:35	10:37	10:43	10:51	10:59	11:09	11:19	11:25	11:28	11:35	11:43	11:51	11:53	11:58
11:12	11:19	11:21	11:27	11:35	11:43	11:53	12:03	12:09	12:12	12:19	12:27	12:34	12:37	12:42
11:58	12:05	12:07	12:13	12:21	12:29	12:39	12:49	12:55	12:58	1:05	1:13	1:20	1:23	1:28
12:42	12:49	12:50	12:57	1:05	1:13	1:23	1:33	1:39	1:42	1:49	1:57	2:04	2:07	2:12
1:28	1:35	1:36	1:43	1:51	1:59	2:09	2:19	2:25	2:25	2:33	2:43	2:51	2:52	2:57
2:12	2:20	2:20	2:28	2:40	2:49	2:53	3:04	3:10	3:10	3:18	3:28	3:36	3:37	3:42
2:57	3:05	3:05	3:13	3:25	3:34	3:38	3:49	3:55	3:55	4:03	4:13	4:21	4:22	4:27
3:42	3:50	3:50	3:58	4:10	4:19	4:23	4:34	4:41	4:42	4:50	4:59	5:06	5:08	5:12
4:27	4:35	4:36	4:45	5:00	5:09	5:18	5:29	5:36	5:37	5:45	5:54	6:01	6:03	6:07
5:12	5:20	5:21	5:30	5:45	5:54	6:03	6:14	6:21	6:24	6:30	6:37	6:44	6:46	6:51
6:07	6:17	6:19	6:25	6:33	6:40	6:50	7:00	7:07	7:10	7:16	7:23	7:30	7:32	7:37
6:51	7:01	7:03	7:09	7:17	7:24	7:34	7:44	7:51	7:54	8:00	8:07	8:14	8:16	8:21
7:37	7:47	7:49	7:55	8:03	8:10	8:20	8:30	8:37	8:40	8:46	8:53	9:00	9:02	9:07
8:21*	To Garage													
9:07*	To Garage													

LEGEND			
*	Bus into Garage	+	Route Change
5:58	Bus goes into service at Commissioners and Meadowlilly 2min earlier		
6:03	Bus goes into service at Tillman and Southdale 3min earlier		

use realtime.londontransit.ca for up-to-date arrivals

ROUTE 24 - SATURDAY

WESTBOUND							EASTBOUND							
Darnley at Meadowgate	Commissioners at Deveron	Commissioners at Deveron	Victoria Hospital Zone A	Commissioners at Wharncliffe	Wesmount Mall	Westmount Mall	Colonel Talbot at Southdale	Westmount Mall	Westmount Mall	Commissioners at Wharncliffe	Victoria Hospital Zone A	Commissioners at Deveron	Commissioners at Deveron	Darnley at Meadowgate
A	B	B	C	D	E	E	F	E	E	D	C	B	B	A
LVS	ARR	LVS			ARR	LVS		ARR	LVS			ARR	LVS	ARR
-	-	-	-	-	-	-	-	-	-	-	-	-	-	6:37
-	-	6:15	6:21	6:28	6:35	6:35	6:42	6:47	6:51	6:57	7:04	7:13	7:13	7:17
6:37	6:43	6:48	6:53	7:00	7:06	7:13	7:22	7:27	7:31	7:37	7:44	7:53	7:53	7:57
7:17	7:23	7:28	7:33	7:40	7:46	7:53	8:02	8:07	8:11	8:17	8:24	8:33	8:33	8:37
7:57	8:03	8:08	8:13	8:20	8:26	8:33	8:42	8:47	8:51	8:57	9:04	9:13	9:13	9:17
8:37	8:43	8:48	8:53	9:00	9:06	9:13	9:22	9:27	9:31	9:37	9:44	9:53	9:53	9:57
9:17	9:23	9:28	9:33	9:40	9:46	9:53	10:02	10:08	10:11	10:18	10:25	10:32	10:32	10:37
9:57	10:03	10:08	10:13	10:20	10:26	10:33	10:42	10:48	10:49	10:56	11:03	11:10	11:10	11:15
10:37	10:44	10:48	10:54	11:01	11:08	11:13	11:24	11:30	11:31	11:38	11:45	11:52	11:52	11:57
11:15	11:22	11:25	11:31	11:38	11:45	11:49	12:00	12:06	12:06	12:13	12:22	12:30	12:30	12:35
11:57	12:04	12:08	12:14	12:21	12:28	12:33	12:44	12:50	12:50	12:57	1:06	1:14	1:15	1:20
12:35	12:42	12:47	12:52	1:00	1:09	1:20	1:30	1:36	1:36	1:43	1:52	2:00	2:00	2:05
1:20	1:27	1:32	1:37	1:45	1:54	2:05	2:15	2:21	2:23	2:30	2:37	2:44	2:44	2:49
2:05	2:13	2:18	2:23	2:30	2:38	2:50	3:00	3:06	3:08	3:15	3:22	3:29	3:30	3:35
2:49	2:57	3:02	3:07	3:14	3:22	3:34	3:44	3:50	3:52	3:59	4:06	4:13	4:14	4:19
3:35	3:43	3:48	3:53	4:00	4:08	4:20	4:30	4:36	4:38	4:45	4:52	4:59	5:00	5:05
4:19	4:27	4:32	4:37	4:44	4:52	5:04	5:14	5:20	5:22	5:29	5:36	5:43	5:44	5:49
5:05	5:13	5:18	5:23	5:30	5:38	5:44	5:54	6:00	6:02	6:09	6:16	6:23	6:24	6:29
5:49	5:57	6:02	6:07	6:14	6:22	6:28	6:38	6:44	6:46	6:53	7:00	7:07	7:08	7:13
6:29	6:37	6:42	6:47	6:54	7:02	7:08	7:18	7:24	7:26	7:33	7:40	7:47	7:48	7:53
7:13	7:21	7:26	7:31	7:38	7:46	7:52	8:02	8:08	8:11	8:18	8:25	8:32*	To Garage	
7:53	8:01	8:06	8:11	8:18	8:26	8:32*	To Garage							

ROUTE 24 - SUNDAY / HOLIDAY

WESTBOUND							EASTBOUND							
Darnley at Meadowgate	Commissioners at Deveron	Commissioners at Deveron	Victoria Hospital Zone A	Commissioners at Wharncliffe	Wesmount Mall	Westmount Mall	Colonel Talbot at Southdale	Westmount Mall	Westmount Mall	Commissioners at Wharncliffe	Victoria Hospital Zone A	Commissioners at Deveron	Commissioners at Deveron	Darnley at Meadowgate
A	B	B	C	D	E	E	F	E	E	D	C	B	B	A
LVS	ARR	LVS			ARR	LVS		ARR	LVS			ARR	LVS	ARR
-	-	-	-	-	-	-	-	-	-	-	-	-	-	10:02
-	-	9:38	9:44	9:51	9:58	10:00	10:07	10:13	10:13	10:20	10:27	10:35	10:38	10:42
10:02	10:09	10:09	10:14	10:21	10:28	10:35	10:47	10:53	10:53	11:00	11:07	11:15	11:18	11:22
10:42	10:49	10:49	10:54	11:01	11:08	11:15	11:27	11:33	11:33	11:40	11:47	11:55	11:58	12:02
11:22	11:29	11:29	11:34	11:41	11:48	11:55	12:07	12:13	12:13	12:19	12:26	12:34	12:37	12:41
12:02	12:09	12:09	12:15	12:23	12:31	12:38	12:48	12:54	12:54	1:00	1:07	1:15	1:18	1:22
12:41	12:48	12:48	12:54	1:02	1:10	1:17	1:27	1:33	1:33	1:39	1:46	1:54	1:57	2:01
1:22	1:29	1:29	1:35	1:43	1:51	1:58	2:08	2:14	2:14	2:20	2:27	2:35	2:38	2:42
2:01	2:08	2:08	2:14	2:22	2:30	2:37	2:47	2:53	2:53	2:59	3:06	3:14	3:17	3:21
2:42	2:49	2:49	2:55	3:03	3:11	3:18	3:28	3:34	3:34	3:40	3:47	3:55	3:58	4:02
3:21	3:28	3:28	3:34	3:42	3:50	3:57	4:07	4:13	4:13	4:19	4:26	4:34	4:37	4:41
4:02	4:09	4:09	4:15	4:23	4:31	4:38	4:48	4:54	4:54	5:00	5:07	5:15	5:18	5:22
4:41	4:48	4:48	4:54	5:02	5:10	5:17	5:27	5:32	5:32	5:38	5:45	5:53*	To Garage	
5:22*	To Garage													

LEGEND			
*	Bus into Garage	+	Route Change
0:00	Bus goes into service at Commissioners and Meadowlilly 2min earlier		

28 WHITE OAKS MALL-LAMBETH

Map Legend

- A — Timepoint
- Shopping Centre
- Route Direction

Effective: April 30th, 2023

519-451-1347
www.londontransit.ca

london transit

28 WHITE OAKS MALL-LAMBETH

Map Legend

- A — Timepoint
- Shopping Centre
- Route Direction

Effective: April 30th, 2023

519-451-1347
www.londontransit.ca

london transit

use realtime.londontransit.ca for up-to-date arrivals

ROUTE 28 - MONDAY TO FRIDAY

SOUTHBOUND				NORTHBOUND			
White Oaks Mall	White Oak at Bradley	Main at Campbell	Sunray at Colonel Talbot	Sunray at Colonel Talbot	Main at Campbell	White Oak at Bradley	White Oaks Mall
A	B	C	D	D	C	B	A
LVS			ARR	LVS			ARR
-	-	-	-	-	-	**6:26**	6:32
6:35	6:41	6:49	6:51	6:51	6:53	7:01	7:07
7:14	7:20	7:28	7:31	7:31	7:33	7:41	7:47
7:54	8:00	8:08	8:11	8:11	8:13	8:21	8:27
8:34	8:40	8:48	8:51	8:51	8:54	9:02	9:08
9:14	9:20	9:28	9:31	9:31	9:34	9:42	9:48
9:54	10:00	10:08	10:11	10:11	10:14*	To Garage	
No Service Until PM							
-	-	-	-	-	-	**2:36**	2:42
2:48	2:54	3:02	3:05	3:05	3:08	3:16	3:22
3:28	3:34	3:42	3:45	3:45	3:48	3:56	4:02
4:08	4:14	4:22	4:25	4:25	4:28	4:36	4:42
4:48	4:54	5:02	5:05	5:05	5:08	5:16	5:22
5:28	5:34	5:42	5:45	5:45	5:48	5:56	6:02
6:08	6:14	6:22	6:25	6:25	6:28	6:36	6:42
6:48	6:54	7:02	7:05	7:05	7:08*	To Garage	

LEGEND

+	Route Change	*	Bus into Garage
0:00	Bus goes into service at White Oak and Bradley 6 minutes earlier		

SERVICE NOTE:

Route 28 operates on a modified weekday peak period service only from 6:30AM – 10:30AM and 2:30PM – 7:00PM.

Appendix B – Collision Data

Collision Details Report

From: January 1, 2015 **To:** May 16, 2023

Location ..... BOSTWICK RD @ PACK RD **Municipality.....** LONDON

Traffic Control.... Stop sign **Total Collisions....** 16

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-76081	2015-Jul-15, Wed,16:57	Clear	Turning movement	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change	
Comments:					South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
16-24227s	2016-Mar-10, Thu,07:10	Rain	Rear end	Non-reportable	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
16-113727s	2016-Oct-25, Tue,16:30	Clear	Angle	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
17300	2016-Dec-31, Sat,19:00	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	48: Deer										
17-855922s	2017-Dec-24, Sun,19:20	Snow	Angle	Non-reportable	South	Packed snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Packed snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
18-854747s	2018-Jun-19, Tue,08:05	Clear	Turning movement	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
18-855163s	2018-Jul-05, Thu,07:30	Clear	Rear end	Non-reportable	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
19-851639s	2019-Feb-17, Sun,00:00	Snow	Angle	Non-reportable	East	Packed snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Packed snow	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
19-61729	2019-Jun-27, Thu,14:27	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

19-856246s	2019-Aug-01, Thu,00:00	Clear	Other	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Reversing	Automobile, station wagon	Other motor vehicle	Other
19-101926	2019-Oct-05, Sat,00:00	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
20-8760	2020-Jan-25, Sat,02:39	Rain	Angle	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
20-851707s	2020-Feb-16, Sun,15:00	Clear	Other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
20-852967s	2020-Apr-24, Fri,19:45	Clear	Sideswipe	Non-reportable	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
22853866	2022-May-26, Thu,21:00	Clear	Sideswipe	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
23851009	2023-Feb-03, Fri,15:15	Strong wind	Angle	P.D. only	West	Ice	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Ice	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly

Location ..... CAMPBELL ST @ MAIN ST **Municipality.....** LONDON

Traffic Control.... Traffic signal **Total Collisions....** 25

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-64669s	2015-Jun-16, Tue,18:15		Rear end	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-86715	2015-Aug-11, Tue,15:56	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control	
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-100171	2015-Sep-14, Mon,17:27	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

15-117090s	2015-Oct-28, Wed,14:45	Rain	Angle	Non-reportable	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Stopped	Pick-up truck	Other motor vehicle	Driving properly
15-124520s	2015-Nov-16, Mon,13:20	Clear	Sideswipe	Non-reportable	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					North		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-14351	2016-Feb-10, Wed,16:55	Clear	Angle	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-68094s	2016-Jul-02, Sat,11:30	Clear	Angle	Non-reportable	West	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-83316s	2016-Aug-08, Mon,15:50	Clear	Rear end	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Slowing or stopping	Delivery van	Other motor vehicle	Driving properly
16-97445	2016-Sep-13, Tue,13:30	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-121543s	2016-Nov-15, Tue,16:45	Clear	Sideswipe	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West		Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
17-34383s	2017-Apr-06, Thu,17:30	Rain	Turning movement	Non-reportable	East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-850034s	2017-May-02, Tue,10:45	Rain	Angle	Non-reportable	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
17-850105s	2017-May-04, Thu,16:15	Rain	Rear end	Non-reportable	West	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-855242s	2017-Dec-06, Wed,17:10	Clear	Rear end	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

18-3232	2018-Jan-04, Thu,17:15	Snow	Sideswipe	P.D. only	East	Packed snow	Changing lanes	Pick-up truck	Other motor vehicle	
Comments:					East	Packed snow	Going ahead	Tow truck	Other motor vehicle	Driving properly
19-850784s	2019-Jan-25, Fri,00:00	Clear	Rear end	Non-reportable	South	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other
Comments:					South	Wet				
1921434	2019-Mar-08, Fri,09:24	Clear	Other	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Pole (utility, power)	Lost control
Comments:					East	Dry	Going ahead	Truck - dump	Pole (utility, power)	Driving properly
19-853211s	2019-Apr-13, Sat,00:00	Clear	Rear end	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					East		Stopped	Passenger van	Other motor vehicle	Driving properly
20-850135s	2020-Jan-06, Mon,11:00	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
20857176	2020-Dec-09, Wed,16:30	Clear	Approaching	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
21856101	2021-Nov-07, Sun,18:00	Clear	Rear end	P.D. only	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
21857553	2021-Dec-23, Thu,22:15	Snow	Angle	P.D. only	North	Loose snow	Turning right	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					West	Loose snow	Stopped	Passenger van	Other motor vehicle	Driving properly
22853660	2022-May-17, Tue,15:00	Clear	Rear end	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
22854786	2022-Jun-29, Wed,17:45	Clear	Sideswipe	P.D. only	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
22857252	2022-Sep-29, Thu,19:20	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

Location ..... COLONEL TALBOT RD @ KILBOURNE RD **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 3

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
16-21228	2016-Mar-02, Wed,03:59	Snow	SMV other	P.D. only	North	Loose snow	Going ahead	Truck - dump	Other	Other	
Comments:	Electrical wires										
18-853656s	2018-May-07, Mon,08:45	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
18-854250s	2018-May-29, Tue,07:10	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly	

Location ..... COLONEL TALBOT RD @ MAIN ST **Municipality.....** LONDON

Traffic Control.... Traffic signal **Total Collisions....** 67

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-18972s	2015-Feb-20, Fri,09:20	Clear	Sideswipe	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					West	Dry					
15-44958	2015-Apr-30, Thu,08:55	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Other	Other motor vehicle	Driving properly	
15-65728	2015-Jun-19, Fri,17:29	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Passenger van	Other motor vehicle	Failed to yield right-of-way	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-66033	2015-Jun-20, Sat,13:25	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Passenger van	Other motor vehicle	Improper turn	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-102853s	2015-Sep-21, Mon,11:40	Clear	Turning movement	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
16-44020s	2016-May-03, Tue,16:30	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Dry	Turning right	Pick-up truck	Other motor vehicle	Improper turn	

16-58101s	2016-Jun-08, Wed,16:50	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry				
16-62232s	2016-Jun-18, Sat,14:00	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
16-66986	2016-Jun-29, Wed,21:52	Clear	SMV other	P.D. only	West	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:	Deer									
16-67415s	2016-Jun-30, Thu,19:20	Clear	Turning movement	Non-reportable	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-87619	2016-Aug-19, Fri,19:23	Clear	SMV other	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Ran off road	Other
Comments:										
16-91259	2016-Aug-29, Mon,12:30	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					West	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
16-109983s	2016-Oct-15, Sat,16:15	Clear	Rear end	Non-reportable	West	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	
Comments:					West	Dry	Other	Automobile, station wagon	Other motor vehicle	Driving properly
16-116887s	2016-Nov-02, Wed,17:30	Rain	Angle	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Turning left	Passenger van	Other motor vehicle	
16-120124s	2016-Nov-10, Thu,18:00	Clear	Turning movement	Non-reportable	East	Dry	Turning right	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
17-852359s	2017-Aug-19, Sat,12:38	Clear	Rear end	Non-reportable	North	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly
Comments:					North	Dry				
17-103596	2017-Oct-06, Fri,15:15	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Bicycle	Cyclist	Other
17-854504s	2017-Nov-10, Fri,11:00	Clear	Other	Non-reportable	North	Dry	Reversing	Truck-other	Other motor vehicle	Driving properly
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

17-855016s	2017-Nov-28, Tue,21:10	Clear	Turning movement	Non-reportable	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
18-850123s	2018-Jan-05, Fri,09:30	Other	Sideswipe	Non-reportable	North	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Slush				
18-852332s	2018-Mar-09, Fri,17:00	Clear	Turning movement	Non-reportable	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-853080s	2018-Apr-12, Thu,10:00	Clear	Rear end	Non-reportable	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly
18-853321s	2018-Apr-21, Sat,16:45	Clear	Sideswipe	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
18-60138	2018-Jun-11, Mon,23:57	Clear	SMV other	P.D. only	East	Dry	Going ahead	Pick-up truck	Ran off road	Wrong way on one-way road
Comments:										
18-93193	2018-Aug-31, Fri,14:00	Clear	Rear end	P.D. only	West	Dry		Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Going ahead	Delivery van	Other motor vehicle	Driving properly
18-859255s	2018-Nov-26, Mon,14:00	Rain	Angle	Non-reportable	North	Wet	Turning left	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Wet				
19-852335s	2019-Mar-11, Mon,00:00	Clear	Turning movement	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
19852335	2019-Mar-11, Mon,20:40	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-854506s	2019-May-31, Fri,00:00	Clear	Sideswipe	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North					
19-856999s	2019-Sep-01, Sun,00:00	Rain	Rear end	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

19-857310s	2019-Sep-09, Mon,15:30	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry				
19-857602s	2019-Sep-11, Wed,18:00	Rain	Rear end	Non-reportable	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East		Stopped		Other motor vehicle	Driving properly
19-858054s	2019-Oct-06, Sun,00:00	Clear	SMV other	Non-reportable	South	Dry	Turning left	Automobile, station wagon	Other	Driving properly
Comments:	Manhole									
19-858060s	2019-Oct-06, Sun,00:00	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other	Driving properly
Comments:	Raised manhole									
19-860564s	2019-Dec-17, Tue,18:30	Clear	Rear end	Non-reportable	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-860907s	2019-Dec-20, Fri,13:25	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North					
20-850221s	2020-Jan-09, Thu,12:45	Clear	Rear end	Non-reportable	East	Wet	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly
Comments:					East	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly
20-850628s	2020-Jan-16, Thu,18:30	Snow	Angle	Non-reportable	South	Slush	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Slush	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
20-853601s	2020-Jun-15, Mon,15:15	Clear	Turning movement	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
20-853821s	2020-Jun-26, Fri,12:30	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Truck - dump	Other motor vehicle	Driving properly
20855537	2020-Sep-25, Fri,18:50	Clear	Turning movement	Non-reportable	North	Dry	Turning left	Motorcycle	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead		Other motor vehicle	
20856551	2020-Nov-09, Mon,16:15	Clear	Rear end	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Other

20856898	2020-Nov-28, Sat,18:20	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
20856916	2020-Nov-29, Sun,19:30	Rain	Turning movement	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Turning left	Passenger van	Other motor vehicle	Driving properly
21850106	2021-Jan-07, Thu,16:45	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
2121442	2021-Mar-04, Thu,07:40	Snow	Turning movement	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
21852865	2021-Jun-19, Sat,15:45	Rain	Rear end	P.D. only	North	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					North	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
21853077	2021-Jul-01, Thu,19:00	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
21853408	2021-Jul-20, Tue,19:00	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
21854948	2021-Sep-27, Mon,00:30	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
21855568	2021-Oct-21, Thu,18:15	Rain	Rear end	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Wet	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly
22850375	2022-Jan-17, Mon,15:15	Snow	Rear end	P.D. only	South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
229188	2022-Feb-01, Tue,23:30	Clear	Rear end	P.D. only	North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Disobeyed traffic control
Comments:	Charged Driver #1 on page 1: HTA 144 (18) (NA)				North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

22851353	2022-Feb-18, Fri,22:00	Clear	Rear end	P.D. only	North	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
22852145	2022-Mar-13, Sun,20:25	Clear	SMV other	Non-reportable	South	Slush	Going ahead	Truck - tractor	Pole (utility, power)	Driving properly
Comments:						Slush				
22854047	2022-Jun-02, Thu,15:00	Clear	Sideswipe	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning left	Pick-up truck	Other motor vehicle	Driving properly
22854217	2022-Jun-08, Wed,22:50	Clear	Rear end	Non-reportable	South	Dry	Stopped	Delivery van	Other motor vehicle	Driving properly
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
22854791	2022-Jun-29, Wed,14:00	Rain	Rear end	P.D. only	South	Wet	Going ahead	Truck - open	Other motor vehicle	Disobeyed traffic control
Comments:					South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
22855457	2022-Jul-25, Mon,21:15	Clear	Rear end	Non-reportable	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
22855632	2022-Aug-03, Wed,21:00	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
2281888	2022-Aug-30, Tue,03:41	Clear	Angle	P.D. only	East	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Other
Comments:	Charged Driver #1 on page 1: CCC 320.14 (A) (NA)				North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
22856906	2022-Sep-20, Tue,20:30	Clear	Sideswipe	P.D. only	West	Dry	Turning left	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
22857488	2022-Oct-07, Fri,23:20	Clear	Sideswipe	P.D. only	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
22105868	2022-Nov-04, Fri,15:15	Clear	SMV other	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other	Driving properly
Comments:	48: Other					Dry				
22858449	2022-Nov-08, Tue,23:30	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

22859252	2022-Dec-03, Sat,19:45	Clear	Rear end	P.D. only	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Stopped		Other motor vehicle	
23850558	2023-Jan-22, Sun,19:00	Snow	Rear end	Non-reportable	North	Loose snow	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Loose snow	Slowing or stopping		Other motor vehicle	

Location ..... COLONEL TALBOT RD @ PACK RD **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 27

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-002554s	2015-Jan-07, Wed,18:50	Snow	Rear end	Non-reportable	South	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					South	Ice	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-60330	2015-Jun-06, Sat,00:00	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Ran off road	Other	
Comments:	cable wire										
15-86741s	2015-Aug-11, Tue,16:00	Clear	Other	Non-reportable	West	Dry	Reversing	Pick-up truck	Other motor vehicle	Other	
Comments:					East	Dry	Stopped	Unknown	Other motor vehicle	Driving properly	
16-39132	2016-Apr-20, Wed,21:51	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					North	Dry	Going ahead	Truck - closed	Other motor vehicle	Driving properly	
17-852173s	2017-Aug-09, Wed,16:25	Clear	Other	Non-reportable	East	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					East	Dry	Reversing	Truck - closed	Other motor vehicle	Driving properly	
17-114843	2017-Nov-05, Sun,22:15	Clear	Angle	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
18-852600s	2018-Mar-21, Wed,22:15	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Raccoon										
18-65622	2018-Jun-25, Mon,11:27	Clear	Angle	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

18-855759s	2018-Jul-28, Sat,15:52	Clear	Angle	Non-reportable	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-99085	2018-Sep-14, Fri,10:31	Clear	Angle	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-857727s	2018-Oct-13, Sat,15:15	Clear	Rear end	Non-reportable	West	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
18-857742s	2018-Oct-14, Sun,14:55	Clear	Angle	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
19-851528s	2019-Feb-13, Wed,00:00	Snow	Rear end	Non-reportable	South	Slush	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly
Comments:					South	Slush	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
19-852062s	2019-Mar-01, Fri,00:00	Clear	Sideswipe	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
20-850794s	2020-Jan-23, Thu,07:05	Clear	Angle	Non-reportable	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
20-851188s	2020-Feb-01, Sat,05:40	Snow	Angle	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
20-853992s	2020-Jul-06, Mon,09:10	Clear	Sideswipe	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Truck - tractor	Other motor vehicle	Driving properly
20855706	2020-Oct-01, Thu,10:30	Rain	Sideswipe	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					West	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
20128184	2020-Dec-30, Wed,16:51	Rain	Angle	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

2167076	2021-Jul-04, Sun,14:00	Clear	Angle	P.D. only	West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Failed to yield right-of-way
Comments:	Charged Driver #1 on page 1: HTA 144 (8) (NA)				North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
21855761	2021-Oct-28, Thu,16:00	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Turning right	Pick-up truck	Other motor vehicle	Driving properly
22852487	2022-Apr-01, Fri,19:30	Clear	Angle	P.D. only	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
22852868	2022-Apr-18, Mon,15:00	Clear	Angle	P.D. only	East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
22854158	2022-Jun-07, Tue,13:10	Rain	Rear end	P.D. only	North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
22855713	2022-Aug-06, Sat,23:30	Clear	Angle	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
22856493	2022-Sep-06, Tue,20:00	Clear	Other	P.D. only	West	Dry	Reversing		Other motor vehicle	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Other
23852769	2023-Mar-31, Fri,15:15	Rain	Angle	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Location ..... COLONEL TALBOT RD@CLAYTON WALK **Municipality.....** LONDON

Traffic Control.... **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
22851839	2022-Mar-08, Tue,21:30	Clear	Other	P.D. only	West	Wet	Reversing	Automobile, station wagon	Other motor vehicle	Other	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	

Location ..... COLONEL TALBOT RD@DIANE CRES **Municipality.....** LONDON

Traffic Control.... Stop sign **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped

16-136860s	2016-Dec-27, Tue,08:50	Clear	Rear end	Non-reportable	South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry				

Collision Details Report

From: January 1, 2015 **To:** May 16, 2023

Location ..... COLONEL TALBOT RD btwn CLAYTON WALK & DIANE CRES **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 7

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
16-75220	2016-Jul-19, Tue,13:58	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Motorcycle	Other motor vehicle	Speed too fast for condition	
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
18-854037s	2018-May-23, Wed,00:20	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
18-859081s	2018-Nov-21, Wed,00:00	Snow	SMV other	Non-reportable	South	Loose snow	Going ahead	Passenger van	Animal - wild	Driving properly	
Comments:	Deer										
19-850966s	2019-Jan-25, Fri,00:00	Snow	SMV other	Non-reportable	South	Ice	Turning right	Automobile, station wagon	Ran off road	Lost control	
Comments:											
20852421	2020-Mar-09, Mon,10:30	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	48: Wild animal										
20856667	2020-Nov-17, Tue,11:50	Snow	Sideswipe	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South		Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
230334081	2023-Mar-21, Tue,12:00	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Statement #1: V1, SB COLONEL TALBOT ROAD, A DEER RUNS OUT OF THE WEST DITCH INTO THE RIGHT FRONT SIDE OF V1. V1 DRIVER HAD NO TIME TO AVOID DEER. DRIVER NOT INJURED.										

Location ..... COLONEL TALBOT RD btwn CLAYTON WALK & PACK RD **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 13

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-97903s	2015-Sep-09, Wed,05:40	Clear	SMV other	Non-reportable	South	Wet	Going ahead	Pick-up truck	Animal - wild	Driving properly	
Comments:	Deer										

16-24277s	2016-Mar-09, Wed,13:20	Clear	Other	Non-reportable	West	Dry	Reversing	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-128275s	2016-Dec-03, Sat,19:00	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	DEER					Dry				
17-1917s	2017-Jan-06, Fri,07:05	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:	Deer									
17-852630s	2017-Sep-01, Fri,11:30	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:	DEER									
18-854943s	2018-Jun-27, Wed,05:30	Clear	SMV other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									
19-854464s	2019-May-30, Thu,00:00	Clear	Rear end	Non-reportable	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Other
Comments:					North		Stopped	Pick-up truck	Other motor vehicle	Driving properly
19-856674s	2019-Aug-20, Tue,00:00	Clear	Approaching	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-856785s	2019-Aug-23, Fri,00:00	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Passenger van	Animal - wild	Driving properly
Comments:	Deer									
21852693	2021-Jun-11, Fri,11:15	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									
2198912	2021-Sep-28, Tue,04:30	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Ran off road	Exceeding speed limit
Comments:	Charged Driver #1 on page 1: HTA 130 (1) (NA)									
22851985	2022-Mar-14, Mon,19:35	Clear	Other	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Debris falling off vehicle	Driving properly
Comments:					South		Going ahead	Pick-up truck	Debris falling off vehicle	
22859471	2022-Dec-12, Mon,23:20	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									

Location ..... COLONEL TALBOT RD btwn DIANE CRES & KILBOURNE RD **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 7

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
16-38469s	2016-Apr-19, Tue,07:30	Clear	Rear end	Non-reportable	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
17-850732s	2017-Jun-02, Fri,10:45	Clear	SMV other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	DEER										
2094218	2020-Sep-27, Sun,04:40	Clear	SMV other	P.D. only	North	Dry	Going ahead	Pick-up truck	Ran off road	Lost control	
Comments:											
20856994	2020-Dec-01, Tue,17:45	Rain	Sideswipe	P.D. only	South	Wet	Stopped	Pick-up truck	Other motor vehicle	Other	
Comments:					South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
21853678	2021-Aug-04, Wed,13:30	Clear	Sideswipe	P.D. only	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North		Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
22850576	2022-Jan-25, Tue,14:25	Clear	Approaching	P.D. only	South	Slush	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					North		Going ahead	Truck - tractor	Other motor vehicle		
22859350	2022-Dec-07, Wed,15:00	Clear	SMV other	P.D. only	East	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly	
Comments:	48/50: Wild animal										

Location ..... PACK RD btwn BOSTWICK RD & UNKNOWN **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 10

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
17-854673s	2017-Nov-15, Wed,23:30	Clear	SMV other	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
18-852207s	2018-Mar-06, Tue,06:35	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	48: Deer										
18-855397s	2018-Jul-13, Fri,14:45	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										

18-857749s	2018-Oct-14, Sun,20:00	Clear	SMV other	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									
19-859411s	2019-Nov-15, Fri,18:00	Clear	SMV other	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									
19-860319s	2019-Dec-11, Wed,05:40	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:	Deer									
20855709	2020-Oct-03, Sat,15:15	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									
20856426	2020-Oct-30, Fri,23:00	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									
22857313	2022-Oct-02, Sun,03:30	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									
23850752	2023-Jan-27, Fri,05:45	Snow	SMV other	P.D. only	East	Loose snow	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	48: Wild animal									

Location ..... PACK RD btwn COLONEL TALBOT RD & SETTLEMENT TRAIL **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action
17-855730s	2017-Dec-19, Tue,23:00	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Ran off road	Driving properly
Comments:										

Location ..... PACK RD btwn FRONTIER AVE & OLD GARRISON BLVD **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 4

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action
15-39672s	2015-Apr-15, Wed,23:00	Clear	SMV other	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									
15-102774s	2015-Sep-21, Mon,07:38	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									

17-31193s	2017-Mar-29, Wed,06:30	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	Deer									
18-855869s	2018-Aug-01, Wed,14:30	Clear	SMV unattended vehicle	Non-reportable	South	Dry	Parked	Automobile, station wagon	Other motor vehicle	
Comments:					East	Dry	Reversing	Truck - closed	Unattended vehicle	Other

Location ..... PACK RD btwn FRONTIER AVE & PIONEER DR **Municipality.....** LONDON

Traffic Control.... No control **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
19-851069s	2019-Jan-30, Wed,00:00	Clear	SMV other	Non-reportable	West	Ice	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										

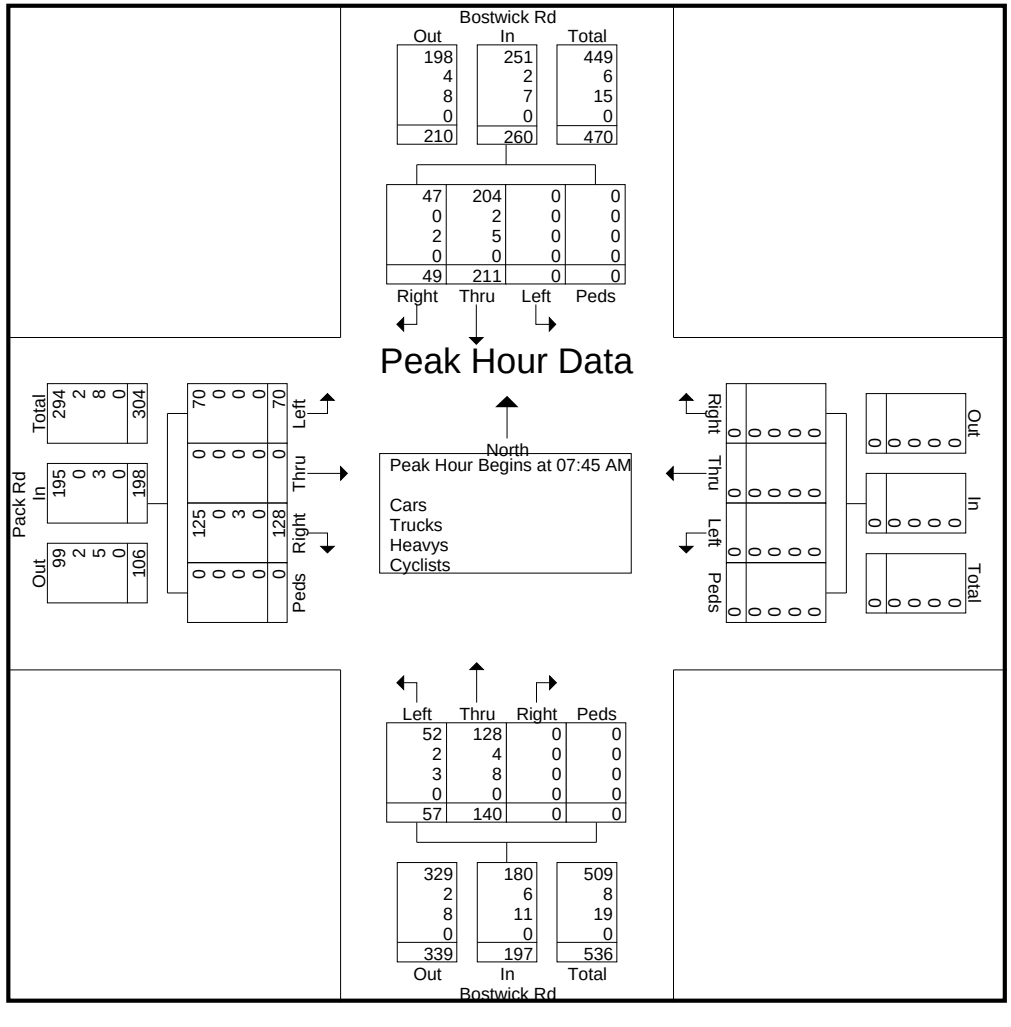
Appendix C – Traffic Count Data

Horizon Data Services Ltd

318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Bostwick Road & Pack Road
Site Code : 00000000
Start Date : 11/17/2021
Page No : 5

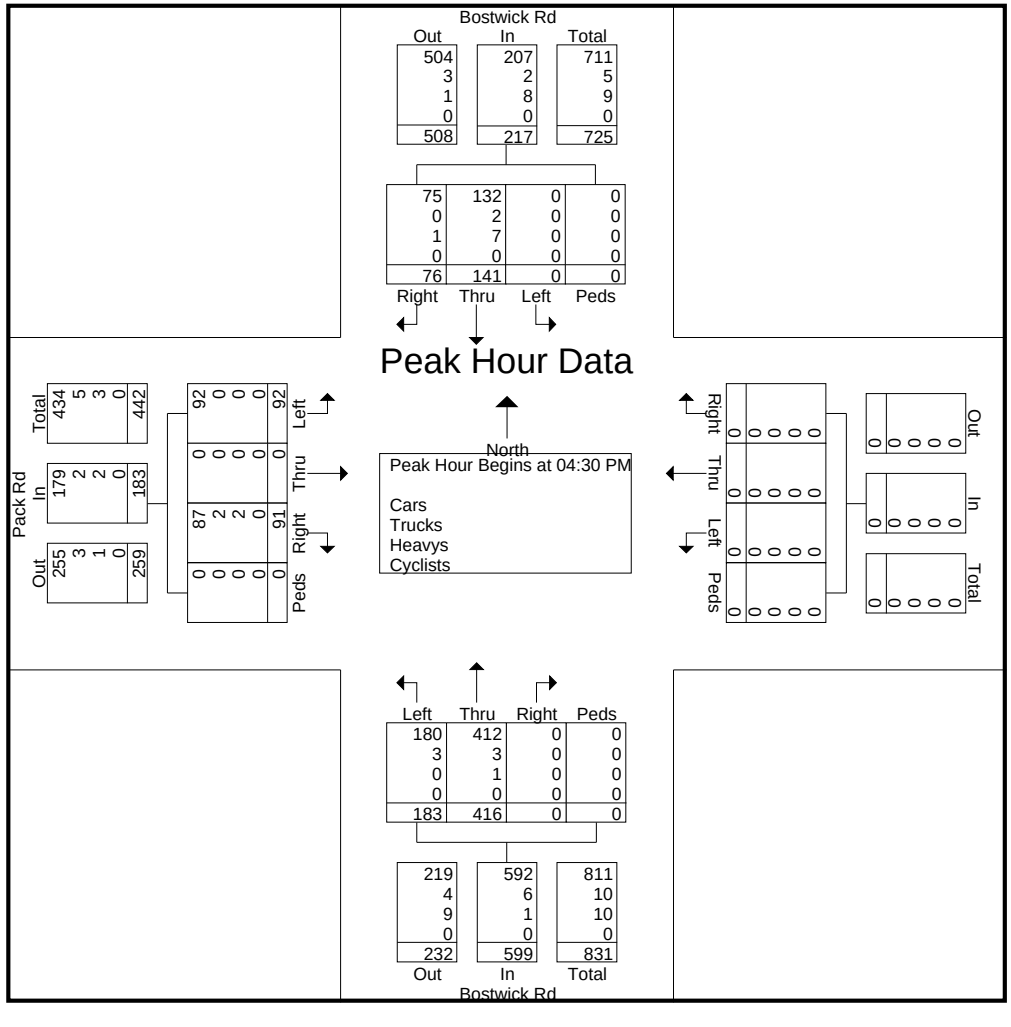


Horizon Data Services Ltd

318 Simonston Blvd
Thornhill, ON L3T 4T5

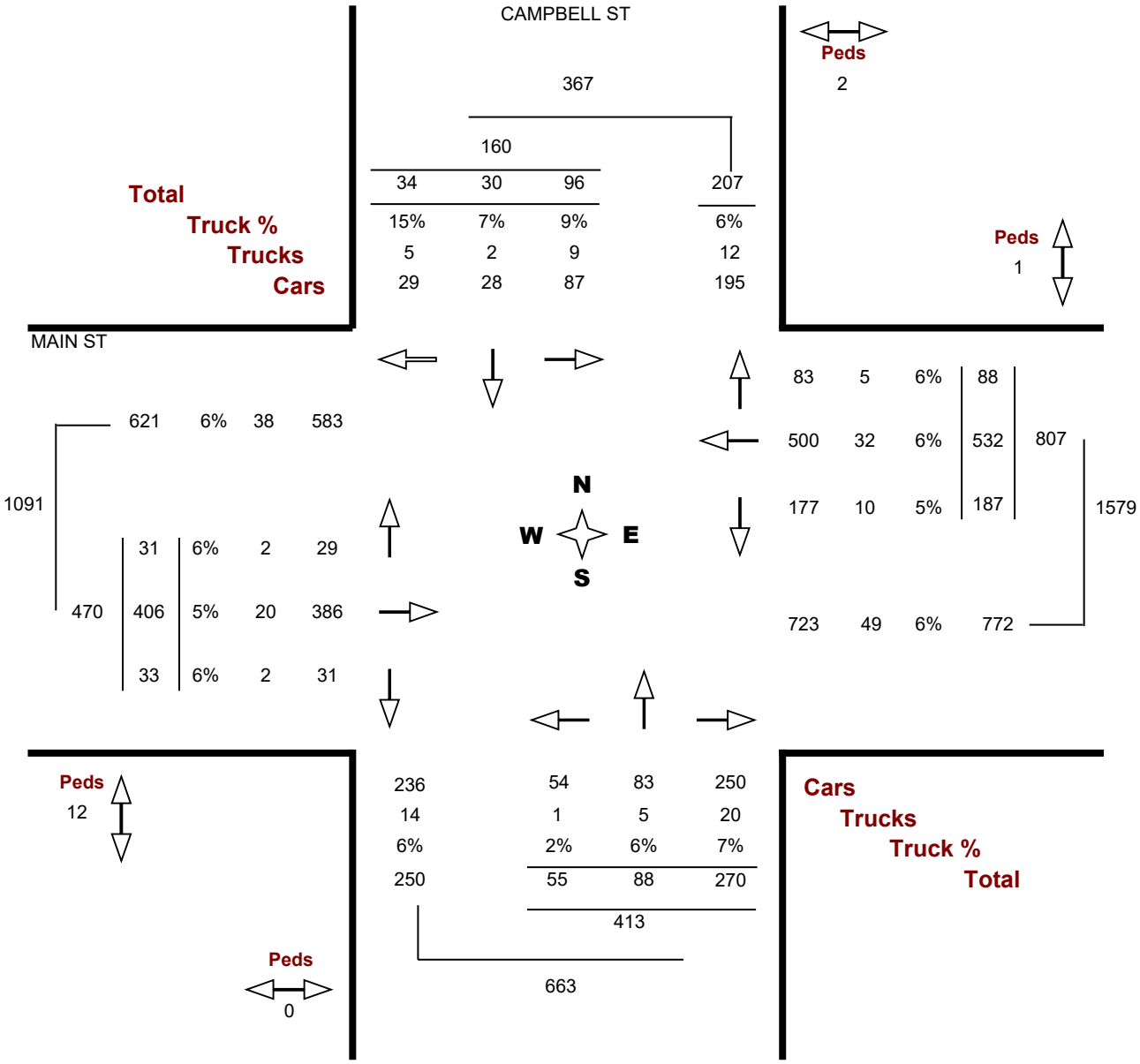
"we always count...never estimated"

File Name : Bostwick Road & Pack Road
Site Code : 00000000
Start Date : 11/17/2021
Page No : 11



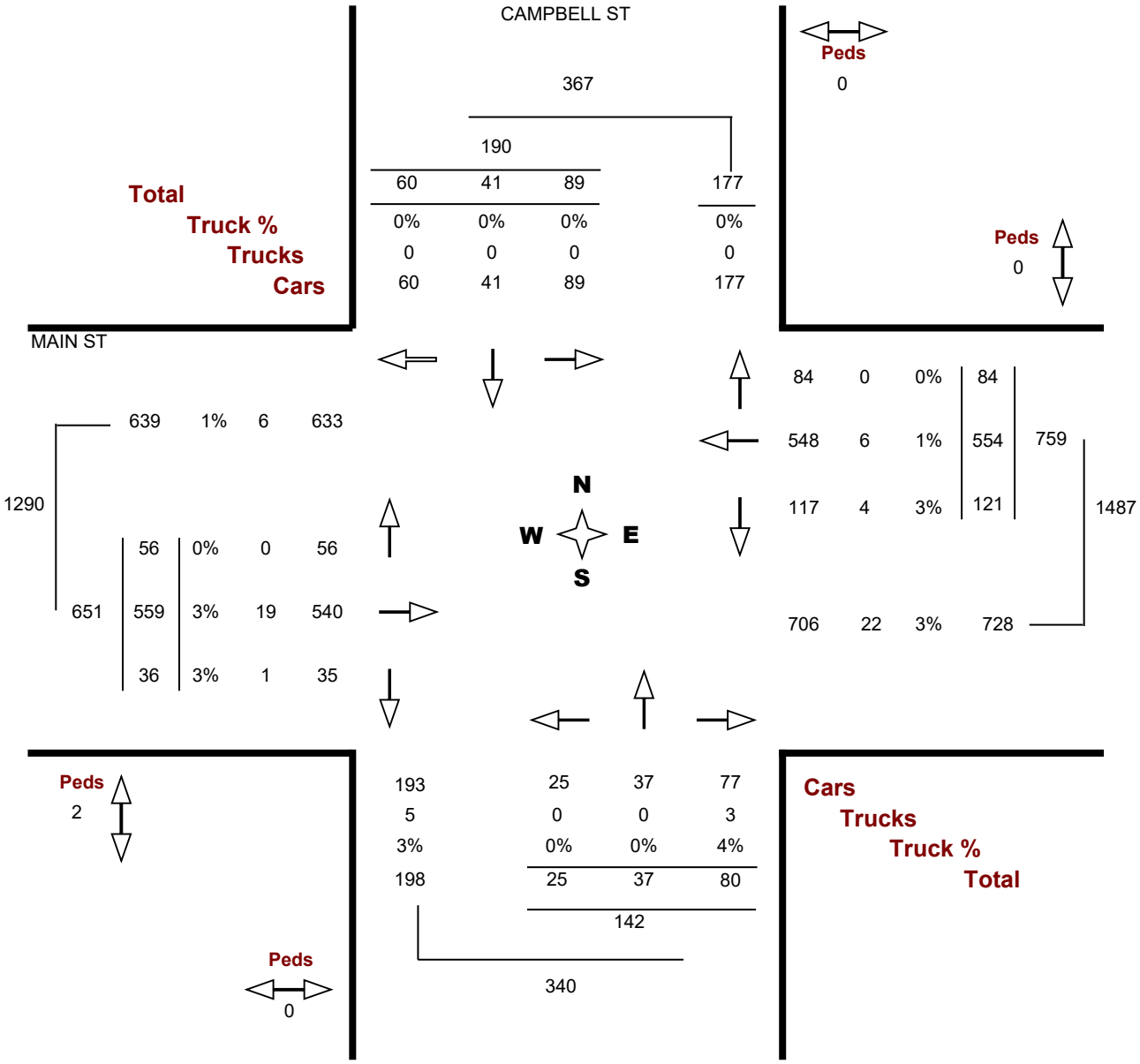
Turning Movements Report - AM Period

Location..... CAMPBELL ST @ MAIN ST
Municipality..... LONDON
GeoID..... INT6172
Count Date..... Tuesday, 02 November, 2021 **Peak Hour.....** 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... CAMPBELL ST @ MAIN ST
Municipality..... LONDON
GeoID..... INT6172
Count Date..... Tuesday, 02 November, 2021 **Peak Hour.....** 04:15 PM — 05:15 PM



Turning Movements Report - AM Period

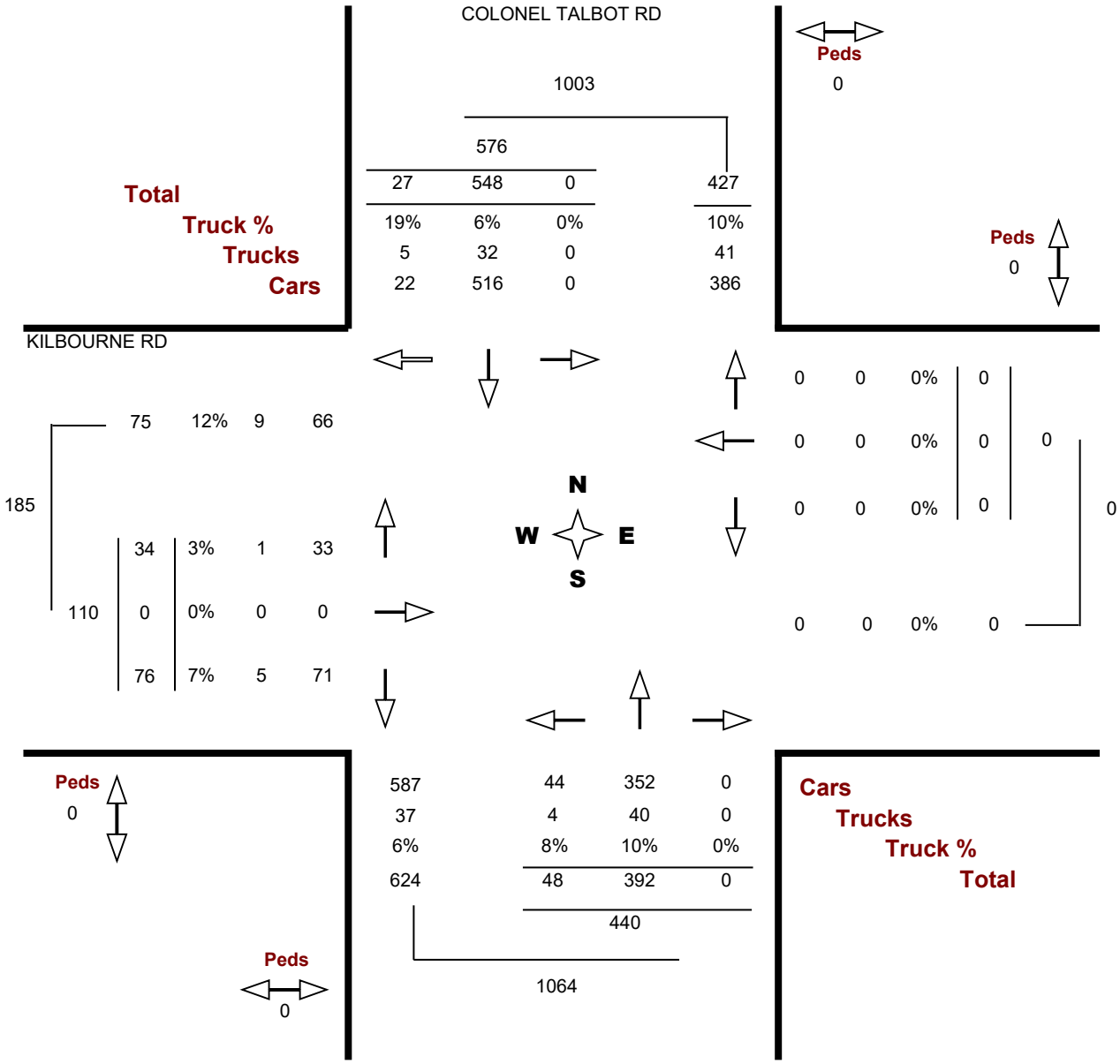
Location..... COLONEL TALBOT RD @ KILBOURNE RD

Municipality..... LONDON

GeoID..... INT6144

Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

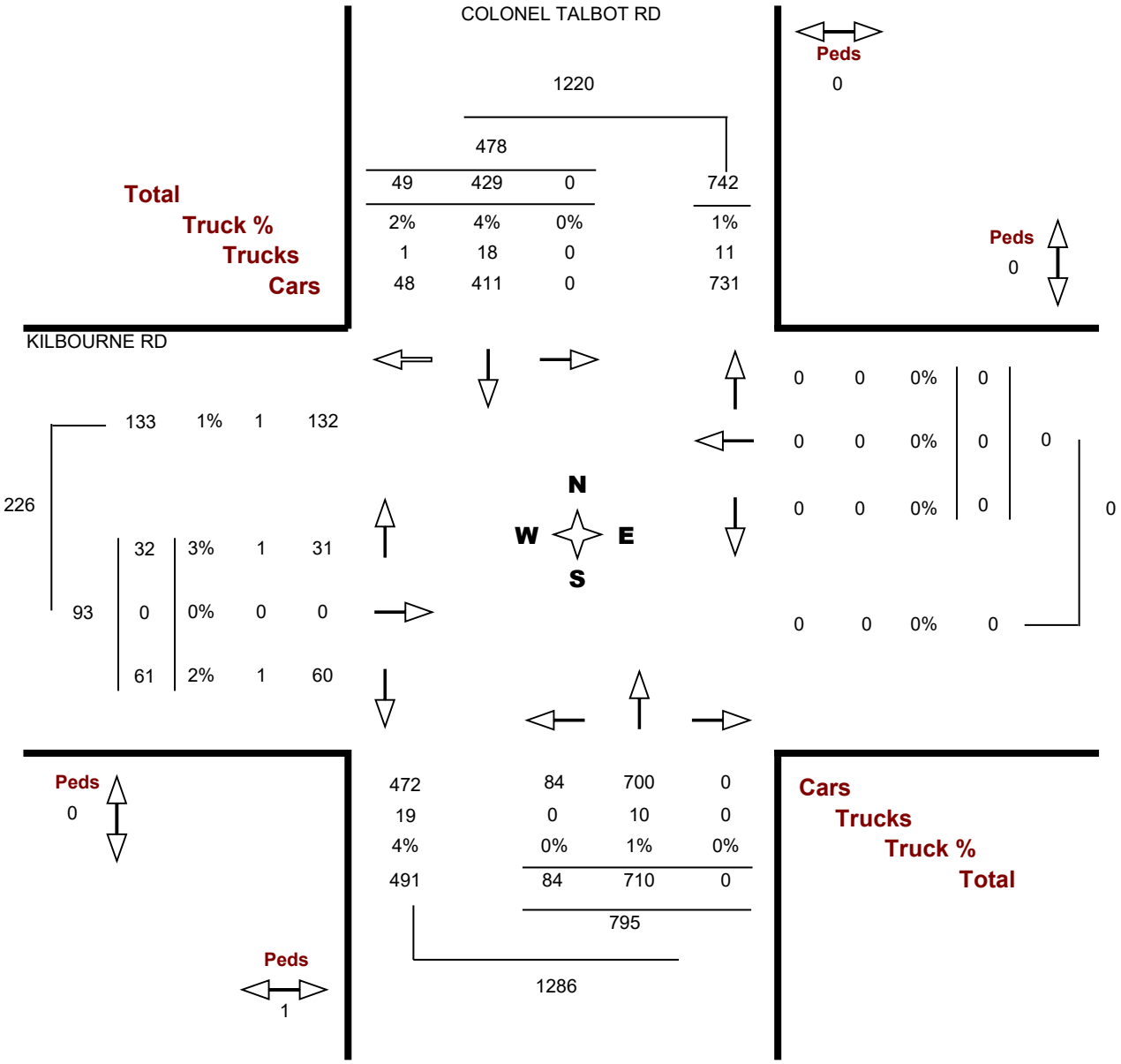
Location..... COLONEL TALBOT RD @ KILBOURNE RD

Municipality..... LONDON

GeoID..... INT6144

Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 04:45 PM — 05:45 PM



Turning Movements Report - AM Period

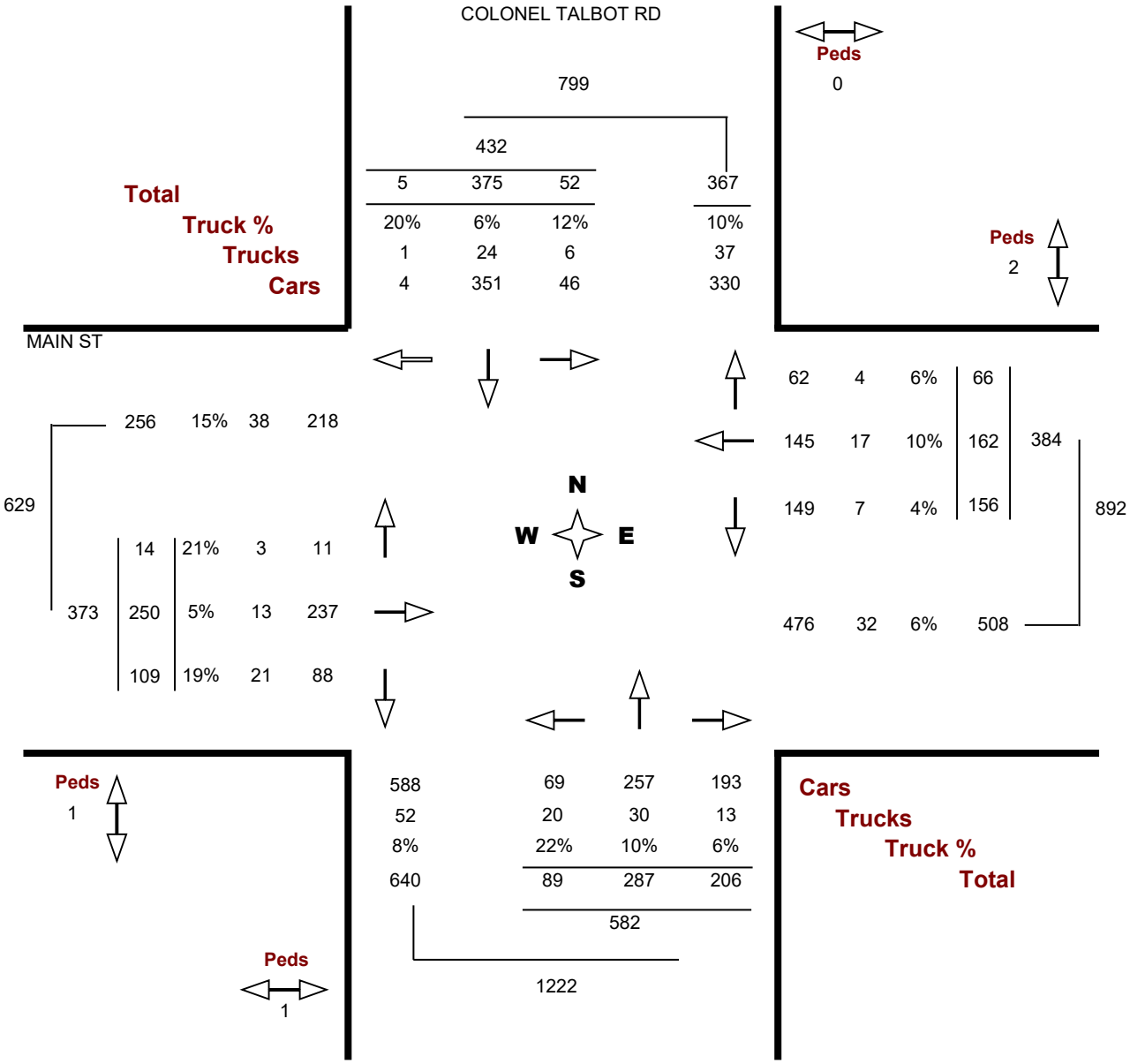
Location..... COLONEL TALBOT RD @ MAIN ST

Municipality..... LONDON

GeoID..... INT6189

Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

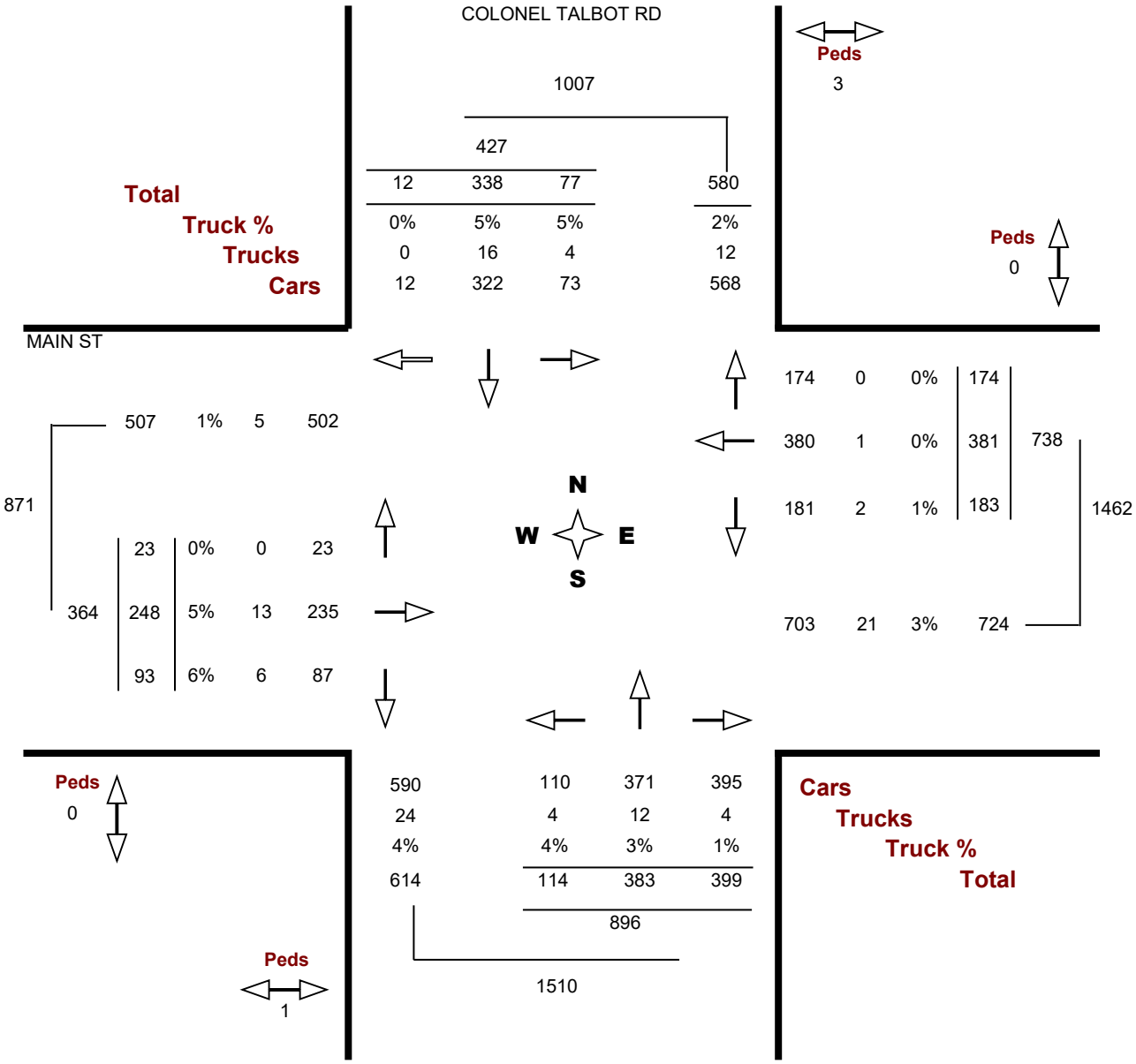
Location..... COLONEL TALBOT RD @ MAIN ST

Municipality..... LONDON

GeoID..... INT6189

Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 04:30 PM — 05:30 PM



Turning Movements Report - AM Period

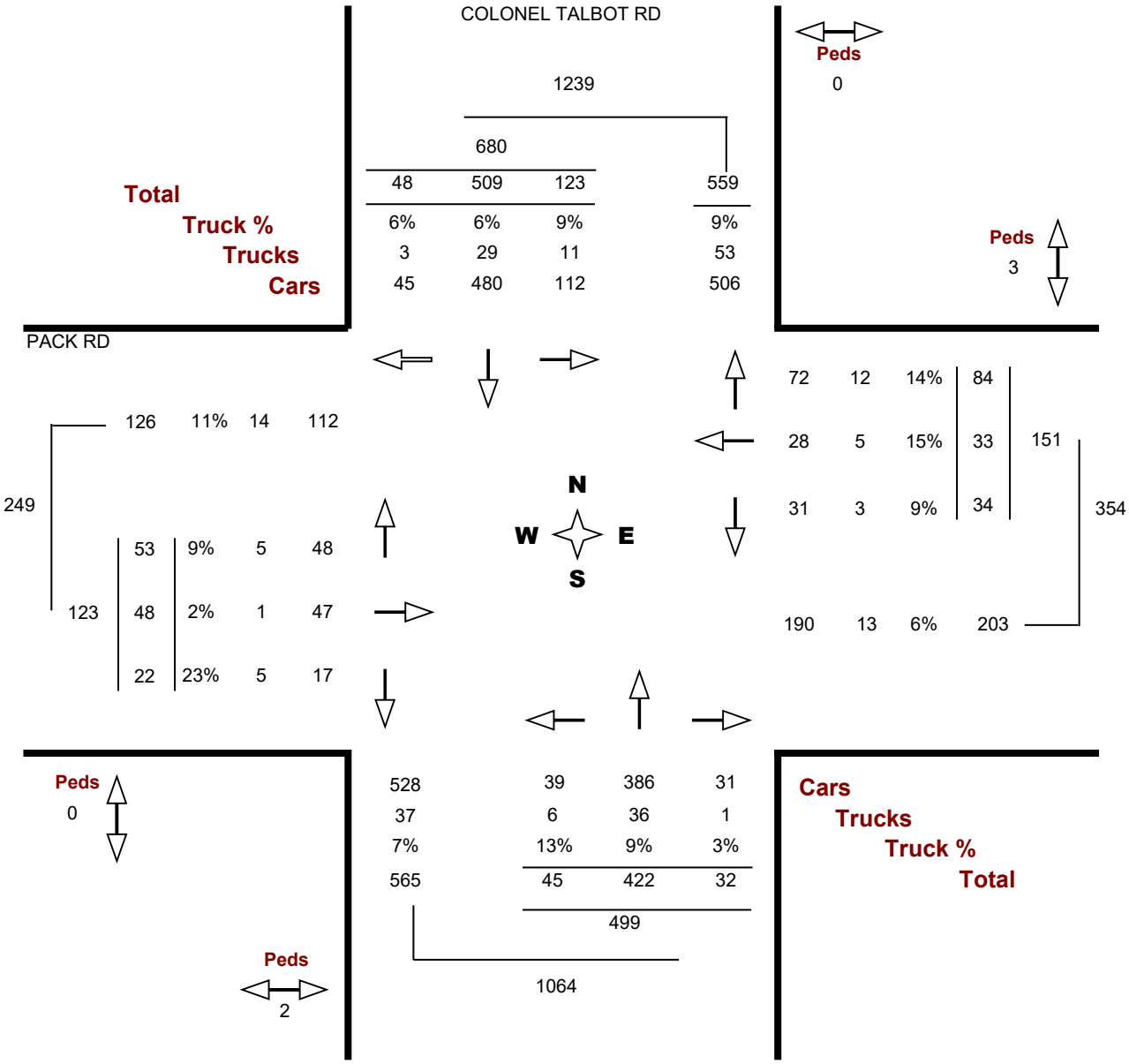
Location..... COLONEL TALBOT RD @ PACK RD

Municipality..... LONDON

GeoID..... INT6029

Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 07:45 AM — 08:45 AM



Turning Movements Report - PM Period

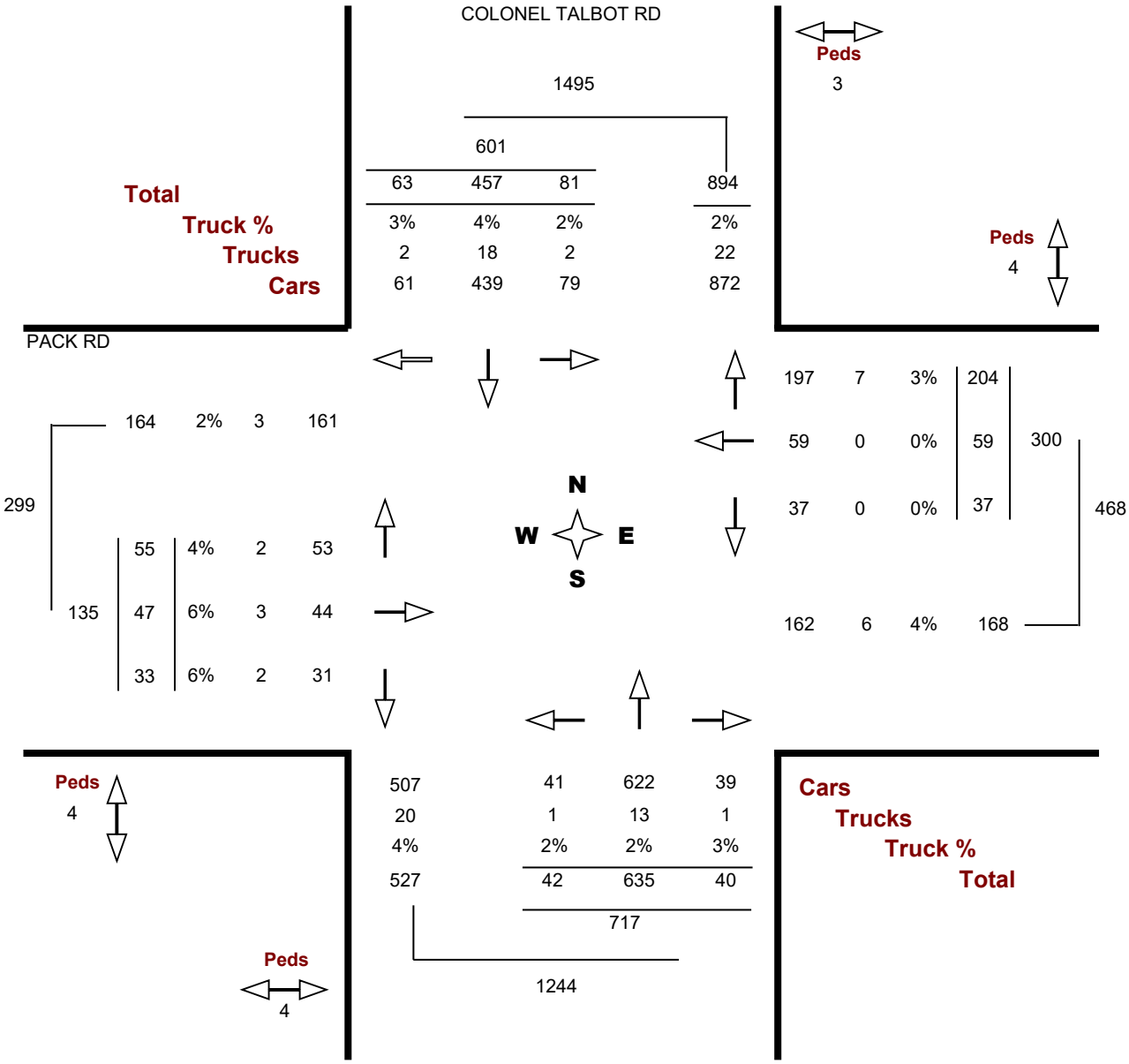
Location..... COLONEL TALBOT RD @ PACK RD

Municipality..... LONDON

GeoID..... INT6029

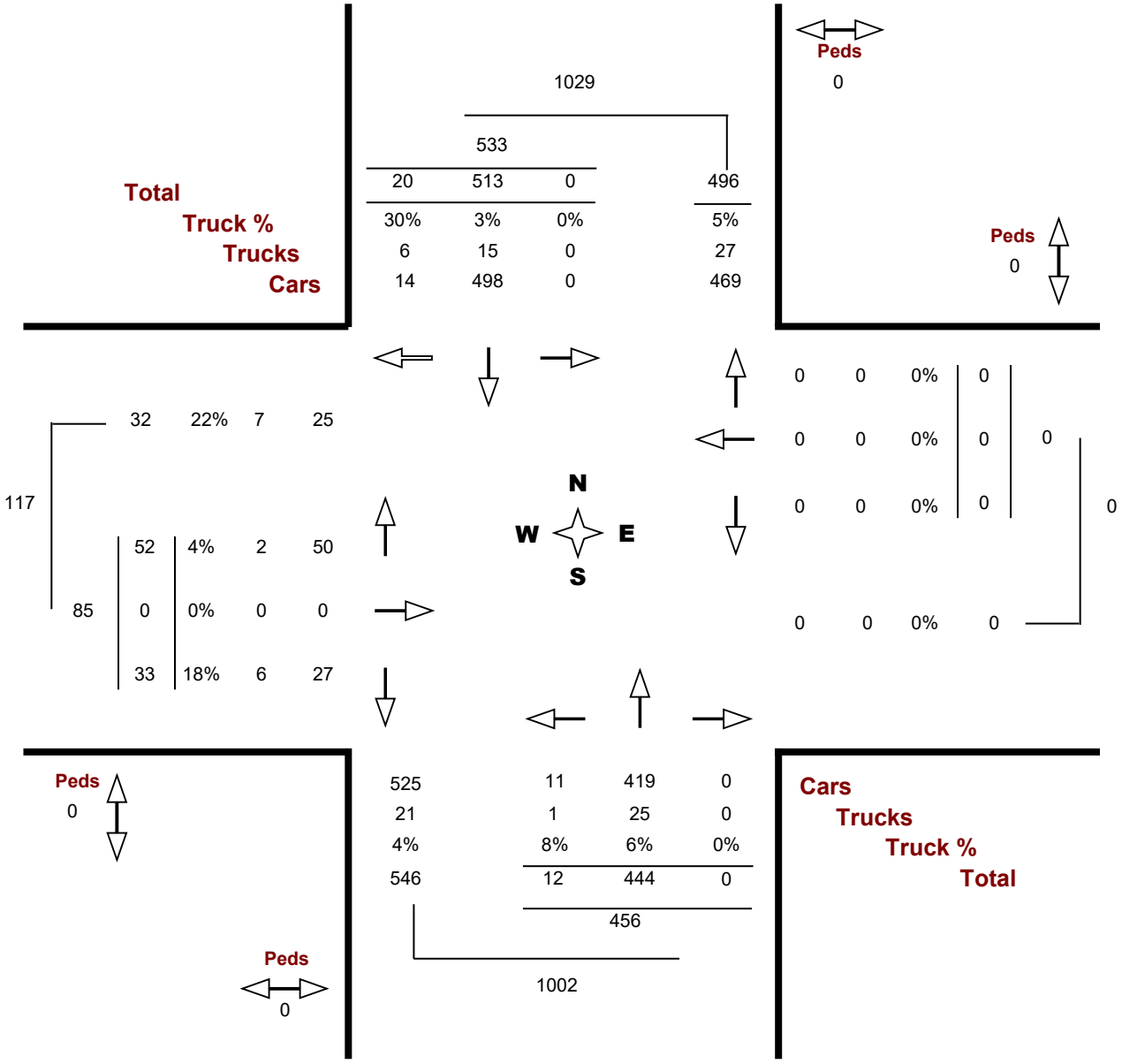
Count Date..... Tuesday, 20 September, 2022

Peak Hour..... 04:30 PM — 05:30 PM



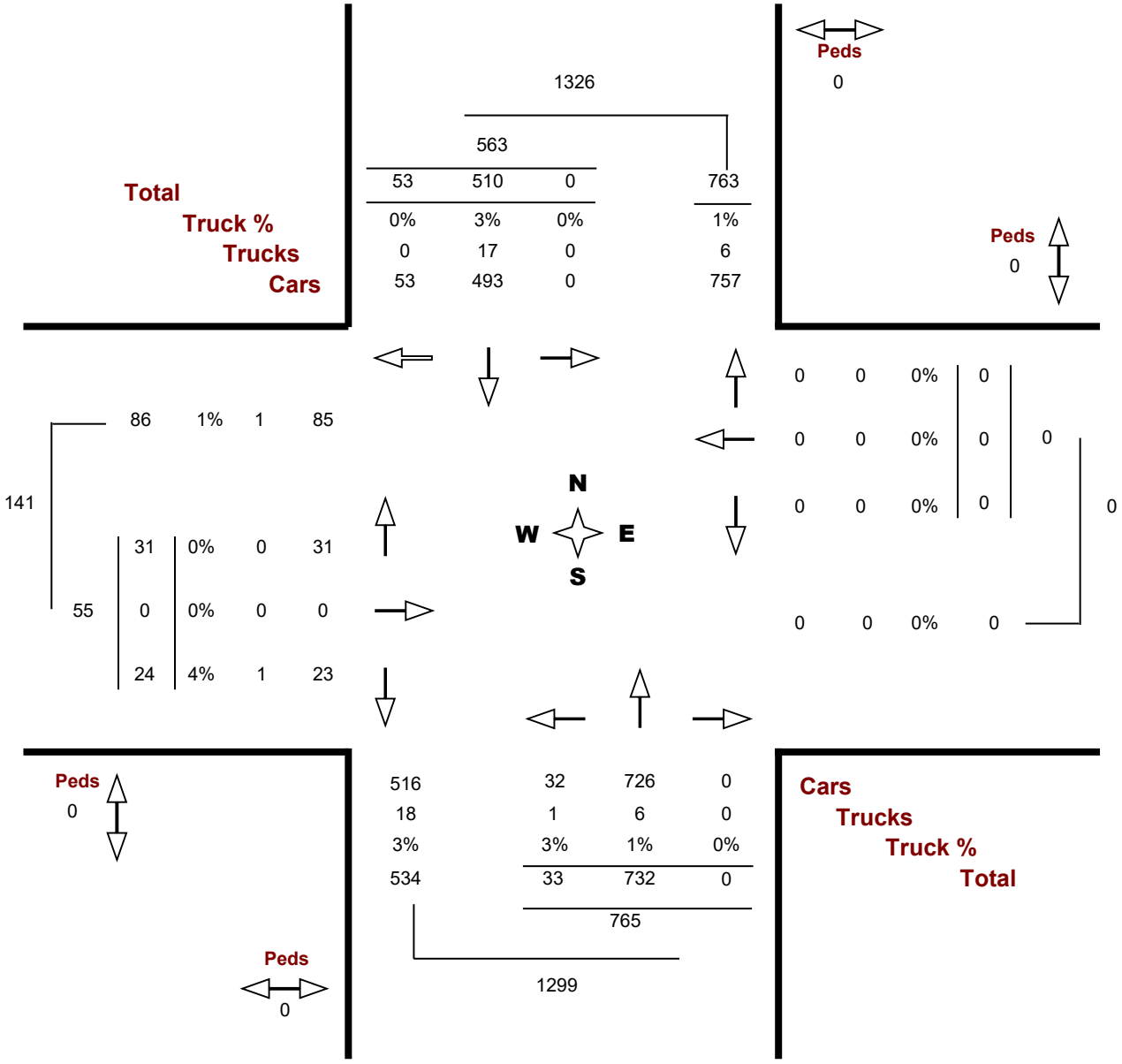
Turning Movements Report - AM Period

Location..... COLONEL TALBOT RD@CLAYTON WALK
Municipality..... LONDON
GeoID..... INT6076
Count Date..... Tuesday, 08 November, 2022 **Peak Hour.....** 07:45 AM — 08:45 AM



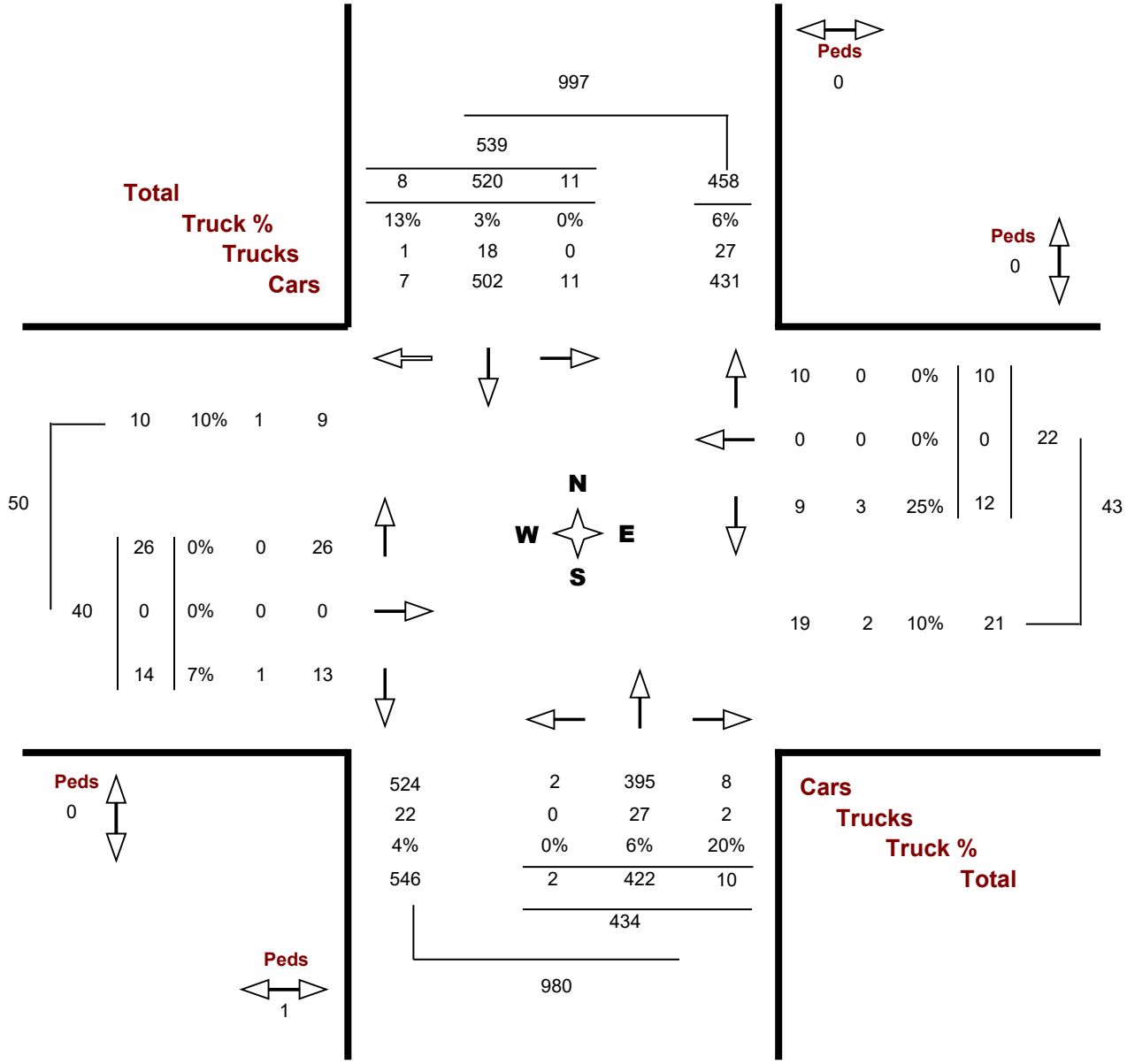
Turning Movements Report - PM Period

Location..... COLONEL TALBOT RD@CLAYTON WALK
Municipality..... LONDON
GeoID..... INT6076
Count Date..... Tuesday, 08 November, 2022 **Peak Hour.....** 04:45 PM — 05:45 PM



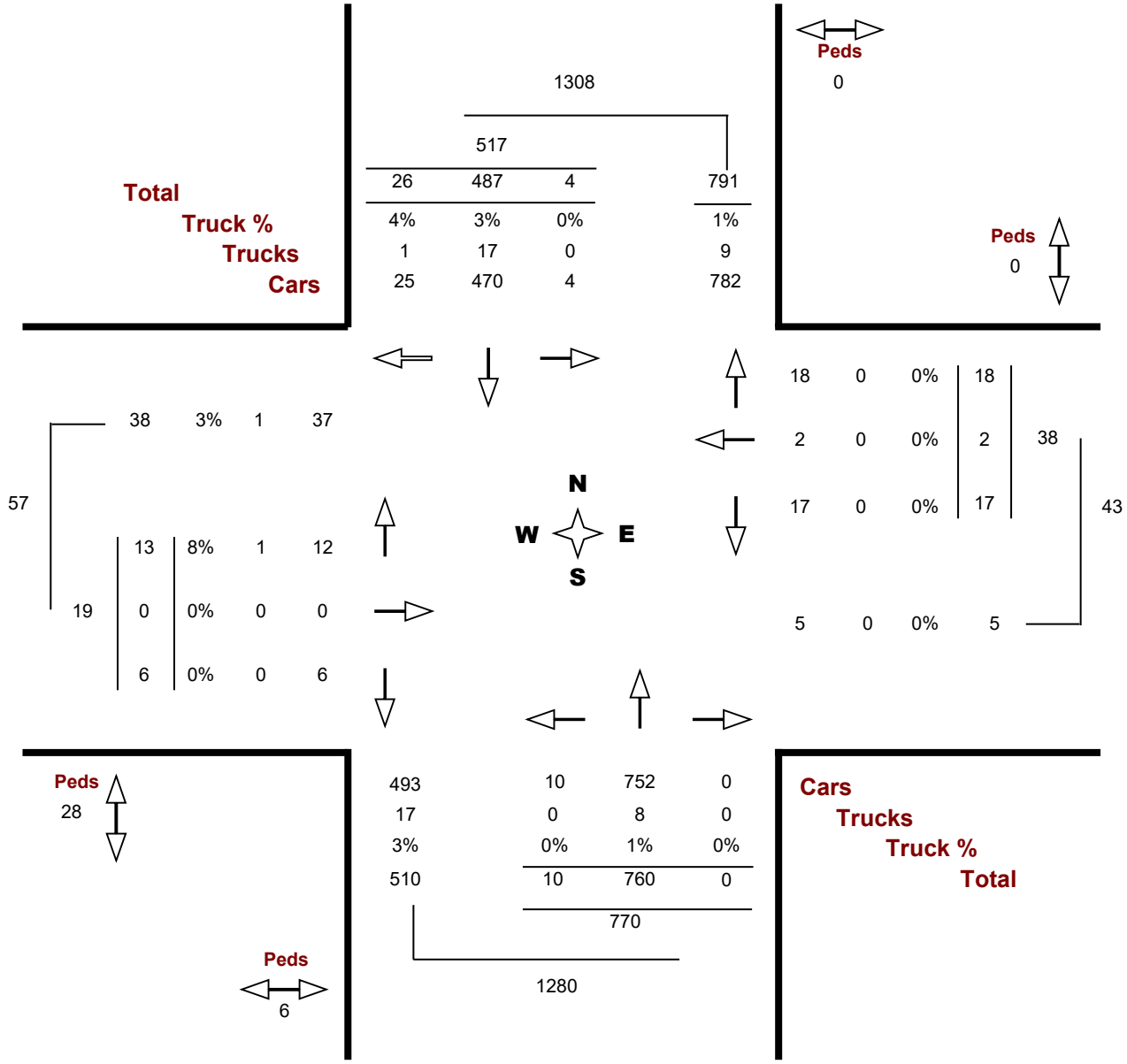
Turning Movements Report - AM Period

Location..... COLONEL TALBOT RD@DIANE CRES
Municipality..... LONDON
GeoID..... INT6118
Count Date..... Tuesday, 08 November, 2022 **Peak Hour.....** 07:45 AM — 08:45 AM



Turning Movements Report - PM Period

Location..... COLONEL TALBOT RD@DIANE CRES
Municipality..... LONDON
GeoID..... INT6118
Count Date..... Tuesday, 08 November, 2022 **Peak Hour.....** 04:30 PM — 05:30 PM



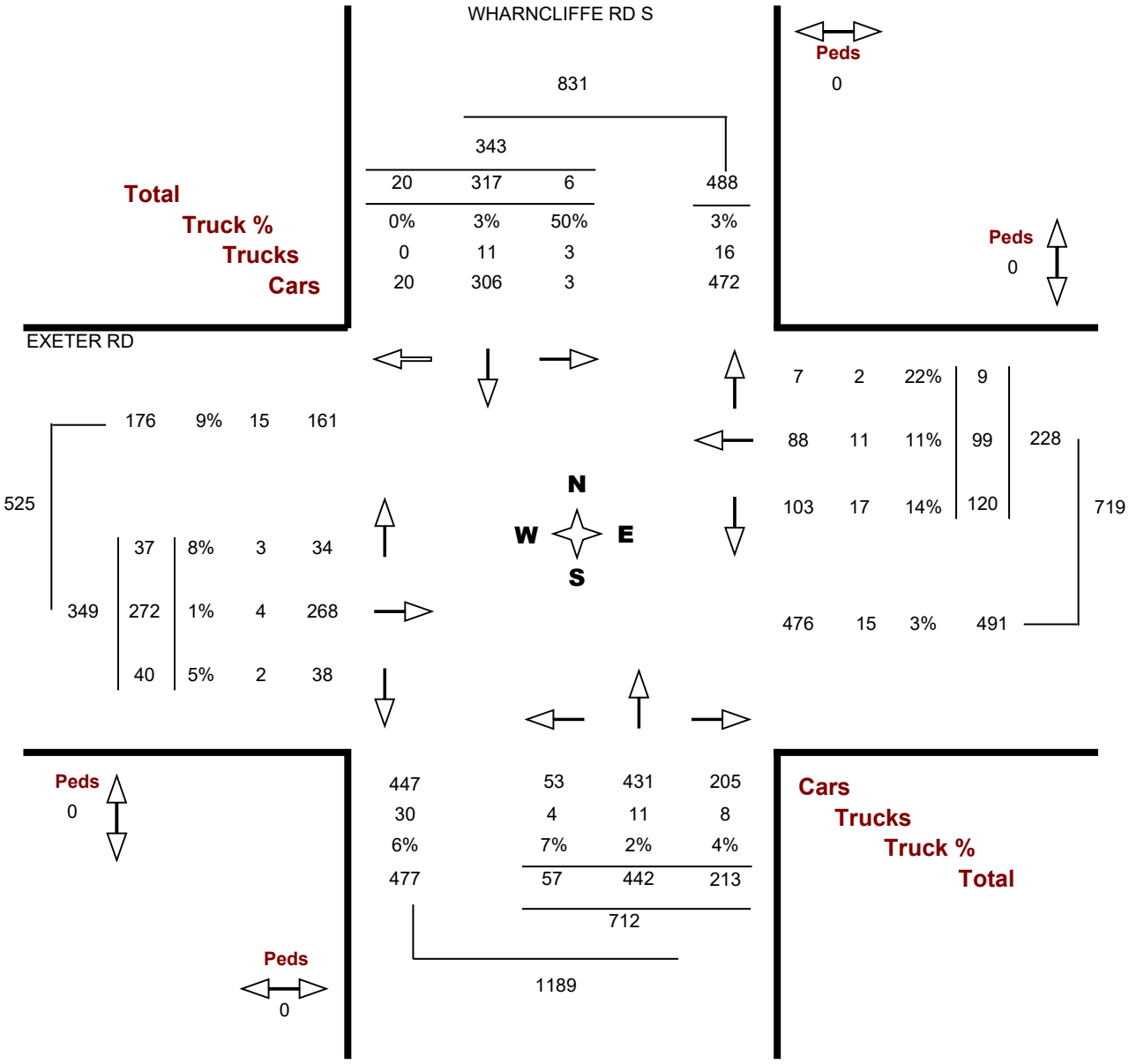
Turning Movements Report - AM Period

Location..... EXETER RD @ WHARNCLIFFE RD S

Municipality..... LONDON

GeoID..... INT6088

Count Date..... Wednesday, 22 March, 2023 **Peak Hour.....** 07:45 AM — 08:45 AM



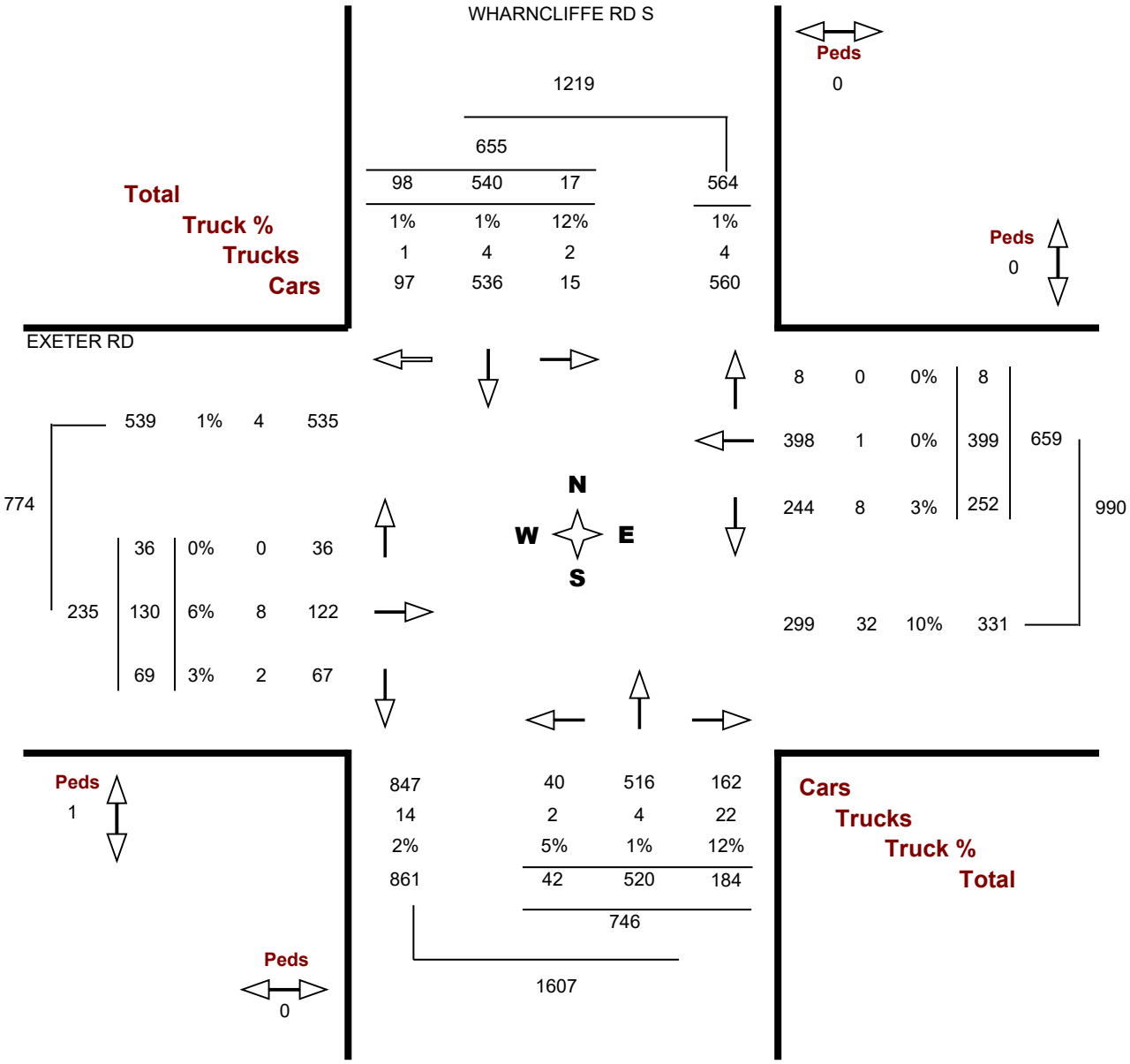
Turning Movements Report - PM Period

Location..... EXETER RD @ WHARNCLIFFE RD S

Municipality..... LONDON

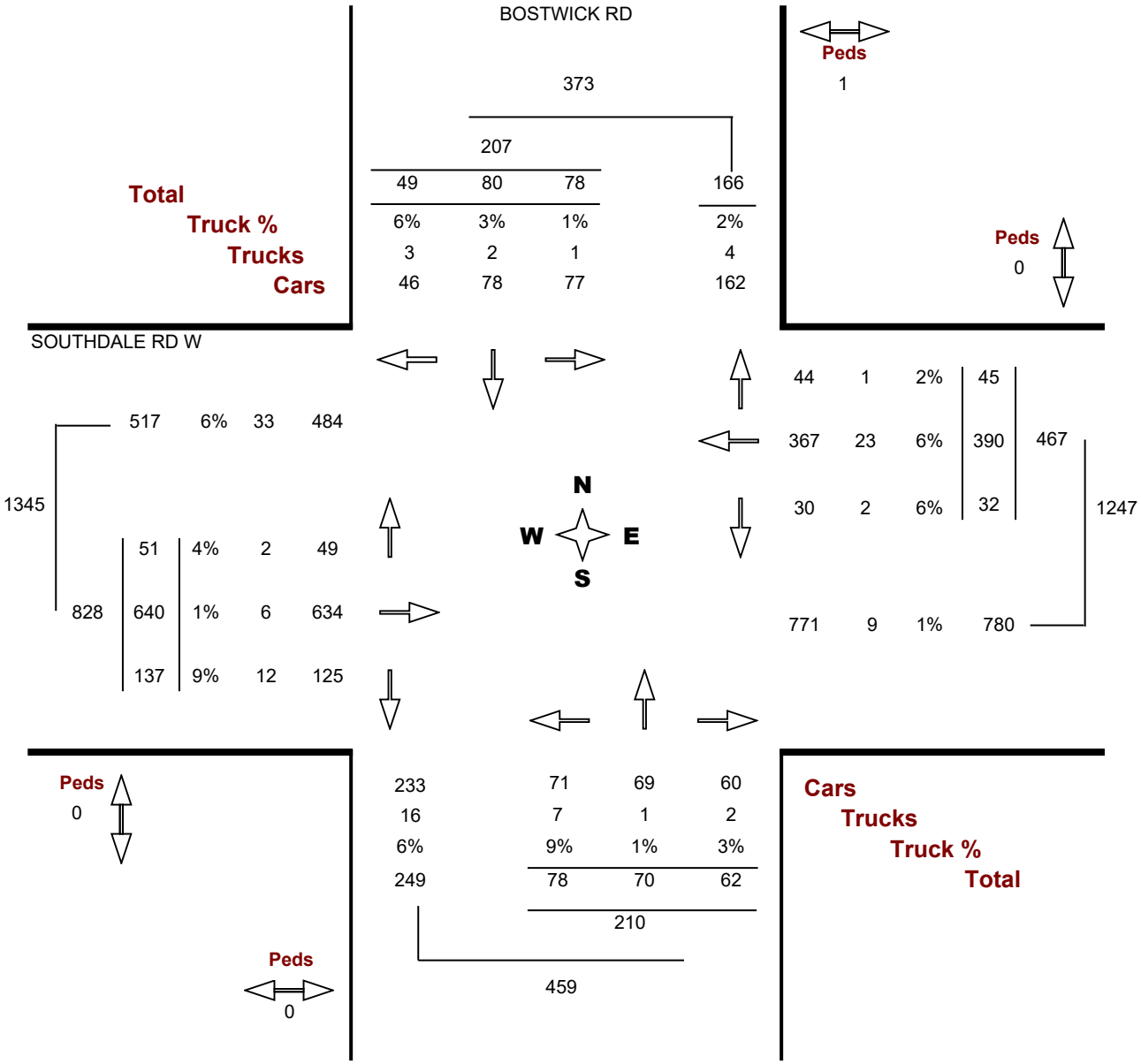
GeoID..... INT6088

Count Date..... Wednesday, 22 March, 2023 **Peak Hour.....** 04:15 PM — 05:15 PM



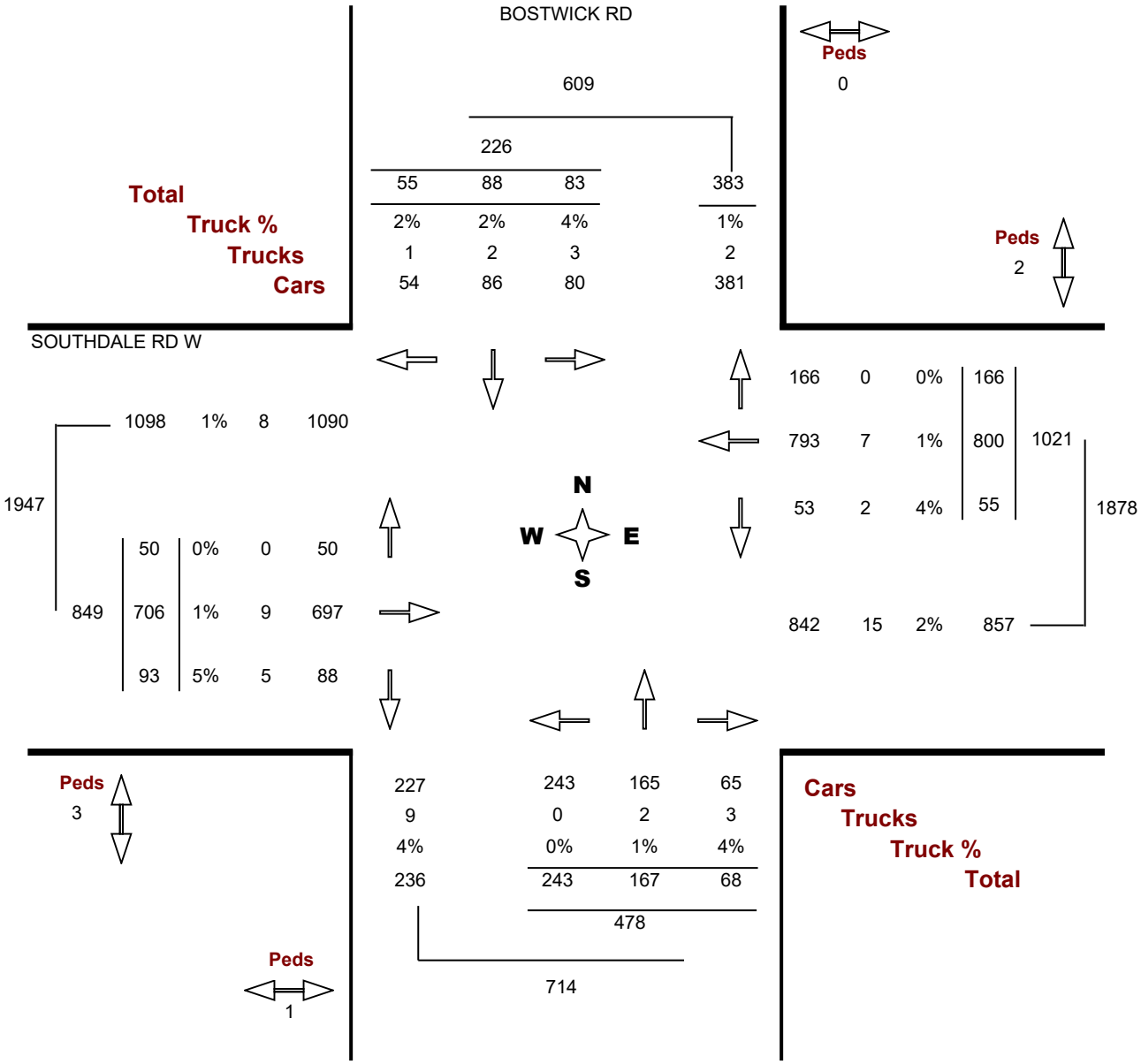
Turning Movements Report - AM Period

Location..... BOSTWICK RD @ SOUTHDALE RD W
Municipality..... LONDON
GeoID..... INT5739
Count Date..... Tuesday, 21 May, 2019 **Peak Hour.....** 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

Location..... BOSTWICK RD @ SOUTHDALE RD W
Municipality..... LONDON
GeoID..... INT5739
Count Date..... Tuesday, 21 May, 2019 **Peak Hour.....** 04:45 PM — 05:45 PM



Appendix D – Trip Generation Data

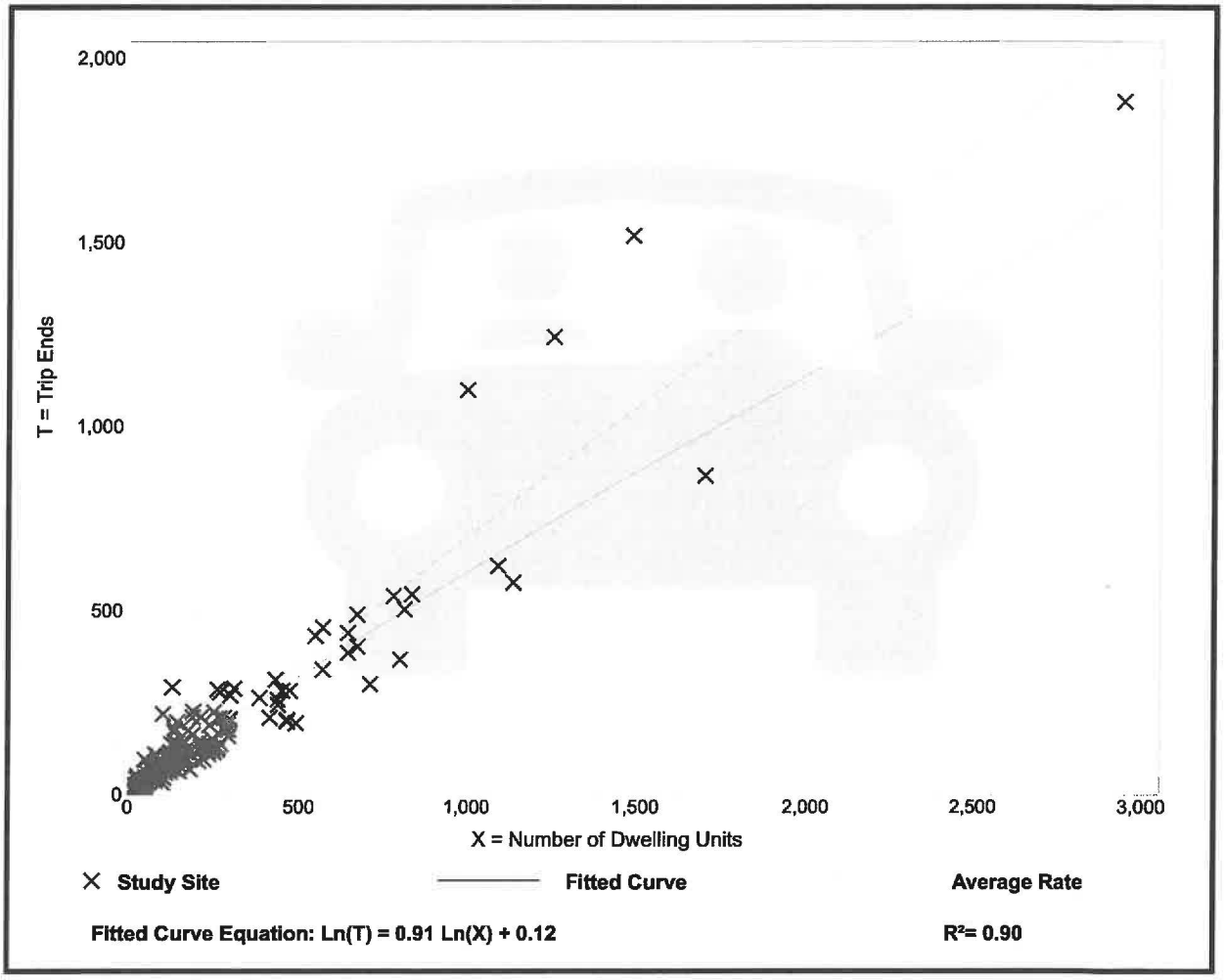
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



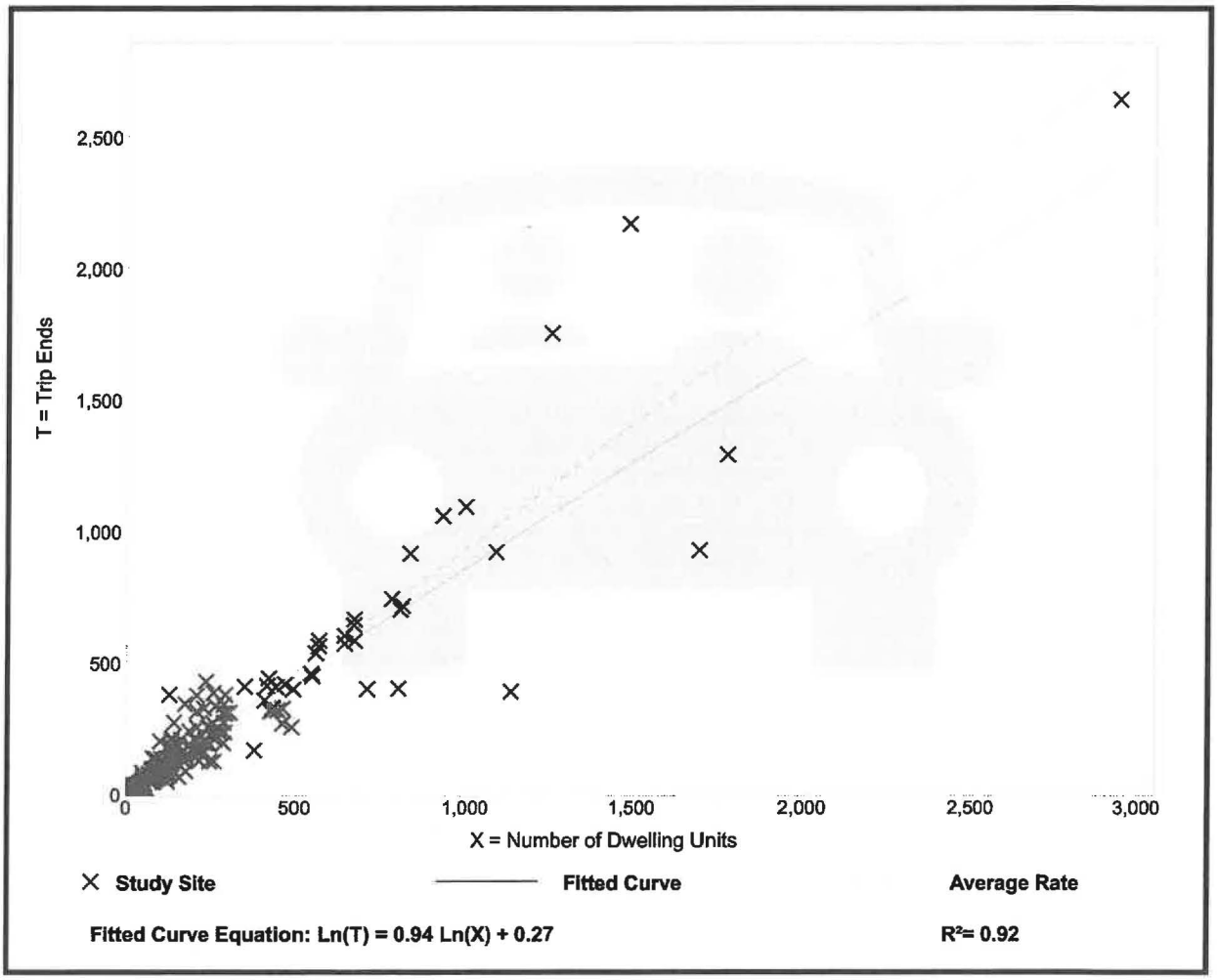
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



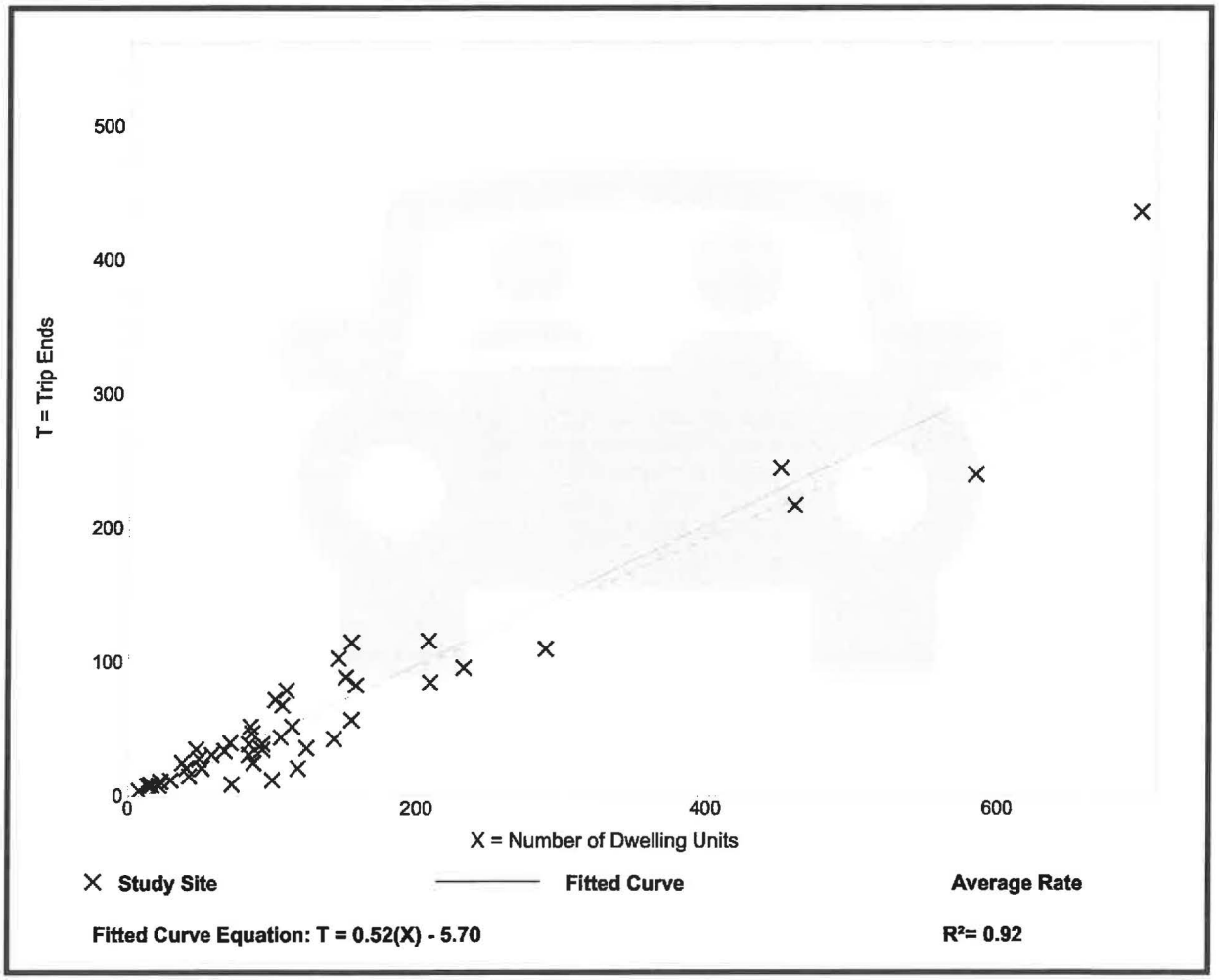
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



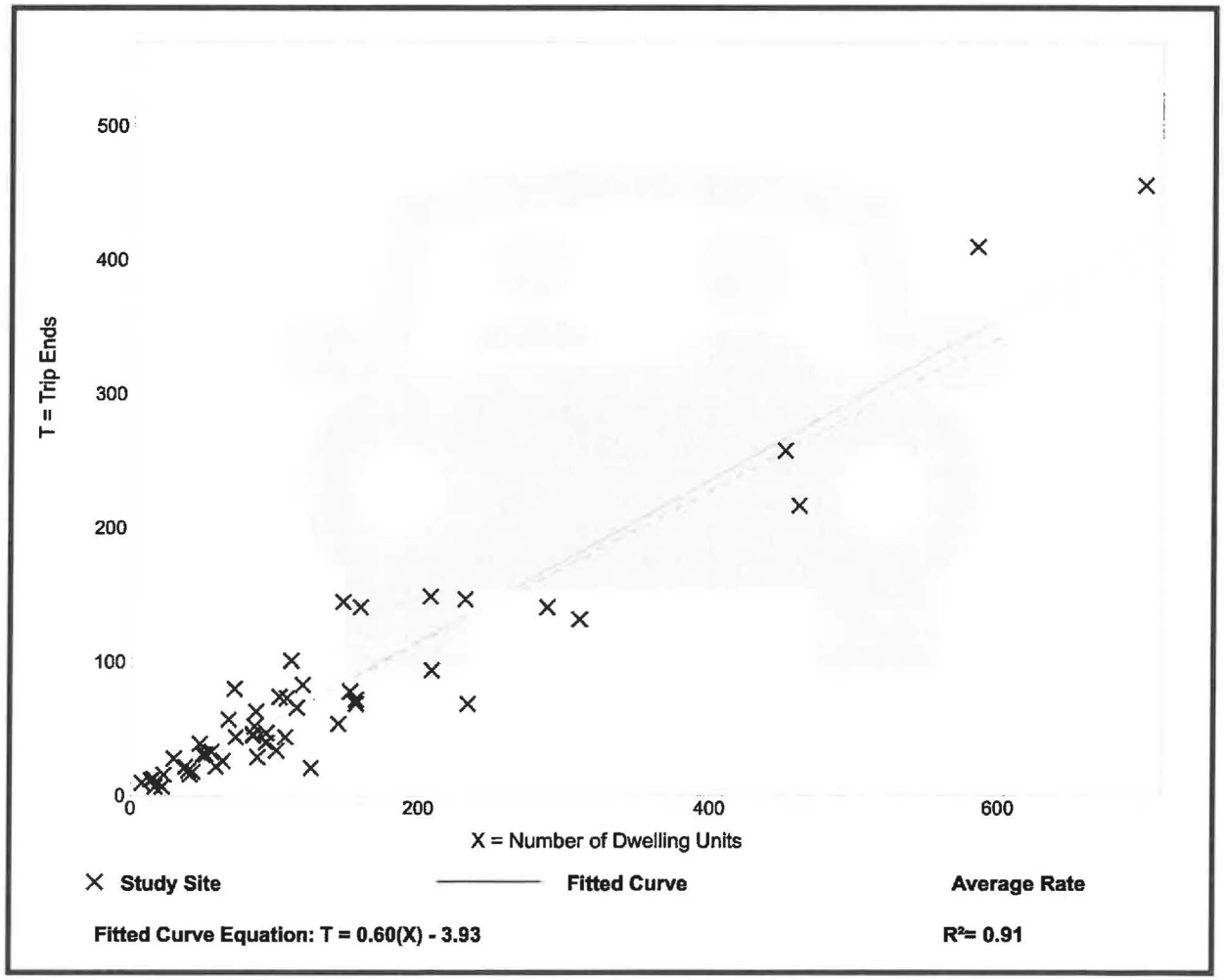
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



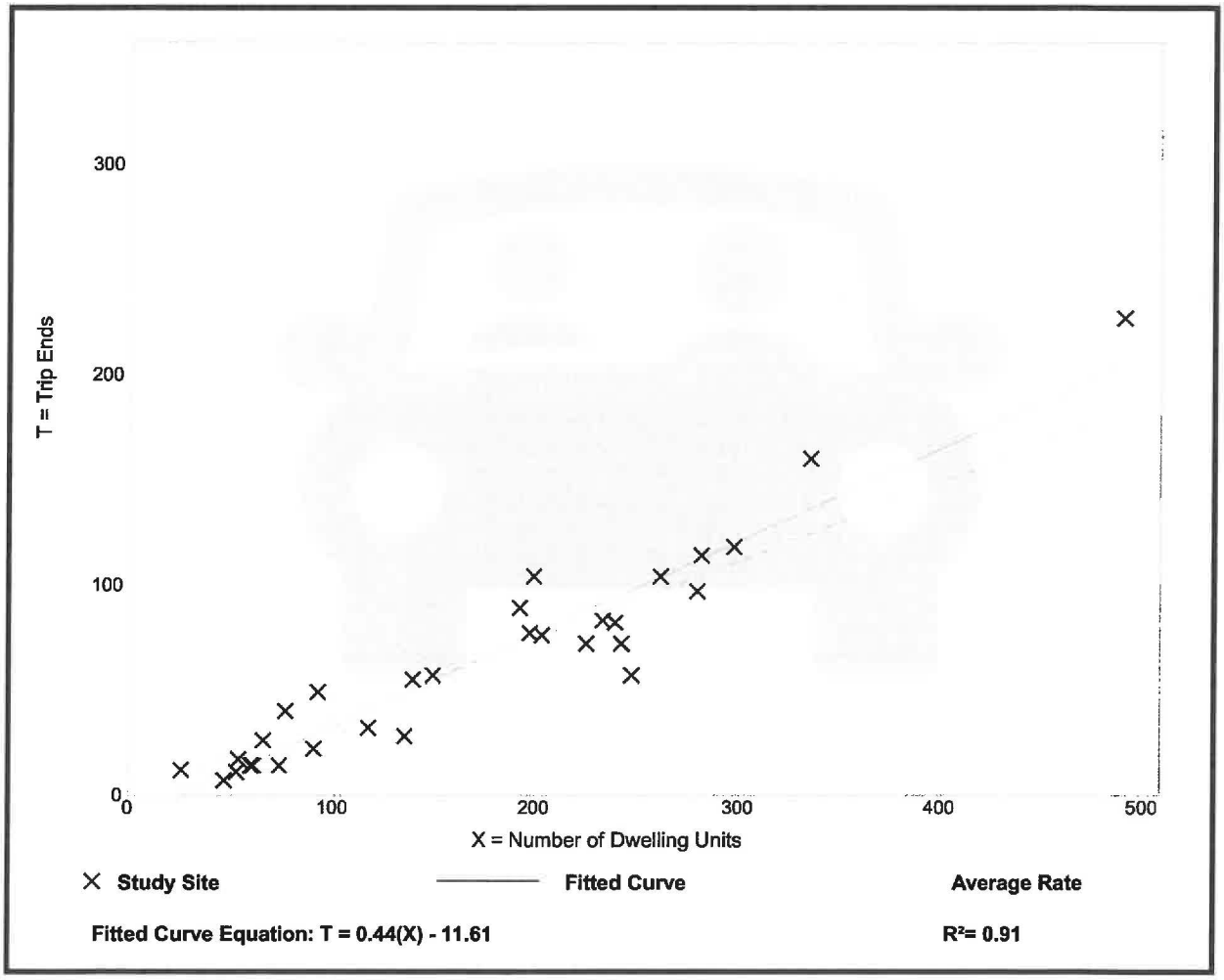
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 30
Avg. Num. of Dwelling Units: 173
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



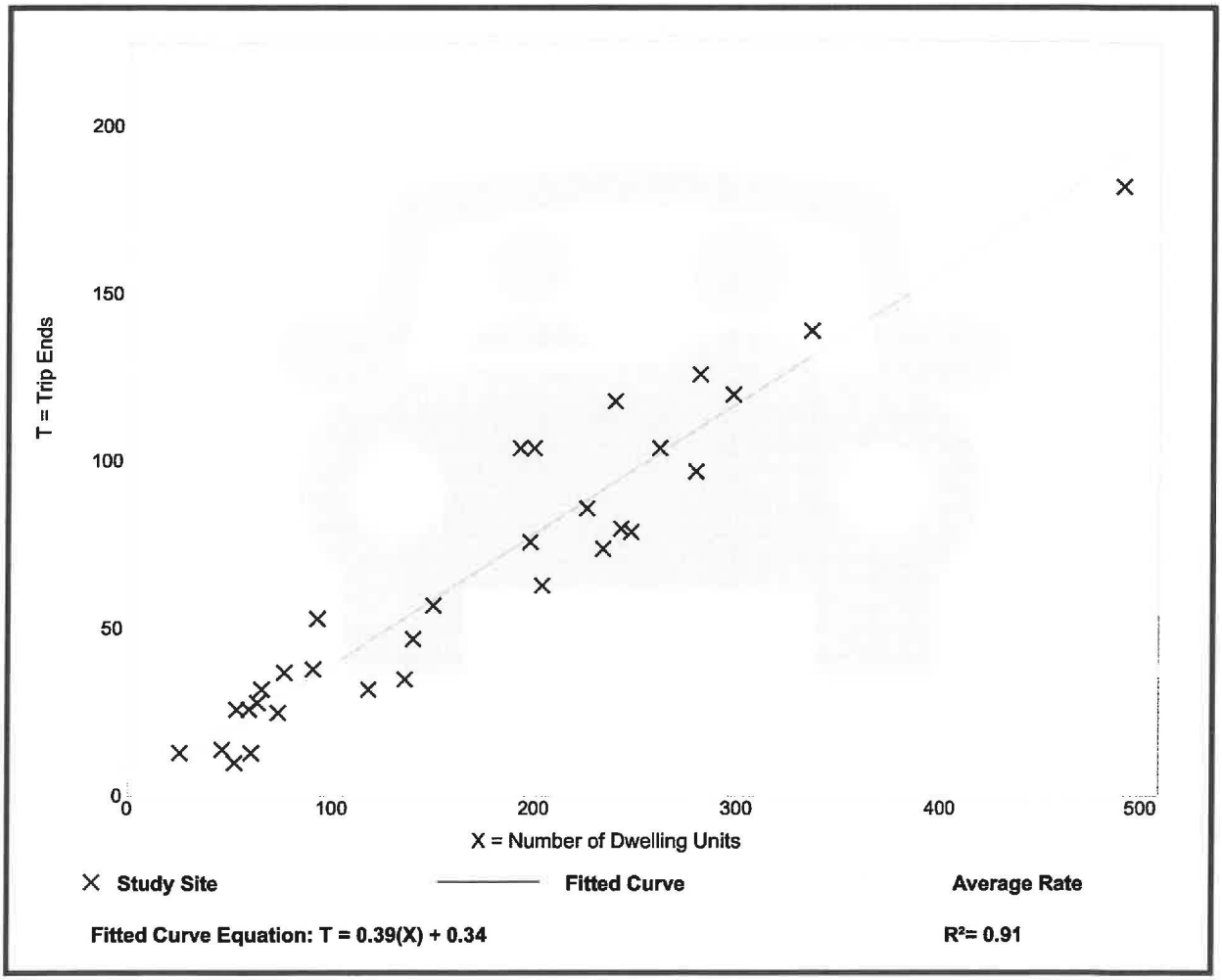
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 31
Avg. Num. of Dwelling Units: 169
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



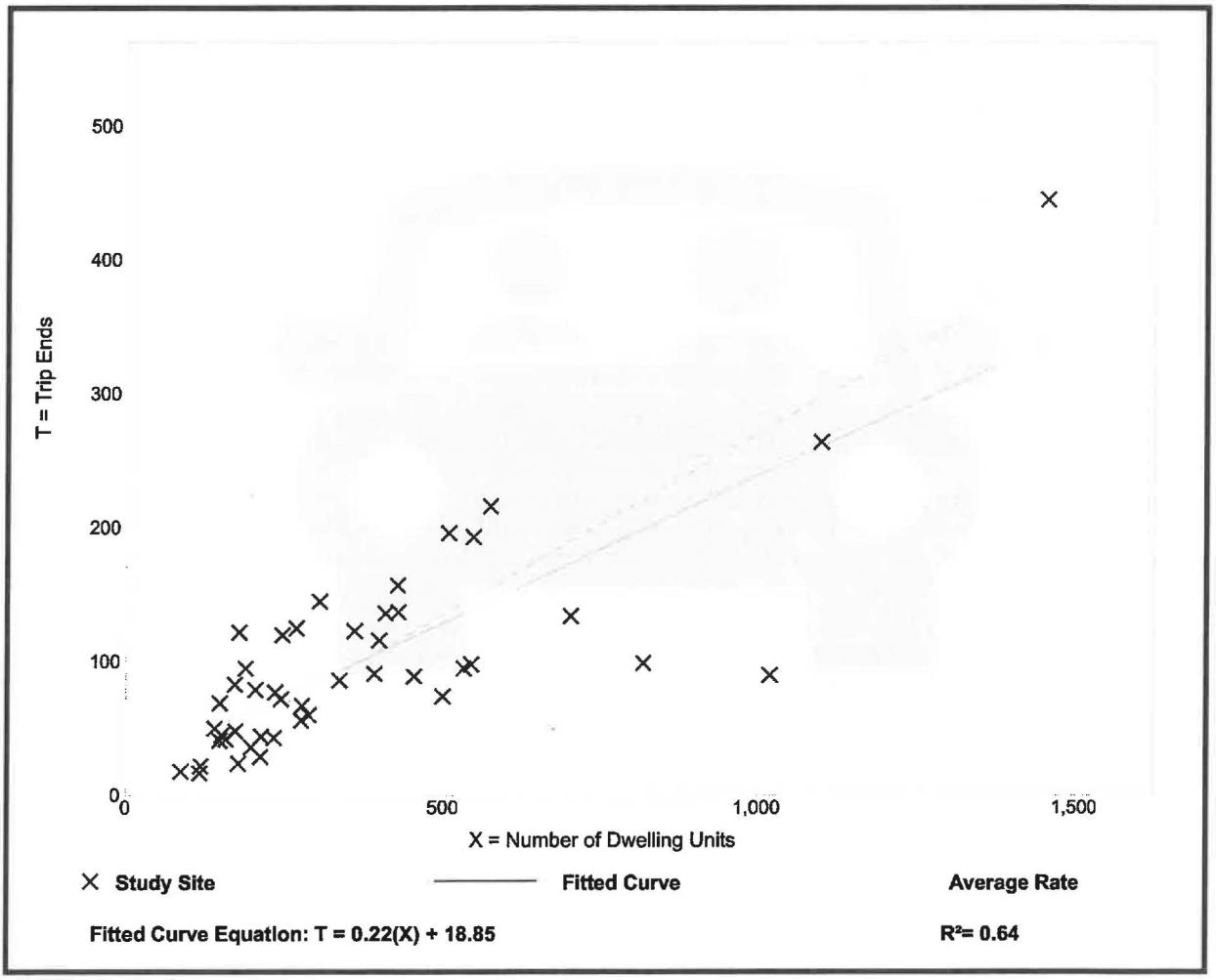
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 45
Avg. Num. of Dwelling Units: 372
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.27	0.09 - 0.67	0.11

Data Plot and Equation



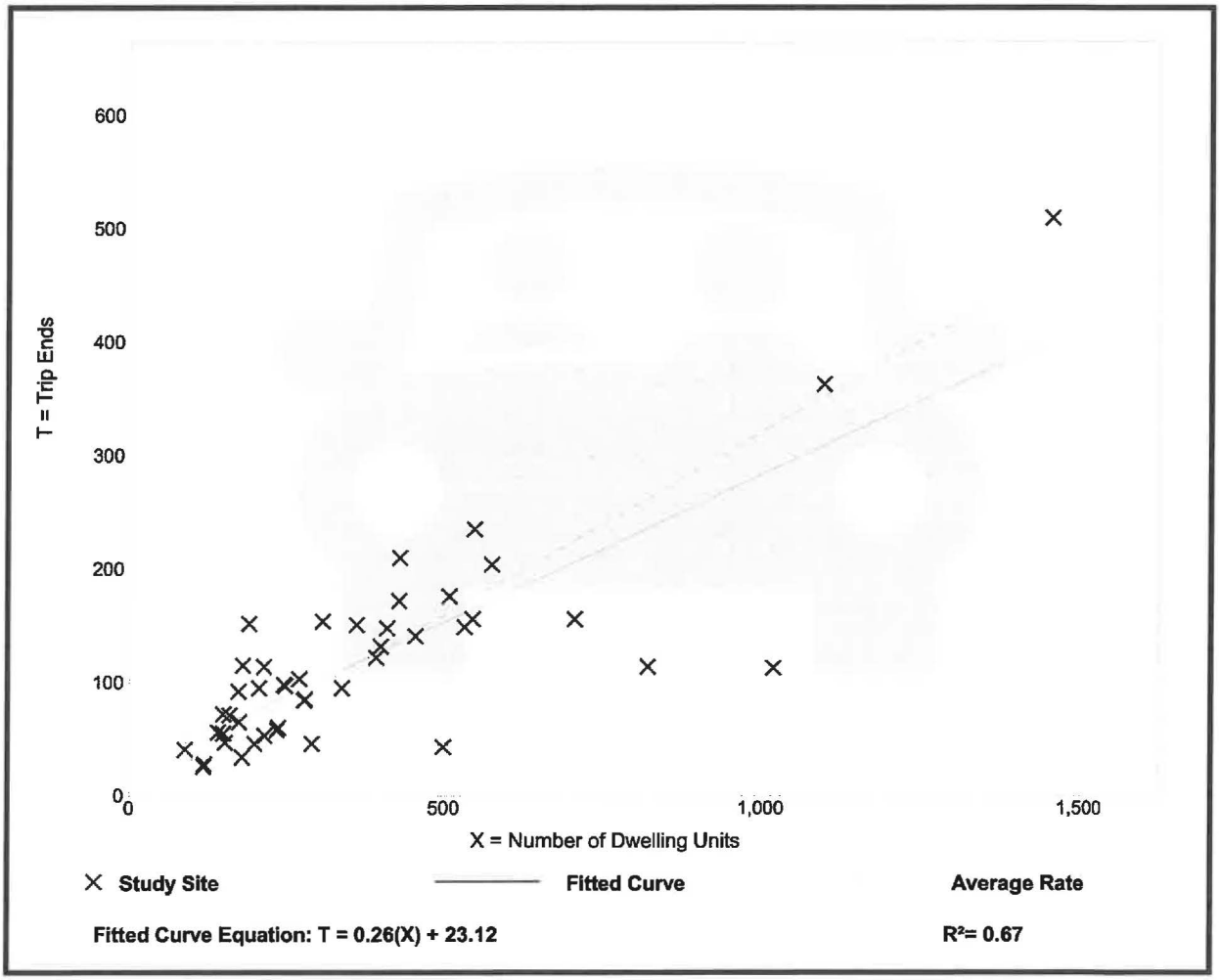
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 45
Avg. Num. of Dwelling Units: 372
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

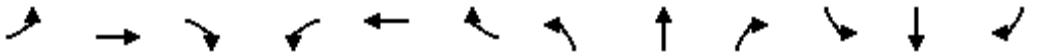
Average Rate	Range of Rates	Standard Deviation
0.32	0.09 - 0.80	0.13

Data Plot and Equation



Appendix E – Intersection Capacity Analysis

November 30, 2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	49	22	35	33	85	46	428	32	125	517	49
Future Volume (vph)	54	49	22	35	33	85	46	428	32	125	517	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		0.0	80.0		0.0	120.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		1.00				1.00		1.00		
Frt		0.953			0.892			0.990			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1674	0	1674	1500	0	1615	1749	0	1674	1789	0
Flt Permitted	0.672			0.705			0.380			0.452		
Satd. Flow (perm)	1184	1674	0	1238	1500	0	646	1749	0	796	1789	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			96			8			10	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)			2	2					3	3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%
Adj. Flow (vph)	61	55	25	39	37	96	52	481	36	140	581	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	80	0	39	133	0	52	517	0	140	636	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	25.2	25.2		25.2	25.2		45.9	45.9		45.9	45.9	
Total Split (s)	29.0	29.0		29.0	29.0		51.0	51.0		51.0	51.0	
Total Split (%)	36.3%	36.3%		36.3%	36.3%		63.8%	63.8%		63.8%	63.8%	
Maximum Green (s)	22.8	22.8		22.8	22.8		45.1	45.1		45.1	45.1	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.8	3.8		3.8	3.8	
All-Red Time (s)	1.9	1.9		1.9	1.9		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		28.0	28.0		28.0	28.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	9.1	9.1		9.1	9.1		49.3	49.3		49.3	49.3	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.74	0.74		0.74	0.74	
v/c Ratio	0.38	0.32		0.23	0.46		0.11	0.40		0.24	0.48	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	32.9	22.5		28.7	15.5		5.0	5.8		5.8	6.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.9	22.5		28.7	15.5		5.0	5.8		5.8	6.7	
LOS	C	C		C	B		A	A		A	A	
Approach Delay		27.0			18.5			5.8			6.5	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	7.0	6.2		4.4	4.1		1.8	22.4		5.3	30.1	
Queue Length 95th (m)	16.6	16.7		11.9	17.1		6.0	45.7		14.4	60.8	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0			80.0			120.0		
Base Capacity (vph)	404	588		423	576		477	1295		588	1325	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.15	0.14		0.09	0.23		0.11	0.40		0.24	0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 66.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 65.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	33	12	454	553	20
Future Vol, veh/h	52	33	12	454	553	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	30	0	110	-	-	30
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	4	18	8	6	3	30
Mvmt Flow	60	38	14	528	643	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1199	643	666	0	-	0
Stage 1	643	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Critical Hdwy	6.44	6.38	4.18	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.462	2.272	-	-	-
Pot Cap-1 Maneuver	203	446	896	-	-	-
Stage 1	520	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	200	446	896	-	-	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	512	-	-	-	-	-
Stage 2	570	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	200	446	-	-
HCM Lane V/C Ratio	0.016	-	0.302	0.086	-	-
HCM Control Delay (s)	9.1	-	30.6	13.8	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0	-	1.2	0.3	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	13	2	430	567	8
Future Vol, veh/h	26	13	2	430	567	8
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	80
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	8	0	6	3	12
Mvmt Flow	30	15	2	489	644	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1137	645	653	0	-	0
Stage 1	644	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Critical Hdwy	6.4	6.28	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	2.2	-	-	-
Pot Cap-1 Maneuver	225	462	943	-	-	-
Stage 1	527	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	225	462	943	-	-	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	943	-	271	-	-
HCM Lane V/C Ratio	0.002	-	0.164	-	-
HCM Control Delay (s)	8.8	-	20.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	77	49	407	565	28
Future Vol, veh/h	35	77	49	407	565	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	45	0	55	-	-	45
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	7	8	10	6	19
Mvmt Flow	39	87	55	457	635	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	635	666	0	-	0
Stage 1	635	-	-	-	-	-
Stage 2	567	-	-	-	-	-
Critical Hdwy	6.43	6.27	4.18	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.363	2.272	-	-	-
Pot Cap-1 Maneuver	203	470	896	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	191	470	896	-	-	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	566	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.9	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	191	470	-	-
HCM Lane V/C Ratio	0.061	-	0.206	0.184	-	-
HCM Control Delay (s)	9.3	-	28.7	14.4	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.7	0.7	-	-

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	132	59	144	217	50
Future Vol, veh/h	72	132	59	144	217	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	2	9	9	3	4
Mvmt Flow	81	148	66	162	244	56

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	566	272	300	0	-	0
Stage 1	272	-	-	-	-	-
Stage 2	294	-	-	-	-	-
Critical Hdwy	6.4	6.22	4.19	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	2.281	-	-	-
Pot Cap-1 Maneuver	489	767	1222	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	460	767	1222	-	-	-
Mov Cap-2 Maneuver	460	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	761	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	2.4	0
HCM LOS	B		

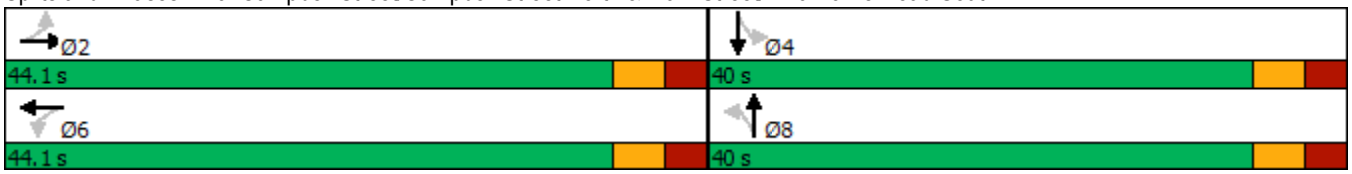
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1222	-	621	-	-
HCM Lane V/C Ratio	0.054	-	0.369	-	-
HCM Control Delay (s)	8.1	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.7	-	-

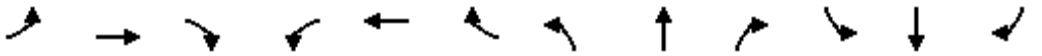
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	418	33	187	548	88	55	88	270	96	30	34
Future Volume (vph)	31	418	33	187	548	88	55	88	270	96	30	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00		0.98	0.98		1.00	0.98	
Frt		0.989			0.979			0.887			0.921	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1808	0	1738	1769	0	1789	1570	0	1674	1553	0
Flt Permitted	0.292			0.436			0.711			0.276		
Satd. Flow (perm)	529	1808	0	798	1769	0	1308	1570	0	486	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			13			219			37	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	34	454	36	203	596	96	60	96	293	104	33	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	490	0	203	692	0	60	389	0	104	70	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1		26.0	26.0		26.0	26.0	
Total Split (s)	44.1	44.1		44.1	44.1		40.0	40.0		40.0	40.0	
Total Split (%)	52.4%	52.4%		52.4%	52.4%		47.6%	47.6%		47.6%	47.6%	
Maximum Green (s)	38.0	38.0		38.0	38.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	38.3	38.3		38.3	38.3		14.5	14.5		14.5	14.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.22	0.22		0.22	0.22	
v/c Ratio	0.11	0.46		0.43	0.66		0.21	0.75		0.96	0.19	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.1	10.5		12.9	14.4		21.2	19.5		106.0	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.1	10.5		12.9	14.4		21.2	19.5		106.0	12.1	
LOS	A	B		B	B		C	B		F	B	
Approach Delay		10.4			14.0			19.7			68.2	
Approach LOS		B			B			B			E	
Queue Length 50th (m)	1.6	28.5		11.8	47.9		5.9	17.8		12.3	3.1	
Queue Length 95th (m)	7.0	67.3		35.9	113.9		13.9	44.0		#35.6	11.3	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0						5.0			45.0		
Base Capacity (vph)	312	1068		470	1048		689	931		256	836	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.46		0.43	0.66		0.09	0.42		0.41	0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 84.1			
Actuated Cycle Length: 65			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	48	36	40	60	207	47	709	45	82	495	64
Future Volume (vph)	56	48	36	40	60	207	47	709	45	82	495	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		0.0	80.0		0.0	120.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.98		1.00	1.00		1.00	1.00	
Frt		0.936			0.884			0.991			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1676	0	1825	1626	0	1789	1864	0	1789	1813	0
Flt Permitted	0.364			0.699			0.386			0.261		
Satd. Flow (perm)	670	1676	0	1333	1626	0	726	1864	0	491	1813	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			185			7			13	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	60	51	38	43	64	220	50	754	48	87	527	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	89	0	43	284	0	50	802	0	87	595	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	25.2	25.2		25.2	25.2		45.9	45.9		45.9	45.9	
Total Split (s)	29.0	29.0		29.0	29.0		51.0	51.0		51.0	51.0	
Total Split (%)	36.3%	36.3%		36.3%	36.3%		63.8%	63.8%		63.8%	63.8%	
Maximum Green (s)	22.8	22.8		22.8	22.8		45.1	45.1		45.1	45.1	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.8	3.8		3.8	3.8	
All-Red Time (s)	1.9	1.9		1.9	1.9		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		28.0	28.0		28.0	28.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.0	11.0		11.0	11.0		45.3	45.3		45.3	45.3	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.66	0.66		0.66	0.66	
v/c Ratio	0.56	0.30		0.20	0.68		0.10	0.65		0.27	0.49	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.3	18.3		26.4	18.9		6.0	10.9		8.7	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.3	18.3		26.4	18.9		6.0	10.9		8.7	8.2	
LOS	D	B		C	B		A	B		A	A	
Approach Delay		29.6			19.9			10.6			8.3	
Approach LOS		C			B			B			A	
Queue Length 50th (m)	7.1	5.7		4.8	11.4		1.8	47.0		3.6	29.1	
Queue Length 95th (m)	17.9	16.3		12.3	32.6		7.3	114.1		14.0	70.5	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0			80.0			120.0		
Base Capacity (vph)	224	586		445	667		480	1236		324	1204	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.15		0.10	0.43		0.10	0.65		0.27	0.49	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 68.4			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 88.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	24	33	769	518	53
Future Vol, veh/h	31	24	33	769	518	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	30	0	110	-	-	30
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	4	3	1	3	0
Mvmt Flow	33	25	35	809	545	56

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1424	545	601	0	-	0
Stage 1	545	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.13	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.227	-	-	-
Pot Cap-1 Maneuver	151	534	971	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	146	534	971	-	-	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	564	-	-	-	-	-
Stage 2	409	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.9	0.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	971	-	146	534	-	-
HCM Lane V/C Ratio	0.036	-	0.224	0.047	-	-
HCM Control Delay (s)	8.8	-	36.6	12.1	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	6	10	771	512	26
Future Vol, veh/h	13	6	10	771	512	26
Conflicting Peds, #/hr	0	6	28	0	0	28
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	75	-	-	80
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	8	0	0	1	3	4
Mvmt Flow	14	6	11	812	539	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1401	573	594	0	-	0
Stage 1	567	-	-	-	-	-
Stage 2	834	-	-	-	-	-
Critical Hdwy	6.48	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	150	523	992	-	-	-
Stage 1	556	-	-	-	-	-
Stage 2	416	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	140	506	965	-	-	-
Mov Cap-2 Maneuver	140	-	-	-	-	-
Stage 1	535	-	-	-	-	-
Stage 2	405	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.3	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	965	-	181	-	-
HCM Lane V/C Ratio	0.011	-	0.11	-	-
HCM Control Delay (s)	8.8	-	27.3	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	62	85	748	480	55
Future Vol, veh/h	34	62	85	748	480	55
Conflicting Peds, #/hr	0	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	45	0	55	-	-	45
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	2	0	1	4	2
Mvmt Flow	37	67	91	804	516	59

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1502	517	575	0	-	0
Stage 1	516	-	-	-	-	-
Stage 2	986	-	-	-	-	-
Critical Hdwy	6.43	6.22	4.1	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.318	2.2	-	-	-
Pot Cap-1 Maneuver	133	558	1008	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	360	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	121	557	1008	-	-	-
Mov Cap-2 Maneuver	121	-	-	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	360	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.6	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1008	-	121	557	-	-
HCM Lane V/C Ratio	0.091	-	0.302	0.12	-	-
HCM Control Delay (s)	8.9	-	47.1	12.3	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	0.4	-	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	95	94	188	428	145	78
Future Vol, veh/h	95	94	188	428	145	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	4	2	1	6	1
Mvmt Flow	102	101	202	460	156	84

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1062	198	240	0	-	0
Stage 1	198	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Critical Hdwy	6.4	6.24	4.12	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.336	2.218	-	-	-
Pot Cap-1 Maneuver	250	838	1327	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	416	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	199	838	1327	-	-	-
Mov Cap-2 Maneuver	199	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	416	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.7	2.5	0
HCM LOS	D		

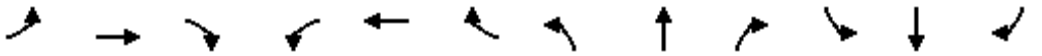
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	321	-	-
HCM Lane V/C Ratio	0.152	-	0.633	-	-
HCM Control Delay (s)	8.2	0	33.7	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.5	-	4.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	626	39	132	620	91	27	40	87	97	45	65
Future Volume (vph)	61	626	39	132	620	91	27	40	87	97	45	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.991			0.981			0.897			0.911	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1848	0	1772	1868	0	1825	1677	0	1825	1724	0
Flt Permitted	0.306			0.332			0.671			0.611		
Satd. Flow (perm)	588	1848	0	619	1868	0	1284	1677	0	1174	1724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			15			95			69	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	66	680	42	143	674	99	29	43	95	105	49	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	722	0	143	773	0	29	138	0	105	120	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1		26.0	26.0		26.0	26.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	63.9	63.9		63.9	63.9		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	74.3	74.3		74.3	74.3		13.6	13.6		13.6	13.6	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.14	0.14		0.14	0.14	
v/c Ratio	0.15	0.53		0.31	0.56		0.17	0.45		0.66	0.41	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	5.7	7.7		7.3	8.1		38.1	18.4		59.7	21.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.7	7.7		7.3	8.1		38.1	18.4		59.7	21.8	
LOS	A	A		A	A		D	B		E	C	
Approach Delay		7.6			7.9			21.8			39.5	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	3.1	48.8		7.8	53.5		5.0	7.5		19.6	8.9	
Queue Length 95th (m)	9.2	92.5		20.7	101.7		12.3	23.0		34.5	23.2	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0						5.0			45.0		
Base Capacity (vph)	437	1375		460	1392		308	474		281	466	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.15	0.53		0.31	0.56		0.09	0.29		0.37	0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 77.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	77	29	129	57	146	67	703	196	185	632	49
Future Volume (vph)	47	77	29	129	57	146	67	703	196	185	632	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		0.0	80.0		0.0	120.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.99				1.00		1.00		
Frt		0.959			0.892			0.967			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1697	0	1674	1499	0	1615	1719	0	1674	1792	0
Flt Permitted	0.290			0.617			0.311			0.197		
Satd. Flow (perm)	511	1697	0	1081	1499	0	529	1719	0	347	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			83			32			9	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)			2	2					3	3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%
Adj. Flow (vph)	53	87	33	145	64	164	75	790	220	208	710	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	120	0	145	228	0	75	1010	0	208	765	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	25.2	25.2		25.2	25.2		45.9	45.9		45.9	45.9	
Total Split (s)	25.2	25.2		25.2	25.2		104.8	104.8		104.8	104.8	
Total Split (%)	19.4%	19.4%		19.4%	19.4%		80.6%	80.6%		80.6%	80.6%	
Maximum Green (s)	19.0	19.0		19.0	19.0		98.9	98.9		98.9	98.9	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.8	3.8		3.8	3.8	
All-Red Time (s)	1.9	1.9		1.9	1.9		2.1	2.1		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.9	5.9		5.9	5.9	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		28.0	28.0		28.0	28.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	18.7	18.7		18.7	18.7		98.9	98.9		98.9	98.9	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.76	0.76		0.76	0.76	
v/c Ratio	0.73	0.47		0.94	0.80		0.19	0.77		0.79	0.56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	101.9	52.5		112.3	54.5		5.6	13.5		33.8	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	101.9	52.5		112.3	54.5		5.6	13.5		33.8	8.2	
LOS	F	D		F	D		A	B		C	A	
Approach Delay		67.6			77.0			12.9			13.7	
Approach LOS		E			E			B			B	
Queue Length 50th (m)	13.1	25.6		37.1	36.7		4.6	124.9		27.6	69.8	
Queue Length 95th (m)	#35.0	44.5		#76.1	#74.0		9.5	175.5		#87.3	93.5	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0			80.0			120.0		
Base Capacity (vph)	74	259		157	290		403	1318		264	1368	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.46		0.92	0.79		0.19	0.77		0.79	0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 129.7			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 26.0		Intersection LOS: C	
Intersection Capacity Utilization 97.2%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	0	33	0	0	0	12	826	0	0	792	20
Future Vol, veh/h	52	0	33	0	0	0	12	826	0	0	792	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	0	18	0	0	0	8	6	0	0	3	30
Mvmt Flow	60	0	38	0	0	0	14	960	0	0	921	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1921	1921	933	1940	1932	960	944	0	0	960	0	0
Stage 1	933	933	-	988	988	-	-	-	-	-	-	-
Stage 2	988	988	-	952	944	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.38	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.462	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 50	68	301	50	67	314	703	-	-	725	-	-
Stage 1	317	348	-	300	328	-	-	-	-	-	-	-
Stage 2	295	328	-	314	344	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 49	67	301	43	66	314	703	-	-	725	-	-
Mov Cap-2 Maneuver	~ 49	67	-	43	66	-	-	-	-	-	-	-
Stage 1	311	348	-	294	321	-	-	-	-	-	-	-
Stage 2	289	321	-	274	344	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	215.1	0	0.1	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	703	-	-	49	301	-	725	-	-
HCM Lane V/C Ratio	0.02	-	-	1.234	0.127	-	-	-	-
HCM Control Delay (s)	10.2	-	-	$ 339.8	18.7	0	0	-	-
HCM Lane LOS	B	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	5.5	0.4	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	0	13	49	0	157	2	651	26	47	772	8
Future Vol, veh/h	26	0	13	49	0	157	2	651	26	47	772	8
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	60	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	8	0	0	0	0	6	0	0	3	12
Mvmt Flow	30	0	15	56	0	178	2	740	30	53	877	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1836	1762	883	1755	1751	755	886	0	0	770	0	0
Stage 1	988	988	-	759	759	-	-	-	-	-	-	-
Stage 2	848	774	-	996	992	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.28	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.372	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	59	85	336	67	87	412	773	-	-	854	-	-
Stage 1	300	328	-	402	418	-	-	-	-	-	-	-
Stage 2	359	411	-	297	326	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	79	336	61	81	412	773	-	-	854	-	-
Mov Cap-2 Maneuver	32	79	-	61	81	-	-	-	-	-	-	-
Stage 1	299	308	-	401	417	-	-	-	-	-	-	-
Stage 2	203	410	-	266	306	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	259.4	63.3	0	0.5
HCM LOS	F	F		

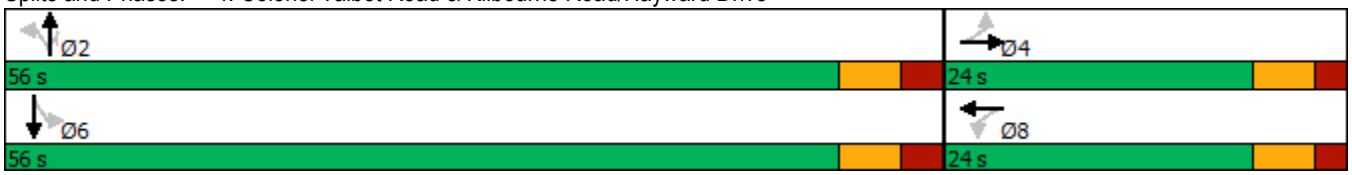
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	773	-	-	46	61	412	854	-	-
HCM Lane V/C Ratio	0.003	-	-	0.963	0.913	0.433	0.063	-	-
HCM Control Delay (s)	9.7	-	-	259.4	201.3	20.2	9.5	-	-
HCM Lane LOS	A	-	-	F	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	4	4.2	2.1	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	4	92	213	6	74	60	566	53	26	780	32
Future Volume (vph)	41	4	92	213	6	74	60	566	53	26	780	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.856			0.862				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1541	0	1825	1656	0	1690	1746	1633	1825	1793	0
Flt Permitted	0.699			0.688			0.176			0.344		
Satd. Flow (perm)	1304	1541	0	1322	1656	0	313	1746	1633	661	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103			83				60		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	0%	7%	0%	0%	0%	8%	10%	0%	0%	6%	19%
Adj. Flow (vph)	46	4	103	239	7	83	67	636	60	29	876	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	107	0	239	90	0	67	636	60	29	912	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	24.0	24.0		24.0	24.0		56.0	56.0	56.0	56.0	56.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%	70.0%	70.0%	70.0%	
Maximum Green (s)	18.3	18.3		18.3	18.3		49.6	49.6	49.6	49.6	49.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	17.0	17.0		17.0	17.0		50.8	50.8	50.8	50.8	50.8	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.64	0.64	0.64	0.64	0.64	
v/c Ratio	0.17	0.26		0.85	0.22		0.34	0.57	0.06	0.07	0.80	
Control Delay	26.6	8.0		57.8	8.7		13.2	11.3	1.9	6.6	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	26.6	8.0		57.8	8.7		13.2	11.3	1.9	6.6	18.3	
LOS	C	A		E	A		B	B	A	A	B	
Approach Delay		13.6			44.4			10.7			17.9	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	5.6	0.5		34.3	0.8		4.4	51.6	0.0	1.6	95.1	
Queue Length 95th (m)	13.9	11.8		#68.7	11.3		13.1	78.5	3.7	4.6	148.8	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	298	432		302	443		199	1109	1059	419	1141	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.25		0.79	0.20		0.34	0.57	0.06	0.07	0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 79.9			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

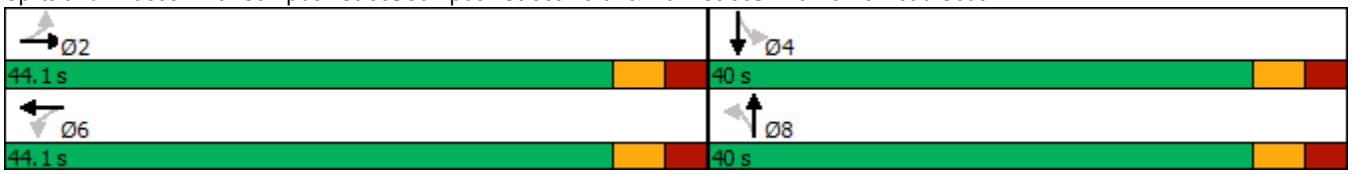


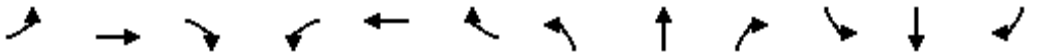
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	616	43	187	702	94	61	91	270	140	35	138
Future Volume (vph)	64	616	43	187	702	94	61	91	270	140	35	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00		0.98	0.98		1.00	0.96	
Frt		0.990			0.982			0.888			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1810	0	1738	1775	0	1789	1572	0	1674	1438	0
Flt Permitted	0.133			0.239			0.639			0.315		
Satd. Flow (perm)	241	1810	0	437	1775	0	1180	1572	0	555	1438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			10			155			116	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	70	670	47	203	763	102	66	99	293	152	38	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	717	0	203	865	0	66	392	0	152	188	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1		26.0	26.0		26.0	26.0	
Total Split (s)	44.1	44.1		44.1	44.1		40.0	40.0		40.0	40.0	
Total Split (%)	52.4%	52.4%		52.4%	52.4%		47.6%	47.6%		47.6%	47.6%	
Maximum Green (s)	38.0	38.0		38.0	38.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	38.5	38.5		38.5	38.5		19.9	19.9		19.9	19.9	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.28	0.28		0.28	0.28	
v/c Ratio	0.53	0.73		0.85	0.89		0.20	0.71		0.98	0.39	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	34.7	20.3		53.0	30.7		19.3	20.2		93.4	10.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.7	20.3		53.0	30.7		19.3	20.2		93.4	10.2	
LOS	C	C		D	C		B	C		F	B	
Approach Delay		21.6			35.0			20.1			47.4	
Approach LOS		C			C			C			D	
Queue Length 50th (m)	5.4	64.2		20.7	90.7		6.5	26.8		19.5	7.1	
Queue Length 95th (m)	#30.3	#167.6		#74.9	#224.6		14.6	52.7		#49.0	20.1	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0						5.0			45.0		
Base Capacity (vph)	131	988		238	972		575	846		270	760	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.53	0.73		0.85	0.89		0.11	0.46		0.56	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 84.1			
Actuated Cycle Length: 70.7			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 30.0		Intersection LOS: C	
Intersection Capacity Utilization 97.9%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	85	49	241	104	308	65	893	200	174	690	53
Future Volume (vph)	54	85	49	241	104	308	65	893	200	174	690	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		0.0	80.0		0.0	120.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.99	0.98		1.00	1.00			1.00	
Frt		0.945			0.888			0.973			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1693	0	1825	1633	0	1789	1827	0	1789	1825	0
Flt Permitted	0.168			0.633			0.288			0.058		
Satd. Flow (perm)	310	1693	0	1205	1633	0	542	1827	0	109	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			123			18			8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	57	90	52	256	111	328	69	950	213	185	734	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	142	0	256	439	0	69	1163	0	185	790	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		
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		5.0	7.0	
Minimum Split (s)	25.2	25.2		25.2	25.2		45.9	45.9		8.0	45.9	
Total Split (s)	30.0	30.0		30.0	30.0		72.0	72.0		8.0	80.0	
Total Split (%)	27.3%	27.3%		27.3%	27.3%		65.5%	65.5%		7.3%	72.7%	
Maximum Green (s)	23.8	23.8		23.8	23.8		66.1	66.1		5.0	74.1	
Yellow Time (s)	4.3	4.3		4.3	4.3		3.8	3.8		3.0	3.8	
All-Red Time (s)	1.9	1.9		1.9	1.9		2.1	2.1		0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.2	6.2		6.2	6.2		5.9	5.9		3.0	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		28.0	28.0			28.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	23.8	23.8		23.8	23.8		66.1	66.1		77.0	74.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.60	0.60		0.70	0.67	
v/c Ratio	0.85	0.37		0.98	0.98		0.21	1.05		1.22	0.64	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	118.7	33.5		96.2	69.1		12.1	64.9		166.1	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	118.7	33.5		96.2	69.1		12.1	64.9		166.1	13.2	
LOS	F	C		F	E		B	E		F	B	
Approach Delay		57.9			79.1			61.9			42.2	
Approach LOS		E			E			E			D	
Queue Length 50th (m)	11.8	21.5		55.0	71.1		6.3	~272.2		~32.4	87.0	
Queue Length 95th (m)	#36.5	39.8		#105.5	#134.1		14.0	#351.1		#76.6	123.9	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0			80.0			120.0		
Base Capacity (vph)	67	385		260	449		325	1105		152	1231	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.85	0.37		0.98	0.98		0.21	1.05		1.22	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.22			
Intersection Signal Delay: 59.3		Intersection LOS: E	
Intersection Capacity Utilization 118.0%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	24	0	0	0	33	1136	0	0	862	53
Future Vol, veh/h	31	0	24	0	0	0	33	1136	0	0	862	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	4	0	0	0	3	1	0	0	3	0
Mvmt Flow	33	0	25	0	0	0	35	1196	0	0	907	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2201	2201	935	2214	2229	1196	963	0	0	1196	0	0
Stage 1	935	935	-	1266	1266	-	-	-	-	-	-	-
Stage 2	1266	1266	-	948	963	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 32	45	319	32	43	229	711	-	-	591	-	-
Stage 1	321	347	-	209	242	-	-	-	-	-	-	-
Stage 2	209	242	-	316	337	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 31	43	319	28	41	229	711	-	-	591	-	-
Mov Cap-2 Maneuver	~ 31	43	-	28	41	-	-	-	-	-	-	-
Stage 1	305	347	-	199	230	-	-	-	-	-	-	-
Stage 2	199	230	-	291	337	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	214.9	0	0.3	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	711	-	-	31	319	-	591	-	-
HCM Lane V/C Ratio	0.049	-	-	1.053	0.079	-	-	-	-
HCM Control Delay (s)	10.3	-	-	$ 367.8	17.3	0	0	-	-
HCM Lane LOS	B	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.6	0.3	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	0	6	17	2	86	10	1071	83	106	753	26
Future Vol, veh/h	13	0	6	17	2	86	10	1071	83	106	753	26
Conflicting Peds, #/hr	0	0	6	6	0	0	28	0	0	0	0	28
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	60	75	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	8	0	0	0	0	0	0	1	0	0	3	4
Mvmt Flow	14	0	6	18	2	91	11	1127	87	112	793	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2298	2295	841	2233	2265	1171	848	0	0	1214	0	0
Stage 1	1059	1059	-	1193	1193	-	-	-	-	-	-	-
Stage 2	1239	1236	-	1040	1072	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	26	39	368	31	41	237	798	-	-	582	-	-
Stage 1	264	304	-	230	263	-	-	-	-	-	-	-
Stage 2	209	250	-	281	299	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 13	30	356	26	32	237	776	-	-	582	-	-
Mov Cap-2 Maneuver	~ 13	30	-	26	32	-	-	-	-	-	-	-
Stage 1	253	239	-	227	259	-	-	-	-	-	-	-
Stage 2	126	247	-	222	235	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 506.1	78	0.1	1.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	776	-	-	19	27	237	582	-	-
HCM Lane V/C Ratio	0.014	-	-	1.053	0.741	0.382	0.192	-	-
HCM Control Delay (s)	9.7	-	-	$ 506.1	298.7	29.3	12.6	-	-
HCM Lane LOS	A	-	-	F	F	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	2.8	2.3	1.7	0.7	-	-

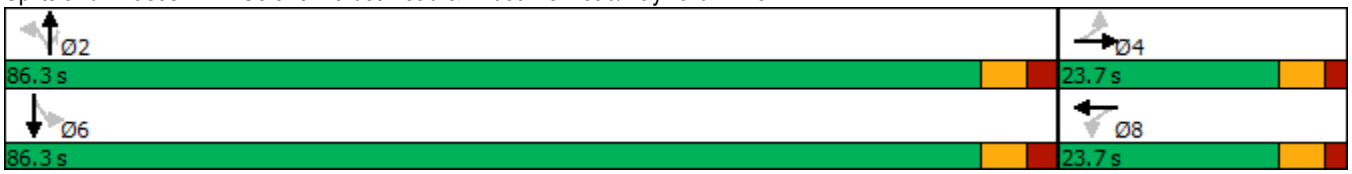
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	9	78	136	10	49	106	1077	223	72	645	63
Future Volume (vph)	39	9	78	136	10	49	106	1077	223	72	645	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		1.00								
Frt		0.866			0.876				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1601	0	1825	1683	0	1825	1902	1633	1825	1826	0
Flt Permitted	0.715			0.696			0.312			0.122		
Satd. Flow (perm)	1334	1601	0	1334	1683	0	599	1902	1633	234	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84			53				220		12	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%	0%	1%	0%	0%	4%	2%
Adj. Flow (vph)	42	10	84	146	11	53	114	1158	240	77	694	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	94	0	146	64	0	114	1158	240	77	762	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	23.7	23.7		23.7	23.7		86.3	86.3	86.3	86.3	86.3	
Total Split (%)	21.5%	21.5%		21.5%	21.5%		78.5%	78.5%	78.5%	78.5%	78.5%	
Maximum Green (s)	18.0	18.0		18.0	18.0		79.9	79.9	79.9	79.9	79.9	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.8	15.8		15.8	15.8		82.8	82.8	82.8	82.8	82.8	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.75	0.75	0.75	0.75	0.75	
v/c Ratio	0.22	0.31		0.77	0.22		0.25	0.81	0.19	0.44	0.56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	43.3	13.8		70.8	16.2		6.5	15.8	1.1	15.5	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	43.3	13.8		70.8	16.2		6.5	15.8	1.1	15.5	8.2	
LOS	D	B		E	B		A	B	A	B	A	
Approach Delay		22.9			54.2			12.8			8.8	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	7.9	1.8		29.8	2.0		7.0	147.8	1.0	5.7	63.8	
Queue Length 95th (m)	18.2	15.9		#55.9	13.7		14.5	225.0	7.0	19.1	93.0	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	217	330		217	318		448	1422	1277	174	1368	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.19	0.28		0.67	0.20		0.25	0.81	0.19	0.44	0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110.7			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 92.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

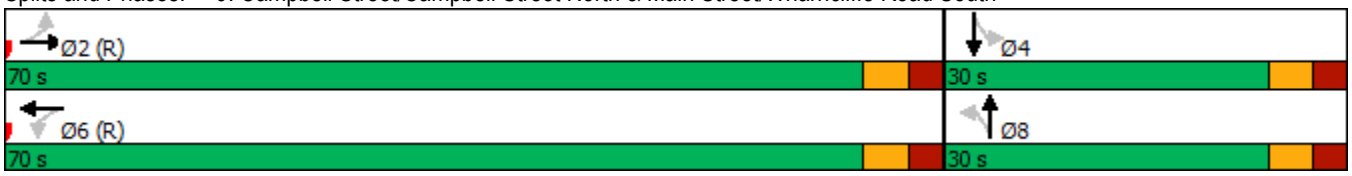


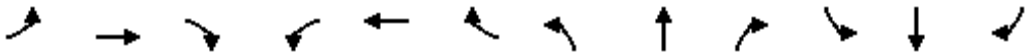
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	824	50	132	887	132	41	46	87	115	50	127
Future Volume (vph)	169	824	50	132	887	132	41	46	87	115	50	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.98	
Frt		0.991			0.981			0.902			0.892	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1848	0	1772	1868	0	1825	1689	0	1825	1683	0
Flt Permitted	0.131			0.209			0.466			0.603		
Satd. Flow (perm)	252	1848	0	390	1868	0	892	1689	0	1158	1683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			15			90			121	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	184	896	54	143	964	143	45	50	95	125	54	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	950	0	143	1107	0	45	145	0	125	192	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1		26.0	26.0		26.0	26.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	63.9	63.9		63.9	63.9		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	72.6	72.6		72.6	72.6		15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.15	0.15		0.15	0.15	
v/c Ratio	1.01	0.71		0.51	0.81		0.33	0.43		0.71	0.53	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	90.1	12.5		15.3	16.9		42.4	19.2		60.5	20.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	90.1	12.5		15.3	16.9		42.4	19.2		60.5	20.2	
LOS	F	B		B	B		D	B		E	C	
Approach Delay		25.1			16.7			24.7			36.1	
Approach LOS		C			B			C			D	
Queue Length 50th (m)	~31.5	87.8		10.2	120.8		7.9	9.5		23.3	12.3	
Queue Length 95th (m)	#50.4	171.3		35.1	#272.7		17.1	24.9		39.5	30.4	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0						5.0			45.0		
Base Capacity (vph)	182	1343		283	1360		214	473		277	495	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.01	0.71		0.51	0.81		0.21	0.31		0.45	0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 22.7		Intersection LOS: C	
Intersection Capacity Utilization 101.0%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





													R
Lane Configurations													
Traffic Volume (vph)	47	77	29	129	57	146	67	703	196	185	632	49	
Future Volume (vph)	47	77	29	129	57	146	67	703	196	185	632	49	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0	
Storage Lanes	1		0	1		1	1		1	1		0	
Taper Length (m)	7.6			7.6			7.6			7.6			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99		0.99					0.99	1.00			
Frt		0.959				0.850			0.850		0.989		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1674	1697	0	1674	1671	1432	1615	1762	1585	1674	1792	0	
Flt Permitted	0.715			0.507			0.290			0.277			
Satd. Flow (perm)	1260	1697	0	889	1671	1432	493	1762	1562	488	1792	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		14				164			175		5		
Link Speed (k/h)		60			60			60			60		
Link Distance (m)		559.5			2005.5			477.6			496.5		
Travel Time (s)		33.6			120.3			28.7			29.8		
Confl. Peds. (#/hr)			2	2					3	3			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%	
Adj. Flow (vph)	53	87	33	145	64	164	75	790	220	208	710	55	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	53	120	0	145	64	164	75	790	220	208	765	0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		
Protected Phases		4		3	8			2			6		
Permitted Phases	4			8		8	2		2	6			
Detector Phase	4	4		3	8	8	2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	45.9	45.9		
Total Split (s)	37.0	37.0		8.0	45.0	45.0	85.0	85.0	85.0	85.0	85.0		
Total Split (%)	28.5%	28.5%		6.2%	34.6%	34.6%	65.4%	65.4%	65.4%	65.4%	65.4%		
Maximum Green (s)	30.8	30.8		5.0	38.8	38.8	79.1	79.1	79.1	79.1	79.1		
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.8	3.8		
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	2.1	2.1		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	5.9	5.9		
Lead/Lag	Lag	Lag		Lead									
Lead-Lag Optimize?	Yes	Yes		Yes									
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max		
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0	28.0	28.0		
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0	12.0		
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0	0	0		
Act Effct Green (s)	12.3	12.3		23.5	20.3	20.3	79.2	79.2	79.2	79.2	79.2		
Actuated g/C Ratio	0.11	0.11		0.21	0.18	0.18	0.71	0.71	0.71	0.71	0.71		
v/c Ratio	0.38	0.60		0.65	0.21	0.42	0.21	0.63	0.19	0.60	0.60		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	53.9	54.4		53.5	40.2	9.3	8.1	12.0	2.0	18.3	11.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.9	54.4		53.5	40.2	9.3	8.1	12.0	2.0	18.3	11.2	
LOS	D	D		D	D	A	A	B	A	B	B	
Approach Delay		54.2			31.8			9.7			12.7	
Approach LOS		D			C			A			B	
Queue Length 50th (m)	10.9	22.3		27.5	12.0	0.0	5.0	80.0	2.6	20.2	73.9	
Queue Length 95th (m)	22.8	40.3		45.5	23.7	16.5	12.7	132.7	10.4	53.6	121.9	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	348	478		222	581	605	349	1249	1158	346	1272	
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	0.25		0.65	0.11	0.27	0.21	0.63	0.19	0.60	0.60	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 111.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	13	49	0	157	2	651	26	47	772	8
Future Volume (vph)	26	0	13	49	0	157	2	651	26	47	772	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.955				0.850		0.994			0.998	
Flt Protected		0.968			0.950		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1825	1633	1825	1805	0	1825	1860	0
Flt Permitted		0.765			0.728		0.225			0.291		
Satd. Flow (perm)	0	1357	0	0	1397	1633	432	1805	0	559	1860	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				148		4			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			1	1								
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
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	6%	0%	0%	3%	12%
Adj. Flow (vph)	30	0	15	56	0	178	2	740	30	53	877	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	56	178	2	770	0	53	886	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.3	34.3		34.3	34.3	34.3	26.0	26.0		26.0	26.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	45.0	45.0		45.0	45.0	
Total Split (%)	43.8%	43.8%		43.8%	43.8%	43.8%	56.3%	56.3%		56.3%	56.3%	
Maximum Green (s)	28.7	28.7		28.7	28.7	28.7	39.0	39.0		39.0	39.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		21.0	21.0	21.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		8.1			8.1	8.1	41.8	41.8		41.8	41.8	
Actuated g/C Ratio		0.13			0.13	0.13	0.67	0.67		0.67	0.67	
v/c Ratio		0.21			0.31	0.52	0.01	0.63		0.14	0.71	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		11.8			27.6	12.8	4.5	9.4		5.5	11.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.8			27.6	12.8	4.5	9.4		5.5	11.2	
LOS		B			C	B	A	A		A	B	
Approach Delay		11.8			16.3			9.4			10.8	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		0.4			5.6	2.9	0.1	39.6		1.7	50.0	
Queue Length 95th (m)		7.4			13.9	16.4	0.7	79.7		6.1	101.4	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		651			647	836	290	1213		375	1249	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.09	0.21	0.01	0.63		0.14	0.71	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 62.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 65.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

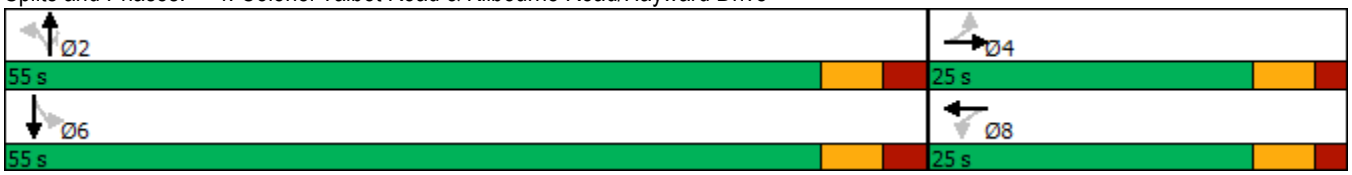
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	4	92	213	6	74	60	566	53	26	780	32
Future Volume (vph)	41	4	92	213	6	74	60	566	53	26	780	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.856			0.862				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1541	0	1825	1656	0	1690	1746	1633	1825	1793	0
Flt Permitted	0.699			0.688			0.170			0.341		
Satd. Flow (perm)	1304	1541	0	1322	1656	0	302	1746	1633	655	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103			83				60		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	0%	7%	0%	0%	0%	8%	10%	0%	0%	6%	19%
Adj. Flow (vph)	46	4	103	239	7	83	67	636	60	29	876	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	107	0	239	90	0	67	636	60	29	912	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%	68.8%	68.8%	68.8%	
Maximum Green (s)	19.3	19.3		19.3	19.3		48.6	48.6	48.6	48.6	48.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	17.4	17.4		17.4	17.4		49.8	49.8	49.8	49.8	49.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.16	0.26		0.83	0.21		0.35	0.58	0.06	0.07	0.81	
Control Delay	25.7	7.7		53.5	8.4		14.5	11.8	2.1	7.0	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	25.7	7.7		53.5	8.4		14.5	11.8	2.1	7.0	19.3	
LOS	C	A		D	A		B	B	A	A	B	
Approach Delay		13.1			41.2			11.3			18.9	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	5.5	0.5		33.7	0.8		4.6	53.7	0.0	1.6	99.1	
Queue Length 95th (m)	13.6	11.6		#66.0	11.1		14.0	81.8	3.9	4.8	#162.6	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	317	452		321	466		189	1096	1047	411	1128	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.24		0.74	0.19		0.35	0.58	0.06	0.07	0.81	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 79.3
Natural Cycle: 70
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 19.2 Intersection LOS: B
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

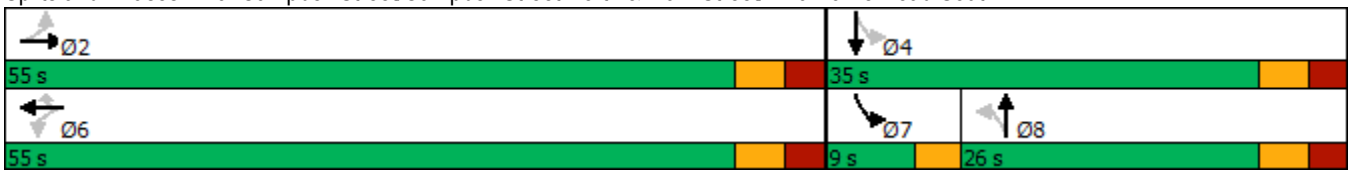


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	616	43	187	702	94	61	91	270	140	35	138
Future Volume (vph)	64	616	43	187	702	94	61	91	270	140	35	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98	0.98	0.98		1.00	0.96	
Frt		0.990				0.850		0.888			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1810	0	1738	1812	1541	1789	1572	0	1674	1436	0
Flt Permitted	0.204			0.236			0.639			0.193		
Satd. Flow (perm)	370	1810	0	432	1812	1506	1178	1572	0	340	1436	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				102		152			150	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	70	670	47	203	763	102	66	99	293	152	38	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	717	0	203	763	102	66	392	0	152	188	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		5.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1	44.1	26.0	26.0		8.0	26.0	
Total Split (s)	55.0	55.0		55.0	55.0	55.0	26.0	26.0		9.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%	61.1%	28.9%	28.9%		10.0%	38.9%	
Maximum Green (s)	48.9	48.9		48.9	48.9	48.9	20.0	20.0		6.0	29.0	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.7	2.7		0.0	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0	25.0	7.0	7.0			7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0			13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)	49.0	49.0		49.0	49.0	49.0	17.7	17.7		29.7	26.7	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.20	0.20		0.34	0.30	
v/c Ratio	0.34	0.71		0.85	0.75	0.12	0.28	0.90		0.74	0.35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	17.4	19.5		50.5	21.5	2.5	32.7	45.5		45.1	8.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.4	19.5		50.5	21.5	2.5	32.7	45.5		45.1	8.3	
LOS	B	B		D	C	A	C	D		D	A	
Approach Delay		19.3			25.2			43.6			24.8	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	6.4	87.2		28.4	97.7	0.0	9.5	40.7		18.3	4.6	
Queue Length 95th (m)	16.9	130.5		#72.2	146.3	6.6	20.8	#88.7		#41.1	19.4	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	206	1012		240	1011	885	268	475		206	575	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.34	0.71		0.85	0.75	0.12	0.25	0.83		0.74	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 26.6		Intersection LOS: C	
Intersection Capacity Utilization 93.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	85	49	241	104	308	65	893	200	174	690	53
Future Volume (vph)	54	85	49	241	104	308	65	893	200	174	690	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99		0.97	1.00		0.98		1.00	
Frt		0.945				0.850			0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1692	0	1825	1921	1585	1789	1883	1601	1789	1825	0
Flt Permitted	0.685			0.449			0.296			0.078		
Satd. Flow (perm)	1254	1692	0	854	1921	1538	557	1883	1576	147	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21				196			111		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	57	90	52	256	111	328	69	950	213	185	734	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	142	0	256	111	328	69	950	213	185	790	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	8.0	45.9	
Total Split (s)	36.0	36.0		12.0	48.0	48.0	71.0	71.0	71.0	11.0	82.0	
Total Split (%)	27.7%	27.7%		9.2%	36.9%	36.9%	54.6%	54.6%	54.6%	8.5%	63.1%	
Maximum Green (s)	29.8	29.8		9.0	41.8	41.8	65.1	65.1	65.1	8.0	76.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.0	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	3.0	5.9	
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	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0		28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0		12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0		0	
Act Effct Green (s)	13.5	13.5		28.7	25.5	25.5	65.2	65.2	65.2	79.1	76.2	
Actuated g/C Ratio	0.12	0.12		0.25	0.22	0.22	0.57	0.57	0.57	0.70	0.67	
v/c Ratio	0.39	0.65		0.88	0.26	0.66	0.22	0.88	0.22	0.85	0.65	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	53.5	54.5		68.1	37.6	22.4	15.2	33.1	6.7	52.1	14.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.5	54.5		68.1	37.6	22.4	15.2	33.1	6.7	52.1	14.7	
LOS	D	D		E	D	C	B	C	A	D	B	
Approach Delay		54.2			41.7			27.5			21.8	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	11.9	26.0		49.7	20.5	26.0	7.1	172.6	9.8	18.8	92.4	
Queue Length 95th (m)	24.7	46.5		#86.4	35.5	56.4	17.4	#289.8	23.8	#63.4	152.9	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	328	459		292	706	689	318	1078	949	217	1223	
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	0.17	0.31		0.88	0.16	0.48	0.22	0.88	0.22	0.85	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 113.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 30.6		Intersection LOS: C	
Intersection Capacity Utilization 95.4%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

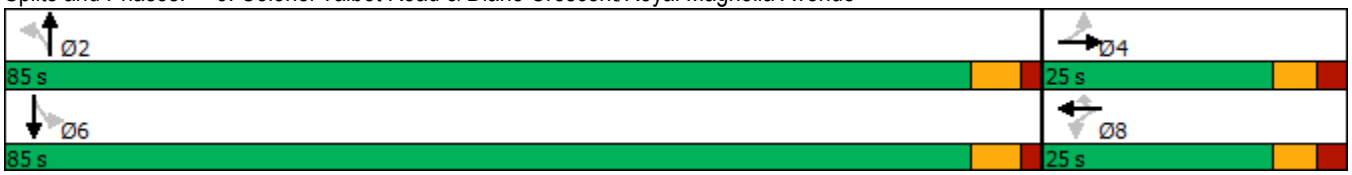
Splits and Phases: 1: Colonel Talbot Road & Pack Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	6	17	2	86	10	1071	83	106	753	26
Future Volume (vph)	13	0	6	17	2	86	10	1071	83	106	753	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98						1.00	
Frt		0.959				0.850		0.989			0.995	
Flt Protected		0.966			0.957		0.950			0.950		
Satd. Flow (prot)	0	1666	0	0	1839	1633	1825	1883	0	1825	1849	0
Flt Permitted		0.779			0.733		0.318			0.154		
Satd. Flow (perm)	0	1344	0	0	1386	1633	611	1883	0	296	1849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30				91		9			4	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			6	6			28					28
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
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	4%
Adj. Flow (vph)	14	0	6	18	2	91	11	1127	87	112	793	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	20	91	11	1214	0	112	820	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.3	24.3		24.3	24.3	24.3	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	85.0	85.0		85.0	85.0	
Total Split (%)	22.7%	22.7%		22.7%	22.7%	22.7%	77.3%	77.3%		77.3%	77.3%	
Maximum Green (s)	18.7	18.7		18.7	18.7	18.7	79.0	79.0		79.0	79.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		7.2			7.2	7.2	87.3	87.3		87.3	87.3	
Actuated g/C Ratio		0.07			0.07	0.07	0.85	0.85		0.85	0.85	
v/c Ratio		0.17			0.21	0.46	0.02	0.76		0.45	0.52	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		13.1			48.7	17.2	2.4	9.3		10.0	4.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		13.1			48.7	17.2	2.4	9.3		10.0	4.6	
LOS		B			D	B	A	A		A	A	
Approach Delay		13.1			22.9			9.3			5.2	
Approach LOS		B			C			A			A	
Queue Length 50th (m)		0.0			3.9	0.0	0.3	93.8		5.0	40.4	
Queue Length 95th (m)		5.2			10.9	14.4	1.5	185.6		19.4	72.9	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		268			251	370	517	1594		250	1565	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.08	0.25	0.02	0.76		0.45	0.52	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 103.2			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 8.3		Intersection LOS: A	
Intersection Capacity Utilization 91.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

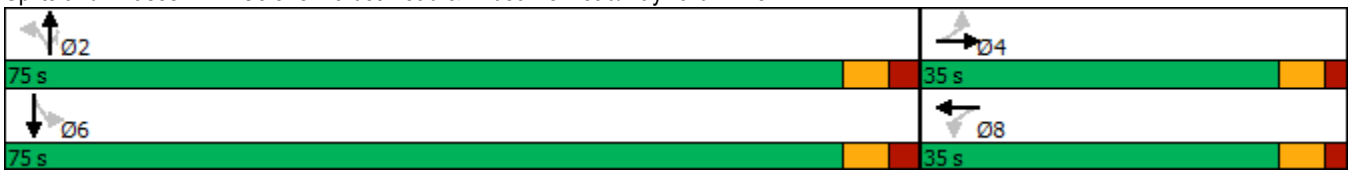


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	9	78	136	10	49	106	1077	223	72	645	63
Future Volume (vph)	39	9	78	136	10	49	106	1077	223	72	645	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		1.00								
Frt		0.866			0.876				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1601	0	1825	1683	0	1825	1902	1633	1825	1826	0
Flt Permitted	0.715			0.696			0.302			0.099		
Satd. Flow (perm)	1334	1601	0	1334	1683	0	580	1902	1633	190	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84			53				160		9	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%	0%	1%	0%	0%	4%	2%
Adj. Flow (vph)	42	10	84	146	11	53	114	1158	240	77	694	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	94	0	146	64	0	114	1158	240	77	762	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	35.0	35.0		35.0	35.0		75.0	75.0	75.0	75.0	75.0	
Total Split (%)	31.8%	31.8%		31.8%	31.8%		68.2%	68.2%	68.2%	68.2%	68.2%	
Maximum Green (s)	29.3	29.3		29.3	29.3		68.6	68.6	68.6	68.6	68.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	16.0	16.0		16.0	16.0		71.5	71.5	71.5	71.5	71.5	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.72	0.72	0.72	0.72	0.72	
v/c Ratio	0.20	0.29		0.68	0.20		0.27	0.85	0.20	0.57	0.58	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	36.3	11.7		54.8	13.7		8.0	19.4	2.4	29.3	9.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.3	11.7		54.8	13.7		8.0	19.4	2.4	29.3	9.8	
LOS	D	B		D	B		A	B	A	C	A	
Approach Delay		19.3			42.3			15.8			11.6	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	6.9	1.6		25.9	1.8		6.6	136.5	3.9	6.0	59.2	
Queue Length 95th (m)	16.1	14.2		45.5	12.2		18.2	#300.1	13.4	#35.2	115.0	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	392	530		392	532		416	1364	1217	136	1312	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.18		0.37	0.12		0.27	0.85	0.20	0.57	0.58	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 99.7			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 92.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

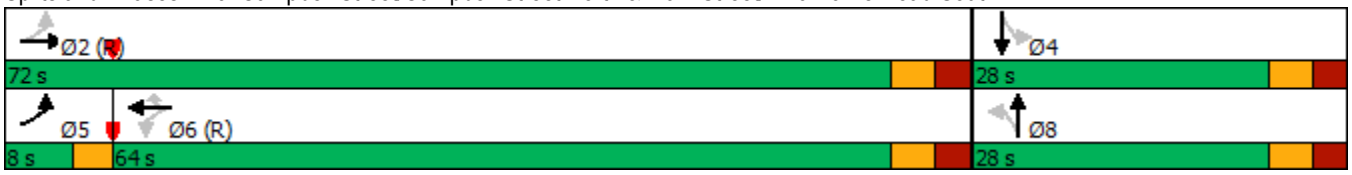


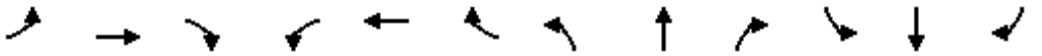
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	824	50	132	887	132	41	46	87	115	50	127
Future Volume (vph)	169	824	50	132	887	132	41	46	87	115	50	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.98	
Frt		0.991				0.850		0.902			0.892	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1848	0	1772	1902	1633	1825	1689	0	1825	1683	0
Flt Permitted	0.099			0.253			0.466			0.603		
Satd. Flow (perm)	190	1848	0	472	1902	1633	892	1689	0	1158	1683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				113		88			118	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	184	896	54	143	964	143	45	50	95	125	54	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	950	0	143	964	143	45	145	0	125	192	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	8.0	44.1		44.1	44.1	44.1	26.0	26.0		26.0	26.0	
Total Split (s)	8.0	72.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Total Split (%)	8.0%	72.0%		64.0%	64.0%	64.0%	28.0%	28.0%		28.0%	28.0%	
Maximum Green (s)	5.0	65.9		57.9	57.9	57.9	22.0	22.0		22.0	22.0	
Yellow Time (s)	3.0	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	0.0	2.8		2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)		25.0		25.0	25.0	25.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0	13.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)	75.7	72.6		60.0	60.0	60.0	15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.76	0.73		0.60	0.60	0.60	0.15	0.15		0.15	0.15	
v/c Ratio	0.61	0.71		0.51	0.85	0.14	0.33	0.44		0.71	0.54	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.1	12.6		20.2	25.8	3.2	42.3	19.6		60.3	20.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	20.1	12.6		20.2	25.8	3.2	42.3	19.6		60.3	20.7	
LOS	C	B		C	C	A	D	B		E	C	
Approach Delay		13.8			22.6			25.0			36.3	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	7.9	88.2		15.6	149.1	2.3	7.9	9.8		23.3	12.9	
Queue Length 95th (m)	#32.8	171.3		35.7	#240.3	10.1	17.1	25.2		39.5	31.0	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	300	1342		283	1140	1024	196	440		254	462	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.71		0.51	0.85	0.14	0.23	0.33		0.49	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 91.3%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	82	30	137	61	155	70	727	207	196	666	53
Future Volume (vph)	50	82	30	137	61	155	70	727	207	196	666	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.99					0.99	1.00		
Frt		0.960				0.850			0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1701	0	1674	1671	1432	1615	1762	1585	1674	1792	0
Flt Permitted	0.712			0.494			0.260			0.255		
Satd. Flow (perm)	1255	1701	0	866	1671	1432	442	1762	1562	449	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				174			173		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)			2	2					3	3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%
Adj. Flow (vph)	56	92	34	154	69	174	79	817	233	220	748	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	126	0	154	69	174	79	817	233	220	808	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	45.9	45.9	
Total Split (s)	38.0	38.0		9.0	47.0	47.0	83.0	83.0	83.0	83.0	83.0	
Total Split (%)	29.2%	29.2%		6.9%	36.2%	36.2%	63.8%	63.8%	63.8%	63.8%	63.8%	
Maximum Green (s)	31.8	31.8		6.0	40.8	40.8	77.1	77.1	77.1	77.1	77.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.8	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	5.9	5.9	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0	28.0	28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0	0	0	
Act Effct Green (s)	12.6	12.6		24.8	21.6	21.6	77.2	77.2	77.2	77.2	77.2	
Actuated g/C Ratio	0.11	0.11		0.22	0.19	0.19	0.70	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.61		0.65	0.21	0.42	0.26	0.67	0.20	0.71	0.65	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	53.4	54.4		51.0	38.8	8.7	9.6	13.6	2.4	26.6	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.4	54.4		51.0	38.8	8.7	9.6	13.6	2.4	26.6	12.9	
LOS	D	D		D	D	A	A	B	A	C	B	
Approach Delay		54.1			30.3			11.0			15.9	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	11.4	23.3		28.7	12.6	0.0	5.6	89.3	3.7	25.2	85.5	
Queue Length 95th (m)	23.5	41.8		47.1	24.6	16.7	14.7	148.1	12.4	#79.8	141.2	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	360	498		237	615	637	307	1226	1139	312	1248	
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	0.25		0.65	0.11	0.27	0.26	0.67	0.20	0.71	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 110.9			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	0	33	0	0	0	12	860	0	0	834	20
Future Vol, veh/h	52	0	33	0	0	0	12	860	0	0	834	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	0	18	0	0	0	8	6	0	0	3	30
Mvmt Flow	60	0	38	0	0	0	14	1000	0	0	970	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2010	2010	982	2029	2021	1000	993	0	0	1000	0	0
Stage 1	982	982	-	1028	1028	-	-	-	-	-	-	-
Stage 2	1028	1028	-	1001	993	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.38	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.462	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 43	60	282	43	59	298	673	-	-	700	-	-
Stage 1	297	330	-	285	314	-	-	-	-	-	-	-
Stage 2	280	314	-	295	326	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 42	59	282	37	58	298	673	-	-	700	-	-
Mov Cap-2 Maneuver	~ 42	59	-	37	58	-	-	-	-	-	-	-
Stage 1	291	330	-	279	307	-	-	-	-	-	-	-
Stage 2	274	307	-	255	326	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	280	0	0.1	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	673	-	-	42	282	-	700	-	-
HCM Lane V/C Ratio	0.021	-	-	1.44	0.136	-	-	-	-
HCM Control Delay (s)	10.5	-	-	$ 445.2	19.8	0	0	-	-
HCM Lane LOS	B	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.1	0.5	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	13	49	0	157	2	684	26	47	815	8
Future Volume (vph)	26	0	13	49	0	157	2	684	26	47	815	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.955				0.850		0.994			0.999	
Flt Protected		0.968			0.950		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1825	1633	1825	1805	0	1825	1862	0
Flt Permitted		0.765			0.728		0.196			0.269		
Satd. Flow (perm)	0	1357	0	0	1397	1633	377	1805	0	517	1862	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				133		3			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			1	1								
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
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	6%	0%	0%	3%	12%
Adj. Flow (vph)	30	0	15	56	0	178	2	777	30	53	926	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	56	178	2	807	0	53	935	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.3	34.3		34.3	34.3	34.3	26.0	26.0		26.0	26.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	45.0	45.0		45.0	45.0	
Total Split (%)	43.8%	43.8%		43.8%	43.8%	43.8%	56.3%	56.3%		56.3%	56.3%	
Maximum Green (s)	28.7	28.7		28.7	28.7	28.7	39.0	39.0		39.0	39.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		21.0	21.0	21.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		8.2			8.2	8.2	41.8	41.8		41.8	41.8	
Actuated g/C Ratio		0.13			0.13	0.13	0.67	0.67		0.67	0.67	
v/c Ratio		0.21			0.30	0.54	0.01	0.67		0.15	0.75	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		11.7			27.3	14.5	4.5	10.2		5.9	12.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.7			27.3	14.5	4.5	10.2		5.9	12.9	
LOS		B			C	B	A	B		A	B	
Approach Delay		11.7			17.6			10.2			12.5	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		0.4			5.6	4.4	0.1	43.1		1.7	55.5	
Queue Length 95th (m)		7.3			13.9	18.2	0.7	90.1		6.4	#120.3	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		649			645	826	252	1210		346	1248	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.09	0.22	0.01	0.67		0.15	0.75	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 62.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 67.6%		ICU Level of Service C	
Analysis Period (min) 15			

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

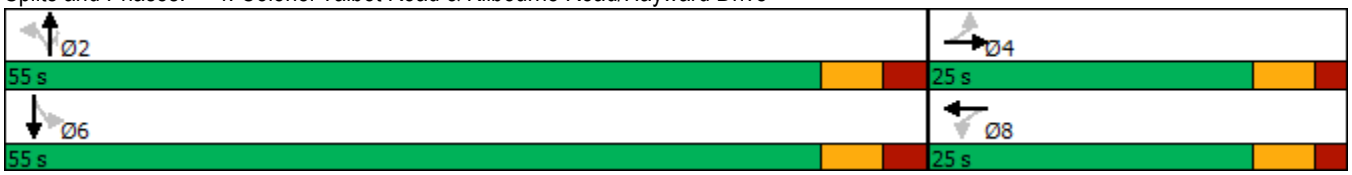
Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

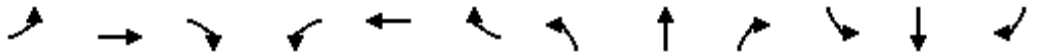
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	4	97	213	6	74	64	597	53	26	823	34
Future Volume (vph)	43	4	97	213	6	74	64	597	53	26	823	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.855			0.862				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1539	0	1825	1656	0	1690	1746	1633	1825	1793	0
Flt Permitted	0.699			0.684			0.139			0.318		
Satd. Flow (perm)	1304	1539	0	1314	1656	0	247	1746	1633	611	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109			83				60		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	0%	7%	0%	0%	0%	8%	10%	0%	0%	6%	19%
Adj. Flow (vph)	48	4	109	239	7	83	72	671	60	29	925	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	113	0	239	90	0	72	671	60	29	963	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%	68.8%	68.8%	68.8%	
Maximum Green (s)	19.3	19.3		19.3	19.3		48.6	48.6	48.6	48.6	48.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	17.4	17.4		17.4	17.4		49.7	49.7	49.7	49.7	49.7	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.17	0.27		0.83	0.21		0.46	0.61	0.06	0.08	0.85	
Control Delay	25.8	7.6		53.8	8.4		21.2	12.5	2.1	7.1	22.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	25.8	7.6		53.8	8.4		21.2	12.5	2.1	7.1	22.3	
LOS	C	A		D	A		C	B	A	A	C	
Approach Delay		13.0			41.4			12.5			21.9	
Approach LOS		B			D			B			C	
Queue Length 50th (m)	5.8	0.5		33.7	0.8		5.5	58.4	0.0	1.6	111.0	
Queue Length 95th (m)	13.9	11.8		#66.3	11.1		19.8	89.5	3.9	4.8	#197.9	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	317	457		320	466		155	1095	1046	383	1127	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.25		0.75	0.19		0.46	0.61	0.06	0.08	0.85	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 79.2			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive



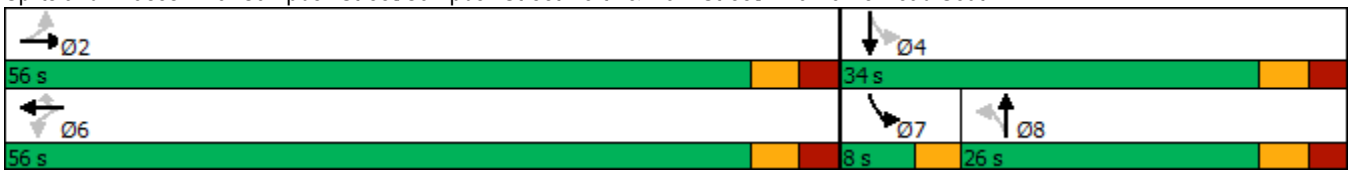


L												
Lane Configurations												
Traffic Volume (vph)	64	648	43	187	746	94	61	91	270	140	35	138
Future Volume (vph)	64	648	43	187	746	94	61	91	270	140	35	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98	0.98	0.98		1.00	0.96	
Frt		0.991				0.850		0.888			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1812	0	1738	1812	1541	1789	1572	0	1674	1436	0
Flt Permitted	0.181			0.221			0.639			0.193		
Satd. Flow (perm)	328	1812	0	404	1812	1506	1178	1572	0	340	1436	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				100		152			150	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	70	704	47	203	811	102	66	99	293	152	38	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	751	0	203	811	102	66	392	0	152	188	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		5.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1	44.1	26.0	26.0		8.0	26.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	26.0	26.0		8.0	34.0	
Total Split (%)	62.2%	62.2%		62.2%	62.2%	62.2%	28.9%	28.9%		8.9%	37.8%	
Maximum Green (s)	49.9	49.9		49.9	49.9	49.9	20.0	20.0		5.0	28.0	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.7	2.7		0.0	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0	25.0	7.0	7.0			7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0			13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	17.7	17.7		28.7	25.7	
Actuated g/C Ratio	0.57	0.57		0.57	0.57	0.57	0.20	0.20		0.33	0.29	
v/c Ratio	0.38	0.73		0.89	0.79	0.11	0.28	0.90		0.81	0.36	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	18.8	19.5		58.2	22.4	2.5	32.7	45.5		57.0	8.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.8	19.5		58.2	22.4	2.5	32.7	45.5		57.0	8.7	
LOS	B	B		E	C	A	C	D		E	A	
Approach Delay		19.5			27.1			43.6			30.3	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	6.4	91.5		29.4	105.7	0.2	9.5	40.7		18.7	4.6	
Queue Length 95th (m)	17.9	137.1		#74.1	159.5	6.6	20.8	#88.7		#45.5	19.7	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	186	1034		229	1031	900	268	475		187	561	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.38	0.73		0.89	0.79	0.11	0.25	0.83		0.81	0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 94.8%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	90	52	254	110	326	68	938	212	184	717	57
Future Volume (vph)	57	90	52	254	110	326	68	938	212	184	717	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99		0.97	1.00		0.98		1.00	
Frt		0.945				0.850			0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1692	0	1825	1921	1585	1789	1883	1601	1789	1825	0
Flt Permitted	0.682			0.403			0.278			0.054		
Satd. Flow (perm)	1249	1692	0	767	1921	1538	523	1883	1576	102	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				218			123		6	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	61	96	55	270	117	347	72	998	226	196	763	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	151	0	270	117	347	72	998	226	196	824	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	8.0	45.9	
Total Split (s)	26.0	26.0		14.0	40.0	40.0	77.0	77.0	77.0	13.0	90.0	
Total Split (%)	20.0%	20.0%		10.8%	30.8%	30.8%	59.2%	59.2%	59.2%	10.0%	69.2%	
Maximum Green (s)	19.8	19.8		11.0	33.8	33.8	71.1	71.1	71.1	10.0	84.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.0	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	3.0	5.9	
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	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0		28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0		12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0		0	
Act Effct Green (s)	14.7	14.7		31.9	28.7	28.7	71.1	71.1	71.1	87.1	84.2	
Actuated g/C Ratio	0.12	0.12		0.26	0.23	0.23	0.57	0.57	0.57	0.70	0.67	
v/c Ratio	0.41	0.70		0.93	0.27	0.67	0.24	0.93	0.24	0.95	0.67	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	59.5	63.5		81.7	40.8	22.3	17.2	41.4	7.0	83.5	16.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.5	63.5		81.7	40.8	22.3	17.2	41.4	7.0	83.5	16.1	
LOS	E	E		F	D	C	B	D	A	F	B	
Approach Delay		62.3			47.1			34.0			29.1	
Approach LOS		E			D			C			C	
Queue Length 50th (m)	14.1	31.6		58.2	23.7	28.2	8.5	216.3	11.2	32.2	110.7	
Queue Length 95th (m)	28.1	53.7		#105.9	40.2	60.8	19.5	#334.8	25.7	#83.1	171.3	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	198	284		289	519	575	297	1071	949	206	1230	
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	0.31	0.53		0.93	0.23	0.60	0.24	0.93	0.24	0.95	0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 125			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 37.3		Intersection LOS: D	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	24	0	0	0	33	1195	0	0	901	53
Future Vol, veh/h	31	0	24	0	0	0	33	1195	0	0	901	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	4	0	0	0	3	1	0	0	3	0
Mvmt Flow	33	0	25	0	0	0	35	1258	0	0	948	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2304	2304	976	2317	2332	1258	1004	0	0	1258	0	0
Stage 1	976	976	-	1328	1328	-	-	-	-	-	-	-
Stage 2	1328	1328	-	989	1004	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 27	39	302	27	37	211	686	-	-	560	-	-
Stage 1	305	332	-	193	226	-	-	-	-	-	-	-
Stage 2	193	226	-	300	322	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 26	37	302	24	35	211	686	-	-	560	-	-
Mov Cap-2 Maneuver	~ 26	37	-	24	35	-	-	-	-	-	-	-
Stage 1	289	332	-	183	214	-	-	-	-	-	-	-
Stage 2	183	214	-	275	322	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	282	0	0.3	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	686	-	-	26	302	-	560	-	-
HCM Lane V/C Ratio	0.051	-	-	1.255	0.084	-	-	-	-
HCM Control Delay (s)	10.5	-	-	$ 486.3	18	0	0	-	-
HCM Lane LOS	B	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.9	0.3	-	0	-	-

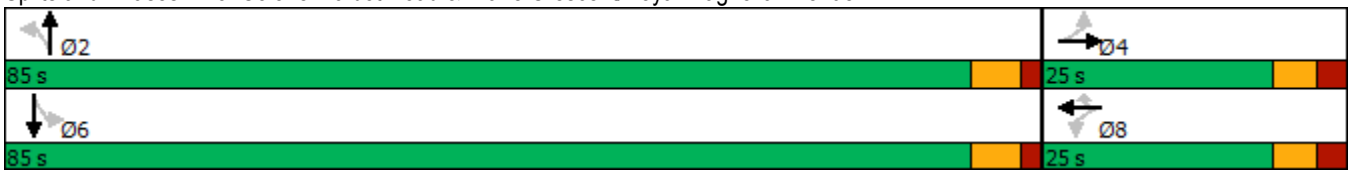
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	6	17	2	86	10	1129	83	106	792	26
Future Volume (vph)	13	0	6	17	2	86	10	1129	83	106	792	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98						1.00	
Frt		0.959				0.850		0.990			0.995	
Flt Protected		0.966			0.957		0.950			0.950		
Satd. Flow (prot)	0	1666	0	0	1839	1633	1825	1884	0	1825	1849	0
Flt Permitted		0.779			0.733		0.300			0.128		
Satd. Flow (perm)	0	1344	0	0	1386	1633	576	1884	0	246	1849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30				91		9			4	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			6	6			28					28
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
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	4%
Adj. Flow (vph)	14	0	6	18	2	91	11	1188	87	112	834	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	20	91	11	1275	0	112	861	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.3	24.3		24.3	24.3	24.3	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	85.0	85.0		85.0	85.0	
Total Split (%)	22.7%	22.7%		22.7%	22.7%	22.7%	77.3%	77.3%		77.3%	77.3%	
Maximum Green (s)	18.7	18.7		18.7	18.7	18.7	79.0	79.0		79.0	79.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		7.2			7.2	7.2	87.3	87.3		87.3	87.3	
Actuated g/C Ratio		0.07			0.07	0.07	0.85	0.85		0.85	0.85	
v/c Ratio		0.17			0.21	0.46	0.02	0.80		0.54	0.55	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		13.1			48.7	17.2	2.4	11.0		15.8	4.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		13.1			48.7	17.2	2.4	11.0		15.8	4.9	
LOS		B			D	B	A	B		B	A	
Approach Delay		13.1			22.9			10.9			6.1	
Approach LOS		B			C			B			A	
Queue Length 50th (m)		0.0			3.9	0.0	0.3	108.5		5.7	44.3	
Queue Length 95th (m)		5.2			10.9	14.4	1.5	222.7		#33.0	79.8	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		268			251	370	487	1595		208	1565	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.08	0.25	0.02	0.80		0.54	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 103.2			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 94.8%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

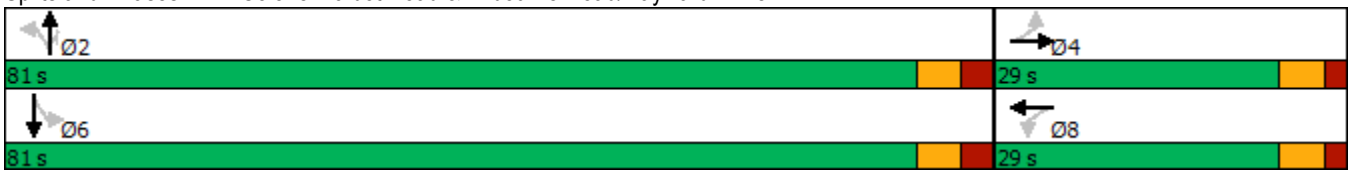


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	9	83	136	10	49	112	1134	223	72	681	67
Future Volume (vph)	41	9	83	136	10	49	112	1134	223	72	681	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		1.00								
Frt		0.865			0.876				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1599	0	1825	1683	0	1825	1902	1633	1825	1826	0
Flt Permitted	0.715			0.693			0.284			0.075		
Satd. Flow (perm)	1334	1599	0	1328	1683	0	546	1902	1633	144	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89			53				178		10	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%	0%	1%	0%	0%	4%	2%
Adj. Flow (vph)	44	10	89	146	11	53	120	1219	240	77	732	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	99	0	146	64	0	120	1219	240	77	804	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	29.0	29.0		29.0	29.0		81.0	81.0	81.0	81.0	81.0	
Total Split (%)	26.4%	26.4%		26.4%	26.4%		73.6%	73.6%	73.6%	73.6%	73.6%	
Maximum Green (s)	23.3	23.3		23.3	23.3		74.6	74.6	74.6	74.6	74.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	16.6	16.6		16.6	16.6		77.6	77.6	77.6	77.6	77.6	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.73	0.73	0.73	0.73	0.73	
v/c Ratio	0.21	0.31		0.71	0.21		0.30	0.88	0.19	0.73	0.60	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	39.5	12.2		60.0	14.6		8.3	21.5	2.0	54.8	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	39.5	12.2		60.0	14.6		8.3	21.5	2.0	54.8	10.0	
LOS	D	B		E	B		A	C	A	D	A	
Approach Delay		20.6			46.2			17.5			13.9	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	7.7	1.7		28.0	1.9		7.4	162.3	3.1	7.9	67.5	
Queue Length 95th (m)	17.4	15.3		48.4	12.8		19.8	#335.0	11.7	#21.5	125.3	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	293	420		291	411		398	1387	1239	105	1335	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.24		0.50	0.16		0.30	0.88	0.19	0.73	0.60	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 106.3			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

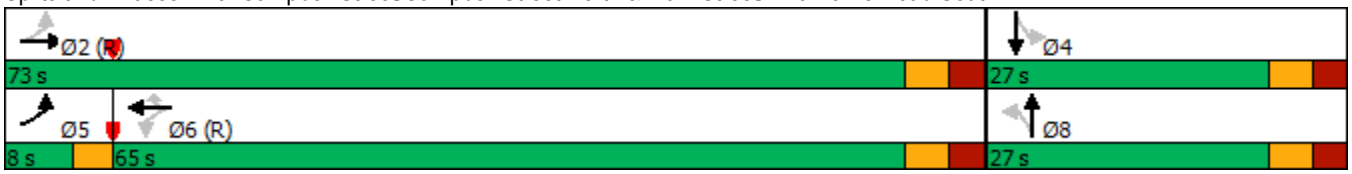


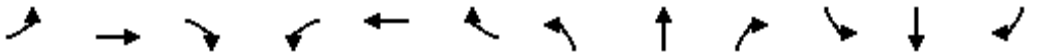
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	874	50	132	935	132	41	46	87	115	50	127
Future Volume (vph)	169	874	50	132	935	132	41	46	87	115	50	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.98	
Frt		0.992				0.850		0.902			0.892	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1850	0	1772	1902	1633	1825	1689	0	1825	1683	0
Flt Permitted	0.064			0.224			0.464			0.602		
Satd. Flow (perm)	123	1850	0	418	1902	1633	888	1689	0	1157	1683	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				110		87			116	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	184	950	54	143	1016	143	45	50	95	125	54	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	1004	0	143	1016	143	45	145	0	125	192	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	8.0	44.1		44.1	44.1	44.1	26.0	26.0		26.0	26.0	
Total Split (s)	8.0	73.0		65.0	65.0	65.0	27.0	27.0		27.0	27.0	
Total Split (%)	8.0%	73.0%		65.0%	65.0%	65.0%	27.0%	27.0%		27.0%	27.0%	
Maximum Green (s)	5.0	66.9		58.9	58.9	58.9	21.0	21.0		21.0	21.0	
Yellow Time (s)	3.0	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	0.0	2.8		2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)		25.0		25.0	25.0	25.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0	13.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)	75.8	72.7		59.4	59.4	59.4	15.2	15.2		15.2	15.2	
Actuated g/C Ratio	0.76	0.73		0.59	0.59	0.59	0.15	0.15		0.15	0.15	
v/c Ratio	0.69	0.75		0.58	0.90	0.14	0.34	0.44		0.71	0.54	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	34.6	13.7		24.3	30.6	3.2	42.9	20.1		61.3	21.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.6	13.7		24.3	30.6	3.2	42.9	20.1		61.3	21.4	
LOS	C	B		C	C	A	D	C		E	C	
Approach Delay		16.9			26.9			25.5			37.1	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	17.3	99.6		16.1	161.8	2.5	7.9	10.0		23.2	13.2	
Queue Length 95th (m)	#65.4	187.6		39.8	#258.7	10.1	17.4	25.8		40.0	31.9	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	268	1346		248	1129	1014	186	423		242	445	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.69	0.75		0.58	0.90	0.14	0.24	0.34		0.52	0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 23.9		Intersection LOS: C	
Intersection Capacity Utilization 93.8%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	77	29	163	57	146	67	811	304	185	666	49
Future Volume (vph)	47	77	29	163	57	146	67	811	304	185	666	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.99					0.99			
Frt		0.959				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1697	0	1674	1671	1432	1615	1762	1585	1674	1794	0
Flt Permitted	0.715			0.507			0.255			0.197		
Satd. Flow (perm)	1260	1697	0	889	1671	1432	434	1762	1562	347	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				138			223		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)			2	2					3	3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%
Adj. Flow (vph)	53	87	33	183	64	164	75	911	342	208	748	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	120	0	183	64	164	75	911	342	208	803	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	45.9	45.9	
Total Split (s)	37.0	37.0		11.0	48.0	48.0	82.0	82.0	82.0	82.0	82.0	
Total Split (%)	28.5%	28.5%		8.5%	36.9%	36.9%	63.1%	63.1%	63.1%	63.1%	63.1%	
Maximum Green (s)	30.8	30.8		8.0	41.8	41.8	76.1	76.1	76.1	76.1	76.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.8	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	5.9	5.9	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0	28.0	28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0	0	0	
Act Effct Green (s)	12.3	12.3		26.5	23.3	23.3	76.2	76.2	76.2	76.2	76.2	
Actuated g/C Ratio	0.11	0.11		0.24	0.21	0.21	0.68	0.68	0.68	0.68	0.68	
v/c Ratio	0.38	0.60		0.69	0.18	0.40	0.25	0.76	0.30	0.88	0.65	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	53.9	54.4		50.9	37.2	12.2	10.3	17.6	3.3	53.8	13.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.9	54.4		50.9	37.2	12.2	10.3	17.6	3.3	53.8	13.9	
LOS	D	D		D	D	B	B	B	A	D	B	
Approach Delay		54.2			33.3			13.5			22.1	
Approach LOS		D			C			B			C	
Queue Length 50th (m)	10.9	22.3		34.3	11.6	4.6	5.6	117.2	8.0	32.3	89.7	
Queue Length 95th (m)	22.8	40.3		54.4	22.8	21.5	14.7	193.4	20.1	#90.5	145.5	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	348	478		267	626	623	296	1202	1136	236	1226	
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	0.25		0.69	0.10	0.26	0.25	0.76	0.30	0.88	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 111.6			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 83.6%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	35

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	0	33	0	0	62	12	980	5	19	841	20
Future Vol, veh/h	52	0	33	0	0	62	12	980	5	19	841	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	0	18	0	0	0	8	6	0	0	3	30
Mvmt Flow	60	0	38	0	0	72	14	1140	6	22	978	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2241	2208	990	2224	2216	1143	1001	0	0	1146	0	0
Stage 1	1034	1034	-	1171	1171	-	-	-	-	-	-	-
Stage 2	1207	1174	-	1053	1045	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.38	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.462	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 30	45	279	31	44	246	669	-	-	617	-	-
Stage 1	278	312	-	237	269	-	-	-	-	-	-	-
Stage 2	222	268	-	276	308	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	42	279	26	42	246	669	-	-	617	-	-
Mov Cap-2 Maneuver	~ 20	42	-	26	42	-	-	-	-	-	-	-
Stage 1	272	301	-	232	263	-	-	-	-	-	-	-
Stage 2	154	262	-	230	297	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 810.8	25.6	0.1	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	669	-	-	20	279	246	617	-	-
HCM Lane V/C Ratio	0.021	-	-	3.023	0.138	0.293	0.036	-	-
HCM Control Delay (s)	10.5	-	-	$ 1312.6	20	25.6	11.1	-	-
HCM Lane LOS	B	-	-	F	C	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.9	0.5	1.2	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	13	80	0	312	2	656	31	96	788	8
Future Volume (vph)	26	0	13	80	0	312	2	656	31	96	788	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.955				0.850		0.993			0.999	
Flt Protected		0.968			0.950		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1825	1633	1825	1804	0	1825	1862	0
Flt Permitted		0.775			0.728		0.153			0.234		
Satd. Flow (perm)	0	1375	0	0	1397	1633	294	1804	0	450	1862	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				146		4			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			1	1								
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
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	6%	0%	0%	3%	12%
Adj. Flow (vph)	30	0	15	91	0	355	2	745	35	109	895	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	91	355	2	780	0	109	904	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.3	34.3		34.3	34.3	34.3	26.0	26.0		26.0	26.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	45.0	45.0		45.0	45.0	
Total Split (%)	43.8%	43.8%		43.8%	43.8%	43.8%	56.3%	56.3%		56.3%	56.3%	
Maximum Green (s)	28.7	28.7		28.7	28.7	28.7	39.0	39.0		39.0	39.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		21.0	21.0	21.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		14.5			14.5	14.5	39.3	39.3		39.3	39.3	
Actuated g/C Ratio		0.22			0.22	0.22	0.59	0.59		0.59	0.59	
v/c Ratio		0.14			0.30	0.75	0.01	0.73		0.41	0.82	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		8.4			23.2	24.2	8.5	16.8		15.5	20.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		8.4			23.2	24.2	8.5	16.8		15.5	20.8	
LOS		A			C	C	A	B		B	C	
Approach Delay		8.4			24.0			16.8			20.3	
Approach LOS		A			C			B			C	
Queue Length 50th (m)		0.4			9.3	23.2	0.1	59.1		6.2	76.0	
Queue Length 95th (m)		6.5			19.2	46.3	1.1	#150.8		23.5	#187.3	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		623			610	795	174	1072		267	1105	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.15	0.45	0.01	0.73		0.41	0.82	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 66.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

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

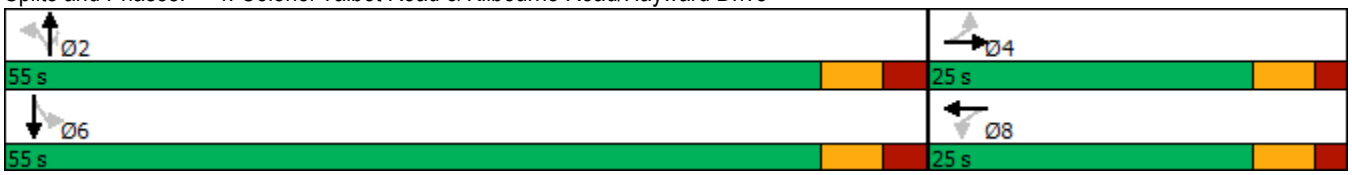
Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	4	92	213	6	74	60	576	53	26	811	32
Future Volume (vph)	41	4	92	213	6	74	60	576	53	26	811	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.856			0.862				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1541	0	1825	1656	0	1690	1746	1633	1825	1793	0
Flt Permitted	0.699			0.688			0.149			0.334		
Satd. Flow (perm)	1304	1541	0	1322	1656	0	265	1746	1633	642	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103			83				60		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	0%	7%	0%	0%	0%	8%	10%	0%	0%	6%	19%
Adj. Flow (vph)	46	4	103	239	7	83	67	647	60	29	911	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	107	0	239	90	0	67	647	60	29	947	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%	68.8%	68.8%	68.8%	
Maximum Green (s)	19.3	19.3		19.3	19.3		48.6	48.6	48.6	48.6	48.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	17.4	17.4		17.4	17.4		49.8	49.8	49.8	49.8	49.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.16	0.26		0.83	0.21		0.40	0.59	0.06	0.07	0.84	
Control Delay	25.7	7.7		53.5	8.4		17.4	12.0	2.1	7.0	21.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	25.7	7.7		53.5	8.4		17.4	12.0	2.1	7.0	21.2	
LOS	C	A		D	A		B	B	A	A	C	
Approach Delay		13.1			41.2			11.7			20.8	
Approach LOS		B			D			B			C	
Queue Length 50th (m)	5.5	0.5		33.7	0.8		4.8	55.1	0.0	1.6	107.1	
Queue Length 95th (m)	13.6	11.6		#66.0	11.1		16.0	84.1	3.9	4.8	#192.6	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	317	452		321	466		166	1096	1047	403	1128	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.24		0.74	0.19		0.40	0.59	0.06	0.07	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 79.3			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

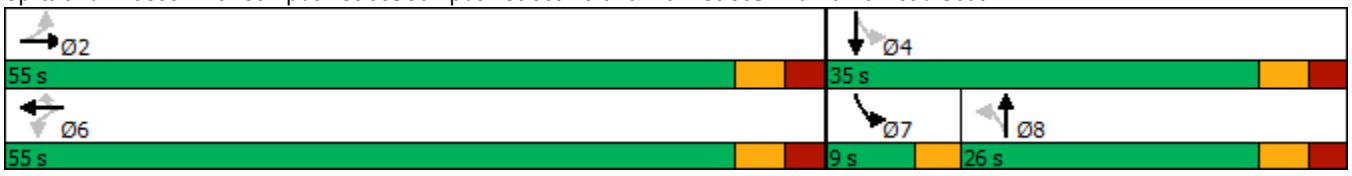


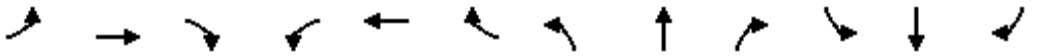
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	616	43	187	702	99	61	91	270	155	35	153
Future Volume (vph)	69	616	43	187	702	99	61	91	270	155	35	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98	0.98	0.98		1.00	0.96	
Frt		0.990				0.850		0.888			0.878	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1810	0	1738	1812	1541	1789	1572	0	1674	1430	0
Flt Permitted	0.204			0.236			0.630			0.193		
Satd. Flow (perm)	370	1810	0	432	1812	1506	1162	1572	0	340	1430	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				108		152			166	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	75	670	47	203	763	108	66	99	293	168	38	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	717	0	203	763	108	66	392	0	168	204	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		5.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1	44.1	26.0	26.0		8.0	26.0	
Total Split (s)	55.0	55.0		55.0	55.0	55.0	26.0	26.0		9.0	35.0	
Total Split (%)	61.1%	61.1%		61.1%	61.1%	61.1%	28.9%	28.9%		10.0%	38.9%	
Maximum Green (s)	48.9	48.9		48.9	48.9	48.9	20.0	20.0		6.0	29.0	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.7	2.7		0.0	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0	25.0	7.0	7.0			7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0			13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)	49.0	49.0		49.0	49.0	49.0	17.7	17.7		29.7	26.7	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.20	0.20		0.34	0.30	
v/c Ratio	0.36	0.71		0.85	0.75	0.12	0.28	0.90		0.82	0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	18.2	19.5		50.5	21.5	2.5	32.8	45.5		54.2	8.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.2	19.5		50.5	21.5	2.5	32.8	45.5		54.2	8.1	
LOS	B	B		D	C	A	C	D		D	A	
Approach Delay		19.4			25.1			43.6			28.9	
Approach LOS		B			C			D			C	
Queue Length 50th (m)	7.0	87.2		28.4	97.7	0.0	9.5	40.7		20.5	4.5	
Queue Length 95th (m)	18.5	130.5		#72.2	146.3	6.8	20.8	#88.7		#48.7	20.0	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	206	1012		240	1011	888	265	475		206	584	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.36	0.71		0.85	0.75	0.12	0.25	0.83		0.82	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 27.1		Intersection LOS: C	
Intersection Capacity Utilization 94.0%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	85	49	336	104	308	65	952	259	174	784	53
Future Volume (vph)	54	85	49	336	104	308	65	952	259	174	784	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99		0.97	1.00		0.98		1.00	
Frt		0.945				0.850			0.850		0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1692	0	1825	1921	1585	1789	1883	1601	1789	1829	0
Flt Permitted	0.685			0.424			0.203			0.057		
Satd. Flow (perm)	1254	1692	0	807	1921	1538	382	1883	1576	107	1829	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				198			139		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	57	90	52	357	111	328	69	1013	276	185	834	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	142	0	357	111	328	69	1013	276	185	890	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	8.0	45.9	
Total Split (s)	26.0	26.0		19.0	45.0	45.0	73.0	73.0	73.0	12.0	85.0	
Total Split (%)	20.0%	20.0%		14.6%	34.6%	34.6%	56.2%	56.2%	56.2%	9.2%	65.4%	
Maximum Green (s)	19.8	19.8		16.0	38.8	38.8	67.1	67.1	67.1	9.0	79.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.0	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	3.0	5.9	
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	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0		28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0		12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0		0	
Act Effct Green (s)	14.2	14.2		36.4	33.2	33.2	67.2	67.2	67.2	82.1	79.2	
Actuated g/C Ratio	0.11	0.11		0.29	0.27	0.27	0.54	0.54	0.54	0.66	0.64	
v/c Ratio	0.40	0.68		0.98	0.22	0.59	0.33	1.00	0.30	0.97	0.76	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	59.2	62.0		81.7	36.3	19.5	23.1	57.1	8.8	87.5	22.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.2	62.0		81.7	36.3	19.5	23.1	57.1	8.8	87.5	22.3	
LOS	E	E		F	D	B	C	E	A	F	C	
Approach Delay		61.2			49.8			45.6			33.5	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	13.1	29.3		76.9	21.2	26.5	9.2	238.6	16.3	29.3	143.7	
Queue Length 95th (m)	26.5	50.9		#137.8	36.2	56.6	22.9	#358.7	35.5	#80.6	223.8	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	199	285		366	599	615	206	1015	914	191	1164	
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	0.29	0.50		0.98	0.19	0.53	0.33	1.00	0.30	0.97	0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 124.5			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 43.7		Intersection LOS: D	
Intersection Capacity Utilization 103.8%		ICU Level of Service G	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	17.1

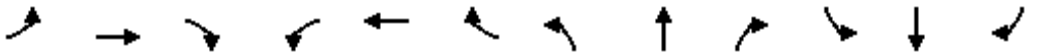
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	24	0	0	34	33	1220	14	54	997	53
Future Vol, veh/h	31	0	24	0	0	34	33	1220	14	54	997	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	4	0	0	0	3	1	0	0	3	0
Mvmt Flow	33	0	25	0	0	36	35	1284	15	57	1049	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2571	2560	1077	2566	2581	1292	1105	0	0	1299	0	0
Stage 1	1191	1191	-	1362	1362	-	-	-	-	-	-	-
Stage 2	1380	1369	-	1204	1219	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 18	27	264	18	26	201	628	-	-	540	-	-
Stage 1	231	263	-	185	218	-	-	-	-	-	-	-
Stage 2	180	216	-	227	255	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 13	23	264	14	22	201	628	-	-	540	-	-
Mov Cap-2 Maneuver	~ 13	23	-	14	22	-	-	-	-	-	-	-
Stage 1	218	235	-	175	206	-	-	-	-	-	-	-
Stage 2	140	204	-	184	228	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 728	26.8	0.3	0.6
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	628	-	-	13	264	201	540	-	-
HCM Lane V/C Ratio	0.055	-	-	2.51	0.096	0.178	0.105	-	-
HCM Control Delay (s)	11.1	-	-	$ 1276.1	20.1	26.8	12.4	-	-
HCM Lane LOS	B	-	-	F	C	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	4.9	0.3	0.6	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

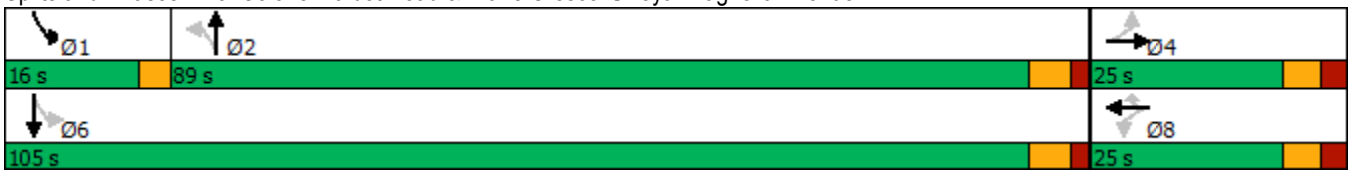


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	6	34	2	170	10	1084	96	241	762	26
Future Volume (vph)	13	0	6	34	2	170	10	1084	96	241	762	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98		0.97				1.00	
Frt		0.959				0.850		0.988			0.995	
Flt Protected		0.966			0.955		0.950			0.950		
Satd. Flow (prot)	0	1664	0	0	1835	1633	1825	1881	0	1825	1848	0
Flt Permitted		0.768			0.723		0.354			0.047		
Satd. Flow (perm)	0	1323	0	0	1361	1633	661	1881	0	90	1848	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				179		7			4	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			6	6			28					28
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
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	4%
Adj. Flow (vph)	14	0	6	36	2	179	11	1141	101	254	802	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	38	179	11	1242	0	254	829	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.3	24.3		24.3	24.3	24.3	24.0	24.0		8.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	89.0	89.0		16.0	105.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%	19.2%	68.5%	68.5%		12.3%	80.8%	
Maximum Green (s)	18.7	18.7		18.7	18.7	18.7	83.0	83.0		13.0	99.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		3.0	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		0.0	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)		8.9			8.9	8.9	83.0	83.0		102.0	99.0	
Actuated g/C Ratio		0.07			0.07	0.07	0.69	0.69		0.85	0.82	
v/c Ratio		0.14			0.38	0.63	0.02	0.95		0.96	0.54	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		2.5			63.7	17.7	6.8	34.5		82.7	5.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		2.5			63.7	17.7	6.8	34.5		82.7	5.2	
LOS		A			E	B	A	C		F	A	
Approach Delay		2.5			25.7			34.3			23.4	
Approach LOS		A			C			C			C	
Queue Length 50th (m)		0.0			8.7	0.0	0.7	238.2		43.3	47.5	
Queue Length 95th (m)		0.9			19.9	20.7	2.8	#391.8		#100.0	84.2	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		247			211	405	456	1301		264	1523	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.08			0.18	0.44	0.02	0.95		0.96	0.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 120.2			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 28.7		Intersection LOS: C	
Intersection Capacity Utilization 99.0%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

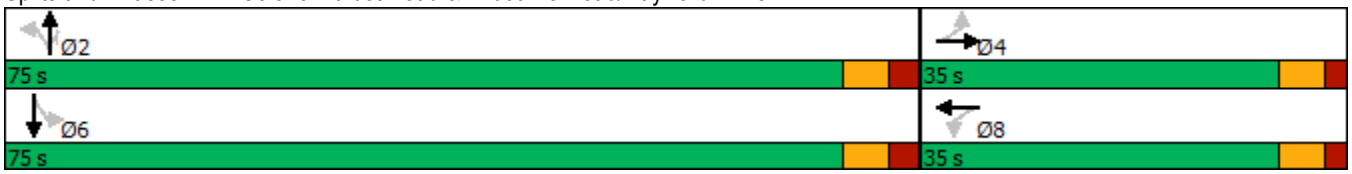


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	9	78	136	10	49	106	1104	223	72	661	63
Future Volume (vph)	39	9	78	136	10	49	106	1104	223	72	661	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		1.00								
Frt		0.866			0.876				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1601	0	1825	1683	0	1825	1902	1633	1825	1826	0
Flt Permitted	0.715			0.696			0.293			0.083		
Satd. Flow (perm)	1334	1601	0	1334	1683	0	563	1902	1633	159	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84			53				156		8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%	0%	1%	0%	0%	4%	2%
Adj. Flow (vph)	42	10	84	146	11	53	114	1187	240	77	711	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	94	0	146	64	0	114	1187	240	77	779	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	35.0	35.0		35.0	35.0		75.0	75.0	75.0	75.0	75.0	
Total Split (%)	31.8%	31.8%		31.8%	31.8%		68.2%	68.2%	68.2%	68.2%	68.2%	
Maximum Green (s)	29.3	29.3		29.3	29.3		68.6	68.6	68.6	68.6	68.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	16.0	16.0		16.0	16.0		71.5	71.5	71.5	71.5	71.5	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.72	0.72	0.72	0.72	0.72	
v/c Ratio	0.20	0.29		0.68	0.20		0.28	0.87	0.20	0.68	0.59	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	36.3	11.7		54.8	13.7		8.2	20.9	2.5	44.9	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.3	11.7		54.8	13.7		8.2	20.9	2.5	44.9	10.0	
LOS	D	B		D	B		A	C	A	D	B	
Approach Delay		19.3			42.3			17.1			13.2	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	6.9	1.6		25.9	1.8		6.6	145.5	4.1	6.9	61.8	
Queue Length 95th (m)	16.1	14.2		45.5	12.2		18.5	#312.8	13.7	#39.5	119.9	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	392	530		392	532		403	1364	1216	113	1312	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.18		0.37	0.12		0.28	0.87	0.20	0.68	0.59	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 99.7			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 93.6%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

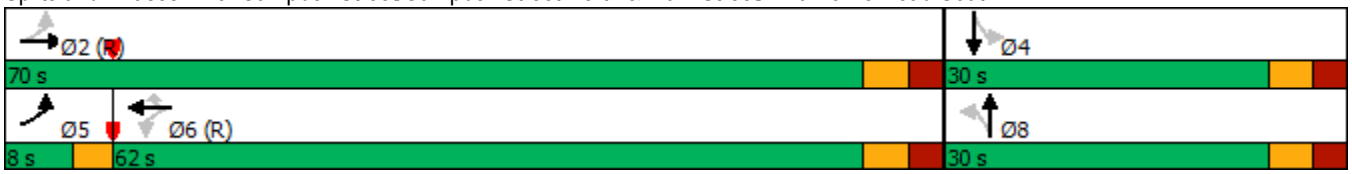


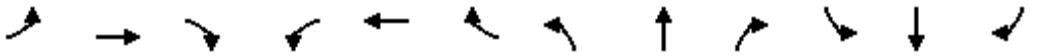
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	824	50	132	887	146	41	46	87	123	50	136
Future Volume (vph)	182	824	50	132	887	146	41	46	87	123	50	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.98	
Frt		0.991				0.850		0.902			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1848	0	1772	1902	1633	1825	1689	0	1825	1679	0
Flt Permitted	0.067			0.261			0.449			0.608		
Satd. Flow (perm)	129	1848	0	487	1902	1633	860	1689	0	1168	1679	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				120		90			130	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	198	896	54	143	964	159	45	50	95	134	54	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	950	0	143	964	159	45	145	0	134	202	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	8.0	44.1		44.1	44.1	44.1	26.0	26.0		26.0	26.0	
Total Split (s)	8.0	70.0		62.0	62.0	62.0	30.0	30.0		30.0	30.0	
Total Split (%)	8.0%	70.0%		62.0%	62.0%	62.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	5.0	63.9		55.9	55.9	55.9	24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	0.0	2.8		2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)		25.0		25.0	25.0	25.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0	13.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)	75.0	71.9		56.3	56.3	56.3	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.75	0.72		0.56	0.56	0.56	0.16	0.16		0.16	0.16	
v/c Ratio	0.64	0.71		0.52	0.90	0.16	0.33	0.42		0.72	0.53	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	30.9	13.2		22.3	32.8	3.7	41.6	18.5		59.9	19.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.9	13.2		22.3	32.8	3.7	41.6	18.5		59.9	19.1	
LOS	C	B		C	C	A	D	B		E	B	
Approach Delay		16.2			27.9			24.0			35.4	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	19.1	90.6		16.3	157.4	3.2	7.8	9.4		24.9	12.4	
Queue Length 95th (m)	#68.5	177.5		36.6	#248.0	11.8	17.0	24.5		41.3	30.7	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	310	1329		274	1070	971	206	473		280	501	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.64	0.71		0.52	0.90	0.16	0.22	0.31		0.48	0.40	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 24.0		Intersection LOS: C	
Intersection Capacity Utilization 92.5%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	6	34	2	170	10	1084	96	241	762	26
Future Volume (vph)	13	0	6	34	2	170	10	1084	96	241	762	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98						1.00	
Frt		0.959				0.850		0.988			0.995	
Flt Protected		0.966			0.955		0.950			0.950		
Satd. Flow (prot)	0	1666	0	0	1835	1633	1825	1881	0	1825	1849	0
Flt Permitted		0.768			0.723		0.300			0.116		
Satd. Flow (perm)	0	1325	0	0	1366	1633	576	1881	0	223	1849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30				134		10			4	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			6	6			28					28
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
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	4%
Adj. Flow (vph)	14	0	6	36	2	179	11	1141	101	254	802	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	38	179	11	1242	0	254	829	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.3	24.3		24.3	24.3	24.3	24.0	24.0		24.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	85.0	85.0		85.0	85.0	
Total Split (%)	22.7%	22.7%		22.7%	22.7%	22.7%	77.3%	77.3%		77.3%	77.3%	
Maximum Green (s)	18.7	18.7		18.7	18.7	18.7	79.0	79.0		79.0	79.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		9.4			9.4	9.4	82.2	82.2		82.2	82.2	
Actuated g/C Ratio		0.09			0.09	0.09	0.79	0.79		0.79	0.79	
v/c Ratio		0.14			0.31	0.66	0.02	0.83		1.44	0.57	

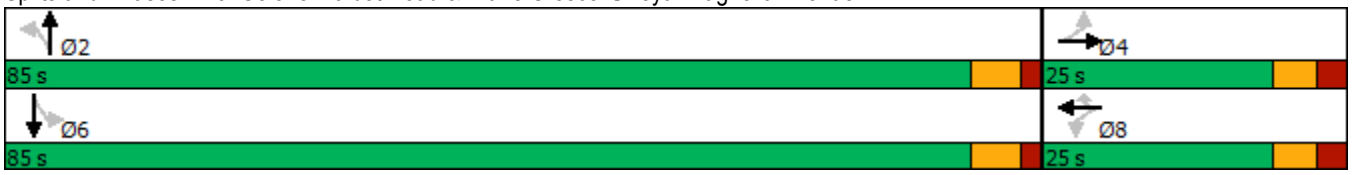
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		11.5			48.6	25.7	3.3	14.3		247.4	6.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		11.5			48.6	25.7	3.3	14.3		247.4	6.4	
LOS		B			D	C	A	B		F	A	
Approach Delay		11.5			29.7			14.2			63.0	
Approach LOS		B			C			B			E	
Queue Length 50th (m)		0.0			7.0	8.3	0.4	112.7		~32.3	46.5	
Queue Length 95th (m)		5.0			16.7	28.7	1.9	#285.9		#88.7	97.7	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		263			246	403	455	1489		176	1463	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.08			0.15	0.44	0.02	0.83		1.44	0.57	

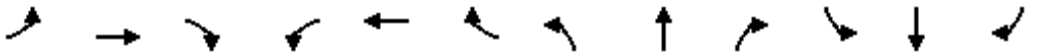
Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 104			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.44			
Intersection Signal Delay: 36.0		Intersection LOS: D	
Intersection Capacity Utilization 100.7%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	82	30	171	61	155	70	835	315	196	700	53
Future Volume (vph)	50	82	30	171	61	155	70	835	315	196	700	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		0.99					0.99			
Frt		0.960				0.850			0.850		0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1674	1701	0	1674	1671	1432	1615	1762	1585	1674	1792	0
Flt Permitted	0.712			0.486			0.243			0.197		
Satd. Flow (perm)	1255	1701	0	852	1671	1432	413	1762	1562	347	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				149			247		6	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)			2	2					3	3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	2%	23%	9%	15%	14%	13%	9%	3%	9%	6%	6%
Adj. Flow (vph)	56	92	34	192	69	174	79	938	354	220	787	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	126	0	192	69	174	79	938	354	220	847	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	45.9	45.9	
Total Split (s)	34.0	34.0		9.0	43.0	43.0	87.0	87.0	87.0	87.0	87.0	
Total Split (%)	26.2%	26.2%		6.9%	33.1%	33.1%	66.9%	66.9%	66.9%	66.9%	66.9%	
Maximum Green (s)	27.8	27.8		6.0	36.8	36.8	81.1	81.1	81.1	81.1	81.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.8	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	5.9	5.9	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0	28.0	28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0	12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0	0	0	
Act Effct Green (s)	13.0	13.0		25.2	22.0	22.0	81.2	81.2	81.2	81.2	81.2	
Actuated g/C Ratio	0.11	0.11		0.22	0.19	0.19	0.70	0.70	0.70	0.70	0.70	
v/c Ratio	0.40	0.62		0.84	0.22	0.44	0.27	0.76	0.30	0.90	0.67	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	55.5	57.1		71.5	40.7	12.9	10.0	16.7	2.8	56.3	13.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.5	57.1		71.5	40.7	12.9	10.0	16.7	2.8	56.3	13.5	
LOS	E	E		E	D	B	A	B	A	E	B	
Approach Delay		56.6			43.2			12.7			22.3	
Approach LOS		E			D			B			C	
Queue Length 50th (m)	11.9	24.6		38.5	13.2	4.7	5.8	119.1	6.8	35.7	94.4	
Queue Length 95th (m)	24.2	43.4		#66.4	25.5	22.7	15.5	199.4	18.1	#97.6	155.5	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	302	420		229	533	558	290	1240	1172	244	1263	
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	0.19	0.30		0.84	0.13	0.31	0.27	0.76	0.30	0.90	0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 115.3			
Natural Cycle: 120			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 23.0		Intersection LOS: C	
Intersection Capacity Utilization 85.9%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	41.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	0	33	0	0	62	12	1015	5	19	883	20
Future Vol, veh/h	52	0	33	0	0	62	12	1015	5	19	883	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	0	18	0	0	0	8	6	0	0	3	30
Mvmt Flow	60	0	38	0	0	72	14	1180	6	22	1027	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2330	2297	1039	2313	2305	1183	1050	0	0	1186	0	0
Stage 1	1083	1083	-	1211	1211	-	-	-	-	-	-	-
Stage 2	1247	1214	-	1102	1094	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.38	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.462	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 26	39	261	27	39	233	640	-	-	596	-	-
Stage 1	261	296	-	225	257	-	-	-	-	-	-	-
Stage 2	211	257	-	259	292	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 17	37	261	22	37	233	640	-	-	596	-	-
Mov Cap-2 Maneuver	~ 17	37	-	22	37	-	-	-	-	-	-	-
Stage 1	255	285	-	220	251	-	-	-	-	-	-	-
Stage 2	143	251	-	213	281	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 993.5	27.2	0.1	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	640	-	-	17	261	233	596	-	-
HCM Lane V/C Ratio	0.022	-	-	3.557	0.147	0.309	0.037	-	-
HCM Control Delay (s)	10.8	-	-	$ 1610.5	21.2	27.2	11.3	-	-
HCM Lane LOS	B	-	-	F	C	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	8.2	0.5	1.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	13	80	0	312	2	688	31	96	831	8
Future Volume (vph)	26	0	13	80	0	312	2	688	31	96	831	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.955				0.850		0.994			0.999	
Flt Protected		0.968			0.950		0.950			0.950		
Satd. Flow (prot)	0	1717	0	0	1825	1633	1825	1806	0	1825	1862	0
Flt Permitted		0.779			0.728		0.115			0.204		
Satd. Flow (perm)	0	1382	0	0	1397	1633	221	1806	0	392	1862	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				131		4			1	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			1	1								
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
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	6%	0%	0%	3%	12%
Adj. Flow (vph)	30	0	15	91	0	355	2	782	35	109	944	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	91	355	2	817	0	109	953	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.3	34.3		34.3	34.3	34.3	26.0	26.0		26.0	26.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	45.0	45.0		45.0	45.0	
Total Split (%)	43.8%	43.8%		43.8%	43.8%	43.8%	56.3%	56.3%		56.3%	56.3%	
Maximum Green (s)	28.7	28.7		28.7	28.7	28.7	39.0	39.0		39.0	39.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		4.1	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		1.9	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		21.0	21.0	21.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)		15.2			15.2	15.2	39.3	39.3		39.3	39.3	
Actuated g/C Ratio		0.23			0.23	0.23	0.59	0.59		0.59	0.59	
v/c Ratio		0.13			0.29	0.75	0.02	0.77		0.47	0.87	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		8.3			22.8	25.2	9.0	18.9		19.4	25.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		8.3			22.8	25.2	9.0	18.9		19.4	25.0	
LOS		A			C	C	A	B		B	C	
Approach Delay		8.3			24.7			18.9			24.4	
Approach LOS		A			C			B			C	
Queue Length 50th (m)		0.4			9.3	25.3	0.1	66.4		6.8	87.4	
Queue Length 95th (m)		6.5			19.2	48.6	1.1	#165.9		27.1	#206.7	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		620			604	780	129	1062		230	1094	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.07			0.15	0.46	0.02	0.77		0.47	0.87	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 66.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 22.2		Intersection LOS: C	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

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

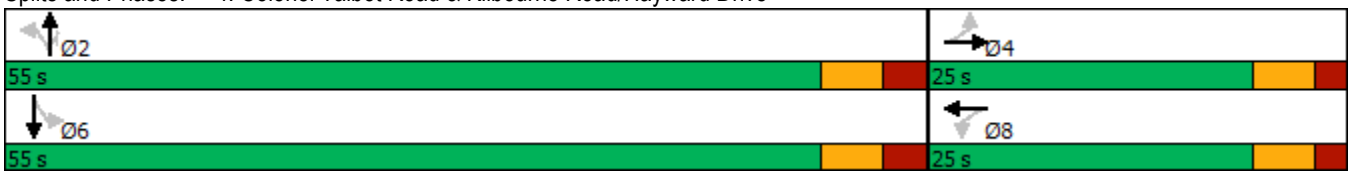
Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	4	97	213	6	74	64	607	53	26	854	34
Future Volume (vph)	43	4	97	213	6	74	64	607	53	26	854	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.855			0.862				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1539	0	1825	1656	0	1690	1746	1633	1825	1793	0
Flt Permitted	0.699			0.684			0.118			0.311		
Satd. Flow (perm)	1304	1539	0	1314	1656	0	210	1746	1633	597	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109			83				60		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	0%	7%	0%	0%	0%	8%	10%	0%	0%	6%	19%
Adj. Flow (vph)	48	4	109	239	7	83	72	682	60	29	960	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	113	0	239	90	0	72	682	60	29	998	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%	68.8%	68.8%	68.8%	
Maximum Green (s)	19.3	19.3		19.3	19.3		48.6	48.6	48.6	48.6	48.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	17.4	17.4		17.4	17.4		49.7	49.7	49.7	49.7	49.7	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.17	0.27		0.83	0.21		0.55	0.62	0.06	0.08	0.89	
Control Delay	25.8	7.6		53.8	8.4		30.0	12.7	2.1	7.2	25.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	25.8	7.6		53.8	8.4		30.0	12.7	2.1	7.2	25.1	
LOS	C	A		D	A		C	B	A	A	C	
Approach Delay		13.0			41.4			13.5			24.6	
Approach LOS		B			D			B			C	
Queue Length 50th (m)	5.8	0.5		33.7	0.8		5.9	60.1	0.0	1.6	120.1	
Queue Length 95th (m)	13.9	11.8		#66.3	11.1		#27.0	91.5	3.9	4.8	#210.4	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	317	457		320	466		131	1095	1046	374	1127	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.25		0.75	0.19		0.55	0.62	0.06	0.08	0.89	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 79.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

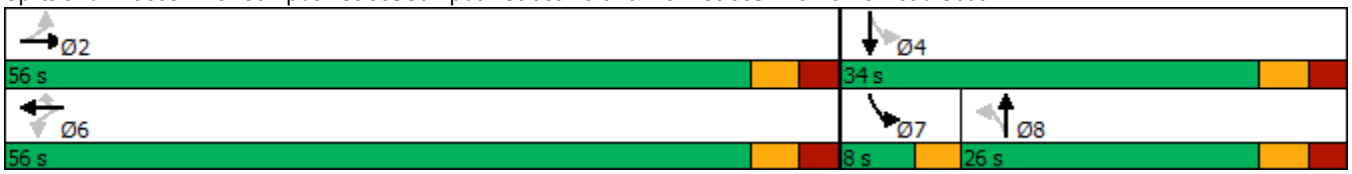


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	648	43	187	746	99	61	91	270	155	35	153
Future Volume (vph)	69	648	43	187	746	99	61	91	270	155	35	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98	0.98	0.98		1.00	0.96	
Frt		0.991				0.850		0.888			0.878	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1722	1812	0	1738	1812	1541	1789	1572	0	1674	1430	0
Flt Permitted	0.181			0.221			0.630			0.193		
Satd. Flow (perm)	328	1812	0	404	1812	1506	1162	1572	0	340	1430	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				106		152			158	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)	2					2	12		1	1		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	6%	5%	6%	6%	2%	6%	7%	9%	7%	15%
Adj. Flow (vph)	75	704	47	203	811	108	66	99	293	168	38	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	751	0	203	811	108	66	392	0	168	204	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		5.0	7.0	
Minimum Split (s)	44.1	44.1		44.1	44.1	44.1	26.0	26.0		8.0	26.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	26.0	26.0		8.0	34.0	
Total Split (%)	62.2%	62.2%		62.2%	62.2%	62.2%	28.9%	28.9%		8.9%	37.8%	
Maximum Green (s)	49.9	49.9		49.9	49.9	49.9	20.0	20.0		5.0	28.0	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		2.8	2.8	2.8	2.7	2.7		0.0	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	25.0	25.0		25.0	25.0	25.0	7.0	7.0			7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0			13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	17.7	17.7		28.7	25.7	
Actuated g/C Ratio	0.57	0.57		0.57	0.57	0.57	0.20	0.20		0.33	0.29	
v/c Ratio	0.40	0.73		0.89	0.79	0.12	0.28	0.90		0.90	0.39	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.8	19.5		58.2	22.4	2.5	32.8	45.5		71.6	9.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.8	19.5		58.2	22.4	2.5	32.8	45.5		71.6	9.1	
LOS	B	B		E	C	A	C	D		E	A	
Approach Delay		19.5			27.0			43.6			37.3	
Approach LOS		B			C			D			D	
Queue Length 50th (m)	7.0	91.5		29.4	105.7	0.2	9.5	40.7		20.9	5.6	
Queue Length 95th (m)	19.7	137.1		#74.1	159.5	6.7	20.8	#88.7		#53.2	21.8	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	186	1034		229	1031	903	265	475		187	564	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.40	0.73		0.89	0.79	0.12	0.25	0.83		0.90	0.36	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 95.6%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	90	52	348	110	326	68	997	271	184	812	57
Future Volume (vph)	57	90	52	348	110	326	68	997	271	184	812	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	55.0		0.0	55.0		60.0	80.0		60.0	120.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99		0.97	1.00		0.98		1.00	
Frt		0.945				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1692	0	1825	1921	1585	1789	1883	1601	1789	1827	0
Flt Permitted	0.682			0.405			0.183			0.056		
Satd. Flow (perm)	1249	1692	0	771	1921	1538	344	1883	1576	105	1827	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				191			140		5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		559.5			2005.5			477.6			496.5	
Travel Time (s)		33.6			120.3			28.7			29.8	
Confl. Peds. (#/hr)	3		4	4		3	4		4	4		4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	6%	6%	0%	0%	3%	2%	2%	2%	2%	4%	3%
Adj. Flow (vph)	61	96	55	370	117	347	72	1061	288	196	864	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	151	0	370	117	347	72	1061	288	196	925	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0	
Minimum Split (s)	25.2	25.2		8.0	25.2	25.2	45.9	45.9	45.9	8.0	45.9	
Total Split (s)	26.0	26.0		18.0	44.0	44.0	74.0	74.0	74.0	12.0	86.0	
Total Split (%)	20.0%	20.0%		13.8%	33.8%	33.8%	56.9%	56.9%	56.9%	9.2%	66.2%	
Maximum Green (s)	19.8	19.8		15.0	37.8	37.8	68.1	68.1	68.1	9.0	80.1	
Yellow Time (s)	4.3	4.3		3.0	4.3	4.3	3.8	3.8	3.8	3.0	3.8	
All-Red Time (s)	1.9	1.9		0.0	1.9	1.9	2.1	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	6.2		3.0	6.2	6.2	5.9	5.9	5.9	3.0	5.9	
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	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max	Max	None	Max	
Walk Time (s)	7.0	7.0			7.0	7.0	28.0	28.0	28.0		28.0	
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	12.0	12.0	12.0		12.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0		0	
Act Effct Green (s)	14.7	14.7		35.9	32.7	32.7	68.1	68.1	68.1	83.1	80.2	
Actuated g/C Ratio	0.12	0.12		0.29	0.26	0.26	0.54	0.54	0.54	0.66	0.64	
v/c Ratio	0.41	0.70		1.06	0.23	0.64	0.39	1.03	0.31	1.03	0.79	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	59.5	63.5		106.1	37.2	23.3	25.3	66.3	9.0	104.1	23.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.5	63.5		106.1	37.2	23.3	25.3	66.3	9.0	104.1	23.2	
LOS	E	E		F	D	C	C	E	A	F	C	
Approach Delay		62.3			62.0			52.6			37.4	
Approach LOS		E			E			D			D	
Queue Length 50th (m)	14.1	31.6		~87.7	22.7	33.6	9.8	~281.5	17.7	~35.3	154.3	
Queue Length 95th (m)	28.1	53.7		#160.0	38.4	65.4	25.0	#381.0	37.2	#87.3	237.9	
Internal Link Dist (m)		535.5			1981.5			453.6			472.5	
Turn Bay Length (m)	55.0			55.0		60.0	80.0		60.0	120.0		
Base Capacity (vph)	198	284		348	581	598	187	1026	922	191	1173	
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	0.31	0.53		1.06	0.20	0.58	0.39	1.03	0.31	1.03	0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 125			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 50.6		Intersection LOS: D	
Intersection Capacity Utilization 107.7%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Colonel Talbot Road & Pack Road

Intersection	
Int Delay, s/veh	20

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	24	0	0	34	33	1279	14	54	1036	53
Future Vol, veh/h	31	0	24	0	0	34	33	1279	14	54	1036	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	30	-	-	-	-	-	110	-	-	45	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	4	0	0	0	3	1	0	0	3	0
Mvmt Flow	33	0	25	0	0	36	35	1346	15	57	1091	56

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2675	2664	1119	2670	2685	1354	1147	0	0	1361	0	0
Stage 1	1233	1233	-	1424	1424	-	-	-	-	-	-	-
Stage 2	1442	1431	-	1246	1261	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 15	23	249	15	22	185	605	-	-	512	-	-
Stage 1	219	251	-	170	204	-	-	-	-	-	-	-
Stage 2	166	202	-	215	244	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 11	19	249	12	18	185	605	-	-	512	-	-
Mov Cap-2 Maneuver	~ 11	19	-	12	18	-	-	-	-	-	-	-
Stage 1	206	223	-	160	192	-	-	-	-	-	-	-
Stage 2	126	190	-	172	217	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 894.2	29.1	0.3	0.6
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	605	-	-	11	249	185	512	-	-
HCM Lane V/C Ratio	0.057	-	-	2.967	0.101	0.193	0.111	-	-
HCM Control Delay (s)	11.3	-	-	$ 1570.1	21.1	29.1	12.9	-	-
HCM Lane LOS	B	-	-	F	C	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	5.1	0.3	0.7	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	0	6	34	2	170	10	1142	96	241	800	26
Future Volume (vph)	13	0	6	34	2	170	10	1142	96	241	800	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		60.0	75.0		0.0	75.0		80.0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98		0.98				1.00	
Frt		0.959				0.850		0.988			0.995	
Flt Protected		0.966			0.955		0.950			0.950		
Satd. Flow (prot)	0	1664	0	0	1835	1633	1825	1881	0	1825	1848	0
Flt Permitted		0.768			0.723		0.341			0.047		
Satd. Flow (perm)	0	1323	0	0	1361	1633	639	1881	0	90	1848	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				179		6			4	
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		287.7			284.1			119.4			298.9	
Travel Time (s)		20.7			20.5			7.2			17.9	
Confl. Peds. (#/hr)			6	6			28					28
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
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	4%
Adj. Flow (vph)	14	0	6	36	2	179	11	1202	101	254	842	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	38	179	11	1303	0	254	869	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	24.3	24.3		24.3	24.3	24.3	24.0	24.0		8.0	24.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	89.0	89.0		16.0	105.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%	19.2%	68.5%	68.5%		12.3%	80.8%	
Maximum Green (s)	18.7	18.7		18.7	18.7	18.7	83.0	83.0		13.0	99.0	
Yellow Time (s)	3.6	3.6		3.6	3.6	3.6	4.1	4.1		3.0	4.1	
All-Red Time (s)	2.7	2.7		2.7	2.7	2.7	1.9	1.9		0.0	1.9	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	6.0	6.0		3.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)		8.9			8.9	8.9	83.0	83.0		102.0	99.0	
Actuated g/C Ratio		0.07			0.07	0.07	0.69	0.69		0.85	0.82	
v/c Ratio		0.14			0.38	0.63	0.02	1.00		0.96	0.57	

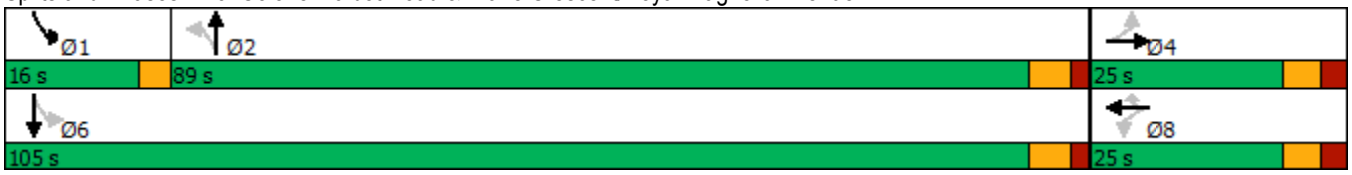
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		2.5			63.7	17.7	6.8	45.1		82.7	5.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		2.5			63.7	17.7	6.8	45.1		82.7	5.5	
LOS		A			E	B	A	D		F	A	
Approach Delay		2.5			25.7			44.7			23.0	
Approach LOS		A			C			D			C	
Queue Length 50th (m)		0.0			8.7	0.0	0.7	~276.4		43.3	51.9	
Queue Length 95th (m)		0.9			19.9	20.7	2.9	#423.9		#100.0	92.0	
Internal Link Dist (m)		263.7			260.1			95.4			274.9	
Turn Bay Length (m)						60.0	75.0			75.0		
Base Capacity (vph)		247			211	405	441	1301		264	1523	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.08			0.18	0.44	0.02	1.00		0.96	0.57	

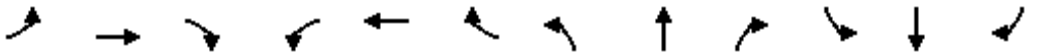
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 120.2			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 33.7		Intersection LOS: C	
Intersection Capacity Utilization 102.1%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Colonel Talbot Road & Diane Crescent/Royal Magnolia Avenue



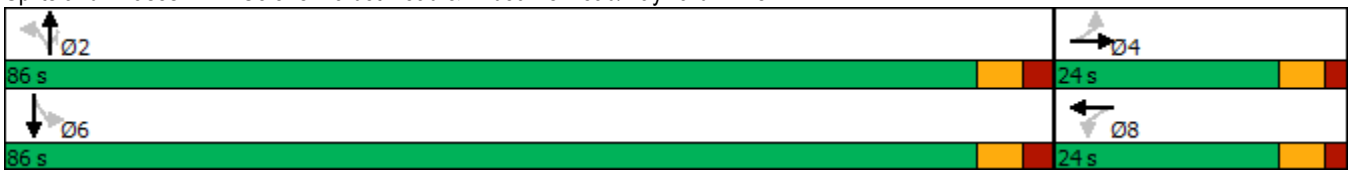


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	9	83	136	10	49	112	1161	223	72	698	67
Future Volume (vph)	41	9	83	136	10	49	112	1161	223	72	698	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		0.0	55.0		60.0	45.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.6			2.5			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98		1.00								
Frt		0.865			0.876				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1599	0	1825	1683	0	1825	1902	1633	1825	1826	0
Flt Permitted	0.715			0.693			0.282			0.074		
Satd. Flow (perm)	1334	1599	0	1328	1683	0	542	1902	1633	142	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89			53				203		11	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		468.4			250.7			300.3			367.6	
Travel Time (s)		28.1			15.0			18.0			22.1	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	0%	2%	0%	0%	0%	0%	1%	0%	0%	4%	2%
Adj. Flow (vph)	44	10	89	146	11	53	120	1248	240	77	751	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	99	0	146	64	0	120	1248	240	77	823	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		43.4	43.4	43.4	43.4	43.4	
Total Split (s)	24.0	24.0		24.0	24.0		86.0	86.0	86.0	86.0	86.0	
Total Split (%)	21.8%	21.8%		21.8%	21.8%		78.2%	78.2%	78.2%	78.2%	78.2%	
Maximum Green (s)	18.3	18.3		18.3	18.3		79.6	79.6	79.6	79.6	79.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7		6.4	6.4	6.4	6.4	6.4	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		30.0	30.0	30.0	30.0	30.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.9	15.9		15.9	15.9		82.5	82.5	82.5	82.5	82.5	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.75	0.75	0.75	0.75	0.75	
v/c Ratio	0.23	0.32		0.77	0.22		0.30	0.88	0.19	0.73	0.60	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	43.3	13.5		70.4	16.1		7.3	20.3	1.4	52.3	9.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	43.3	13.5		70.4	16.1		7.3	20.3	1.4	52.3	9.0	
LOS	D	B		E	B		A	C	A	D	A	
Approach Delay		22.7			53.8			16.5			12.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	8.2	1.8		29.7	2.0		7.7	180.1	1.9	8.4	73.3	
Queue Length 95th (m)	18.5	16.3		#55.3	13.6		16.5	#328.6	8.2	#19.2	108.7	
Internal Link Dist (m)		444.4			226.7			276.3			343.6	
Turn Bay Length (m)	45.0						55.0		60.0	45.0		
Base Capacity (vph)	220	339		220	323		404	1420	1270	105	1366	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.29		0.66	0.20		0.30	0.88	0.19	0.73	0.60	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110.5			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 96.6%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Colonel Talbot Road & Kilbourne Road/Hayward Drive

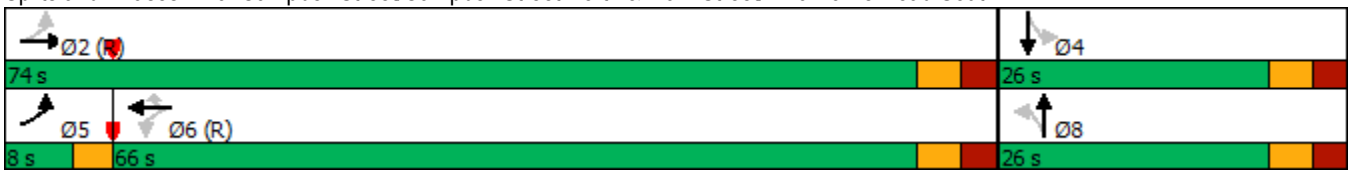


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	874	50	132	935	146	41	46	87	123	50	136
Future Volume (vph)	182	874	50	132	935	146	41	46	87	123	50	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	0.0		60.0	5.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.98	
Frt		0.992				0.850		0.902			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1850	0	1772	1902	1633	1825	1689	0	1825	1679	0
Flt Permitted	0.066			0.219			0.440			0.604		
Satd. Flow (perm)	127	1850	0	408	1902	1633	842	1689	0	1160	1679	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				125		86			123	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		346.2			367.0			288.8			243.6	
Travel Time (s)		24.9			26.4			20.8			17.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	3%	3%	1%	0%	0%	0%	4%	0%	0%	0%
Adj. Flow (vph)	198	950	54	143	1016	159	45	50	95	134	54	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	1004	0	143	1016	159	45	145	0	134	202	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	8.0	44.1		44.1	44.1	44.1	26.0	26.0		26.0	26.0	
Total Split (s)	8.0	74.0		66.0	66.0	66.0	26.0	26.0		26.0	26.0	
Total Split (%)	8.0%	74.0%		66.0%	66.0%	66.0%	26.0%	26.0%		26.0%	26.0%	
Maximum Green (s)	5.0	67.9		59.9	59.9	59.9	20.0	20.0		20.0	20.0	
Yellow Time (s)	3.0	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	0.0	2.8		2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)		25.0		25.0	25.0	25.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		13.0		13.0	13.0	13.0	13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	
Act Effct Green (s)	75.5	72.4		59.9	59.9	59.9	15.5	15.5		15.5	15.5	
Actuated g/C Ratio	0.76	0.72		0.60	0.60	0.60	0.16	0.16		0.16	0.16	
v/c Ratio	0.77	0.75		0.59	0.89	0.15	0.35	0.43		0.74	0.55	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	43.0	13.8		24.5	29.2	2.9	43.5	20.2		63.9	21.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	43.0	13.8		24.5	29.2	2.9	43.5	20.2		63.9	21.3	
LOS	D	B		C	C	A	D	C		E	C	
Approach Delay		18.6			25.5			25.7			38.3	
Approach LOS		B			C			C			D	
Queue Length 50th (m)	20.1	102.8		15.9	157.1	2.5	7.8	10.1		24.9	13.6	
Queue Length 95th (m)	#70.8	180.8		39.9	#254.8	10.2	17.7	26.4		43.2	33.5	
Internal Link Dist (m)		322.2			343.0			264.8			219.6	
Turn Bay Length (m)	45.0					60.0	5.0			45.0		
Base Capacity (vph)	256	1340		244	1139	1028	168	406		232	434	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.77	0.75		0.59	0.89	0.15	0.27	0.36		0.58	0.47	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 24.2		Intersection LOS: C	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 9: Campbell Street/Campbell Street North & Main Street/Wharncliffe Road South



MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: BG 2033 AM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2033) Background Traffic
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	85	9.0	92	9.0	0.422	10.0	LOS A	2.1	17.2	0.60	0.64	0.72	52.0
8	T1	488	9.0	530	9.0	0.422	9.6	LOS A	2.1	16.9	0.59	0.62	0.70	52.9
18	R2	72	0.0	78	0.0	0.422	8.9	LOS A	2.1	16.9	0.59	0.61	0.69	52.3
Approach		645	8.0	701	8.0	0.422	9.6	LOS A	2.1	17.2	0.59	0.62	0.70	52.7
East: Bradley Avenue														
1	L2	42	0.0	46	0.0	0.179	7.9	LOS A	0.7	5.0	0.62	0.62	0.62	53.4
6	T1	131	0.0	142	0.0	0.179	7.5	LOS A	0.7	5.0	0.61	0.61	0.61	54.4
16	R2	45	0.0	49	0.0	0.179	7.2	LOS A	0.7	5.0	0.60	0.60	0.60	53.8
Approach		218	0.0	237	0.0	0.179	7.5	LOS A	0.7	5.0	0.61	0.61	0.61	54.1
North: Bostwick Road														
7	L2	46	0.0	50	0.0	0.270	6.1	LOS A	1.2	9.2	0.44	0.34	0.44	55.7
4	T1	393	3.0	427	3.0	0.270	6.1	LOS A	1.2	9.2	0.43	0.33	0.43	55.9
14	R2	80	4.0	87	4.0	0.270	6.0	LOS A	1.2	9.0	0.42	0.32	0.42	54.6
Approach		519	2.9	564	2.9	0.270	6.1	LOS A	1.2	9.2	0.43	0.33	0.43	55.7
West: Pack Road														
5	L2	146	0.0	159	0.0	0.366	8.7	LOS A	1.7	13.1	0.61	0.62	0.64	52.4
2	T1	260	0.0	283	0.0	0.366	8.4	LOS A	1.7	13.1	0.60	0.60	0.62	53.3
12	R2	172	2.0	187	2.0	0.366	8.2	LOS A	1.7	12.7	0.59	0.58	0.60	52.9
Approach		578	0.6	628	0.6	0.366	8.4	LOS A	1.7	13.1	0.60	0.60	0.62	53.0
All Vehicles		1960	3.6	2130	3.6	0.422	8.1	LOS A	2.1	17.2	0.55	0.54	0.60	53.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: BG 2033 PM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2033) Background Traffic
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	247	2.0	268	2.0	0.638	14.8	LOS B	6.2	47.7	0.76	0.97	1.33	48.3
8	T1	710	1.0	772	1.0	0.638	14.1	LOS B	6.4	48.8	0.75	0.96	1.31	49.7
18	R2	67	0.0	73	0.0	0.638	13.8	LOS B	6.4	48.8	0.75	0.95	1.30	49.2
Approach		1024	1.2	1113	1.2	0.638	14.3	LOS B	6.4	48.8	0.75	0.96	1.31	49.3
East: Bradley Avenue														
1	L2	74	0.0	80	0.0	0.453	16.9	LOS C	2.1	15.8	0.79	0.89	1.15	47.5
6	T1	259	0.0	282	0.0	0.453	15.9	LOS C	2.1	16.1	0.78	0.88	1.14	48.6
16	R2	65	0.0	71	0.0	0.453	15.1	LOS C	2.1	16.1	0.77	0.87	1.13	48.3
Approach		398	0.0	433	0.0	0.453	15.9	LOS C	2.1	16.1	0.78	0.88	1.14	48.3
North: Bostwick Road														
7	L2	70	0.0	76	0.0	0.468	11.5	LOS B	2.7	21.0	0.68	0.77	0.96	51.4
4	T1	420	6.0	457	6.0	0.468	11.4	LOS B	2.7	21.2	0.67	0.76	0.95	51.6
14	R2	163	1.0	177	1.0	0.468	10.6	LOS B	2.7	21.2	0.66	0.75	0.93	51.1
Approach		653	4.1	710	4.1	0.468	11.2	LOS B	2.7	21.2	0.67	0.76	0.94	51.5
West: Pack Road														
5	L2	141	0.0	153	0.0	0.373	9.5	LOS A	1.8	13.7	0.64	0.68	0.75	51.7
2	T1	258	0.0	280	0.0	0.373	9.1	LOS A	1.8	13.7	0.63	0.66	0.73	52.9
12	R2	135	4.0	147	4.0	0.373	9.0	LOS A	1.7	13.4	0.62	0.65	0.71	52.3
Approach		534	1.0	580	1.0	0.373	9.2	LOS A	1.8	13.7	0.63	0.66	0.73	52.4
All Vehicles		2609	1.7	2836	1.7	0.638	12.7	LOS B	6.4	48.8	0.71	0.84	1.07	50.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: BG 2038 AM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2038) Background Traffic
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	90	9.0	98	9.0	0.440	10.5	LOS B	2.3	18.9	0.62	0.68	0.79	51.6
8	T1	498	9.0	541	9.0	0.440	10.0	LOS B	2.3	18.8	0.61	0.66	0.77	52.5
18	R2	73	0.0	79	0.0	0.440	9.4	LOS A	2.3	18.8	0.60	0.65	0.75	52.0
Approach		661	8.0	718	8.0	0.440	10.0	LOS B	2.3	18.9	0.61	0.67	0.77	52.3
East: Bradley Avenue														
1	L2	42	0.0	46	0.0	0.195	8.3	LOS A	0.7	5.5	0.63	0.63	0.63	53.2
6	T1	140	0.0	152	0.0	0.195	7.9	LOS A	0.7	5.5	0.62	0.62	0.62	54.1
16	R2	50	0.0	54	0.0	0.195	7.5	LOS A	0.7	5.4	0.61	0.61	0.61	53.5
Approach		232	0.0	252	0.0	0.195	7.9	LOS A	0.7	5.5	0.62	0.62	0.62	53.8
North: Bostwick Road														
7	L2	48	0.0	52	0.0	0.285	6.4	LOS A	1.3	9.8	0.46	0.37	0.46	55.5
4	T1	409	3.0	445	3.0	0.285	6.3	LOS A	1.3	9.8	0.45	0.36	0.45	55.7
14	R2	83	4.0	90	4.0	0.285	6.2	LOS A	1.2	9.6	0.44	0.34	0.44	54.4
Approach		540	2.9	587	2.9	0.285	6.3	LOS A	1.3	9.8	0.45	0.35	0.45	55.5
West: Pack Road														
5	L2	151	0.0	164	0.0	0.390	9.2	LOS A	2.0	15.0	0.63	0.66	0.72	52.0
2	T1	271	0.0	295	0.0	0.390	8.9	LOS A	2.0	15.0	0.62	0.65	0.70	53.0
12	R2	182	2.0	198	2.0	0.390	8.7	LOS A	1.9	14.6	0.60	0.63	0.68	52.5
Approach		604	0.6	657	0.6	0.390	8.9	LOS A	2.0	15.0	0.61	0.64	0.70	52.6
All Vehicles		2037	3.5	2214	3.5	0.440	8.5	LOS A	2.3	18.9	0.57	0.57	0.65	53.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: BG 2038 PM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2038) Background Traffic
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	262	2.0	285	2.0	0.683	16.9	LOS C	7.3	56.3	0.80	1.06	1.51	47.1
8	T1	741	1.0	805	1.0	0.683	16.1	LOS C	7.6	57.9	0.80	1.05	1.49	48.5
18	R2	68	0.0	74	0.0	0.683	15.7	LOS C	7.6	57.9	0.79	1.04	1.48	48.0
Approach		1071	1.2	1164	1.2	0.683	16.2	LOS C	7.6	57.9	0.80	1.05	1.50	48.1
East: Bradley Avenue														
1	L2	75	0.0	82	0.0	0.503	19.4	LOS C	2.4	18.2	0.82	0.94	1.27	46.1
6	T1	273	0.0	297	0.0	0.503	18.2	LOS C	2.4	18.5	0.80	0.93	1.25	47.2
16	R2	71	0.0	77	0.0	0.503	17.2	LOS C	2.4	18.5	0.80	0.92	1.24	47.0
Approach		419	0.0	455	0.0	0.503	18.2	LOS C	2.4	18.5	0.80	0.93	1.25	47.0
North: Bostwick Road														
7	L2	75	0.0	82	0.0	0.497	12.4	LOS B	3.0	23.4	0.70	0.82	1.05	50.7
4	T1	431	6.0	468	6.0	0.497	12.3	LOS B	3.0	23.7	0.69	0.81	1.03	51.0
14	R2	168	1.0	183	1.0	0.497	11.5	LOS B	3.0	23.7	0.68	0.80	1.02	50.5
Approach		674	4.1	733	4.1	0.497	12.1	LOS B	3.0	23.7	0.69	0.81	1.03	50.8
West: Pack Road														
5	L2	148	0.0	161	0.0	0.398	10.1	LOS B	2.0	15.5	0.66	0.71	0.82	51.3
2	T1	271	0.0	295	0.0	0.398	9.7	LOS A	2.0	15.5	0.65	0.70	0.80	52.4
12	R2	142	4.0	154	4.0	0.398	9.6	LOS A	2.0	15.2	0.64	0.69	0.78	51.9
Approach		561	1.0	610	1.0	0.398	9.8	LOS A	2.0	15.5	0.65	0.70	0.80	52.0
All Vehicles		2725	1.7	2962	1.7	0.683	14.2	LOS B	7.6	57.9	0.74	0.90	1.20	49.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: TT 2033 AM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2033) Total Traffic
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	85	9.0	92	9.0	0.489	12.3	LOS B	2.8	23.1	0.67	0.78	0.99	50.4
8	T1	488	9.0	530	9.0	0.489	11.8	LOS B	2.9	23.4	0.66	0.77	0.98	51.3
18	R2	103	0.0	112	0.0	0.489	10.9	LOS B	2.9	23.4	0.66	0.77	0.96	50.8
Approach		676	7.6	735	7.6	0.489	11.7	LOS B	2.9	23.4	0.66	0.77	0.98	51.1
East: Bradley Avenue														
1	L2	51	0.0	55	0.0	0.215	8.4	LOS A	0.8	6.1	0.63	0.63	0.63	53.0
6	T1	165	0.0	179	0.0	0.215	8.0	LOS A	0.8	6.1	0.62	0.62	0.62	54.1
16	R2	45	0.0	49	0.0	0.215	7.6	LOS A	0.8	6.1	0.61	0.61	0.61	53.4
Approach		261	0.0	284	0.0	0.215	8.0	LOS A	0.8	6.1	0.62	0.62	0.62	53.7
North: Bostwick Road														
7	L2	46	0.0	50	0.0	0.282	6.5	LOS A	1.2	9.6	0.47	0.39	0.47	55.4
4	T1	393	3.0	427	3.0	0.282	6.4	LOS A	1.2	9.6	0.46	0.38	0.46	55.6
14	R2	80	4.0	87	4.0	0.282	6.3	LOS A	1.2	9.4	0.45	0.37	0.45	54.3
Approach		519	2.9	564	2.9	0.282	6.4	LOS A	1.2	9.6	0.46	0.38	0.46	55.4
West: Pack Road														
5	L2	146	0.0	159	0.0	0.438	10.0	LOS A	2.5	19.2	0.65	0.71	0.82	51.8
2	T1	368	0.0	400	0.0	0.438	9.7	LOS A	2.5	19.2	0.64	0.70	0.80	52.6
12	R2	172	2.0	187	2.0	0.438	9.4	LOS A	2.5	19.0	0.63	0.68	0.79	52.0
Approach		686	0.5	746	0.5	0.438	9.7	LOS A	2.5	19.2	0.64	0.70	0.80	52.3
All Vehicles		2142	3.3	2328	3.3	0.489	9.3	LOS A	2.9	23.4	0.60	0.63	0.75	52.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: TT 2033 PM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2033) Total Traffic
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	247	2.0	268	2.0	0.686	17.4	LOS C	7.1	54.7	0.81	1.07	1.54	46.8
8	T1	710	1.0	772	1.0	0.686	16.6	LOS C	7.4	56.3	0.80	1.06	1.53	48.1
18	R2	84	0.0	91	0.0	0.686	16.1	LOS C	7.4	56.3	0.80	1.06	1.52	47.7
Approach		1041	1.2	1132	1.2	0.686	16.8	LOS C	7.4	56.3	0.80	1.06	1.53	47.8
East: Bradley Avenue														
1	L2	101	0.0	110	0.0	0.592	22.1	LOS C	3.2	24.7	0.83	1.00	1.44	44.5
6	T1	354	0.0	385	0.0	0.592	20.7	LOS C	3.3	25.4	0.82	0.99	1.43	45.8
16	R2	65	0.0	71	0.0	0.592	19.8	LOS C	3.3	25.4	0.81	0.98	1.42	45.6
Approach		520	0.0	565	0.0	0.592	20.9	LOS C	3.3	25.4	0.82	0.99	1.43	45.5
North: Bostwick Road														
7	L2	70	0.0	76	0.0	0.526	14.1	LOS B	3.1	24.8	0.73	0.87	1.16	49.5
4	T1	420	6.0	457	6.0	0.526	13.9	LOS B	3.2	25.3	0.72	0.86	1.15	49.9
14	R2	163	1.0	177	1.0	0.526	13.0	LOS B	3.2	25.3	0.72	0.85	1.14	49.5
Approach		653	4.1	710	4.1	0.526	13.7	LOS B	3.2	25.3	0.72	0.86	1.15	49.7
West: Pack Road														
5	L2	141	0.0	153	0.0	0.424	10.7	LOS B	2.3	17.4	0.67	0.74	0.88	51.1
2	T1	317	0.0	345	0.0	0.424	10.3	LOS B	2.3	17.4	0.66	0.73	0.86	52.1
12	R2	135	4.0	147	4.0	0.424	10.1	LOS B	2.2	17.3	0.65	0.72	0.85	51.5
Approach		593	0.9	645	0.9	0.424	10.3	LOS B	2.3	17.4	0.66	0.73	0.87	51.8
All Vehicles		2807	1.6	3051	1.6	0.686	15.5	LOS C	7.4	56.3	0.76	0.93	1.28	48.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: TT 2038 AM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2038) Total Traffic
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	90	9.0	98	9.0	0.509	13.0	LOS B	3.1	24.9	0.69	0.81	1.06	49.9
8	T1	498	9.0	541	9.0	0.509	12.4	LOS B	3.2	25.3	0.68	0.80	1.04	50.8
18	R2	104	0.0	113	0.0	0.509	11.5	LOS B	3.2	25.3	0.67	0.80	1.02	50.4
Approach		692	7.6	752	7.6	0.509	12.4	LOS B	3.2	25.3	0.68	0.80	1.04	50.7
East: Bradley Avenue														
1	L2	52	0.0	57	0.0	0.232	8.8	LOS A	0.9	6.6	0.64	0.64	0.64	52.8
6	T1	174	0.0	189	0.0	0.232	8.4	LOS A	0.9	6.6	0.63	0.63	0.63	53.8
16	R2	50	0.0	54	0.0	0.232	8.0	LOS A	0.9	6.6	0.62	0.62	0.62	53.1
Approach		276	0.0	300	0.0	0.232	8.4	LOS A	0.9	6.6	0.63	0.63	0.63	53.5
North: Bostwick Road														
7	L2	48	0.0	52	0.0	0.298	6.8	LOS A	1.3	10.2	0.49	0.42	0.49	55.2
4	T1	409	3.0	445	3.0	0.298	6.7	LOS A	1.3	10.2	0.48	0.40	0.48	55.4
14	R2	83	4.0	90	4.0	0.298	6.5	LOS A	1.3	10.0	0.47	0.39	0.47	54.1
Approach		540	2.9	587	2.9	0.298	6.7	LOS A	1.3	10.2	0.48	0.40	0.48	55.2
West: Pack Road														
5	L2	151	0.0	164	0.0	0.463	10.6	LOS B	2.8	21.5	0.67	0.75	0.90	51.3
2	T1	379	0.0	412	0.0	0.463	10.3	LOS B	2.8	21.5	0.66	0.74	0.88	52.1
12	R2	182	2.0	198	2.0	0.463	10.0	LOS B	2.8	21.4	0.65	0.72	0.87	51.6
Approach		712	0.5	774	0.5	0.463	10.3	LOS B	2.8	21.5	0.66	0.74	0.88	51.8
All Vehicles		2220	3.3	2413	3.3	0.509	9.8	LOS A	3.2	25.3	0.62	0.66	0.80	52.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [Bostwick & Pack/Bradley (Site Folder: TT 2038 PM)]

Bostwick Road & Pack Road/Bradley Avenue
Future (2038) Total Traffic
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bostwick Road														
3	L2	262	2.0	285	2.0	0.735	20.2	LOS C	8.4	64.9	0.85	1.17	1.77	45.2
8	T1	741	1.0	805	1.0	0.735	19.3	LOS C	8.8	67.3	0.85	1.16	1.75	46.6
18	R2	85	0.0	92	0.0	0.735	18.7	LOS C	8.8	67.3	0.84	1.16	1.74	46.2
Approach		1088	1.2	1183	1.2	0.735	19.5	LOS C	8.8	67.3	0.85	1.16	1.75	46.2
East: Bradley Avenue														
1	L2	102	0.0	111	0.0	0.649	26.2	LOS D	3.7	28.5	0.86	1.06	1.61	42.5
6	T1	368	0.0	400	0.0	0.649	24.5	LOS C	3.9	29.4	0.85	1.05	1.60	43.7
16	R2	71	0.0	77	0.0	0.649	23.4	LOS C	3.9	29.4	0.85	1.05	1.59	43.6
Approach		541	0.0	588	0.0	0.649	24.7	LOS C	3.9	29.4	0.85	1.06	1.60	43.5
North: Bostwick Road														
7	L2	75	0.0	82	0.0	0.559	15.5	LOS C	3.5	27.5	0.75	0.91	1.26	48.6
4	T1	431	6.0	468	6.0	0.559	15.2	LOS C	3.6	28.1	0.74	0.90	1.24	49.0
14	R2	168	1.0	183	1.0	0.559	14.2	LOS B	3.6	28.1	0.74	0.89	1.23	48.7
Approach		674	4.1	733	4.1	0.559	15.0	LOS C	3.6	28.1	0.74	0.90	1.24	48.9
West: Pack Road														
5	L2	148	0.0	161	0.0	0.451	11.4	LOS B	2.6	19.4	0.69	0.78	0.95	50.6
2	T1	330	0.0	359	0.0	0.451	10.9	LOS B	2.6	19.4	0.68	0.76	0.94	51.7
12	R2	142	4.0	154	4.0	0.451	10.8	LOS B	2.5	19.4	0.67	0.75	0.92	51.1
Approach		620	0.9	674	0.9	0.451	11.0	LOS B	2.6	19.4	0.68	0.76	0.94	51.3
All Vehicles		2923	1.6	3177	1.6	0.735	17.6	LOS C	8.8	67.3	0.79	1.00	1.43	47.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix F – Traffic Signal Warrants

IBI

OTM BOOK 12* - TRAFFIC SIGNAL WARRANT

Project: W3 Sunset Creek **Date:** September 18, 2023

Project #: 143384

Location: Colonel Talbot Road (Major Roadway) at Clayton Walk (Minor Roadway)

Orientation: North/South East/West

Municipality: City of London **Scenario:** Future (2038) Total Traffic

Justification 7 - Projected Volumes

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL AHV	SECTIONAL %	ENTIRE %
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	**720**	1080	1164	100%	33%
	B. Vehicle volume along minor roads (Average Hour)	120	170	**180**	255	59	33%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	**720**	1080	1105	100%	28%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	**75**	113	21	28%	

Projected Traffic Volumes:

Average Hourly Volume (AHV) Equation: AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	↑	62
20	883	19	←		0
↙	↓	↘	↙		0
	52	↗	↖	↑	↗
	0	→	12	1015	5
	33	↘			

PM Peak Hour Volumes

			↖	↑	34
53	1036	54	←		0
↙	↓	↘	↙		0
	31	↗	↖	↑	↗
	0	→	33	1279	14
	24	↘			

Average Hourly Volumes (AHV)

			↖	↑	24
18	480	18	←		0
↙	↓	↘	↙		0
	21	↗	↖	↑	↗
	0	→	11	573	5
	14	↘			

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above. — 1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h. — Free Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only). — 4-legged Intersection

5. All flow values for Justification 1 and 2 are to be increased by 20% in the case of new intersections, Justification 3 is to only be used for existing intersections and all flow values for Warrant 1 and Warrant 2 of Justification 7 are to be increased by 20% for existing intersections and by 50% in the case of new intersections. — New Intersection

6. The crossing volumes are defined as the sum of:
   (a) Left-turns from both minor road approaches.
   (b) The heaviest through volume from the minor road.
   (c) 50% of the heavier left turn movement from major road when both of the following are met:
      (i) the left-turn volume >120 vph
      (ii) the left-turn volume plus the opposing volume >720 vph
   (d) Pedestrians crossing the main road.

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

IBI

OTM BOOK 12* - TRAFFIC SIGNAL WARRANT

Project: W3 Sunset Creek **Date:** September 18, 2023

Project #: 143384

Location: Colonel Talbot Road (*Major Roadway*) at Diane Crescent/Royal Magnolia Avenue (*Minor Roadway*)

Orientation: North/South East/West

Municipality: City of London **Scenario:** Future (2038) Total Traffic

Justification 7 - Projected Volumes

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL AHV	SECTIONAL %	ENTIRE %
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	**720**	1080	1157	100%	91%
	B. Vehicle volume along minor roads (Average Hour)	120	170	**180**	255	164	91%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	**720**	1080	993	100%	55%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	**75**	113	41	55%	

Projected Traffic Volumes: **Average Hourly Volume (AHV) Equation:** AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	↑	312
8	831	96	←		0
↙	↓	↘	↙		80
	26	↗	↖	↑	↗
	0	→	2	688	31
	13	↘			

PM Peak Hour Volumes

			↖	↑	170
26	800	241	←		2
↙	↓	↘	↙		34
	13	↗	↖	↑	↗
	0	→	10	1142	97
	6	↘			

Average Hourly Volumes (AHV)

			↖	↑	120
9	408	84	←		1
↙	↓	↘	↙		28
	10	↗	↖	↑	↗
	0	→	3	458	32
	5	↘			

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above. — 1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h. — Free Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only). — 4-legged Intersection

5. All flow values for Justification 1 and 2 are to be increased by 20% in the case of new intersections, Justification 3 is to only be used for existing intersections and all flow values for Warrant 1 and Warrant 2 of Justification 7 are to be increased by 20% for existing intersections and by 50% in the case of new intersections. — New Intersection

6. The crossing volumes are defined as the sum of:
   (a) Left-turns from both minor road approaches.
   (b) The heaviest through volume from the minor road.
   (c) 50% of the heavier left turn movement from major road when both of the following are met:
      (i) the left-turn volume >120 vph
      (ii) the left-turn volume plus the opposing volume >720 vph
   (d) Pedestrians crossing the main road.

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

Appendix G – Auxiliary Left-Turn Lane Warrant Analysis

November 30, 2023

Colonel Talbot Road & Clayton Walk | Northbound Left-Turn | AM Peak Hour

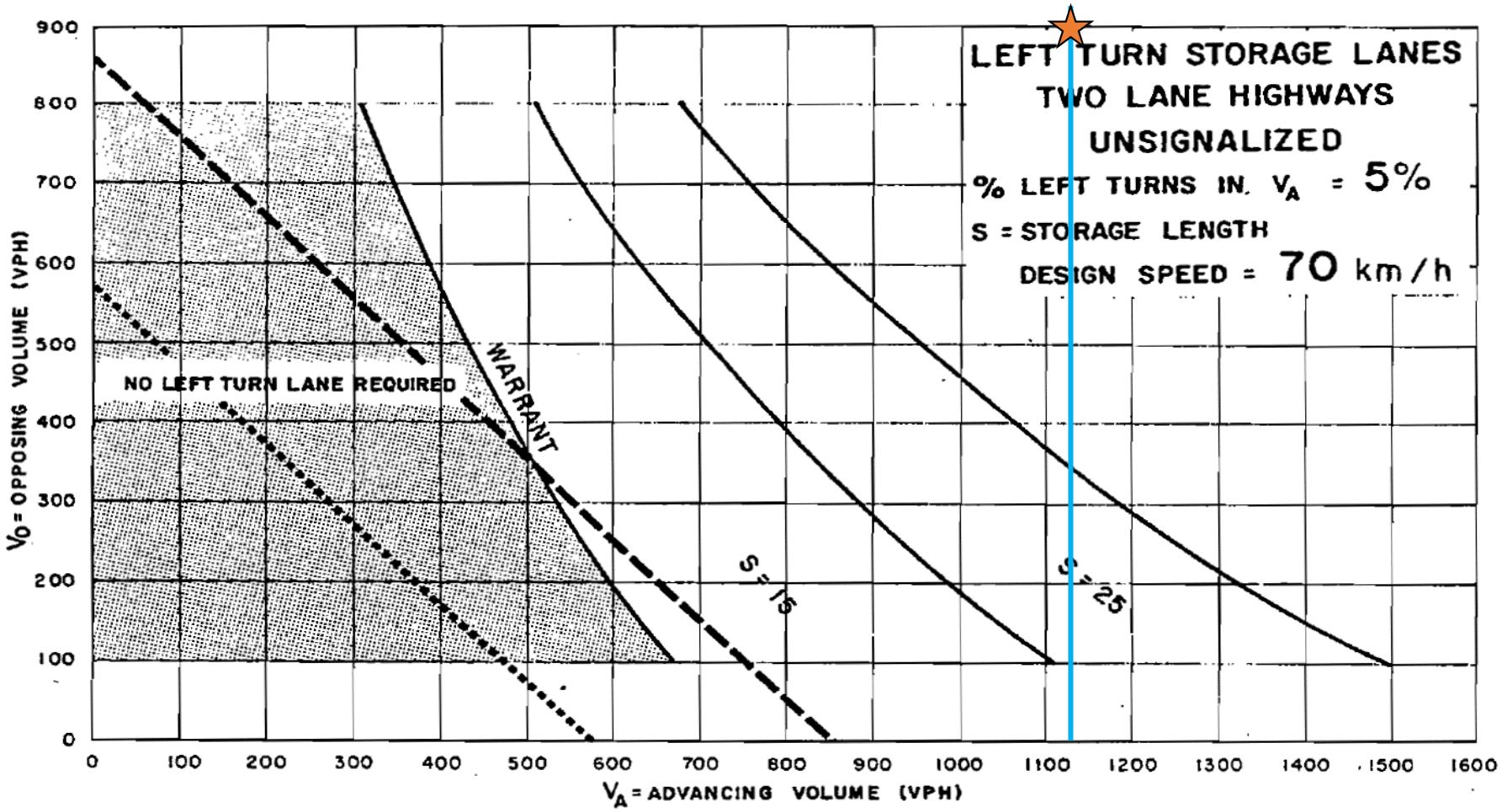
Left-turn volume represents less than 5% of approaching volumes. As such, left-turn warrant analysis can not be completed.

Colonel Talbot Road & Clayton Walk | Southbound Left-Turn | AM Peak Hour

Left-turn volume represents less than 5% of approaching volumes. As such, left-turn warrant analysis can not be completed.

Colonel Talbot Road & Clayton Walk | Northbound Left-Turn | PM Peak Hour

Left-turn volume represents less than 5% of approaching volumes. As such, left-turn warrant analysis can not be completed.



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume

Colonel Talbot Road & Clayton Walk | Southbound Left-Turn | PM Peak Hour