



STRIK
BALDINELLI
MONIZ

PLANNING • CIVIL • STRUCTURAL • MECHANICAL • ELECTRICAL

TRANSPORTATION IMPACT STUDY

1025 ELGIN STREET WEST

COBOURG, ONTARIO

PROPOSED COMMERCIAL BUILDING

TRI BATE ASSET MANAGEMENT

MAY 2021

SBM-21-1211

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May 31, 2021
SBM-21-1211

Attn: David Traher

**Re: Transportation Impact Study
1025 Elgin Street West
Cobourg, Ontario**

Mr. Traher

Strik, Baldinelli, Moniz Ltd. is pleased to provide you with the enclosed Transportation Impact Study report for the proposed commercial development at 1025 Elgin Street West in Cobourg, Ontario. The report concludes that the development proposal can generally be accommodated by the existing transportation network with no significant impact to traffic operations.

We trust this submission meets your satisfaction and will assist with the approval of your development. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,
Strik, Baldinelli, Moniz Ltd.
Civil • Structural • Mechanical • Electrical



Jonah Lester, P.Eng.
Transportation Engineer



EXECUTIVE SUMMARY

This Transportation Impact Study (TIS) has been prepared by Strik, Baldinelli, Moniz Ltd. (SBM) for Tri Bate Asset Management to identify transportation impacts, or a lack thereof, associated with the proposed commercial development located at 1025 Elgin Street West in Cobourg, Ontario. The development is proposed to include a single building (five commercial units) with a total of approximately 650 m² (7,050 ft²) of gross floor area and site access via the existing access to Elgin Street West and connections to the adjacent commercial properties.

This study has forecasted traffic volumes for a 2026 horizon year and assessed traffic operations within the vicinity of the subject site for existing, future background and future total traffic conditions. Site access and active transportation considerations have also been assessed. Based on the analysis completed, the following key conclusions and recommendations are made in this TIS:

- It is forecast that the proposed development will generate up to a total of 79 new trips in the PM peak hour (41 in and 38 out) and 122 new trips during the Saturday peak hour (60 in and 62 out).
- Under existing conditions, all movements at the study area intersections are operating well with reserve capacity and LOS C or better, with the exception of the southbound movement on Courthouse Road (W) at Elgin Street West, which is at LOS E and D during the PM peak hour and Saturday peak hour, respectively.
- Analysis of the 2026 background and total traffic conditions confirmed that the study area intersections, including the site accesses, will continue to operate well throughout the horizon, however, the delay for the southbound movement on Courthouse Road (W) at Elgin Street West will increase and reach LOS F. However, LOS F is not uncommon for unsignalized intersections on arterial roads and is not considered an operational concern particularly since the traffic volumes for this movement should be very low once the Golden Plough Lodge redevelopment is constructed at which point this leg of Courthouse Road will only serve the church at 594 Elgine Street West and the existing commercial building at 1000 Elgin Street West.
- Queuing analysis and left turn storage requirements were reviewed and it is concluded that the future left turn queuing/storage requirements can be accommodated by the existing intersection and lane configurations.
- The existing sidewalks and multi-use trails on the surrounding road network and the internal sidewalk connection will provide good pedestrian and cycling access to the site, which provides increased opportunity for non-auto mode site trips.
- Overall, the forecasted site traffic does not introduce any significant operational problems on the surrounding road network and no road improvements are required to accommodate the proposed development.

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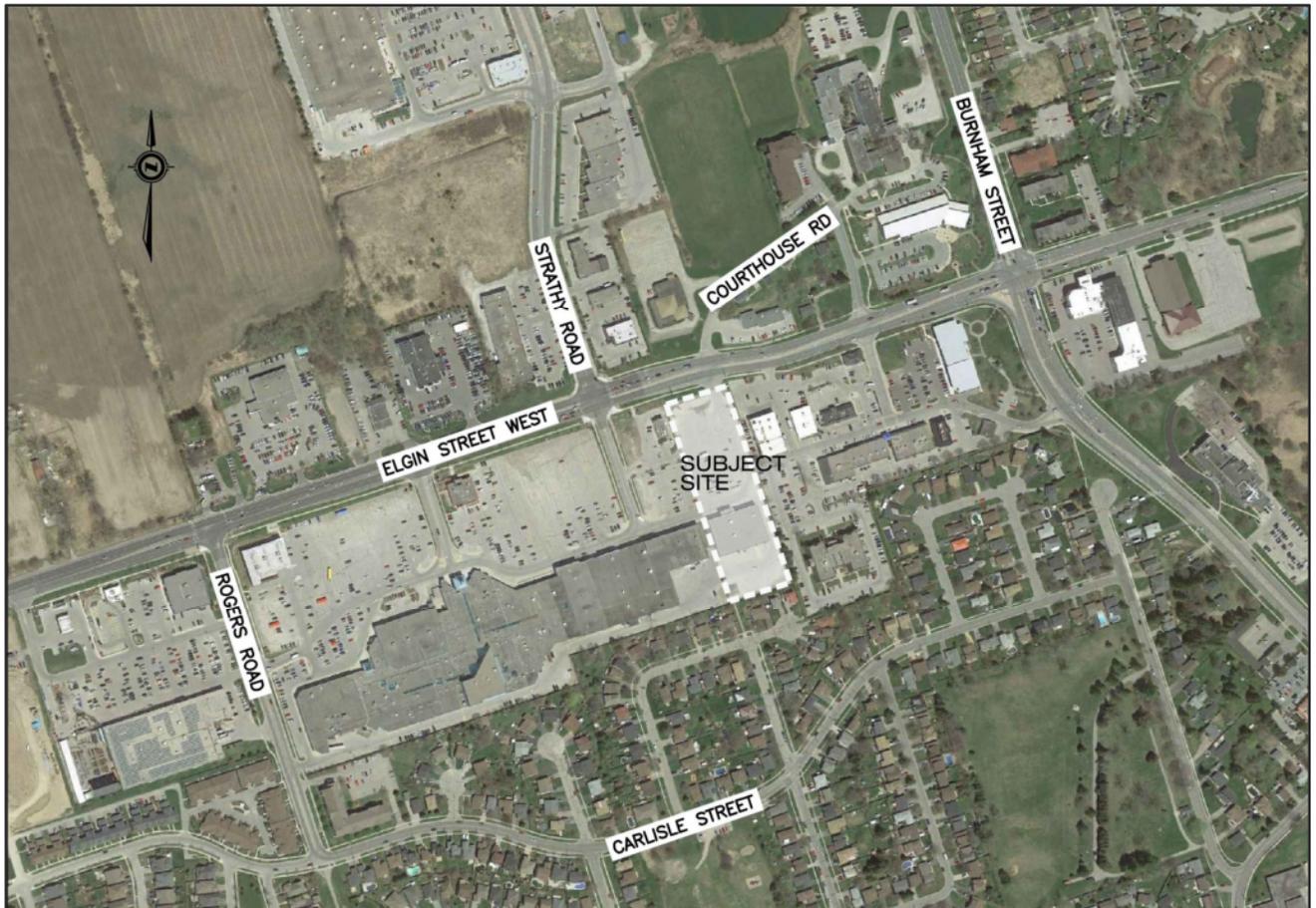
APPENDIX E – SYNCHRO OUTPUT REPORTS - 2026 TOTAL TRAFFIC

1 INTRODUCTION

This Transportation Impact Study (TIS) has been prepared by Strik, Baldinelli, Moniz Ltd. (SBM) for Tri Bate Asset Management to identify transportation impacts, or a lack thereof, associated with the proposed commercial development located at 1025 Elgin Street West in Cobourg, Ontario. The development is proposed to include a single building (five commercial units) with a total of approximately 650 m² (7,050 ft²) of gross floor area and site access via the existing access to Elgin Street West and connections to the adjacent commercial properties.

The location of the proposed development is illustrated in Figure 1.

Figure 1: Site Location



Aerial Image Source: Google Earth (May 2018 imagery)

1.1 SCOPE AND METHODOLOGY

The general scope of the analysis in this study is summarized in Table 1. The TIS scope was confirmed with Town of Cobourg (Town) and County of Northumberland (County) staff prior to commencing the study.

Table 1: Study Scope and Parameters

Study Scope and Parameters	
Analysis Intersections (Study Area)	<ul style="list-style-type: none"> • Elgin Street West / Strathy Road / Northumberland Mall Access • Elgin Street West / Courthouse Road (west leg) / Site Access • Elgin Street West / Courthouse Road (east leg) / Plaza Access
Analysis Time Periods	<ul style="list-style-type: none"> • Weekday PM peak hour • Saturday peak hour
Analysis Scenarios (Years)	<ul style="list-style-type: none"> • Existing Traffic • 2026 Background Traffic • 2026 Total Traffic

The intersection operational analysis has been performed using Synchro 11 software based on the Highway Capacity Manual 2000 (HCM 2000) methodology published by the Transportation Research Board National Research Council.

The operational analysis has identified all critical movements within the study area, which have been defined as:

- Any movements where the 95th percentile queue exceeds available storage.
- Through movements and shared through/turning movements with a volume to capacity ratio (v/c ratio) of 0.85 or higher at signalized intersections.
- Exclusive turning movements at signalized intersections with a v/c ratio of 0.9 or higher.
- Any movement at an unsignalized intersection with a Level of Service (LOS) F or worse.

Level of Service (LOS) is a function of the average control delay for an entire intersection or an individual movement. The relationships between the LOS letters and average delay ranges are defined in Table 2 for signalized and unsignalized intersections.

Table 2: Vehicular Level of Service Designations

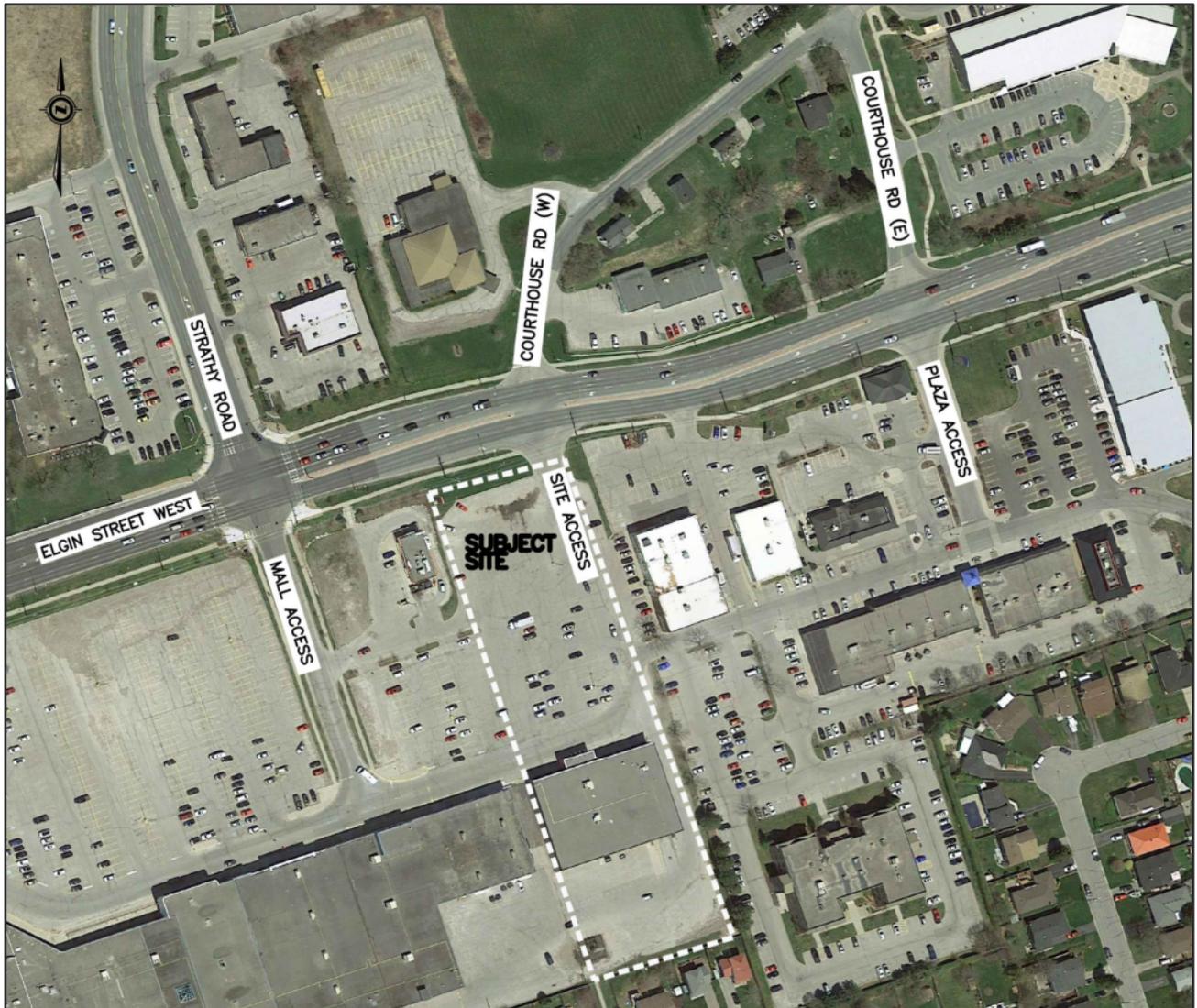
LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (s)	
	SIGNALIZED INTERSECTION	UNSIGNALIZED INTERSECTION
A	≤ 10	≤ 10
B	10 to 20	10 to 15
C	20 to 35	15 to 25
D	35 to 55	25 to 35
E	55 to 80	35 to 50
F	> 80	> 50

2 EXISTING CONDITIONS

2.1 SITE CONTEXT

The development site has a total area of approximately 1.2 hectares and is located on the south side of Elgin Street West, east of Strathy Road. The site currently contains an existing commercial building of approximately 1850 m² (Staples) with paved parking areas on the remainder of the site. It is bounded by Elgin Street West to the north, the Northumberland Mall with adjoining parking lot to the west, a commercial plaza to the east, and residential land to the south, as shown in Figure 2.

Figure 2: Study Area



Aerial Image Source: Google Earth (May 2018 imagery)

2.2 EXISTING ROAD NETWORK

The existing road network is described below and the existing lane configurations, traffic control and storage lengths are illustrated in Figure 3.

Elgin Street West (County Road 2) is an arterial road running east-west through the north end of the Town that is under the jurisdiction of the County. Through the study area, Elgin Street West has a four-lane

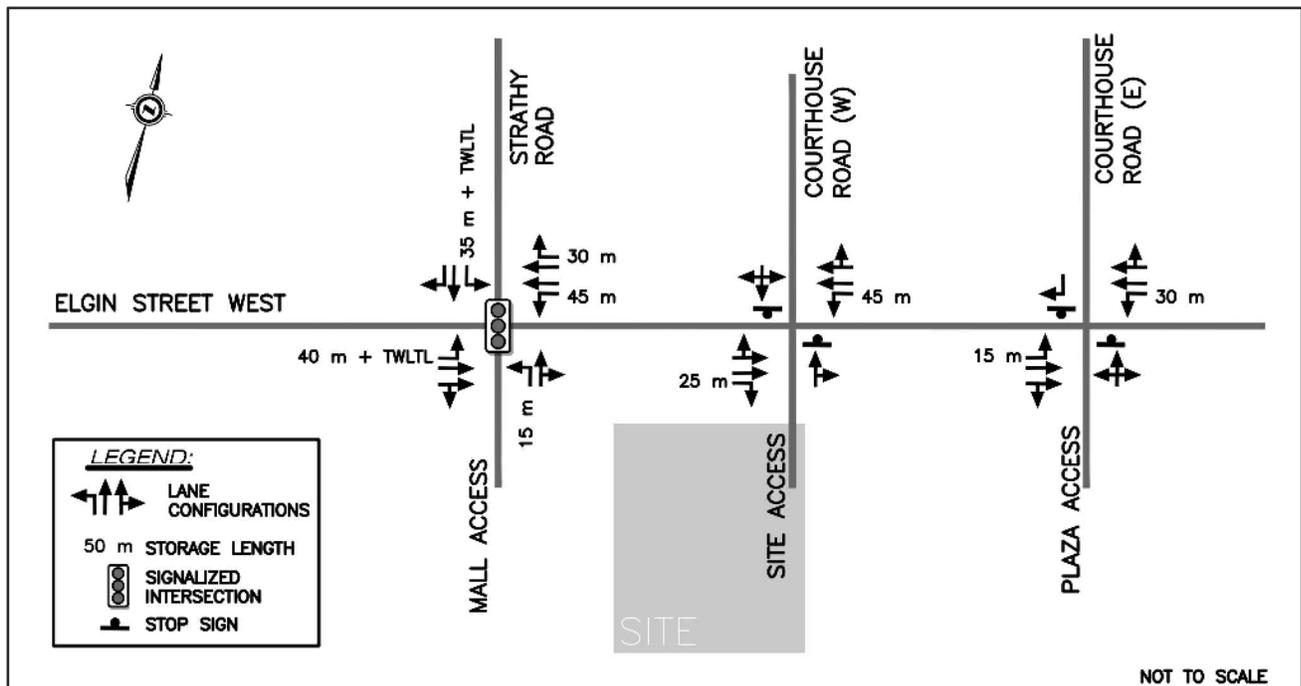
urban cross-section (curb and gutter) with left turn lanes at intersections, a sidewalk on north side of the road and a paved multi-use path in the south boulevard. The posted speed limit is 50 km/h and on-street parking is prohibited.

Strathy Road is a north-south collector road running north of Elgin Street West with an assumed (unposted) speed of 50 km/h under the jurisdiction of the Town. It has a four-lane urban cross-section with left turn lanes at intersections. There is an existing sidewalk on the west side of the road and a paved multi-use pathway in the east boulevard. On-street parking is prohibited.

The south leg of the Elgin Street West and Strathy Road intersection is an access to the commercial plaza and Northumberland Mall parking lot. It has a two-lane urban cross-section with sidewalks on both sides and there is a left turn lane at Elgin Street West. For the purpose of this report, it is referred to as the Mall Access. Parking is prohibited along the access roadway.

Courthouse Road is a two-lane local road that loops around to the north of Elgin Street West, connecting to Elgin Street West in two locations. For the purpose of this report we have referred to the east and west sections of Courthouse Road as Courthouse Road (W) and Courthouse Road (E), respectively. Courthouse Road has an assumed (unposted) speed limit of 50 km/h and is under the jurisdiction of the Town. Courthouse Road (E) has an urban cross-section (curb and gutter) with a sidewalk on the east side. At Elgin Street West, the southbound movement on Courthouse Road (E) is restricted to only right turn movements. Courthouse Road (W) has a semi-urban cross-section, generally without curb and gutter, and no sidewalk.

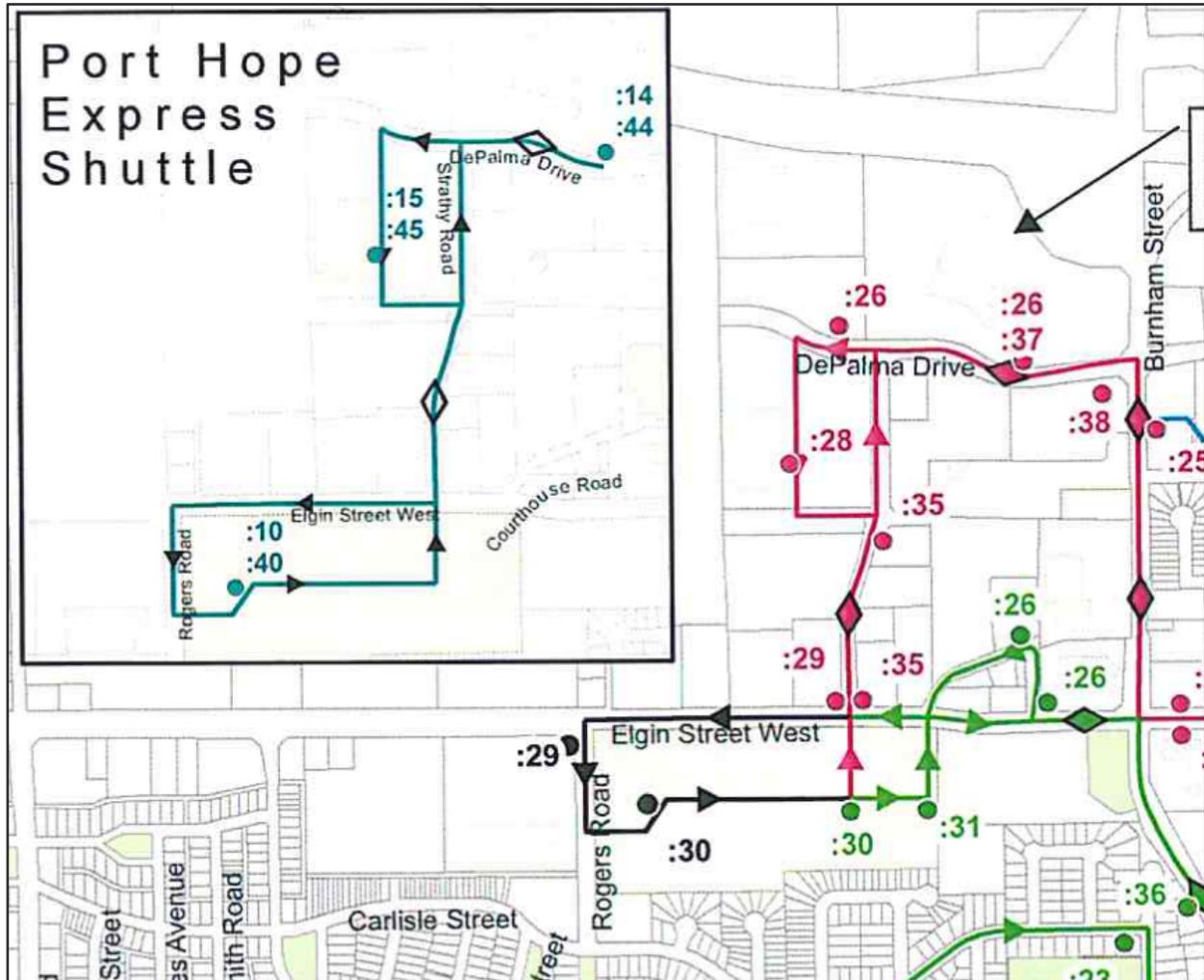
Figure 3: Existing Study Area Traffic Control and Lane Configuration



2.3 EXISTING TRANSIT SERVICES

The study area is currently served by both of the Town’s conventional bus routes (Routes 1 and 2), as shown in the excerpt from the Cobourg Transit Schedule shown in Figure 4. The conventional bus routes run on 1-hour loops between 6:15 AM and 7:45 PM Monday to Friday, between 8:15 AM and 6:45 PM on Saturdays, and between 8:45 AM and 3:45 PM on Sundays. The nearest bus stops are on Strathy Road at Elgin Street West for Route 1 and on the subject site, in front of the Staples building, for Route 2, so the site is very well served by existing transit system.

Figure 4: Excerpt of Transit Routes Map from the Cobourg Transit Schedule (2019)



Source: Cobourg Transit Schedule (2019)

A new on-demand bus service called Cobourg Rides has recently started a first trial phase that will run until June 14th, 2021. During the first phase, the existing transit routes remain operational. During the second phase (after June 14th), the existing fixed routes will no longer run. The on-demand bus service will allow passengers to request/schedule a pick-up in advance and provide real-time tracking of the transit vehicle’s location. The service will use the existing transit stops plus additional “virtual stops”, so the study area will continue to be well served by the new transit system.

2.4 ACTIVE TRANSPORTATION FACILITIES

Existing sidewalks are available on the north side of Elgin Street West and the west side of Strathy Road. An on-road/in-boulevard trail on Elgin Street West was recommended in the Town of Cobourg Transportation Master Plan (HDR/iTRANS, August 2011) and the Northumberland County Transportation Master Plan (WSP, March 2017), which has since been implemented in the south boulevard in 2019, providing a dedicated cycling facility through the study area. Strathy Road also has a multi-use trail in the east boulevard.

2.5 EXISTING TRAFFIC VOLUMES

Since March of 2020, the Ontario government has implemented various levels of social, business, and schooling restrictions in response to the COVID-19 pandemic. These measures are ongoing and in most areas they have significantly altered traffic volumes and patterns, therefore new traffic counts taken at the time of this study would likely not be representative of normal (pre-pandemic) traffic conditions. Fortunately, relatively recent traffic data for this study area is available from the following Transportation Impact Studies:

- Northumberland Mall – Proposed Driveway Relocation and Commercial Addition Updated TIS (LEA Consulting Ltd., April 2020)¹, hereby referred to as the LEA TIS
- Golden Plough Lodge and County Archives Redevelopment TIS Update (Paradigm Transportation Solutions Limited, August 2019)², hereby referred to as the Paradigm TIS

For the Elgin Street West and Strathy Road intersection, 2019 (Friday PM and Saturday peak hour) and 2020 (weekday AM and PM peak hour) counts were available from the LEA TIS. A review of the data indicates that the Friday PM peak hour volumes are slightly higher than the weekday PM peak hour, therefore we have used the 2019 data for Friday PM and Saturday peak hour.

For the Elgin Street West and Courthouse Road (E)/(W) intersections, a 2016 (weekday AM and PM peak hour) count was available from the Paradigm TIS. A comparison of the PM and Saturday peak hour volumes entering/exiting Northumberland Mall at Elgin Street West and Strathy Road shows the PM peak hour traffic is very similar to the Saturday peak hour, so we have used the PM peak hour volumes for the Elgin Street West and Courthouse Road (E)/(W) intersections to also represent the Saturday peak hour condition with through volumes on Elgin Street West being balanced to match the Saturday peak hour volumes at the Elgin Street West and Strathy Road intersection.

The following summarizes the base turning movement count collection dates and the raw traffic count data is provided in Appendix A:

- Elgin Street West and Strathy Road / Mall Access (from LEA TIS)
 - Friday May 24, 2019 and Saturday May 25, 2019
- Elgin Street West and Courthouse Road (W) / Site Access (from Paradigm TIS)

¹ LEA Consulting Ltd., Northumberland Mall – Proposed Driveway Relocation and Commercial Addition Updated Transportation Impact Study, April 2020
<https://www.cobourg.ca/en/resources/Planning-Attachments/Planning-Applications/1111-Elgin-Street/SPA---1111-Elgin-St.-W/Transportation-Impact-Study.pdf>

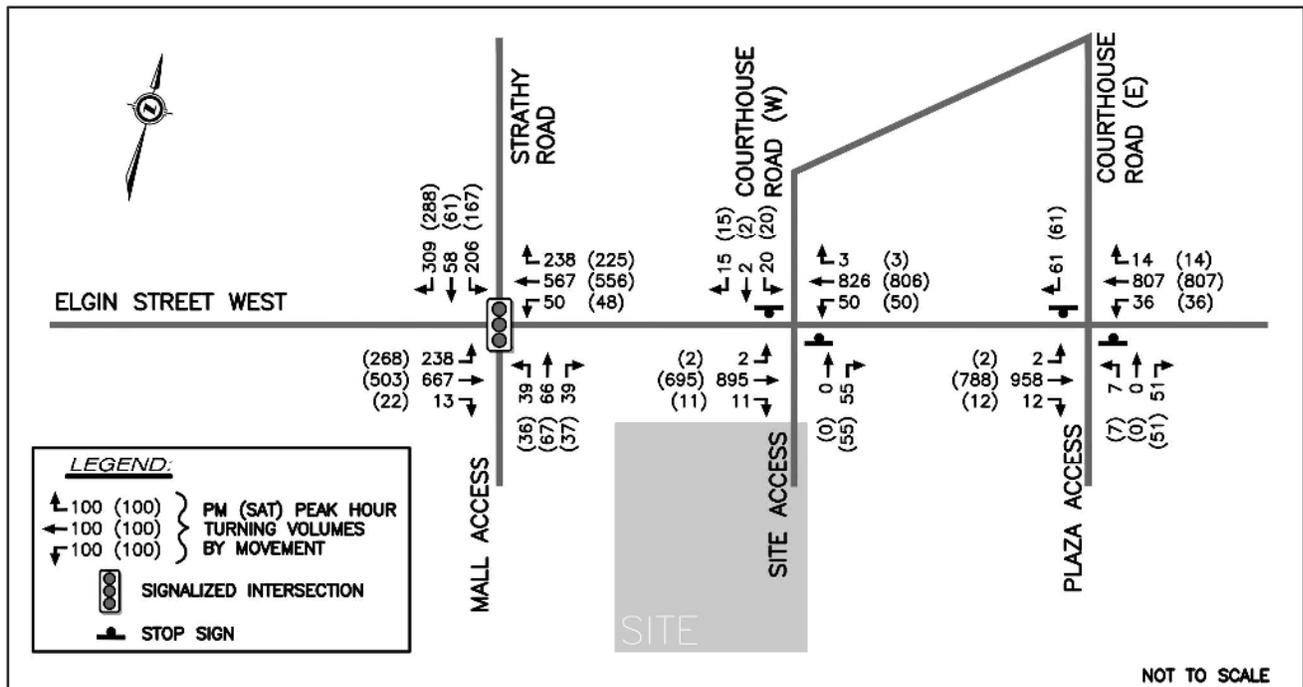
² Paradigm Transportation Solutions Limited, Golden Plough Lodge and County Archives Redevelopment Transportation Study Update, August 2019
<https://www.cobourg.ca/en/resources/Planning-Attachments/Planning-Applications/Golden-Plough-Lodge/18015-GPL-Traffic-Report.pdf>

- Thursday June 2, 2016
- Elgin Street West and Courthouse Road (E) / Plaza Access (from Paradigm TIS)
 - Thursday June 2, 2016

The base (2016 and 2019) turning movement count volumes were increased by an annual growth rate of 2% up to 2021, and Elgin Street West volumes between the intersections were balanced where necessary, to establish a best estimate (and most likely a conservative estimate) of “normal” peak hour 2021 traffic conditions for the study area.

The resulting “existing” peak hour traffic volumes are illustrated in Figure 5.

Figure 5: Existing Peak Hour Traffic Volumes



2.6 EXISTING TRAFFIC OPERATIONS AND QUEUING

Existing traffic operations were assessed for the study area based on the existing lane configurations and traffic volumes presented in Sections 2.2 and 2.5. The signal timing for the Elgin Street West and Strathy Road intersection was based on the County’s signal timing plan that was included in the LEA TIS.

Table 3 provides a summary of the existing intersection operations and complete Synchro output reports are provided in Appendix B.

Table 3: Existing Intersection Operations

INTERSECTIONS / MOVEMENTS		2021 TRAFFIC					
		PM PEAK HOUR			SATURDAY PEAK HOUR		
		V/C	LOS	Delay	V/C	LOS	Delay
Elgin Street West and Strathy Road / Mall Access	Overall	0.55	C	21	0.55	C	21
	EB L	0.52	B	13	0.56	B	13
	EB TR	0.47	B	18	0.36	B	16
	WB L	0.16	B	17	0.13	B	16
	WB T	0.51	C	24	0.50	C	24
	WB R	0.15	C	20	0.14	B	20
	NB L	0.16	C	29	0.15	C	29
	NB TR	0.39	C	34	0.40	C	34
	SB L	0.47	C	21	0.40	C	21
	SB T	0.13	C	25	0.15	C	25
SB R	0.20	C	25	0.19	C	26	
Elgin Street West and Courthouse Road (W) / Site Access	EB LT	0.37	A	0	0.28	A	0
	EB R	0.01	A	0	0.01	A	0
	WB L	0.06	A	10	0.05	A	9
	WB TR	0.34	A	0	0.33	A	0
	NB TR	0.07	A	10	0.07	A	10
SB LTR	0.27	E	38	0.23	D	32	
Elgin Street West and Courthouse Road (E) / Plaza Access	EB L	0.00	A	10	0.00	A	10
	EB TR	0.39	A	0	0.32	A	0
	WB L	0.05	B	10	0.05	A	10
	WB TR	0.33	A	0	0.33	A	0
	NB LTR	0.16	C	16	0.14	C	15
	SB R	0.12	B	13	0.12	B	13
Notes: V/C - Volume to Capacity Ratio, LOS – Level of Service, Delay = Average Delay in Seconds EB – Eastbound, WB – Westbound, NB – Northbound, SB - Southbound L – Left, T – Through, R – Right							

From the results shown, it can be seen that the existing intersections are operating well with all v/c ratios below 0.6 and all movements at LOS C or better with the exception of the southbound movement on Courthouse Road (W), which is operating acceptably but with longer delay at LOS E and D during the PM peak hour and Saturday peak hour, respectively.

Queuing results were also reviewed by comparing the 95th percentile queue length from the Synchro analysis with the available storage length for the turn lanes within the study area in order to determine where queues may block adjacent lanes. The results are summarized in Table 4.

Table 4: Existing Intersection Queuing

INTERSECTIONS / MOVEMENTS		AVAILABLE STORAGE (m)	95 th PERCENTILE QUEUE (m)	
			2021 TRAFFIC	
			PM	SATURDAY
Elgin Street West and Strathy Road / Mall Access	EB L	40 ¹	35	40
	WB L	45	9	9
	WB R	30	19	18
	NB L	15	10	10
	SB L	35 ¹	18	33
Elgin Street West and Courthouse Road (W) / Site Access	WB L	45	<5	<5
	NB TR	N/A	<5	<5
	SB LTR	N/A	8	6
Elgin Street West and Courthouse Road (E) / Plaza Access	EB L	15	<5	<5
	WB L	30	<5	<5
	NB LTR	N/A	<5	<5
	SB R	N/A	<5	<5
Notes: EB – Eastbound, WB – Westbound, NB – Northbound, SB - Southbound L – Left, T – Through, R – Right ¹ Existing upstream TWLTL could provide additional storage if needed				

The existing queuing results show that the turn lane storage lengths sufficiently accommodate the 95th percentile queues for the existing traffic volumes.

3 FUTURE BACKGROUND TRAFFIC

Future background traffic forecasts typically include existing traffic with a general growth rate applied, plus traffic anticipated to be generated from specific developments surrounding the study area. For the purpose of this study, a horizon year of 2026 has been selected for future traffic projections and analysis based on a five-year post-development horizon period (assumed new building completion in 2021).

3.1 BACKGROUND GROWTH RATE

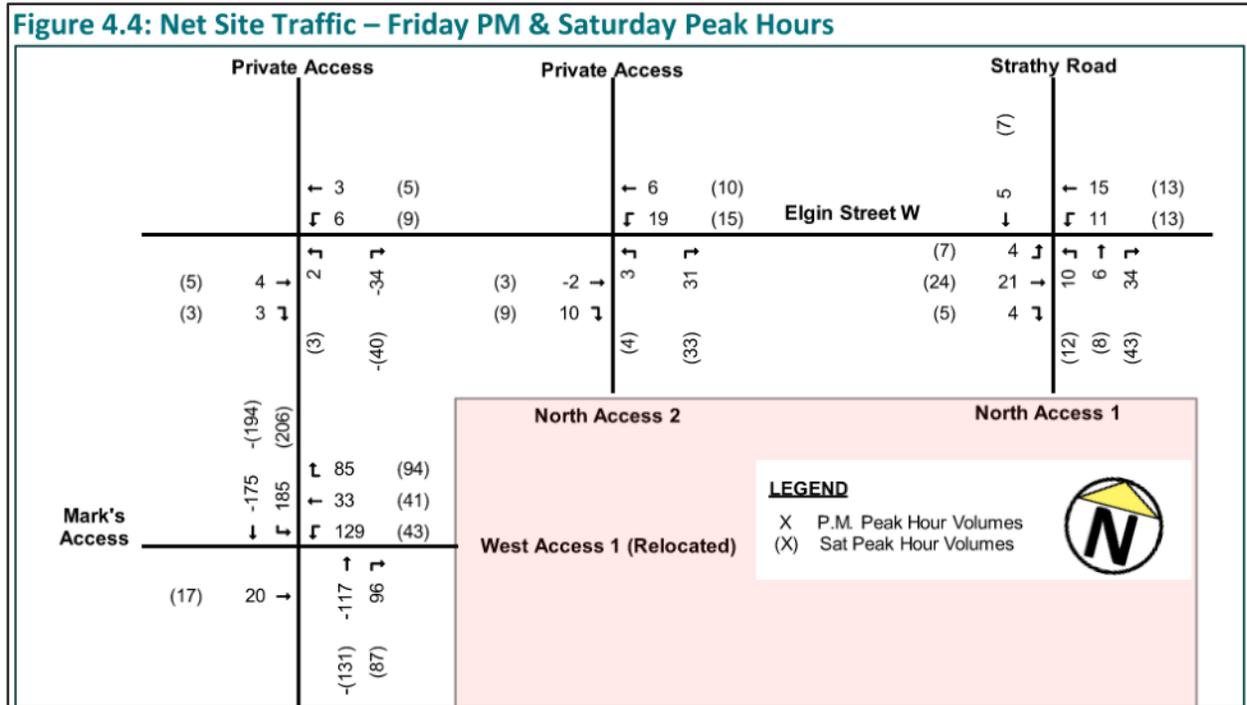
For the 2026 horizon year, a background growth rate of 2% per year has been used, which is consistent with the background growth rate used in the LEA TIS and Paradigm TIS.

3.2 BACKGROUND DEVELOPMENT TRAFFIC

The Town and County requested that the forecasted development traffic from the proposed freestanding 930 m² commercial building at 1111 Elgin Street West (as per the LEA TIS) and the Golden Plough Lodge Redevelopment project (as per the Paradigm TIS) be accounted for in the future background traffic.

Figure 6 is an excerpt of Figure 4.4 from the LEA TIS that shows the PM and Saturday peak hour site traffic associated with the proposed commercial building at 1111 Elgin Street West, which also accounted for some redistributed mall traffic related to a proposed mall access relocation on Rogers Road.

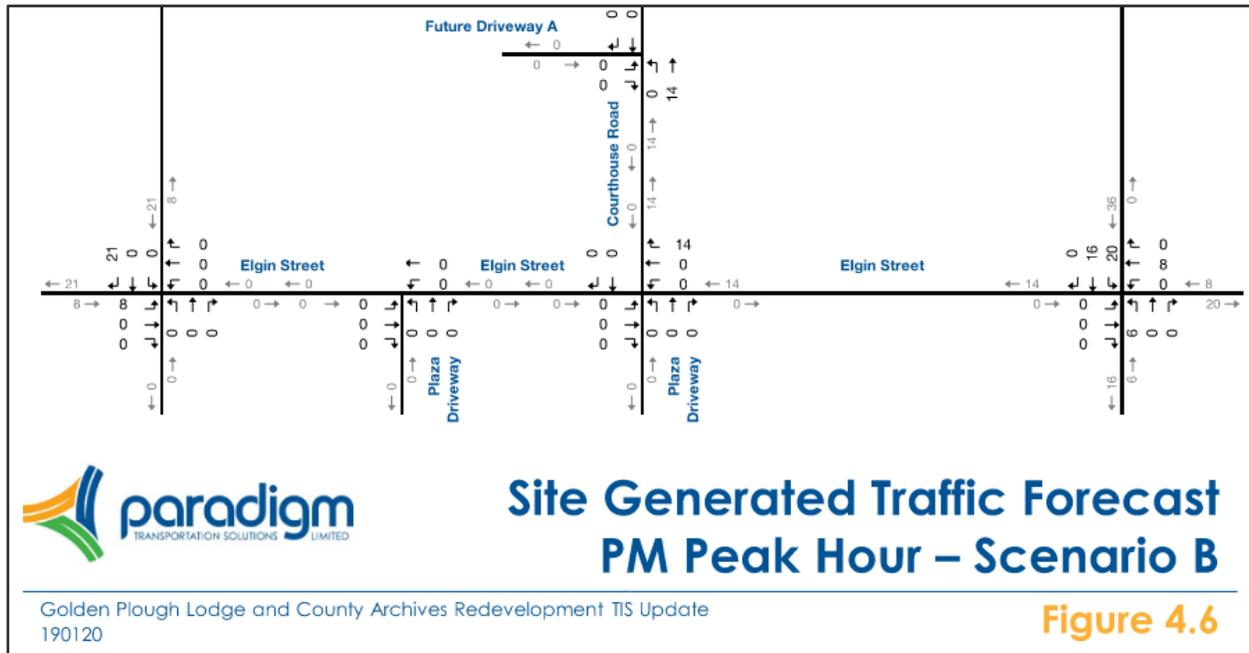
Figure 6: Excerpt of Figure 4.4 from LEA TIS Showing Site Traffic from New Commercial Building and Relocated Mall Access



Source: Northumberland Mall – Proposed Driveway Relocation and Commercial Addition Updated TIS (LEA Consulting Ltd., April 2020)

Figure 7 is an excerpt of Figure 4.6 from the Paradigm TIS that shows the PM peak hour site traffic associated with the proposed Golden Plough Lodge Redevelopment. Two site traffic scenarios were presented in the Paradigm TIS, so we have used Scenario B since it has higher traffic volumes through the subject study area. Saturday peak hour site traffic was not considered in the Paradigm TIS, so we have assumed the PM peak hour volumes will apply to the Saturday peak hour condition.

Figure 7: Excerpt of Figure 4.6 from Paradigm TIS Showing Site Traffic from the Golden Plough Lodge Redevelopment



Source: Golden Plough Lodge and County Archives Redevelopment TIS Update (Paradigm Transportation Solutions Limited, August 2019)

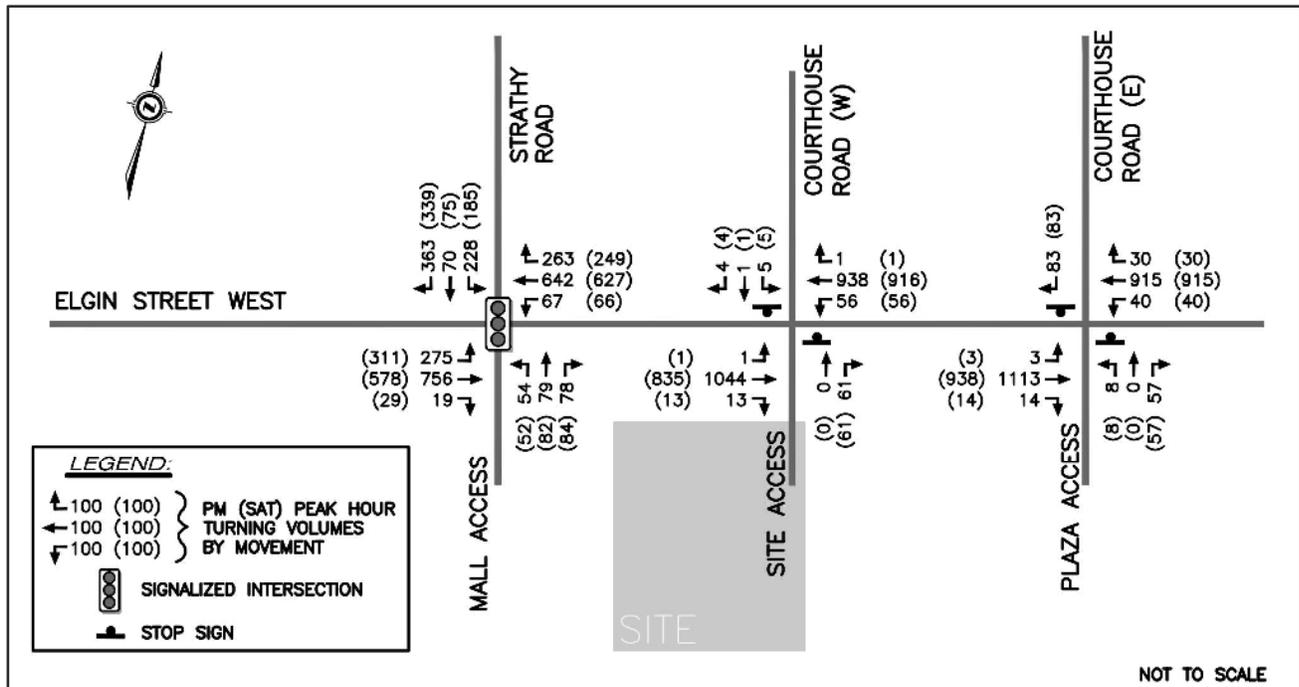
3.3 FUTURE ROAD NETWORK

No planned road improvements were identified by the Town or County for the study area, however, with the Golden Plough Lodge Redevelopment, the Courthouse Road (E) and (W) sections will no longer connect and Courthouse Road (W) will only provide access to the existing church at 594 Courthouse Road and the existing commercial building at 1000 Elgin Street West. To reflect this, we have reduced the future peak hour Courthouse Road (W) traffic to 25% of the existing traffic volumes.

3.4 2026 BACKGROUND TRAFFIC VOLUMES

Combining the background growth rate applied to the existing traffic, the background development traffic discussed in Section 3.2, and the future road network considerations per Section 3.3, the resulting 2026 background traffic volumes for the PM and Saturday peak hours are presented in Figure 8.

Figure 8: 2026 Background Traffic Volumes



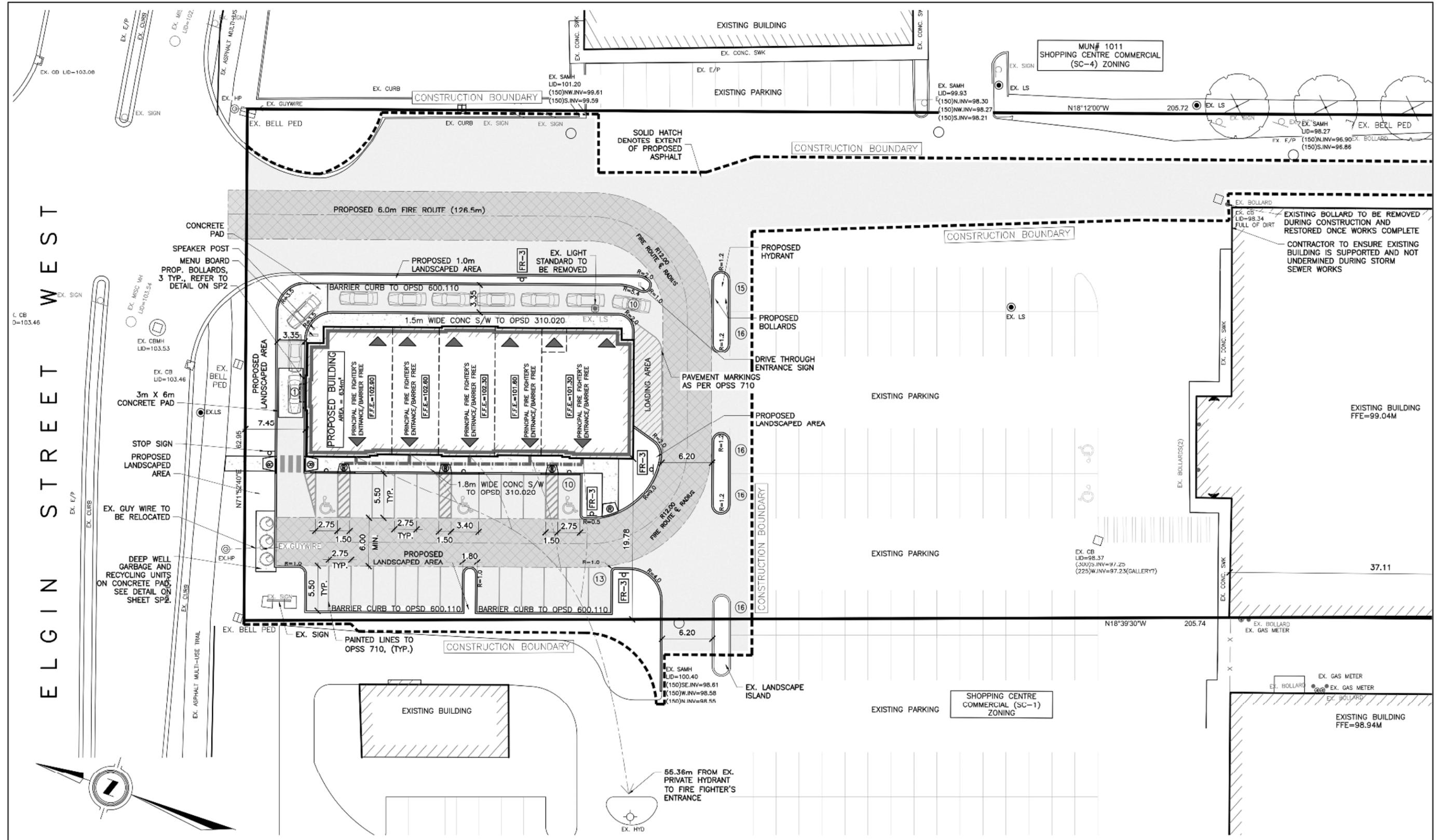
4 PROPOSED DEVELOPMENT

4.1 SITE PLAN

The proposed development will consist of one single-storey building with a total of approximately 650 m² (7,050 ft²) of gross floor area. The building is proposed to have five commercial units with one unit having a drive-through window. A cropped version of the Site Plan is provided in Figure 9 and a full version of the drawing is provided in Appendix C. Primary vehicular access to Elgin Street West will be provided via the existing Site Access and through the connected parking lot to the signalized Mall Access at the Strathay Road intersection. The site also connects to the commercial plaza to the east.

Three of the units (two at the north and one at the south of the building) are proposed to be restaurant uses, which includes the drive-through window unit, and the other two units are proposed to be for retail use.

Figure 9: Site Plan



4.2 SITE TRAFFIC GENERATION AND DISTRIBUTION

Site generated traffic volumes from the proposed development have been estimated based on trip rate information contained in the ITE *Trip Generation Manual, 10th Edition* (September 2017). Pass-by trips rates (percentages) for applicable land uses were derived from information published in the ITE *Trip Generation Handbook, 3rd Edition* (September 2017).

For the drive-through window unit, a “Fast Food with Drive-Thru” use (Land Use Code 934) has been applied and for other restaurant units, a “Fast Food Without Drive-Thru” use (Land Use Code 933) has been applied.

A general “Shopping Centre” use (Land Use Code 820) has been applied to the remaining two units.

Considering that the subject site has internal connections to the Northumberland Mall and the commercial plaza to the east, reductions for internal interaction trips (i.e. trips that make stops at multiple facilities within the connected properties) have been applied based on the data and methodology of ITE’s *Trip Generation Handbook, 3rd Edition*, however, the “Shopping Centre” use was not included in the reduction calculation since this type of internal interaction is considered to be already inherent in the “Shopping Centre” trip generation rates.

The applicable floor areas and resulting trip generation estimates for various uses described above are summarized in Table 5.

It is noted that no adjustments for non-auto mode trips have been applied, so the vehicular site traffic is considered a conservative estimate.

Table 5: Trip Generation Summary

ITE LAND USE DESCRIPTION	APPLICABLE GFA	PM PEAK HOUR TRIPS			SAT PEAK HOUR TRIPS		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Shopping Centre LUC 820	2,200 ft ²	15	17	32	12	10	22
Fast Food with Drive-Thru LUC 934	2,000 ft ²	42	38	80	55	55	110
Fast Food without Drive-Thru LUC 933	2,850 ft ²	41	40	81	76	80	156
Gross Total Trips		98	95	193	147	149	296
Pass-By Trips							
Shopping Centre LUC 820	34% PM 26% SAT	-6	-6	-12	-4	-4	-8
Fast Food with Drive-Thru LUC 934	50%	-14	-14	-28	-20	-20	-40
Fast Food without Drive-Thru LUC 933	43%	-13	-13	-26	-24	-24	-48
Internal Interaction Reduction							
Applied to all Fast Food uses	29%	-24	-24	-48	-39	-39	-78
Net New Trips		41	38	79	60	62	122

As shown in Table 5, the new trip generation (two-way) for the proposed development is forecast to be 79 and 122 trips in the PM peak and Saturday peak hours, respectively.

The forecast development traffic has been distributed over the road network based on a combination of the existing traffic patterns in the area and expected origin/destinations. Table 6 summarizes the trip distribution applied in this study.

Table 6: New Trip Distribution Summary

DIRECTION TO / FROM	VIA	IN	OUT
North	Strathy Road	20%	20%
	Courthouse Road (E)	5%	5%
West	Elgin Street West	30%	30%
East	Elgin Street West	45%	45%
Total		100%	100%

All site traffic was assigned to enter/exit the site via the study area intersections. While it is recognized that some site trips may enter/exit from alternative accesses through the surrounding commercial lots, the impact on those alternative accesses is expected to be negligible and assigning all site traffic to the study area accesses allows a conservative assessment of those key locations. When assigning the site traffic between the primary site accesses (i.e. the Site Access and the Mall Access), it was generally

assumed that motorists will use the access that provides the most direct route between their origin and destination.

The pass-by traffic was broken down as 40% from westbound Elgin Street West, 35% from eastbound Elgin Street West, 10% from northbound Strathy Road (i.e. eastbound traffic on Elgin Street West that would turn northbound onto Strathy Road), and 15% from southbound Strathy Road (i.e. southbound traffic on Strathy Road that would turn westbound onto Elgin Street West) on proportion of existing traffic volumes travelling in these directions.

The resulting site traffic from the proposed development is illustrated in Figure 10, Figure 11, and Figure 12, for new trips, pass-by trips and total trips, respectively.

Figure 10: Site Traffic – New Trips

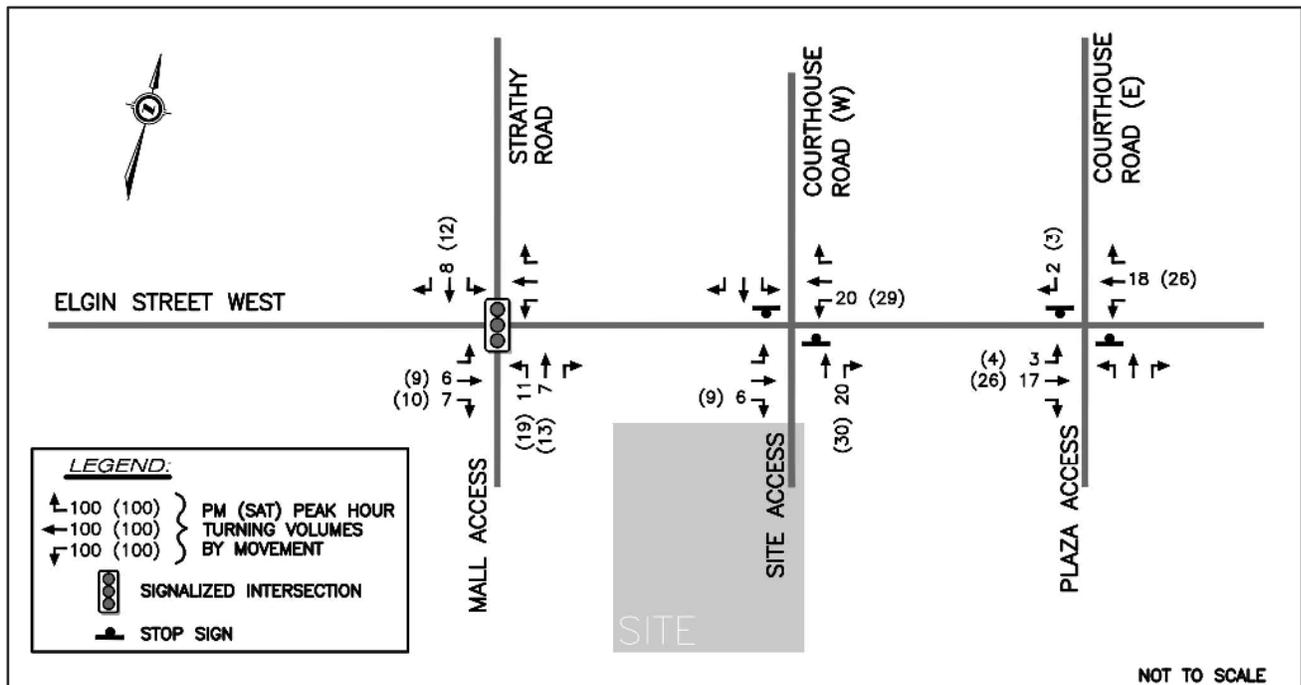


Figure 11: Site Traffic – Pass-By Trips

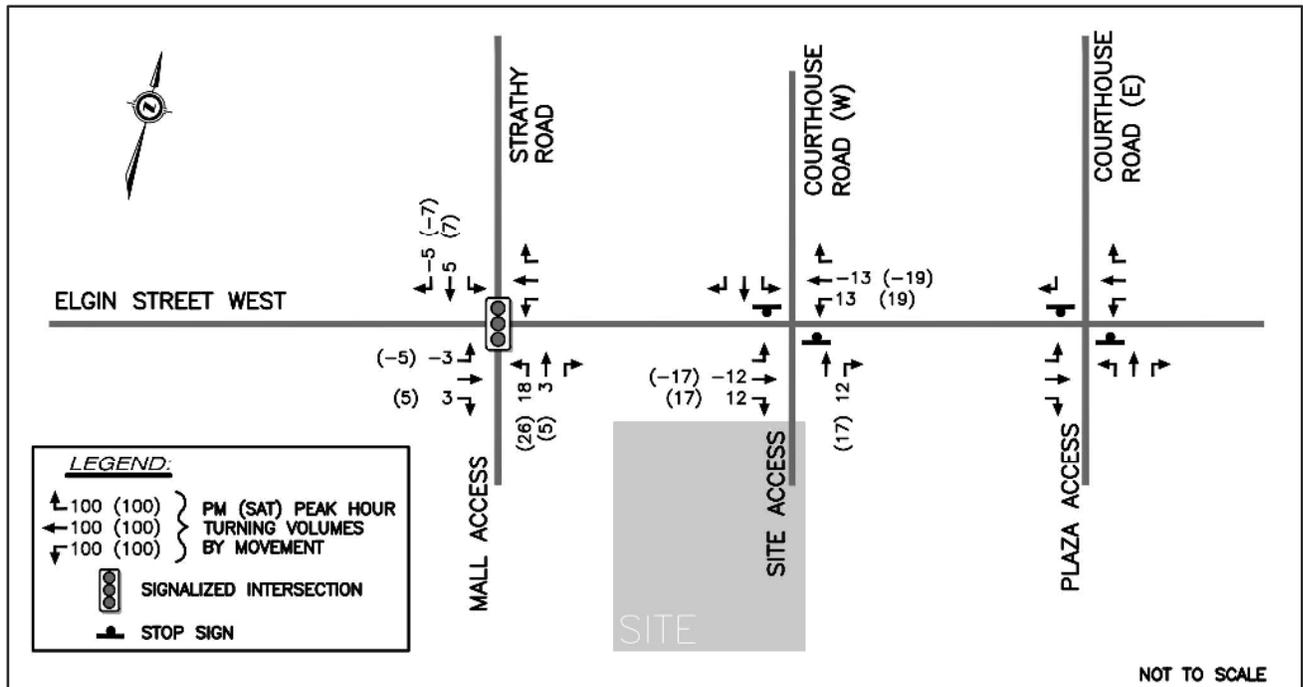
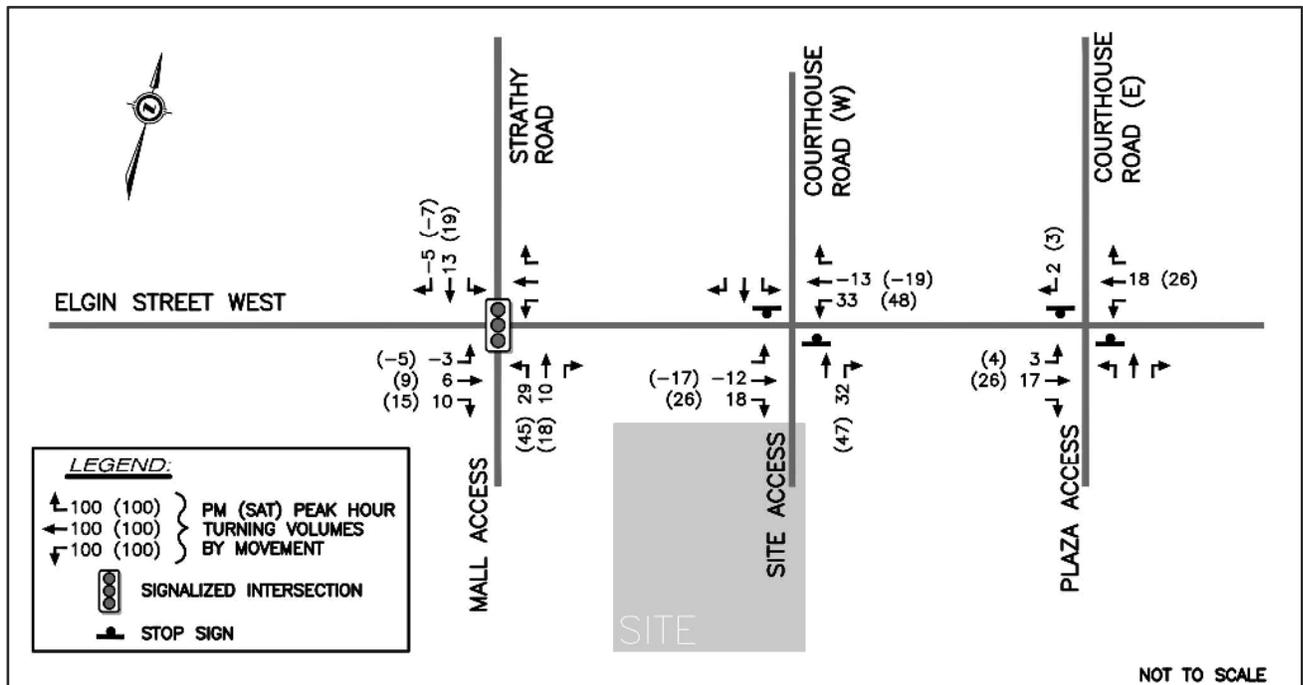


Figure 12: Site Traffic - Total



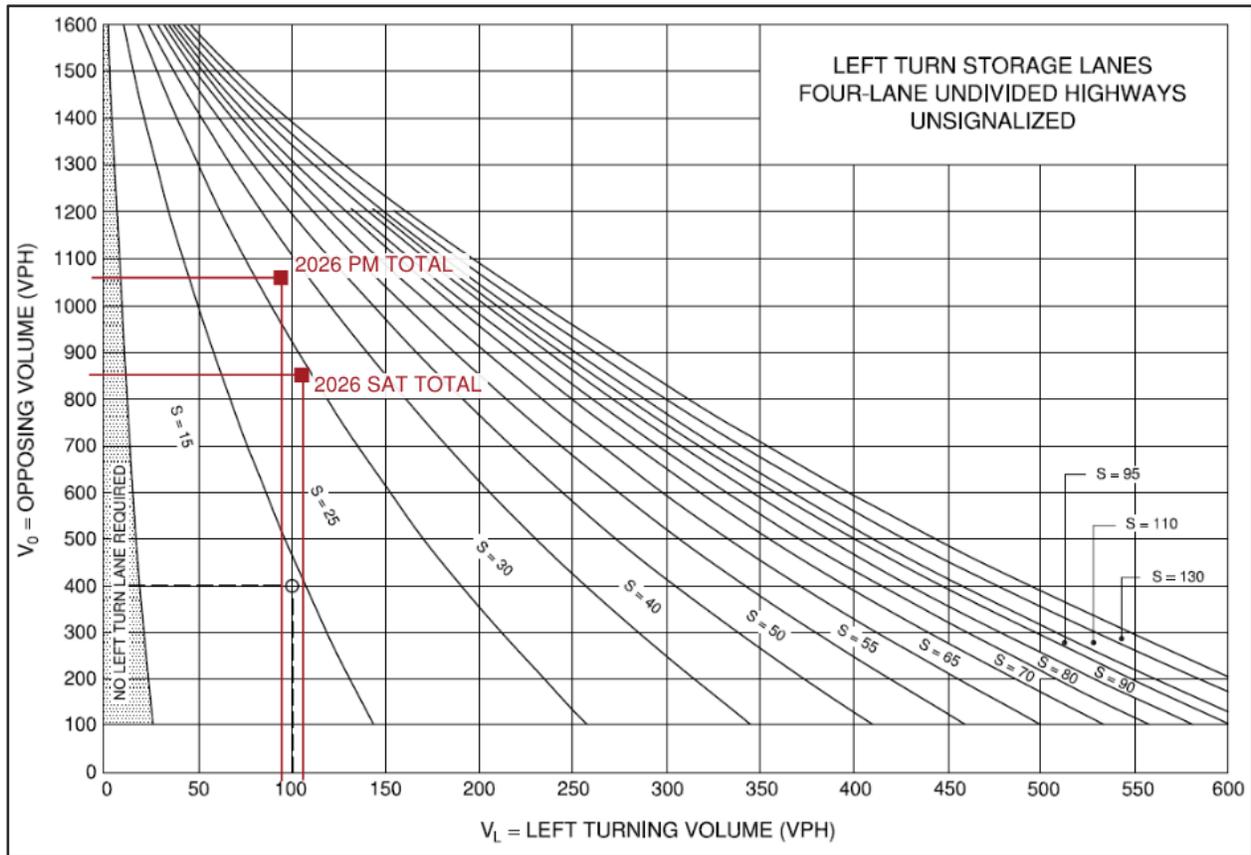
4.3 ACCESS CONSIDERATIONS

4.3.1 SITE ACCESS

The existing Site Access is located on Elgin Street West approximately 110 m east of Strathy Road (measured centerline to centerline). The access already includes an eastbound right turn lane and a westbound left turn lane and the northbound left turn movement is prohibited (by signage). Sightlines at the Site Access along Elgin Street West are good and there are no significant sight obstructions within the boulevards.

The existing westbound left turn lane on Elgin Street West at the Site Access provides a storage length of 45 m. To confirm this storage will continue to be sufficient with the additional site traffic, left turn lane warrant graphs from the Ministry of Transportation Design Supplement for the TAC Geometric Design Guide for Canadian Roads, June 2017 (MTO Design Supplement) were reviewed. For an undivided four lane road, the warrant is based on the hourly volume of left turning vehicles and the volume of opposing traffic. Using the total site traffic and 2026 background traffic (i.e. the 2026 total traffic, as presented in Section 5), the warrant graph is shown in Figure 13.

Figure 13: Left Turn Lane Storage Requirements for Site Access



Source: MTO Design Supplement

Based on the warrant graph in Figure 13, the maximum left turn storage warranted for the Site Access is 30 m, which is accommodated by the existing westbound left turn lane.

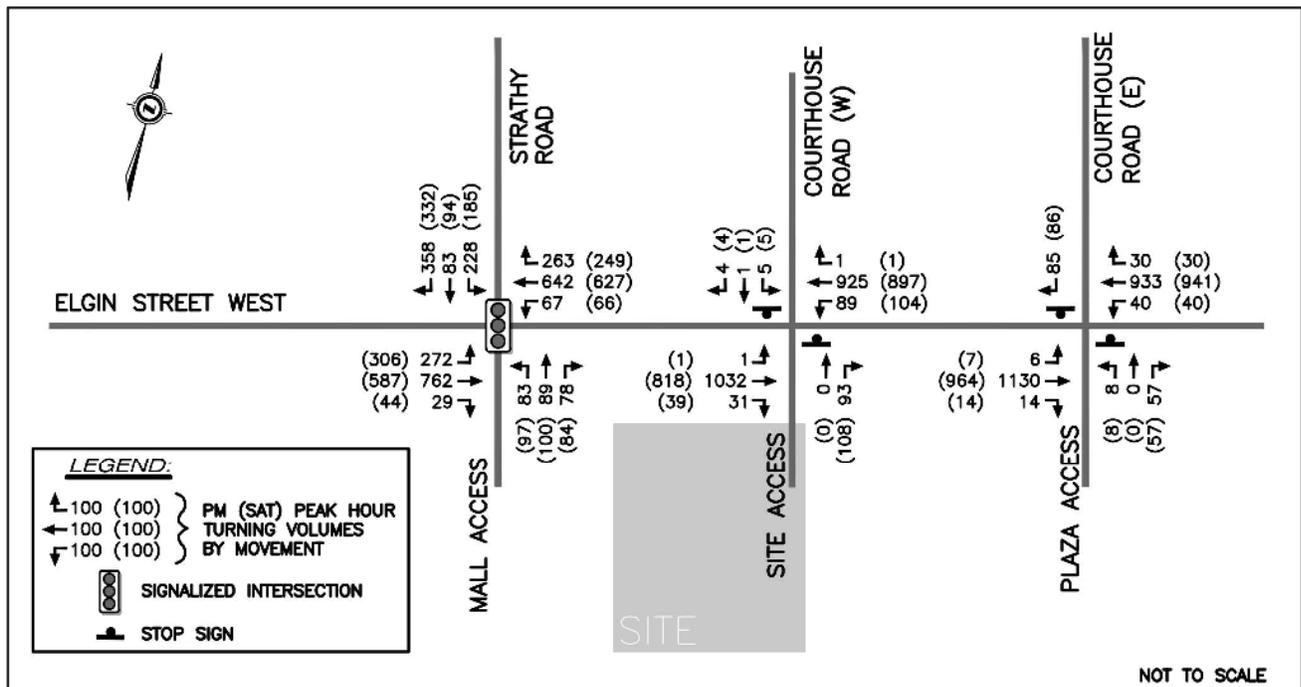
4.3.2 PEDESTRIAN AND CYCLIST ACCESS

An internal walkway is incorporated into the site plan providing a pedestrian connection to the multi-use trail on Elgin Street West. Cyclists can access the site through any of the vehicular accesses, or dismount and walk their bicycle on the internal walkway.

5 FUTURE TOTAL TRAFFIC

The total future traffic is determined by combining the development traffic (site traffic) from Section 4.2 with the future background traffic from Section 3.4. The resulting 2026 total traffic volumes for the weekday PM and Saturday peak hours are shown in Figure 14.

Figure 14: 2026 Total Traffic



6 FUTURE TRAFFIC OPERATIONAL ANALYSIS

Intersection operations were re-assessed for future background and total traffic conditions. The results of the future conditions analysis are summarized in Table 7 which also includes the existing conditions analysis results for ease of reference. Detailed Synchro reports for the future background traffic and future total traffic are available in Appendix D and Appendix E, respectively.

Table 7: Future Intersection Operations Summary

INTERSECTIONS / MOVEMENTS		EXISTING 2021						2026 BACKGROUND						2026 TOTAL						
		PM PEAK HOUR			SAT PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR			PM PEAK HOUR			SAT PEAK HOUR			
		V/C	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	
Elgin Street West and Strathy Road / Mall Access		Overall	0.55	C	21	0.55	C	21	0.67	C	25	0.67	C	24	0.67	C	25	0.67	C	24
		EB L	0.52	B	13	0.56	B	13	0.68	B	19	0.73	C	21	0.67	B	18	0.72	B	19
		EB TR	0.47	B	18	0.36	B	16	0.60	C	23	0.46	C	21	0.60	C	23	0.47	C	20
		WB L	0.16	B	17	0.13	B	16	0.24	B	18	0.19	B	18	0.24	B	18	0.19	B	18
		WB T	0.51	C	24	0.50	C	24	0.63	C	29	0.62	C	28	0.63	C	28	0.61	C	28
		WB R	0.15	C	20	0.14	B	20	0.24	C	24	0.22	C	24	0.24	C	23	0.22	C	23
		NB L	0.16	C	29	0.15	C	29	0.17	C	26	0.17	C	26	0.24	C	26	0.27	C	25
		NB TR	0.39	C	34	0.40	C	34	0.41	C	32	0.43	C	32	0.47	C	33	0.53	C	34
		SB L	0.47	C	21	0.40	C	21	0.51	C	21	0.44	C	20	0.53	C	21	0.46	C	21
		SB T	0.13	C	25	0.15	C	25	0.14	C	24	0.16	C	25	0.19	C	26	0.24	C	27
SB R	0.20	C	25	0.19	C	26	0.24	C	25	0.22	C	25	0.23	C	27	0.22	C	27		
Elgin Street West and Courthouse Road (W) / Site Access		EB LT	0.37	A	0	0.28	A	0	0.43	A	0	0.34	A	0	0.42	A	0	0.33	A	0
		EB R	0.01	A	0	0.01	A	0	0.01	A	0	0.01	A	0	0.02	A	0	0.02	A	0
		WB L	0.06	A	10	0.05	A	9	0.08	B	10	0.07	A	9	0.12	B	11	0.12	A	10
		WB TR	0.34	A	0	0.33	A	0	0.38	A	0	0.37	A	0	0.38	A	0	0.37	A	0
		NB TR	0.07	A	10	0.07	A	10	0.07	A	10	0.08	A	10	0.11	A	10	0.13	A	10
		SB LTR	0.27	E	38	0.23	D	32	0.10	E	46	0.08	E	38	0.13	F	57	0.11	F	50
Elgin Street West and Courthouse Road (E) / Plaza Access		EB L	0.00	A	10	0.00	A	10	0.00	B	10	0.00	B	10	0.01	B	10	0.01	B	10
		EB TR	0.39	A	0	0.32	A	0	0.45	A	0	0.38	A	0	0.46	A	0	0.39	A	0
		WB L	0.05	B	10	0.05	A	10	0.06	B	11	0.06	B	10	0.07	B	11	0.06	B	10
		WB TR	0.33	A	0	0.33	A	0	0.37	A	0	0.37	A	0	0.38	A	0	0.38	A	0
		NB LTR	0.16	C	16	0.14	C	15	0.24	C	22	0.21	C	19	0.26	C	24	0.23	C	21
		SB R	0.12	B	13	0.12	B	13	0.18	B	14	0.18	B	14	0.19	B	14	0.19	B	14
<p>Notes: V/C - Volume to Capacity Ratio, LOS - Level of Service, Delay = Average Delay in Seconds EB - Eastbound, WB - Westbound, NB - Northbound, SB - Southbound L - Left, T - Through, R - Right</p>																				

From the results in Table 7, we can see that the study area intersections continue to operate well under the future background and total traffic conditions. As with the existing conditions, the exception is the southbound movement on Courthouse Road (W), which continues to have longer delay and reaches LOS F during the future total traffic condition. However, this increased delay is not uncommon for left turn movements at unsignalized intersections on busy arterial roads, and since the maximum v/c ratio is only 0.13 (i.e. very low volumes), there is sufficient capacity and we have no concerns about the operations.

Queuing results for the 2026 background and total traffic conditions were reviewed from the Synchro analysis to compare 95th percentile queues with the available storage lengths and the results are presented in Table 8.

Table 8: Future Intersection Queuing Summary

INTERSECTIONS / MOVEMENTS		AVAILABLE STORAGE (m)	95 th PERCENTILE QUEUE (m)					
			2021 EXISTING		2026 BACKGROUND		2026 TOTAL	
			PM PEAK HOUR	SAT PEAK HOUR	PM PEAK HOUR	SAT PEAK HOUR	PM PEAK HOUR	SAT PEAK HOUR
Elgin Street West and Strathy Road / Mall Access	EB L	40 ¹	35	40	42	51	41	47
	WB L	45	9	9	12	12	12	12
	WB R	30	19	18	25	23	25	23
	NB L	15	10	10	13	12	18	20
	SB L	35 ¹	18	33	44	36	44	36
Elgin Street West and Courthouse Road (W) / Site Access	WB L	45	<5	<5	<5	<5	<5	<5
	NB TR	N/A	<5	<5	<5	<5	<5	<5
	SB LTR	N/A	8	6	<5	<5	<5	<5
Elgin Street West and Courthouse Road (E) / Plaza Access	EB L	30	<5	<5	<5	<5	<5	<5
	WB L	15	<5	<5	<5	<5	<5	<5
	NB LTR	N/A	<5	<5	7	6	8	7
	SB R	N/A	<5	<5	<5	<5	5	5

Notes: EB – Eastbound, WB – Westbound, NB – Northbound, SB - Southbound
L – Left, T – Through, R – Right
¹Existing upstream TWLTL could provide additional storage if needed

The results in Table 8 show that the future background traffic will cause the eastbound and southbound left turn queues to extend past their designated storage lengths, however both of these lanes have upstream two-way left turn lanes that can provide additional storage, so no blockage of through lanes will occur. Even though this queuing is not expected to cause any operational issues, it is worth noting that the site traffic does not contribute any traffic to either of these movements.

The northbound left turn queue is expected to extend 5 m past the painted storage area, however, the entire northbound approach has enough width for two lanes, so the left turn movements can queue into the taper area and will still not block the through/right turn lane movements.

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis completed, the following key conclusions and recommendations are made in this TIS:

- It is forecast that the proposed development will generate up to a total of 79 new trips in the PM peak hour (41 in and 38 out) and 122 new trips during the Saturday peak hour (60 in and 62 out).
- Under existing conditions, all movements at the study area intersections are operating well with reserve capacity and LOS C or better, with the exception of the southbound movement on Courthouse Road (W) at Elgin Street West, which is at LOS E and D during the PM peak hour and Saturday peak hour, respectively.
- Analysis of the 2026 background and total traffic conditions confirmed that the study area intersections, including the site accesses, will continue to operate well throughout the horizon, however, the delay for the southbound movement on Courthouse Road (W) at Elgin Street West will increase and reach LOS F. However, LOS F is not uncommon for unsignalized intersections on arterial roads and is not considered an operational concern particularly since the traffic volumes for this movement should be very low once the Golden Plough Lodge redevelopment is constructed at which point this leg of Courthouse Road will only serve the church at 594 Elgin Street West and the existing commercial building at 1000 Elgin Street West.
- Queuing analysis and left turn storage requirements were reviewed and it is concluded that the future left turn queuing/storage requirements can be accommodated by the existing intersection and lane configurations.
- The existing sidewalks and multi-use trails on the surrounding road network and the internal sidewalk connection will provide good pedestrian and cycling access to the site, which provides increased opportunity for non-auto mode site trips.
- Overall, the forecasted site traffic does not introduce any significant operational problems on the surrounding road network and no road improvements are required to accommodate the proposed development.

8 LIMITATIONS

This Report was prepared by Strik, Baldinelli, Moniz Ltd. (the Consultant) for Tri Bate Asset Management (owner), the Town of Cobourg, and the County of Northumberland. Use of this Report by any third party, or any reliance upon its findings, is solely the responsibility of that party. Strik, Baldinelli, Moniz Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions undertaken as a result of this Report. Third party use of this Report, without the express written consent of the Consultant, denies any claims, whether in contract, tort, and/or any other cause of action in law, against the Consultant.

All findings and conclusions presented in this Report are based on information as it appeared during the period of the investigation. This Report is not intended to be exhaustive in scope, or to imply a risk-free development. It should be recognized that the passage of time may alter the opinions, conclusions, and/or recommendations provided herein.

The analysis was limited to the documents referenced herein. Strik, Baldinelli, Moniz Ltd. accepts no responsibility for the accuracy of the information provided by others. All opinions, conclusions, and/or recommendations presented in this Report are based on the information available at the time of the review.

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Appendix A – Traffic Data

Sources:

LEA Consulting Ltd., Northumberland Mall – Proposed Driveway Relocation and Commercial Addition
Updated Transportation Impact Study, April 2020

<https://www.cobourg.ca/en/resources/Planning-Attachments/Planning-Applications/1111-Elgin-Street/SPA---1111-Elgin-St.-W/Transportation-Impact-Study.pdf>

Paradigm Transportation Solutions Limited, Golden Plough Lodge and County Archives Redevelopment
Transportation Study Update, August 2019

<https://www.cobourg.ca/en/resources/Planning-Attachments/Planning-Applications/Golden-Plough-Lodge/18015-GPL-Traffic-Report.pdf>

LEA CONSULTING LTD

625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-FRI_660551_05-24-2019
Site Code : 20045
Start Date : 2019-05-24
Page No : 3

Start Time	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 15:45 to 16:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:45																					
15:45	42	19	74	0	135	14	136	63	0	213	13	13	14	0	40	54	151	3	4	212	600
16:00	62	18	85	0	165	12	125	48	3	188	8	16	7	2	33	66	168	4	3	241	627
16:15	50	9	62	0	121	18	151	55	0	224	7	10	15	0	32	57	171	3	1	232	609
16:30	48	9	76	0	133	4	142	62	1	209	5	24	6	6	41	51	160	2	3	216	599
Total Volume	202	55	297	0	554	48	554	228	4	834	33	63	42	8	146	228	650	12	11	901	2435
% App. Total	36.5	9.9	53.6	0		5.8	66.4	27.3	0.5		22.6	43.2	28.8	5.5		25.3	72.1	1.3	1.2		
PHF	.815	.724	.874	.000	.839	.667	.917	.905	.333	.931	.635	.656	.700	.333	.890	.864	.950	.750	.688	.935	.971
Lights	200	55	292	0	547	48	544	228	0	820	32	63	42	0	137	227	641	12	0	880	2384
% Lights	99.0	100	98.3	0	98.7	100	98.2	100	0	98.3	97.0	100	100	0	93.8	99.6	98.6	100	0	97.7	97.9
Buses	1	0	3	0	4	0	5	0	0	5	0	0	0	0	0	1	0	0	0	1	10
% Buses	0.5	0	1.0	0	0.7	0	0.9	0	0	0.6	0	0	0	0	0	0.4	0	0	0	0.1	0.4
Trucks	1	0	2	0	3	0	5	0	0	5	1	0	0	0	1	0	9	0	0	9	18
% Trucks	0.5	0	0.7	0	0.5	0	0.9	0	0	0.6	3.0	0	0	0	0.7	0	1.4	0	0	1.0	0.7
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	4	4	0	0	0	8	8	0	0	0	11	11	23
% Pedestrians	0	0	0	0	0	0	0	0	100	0.5	0	0	0	100	5.5	0	0	0	100	1.2	0.9

LEA CONSULTING LTD

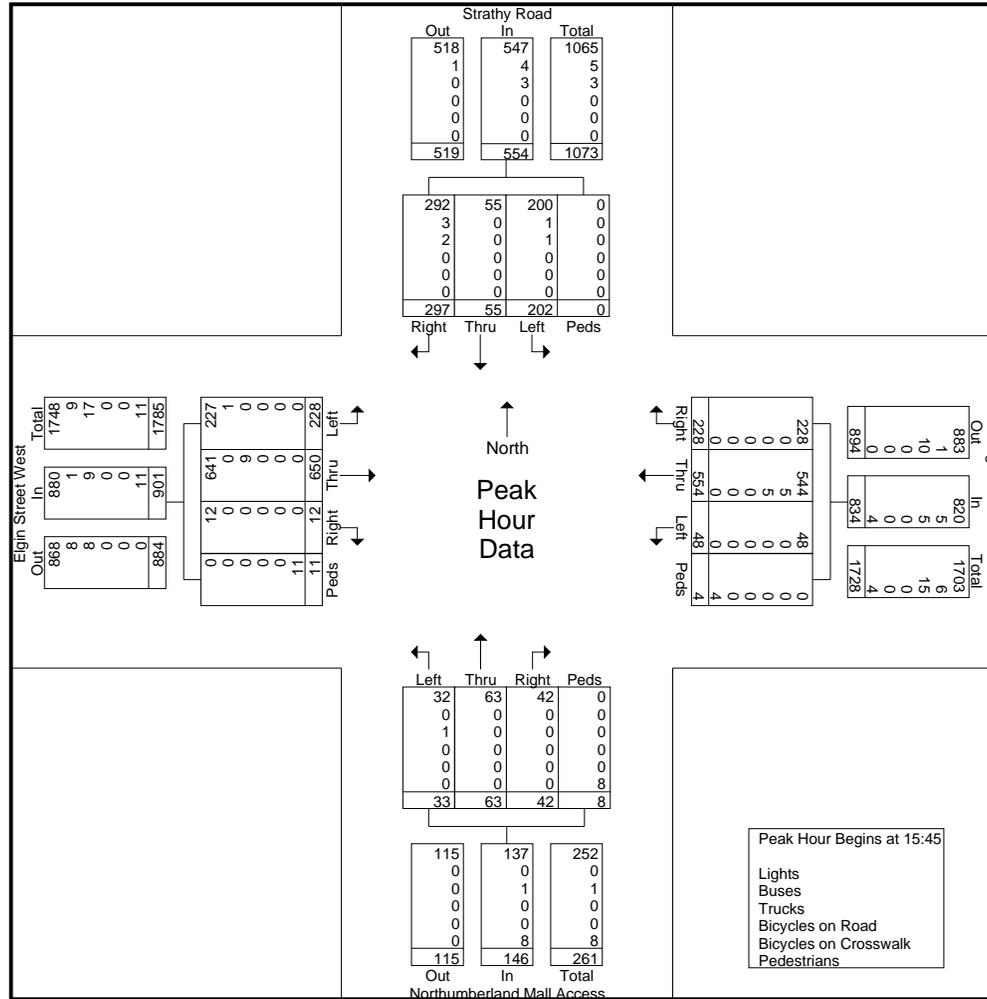
625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-FRI_660551_05-24-2019

Site Code : 20045

Start Date : 2019-05-24

Page No : 4



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625 Cochrane Drive 9th Floor
Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-SAT_660552_05-25-2019

Site Code : 20045

Start Date : 2019-05-25

Page No : 4

Start Time	Strathy Road Southbound					Elgin Street West Westbound					Northumberland Mall Access Northbound					Elgin Street West Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 10:45 to 11:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 10:45																					
10:45	46	15	64	0	125	12	137	46	0	195	5	19	7	0	31	63	99	7	0	169	520
11:00	42	17	75	0	134	7	130	69	3	209	11	21	7	0	39	63	123	4	1	191	573
11:15	36	13	66	0	115	15	131	47	0	193	9	15	12	0	36	72	127	4	0	203	547
11:30	36	15	75	0	126	12	136	54	3	205	5	10	9	0	24	59	134	6	0	199	554
Total Volume	160	60	280	0	500	46	534	216	6	802	30	65	35	0	130	257	483	21	1	762	2194
% App. Total	32	12	56	0		5.7	66.6	26.9	0.7		23.1	50	26.9	0		33.7	63.4	2.8	0.1		
PHF	.870	.882	.933	.000	.933	.767	.974	.783	.500	.959	.682	.774	.729	.000	.833	.892	.901	.750	.250	.938	.957
Lights	160	58	276	0	494	46	529	216	0	791	30	64	35	0	129	253	481	21	0	755	2169
% Lights	100	96.7	98.6	0	98.8	100	99.1	100	0	98.6	100	98.5	100	0	99.2	98.4	99.6	100	0	99.1	98.9
Buses	0	2	4	0	6	0	1	0	0	1	0	1	0	0	1	1	0	0	0	1	9
% Buses	0	3.3	1.4	0	1.2	0	0.2	0	0	0.1	0	1.5	0	0	0.8	0.4	0	0	0	0.1	0.4
Trucks	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	3	2	0	0	5	9
% Trucks	0	0	0	0	0	0	0.7	0	0	0.5	0	0	0	0	0	1.2	0.4	0	0	0.7	0.4
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	6
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	100	0.7	0	0	0	0	0	0	0	0	0	0	0.3
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1	0.0

LEA CONSULTING LTD

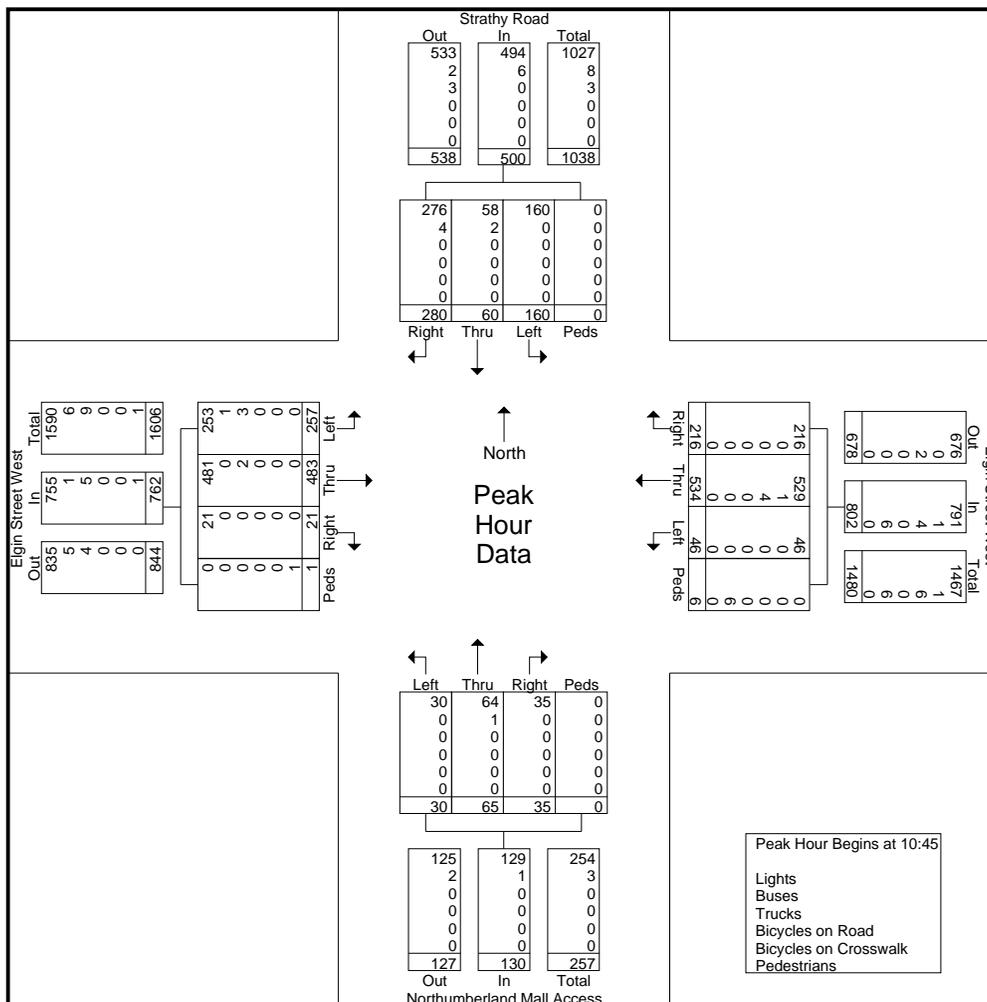
625 Cochrane Drive 9th Floor
 Markham, Ontario, L3R 9R9

File Name : 20045_StrathyRd&ElginStW-SAT_660552_05-25-2019

Site Code : 20045

Start Date : 2019-05-25

Page No : 5





Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Elgin Street & Courthouse Road
(West leg)
Site Code:
Start Date: 06/22/2016
Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Elgin Street Eastbound						Elgin Street Westbound						Plaza Driveway Northbound						Courthouse Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	1	195	4	0	0	200	11	168	1	1	0	181	1	0	15	0	0	16	4	0	7	0	2	11	408
4:45 PM	0	186	2	0	0	188	12	174	1	2	0	189	2	0	10	0	0	12	6	0	3	0	0	9	398
5:00 PM	0	202	0	0	0	202	13	192	0	2	0	207	1	0	11	0	0	12	6	0	2	0	0	8	429
5:15 PM	0	200	3	0	0	203	9	195	0	3	0	207	0	0	13	0	0	13	2	1	1	0	1	4	427
Total	1	783	9	0	0	793	45	729	2	8	0	784	4	0	49	0	0	53	18	1	13	0	3	32	1662
Approach %	0.1	98.7	1.1	0.0	-	-	5.7	93.0	0.3	1.0	-	-	7.5	0.0	92.5	0.0	-	-	56.3	3.1	40.6	0.0	-	-	-
Total %	0.1	47.1	0.5	0.0	-	47.7	2.7	43.9	0.1	0.5	-	47.2	0.2	0.0	2.9	0.0	-	3.2	1.1	0.1	0.8	0.0	-	1.9	-
PHF	0.250	0.969	0.563	0.000	-	0.977	0.865	0.935	0.500	0.667	-	0.947	0.500	0.000	0.817	0.000	-	0.828	0.750	0.250	0.464	0.000	-	0.727	0.969
Lights	1	777	9	0	-	787	42	722	2	8	-	774	4	0	47	0	-	51	18	1	11	0	-	30	1642
% Lights	100.0	99.2	100.0	-	-	99.2	93.3	99.0	100.0	100.0	-	98.7	100.0	-	95.9	-	-	96.2	100.0	100.0	84.6	-	-	93.8	98.8
Mediums	0	5	0	0	-	5	3	6	0	0	-	9	0	0	2	0	-	2	0	0	2	0	-	2	18
% Mediums	0.0	0.6	0.0	-	-	0.6	6.7	0.8	0.0	0.0	-	1.1	0.0	-	4.1	-	-	3.8	0.0	0.0	15.4	-	-	6.3	1.1
Articulated Trucks	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.1	0.0	-	-	0.1	0.0	0.1	0.0	0.0	-	0.1	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66.7	-	-



Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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Count Name: Elgin Street & Courthouse Road
(East leg)
Site Code:
Start Date: 06/22/2016
Page No: 6

Turning Movement Peak Hour Data (4:30 PM)

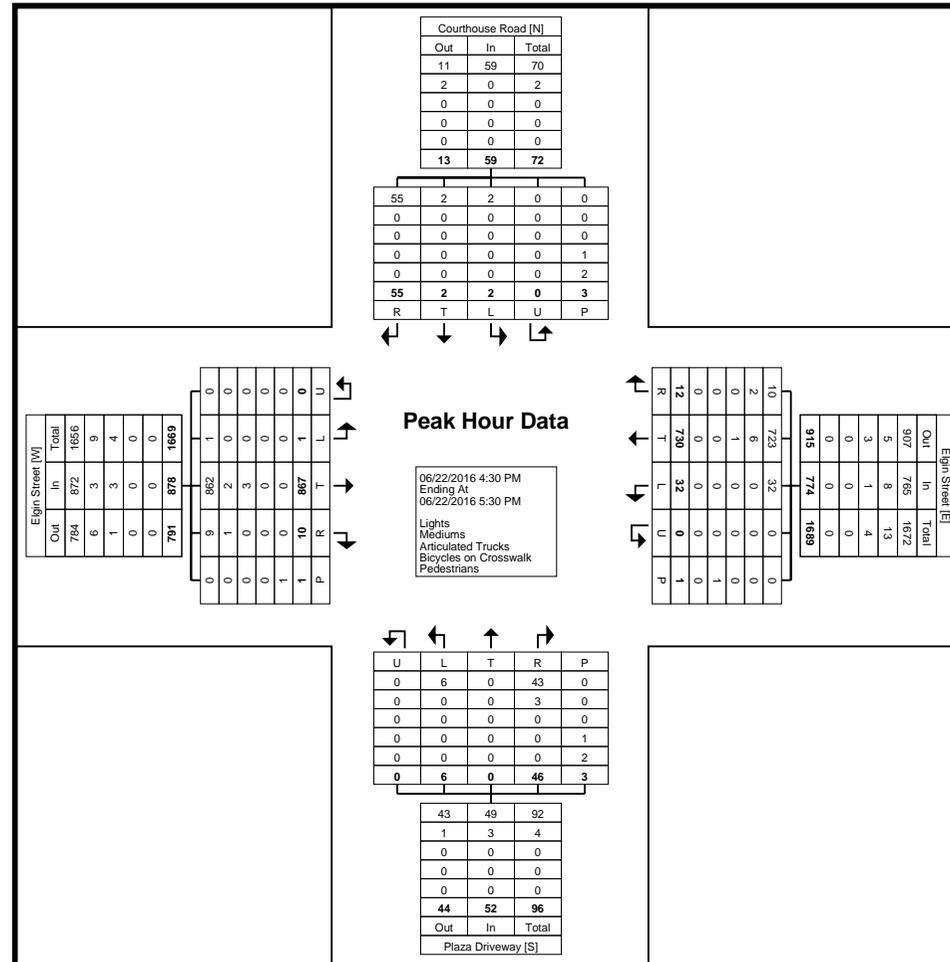
Start Time	Elgin Street Eastbound						Elgin Street Westbound						Plaza Driveway Northbound						Courthouse Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	1	217	1	0	0	219	8	163	5	0	1	176	3	0	16	0	1	19	2	1	16	0	2	19	433
4:45 PM	0	209	3	0	0	212	10	182	1	0	0	193	1	0	7	0	0	8	0	0	6	0	0	6	419
5:00 PM	0	222	3	0	0	225	8	198	4	0	0	210	1	0	14	0	0	15	0	1	8	0	0	9	459
5:15 PM	0	219	3	0	1	222	6	187	2	0	0	195	1	0	9	0	2	10	0	0	25	0	1	25	452
Total	1	867	10	0	1	878	32	730	12	0	1	774	6	0	46	0	3	52	2	2	55	0	3	59	1763
Approach %	0.1	98.7	1.1	0.0	-	-	4.1	94.3	1.6	0.0	-	-	11.5	0.0	88.5	0.0	-	-	3.4	3.4	93.2	0.0	-	-	-
Total %	0.1	49.2	0.6	0.0	-	49.8	1.8	41.4	0.7	0.0	-	43.9	0.3	0.0	2.6	0.0	-	2.9	0.1	0.1	3.1	0.0	-	3.3	-
PHF	0.250	0.976	0.833	0.000	-	0.976	0.800	0.922	0.600	0.000	-	0.921	0.500	0.000	0.719	0.000	-	0.684	0.250	0.500	0.550	0.000	-	0.590	0.960
Lights	1	862	9	0	-	872	32	723	10	0	-	765	6	0	43	0	-	49	2	2	55	0	-	59	1745
% Lights	100.0	99.4	90.0	-	-	99.3	100.0	99.0	83.3	-	-	98.8	100.0	-	93.5	-	-	94.2	100.0	100.0	100.0	-	-	100.0	99.0
Mediums	0	2	1	0	-	3	0	6	2	0	-	8	0	0	3	0	-	3	0	0	0	0	-	0	14
% Mediums	0.0	0.2	10.0	-	-	0.3	0.0	0.8	16.7	-	-	1.0	0.0	-	6.5	-	-	5.8	0.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	3	0	0	-	3	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.3	0.0	-	-	0.3	0.0	0.1	0.0	-	-	0.1	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-	-	-	-	33.3	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-	-	-	-	66.7	-	-	-	-	-	66.7	-	-



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Site Code:
Start Date: 06/22/2016
Page No: 7



Turning Movement Peak Hour Data Plot (4:30 PM)

Appendix B – Synchro Output Reports - Existing Traffic

Timings

Existing PM Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↕	↙	↕	↙	↙	↕	↙	↕	↙
Traffic Volume (vph)	238	667	50	567	238	39	66	206	58	309
Future Volume (vph)	238	667	50	567	238	39	66	206	58	309
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	42.3	34.0	33.3	24.4	24.4	17.7	12.4	27.4	19.0	19.0
Actuated g/C Ratio	0.54	0.44	0.43	0.31	0.31	0.23	0.16	0.35	0.24	0.24
v/c Ratio	0.50	0.45	0.13	0.53	0.37	0.12	0.35	0.45	0.13	0.51
Control Delay	14.4	19.2	11.4	25.8	6.3	17.8	27.8	21.5	26.3	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	19.2	11.4	25.8	6.3	17.8	27.8	21.5	26.3	6.7
LOS	B	B	B	C	A	B	C	C	C	A
Approach Delay		17.9		19.5			25.1		14.0	
Approach LOS		B		B			C		B	

Intersection Summary

Cycle Length: 86

Actuated Cycle Length: 77.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 18.0

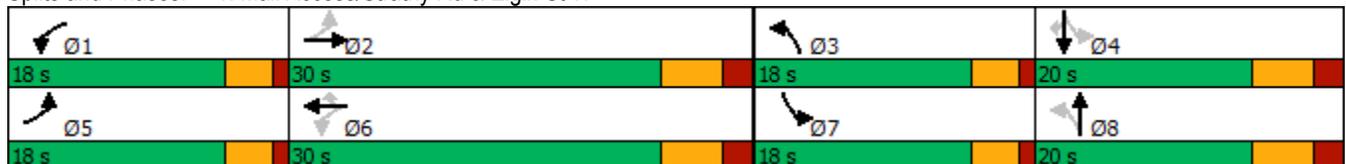
Intersection LOS: B

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

Existing PM Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	248	709	52	591	248	41	110	215	60	322
v/c Ratio	0.50	0.45	0.13	0.53	0.37	0.12	0.35	0.45	0.13	0.51
Control Delay	14.4	19.2	11.4	25.8	6.3	17.8	27.8	21.5	26.3	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	19.2	11.4	25.8	6.3	17.8	27.8	21.5	26.3	6.7
Queue Length 50th (m)	20.0	44.5	3.7	40.3	2.1	3.9	11.2	22.8	7.5	0.0
Queue Length 95th (m)	34.9	64.9	9.2	59.6	18.6	10.2	26.2	39.9	17.7	19.7
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	537	1572	577	1121	668	509	356	486	481	642
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	0.46	0.45	0.09	0.53	0.37	0.08	0.31	0.44	0.12	0.50

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Mall Access/Strathy Rd & Elgin St W

Existing PM Traffic

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 								
Traffic Volume (vph)	238	667	13	50	567	238	39	66	39	206	58	309	
Future Volume (vph)	238	667	13	50	567	238	39	66	39	206	58	309	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1825	3604		1825	3579	1633	1772	1814		1807	1921	1601	
Flt Permitted	0.29	1.00		0.38	1.00	1.00	0.72	1.00		0.48	1.00	1.00	
Satd. Flow (perm)	566	3604		734	3579	1633	1339	1814		921	1921	1601	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	248	695	14	52	591	248	41	69	41	215	60	322	
RTOR Reduction (vph)	0	1	0	0	0	155	0	26	0	0	0	247	
Lane Group Flow (vph)	248	708	0	52	591	93	41	84	0	215	60	75	
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6		6	8			4		4	
Actuated Green, G (s)	42.1	34.0		30.4	26.3	26.3	13.8	9.6		27.2	19.0	19.0	
Effective Green, g (s)	42.1	34.0		30.4	26.3	26.3	13.8	9.6		27.2	19.0	19.0	
Actuated g/C Ratio	0.52	0.42		0.37	0.32	0.32	0.17	0.12		0.33	0.23	0.23	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	475	1507		329	1157	528	249	214		456	448	374	
v/s Ratio Prot	c0.08	0.20		0.01	0.17		0.01	0.05		c0.08	0.03		
v/s Ratio Perm	c0.19			0.05		0.06	0.02			c0.08		0.05	
v/c Ratio	0.52	0.47		0.16	0.51	0.18	0.16	0.39		0.47	0.13	0.20	
Uniform Delay, d1	11.7	17.1		16.4	22.3	19.7	28.7	33.1		20.5	24.6	25.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.0	1.1		0.2	1.6	0.7	0.3	1.2		0.8	0.1	0.3	
Delay (s)	12.8	18.2		16.6	23.9	20.5	29.0	34.3		21.3	24.8	25.3	
Level of Service	B	B		B	C	C	C	C		C	C	C	
Approach Delay (s)		16.8			22.5			32.9			23.8		
Approach LOS		B			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			21.3	HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			81.3	Sum of lost time (s)					20.0				
Intersection Capacity Utilization			60.3%	ICU Level of Service				B					
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
2: Site Access/Courthouse Rd (W) & Elgin St W

Existing PM Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↑			↖	↗
Traffic Volume (veh/h)	2	895	11	50	826	3	0	0	55	20	2	15
Future Volume (Veh/h)	2	895	11	50	826	3	0	0	55	20	2	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	932	11	52	860	3	0	0	57	21	2	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.86			0.86	0.86	0.86	0.86	0.86	
vC, conflicting volume	863			943			1487	1903	466	1492	1912	432
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	863			612			1244	1727	59	1250	1738	432
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			94			100	100	93	79	97	97
cM capacity (veh/h)	788			841			104	72	843	100	71	578
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	313	621	11	52	573	290	57	39				
Volume Left	2	0	0	52	0	0	0	21				
Volume Right	0	0	11	0	0	3	57	16				
cSH	788	1700	1700	841	1700	1700	843	147				
Volume to Capacity	0.00	0.37	0.01	0.06	0.34	0.17	0.07	0.27				
Queue Length 95th (m)	0.1	0.0	0.0	1.5	0.0	0.0	1.6	7.7				
Control Delay (s)	0.1	0.0	0.0	9.6	0.0	0.0	9.6	38.1				
Lane LOS	A			A			A	E				
Approach Delay (s)	0.0			0.5			9.6	38.1				
Approach LOS							A	E				
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			57.0%		ICU Level of Service			B				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

3: Plaza Access/Courthouse Rd (E) & Elgin St W

Existing PM Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	958	12	36	807	14	7	0	51	0	0	61
Future Volume (Veh/h)	2	958	12	36	807	14	7	0	51	0	0	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	998	12	38	841	15	7	0	53	0	0	64
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		270										
pX, platoon unblocked				0.88			0.88	0.88	0.88	0.88	0.88	
vC, conflicting volume	856			1010			1568	1940	505	1480	1938	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	856			730			1367	1791	154	1267	1789	428
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			95			91	100	93	100	100	88
cM capacity (veh/h)	793			734			80	68	752	100	68	540
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	2	665	345	38	561	295	60	64				
Volume Left	2	0	0	38	0	0	7	0				
Volume Right	0	0	12	0	0	15	53	64				
cSH	793	1700	1700	734	1700	1700	379	540				
Volume to Capacity	0.00	0.39	0.20	0.05	0.33	0.17	0.16	0.12				
Queue Length 95th (m)	0.1	0.0	0.0	1.2	0.0	0.0	4.2	3.0				
Control Delay (s)	9.6	0.0	0.0	10.2	0.0	0.0	16.3	12.6				
Lane LOS	A			B			C	B				
Approach Delay (s)	0.0			0.4			16.3	12.6				
Approach LOS							C	B				
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization		40.1%		ICU Level of Service	A							
Analysis Period (min)			15									

Timings

Existing Saturday Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↕	↙	↕	↗	↙	↗	↙	↕	↗
Traffic Volume (vph)	268	503	48	556	225	36	67	167	61	288
Future Volume (vph)	268	503	48	556	225	36	67	167	61	288
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	42.8	34.4	33.2	24.4	24.4	17.7	12.4	26.7	18.3	18.3
Actuated g/C Ratio	0.55	0.44	0.43	0.31	0.31	0.23	0.16	0.34	0.24	0.24
v/c Ratio	0.54	0.34	0.11	0.52	0.35	0.11	0.35	0.38	0.14	0.49
Control Delay	14.7	17.4	11.0	25.4	6.0	17.9	28.0	20.6	26.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	17.4	11.0	25.4	6.0	17.9	28.0	20.6	26.6	6.8
LOS	B	B	B	C	A	B	C	C	C	A
Approach Delay		16.5		19.3			25.4		13.6	
Approach LOS		B		B			C		B	

Intersection Summary

Cycle Length: 86

Actuated Cycle Length: 77.6

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 17.4

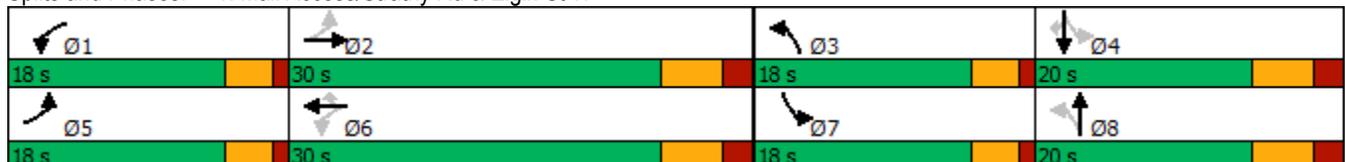
Intersection LOS: B

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

Existing Saturday Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	279	547	50	579	234	38	109	174	64	300
v/c Ratio	0.54	0.34	0.11	0.52	0.35	0.11	0.35	0.38	0.14	0.49
Control Delay	14.7	17.4	11.0	25.4	6.0	17.9	28.0	20.6	26.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	17.4	11.0	25.4	6.0	17.9	28.0	20.6	26.6	6.8
Queue Length 50th (m)	21.8	31.0	3.4	38.8	1.5	3.7	11.2	18.4	8.1	0.0
Queue Length 95th (m)	39.6	48.6	9.0	58.3	17.6	9.7	26.4	32.7	18.5	19.0
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	548	1597	622	1123	663	510	355	479	466	616
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	0.51	0.34	0.08	0.52	0.35	0.07	0.31	0.36	0.14	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Mall Access/Strathy Rd & Elgin St W

Existing Saturday Traffic

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	268	503	22	48	556	225	36	67	37	167	61	288
Future Volume (vph)	268	503	22	48	556	225	36	67	37	167	61	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	3593		1825	3579	1633	1772	1818		1807	1921	1601
Flt Permitted	0.30	1.00		0.45	1.00	1.00	0.72	1.00		0.48	1.00	1.00
Satd. Flow (perm)	582	3593		860	3579	1633	1334	1818		919	1921	1601
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	279	524	23	50	579	234	38	70	39	174	64	300
RTOR Reduction (vph)	0	3	0	0	0	149	0	25	0	0	0	232
Lane Group Flow (vph)	279	544	0	50	579	85	38	84	0	174	64	68
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	42.6	34.5		30.4	26.3	26.3	13.6	9.5		26.4	18.3	18.3
Effective Green, g (s)	42.6	34.5		30.4	26.3	26.3	13.6	9.5		26.4	18.3	18.3
Actuated g/C Ratio	0.53	0.43		0.38	0.32	0.32	0.17	0.12		0.33	0.23	0.23
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	494	1530		371	1162	530	246	213		440	434	361
v/s Ratio Prot	c0.09	0.15		0.01	0.16		0.01	0.05		c0.06	0.03	
v/s Ratio Perm	c0.21			0.04		0.05	0.02			c0.07		0.04
v/c Ratio	0.56	0.36		0.13	0.50	0.16	0.15	0.40		0.40	0.15	0.19
Uniform Delay, d1	11.5	15.7		16.2	22.0	19.5	28.7	33.1		20.5	25.1	25.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.6		0.2	1.5	0.7	0.3	1.2		0.6	0.2	0.3
Delay (s)	13.0	16.4		16.4	23.6	20.1	29.0	34.3		21.1	25.3	25.6
Level of Service	B	B		B	C	C	C	C		C	C	C
Approach Delay (s)		15.2			22.2			32.9			24.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.9									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			81.0							20.0		
Intersection Capacity Utilization			59.5%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Site Access/Courthouse Rd (W) & Elgin St W

Existing Saturday Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↗			↕	
Traffic Volume (veh/h)	2	695	11	50	806	3	0	0	55	20	2	15
Future Volume (Veh/h)	2	695	11	50	806	3	0	0	55	20	2	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	724	11	52	840	3	0	0	57	21	2	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	0.91
vC, conflicting volume	843			735			1269	1675	362	1368	1684	422
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	843			500			1089	1537	88	1199	1548	422
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			95			100	100	93	82	98	97
cM capacity (veh/h)	802			974			143	100	849	116	99	586
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	243	483	11	52	560	283	57	39				
Volume Left	2	0	0	52	0	0	0	21				
Volume Right	0	0	11	0	0	3	57	16				
cSH	802	1700	1700	974	1700	1700	849	171				
Volume to Capacity	0.00	0.28	0.01	0.05	0.33	0.17	0.07	0.23				
Queue Length 95th (m)	0.1	0.0	0.0	1.3	0.0	0.0	1.6	6.4				
Control Delay (s)	0.1	0.0	0.0	8.9	0.0	0.0	9.5	32.3				
Lane LOS	A			A			A	D				
Approach Delay (s)	0.0			0.5			9.5	32.3				
Approach LOS							A	D				
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			57.0%		ICU Level of Service			B				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
3: Plaza Access/Courthouse Rd (E) & Elgin St W

Existing Saturday Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	788	12	36	807	14	7	0	51	0	0	61
Future Volume (Veh/h)	2	788	12	36	807	14	7	0	51	0	0	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	2	821	12	38	841	15	7	0	53	0	0	64
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		270										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	856			833			1392	1763	416	1392	1762	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	856			679			1277	1675	233	1278	1674	428
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			95			93	100	93	100	100	88
cM capacity (veh/h)	793			818			99	86	712	104	86	540
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	2	547	286	38	561	295	60	64				
Volume Left	2	0	0	38	0	0	7	0				
Volume Right	0	0	12	0	0	15	53	64				
cSH	793	1700	1700	818	1700	1700	414	540				
Volume to Capacity	0.00	0.32	0.17	0.05	0.33	0.17	0.14	0.12				
Queue Length 95th (m)	0.1	0.0	0.0	1.1	0.0	0.0	3.8	3.0				
Control Delay (s)	9.6	0.0	0.0	9.6	0.0	0.0	15.2	12.6				
Lane LOS	A			A			C	B				
Approach Delay (s)	0.0			0.4			15.2	12.6				
Approach LOS							C	B				
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			40.1%		ICU Level of Service			A				
Analysis Period (min)			15									

Appendix C – Site Plan

ZONING DATA CHART

GROSS SITE AREA: 12,781 m ²		ASPHALT AREA: 9,755 m ²	
BUILDING AREA (TOTAL): 2,492 m ²		LANDSCAPED AREA: 1,301 m ²	
EXISTING PROPOSED		1,858 m ² 634 m ²	
ITEM	SC-1*	REQUIRED	PROVIDED
1	PERMITTED USES	SEE PERMITTED USE NOTE ON SHEET SP1	SEE PERMITTED USE NOTE ON SHEET SP1
2	LOT AREA (ACRES MIN)	1.3	3.2
3	LOT FRONTAGE (m MIN)	60	62.95
4	FRONT YARD EXTERIOR SIDE YARD SETBACK (m)	3.0 MIN 15.0 MAX	7.45 FRONT N/A EXTERIOR SIDE
5	REAR YARD (m MIN)	9.0	46.67
		6.0	ABUTTING RESIDENTIAL ABUTTING OTHER
6	INTERIOR SIDE YARD SETBACK (m MIN)	9.0	N/A
		6.0	ABUTTING RESIDENTIAL ABUTTING OTHER
7	LANDSCAPED OPEN SPACE (%) MIN	10	10.2
8	LOT COVERAGE (%) MAX	35	19.6
9	HEIGHT MAXIMUM (STOREYS MAX)	4	1
10	GROSS FLOOR AREA (m ² MAX)	N/A	2,510
11	LOADING SPACE REQUIREMENTS	SEE LOADING REQUIREMENTS NOTE	SEE LOADING REQUIREMENTS NOTE
12	VEHICLE PARKING	SEE PARKING REQUIREMENTS NOTE	SEE PARKING REQUIREMENTS NOTE

* EXISTING CONDITION

PERMITTED USES

- SC-1 ZONE (SITE SPECIFIC BY-LAW No. 85-2003):**
- CALL CENTRE;
 - CLINIC USE;
 - CONFERENCE CENTRE;
 - CONVENIENCE COMMERCIAL USE;
 - CONVENTION USE;
 - DATA PROCESSING USES;
 - DAY NURSERY USE;
 - EATING ESTABLISHMENT USE, INCL. BANQUET HALL;
 - EDUCATION AND TRAINING USE;
 - FINANCIAL INSTITUTION USE;
 - FOOD AND/OR SPECIALTY FOOD USE, INCL. SUPERMARKET AND BAKED GOODS OUTLET;
 - HOTEL AND MOTEL USE;
 - INSTITUTIONAL USE;
 - OFFICE USE;
 - PARKS AND RECREATION USES;
 - PERSONAL SERVICE USE INCL. A DRY CLEANING DISTRIBUTION STATION, BUT NOT A DRY CLEANING ESTABLISHMENT;
 - PLACE OF ENTERTAINMENT USE;
 - PRIVATE OR COMMERCIAL CLUB USE;
 - PUBLIC USES IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5.3.2;
 - RETAIL COMMERCIAL USE, INCL. DEPARTMENT STORE AND CATALOGUE STORE;
 - VEHICLE SERVICE STATION;
 - VEHICLE SERVICE AND SUPPLY USES;
 - WHOLESALE USES

LOADING ZONE REQUIREMENTS

*LOADING SPACES MUST BE MINIMUM 4.5m WIDE WITH VERTICAL CLEARANCE OF 4.25m FOR CSA ZONING

TOTAL SPACES REQUIRED ON LOT (TWO BLDGS 0-2,350m²) = 2 SPACES REQUIRED
TOTAL SPACES PROVIDED ON LOT = 2 SPACES PROVIDED*
(*MINOR VARIANCE REQUIRED)

PARKING REQUIREMENTS (AREA 3):

MINIMUM PARKING SPACE DIMENSIONS 15.05m², TYPE A 3.4mX5.5m, TYPE B 2.4mX5.5m

SHOPPING CENTRE (EXISTING) 5.5/100m² 1,858m² = 103 SPACES
EATING EST. (PROPOSED) 1/9m² 204m² = 23 SPACES
RETAIL COMMERCIAL (PROPOSED) 1/18m² 430m² = 24 SPACES
TOTAL REQUIRED PARKING = 150 SPACES
TOTAL PROVIDED PARKING (INCL. 10 CAR STACKING) = 166 SPACES
B/F PARKING: 1/20 FOR 1ST 100 + 1/ADDITIONAL 100 REQUIRED = 6 SPACES
PROVIDED 1 TYPE 'A', 2 TYPE 'B' + 2 EXISTING

NOTE:

REFER TO OBC MATRIX PREPARED BY PATRICK TROTTER ARCHITECT, PROVIDED SEPARATELY.

WASTE REMOVAL

GARBAGE TO BE STORED EXTERNALLY IN DEEP WELL GARBAGE CONTAINERS AND OWNER TO ARRANGE SITE PICK-UP AND REMOVAL.

BUILDING CLASS

COMMERCIAL - GROUP E OCCUPANCY, PART 3 OF THE ONTARIO BUILDING CODE

CANADA POST

THIS DEVELOPMENT WILL RECEIVE MAIL TO A NEAR-BY SUPERBOX AS LOCATED BY CANADA POST.

LEGEND

- FR-2 PROPOSED SIGN, TYPE OF SIGN
- PFFE* PRINCIPAL FIRE FIGHTER'S ENTRANCE
- PROPOSED BARRIER FREE ROUTE
- PROPOSED FIRE ROUTE (6.0m WIDE, 12.0m RADIUS)
- PROPOSED RAMP (SEE DETAIL ON SP2)
- BUILDING ENTRANCE
- PROPOSED LIGHT-DUTY ASPHALT
- PROPOSED HEAVY-DUTY ASPHALT
- PROPOSED CONCRETE
- EXISTING BUILDING
- PROPOSED BUILDING
- LIMITS OF SUBJECT PROPERTY

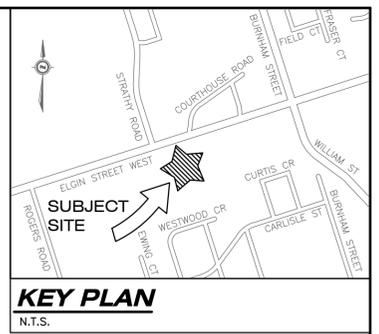
REFERENCE DOCUMENTS

- TOPOGRAPHICAL SURVEY PREPARED BY SBMG, FILE. NO. SBMG-21-0065, DATED APRIL 20, 2021.
- CONCEPTUAL SITE PLAN PROVIDED BY WESTDELL DEVELOPMENT CORPORATION RECEIVED MARCH 18, 2021.
- DESIGN BRIEF PREPARED BY STRIK, BALDINELLI, MONIZ (SBM), PROJECT NUMBER SBM-21-1211, DATED MAY 2021.

SITE BENCHMARK

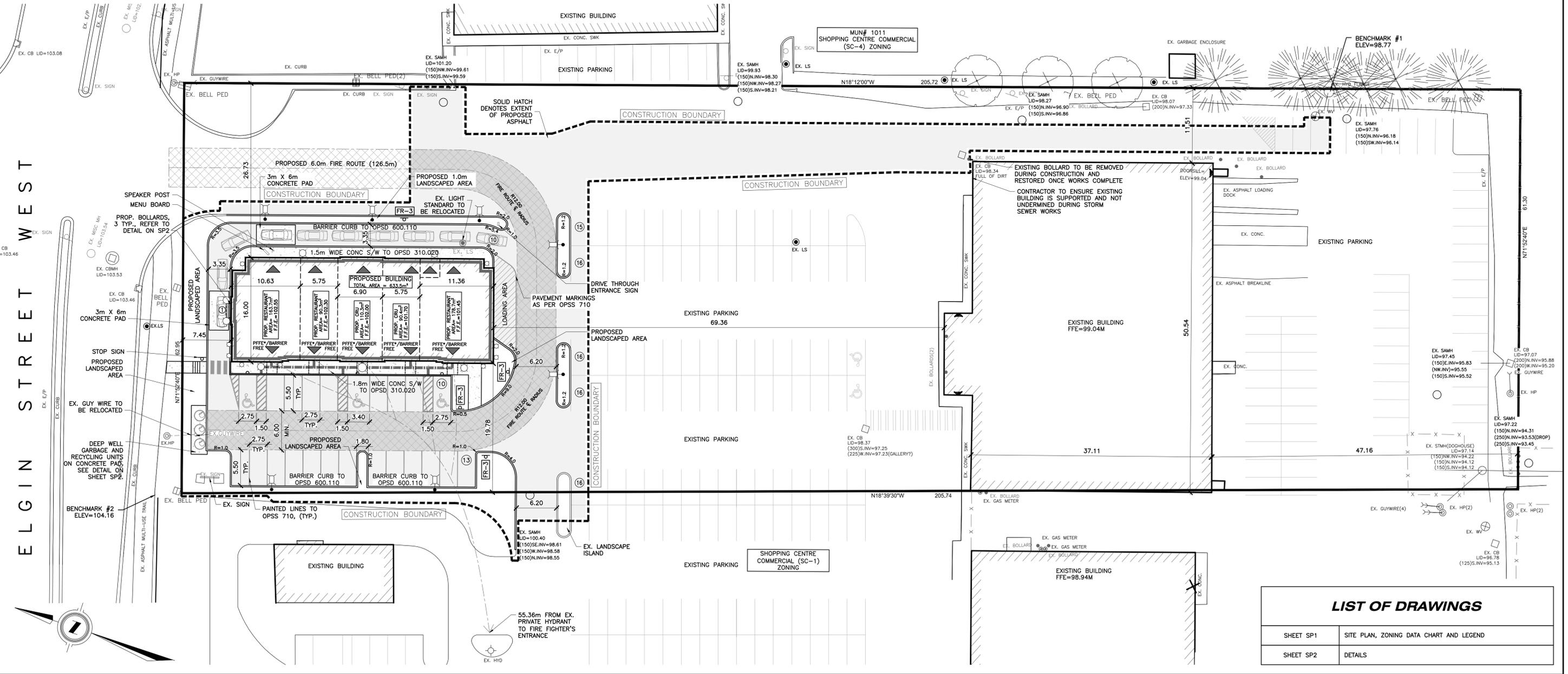
BENCHMARK #1:
MONUMENT TYPE: HYDRANT SPINDLE
LOCATION: TOP OF HYDRANT SPINDLE LOCATED ON THE SOUTHEAST CORNER OF THE SUBJECT SITE.
GEODETIC ELEVATION (CGVD2013): 98.77m

BENCHMARK #2:
MONUMENT TYPE: PK NAIL
LOCATION: PK NAIL IN ASPHALT AT NORTHWEST CORNER ON SITE ADJACENT TO ELGIN STREET WEST.
GEODETIC ELEVATION (CGVD2013): 104.16m
(CONTRACTOR TO CONFIRM BENCHMARK ELEVATIONS)



LEGAL INFORMATION

PART OF
LOT 21, CONCESSION A
(GEOGRAPHIC TOWNSHIP OF HAMILTON)
IN THE
TOWN OF COBOURG
COUNTY OF NORTHUMBERLAND



LIST OF DRAWINGS

SHEET SP1	SITE PLAN, ZONING DATA CHART AND LEGEND
SHEET SP2	DETAILS

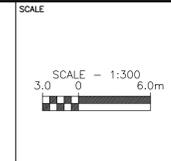
AS CONSTRUCTED SERVICES	COMPLETION	No.	REVISIONS	D/M/Y	BY	CONSULTANT
	DESIGN	CJ	1	FOR REVIEW/APPROVAL	18/05/21	CJ
	DRAWN	CJ	2	ISSUED FOR SPA	28/05/21	CJ
	CHECKED	LS/BH				
	APPROVED	BH				
	DATE		28/05/2021			
	CAD	21-1211				

STRIK BALDINELLI MONIZ
PLANNING - CIVIL - STRUCTURAL - MECHANICAL - ELECTRICAL
1599 Adelaide St. N, Unit 301, London, Ontario, N5X 4E8
Tel: (519) 471-6667 Fax: (519) 471-0034
Email: sbm@sbmtd.ca



ENGINEER'S STAMP
SEALED FOR GENERAL CONFORMANCE WITH THE OBC AND MUNICIPAL SITE PLAN CONTROLS AND ZONING BY-LAWS

CLIENT
TRI BATE ASSET MANAGEMENT
782 RICHMOND STREET
LONDON, ON N6A 3H5
P: 519.850.0000
E: INFO@WESTDELLCORP.COM



TITLE
SITE PLAN, ZONING DATA CHART AND LEGEND
COMMERCIAL DEVELOPMENT
1025 ELGIN STREET WEST
COBOURG, ON.

PROJECT No.
SBM-21-1211

SHEET No.
SP1

PLAN FILE No.
-

Appendix D – Synchro Output Reports - 2026 Background Traffic

Timings

2026 PM Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↕	↙	↕	↙	↙	↕	↙	↕	↙
Traffic Volume (vph)	275	756	67	642	263	54	79	228	70	363
Future Volume (vph)	275	756	67	642	263	54	79	228	70	363
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	42.6	31.6	33.2	24.1	24.1	21.9	12.6	31.4	22.4	22.4
Actuated g/C Ratio	0.52	0.39	0.40	0.29	0.29	0.27	0.15	0.38	0.27	0.27
v/c Ratio	0.65	0.58	0.21	0.64	0.43	0.14	0.52	0.49	0.14	0.53
Control Delay	19.2	23.3	12.6	29.1	8.3	18.0	29.3	22.0	26.7	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	23.3	12.6	29.1	8.3	18.0	29.3	22.0	26.7	6.4
LOS	B	C	B	C	A	B	C	C	C	A
Approach Delay		22.2		22.4			26.4		13.9	
Approach LOS		C		C			C		B	

Intersection Summary

Cycle Length: 86

Actuated Cycle Length: 82

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 20.7

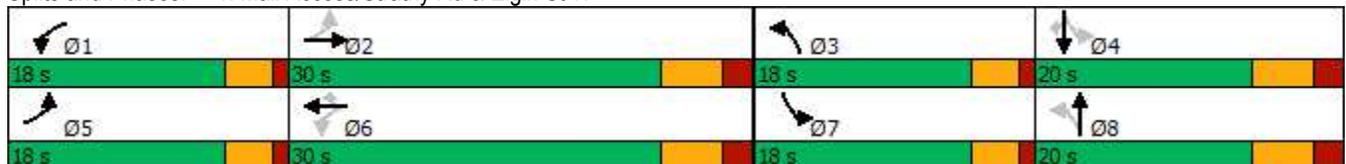
Intersection LOS: C

Intersection Capacity Utilization 72.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

2026 PM Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	286	808	70	669	274	56	163	238	73	378
v/c Ratio	0.65	0.58	0.21	0.64	0.43	0.14	0.52	0.49	0.14	0.53
Control Delay	19.2	23.3	12.6	29.1	8.3	18.0	29.3	22.0	26.7	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	23.3	12.6	29.1	8.3	18.0	29.3	22.0	26.7	6.4
Queue Length 50th (m)	24.4	54.2	5.2	49.2	5.9	5.6	17.0	26.6	9.5	0.0
Queue Length 95th (m)	41.4	78.1	11.8	69.4	24.7	12.7	35.4	44.0	20.7	21.6
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	463	1389	491	1049	637	535	344	500	524	711
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	0.62	0.58	0.14	0.64	0.43	0.10	0.47	0.48	0.14	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mall Access/Strathy Rd & Elgin St W

2026 PM Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	275	756	19	67	642	263	54	79	78	228	70	363
Future Volume (vph)	275	756	19	67	642	263	54	79	78	228	70	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	3601		1825	3579	1633	1772	1778		1807	1921	1601
Flt Permitted	0.23	1.00		0.29	1.00	1.00	0.71	1.00		0.48	1.00	1.00
Satd. Flow (perm)	435	3601		565	3579	1633	1323	1778		904	1921	1601
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	286	788	20	70	669	274	56	82	81	238	73	378
RTOR Reduction (vph)	0	2	0	0	0	158	0	41	0	0	0	278
Lane Group Flow (vph)	286	806	0	70	669	116	56	122	0	238	73	100
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	41.5	31.6		30.9	25.0	25.0	19.0	14.3		31.1	22.4	22.4
Effective Green, g (s)	41.5	31.6		30.9	25.0	25.0	19.0	14.3		31.1	22.4	22.4
Actuated g/C Ratio	0.49	0.37		0.37	0.30	0.30	0.22	0.17		0.37	0.26	0.26
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	418	1345		294	1057	482	322	300		468	508	423
v/s Ratio Prot	c0.10	0.22		0.02	0.19		0.01	0.07		c0.08	0.04	
v/s Ratio Perm	c0.23			0.07		0.07	0.03			c0.11		0.06
v/c Ratio	0.68	0.60		0.24	0.63	0.24	0.17	0.41		0.51	0.14	0.24
Uniform Delay, d1	14.5	21.4		17.8	25.8	22.6	26.3	31.4		19.7	23.8	24.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	2.0		0.4	2.9	1.2	0.3	0.9		0.9	0.1	0.3
Delay (s)	19.1	23.4		18.2	28.7	23.8	26.5	32.3		20.5	23.9	24.7
Level of Service	B	C		B	C	C	C	C		C	C	C
Approach Delay (s)		22.3			26.7			30.8			23.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			24.6	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			84.6	Sum of lost time (s)					20.0			
Intersection Capacity Utilization			72.3%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 2: Site Access/Courthouse Rd (W) & Elgin St W

2026 PM Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↑			↕	
Traffic Volume (veh/h)	1	1044	13	56	938	1	0	0	61	5	1	4
Future Volume (Veh/h)	1	1044	13	56	938	1	0	0	61	5	1	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	1088	14	58	977	1	0	0	64	5	1	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.82			0.82	0.82	0.82	0.82	0.82	
vC, conflicting volume	978			1102			1699	2184	544	1704	2198	489
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	978			689			1416	2007	10	1421	2023	489
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			92			100	100	93	93	98	99
cM capacity (veh/h)	714			751			75	45	865	70	44	530
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	364	725	14	58	651	327	64	10				
Volume Left	1	0	0	58	0	0	0	5				
Volume Right	0	0	14	0	0	1	64	4				
cSH	714	1700	1700	751	1700	1700	865	99				
Volume to Capacity	0.00	0.43	0.01	0.08	0.38	0.19	0.07	0.10				
Queue Length 95th (m)	0.0	0.0	0.0	1.9	0.0	0.0	1.8	2.5				
Control Delay (s)	0.0	0.0	0.0	10.2	0.0	0.0	9.5	45.5				
Lane LOS	A			B			A	E				
Approach Delay (s)	0.0			0.6			9.5	45.5				
Approach LOS							A	E				
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			58.2%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 3: Plaza Access/Courthouse Rd (E) & Elgin St W

2026 PM Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (veh/h)	3	1113	14	40	915	30	8	0	57	0	0	83
Future Volume (Veh/h)	3	1113	14	40	915	30	8	0	57	0	0	83
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	3	1159	15	42	953	31	8	0	59	0	0	86
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
		None			None							
Median storage (veh)												
Upstream signal (m)												
		270										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	0.83
vC, conflicting volume	984			1174			1819	2240	587	1697	2232	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	984			801			1577	2085	93	1431	2076	492
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	100			94			84	100	92	100	100	82
cM capacity (veh/h)	710			653			49	41	779	70	42	489
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	3	773	401	42	635	349	67	86				
Volume Left	3	0	0	42	0	0	8	0				
Volume Right	0	0	15	0	0	31	59	86				
cSH	710	1700	1700	653	1700	1700	279	489				
Volume to Capacity	0.00	0.45	0.24	0.06	0.37	0.21	0.24	0.18				
Queue Length 95th (m)	0.1	0.0	0.0	1.6	0.0	0.0	6.9	4.8				
Control Delay (s)	10.1	0.0	0.0	10.9	0.0	0.0	21.9	13.9				
Lane LOS	B			B			C	B				
Approach Delay (s)	0.0			0.4			21.9	13.9				
Approach LOS							C	B				
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			45.4%		ICU Level of Service			A				
Analysis Period (min)			15									

Timings

2026 Saturday Total Traffic

1: Mall Access/Strathy Rd & Elgin St W

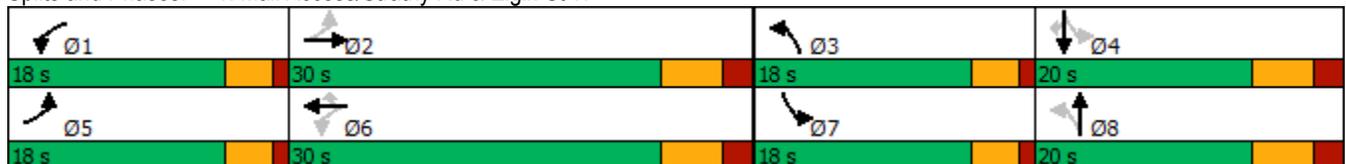


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	311	578	66	627	249	52	82	185	75	339
Future Volume (vph)	311	578	66	627	249	52	82	185	75	339
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	43.2	32.3	33.2	24.1	24.1	21.9	12.7	30.5	21.5	21.5
Actuated g/C Ratio	0.53	0.40	0.41	0.29	0.29	0.27	0.16	0.37	0.26	0.26
v/c Ratio	0.70	0.45	0.17	0.62	0.41	0.14	0.54	0.42	0.15	0.52
Control Delay	21.0	20.7	11.9	28.6	8.0	18.0	29.7	21.1	27.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	20.7	11.9	28.6	8.0	18.0	29.7	21.1	27.1	6.5
LOS	C	C	B	C	A	B	C	C	C	A
Approach Delay		20.8		22.0			26.9		13.6	
Approach LOS		C		C			C		B	

Intersection Summary

Cycle Length: 86
 Actuated Cycle Length: 81.7
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 20.1
 Intersection LOS: C
 Intersection Capacity Utilization 71.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

2026 Saturday Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	324	632	69	653	259	54	173	193	78	353
v/c Ratio	0.70	0.45	0.17	0.62	0.41	0.14	0.54	0.42	0.15	0.52
Control Delay	21.0	20.7	11.9	28.6	8.0	18.0	29.7	21.1	27.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	20.7	11.9	28.6	8.0	18.0	29.7	21.1	27.1	6.5
Queue Length 50th (m)	26.8	38.0	4.9	46.3	4.9	5.4	17.6	21.0	10.2	0.0
Queue Length 95th (m)	#50.5	58.7	11.6	67.6	23.0	12.4	37.3	35.9	21.8	20.7
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	475	1420	565	1053	633	534	347	485	505	681
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	0.68	0.45	0.12	0.62	0.41	0.10	0.50	0.40	0.15	0.52

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Mall Access/Strathy Rd & Elgin St W

2026 Saturday Total Traffic

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	311	578	29	66	627	249	52	82	84	185	75	339	
Future Volume (vph)	311	578	29	66	627	249	52	82	84	185	75	339	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1825	3590		1825	3579	1633	1772	1775		1807	1921	1601	
Flt Permitted	0.24	1.00		0.41	1.00	1.00	0.71	1.00		0.46	1.00	1.00	
Satd. Flow (perm)	453	3590		792	3579	1633	1317	1775		869	1921	1601	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	324	602	30	69	653	259	54	85	88	193	78	353	
RTOR Reduction (vph)	0	4	0	0	0	152	0	43	0	0	0	263	
Lane Group Flow (vph)	324	628	0	69	653	107	54	130	0	193	78	90	
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6		6	8			4		4	
Actuated Green, G (s)	42.1	32.3		30.7	24.9	24.9	19.1	14.4		30.2	21.5	21.5	
Effective Green, g (s)	42.1	32.3		30.7	24.9	24.9	19.1	14.4		30.2	21.5	21.5	
Actuated g/C Ratio	0.50	0.38		0.36	0.30	0.30	0.23	0.17		0.36	0.26	0.26	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	441	1375		359	1057	482	323	303		442	489	408	
v/s Ratio Prot	c0.12	0.18		0.01	0.18		0.01	0.07		c0.06	0.04		
v/s Ratio Perm	c0.25			0.06		0.07	0.03			c0.10		0.06	
v/c Ratio	0.73	0.46		0.19	0.62	0.22	0.17	0.43		0.44	0.16	0.22	
Uniform Delay, d1	14.3	19.4		17.7	25.6	22.4	26.0	31.3		19.6	24.4	24.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.3	1.1		0.3	2.7	1.1	0.2	1.0		0.7	0.2	0.3	
Delay (s)	20.6	20.5		18.0	28.3	23.5	26.3	32.2		20.3	24.5	25.1	
Level of Service	C	C		B	C	C	C	C		C	C	C	
Approach Delay (s)		20.5			26.3			30.8			23.5		
Approach LOS		C			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			24.1									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			84.3									Sum of lost time (s)	20.0
Intersection Capacity Utilization			71.5%									ICU Level of Service	C
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 2: Site Access/Courthouse Rd (W) & Elgin St W

2026 Saturday Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↗			↕	
Traffic Volume (veh/h)	1	835	13	56	916	1	0	0	61	5	1	4
Future Volume (Veh/h)	1	835	13	56	916	1	0	0	61	5	1	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	870	14	58	954	1	0	0	64	5	1	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.88			0.88	0.88	0.88	0.88	0.88	
vC, conflicting volume	955			884			1470	1943	435	1572	1956	478
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	955			583			1252	1793	71	1369	1808	478
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			93			100	100	92	94	98	99
cM capacity (veh/h)	728			876			107	67	842	82	65	539
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	291	580	14	58	636	319	64	10				
Volume Left	1	0	0	58	0	0	0	5				
Volume Right	0	0	14	0	0	1	64	4				
cSH	728	1700	1700	876	1700	1700	842	120				
Volume to Capacity	0.00	0.34	0.01	0.07	0.37	0.19	0.08	0.08				
Queue Length 95th (m)	0.0	0.0	0.0	1.6	0.0	0.0	1.9	2.0				
Control Delay (s)	0.1	0.0	0.0	9.4	0.0	0.0	9.6	37.7				
Lane LOS	A			A			A	E				
Approach Delay (s)	0.0			0.5			9.6	37.7				
Approach LOS							A	E				
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			58.2%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
3: Plaza Access/Courthouse Rd (E) & Elgin St W

2026 Saturday Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	938	14	40	915	30	8	0	57	0	0	83
Future Volume (Veh/h)	3	938	14	40	915	30	8	0	57	0	0	83
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	3	977	15	42	953	31	8	0	59	0	0	86
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
		None			None							
Median storage (veh)												
Upstream signal (m)												
		270										
pX, platoon unblocked												
				0.90			0.90	0.90	0.90	0.90	0.90	0.90
vC, conflicting volume												
	984			992			1637	2058	496	1606	2050	492
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol												
	984			757			1477	1948	203	1443	1939	492
tC, single (s)												
	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)												
	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %												
	100			94			87	100	92	100	100	82
cM capacity (veh/h)												
	710			732			63	55	714	74	56	489
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	3	651	341	42	635	349	67	86				
Volume Left	3	0	0	42	0	0	8	0				
Volume Right	0	0	15	0	0	31	59	86				
cSH	710	1700	1700	732	1700	1700	319	489				
Volume to Capacity	0.00	0.38	0.20	0.06	0.37	0.21	0.21	0.18				
Queue Length 95th (m)	0.1	0.0	0.0	1.4	0.0	0.0	5.9	4.8				
Control Delay (s)	10.1	0.0	0.0	10.2	0.0	0.0	19.3	13.9				
Lane LOS	B			B			C	B				
Approach Delay (s)	0.0			0.4			19.3	13.9				
Approach LOS							C	B				
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			45.4%		ICU Level of Service			A				
Analysis Period (min)			15									

Appendix E – Synchro Output Reports - 2026 Total Traffic

Timings

2026 PM Total Traffic

1: Mall Access/Strathy Rd & Elgin St W

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	272	762	67	642	263	83	89	228	83	358
Future Volume (vph)	272	762	67	642	263	83	89	228	83	358
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	42.6	31.6	33.3	24.1	24.1	22.9	12.8	31.2	19.3	19.3
Actuated g/C Ratio	0.52	0.39	0.41	0.29	0.29	0.28	0.16	0.38	0.24	0.24
v/c Ratio	0.64	0.59	0.21	0.64	0.43	0.21	0.55	0.51	0.19	0.56
Control Delay	18.9	23.5	12.6	29.1	8.3	18.5	31.7	22.4	29.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	23.5	12.6	29.1	8.3	18.5	31.7	22.4	29.0	7.1
LOS	B	C	B	C	A	B	C	C	C	A
Approach Delay		22.3		22.3			27.3		15.1	
Approach LOS		C		C			C		B	

Intersection Summary

Cycle Length: 86

Actuated Cycle Length: 81.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 21.1

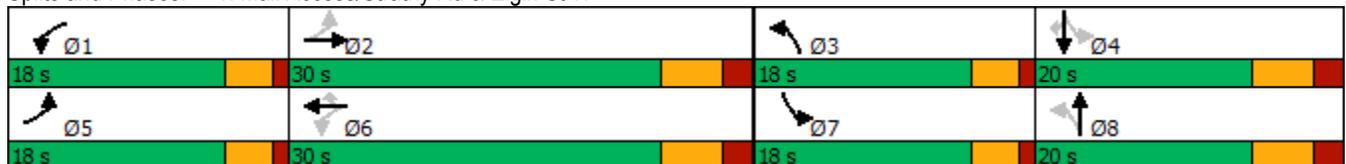
Intersection LOS: C

Intersection Capacity Utilization 72.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

2026 PM Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	283	824	70	669	274	86	174	238	86	373
v/c Ratio	0.64	0.59	0.21	0.64	0.43	0.21	0.55	0.51	0.19	0.56
Control Delay	18.9	23.5	12.6	29.1	8.3	18.5	31.7	22.4	29.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	23.5	12.6	29.1	8.3	18.5	31.7	22.4	29.0	7.1
Queue Length 50th (m)	24.1	55.4	5.2	49.1	5.9	8.8	19.5	26.5	11.4	0.0
Queue Length 95th (m)	41.0	79.8	11.8	69.4	24.7	17.9	38.9	44.0	24.2	22.1
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	467	1389	488	1052	638	537	342	486	453	663
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	0.61	0.59	0.14	0.64	0.43	0.16	0.51	0.49	0.19	0.56

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Mall Access/Strathy Rd & Elgin St W

2026 PM Total Traffic

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	272	762	29	67	642	263	83	89	78	228	83	358	
Future Volume (vph)	272	762	29	67	642	263	83	89	78	228	83	358	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1825	3596		1825	3579	1633	1772	1787		1807	1921	1601	
Flt Permitted	0.23	1.00		0.29	1.00	1.00	0.70	1.00		0.45	1.00	1.00	
Satd. Flow (perm)	441	3596		553	3579	1633	1308	1787		847	1921	1601	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	283	794	30	70	669	274	86	93	81	238	86	373	
RTOR Reduction (vph)	0	2	0	0	0	157	0	37	0	0	0	287	
Lane Group Flow (vph)	283	822	0	70	669	117	86	137	0	238	86	86	
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6		6	8			4		4	
Actuated Green, G (s)	41.5	31.6		30.9	25.0	25.0	20.4	13.6		30.1	19.3	19.3	
Effective Green, g (s)	41.5	31.6		30.9	25.0	25.0	20.4	13.6		30.1	19.3	19.3	
Actuated g/C Ratio	0.50	0.38		0.37	0.30	0.30	0.24	0.16		0.36	0.23	0.23	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	425	1359		294	1070	488	356	290		448	443	369	
v/s Ratio Prot	c0.10	0.23		0.02	0.19		0.02	0.08		c0.08	0.04		
v/s Ratio Perm	c0.23			0.07		0.07	0.04			c0.11		0.05	
v/c Ratio	0.67	0.60		0.24	0.63	0.24	0.24	0.47		0.53	0.19	0.23	
Uniform Delay, d1	14.0	21.0		17.4	25.3	22.1	25.1	31.7		19.9	25.9	26.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.9	2.0		0.4	2.8	1.2	0.4	1.2		1.2	0.2	0.3	
Delay (s)	17.9	23.0		17.8	28.0	23.3	25.5	33.0		21.2	26.1	26.5	
Level of Service	B	C		B	C	C	C	C		C	C	C	
Approach Delay (s)		21.7			26.0			30.5			24.6		
Approach LOS		C			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			24.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			83.6									Sum of lost time (s)	20.0
Intersection Capacity Utilization			72.1%									ICU Level of Service	C
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 2: Site Access/Courthouse Rd (W) & Elgin St W

2026 PM Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↑			↕	
Traffic Volume (veh/h)	1	1032	31	89	925	1	0	0	93	5	1	4
Future Volume (Veh/h)	1	1032	31	89	925	1	0	0	93	5	1	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	1075	32	93	964	1	0	0	97	5	1	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.82			0.82	0.82	0.82	0.82	0.82	
vC, conflicting volume	965			1107			1750	2228	538	1787	2260	482
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	965			693			1476	2059	0	1522	2097	482
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			88			100	100	89	91	97	99
cM capacity (veh/h)	722			748			65	40	876	55	38	535
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	359	717	32	93	643	322	97	10				
Volume Left	1	0	0	93	0	0	0	5				
Volume Right	0	0	32	0	0	1	97	4				
cSH	722	1700	1700	748	1700	1700	876	80				
Volume to Capacity	0.00	0.42	0.02	0.12	0.38	0.19	0.11	0.13				
Queue Length 95th (m)	0.0	0.0	0.0	3.2	0.0	0.0	2.8	3.1				
Control Delay (s)	0.0	0.0	0.0	10.5	0.0	0.0	9.6	56.6				
Lane LOS	A			B			A	F				
Approach Delay (s)	0.0			0.9			9.6	56.6				
Approach LOS							A	F				
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			69.9%	ICU Level of Service	C							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

3: Plaza Access/Courthouse Rd (E) & Elgin St W

2026 PM Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1130	14	40	933	30	8	0	57	0	0	85
Future Volume (Veh/h)	6	1130	14	40	933	30	8	0	57	0	0	85
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	6	1177	15	42	972	31	8	0	59	0	0	89
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	270											
pX, platoon unblocked				0.83				0.83	0.83	0.83	0.83	0.83
vC, conflicting volume	1003			1192			1856	2284	596	1731	2276	502
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1003			829			1626	2140	114	1476	2130	502
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			93			82	100	92	100	100	82
cM capacity (veh/h)	698			639			44	38	759	65	39	482
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	6	785	407	42	648	355	67	89				
Volume Left	6	0	0	42	0	0	8	0				
Volume Right	0	0	15	0	0	31	59	89				
cSH	698	1700	1700	639	1700	1700	260	482				
Volume to Capacity	0.01	0.46	0.24	0.07	0.38	0.21	0.26	0.18				
Queue Length 95th (m)	0.2	0.0	0.0	1.6	0.0	0.0	7.6	5.1				
Control Delay (s)	10.2	0.0	0.0	11.0	0.0	0.0	23.6	14.2				
Lane LOS	B			B			C	B				
Approach Delay (s)	0.1			0.4			23.6	14.2				
Approach LOS							C	B				
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				46.0%	ICU Level of Service			A				
Analysis Period (min)				15								

Timings

2026 Saturday Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↙	↕	↙	↕	↙	↙	↕	↙	↕	↙
Traffic Volume (vph)	306	587	66	627	249	97	100	185	94	332
Future Volume (vph)	306	587	66	627	249	97	100	185	94	332
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2	1	6		3	8	7	4	
Permitted Phases	2		6		6	8		4		4
Detector Phase	5	2	1	6	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	6.0	10.0	6.0	10.0	10.0	6.0	12.0	6.0	12.0	12.0
Minimum Split (s)	10.0	16.0	10.0	16.0	16.0	10.0	18.0	10.0	18.0	18.0
Total Split (s)	18.0	30.0	18.0	30.0	30.0	18.0	20.0	18.0	20.0	20.0
Total Split (%)	20.9%	34.9%	20.9%	34.9%	34.9%	20.9%	23.3%	20.9%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	43.1	32.1	33.2	24.1	24.1	23.4	12.8	29.8	18.0	18.0
Actuated g/C Ratio	0.53	0.39	0.41	0.30	0.30	0.29	0.16	0.37	0.22	0.22
v/c Ratio	0.69	0.46	0.17	0.62	0.41	0.24	0.61	0.45	0.23	0.56
Control Delay	20.4	20.9	11.9	28.5	8.0	18.9	34.4	21.6	30.2	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	20.9	11.9	28.5	8.0	18.9	34.4	21.6	30.2	7.5
LOS	C	C	B	C	A	B	C	C	C	A
Approach Delay		20.7		21.9			29.1		15.3	
Approach LOS		C		C			C		B	

Intersection Summary

Cycle Length: 86

Actuated Cycle Length: 81.6

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.8

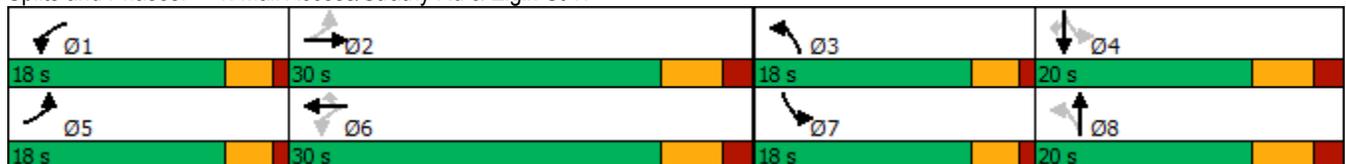
Intersection LOS: C

Intersection Capacity Utilization 71.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Mall Access/Strathy Rd & Elgin St W



Queues

2026 Saturday Total Traffic

1: Mall Access/Strathy Rd & Elgin St W



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	319	657	69	653	259	101	192	193	98	346
v/c Ratio	0.69	0.46	0.17	0.62	0.41	0.24	0.61	0.45	0.23	0.56
Control Delay	20.4	20.9	11.9	28.5	8.0	18.9	34.4	21.6	30.2	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	20.9	11.9	28.5	8.0	18.9	34.4	21.6	30.2	7.5
Queue Length 50th (m)	26.4	39.8	4.9	46.4	4.9	10.4	22.2	21.0	13.2	0.0
Queue Length 95th (m)	#46.6	61.0	11.6	67.6	23.0	20.3	43.6	35.9	27.2	21.6
Internal Link Dist (m)		196.7		89.6			77.7		135.7	
Turn Bay Length (m)	40.0				30.0	15.0		35.0		
Base Capacity (vph)	477	1414	560	1056	634	533	342	464	424	623
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	0.67	0.46	0.12	0.62	0.41	0.19	0.56	0.42	0.23	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Mall Access/Strathy Rd & Elgin St W

2026 Saturday Total Traffic

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		 			 									
Traffic Volume (vph)	306	587	44	66	627	249	97	100	84	185	94	332		
Future Volume (vph)	306	587	44	66	627	249	97	100	84	185	94	332		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		
Satd. Flow (prot)	1825	3578		1825	3579	1633	1772	1789		1807	1921	1601		
Flt Permitted	0.24	1.00		0.40	1.00	1.00	0.69	1.00		0.41	1.00	1.00		
Satd. Flow (perm)	460	3578		772	3579	1633	1294	1789		780	1921	1601		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		
Adj. Flow (vph)	319	611	46	69	653	259	101	104	88	193	98	346		
RTOR Reduction (vph)	0	6	0	0	0	151	0	35	0	0	0	271		
Lane Group Flow (vph)	319	651	0	69	653	108	101	157	0	193	98	75		
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	3%	0%	0%	1%	0%	2%		
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm		
Protected Phases	5	2		1	6		3	8		7	4			
Permitted Phases	2			6		6	8			4		4		
Actuated Green, G (s)	41.9	32.1		30.7	24.9	24.9	21.0	13.7		29.3	18.0	18.0		
Effective Green, g (s)	41.9	32.1		30.7	24.9	24.9	21.0	13.7		29.3	18.0	18.0		
Actuated g/C Ratio	0.50	0.39		0.37	0.30	0.30	0.25	0.16		0.35	0.22	0.22		
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		
Lane Grp Cap (vph)	444	1380		358	1071	488	368	294		417	415	346		
v/s Ratio Prot	c0.11	0.18		0.01	0.18		0.02	0.09		c0.06	0.05			
v/s Ratio Perm	c0.25			0.06		0.07	0.05			c0.10		0.05		
v/c Ratio	0.72	0.47		0.19	0.61	0.22	0.27	0.53		0.46	0.24	0.22		
Uniform Delay, d1	13.8	19.2		17.2	25.0	21.9	24.7	31.8		19.8	26.9	26.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	5.5	1.2		0.3	2.6	1.0	0.4	1.9		0.8	0.3	0.3		
Delay (s)	19.3	20.3		17.5	27.6	22.9	25.1	33.7		20.6	27.2	27.1		
Level of Service	B	C		B	C	C	C	C		C	C	C		
Approach Delay (s)		20.0			25.6			30.7			25.2			
Approach LOS		C			C			C			C			
Intersection Summary														
HCM 2000 Control Delay			24.1									HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio			0.67											
Actuated Cycle Length (s)			83.2								20.0		Sum of lost time (s)	
Intersection Capacity Utilization			71.6%										ICU Level of Service	C
Analysis Period (min)			15											
c	Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
2: Site Access/Courthouse Rd (W) & Elgin St W

2026 Saturday Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑			↑			↕	
Traffic Volume (veh/h)	1	818	39	104	897	1	0	0	108	5	1	4
Future Volume (Veh/h)	1	818	39	104	897	1	0	0	108	5	1	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	852	41	108	934	1	0	0	112	5	1	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		114										
pX, platoon unblocked				0.87			0.87	0.87	0.87	0.87	0.87	
vC, conflicting volume	935			893			1542	2005	426	1690	2046	468
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	935			590			1332	1862	56	1502	1908	468
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			88			100	100	87	91	98	99
cM capacity (veh/h)	741			870			88	57	859	59	53	547
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	285	568	41	108	623	312	112	10				
Volume Left	1	0	0	108	0	0	0	5				
Volume Right	0	0	41	0	0	1	112	4				
cSH	741	1700	1700	870	1700	1700	859	90				
Volume to Capacity	0.00	0.33	0.02	0.12	0.37	0.18	0.13	0.11				
Queue Length 95th (m)	0.0	0.0	0.0	3.2	0.0	0.0	3.4	2.8				
Control Delay (s)	0.1	0.0	0.0	9.7	0.0	0.0	9.8	50.0				
Lane LOS	A			A			A	F				
Approach Delay (s)	0.0			1.0			9.8	50.0				
Approach LOS							A	F				
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			64.2%	ICU Level of Service	C							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
3: Plaza Access/Courthouse Rd (E) & Elgin St W

2026 Saturday Total Traffic

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	964	14	40	941	30	8	0	57	0	0	86
Future Volume (Veh/h)	7	964	14	40	941	30	8	0	57	0	0	86
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	1004	15	42	980	31	8	0	59	0	0	90
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)		270										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	1011			1019			1690	2120	510	1654	2112	506
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1011			800			1544	2023	234	1506	2014	506
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			94			85	100	91	100	100	81
cM capacity (veh/h)	694			709			55	49	686	66	50	479
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	7	669	350	42	653	358	67	90				
Volume Left	7	0	0	42	0	0	8	0				
Volume Right	0	0	15	0	0	31	59	90				
cSH	694	1700	1700	709	1700	1700	290	479				
Volume to Capacity	0.01	0.39	0.21	0.06	0.38	0.21	0.23	0.19				
Queue Length 95th (m)	0.2	0.0	0.0	1.4	0.0	0.0	6.6	5.2				
Control Delay (s)	10.2	0.0	0.0	10.4	0.0	0.0	21.1	14.2				
Lane LOS	B			B			C	B				
Approach Delay (s)	0.1			0.4			21.1	14.2				
Approach LOS							C	B				
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			46.3%		ICU Level of Service			A				
Analysis Period (min)			15									