



**83-85 Hickory Steet W and
265-267 Hemlock Street
Waterloo, Ontario
Transportation Impact Study**

Paradigm Transportation Solutions Limited

August 2022
220292



Project Number
220292

August 2022

Client
DCB Developments Inc.
c/o Masri O Architects

Client Contact
Reema Masri
609 Kumpf Drive, Suite 101
Waterloo ON N2L 1K8

Consultant Project Team
Matthew Brouwer, P.Eng.
Evan Hong, EIT
Andrew Orr, EIT

**Paradigm Transportation
Solutions Limited**
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684
www.ptsl.com

83-85 Hickory Street West and 265-267 Hemlock Street, Waterloo, Ontario Transportation Impact Study



Matthew Brouwer, P.Eng.

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Executive Summary

Content

DCB Development Canada Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for proposed residential building at 83-85 Hickory Street West and 265-267 Hemlock Street, Waterloo, Ontario.

Development Concept

The proposed development is located on the southwest corner of Hickory Street West and Hemlock Street occupying four lots including 83-85 Hickory Street West and 265-267 Hemlock Street in Waterloo, Ontario. The development will consist of a six-storey apartment building with 168 units. Vehicle access is proposed via single all-moves access on east side of the Hemlock Street, north of Hickory Street West.

Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Operations:** The analyses indicate that all intersections within the study area are currently operating without any problem movements except for westbound movements at Hickory Street West and Albert Street operating at LOS E;
- ▶ **Trip Generation:** The development is forecast to generate 62 and 66 new trips during the AM and PM peak hours, respectively at full build out;
- ▶ **Background Traffic Operations:** All intersections within the study area are forecast to operate without problem movements by the 2027 Background horizon except eastbound and westbound movements at Hickory Street West and Albert Street operating at LOS F;
- ▶ **Total Traffic Operations:** As under background traffic conditions, all observed intersections are forecast to operate without problem movements at the 2027 with the same exception being eastbound and westbound movements at Hickory Street West and Albert Street operating at LOS F;
- ▶ **Mitigating Measures:** a southbound left-turn lane with 30 metres of storage length is warranted on Hickory Street West and Albert Street by future background volumes, regardless of



whether the development is built. This left-turn lane will no longer be warranted after Hickory Street is converted to a one-way street in the westbound direction;

- ▶ **Background Traffic Operation with One-way Hickory Street West Conversion:** All intersections within the study area are forecast to operate without problem movements by the 2027 Background horizon except westbound movements at Hickory Street West and Albert Street operating at LOS F; and
- ▶ **Total Traffic Operation with One-way Hickory Street West Conversion:** As under background traffic with the conversion conditions, all observed intersections are forecast to operate without problem movements at the 2027 with the same exception being westbound movements at Hickory Street West and Albert Street operating at LOS F.

Recommendations

Based on the findings of this study, it is recommended that the development be approved with no additional improvements to the transportation network.



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1 Introduction

1.1 Overview

DCB Development Canada Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for proposed residential building at 83-85 Hickory Street West and 265-267 Hemlock Street, Waterloo, Ontario.

Figure 1.1 illustrates the location of the development.

1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impacts resulting from the proposed development. The scope of the study, developed in consultation with City of Waterloo staff via e-mail in May 2022, includes:

- ▶ Assessment of the current traffic and site condition within the study area;
- ▶ Traffic forecasts for a five-year horizon (2027);
- ▶ Estimate of additional traffic generated by the subject site;
- ▶ Analyses of the impact of the future traffic on the surrounding road network; and
- ▶ Recommendations necessary to mitigate the site generated traffic in satisfactory manner.

Based on the pre-study consultation, the following intersections were identified for an assessment in this study:

- ▶ Albert Street and Hickory Street West (unsignalized);
- ▶ Hemlock Street and Hickory Street West (unsignalized);
- ▶ Hazel Street and Hickory Street West (unsignalized); and
- ▶ Site Access and Hemlock Street (unsignalized).





 Subject Site  Study Area  Study Area Intersections



2 Existing Conditions

This section documents current traffic conditions, operational deficiencies and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

2.1 Existing Roads

Reference was made to the City of Waterloo's Transportation Master Plan¹. The roadways within the study area include:

- ▶ **Albert Street** is a north/south two-lane major collector with a speed limit of 50 km/h;
- ▶ **Hemlock Street** is a north/south two-lane local street with a speed limit of 50 km/h; and
- ▶ **Hazel Street** is a north/south two-lane minor collector with a speed limit of 50 km/h.
- ▶ **Hickory Street West** is an east/west two-lane local road with a speed limit of 50 km/h.

The study area is composed of residential developments mainly geared towards post-secondary students, with educational institutions and commercial developments located to the south and west. The existing lane configuration and traffic control for each intersection in the study area is shown in **Figure 2.1**.

Hickory Street West is planned to be converted into westbound one-way street. The analysis of the traffic operations under this condition will be discussed in **Chapter 6**.

2.2 Transit Service

Grand River Transit (GRT) operates nine bus routes within 400 metres of the subject site. **Figure 2.2** displays the GRT transit routes. These include routes 7, 9, 13, 19, 19B, 29, 31, 201 and 202 connecting to major hubs such as University of Waterloo, Wilfred Laurier University, Conestoga Mall, Conestoga College, Uptown Waterloo and Downtown Kitchener. The ION light rail transit (LRT) operates to serve within the Region of Waterloo allowing convenient access between the three major cities: Waterloo, Kitchener and Cambridge. GO busses operate

¹ City of Waterloo Transportation Plan, PTSL, April 2021



near the site having its closest stop at Wilfrid Laurier University on University Avenue West providing interregional accessibility.

2.3 Active Transportation

2.3.1 Cycling

No dedicated cycling infrastructure is provided within local roads. However, on nearby arterials (University Avenue, Columbia Street, and King Street) the Region of Waterloo has constructed separated cycling facilities². This provided network surrounds the Northdale neighbourhood as well as connecting to post secondary institutions and trails including The Great Trail (Trans-Canada Trail) and Laurel Trail.

Figure 2.3 details the Cycling Network.

2.3.2 Walking

Sidewalks are provided on both sides of the road within the study area.

2.3 Traffic Volumes

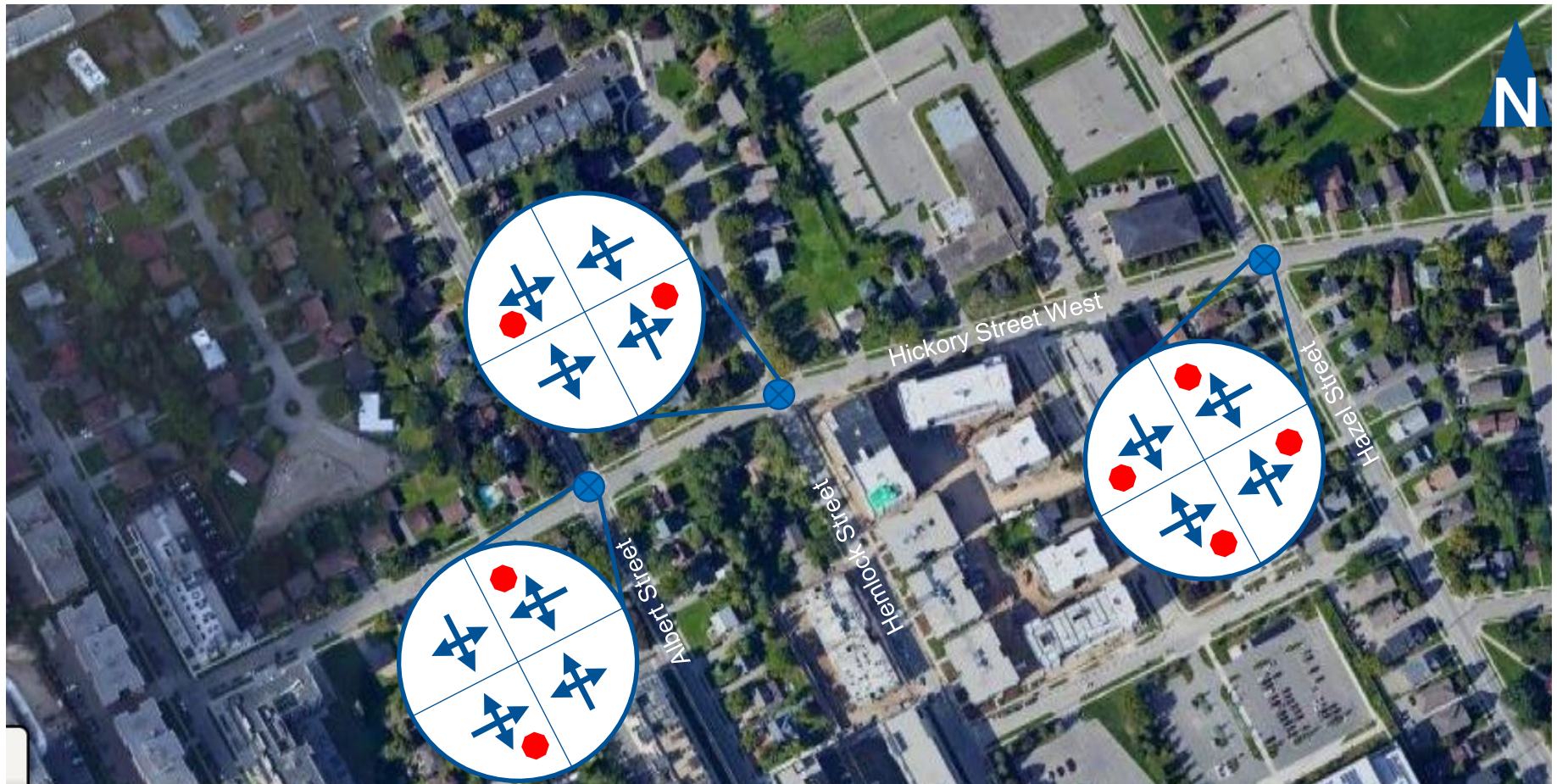
Beginning in March 2020, the Province of Ontario implemented restrictions for day-to-day activities in response to the COVID-19 global pandemic. Restrictions included the closures of retail and institutional land uses, reduced gathering sizes and other operation limiting restrictions at other places of employment. To reflect the representative volumes in the Northdale Neighbourhood area, counts from when school was in session were be used; that is Fall Term (September to December) and Winter Term (January - April), excluding Spring Term (May – August). Older traffic counts were used to adjust the growth of the collected data in an effort to match the post-pandemic traffic situation.

Figure 2.4 illustrates the existing AM and PM weekday peak hour turning movement traffic volumes collected in June 2021 and factored up with pre-pandemic counts.

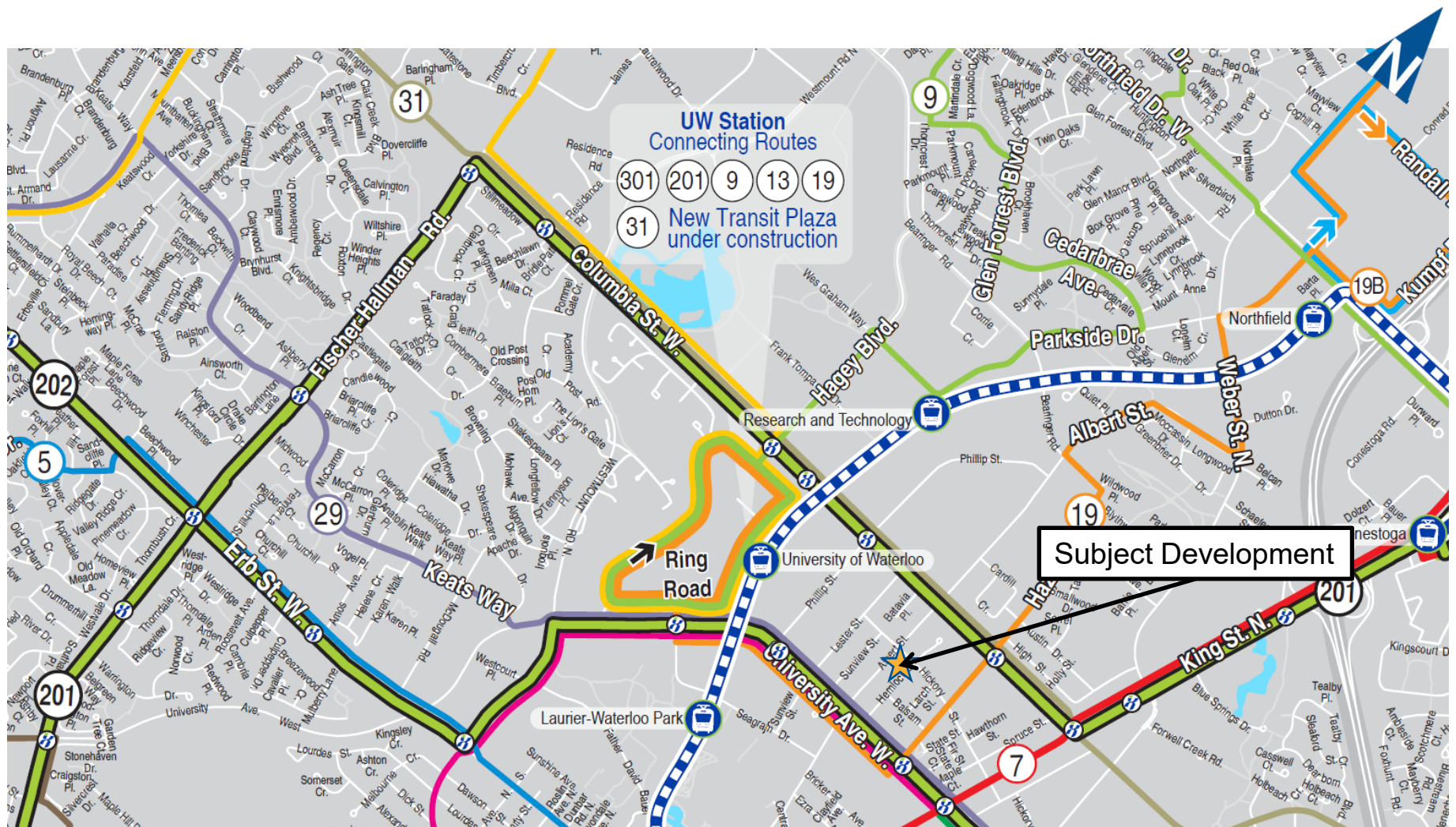
Appendix A contains the detailed traffic counts for the study area intersections.

² Region of Waterloo, Separated Cycling Lanes,
<https://www.regionofwaterloo.ca/en/exploring-the-region/separated-cycling-lanes.aspx#>





● Study Area Intersections



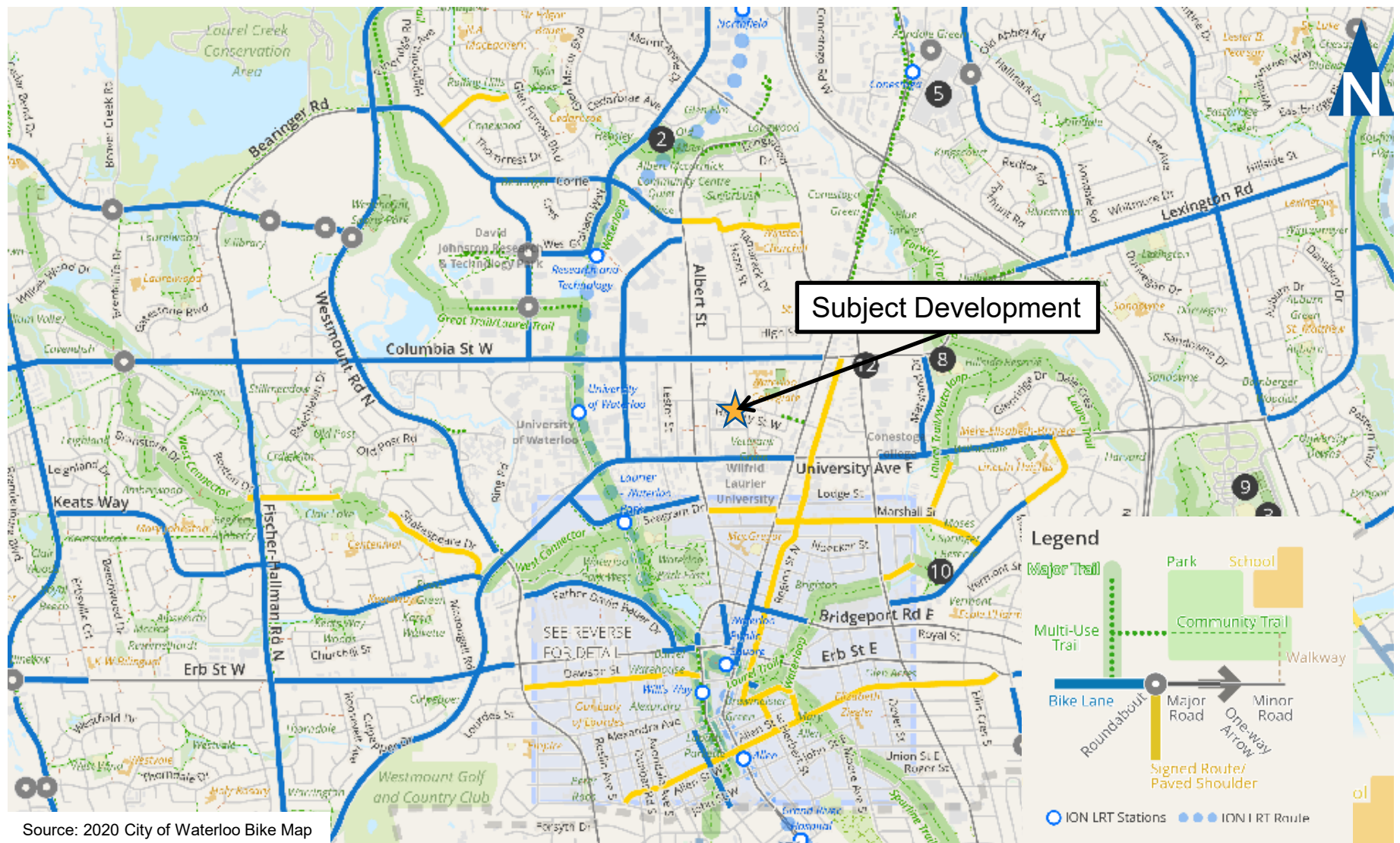
Source: Grand River Transit System Map



Existing Transit Route Map

83-85 Hickory St W & 265-267 Hemlock St – Transportation Impact Study
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Figure 2.2



Source: 2020 City of Waterloo Bike Map



Waterloo Cycling Network

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Figure 2.3

2.4 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of intersections in the study area were evaluated with the existing turning movement volumes using Synchro 11.

The intersection analysis considered two separate measures of performance:

- ▶ The volume to capacity ratio for each intersection; and
- ▶ The LOS for each turning movement (LOS is based on the average control delay per vehicle).

Table 2.1 summarizes the existing intersection operations. The entries in the table indicating the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced.

All intersections are forecast to operate without problem movements with the following with exceptions:

- ▶ Westbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS E during the PM peak hours.

Appendix B contains the detailed Synchro 11 reports.



TABLE 2.1: EXISTING TRAFFIC OPERATIONS SUMMARY

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	C 18 0.18 5	> > > >	C 18	< < < <	C 16 0.14 4	> > > >	C 16	A 8 0.00 0	A 0 0.00 0	A 0	A 8 0.03 1	A 0 0.00 0	A 0	A 1		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0	A 0	A 7 0.01 0	A 0 0.00 0	A 0	A 2	< < < <	A 9 0.06 2	> > > >	A 9	< < < <	A 10 0.03 1	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0.15 1	> > > >		< < < <	A 9 0.16 1	> > > >		< < < <	A 9 0.19 1	> > > >		< < < <	A 9 0.16 1	> > > >		
PM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	D 28 0.41 14	> > > >	D 28	< < < <	E 35 0.55 22	> > > >	E 35	A 8 0.02 1	A 0 0.00 0	A 0	A 8 0.04 1	A 0 0.00 0	A 0	A 1		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 8 0.00 0	A 0 0.00 0	A 0	A 0	A 8 0.01 0	A 0 0.00 0	A 0	A 2	< < < <	A 10 0.04 1	> > > >	A 10	< < < <	A 10 0.02 1	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0.14 1	> > > >		< < < <	A 8 0.19 1	> > > >		< < < <	A 8 0.12 0	> > > >		< < < <	A 8 0.12 0	> > > >		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

</> - Shared with through movement

AWSC - All-Way Stop Control



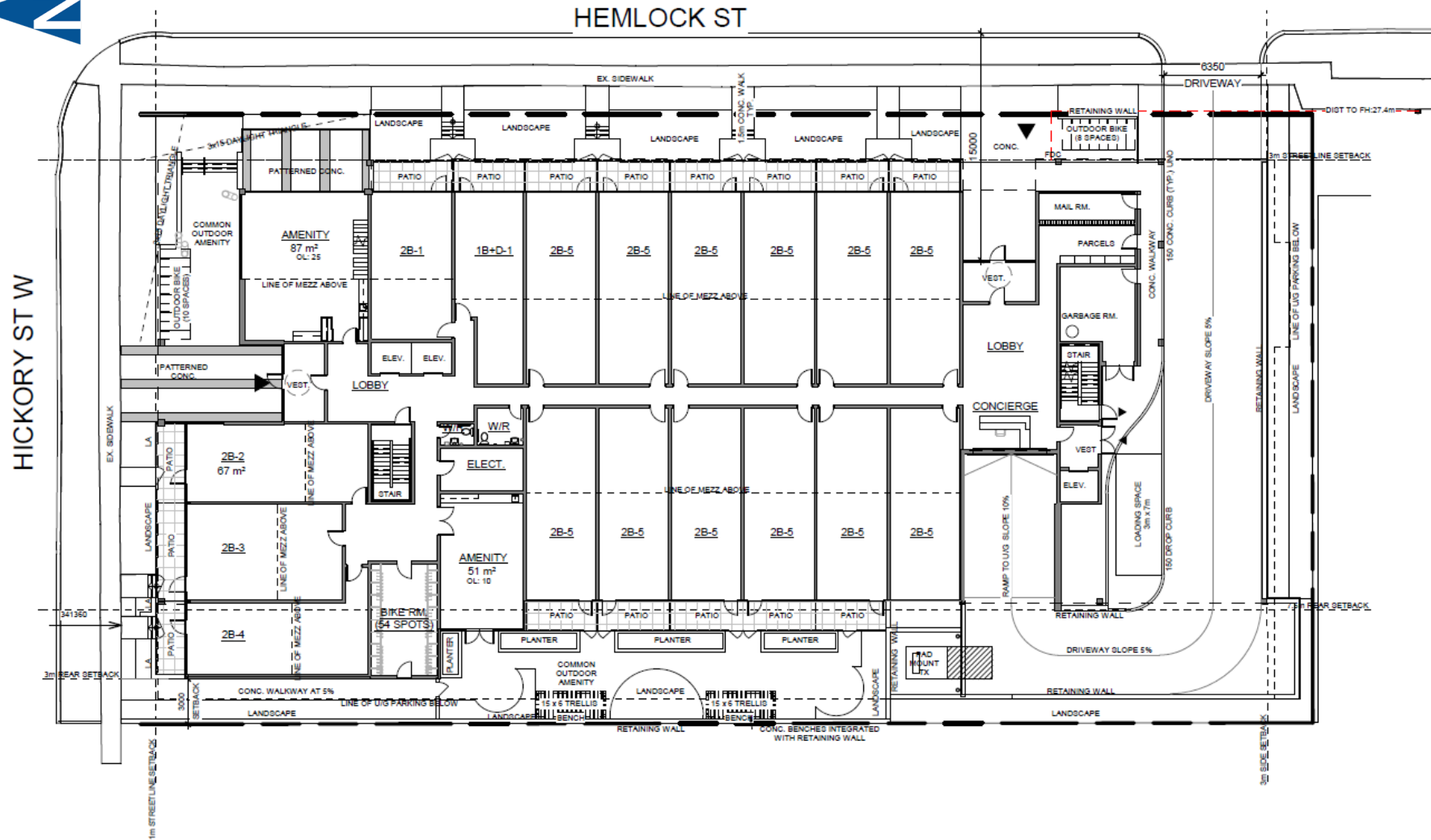
3 Development Concept

3.1 Development Description

The proposed development is located on the southwest corner of Hickory Street West and Hemlock Street occupying four lots including 83-85 Hickory Street West and 265-267 Hemlock Street in Waterloo, Ontario. The development will consist of a six-storey apartment building with 168 dwelling units. Vehicle access is proposed via single all-moves access on east side of the Hemlock Street, north of Hickory Street West.

The development concept plan is shown in **Figure 3.1**.





3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual³ provides rates and equations used to estimate the peak hour traffic volumes generated by the Land Use Codes (LUC) of this development. LUC 221 was used for this study and it is described as follows:

- **LUC 221 (Multifamily Housing: Mid-rise)** includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Table 3.1 summarizes the estimated trip generation for the proposed residential development. The trips generated by the development are forecast to be 62 trips during AM peak hour and 66 trips during PM peak hour).

TABLE 3.1: SITE TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
221 - Multifamily Housing (Mid-Rise)	168	Eq ¹	14	48	62	Eq ²	40	26	66
Total Trip Generation			14	48	62		40	26	66

$$^1(T) = 0.44(X) - 11.61$$

$$^2(T) = 0.39(X) + 0.34$$

3.3 Trip Distribution and Assignment

Given that the area is largely developed and the developments within the immediate area are similar to the proposed plan, the trip distribution was based on existing travel patterns of the surrounding streets.

³ Institute of Transportation Engineers Trip Generation Manual 10th Edition, 2017.

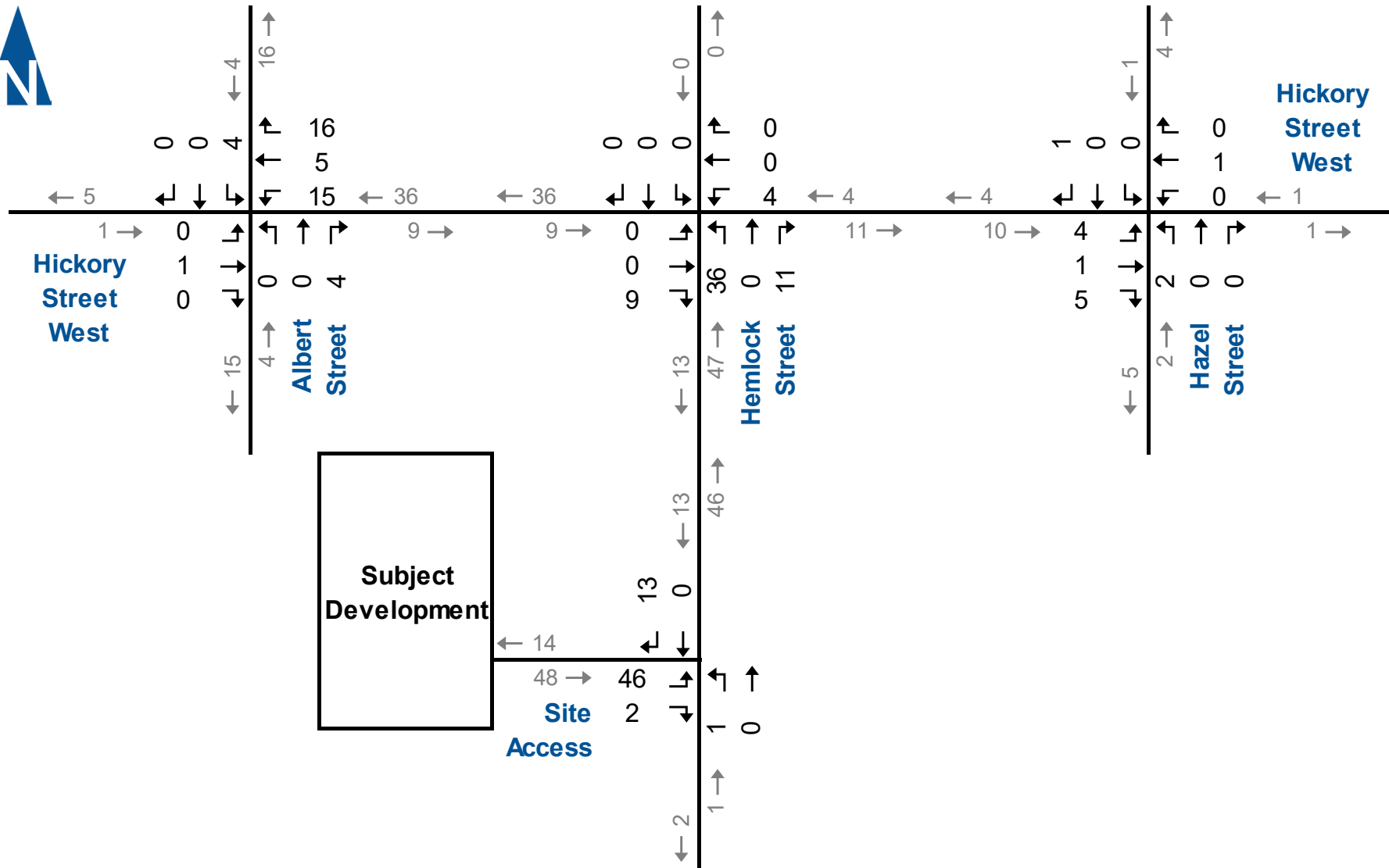


TABLE 3.2: TRIP DISTRIBUTION

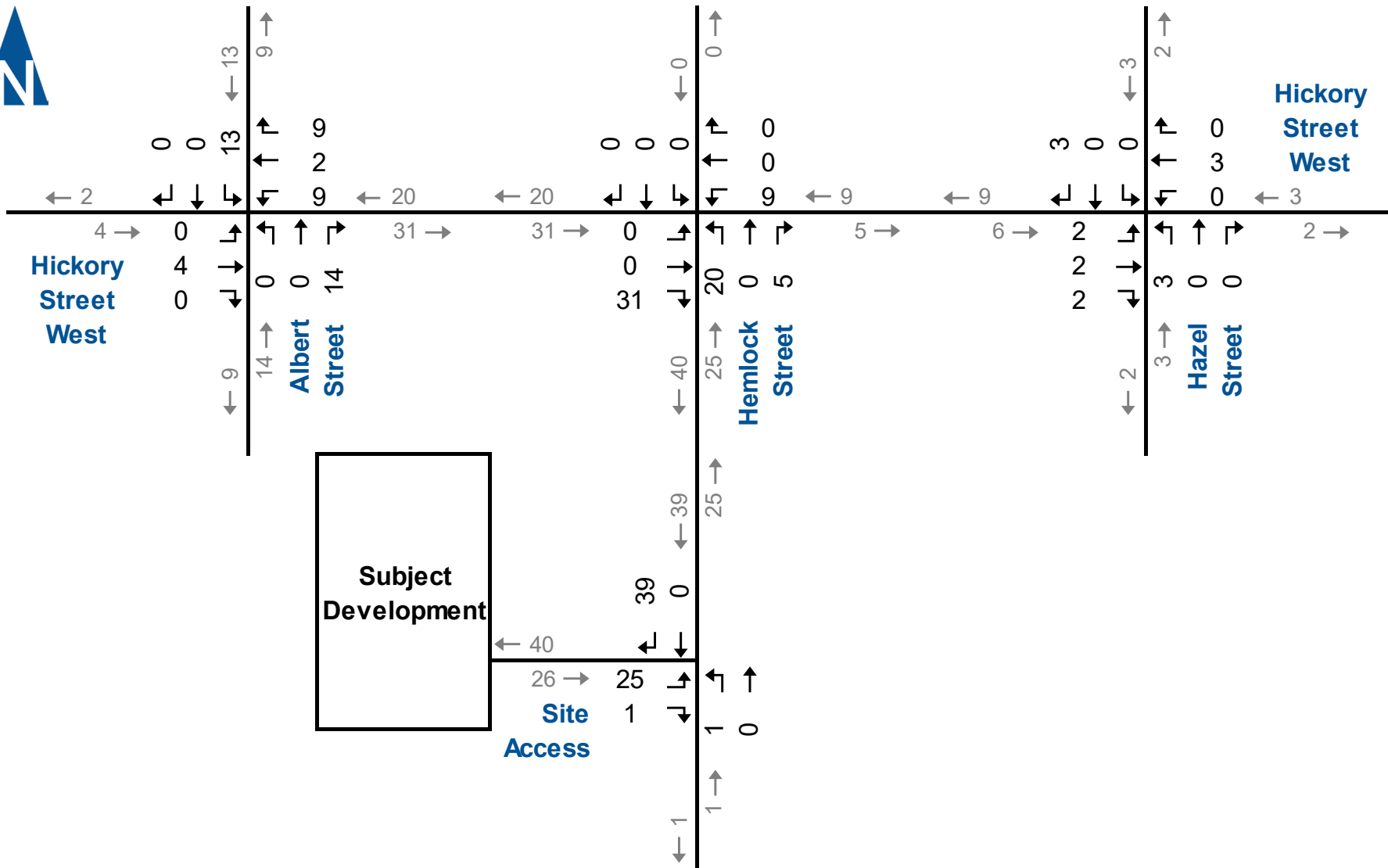
Direction (To/From)	AM Peak Hour		PM Peak Hour	
	% in	% out	% in	% out
West Via Hickory Street	10%	11%	10%	8%
East via Hickory Street	5%	2%	7%	6%
North via Albert Street	31%	33%	34%	35%
South Via Albert Street	31%	30%	34%	34%
South via Hemlock Street	4%	4%	2%	2%
North via Hazel Street	9%	9%	6%	8%
South via Hazel Street	11%	10%	6%	7%
Total	100%	100%	100%	100%

Figure 3.2a and **Figure 3.2b** illustrate the site-generated trip assignment for the AM and PM peak hours, respectively.





Site Generated AM Peak Hour Traffic Volumes



Site Generated PM Peak Hour Traffic Volumes

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes and analyses for the 2027 horizon. The future traffic volumes near the development will likely consist of increased non-site traffic volumes (background traffic), traffic generated by other developments, and the traffic forecast to be generated by the proposed development.

4.1 Background Traffic Forecasts

4.1.1 Background Growth

The non-site traffic increase is the generalized traffic growth in the City of Waterloo. The generalized growth is anticipated to follow the average increase in population within the area. In pre-study consultation, the City of Waterloo confirmed a growth rate of 2% per annum, which was applied to the existing 2022 traffic volumes to forecast 2027 conditions.

4.1.2 Other Area Development

Paradigm requested information from approved but not-yet-built development applications from the City of Waterloo⁴. The following developments included for consideration are:

- ▶ 239 Albert Street;
- ▶ 262-280 Albert Street;
- ▶ 314-316 Batavia Place;
- ▶ 290-298 Hemlock Street; and
- ▶ 34-38 Hickory Street West.

The trips from these other developments were added to the general background traffic. **Appendix C** contains forecast background growth and background development traffic volumes.

4.2 2027 Horizon

4.2.1 2027 Background Traffic Operations

Figure 4.1 illustrates the 2027 background traffic volumes, including traffic growth, and other area development traffic volumes.

⁴ Zone Changes- Current zone change applications, City of Waterloo, <https://www.waterloo.ca/en/government/zone-changes.aspx>



The 2027 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. **Table 4.1** summarizes the results of the 2027 background traffic operations.

All intersections are forecast to operate without problem movements with the following with exceptions:

- ▶ Eastbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F with $v/c = 0.72$ during the PM peak hour; and
- ▶ Westbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F with $v/c = 1.19$ during the PM peak hour.

Appendix D contains the supporting detailed Synchro 11 reports.



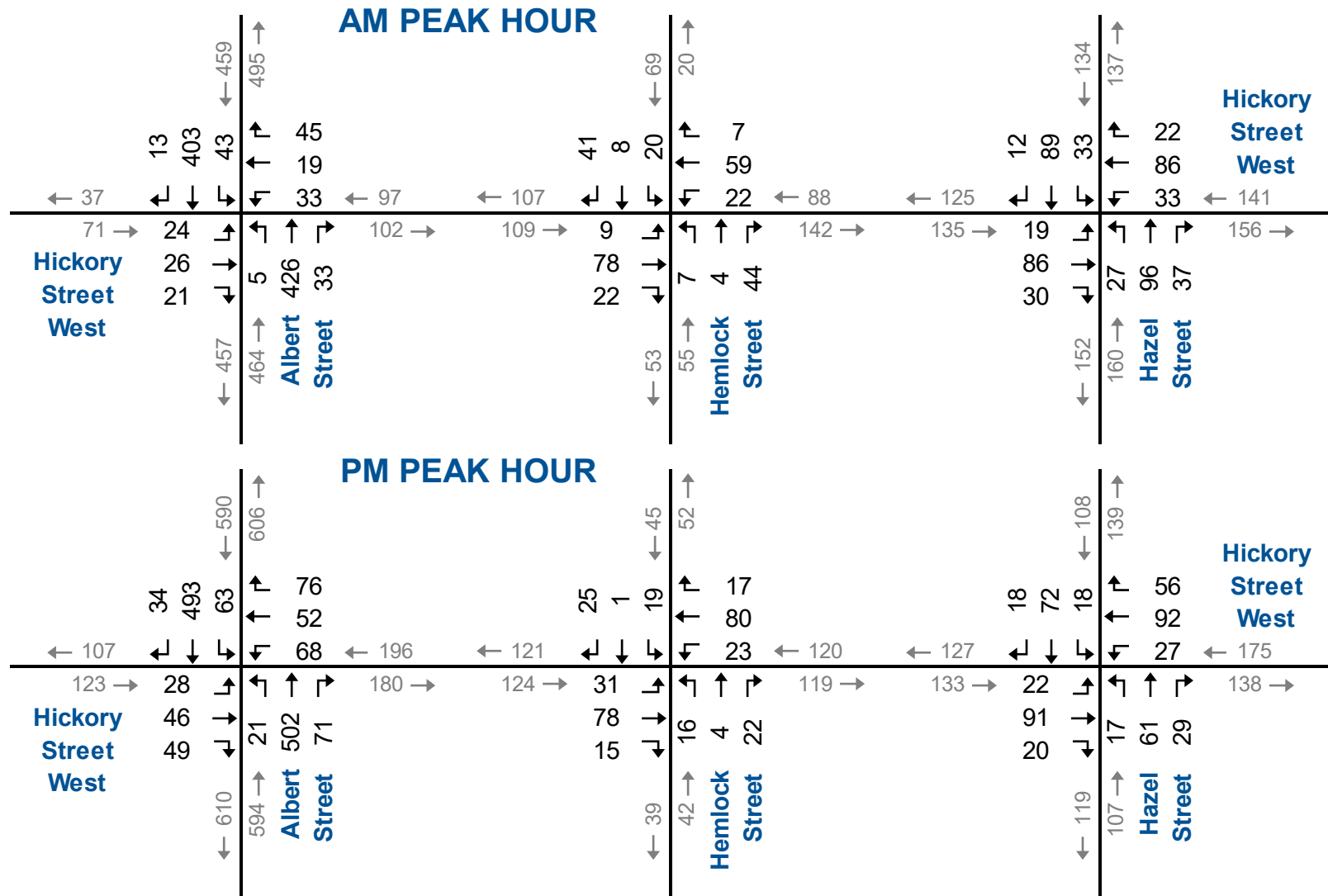


TABLE 4.1: 2027 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	C 24 0.28 8	> > > >	C 24	< < < <	C 23 0.33 10	> > > >	C 23	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 8 0.04 1	A 0 0.00 0	A 0 0.00 0	A 1	
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 2	< < < <	A 9 0.06 2	> > > >	A 9	< < < <	A 10 0.08 2	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 9 0.18 1	> > > >	A 8	< < < <	A 9 0.19 1	> > > >	A 9	< < < <	A 9 0.22 1	> > > >	A 9	< < < <	A 9 0.18 1	> > > >	A 9	
PM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	F 67 0.72 33	> > > >	F 67	< < < <	F 185 1.19 80	> > > >	F 185	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	A 9 0.06 2	A 0 0.00 0	A 0 0.00 0	A 1	
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 2	A 8 0.02 0	A 0 0.00 0	A 0 0.00 0	A 1	< < < <	A 10 0.06 2	> > > >	A 10	< < < <	A 10 0.06 2	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 9 0.17 1	> > > >	A 9	< < < <	A 9 0.21 1	> > > >	A 9	< < < <	A 8 0.14 1	> > > >	A 8	< < < <	A 9 0.14 1	> > > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

</> - Shared with through movement



4.2.2 Total 2027 Traffic Volumes

Figure 4.2a and **Figure 4.2b** illustrate the 2027 total traffic volumes, including trips generated by the background trip.

The total traffic volumes are found by summation of background traffic volumes and site generated traffic volumes.

The 2027 total traffic volumes have been analyzed using the same methodology as under existing traffic conditions. **Table 4.2** summarizes the results of the 2027 total traffic operations.

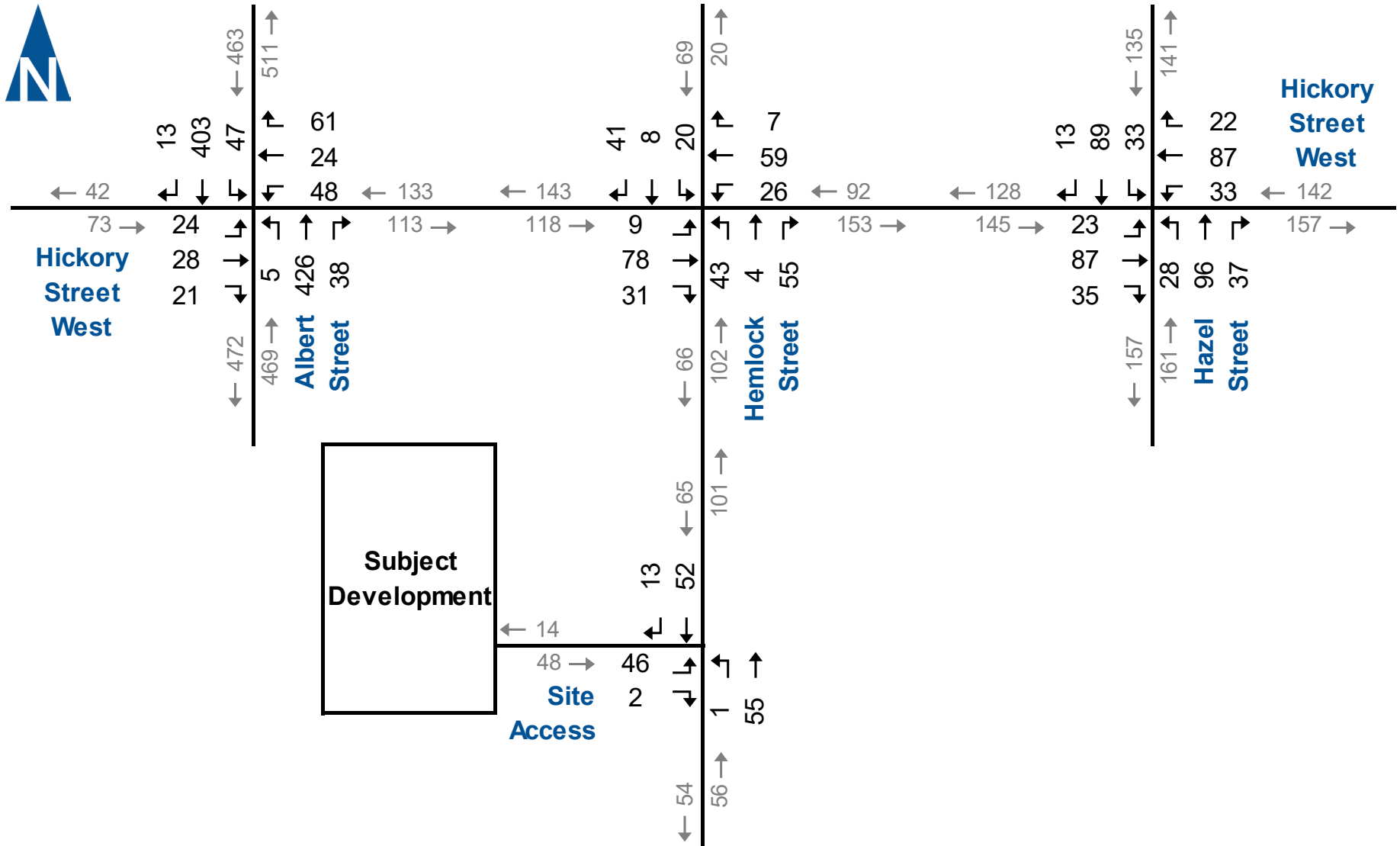
All intersections are forecast to operate without problem movements with the following with exceptions:

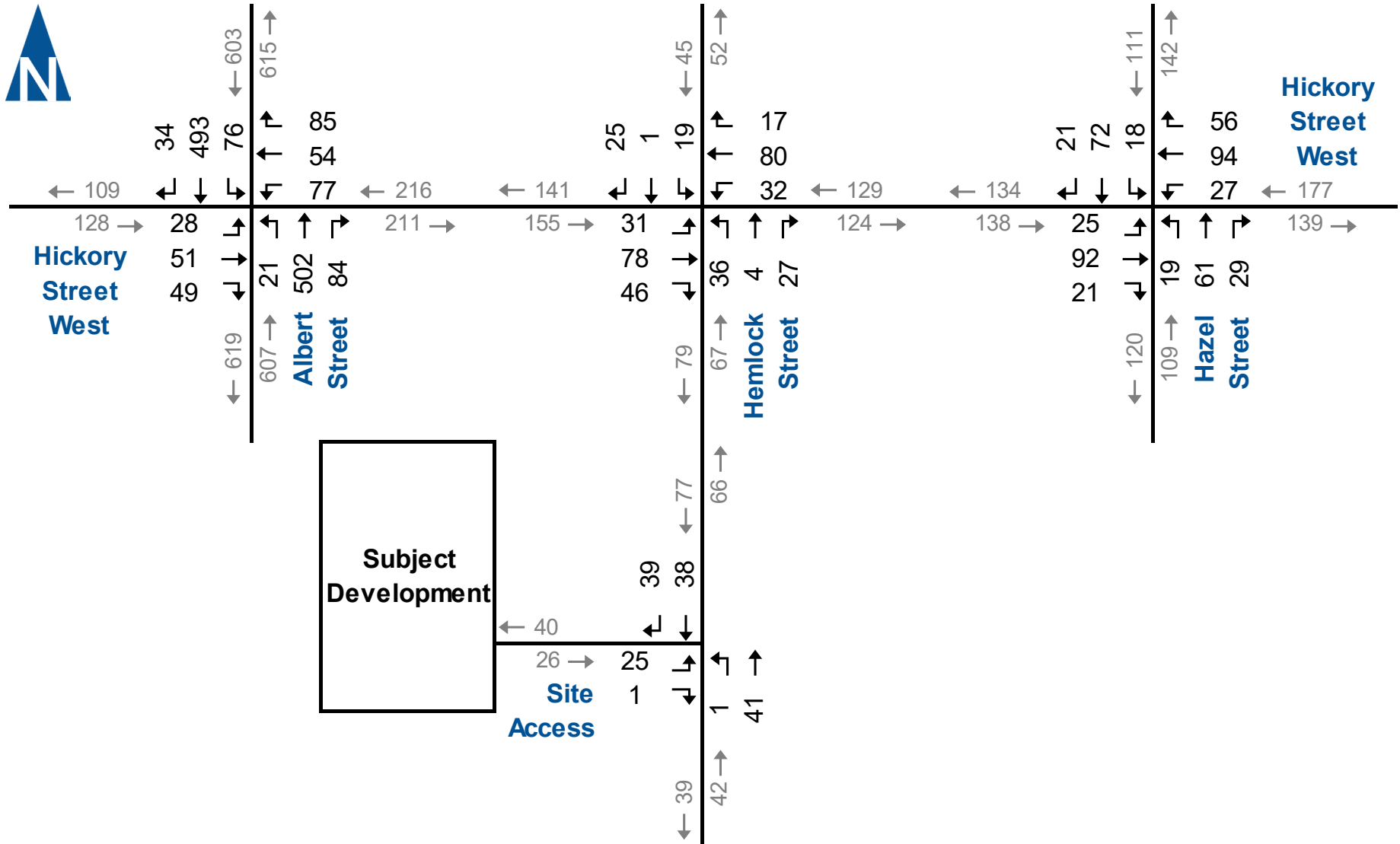
- ▶ Eastbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F with $v/c = 0.82$ during the PM peak hour; and
- ▶ Westbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F of $v/c = 1.45$ during the PM peak hour.

Appendix E contains the supporting detailed Synchro 11 reports.

The trips generated by the subject development have negligible impact on the traffic operations compared to the existing and background conditions.







2027 Total PM Peak Hour Traffic Volumes

TABLE 4.2: 2027 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	D 26 0.30 9	> > > >	D 26 A 1	< < < <	D 28 0.46 17	> > > >	D 28 A 2	A 8 0 0 0	A 0 0 0 0	A 0 0 0 0	A 0 0 0 0	A 0 0 0 0	A 0 0 0 0	A 1 0 0 0		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 7 0.01 0 0	A 0 0.00 0 0	A 0 0.00 0 0	A 1	A 8 0.02 1 0	A 0 0.00 0 0	A 0 0.00 0 0	A 2	< < < <	B 10 0.13 4 0	> > > >	B 10	< < < <	A 10 0.08 2 0	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 9 0.19 1	> > > >		< < < <	A 9 0.19 1	> > > >		< < < <	A 9 0.22 1	> > > >		< < < <	A 9 0.18 1	> > > >		
	Hemlock Street & Site Access	TWSC	LOS Delay V/C Q	A 9 0.06 2		> > > >	A 9						A 7 0.00 0	A 0 0.00 0		A 0		A 0 0.00 0	A 0 0.00 0	A 0
PM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	F 88 0.82 40	> > > >	F 88 A 2	< < < <	F 292 1.45 106	> > > >	F 292 A 2	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0 0 0 0	A 0 0 0 0	A 0 0 0 0	A 0 0 0 0	A 1 0 0 0	
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 2	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 2	< < < <	B 11 0.10 2	> > > >	B 11	< < < <	B 10 0.06 2	> > > >	B 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 9 0.18 1	> > > >		< < < <	A 9 0.22 1	> > > >		< < < <	A 8 0.14 1	> > > >		< < < <	A 9 0.15 1	> > > >		
	Hemlock Street & Site Access	TWSC	LOS Delay V/C Q	A 9 0.03 1		> > > >	A 9					A 7 0.00 0	A 0 0.00 0		A 0		A 0 0.00 0	A 0 0.00 0	A 0	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

</> - Shared with through movement

AWSC - All-Way Stop Control



5 Remedial Measures

5.1 Albert Street and Hickory Street West

The intersection of Albert Street and Hickory Street West are forecast to have side-street movements with LOS F at the 2027 horizon for both background and total volumes. Therefore, the intersection was analysed to determine if other traffic control measures are justified.

5.1.1 Traffic Control Signal Justification

The intersection of Albert Street and Hickory Street West are forecast to have side-street movements with LOS F at the 2027 horizon for both background and total volumes. Therefore, the intersection was analysed to determine if a traffic control signal is justified.

OTM Book 12 Justification System⁵ procedures and warrants revealed that new traffic control signals are not warranted under 2027 total conditions for the Hickory Street West and Albert Street intersection.

Appendix F contains the supporting detailed of the signal warrant.

5.1.2 All-Way Stop Warrant

As a signal is not forecast to be justified at the intersection of Albert Street and Hickory Street West, further analysis to determine if a change in traffic control to an all-way stop was investigated.

The warrant for all-way stop control follow the requirements in Ontario Traffic Manual (OTM) Book 5⁶.

According to OTM Book 5, the listed criteria should be satisfied if an intersection with a major roadway is to be converted to all-way stop control:

- ▶ **Condition 1:** The major roadway vehicle volume does not pass 70% of the intersection volume (pedestrians and vehicles);
- ▶ **Condition 2:** The sum of every approach for the intersection is equal to a volume larger than 200 vehicles per hour; and
- ▶ **Condition 3:** The summation of the minor street hourly volume (pedestrians and vehicles) must be larger than 75.

⁵ Ontario Traffic Manual – Book 12 – Traffic Signals, Ministry of Transportation of Ontario 2007

⁶ Ontario Traffic Manual – Book 5 – Regulatory Signs, Ministry of Transportation of Ontario December 2021



All-way stop control for Hickory Street West and Albert Street is not warranted as condition 1 is not met under background and total traffic conditions (one-way and without the one-way on Hickory Street West).

Therefore, as neither traffic control signals nor an all-way stop control are warranted at this intersection, no changes are recommended for this intersection. Vehicles experiencing longer delays on the side street will have opportunities to use alternate methods of exiting the Northdale neighbourhood, due to the grid nature of the surrounding streets.

5.2 Left-Turn Lane Warrants

The need for designated left turning lanes at unsignalized intersections within the study area was assessed using MTO procedures detailed in the MTO Supplement to the TAC Geometric Design Guide⁷.

The intersections at Hickory Street West and Albert Street and Hickory Street West and Hemlock Street were considered for the left-turn lane warrants. The design speed was assumed to be 10 km/h greater than the posted speed limit. The design speed of 60 km/h was used for the intersections.

A left turn-lane warrant was assessed for the southbound left-turn movement for Hickory Street West and Albert Street while a left turn-lane warrant was assessed for the westbound left-turn movement for Hickory Street West and Hemlock Street.

Existing, background and future conditions have been reviewed on the left-turn nomographs. The results are as follows:

- ▶ A southbound left-turn lane with 30 metres of storage length is warranted on Hickory Street West and Albert Street. The left-turn lane is warranted under existing (15 metres of storage), 2027 background (25 metres of storage), and 2027 total conditions (30 metres of storage).

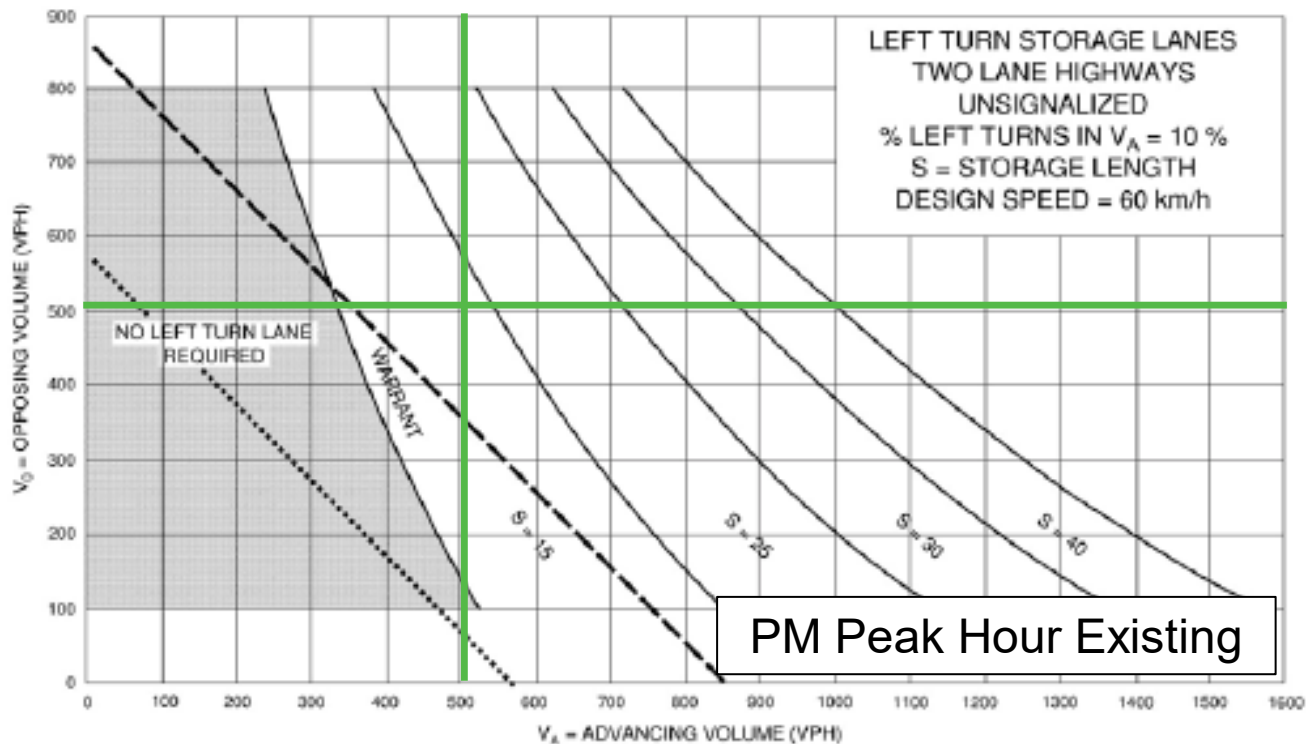
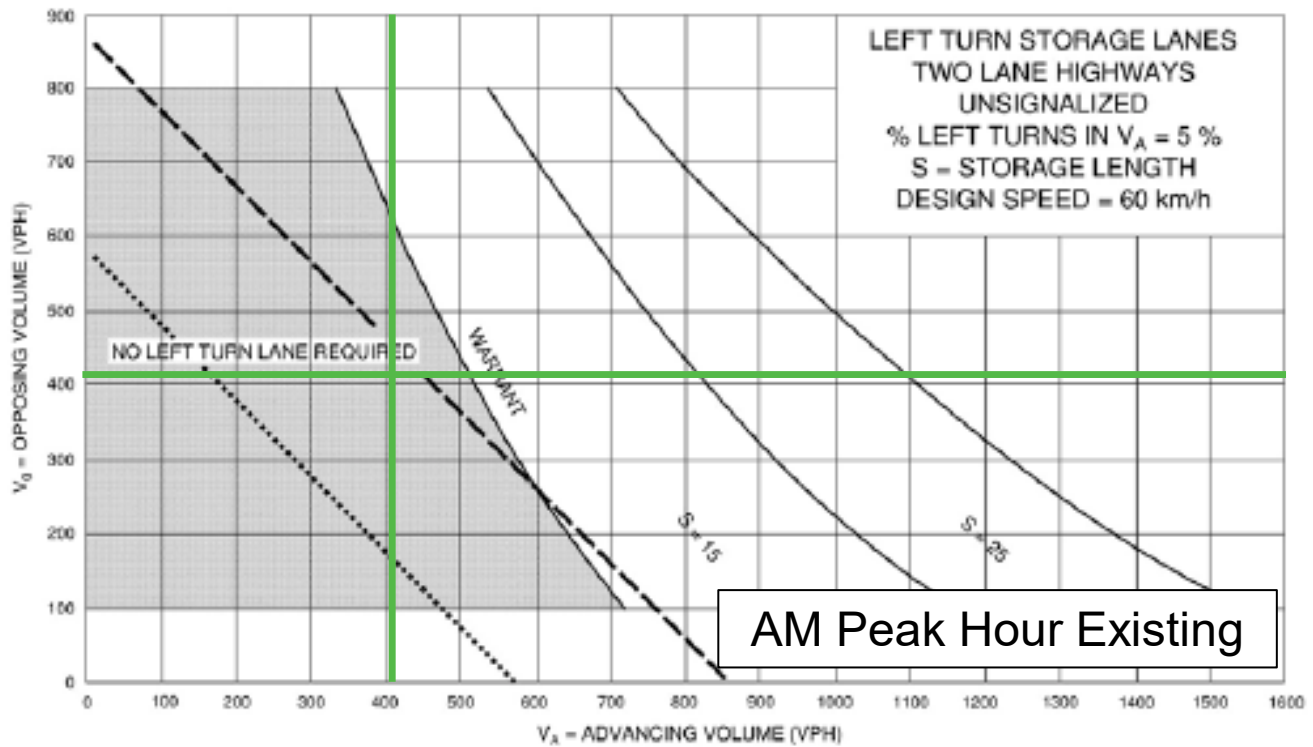
The subject development is not forecast to contribute significant traffic to this movement, and the left-turn lane is warranted regardless of whether the subject development proceeds.

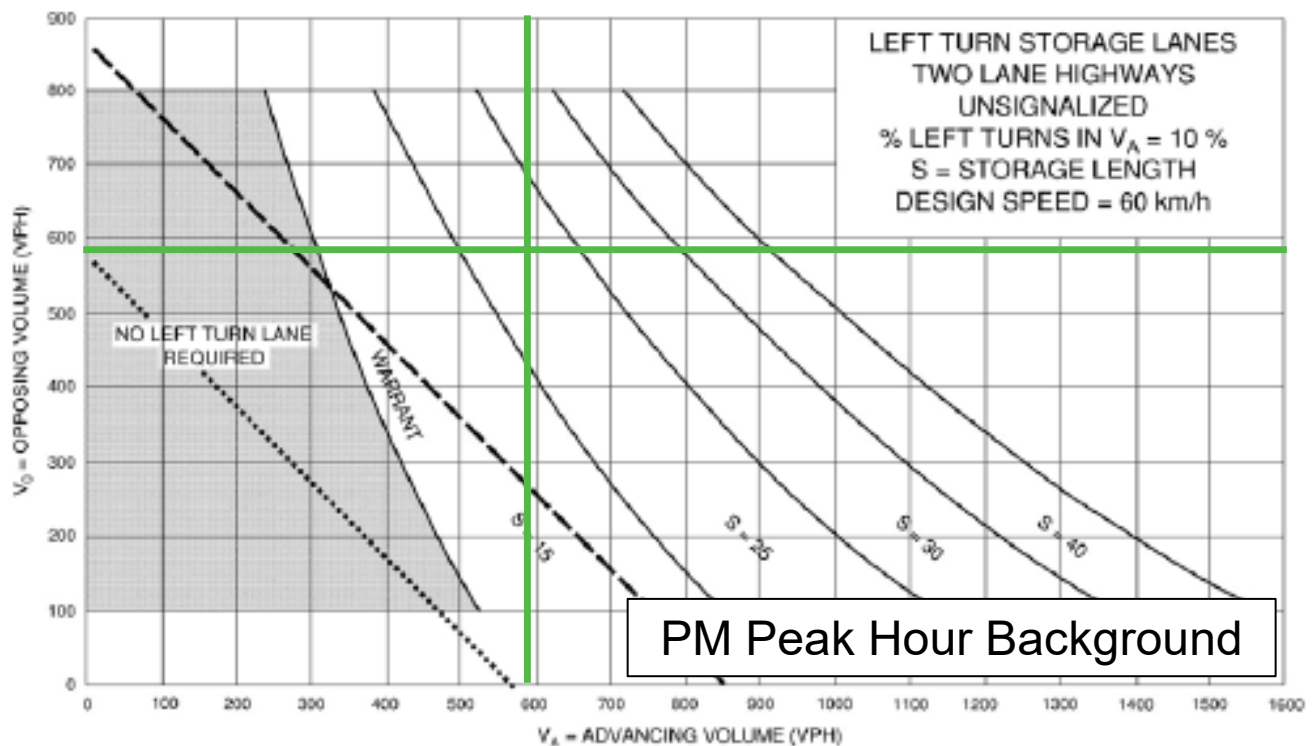
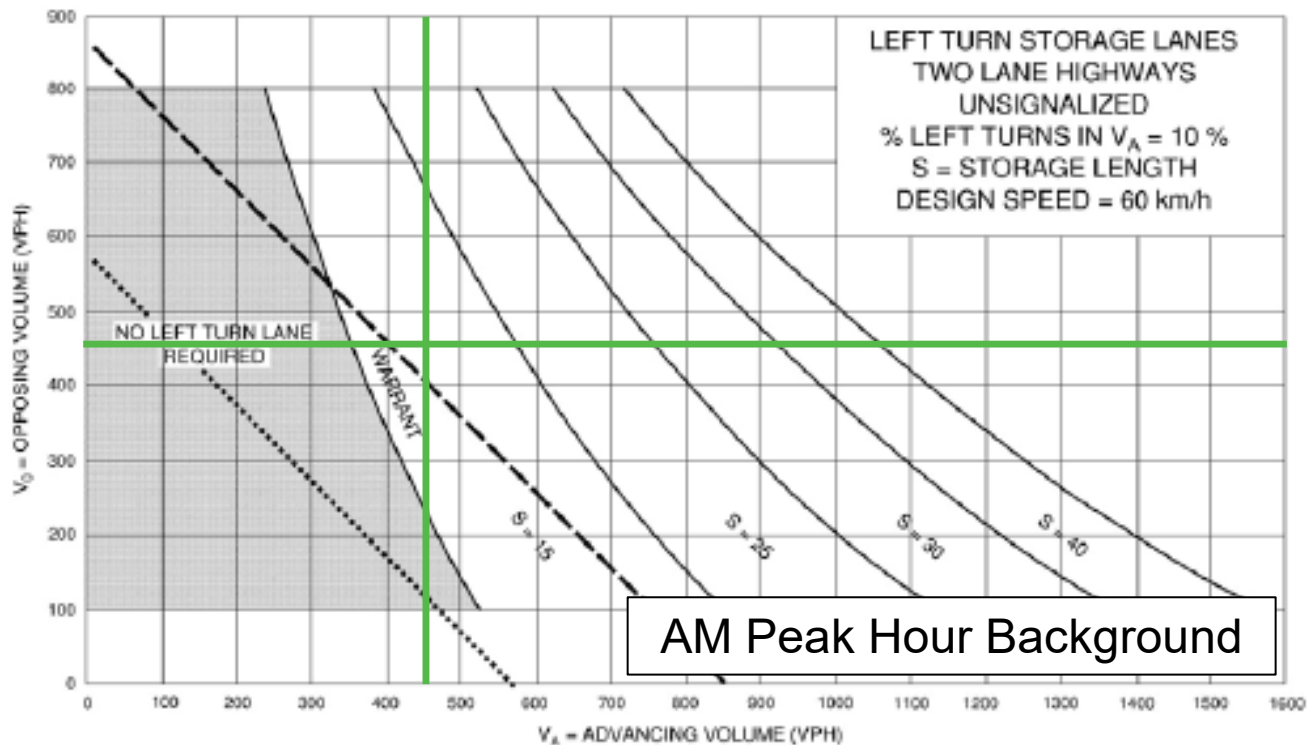
- ▶ A westbound left-turn lane is not warranted at Hickory Street West at Hemlock Street due to low volumes.

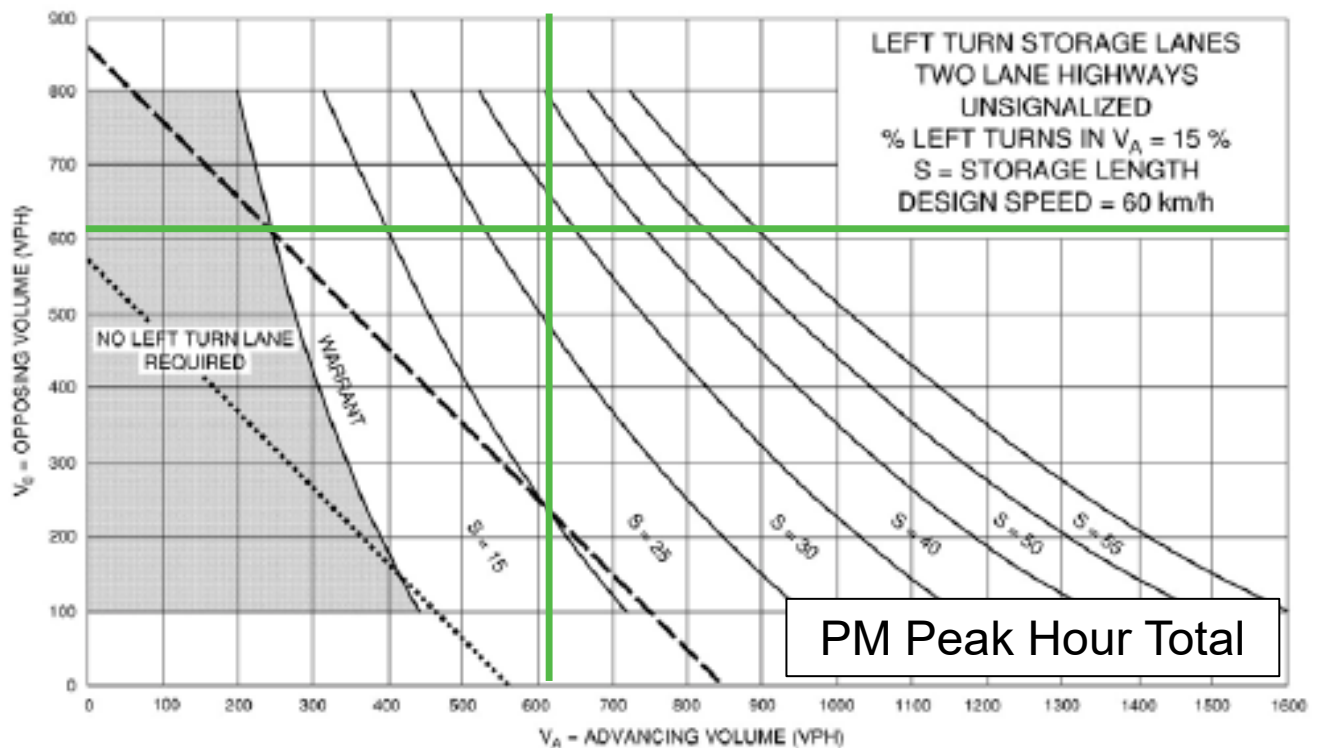
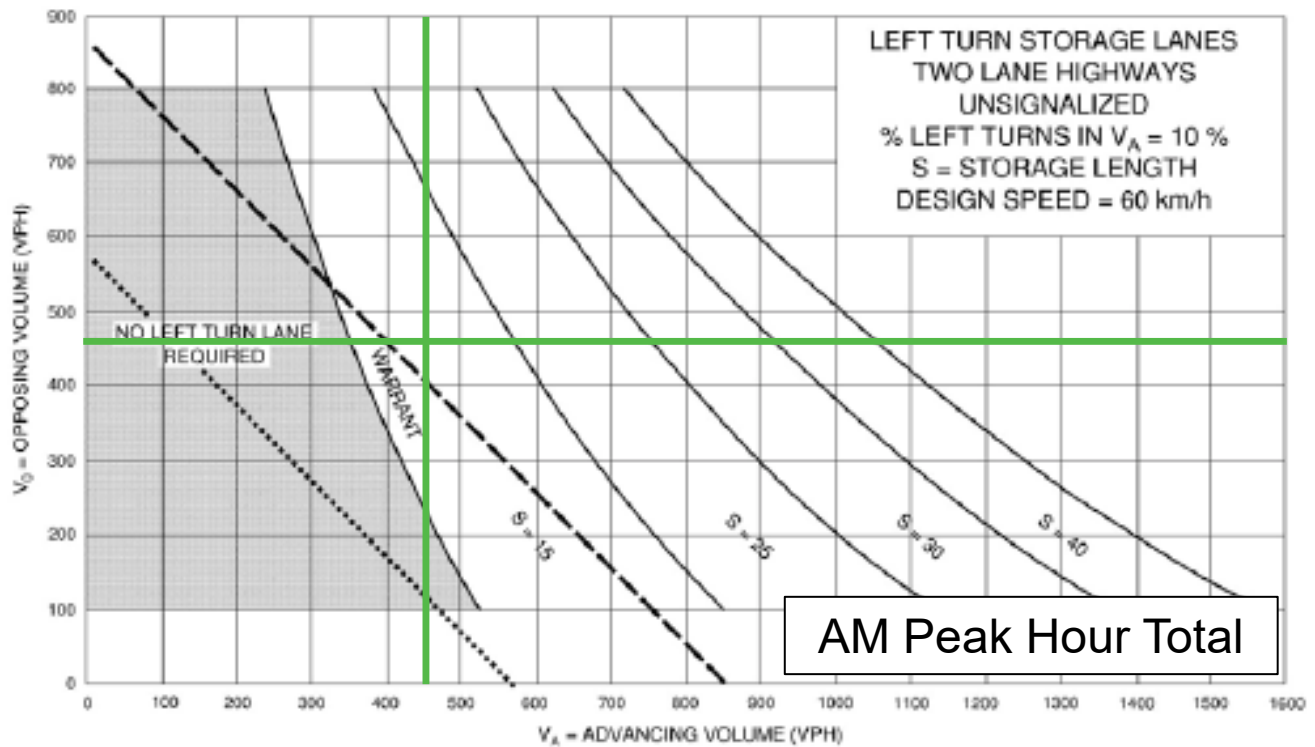
Figure 5.1 and **Figure 5.2** display the left-turn lane warrant nomographs for the two intersections.

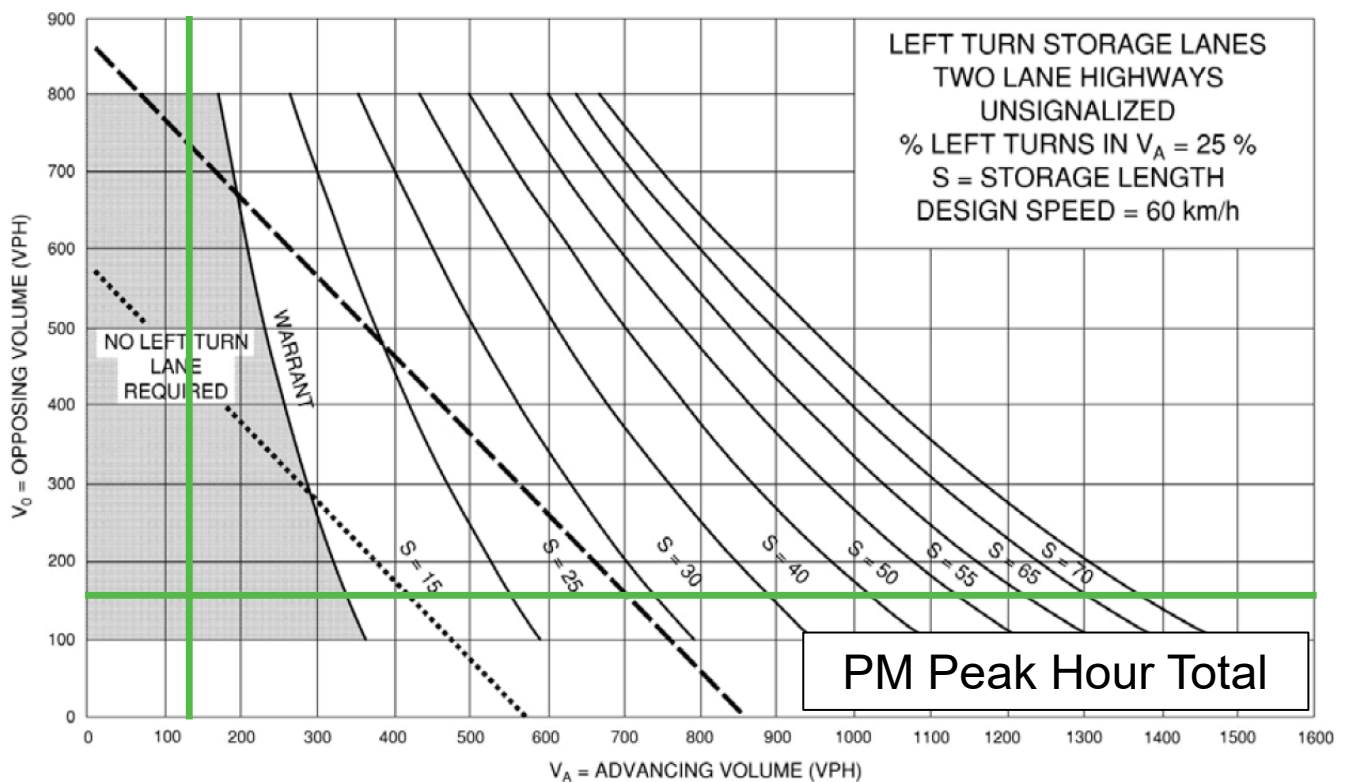
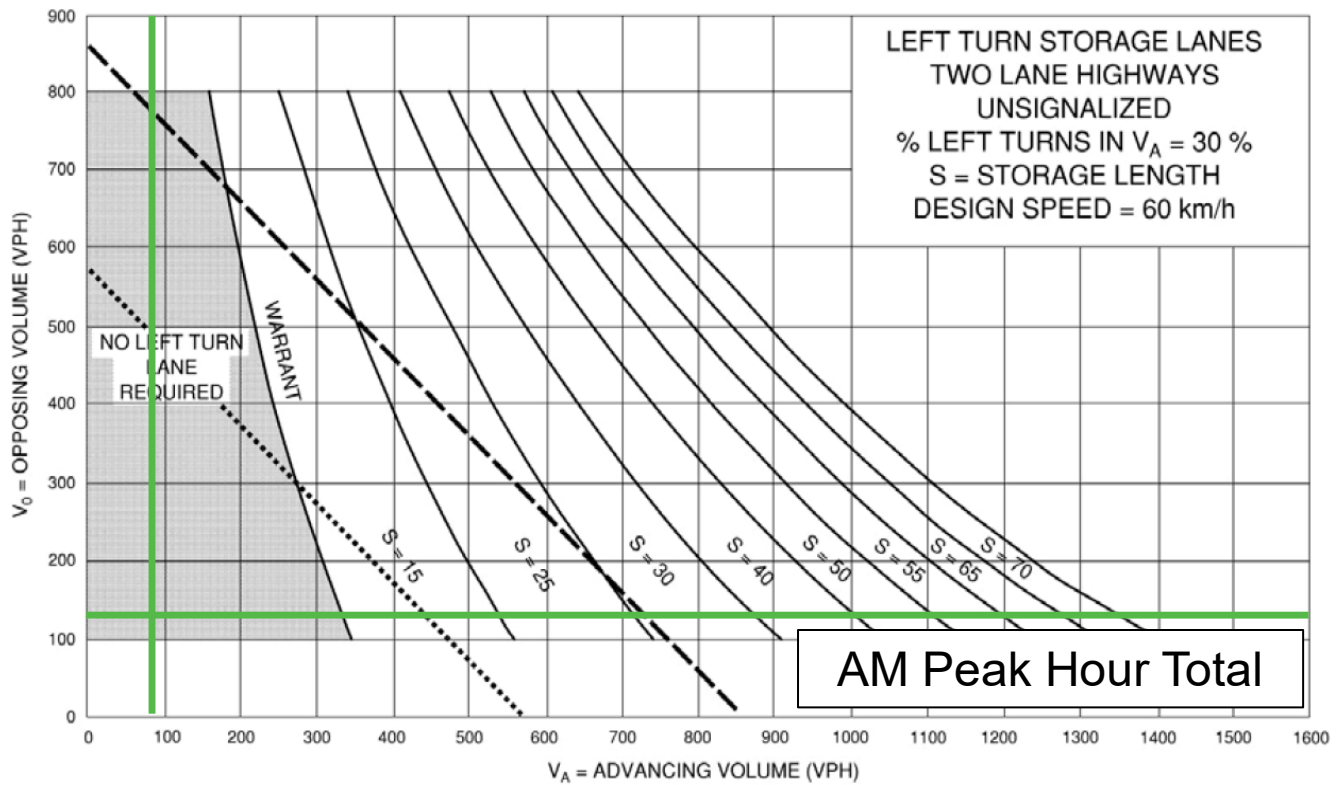
⁷ Geometric Design Standards for Ontario Highways, *Ministry of Transportation*, 1986











6 Evaluation of Future Traffic Conditions with Hickory Street Westbound One-Way Street Conversion

Hickory Street West from Albert Street to Hazel Street has been planned to be converted into a westbound one-way street as described in the Northdale Neighbourhood Streetscape Master Plan and Class Environmental Assessment⁸. The analysis included in this section will be done with Hickory Street West operating in westbound one-way. The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes and analyses for the 2027 horizon. The future traffic volumes near the development will likely consist of increased non-site traffic volumes (background traffic), traffic generated by other developments, and the traffic forecast to be generated by the proposed development.

6.1 Trip Distribution and Trip Assignment

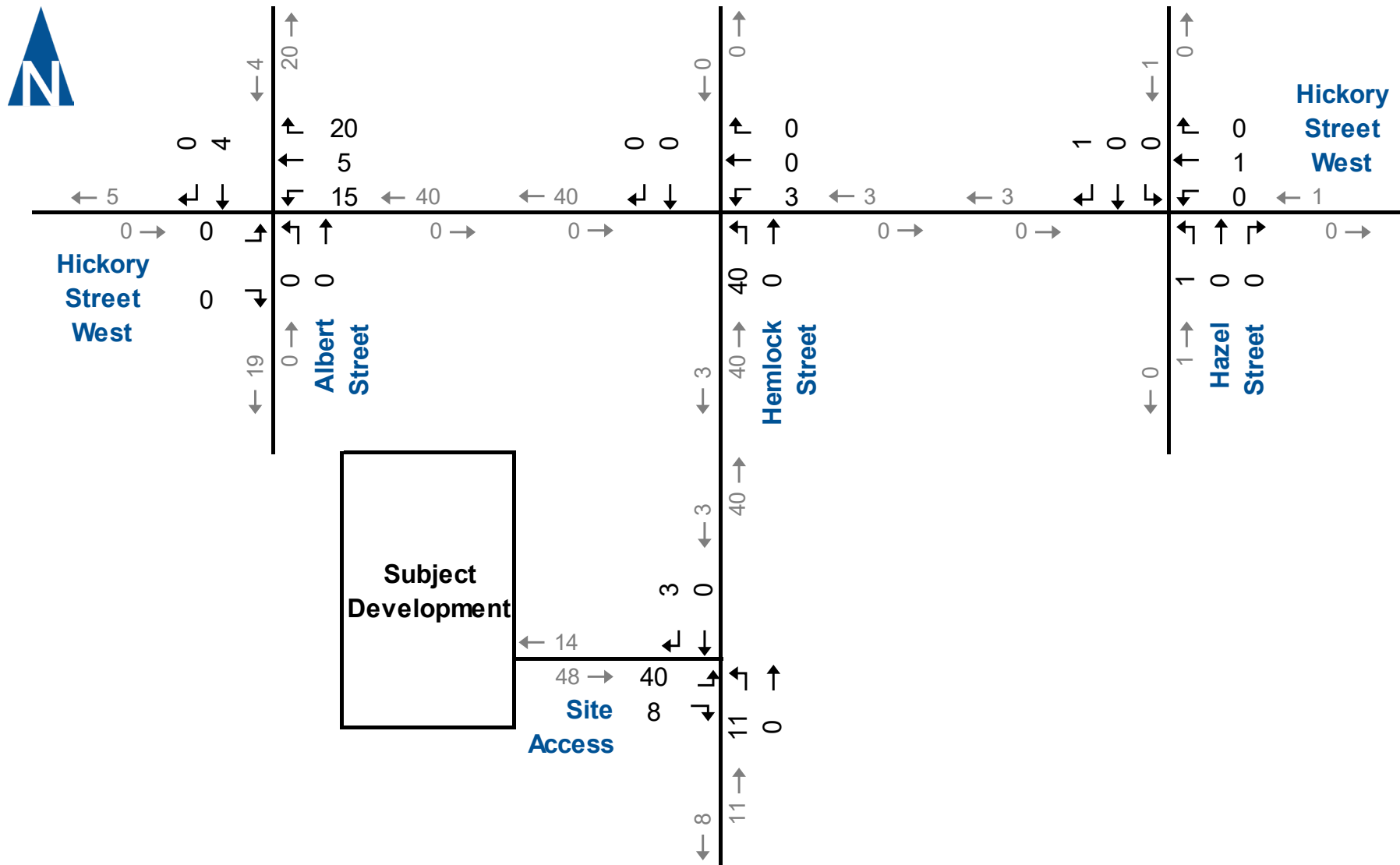
The trip distribution of the site generated trips has not changed however, with the restricted movements, specific movements have been reassigned as follows:

- ▶ West inbound trips via Hickory Street West, north inbound trips via Albert Street and south inbound trips have been reassigned to enter from south via Hemlock Street; and
- ▶ North outbound trips via Hazel Street have been reassigned north via Albert Street.

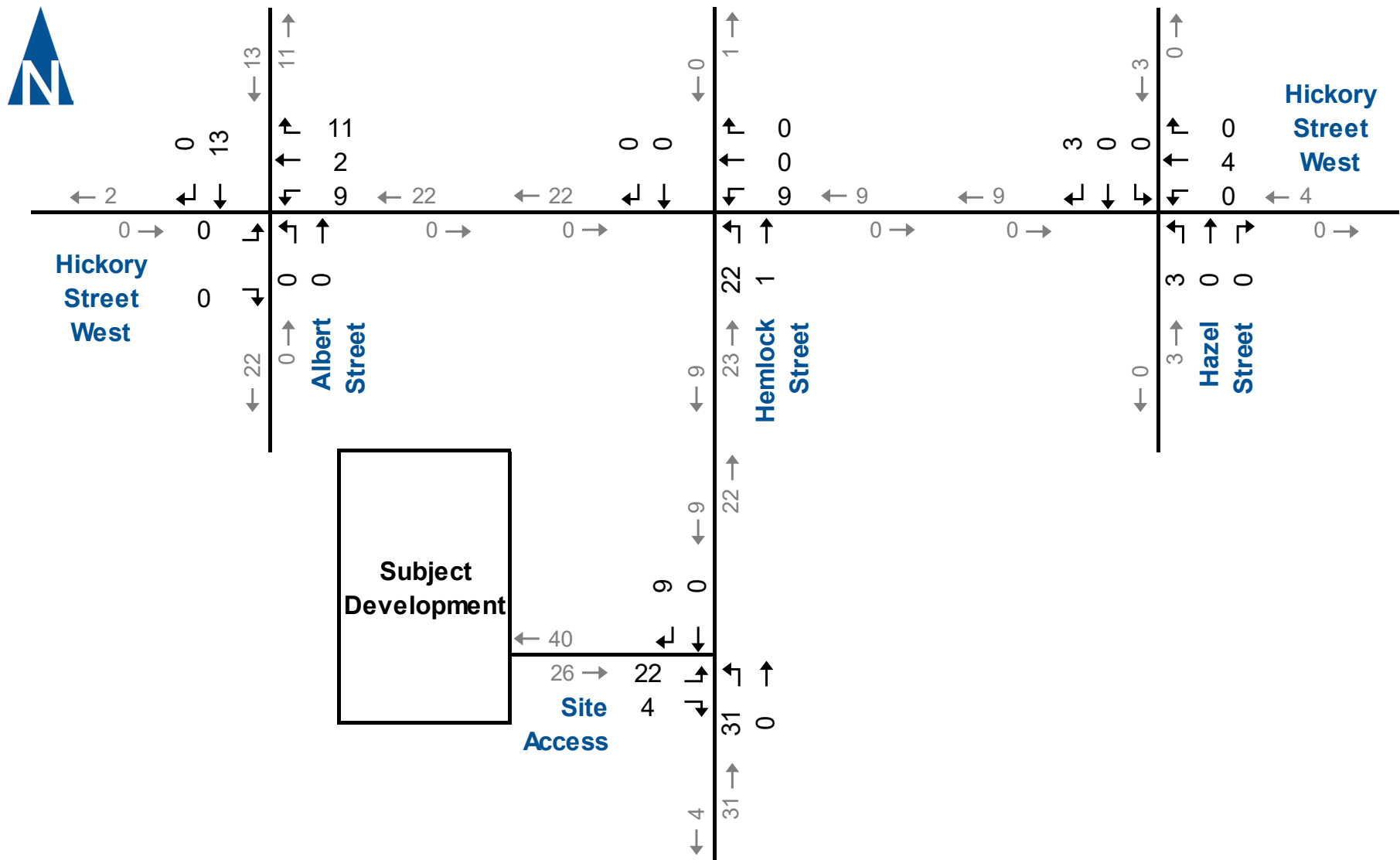
Figure 6.1a and **Figure 6.1b** display the site generated trips with the redistributed trips for AM and PM peak hours, respectively. **Appendix G** contains forecasted background growth and development traffic volumes.

⁸ Part A: Northdale Neighbourhood Streetscape Master Plan & Class Environmental Assessment, Schedule 'B', City of Waterloo, Submitted to City of Waterloo, IBI Group, November 2016





Site Traffic Volumes
AM Peak Hour
Westbound One-way Conversion



**Site Traffic Volumes
PM Peak Hour
Westbound One-way Conversion**

6.2 Background Traffic Forecasts

6.2.1 Background Growth

The same background growth rates and other area development traffic has been used as **Chapter 4.1**.

6.3 2027 Horizon

6.3.1 2027 Background Traffic Operations

Figure 6.2 illustrates the 2027 background traffic volumes, including traffic growth, and other area development traffic volumes.

The 2027 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions. **Table 6.1** summarizes the results of the 2027 background traffic operations.

All intersections are forecast to operate without problem movements with the following with exceptions:

- ▶ Westbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F with $v/c = 0.82$ during the PM peak hours.

Appendix H contains the supporting detailed Synchro 11 reports.



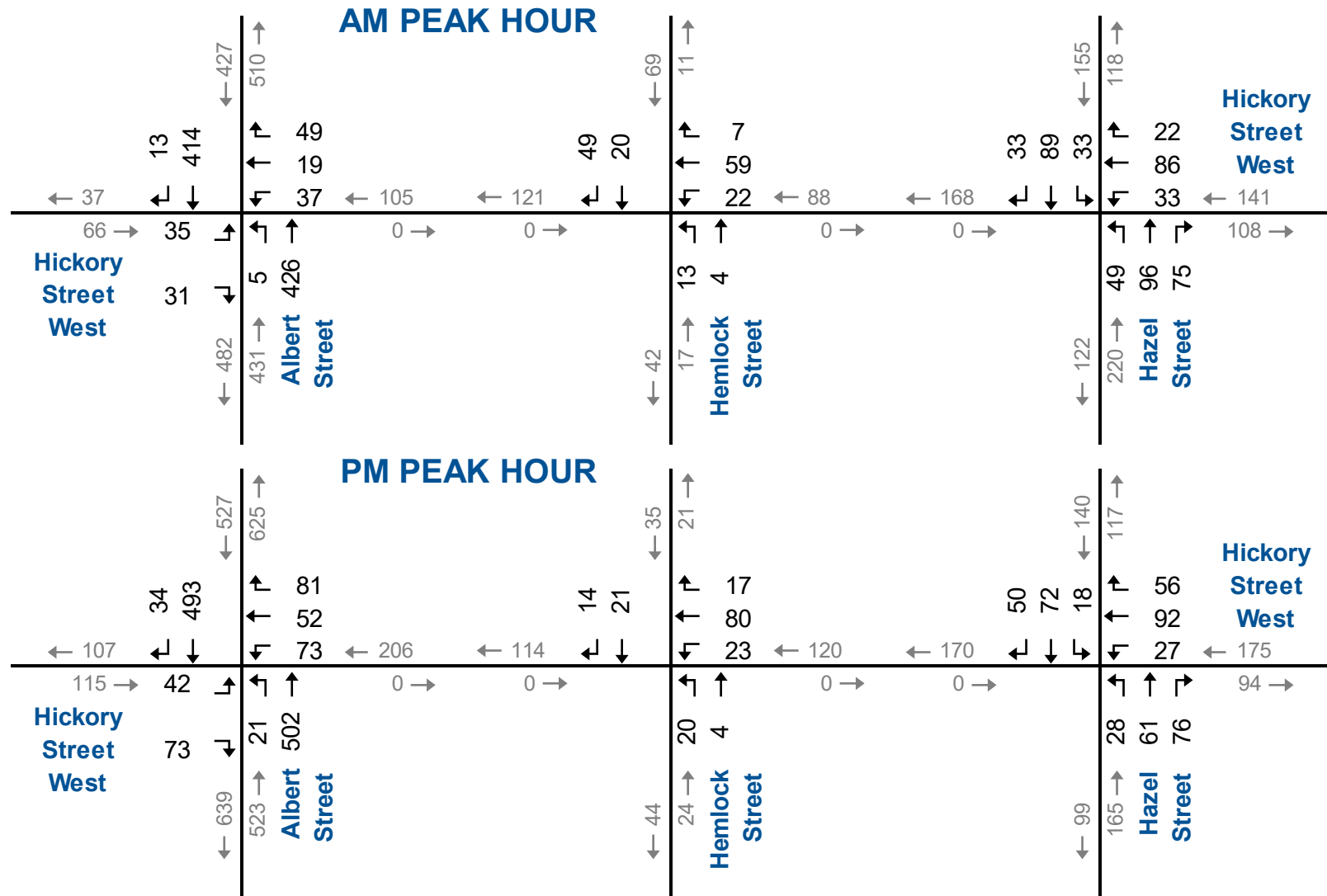


TABLE 6.1: 2027 BACKGROUND TRAFFIC OPERATIONS WITH ONE-WAY CONVERSION

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	C 19 0.20 5	> > > >	C 19	< < < <	C 19 0.29 9	> > > >	C 19	A 8 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 2	< < < <	B 10 0.02 1	> > > >	B 10	< < < <	A 9 0.07 2	> > > >	A 9	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0 1	> > > >	A 8	< < < <	A 9 0.16 1	> > > >	A 9	< < < <	A 9 0.19 1	> > > >	A 9	< < < <	A 9 0.15 1	> > > >	A 9	
PM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	D 31 0.46 17	> > > >	D 31	< < < <	F 63 0.82 49	> > > >	F 63	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 1	< < < <	A 10 0.03 1	> > > >	A 10	< < < <	A 10 0.05 2	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0 0	> > > >	A 8	< < < <	A 9 0.21 1	> > > >	A 9	< < < <	A 8 0.19 1	> > > >	A 8	< < < <	A 8 0.16 1	> > > >	A 8	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

</> - Shared with through movement



6.3.2 Total 2027 Traffic Volumes

Figure 4.2a and **Figure 4.2b** illustrate the 2027 total traffic volumes, including trips generated by the background trip.

The total traffic volumes are found by summation of background traffic volumes and site generated traffic volumes.

The 2027 total traffic volumes have been analyzed using the same methodology as under existing traffic conditions. **Table 4.2** summarizes the results of the 2027 total traffic operations.

All intersections are forecast to operate without problem movements with the following with exceptions:

- ▶ Westbound movements at the intersection of Hickory Street West and Albert Street are forecast to operate at LOS F with $v/c = 0.92$ during the PM peak hours.

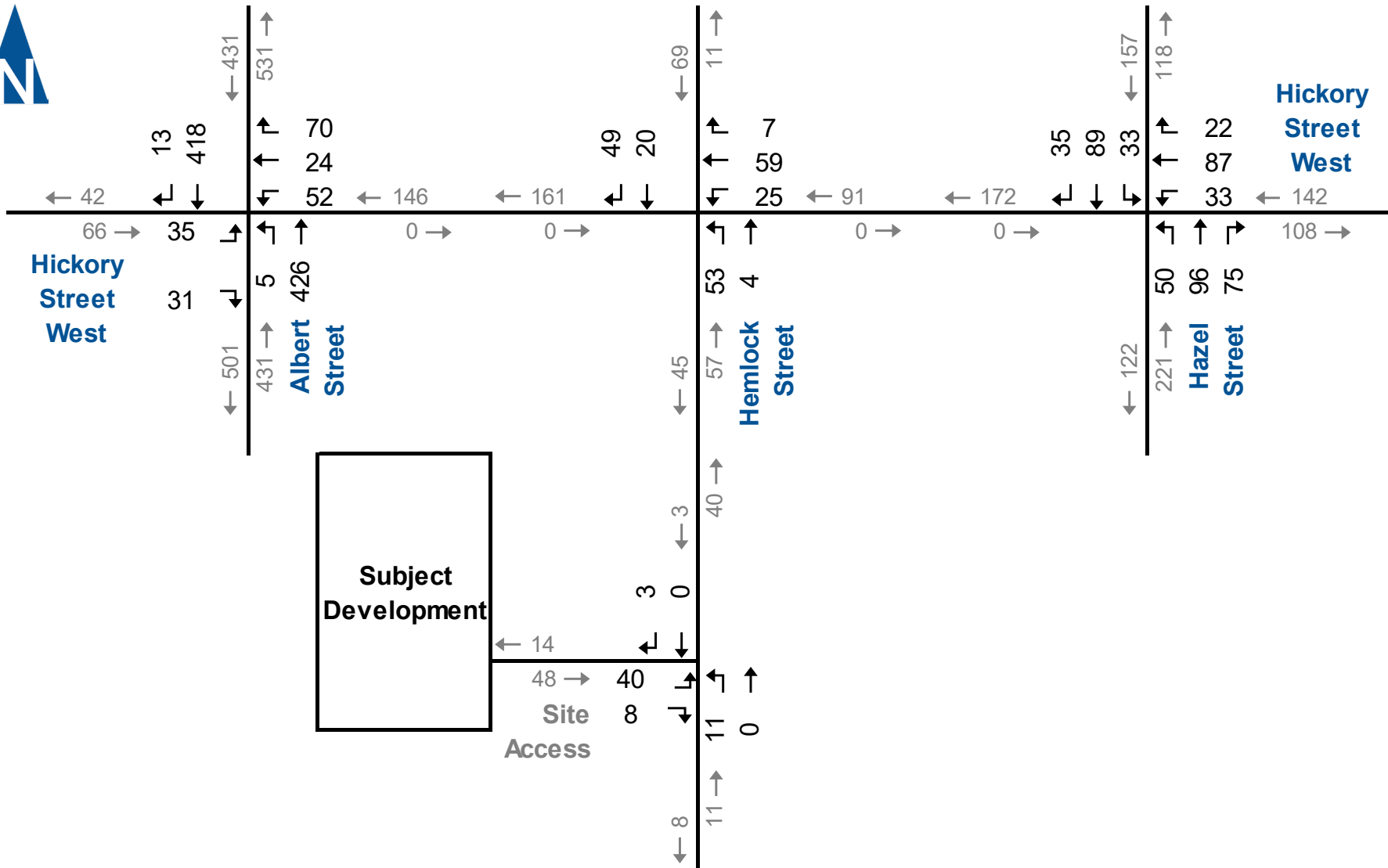
Appendix I contains the supporting detailed Synchro 11 reports.

Again, the trips generated by the subject development have negligible impact on the traffic operations compared to the existing and background conditions. As well, the one-way conversion of Hickory Street West does improve westbound movements when compared to the existing conditions.

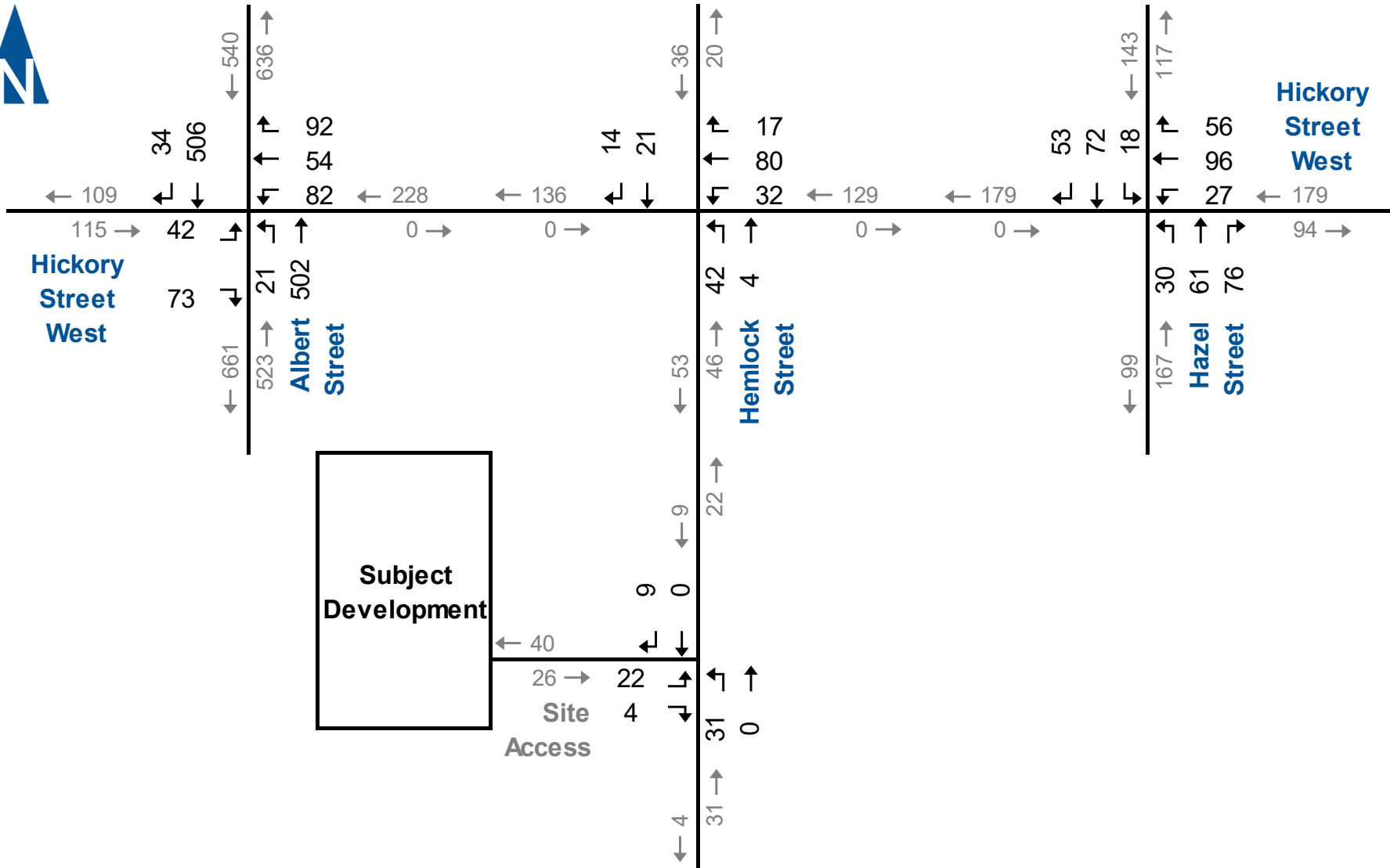
6.4 Left-Turn Lane Warrant

As noted in **Section 5.2**, a southbound left-turn lane on Albert Street at Hickory is warranted by existing volumes. When Hickory Street is converted to a one-way street in the westbound direction, the southbound left-turn movement will no longer be possible and therefore a left-turn lane will not be warranted.





2027 Total AM Peak Hour Traffic Volumes Westbound One-way Conversion



2027 Total PM Peak Hour Traffic Volumes Westbound One-way Conversion

TABLE 6.2: 2027 TOTAL TRAFFIC OPERATIONS WITH ONE-WAY CONVERSION

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	C 20 0.21 6	> > > >	C 20	< < < <	C 22 0.40 14	> > > >	C 22	A 8 0 0 0	A 0 0 0 0	A 0 0 0 0	A 0	A 0 0 0 0	A 0 0 0 0	A 0		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0	A 2	< < < <	B 10 0.08 2	> > > >	B 10	< < < <	A 9 0.07 2	> > > >	A 9	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0.00 0	> > > >		< < < <	A 9 0.19 1	> > > >		< < < <	A 9 0.28 1	> > > >		< < < <	A 9 0.19 1	> > > >		
	Hemlock Street & Site Access	TWSC	LOS Delay V/C Q	A 9 0.05 2		> > > >	A 9					A 7 0.01 0	A 0 0.00 0		A 7		A 0 0.00 0	A 0 0.00 0	A 0	
PM Peak Hour	Albert Street & Hickory Street West	TWSC	LOS Delay V/C Q	< < < <	D 34 0.48 18	> > > >	D 34	< < < <	F 82 0.92 61	> > > >	F 82	A 8 0.02 1	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0		
	Hemlock Street & Hickory Street West	TWSC	LOS Delay V/C Q	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 7 0.02 1	A 0 0.00 0	A 0 0.00 0	A 2	< < < <	B 10 0.06 2	> > > >	B 10	< < < <	A 10 0.05 2	> > > >	A 10	
	Hazel Street & Hickory Street West	AWSC	LOS Delay V/C Q	< < < <	A 8 0.00 0	> > > >		< < < <	A 9 0.22 1	> > > >		< < < <	A 8 0.20 1	> > > >		< < < <	A 8 0.17 1	> > > >		
	Hemlock Street & Site Access	TWSC	LOS Delay V/C Q	A 9 0.03 1		> > > >	A 9					A 7 0.02 1	A 0 0.00 0		A 7		A 0 0.00 0	A 0 0.00 0	A 0	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

</> - Shared with through movement

AWSC - All-Way Stop Control



7 Conclusions and Recommendations

7.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Operations:** The analyses indicate that all intersections within the study area are currently operating without any problem movements except for westbound movements at Hickory Street West and Albert Street operating at LOS E;
- ▶ **Trip Generation:** The development is forecast to generate 62 and 66 new trips during the AM and PM peak hours, respectively at full build out;
- ▶ **Background Traffic Operations:** All intersections within the study area are forecast to operate without problem movements by the 2027 Background horizon except eastbound and westbound movements at Hickory Street West and Albert Street operating at LOS F;
- ▶ **Total Traffic Operations:** As under background traffic conditions, all observed intersections are forecast to operate without problem movements at the 2027 with the same exception being eastbound and westbound movements at Hickory Street West and Albert Street operating at LOS F;
- ▶ **Mitigating Measures:** A southbound left-turn lane with 30 metres of storage length is warranted on Hickory Street West and Albert Street by future background volumes, regardless of whether the development is built. This left-turn lane will no longer be warranted after Hickory Street is converted to a one-way street in the westbound direction;
- ▶ **Background Traffic Operation with One-way Hickory Street West Conversion:** All intersections within the study area are forecast to operate without problem movements by the 2027 Background horizon except westbound movements at Hickory Street West and Albert Street operating at LOS F; and
- ▶ **Total Traffic Operation with One-way Hickory Street West Conversion:** As under background traffic with the conversion conditions, all observed intersections are forecast to operate without problem movements at the 2027 with the same exception being westbound movements at Hickory Street West and Albert Street operating at LOS F.



7.2 Recommendations

Based on the findings of this study, it is recommended that the development be approved with no additional improvements to the transportation network.



Appendix A

Traffic Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Albert Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
Page No: 1

Turning Movement Data

Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Albert Street Northbound						Albert Street 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	
7:30 AM	2	1	1	0	0	4	1	0	3	0	0	4	0	23	0	0	1	23	1	28	1	0	1	30	61
7:45 AM	2	0	3	0	0	5	1	0	3	0	2	4	0	33	1	0	0	34	0	42	0	0	0	42	85
Hourly Total	4	1	4	0	0	9	2	0	6	0	2	8	0	56	1	0	1	57	1	70	1	0	1	72	146
8:00 AM	0	0	2	0	0	2	1	1	2	0	2	4	1	34	1	0	0	36	1	29	2	0	0	32	74
8:15 AM	2	0	1	0	5	3	0	2	3	0	4	5	0	48	2	0	3	50	1	31	0	0	7	32	90
8:30 AM	2	2	5	0	4	9	2	1	2	0	1	5	1	39	4	0	1	44	4	39	0	0	0	43	101
8:45 AM	0	1	1	0	0	2	2	1	3	0	4	6	1	49	2	0	2	52	2	35	1	0	1	38	98
Hourly Total	4	3	9	0	9	16	5	5	10	0	11	20	3	170	9	0	6	182	8	134	3	0	8	145	363
9:00 AM	6	3	0	0	2	9	2	2	1	0	3	5	0	32	2	0	0	34	2	40	1	0	4	43	91
9:15 AM	1	2	2	0	3	5	0	1	5	0	1	6	0	38	0	0	3	38	4	36	3	0	3	43	92
9:30 AM	2	1	1	0	1	4	1	0	2	0	4	3	2	36	0	0	1	38	6	31	0	0	4	37	82
9:45 AM	1	1	2	0	3	4	4	0	4	0	3	8	2	34	1	0	3	37	4	41	1	0	4	46	95
Hourly Total	10	7	5	0	9	22	7	3	12	0	11	22	4	140	3	0	7	147	16	148	5	0	15	169	360
10:00 AM	0	1	1	0	0	2	2	1	1	0	2	4	2	39	3	0	0	44	4	35	1	0	1	40	90
10:15 AM	1	2	1	0	3	4	2	3	3	0	5	8	1	47	3	0	1	51	0	47	2	0	3	49	112
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	3	2	0	3	6	4	4	4	0	7	12	3	86	6	0	1	95	4	82	3	0	4	89	202
12:00 PM	4	1	4	0	3	9	5	4	4	0	6	13	3	69	7	0	6	79	3	48	2	0	0	53	154
12:15 PM	5	4	1	0	3	10	5	4	4	0	3	13	2	64	5	0	2	71	5	58	4	0	1	67	161
12:30 PM	1	3	2	0	3	6	3	3	4	0	1	10	2	55	6	0	7	63	2	46	2	0	1	50	129
12:45 PM	1	9	3	0	2	13	5	6	9	0	3	20	3	65	4	0	10	72	2	47	3	0	5	52	157
Hourly Total	11	17	10	0	11	38	18	17	21	0	13	56	10	253	22	0	25	285	12	199	11	0	7	222	601
1:00 PM	2	2	2	0	2	6	2	1	6	0	6	9	3	61	6	0	5	70	3	59	5	0	4	67	152
1:15 PM	4	6	4	0	5	14	3	3	4	0	14	10	2	52	3	0	2	57	5	54	2	0	8	61	142
1:30 PM	4	4	0	0	3	8	2	6	5	0	6	13	3	58	7	0	2	68	9	41	2	0	3	52	141
1:45 PM	1	4	4	0	4	9	3	6	3	0	7	12	4	56	6	0	1	66	5	44	3	0	3	52	139
Hourly Total	11	16	10	0	14	37	10	16	18	0	33	44	12	227	22	0	10	261	22	198	12	0	18	232	574
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	4	5	3	0	4	12	2	4	3	0	4	9	2	55	6	0	2	63	3	62	1	0	7	66	150
3:15 PM	5	5	1	0	4	11	4	6	7	0	1	17	3	61	4	0	4	68	4	56	2	0	2	62	158
3:30 PM	2	2	6	0	4	10	2	1	7	0	12	10	4	60	3	0	0	67	7	52	0	0	1	59	146
3:45 PM	6	1	2	0	6	9	6	7	5	0	6	18	2	65	1	1	2	69	4	56	1	0	0	61	157
Hourly Total	17	13	12	0	18	42	14	18	22	0	23	54	11	241	14	1	8	267	18	226	4	0	10	248	611
4:00 PM	3	7	4	0	3	14	7	1	5	0	3	13	5	61	8	0	1	74	4	69	2	0	1	75	176
4:15 PM	2	4	4	0	6	10	1	4	4	0	4	9	5	81	4	0	6	90	7	46	1	0	3	54	163

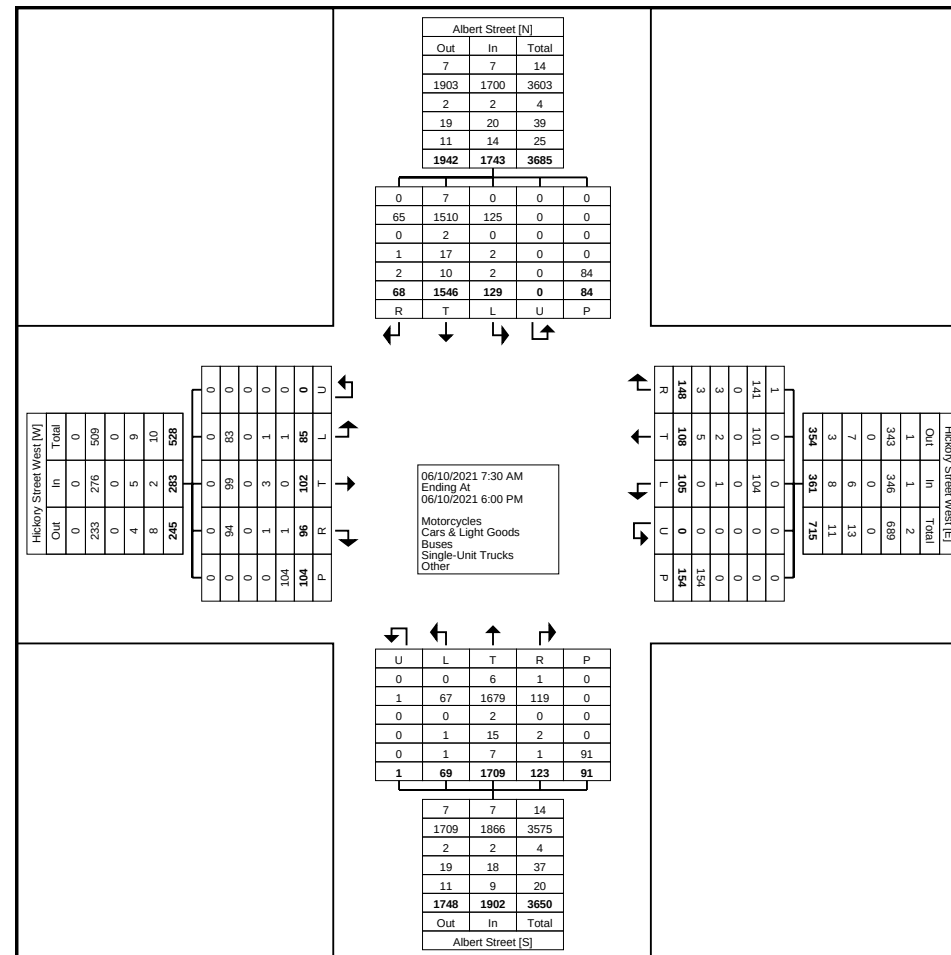
4:30 PM	6	8	15	0	9	29	12	3	9	0	6	24	4	75	3	0	1	82	4	62	3	0	0	69	204
4:45 PM	1	2	2	0	3	5	6	3	9	0	3	18	3	70	5	0	1	78	6	62	3	0	5	71	172
Hourly Total	12	21	25	0	21	58	26	11	27	0	16	64	17	287	20	0	9	324	21	239	9	0	9	269	715
5:00 PM	6	3	4	0	6	13	4	9	13	0	5	26	1	54	7	0	5	62	7	71	4	0	2	82	183
5:15 PM	2	7	5	0	3	14	2	8	3	0	14	13	3	62	11	0	6	76	7	59	8	0	5	74	177
5:30 PM	3	6	4	0	5	13	5	11	1	0	6	17	2	71	4	0	8	77	4	62	5	0	3	71	178
5:45 PM	4	5	6	0	5	15	8	6	11	0	13	25	3	62	4	0	5	69	9	58	3	0	2	70	179
Hourly Total	15	21	19	0	19	55	19	34	28	0	38	81	9	249	26	0	24	284	27	250	20	0	12	297	717
Grand Total	85	102	96	0	104	283	105	108	148	0	154	361	69	1709	123	1	91	1902	129	1546	68	0	84	1743	4289
Approach %	30.0	36.0	33.9	0.0	-	-	29.1	29.9	41.0	0.0	-	-	3.6	89.9	6.5	0.1	-	-	7.4	88.7	3.9	0.0	-	-	-
Total %	2.0	2.4	2.2	0.0	-	6.6	2.4	2.5	3.5	0.0	-	8.4	1.6	39.8	2.9	0.0	-	44.3	3.0	36.0	1.6	0.0	-	40.6	-
Motorcycles	0	0	0	0	-	0	0	0	1	0	-	1	0	6	1	0	-	7	0	7	0	0	-	7	15
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.7	-	-	0.3	0.0	0.4	0.8	0.0	-	0.4	0.0	0.5	0.0	-	-	0.4	0.3
Cars & Light Goods	83	99	94	0	-	276	104	101	141	0	-	346	67	1679	119	1	-	1866	125	1510	65	0	-	1700	4188
% Cars & Light Goods	97.6	97.1	97.9	-	-	97.5	99.0	93.5	95.3	-	-	95.8	97.1	98.2	96.7	100.0	-	98.1	96.9	97.7	95.6	-	-	97.5	97.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	0.0	-	0.1	0.0	0.1	0.0	-	-	0.1	0.1
Single-Unit Trucks	1	3	1	0	-	5	1	2	3	0	-	6	1	15	2	0	-	18	2	17	1	0	-	20	49
% Single-Unit Trucks	1.2	2.9	1.0	-	-	1.8	1.0	1.9	2.0	-	-	1.7	1.4	0.9	1.6	0.0	-	0.9	1.6	1.1	1.5	-	-	1.1	1.1
Articulated Trucks	0	0	0	0	-	0	0	1	1	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.7	-	-	0.6	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	1	0	1	0	-	2	0	4	2	0	-	6	1	6	1	0	-	8	2	10	2	0	-	14	30
% Bicycles on Road	1.2	0.0	1.0	-	-	0.7	0.0	3.7	1.4	-	-	1.7	1.4	0.4	0.8	0.0	-	0.4	1.6	0.6	2.9	-	-	0.8	0.7
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	1.0	-	-	-	-	-	3.2	-	-	-	-	-	0.0	-	-	-	-	-	1.2	-	-
Pedestrians	-	-	-	-	103	-	-	-	-	-	149	-	-	-	-	-	91	-	-	-	-	-	83	-	-
% Pedestrians	-	-	-	-	99.0	-	-	-	-	-	96.8	-	-	-	-	-	100.0	-	-	-	-	-	98.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Albert Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Albert Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
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Turning Movement Peak Hour Data (8:30 AM)

Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Albert Street Northbound						Albert Street 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	
8:30 AM	2	2	5	0	4	9	2	1	2	0	1	5	1	39	4	0	1	44	4	39	0	0	0	43	101
8:45 AM	0	1	1	0	0	2	2	1	3	0	4	6	1	49	2	0	2	52	2	35	1	0	1	38	98
9:00 AM	6	3	0	0	2	9	2	2	1	0	3	5	0	32	2	0	0	34	2	40	1	0	4	43	91
9:15 AM	1	2	2	0	3	5	0	1	5	0	1	6	0	38	0	0	3	38	4	36	3	0	3	43	92
Total	9	8	8	0	9	25	6	5	11	0	9	22	2	158	8	0	6	168	12	150	5	0	8	167	382
Approach %	36.0	32.0	32.0	0.0	-	-	27.3	22.7	50.0	0.0	-	-	1.2	94.0	4.8	0.0	-	-	7.2	89.8	3.0	0.0	-	-	-
Total %	2.4	2.1	2.1	0.0	-	6.5	1.6	1.3	2.9	0.0	-	5.8	0.5	41.4	2.1	0.0	-	44.0	3.1	39.3	1.3	0.0	-	43.7	-
PHF	0.375	0.667	0.400	0.000	-	0.694	0.750	0.625	0.550	0.000	-	0.917	0.500	0.806	0.500	0.000	-	0.808	0.750	0.938	0.417	0.000	-	0.971	0.946
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	12.5	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.3
Cars & Light Goods	8	6	8	0	-	22	6	4	9	0	-	19	2	157	7	0	-	166	12	148	5	0	-	165	372
% Cars & Light Goods	88.9	75.0	100.0	-	-	88.0	100.0	80.0	81.8	-	-	86.4	100.0	99.4	87.5	-	-	98.8	100.0	98.7	100.0	-	-	98.8	97.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	2	0	0	-	2	0	0	1	0	-	1	0	1	0	0	-	1	0	2	0	0	-	2	6
% Single-Unit Trucks	0.0	25.0	0.0	-	-	8.0	0.0	0.0	9.1	-	-	4.5	0.0	0.6	0.0	-	-	0.6	0.0	1.3	0.0	-	-	1.2	1.6
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	20.0	0.0	-	-	4.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	1	0	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Bicycles on Road	11.1	0.0	0.0	-	-	4.0	0.0	0.0	9.1	-	-	4.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	8	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (8:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Albert Street & Hickory Street
West
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Turning Movement Peak Hour Data (12:00 PM)

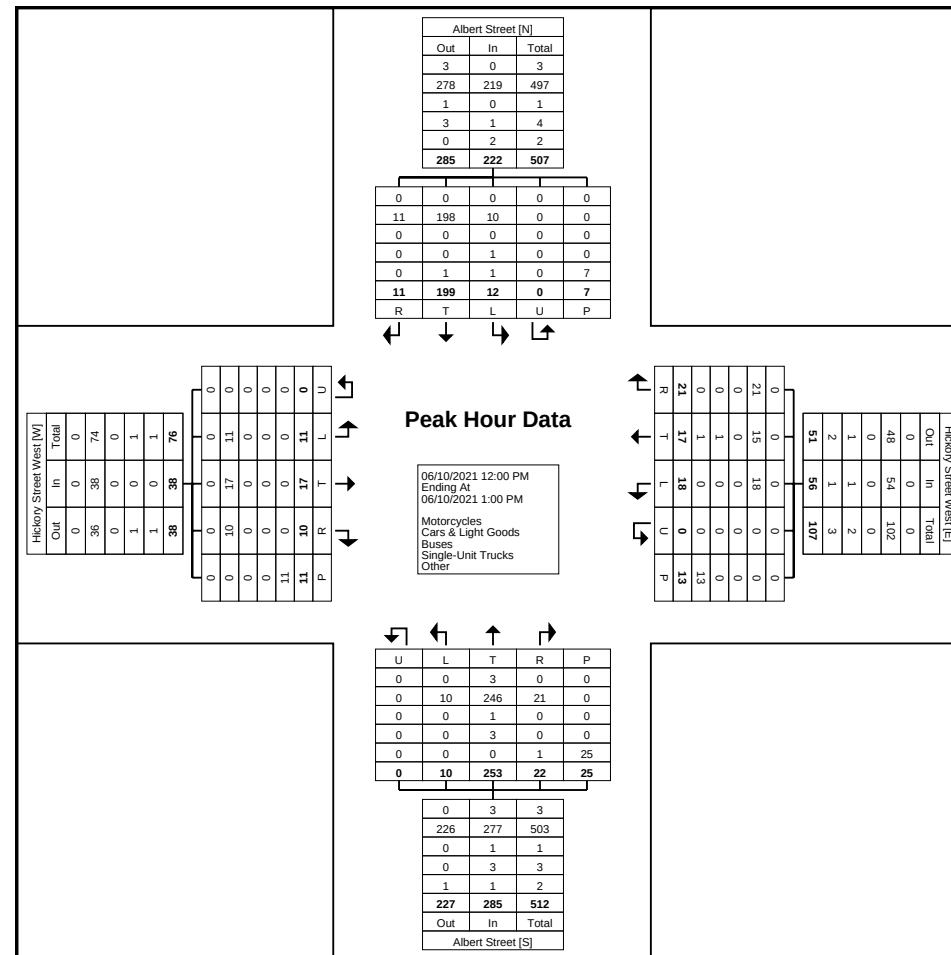
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Albert Street Northbound						Albert Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	4	1	4	0	3	9	5	4	4	0	6	13	3	69	7	0	6	79	3	48	2	0	0	53	154
12:15 PM	5	4	1	0	3	10	5	4	4	0	3	13	2	64	5	0	2	71	5	58	4	0	1	67	161
12:30 PM	1	3	2	0	3	6	3	3	4	0	1	10	2	55	6	0	7	63	2	46	2	0	1	50	129
12:45 PM	1	9	3	0	2	13	5	6	9	0	3	20	3	65	4	0	10	72	2	47	3	0	5	52	157
Total	11	17	10	0	11	38	18	17	21	0	13	56	10	253	22	0	25	285	12	199	11	0	7	222	601
Approach %	28.9	44.7	26.3	0.0	-	-	32.1	30.4	37.5	0.0	-	-	3.5	88.8	7.7	0.0	-	-	5.4	89.6	5.0	0.0	-	-	-
Total %	1.8	2.8	1.7	0.0	-	6.3	3.0	2.8	3.5	0.0	-	9.3	1.7	42.1	3.7	0.0	-	47.4	2.0	33.1	1.8	0.0	-	36.9	-
PHF	0.550	0.472	0.625	0.000	-	0.731	0.900	0.708	0.583	0.000	-	0.700	0.833	0.917	0.786	0.000	-	0.902	0.600	0.858	0.688	0.000	-	0.828	0.933
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.5
Cars & Light Goods	11	17	10	0	-	38	18	15	21	0	-	54	10	246	21	0	-	277	10	198	11	0	-	219	588
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	88.2	100.0	-	-	96.4	100.0	97.2	95.5	-	-	97.2	83.3	99.5	100.0	-	-	98.6	97.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	3	0	0	-	3	1	0	0	0	-	1	5
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	5.9	0.0	-	-	1.8	0.0	1.2	0.0	-	-	1.1	8.3	0.0	0.0	-	-	0.5	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	1	0	-	1	1	1	0	0	-	2	4
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	5.9	0.0	-	-	1.8	0.0	0.0	4.5	-	-	0.4	8.3	0.5	0.0	-	-	0.9	0.7
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	9.1	-	-	-	-	-	15.4	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	11	-	-	-	-	-	25	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	90.9	-	-	-	-	-	84.6	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Albert Street & Hickory Street
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Albert Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
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Turning Movement Peak Hour Data (4:30 PM)

Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Albert Street Northbound						Albert Street 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	6	8	15	0	9	29	12	3	9	0	6	24	4	75	3	0	1	82	4	62	3	0	0	69	204
4:45 PM	1	2	2	0	3	5	6	3	9	0	3	18	3	70	5	0	1	78	6	62	3	0	5	71	172
5:00 PM	6	3	4	0	6	13	4	9	13	0	5	26	1	54	7	0	5	62	7	71	4	0	2	82	183
5:15 PM	2	7	5	0	3	14	2	8	3	0	14	13	3	62	11	0	6	76	7	59	8	0	5	74	177
Total	15	20	26	0	21	61	24	23	34	0	28	81	11	261	26	0	13	298	24	254	18	0	12	296	736
Approach %	24.6	32.8	42.6	0.0	-	-	29.6	28.4	42.0	0.0	-	-	3.7	87.6	8.7	0.0	-	-	8.1	85.8	6.1	0.0	-	-	-
Total %	2.0	2.7	3.5	0.0	-	8.3	3.3	3.1	4.6	0.0	-	11.0	1.5	35.5	3.5	0.0	-	40.5	3.3	34.5	2.4	0.0	-	40.2	-
PHF	0.625	0.625	0.433	0.000	-	0.526	0.500	0.639	0.654	0.000	-	0.779	0.688	0.870	0.591	0.000	-	0.909	0.857	0.894	0.563	0.000	-	0.902	0.902
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	2
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.3
Cars & Light Goods	15	20	24	0	-	59	24	22	34	0	-	80	11	259	25	0	-	295	24	250	17	0	-	291	725
% Cars & Light Goods	100.0	100.0	92.3	-	-	96.7	100.0	95.7	100.0	-	-	98.8	100.0	99.2	96.2	-	-	99.0	100.0	98.4	94.4	-	-	98.3	98.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	0	1	0	-	1	0	1	1	0	-	2	4
% Single-Unit Trucks	0.0	0.0	3.8	-	-	1.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	3.8	-	-	0.3	0.0	0.4	5.6	-	-	0.7	0.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	1	0	-	1	0	1	0	0	-	1	0	2	0	0	-	2	0	1	0	0	-	1	5
% Bicycles on Road	0.0	0.0	3.8	-	-	1.6	0.0	4.3	0.0	-	-	1.2	0.0	0.8	0.0	-	-	0.7	0.0	0.4	0.0	-	-	0.3	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	3.6	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	21	-	-	-	-	-	27	-	-	-	-	-	13	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	96.4	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Hazel Street & Hickory Street West
Site Code: 210343
Start Date: 06/10/2021
Page No: 1

Turning Movement Data

Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hazel Street Northbound						Hazel Street 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	
7:30 AM	1	3	1	0	0	5	0	0	3	0	6	3	3	3	1	0	0	7	1	4	1	0	3	6	21
7:45 AM	3	3	1	0	0	7	0	4	0	0	3	4	0	5	1	0	0	6	2	3	1	0	2	6	23
Hourly Total	4	6	2	0	0	12	0	4	3	0	9	7	3	8	2	0	0	13	3	7	2	0	5	12	44
8:00 AM	2	0	5	0	1	7	1	2	1	0	0	4	2	3	0	0	1	5	2	4	1	0	5	7	23
8:15 AM	1	3	1	0	0	5	1	6	1	0	2	8	0	6	1	0	1	7	1	2	1	0	3	4	24
8:30 AM	3	10	3	0	2	16	2	4	1	0	1	7	4	3	2	0	1	9	2	3	1	0	9	6	38
8:45 AM	2	2	6	0	2	10	3	1	3	0	1	7	0	3	1	0	1	4	1	5	0	0	1	6	27
Hourly Total	8	15	15	0	5	38	7	13	6	0	4	26	6	15	4	0	4	25	6	14	3	0	18	23	112
9:00 AM	1	7	3	0	1	11	2	5	3	0	2	10	0	2	0	0	0	2	2	4	1	0	4	7	30
9:15 AM	2	9	0	0	1	11	0	1	4	0	1	5	1	2	0	0	1	3	0	4	3	0	3	7	26
9:30 AM	1	4	1	0	1	6	2	5	3	0	3	10	2	8	2	0	2	12	1	4	1	0	4	6	34
9:45 AM	1	5	2	0	4	8	3	6	3	0	0	12	2	6	4	0	3	12	2	3	0	0	2	5	37
Hourly Total	5	25	6	0	7	36	7	17	13	0	6	37	5	18	6	0	6	29	5	15	5	0	13	25	127
10:00 AM	1	9	4	0	2	14	3	6	0	0	3	9	2	8	2	0	2	12	3	8	1	0	2	12	47
10:15 AM	1	5	0	0	1	6	1	6	0	0	3	7	1	4	2	0	2	7	3	9	1	0	7	13	33
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	14	4	0	3	20	4	12	0	0	6	16	3	12	4	0	4	19	6	17	2	0	9	25	80
12:00 PM	3	8	1	0	0	12	2	12	3	0	1	17	2	10	7	0	6	19	2	7	3	0	2	12	60
12:15 PM	3	12	6	0	1	21	4	13	5	0	2	22	3	4	5	0	1	12	5	4	1	0	2	10	65
12:30 PM	4	6	5	0	5	15	5	9	8	0	0	22	4	12	2	0	9	18	1	10	1	0	6	12	67
12:45 PM	1	12	7	0	3	20	1	13	4	0	3	18	1	5	4	0	6	10	6	5	4	0	4	15	63
Hourly Total	11	38	19	0	9	68	12	47	20	0	6	79	10	31	18	0	22	59	14	26	9	0	14	49	255
1:00 PM	3	8	6	0	0	17	2	3	7	0	2	12	0	8	1	0	6	9	1	6	5	0	5	12	50
1:15 PM	3	10	3	0	4	16	5	9	4	0	6	18	1	5	2	0	2	8	2	6	1	0	3	9	51
1:30 PM	4	11	3	0	5	18	6	9	7	0	1	22	2	9	1	0	3	12	4	12	4	0	6	20	72
1:45 PM	0	12	7	0	2	19	4	11	4	0	5	19	1	4	1	0	5	6	1	11	2	0	6	14	58
Hourly Total	10	41	19	0	11	70	17	32	22	0	14	71	4	26	5	0	16	35	8	35	12	0	20	55	231
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	8	8	0	1	18	6	7	6	0	6	19	6	7	6	0	7	19	7	10	0	0	3	17	73
3:15 PM	5	7	7	0	3	19	4	10	5	0	9	19	5	6	4	0	7	15	3	10	0	0	4	13	66
3:30 PM	1	9	4	0	2	14	4	8	7	0	2	19	4	7	1	0	12	12	4	11	3	0	3	18	63
3:45 PM	0	6	3	0	2	9	8	11	5	0	5	24	1	10	3	0	2	14	4	4	2	0	6	10	57
Hourly Total	8	30	22	0	8	60	22	36	23	0	22	81	16	30	14	0	28	60	18	35	5	0	16	58	259
4:00 PM	3	14	4	0	5	21	3	7	7	0	0	17	3	11	0	0	8	14	9	8	8	0	7	25	77
4:15 PM	4	8	5	0	2	17	5	8	14	0	2	27	1	13	1	0	0	15	8	7	3	0	8	18	77

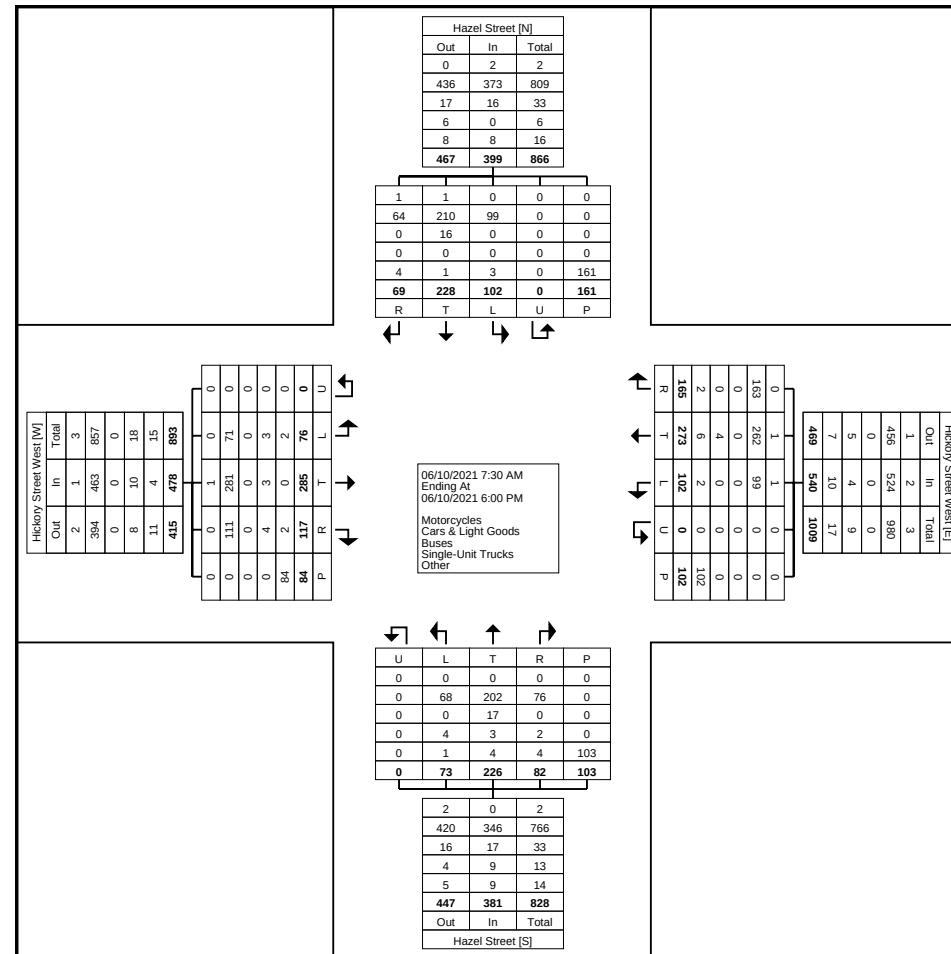
4:30 PM	4	16	4	0	4	24	2	18	6	0	4	26	4	7	0	0	1	11	6	5	3	0	7	14	75
4:45 PM	2	12	4	0	5	18	3	13	10	0	4	26	7	10	7	0	3	24	6	6	5	0	9	17	85
Hourly Total	13	50	17	0	16	80	13	46	37	0	10	96	15	41	8	0	12	64	29	26	19	0	31	74	314
5:00 PM	3	13	7	0	3	23	6	16	13	0	5	35	5	13	4	0	1	22	2	17	3	0	11	22	102
5:15 PM	5	16	2	0	4	23	4	14	13	0	13	31	1	7	6	0	4	14	2	12	2	0	9	16	84
5:30 PM	5	17	3	0	13	25	5	18	10	0	3	33	3	12	6	0	3	21	1	10	4	0	9	15	94
5:45 PM	2	20	1	0	5	23	5	18	5	0	4	28	2	13	5	0	3	20	8	14	3	0	6	25	96
Hourly Total	15	66	13	0	25	94	20	66	41	0	25	127	11	45	21	0	11	77	13	53	12	0	35	78	376
Grand Total	76	285	117	0	84	478	102	273	165	0	102	540	73	226	82	0	103	381	102	228	69	0	161	399	1798
Approach %	15.9	59.6	24.5	0.0	-	-	18.9	50.6	30.6	0.0	-	-	19.2	59.3	21.5	0.0	-	-	25.6	57.1	17.3	0.0	-	-	-
Total %	4.2	15.9	6.5	0.0	-	26.6	5.7	15.2	9.2	0.0	-	30.0	4.1	12.6	4.6	0.0	-	21.2	5.7	12.7	3.8	0.0	-	22.2	-
Motorcycles	0	1	0	0	-	1	1	1	0	0	-	2	0	0	0	0	-	0	0	1	1	0	-	2	5
% Motorcycles	0.0	0.4	0.0	-	-	0.2	1.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.4	1.4	-	-	0.5	0.3
Cars & Light Goods	71	281	111	0	-	463	99	262	163	0	-	524	68	202	76	0	-	346	99	210	64	0	-	373	1706
% Cars & Light Goods	93.4	98.6	94.9	-	-	96.9	97.1	96.0	98.8	-	-	97.0	93.2	89.4	92.7	-	-	90.8	97.1	92.1	92.8	-	-	93.5	94.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	17	0	0	-	17	0	16	0	0	-	16	33
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	7.5	0.0	-	-	4.5	0.0	7.0	0.0	-	-	4.0	1.8
Single-Unit Trucks	3	3	4	0	-	10	0	4	0	0	-	4	4	3	2	0	-	9	0	0	0	0	-	0	23
% Single-Unit Trucks	3.9	1.1	3.4	-	-	2.1	0.0	1.5	0.0	-	-	0.7	5.5	1.3	2.4	-	-	2.4	0.0	0.0	0.0	-	-	0.0	1.3
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	2	0	2	0	-	4	2	5	2	0	-	9	1	4	4	0	-	9	3	1	4	0	-	8	30
% Bicycles on Road	2.6	0.0	1.7	-	-	0.8	2.0	1.8	1.2	-	-	1.7	1.4	1.8	4.9	-	-	2.4	2.9	0.4	5.8	-	-	2.0	1.7
Bicycles on Crosswalk	-	-	-	-	9	-	-	-	-	-	8	-	-	-	-	-	1	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	10.7	-	-	-	-	-	7.8	-	-	-	-	-	1.0	-	-	-	-	-	3.7	-	-
Pedestrians	-	-	-	-	75	-	-	-	-	-	94	-	-	-	-	-	102	-	-	-	-	-	155	-	-
% Pedestrians	-	-	-	-	89.3	-	-	-	-	-	92.2	-	-	-	-	-	99.0	-	-	-	-	-	96.3	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hazel Street & Hickory Street West
Site Code: 210343
Start Date: 06/10/2021
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsll.com

Count Name: Hazel Street & Hickory Street West
Site Code: 210343
Start Date: 06/10/2021
Page No: 4

Turning Movement Peak Hour Data (9:30 AM)

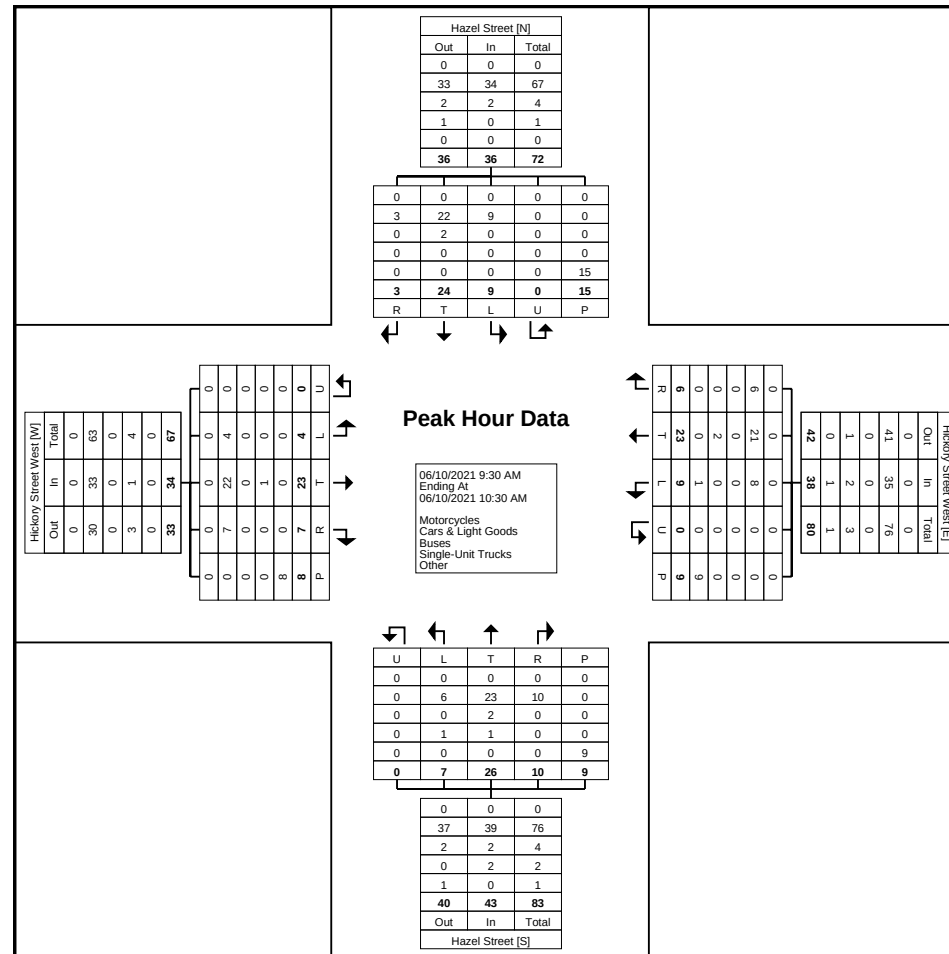
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hazel Street Northbound						Hazel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:30 AM	1	4	1	0	1	6	2	5	3	0	3	10	2	8	2	0	2	12	1	4	1	0	4	6	34
9:45 AM	1	5	2	0	4	8	3	6	3	0	0	12	2	6	4	0	3	12	2	3	0	0	2	5	37
10:00 AM	1	9	4	0	2	14	3	6	0	0	3	9	2	8	2	0	2	12	3	8	1	0	2	12	47
10:15 AM	1	5	0	0	1	6	1	6	0	0	3	7	1	4	2	0	2	7	3	9	1	0	7	13	33
Total	4	23	7	0	8	34	9	23	6	0	9	38	7	26	10	0	9	43	9	24	3	0	15	36	151
Approach %	11.8	67.6	20.6	0.0	-	-	23.7	60.5	15.8	0.0	-	-	16.3	60.5	23.3	0.0	-	-	25.0	66.7	8.3	0.0	-	-	-
Total %	2.6	15.2	4.6	0.0	-	22.5	6.0	15.2	4.0	0.0	-	25.2	4.6	17.2	6.6	0.0	-	28.5	6.0	15.9	2.0	0.0	-	23.8	-
PHF	1.000	0.639	0.438	0.000	-	0.607	0.750	0.958	0.500	0.000	-	0.792	0.875	0.813	0.625	0.000	-	0.896	0.750	0.667	0.750	0.000	-	0.692	0.803
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	4	22	7	0	-	33	8	21	6	0	-	35	6	23	10	0	-	39	9	22	3	0	-	34	141
% Cars & Light Goods	100.0	95.7	100.0	-	-	97.1	88.9	91.3	100.0	-	-	92.1	85.7	88.5	100.0	-	-	90.7	100.0	91.7	100.0	-	-	94.4	93.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	7.7	0.0	-	-	4.7	0.0	8.3	0.0	-	-	5.6	2.6
Single-Unit Trucks	0	1	0	0	-	1	0	2	0	0	-	2	1	1	0	0	-	2	0	0	0	0	-	0	5
% Single-Unit Trucks	0.0	4.3	0.0	-	-	2.9	0.0	8.7	0.0	-	-	5.3	14.3	3.8	0.0	-	-	4.7	0.0	0.0	0.0	-	-	0.0	3.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	11.1	0.0	0.0	-	-	2.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	9	-	-	-	-	-	9	-	-	-	-	-	15	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Hazel Street & Hickory Street West
Site Code: 210343
Start Date: 06/10/2021
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hazel Street & Hickory Street West
Site Code: 210343
Start Date: 06/10/2021
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

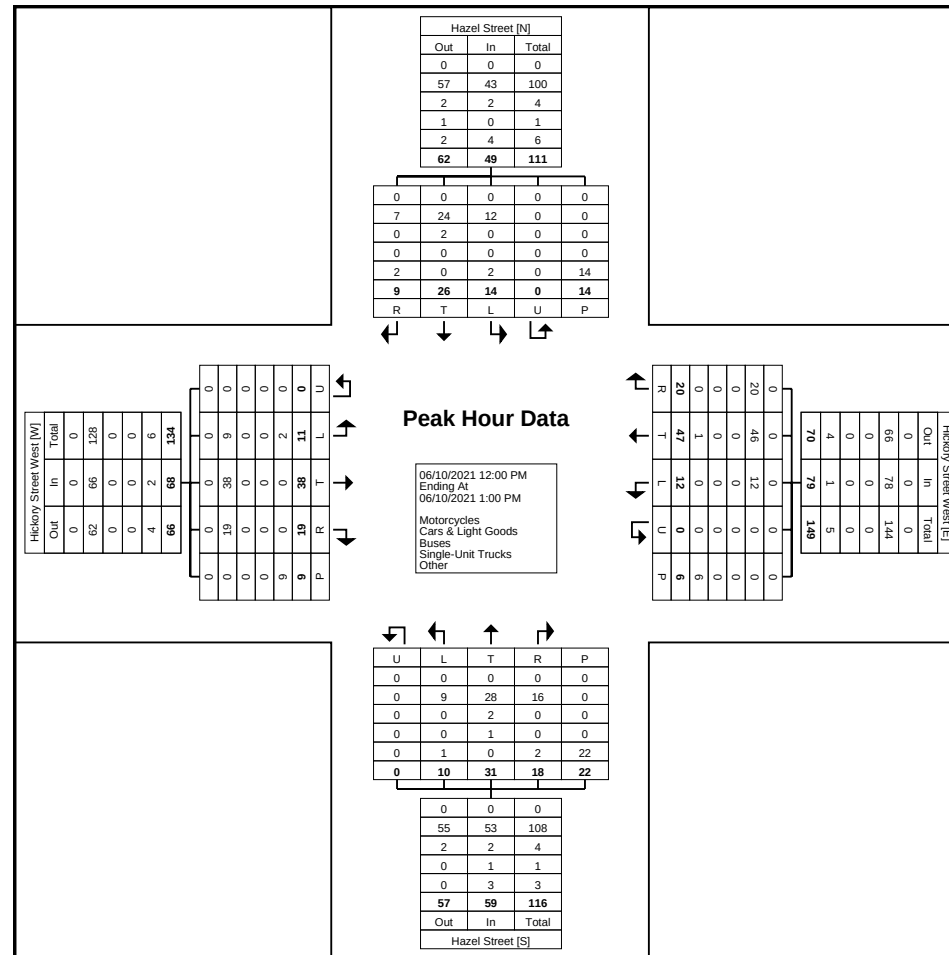
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hazel Street Northbound						Hazel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	3	8	1	0	0	12	2	12	3	0	1	17	2	10	7	0	6	19	2	7	3	0	2	12	60
12:15 PM	3	12	6	0	1	21	4	13	5	0	2	22	3	4	5	0	1	12	5	4	1	0	2	10	65
12:30 PM	4	6	5	0	5	15	5	9	8	0	0	22	4	12	2	0	9	18	1	10	1	0	6	12	67
12:45 PM	1	12	7	0	3	20	1	13	4	0	3	18	1	5	4	0	6	10	6	5	4	0	4	15	63
Total	11	38	19	0	9	68	12	47	20	0	6	79	10	31	18	0	22	59	14	26	9	0	14	49	255
Approach %	16.2	55.9	27.9	0.0	-	-	15.2	59.5	25.3	0.0	-	-	16.9	52.5	30.5	0.0	-	-	28.6	53.1	18.4	0.0	-	-	-
Total %	4.3	14.9	7.5	0.0	-	26.7	4.7	18.4	7.8	0.0	-	31.0	3.9	12.2	7.1	0.0	-	23.1	5.5	10.2	3.5	0.0	-	19.2	-
PHF	0.688	0.792	0.679	0.000	-	0.810	0.600	0.904	0.625	0.000	-	0.898	0.625	0.646	0.643	0.000	-	0.776	0.583	0.650	0.563	0.000	-	0.817	0.951
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	9	38	19	0	-	66	12	46	20	0	-	78	9	28	16	0	-	53	12	24	7	0	-	43	240
% Cars & Light Goods	81.8	100.0	100.0	-	-	97.1	100.0	97.9	100.0	-	-	98.7	90.0	90.3	88.9	-	-	89.8	85.7	92.3	77.8	-	-	87.8	94.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	6.5	0.0	-	-	3.4	0.0	7.7	0.0	-	-	4.1	1.6
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	3.2	0.0	-	-	1.7	0.0	0.0	0.0	-	-	0.0	0.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	2	0	0	0	-	2	0	1	0	0	-	1	1	0	2	0	-	3	2	0	2	0	-	4	10
% Bicycles on Road	18.2	0.0	0.0	-	-	2.9	0.0	2.1	0.0	-	-	1.3	10.0	0.0	11.1	-	-	5.1	14.3	0.0	22.2	-	-	8.2	3.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	22	-	-	-	-	-	14	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hazel Street & Hickory Street West
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hazel Street & Hickory Street West
Site Code: 210343
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Turning Movement Peak Hour Data (5:00 PM)

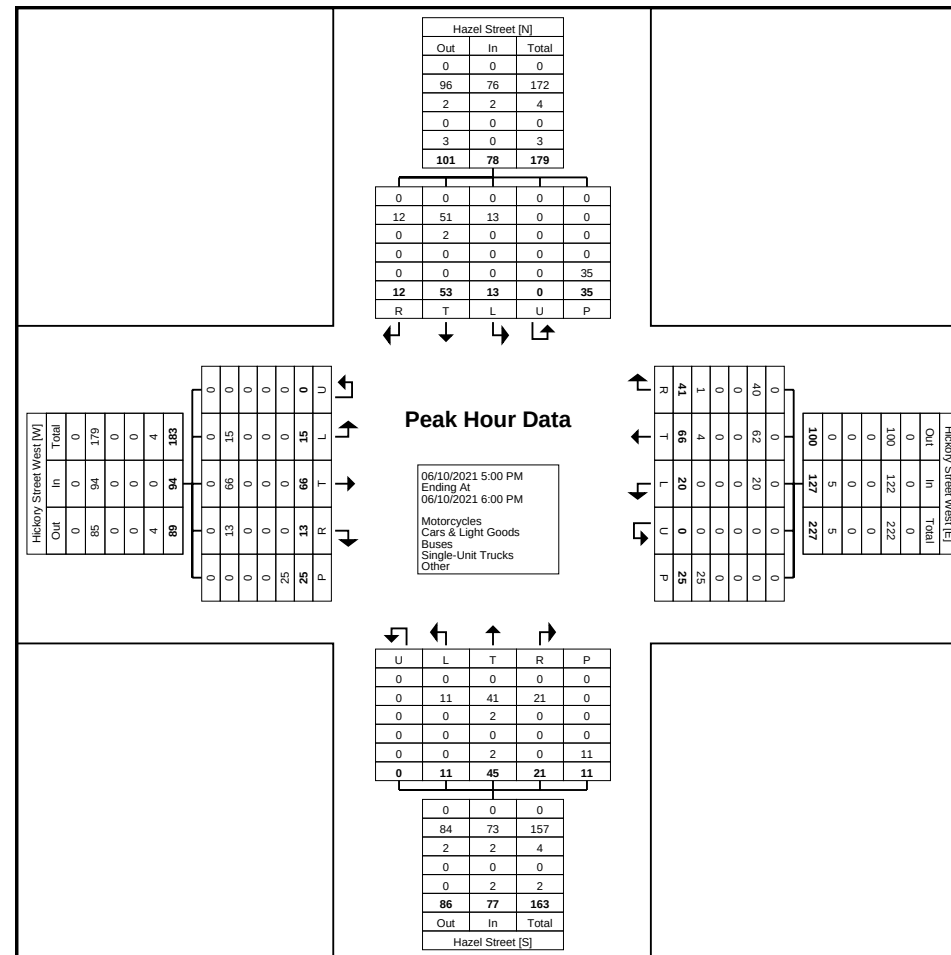
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hazel Street Northbound						Hazel Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	3	13	7	0	3	23	6	16	13	0	5	35	5	13	4	0	1	22	2	17	3	0	11	22	102
5:15 PM	5	16	2	0	4	23	4	14	13	0	13	31	1	7	6	0	4	14	2	12	2	0	9	16	84
5:30 PM	5	17	3	0	13	25	5	18	10	0	3	33	3	12	6	0	3	21	1	10	4	0	9	15	94
5:45 PM	2	20	1	0	5	23	5	18	5	0	4	28	2	13	5	0	3	20	8	14	3	0	6	25	96
Total	15	66	13	0	25	94	20	66	41	0	25	127	11	45	21	0	11	77	13	53	12	0	35	78	376
Approach %	16.0	70.2	13.8	0.0	-	-	15.7	52.0	32.3	0.0	-	-	14.3	58.4	27.3	0.0	-	-	16.7	67.9	15.4	0.0	-	-	-
Total %	4.0	17.6	3.5	0.0	-	25.0	5.3	17.6	10.9	0.0	-	33.8	2.9	12.0	5.6	0.0	-	20.5	3.5	14.1	3.2	0.0	-	20.7	-
PHF	0.750	0.825	0.464	0.000	-	0.940	0.833	0.917	0.788	0.000	-	0.907	0.550	0.865	0.875	0.000	-	0.875	0.406	0.779	0.750	0.000	-	0.780	0.922
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	15	66	13	0	-	94	20	62	40	0	-	122	11	41	21	0	-	73	13	51	12	0	-	76	365
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	93.9	97.6	-	-	96.1	100.0	91.1	100.0	-	-	94.8	100.0	96.2	100.0	-	-	97.4	97.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	4.4	0.0	-	-	2.6	0.0	3.8	0.0	-	-	2.6	1.1
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	4	1	0	-	5	0	2	0	0	-	2	0	0	0	0	-	0	7
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	6.1	2.4	-	-	3.9	0.0	4.4	0.0	-	-	2.6	0.0	0.0	0.0	-	-	0.0	1.9
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	8.0	-	-	-	-	-	4.0	-	-	-	-	-	0.0	-	-	-	-	-	2.9	-	-
Pedestrians	-	-	-	-	23	-	-	-	-	-	24	-	-	-	-	-	11	-	-	-	-	-	34	-	-
% Pedestrians	-	-	-	-	92.0	-	-	-	-	-	96.0	-	-	-	-	-	100.0	-	-	-	-	-	97.1	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Hazel Street & Hickory Street West
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Paradigm Transportation Solutions Limited
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Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hemlock Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
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Turning Movement Data

Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hemlock Street Northbound						Hemlock Street 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	
7:30 AM	0	2	0	0	1	2	0	4	0	0	0	4	0	0	1	0	1	1	0	0	0	0	1	0	7
7:45 AM	0	1	0	0	0	1	0	3	0	0	0	3	1	0	3	0	1	4	0	0	0	0	0	0	8
Hourly Total	0	3	0	0	1	3	0	7	0	0	0	7	1	0	4	0	2	5	0	0	0	0	1	0	15
8:00 AM	0	2	1	0	0	3	1	4	1	0	1	6	0	0	1	0	2	1	2	1	0	0	2	3	13
8:15 AM	0	3	0	0	0	3	1	5	1	0	2	7	0	0	1	0	0	1	0	1	0	0	7	1	12
8:30 AM	0	9	1	0	0	10	2	4	2	0	1	8	1	0	1	0	1	2	0	0	0	0	3	0	20
8:45 AM	1	4	0	0	1	5	0	4	0	0	0	4	2	0	2	0	4	4	0	1	1	0	2	2	15
Hourly Total	1	18	2	0	1	21	4	17	4	0	4	25	3	0	5	0	7	8	2	3	1	0	14	6	60
9:00 AM	0	5	0	0	0	5	1	4	0	0	0	5	0	0	5	0	3	5	1	0	0	0	2	1	16
9:15 AM	0	6	1	0	0	7	2	3	0	0	1	5	1	0	3	0	2	4	1	1	2	0	5	4	20
9:30 AM	0	5	2	0	1	7	3	2	1	0	3	6	0	0	3	0	2	3	0	1	1	0	3	2	18
9:45 AM	0	5	1	0	2	6	0	6	0	0	0	6	1	0	3	0	1	4	2	0	0	0	4	2	18
Hourly Total	0	21	4	0	3	25	6	15	1	0	4	22	2	0	14	0	8	16	4	2	3	0	14	9	72
10:00 AM	0	5	2	0	0	7	1	5	0	0	1	6	0	1	3	0	2	4	0	0	0	0	1	0	17
10:15 AM	0	5	1	0	2	6	1	5	1	0	0	7	1	0	1	0	1	2	0	0	0	0	2	0	15
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	10	3	0	2	13	2	10	1	0	1	13	1	1	4	0	3	6	0	0	0	0	3	0	32
12:00 PM	1	9	1	0	1	11	5	7	2	0	1	14	2	1	5	0	7	8	0	1	3	0	1	4	37
12:15 PM	0	11	2	0	0	13	5	12	2	0	0	19	4	1	3	0	2	8	1	1	0	0	1	2	42
12:30 PM	1	6	4	0	3	11	2	9	1	0	4	12	1	0	5	0	10	6	1	2	0	0	7	3	32
12:45 PM	0	14	3	0	3	17	1	15	0	3	5	19	5	0	2	0	11	7	1	1	0	0	8	2	45
Hourly Total	2	40	10	0	7	52	13	43	5	3	10	64	12	2	15	0	30	29	3	5	3	0	17	11	156
1:00 PM	0	9	2	0	1	11	1	6	2	0	1	9	3	0	4	0	3	7	0	1	0	0	3	1	28
1:15 PM	0	12	0	0	0	12	2	10	0	0	2	12	0	0	5	0	2	5	1	1	0	0	4	2	31
1:30 PM	0	16	2	0	0	18	3	11	0	0	4	14	2	1	4	0	7	7	0	0	0	0	3	0	39
1:45 PM	2	10	3	0	1	15	1	8	1	0	3	10	2	0	3	0	3	5	0	0	2	0	7	2	32
Hourly Total	2	47	7	0	2	56	7	35	3	0	10	45	7	1	16	0	15	24	1	2	2	0	17	5	130
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	12	3	0	1	15	2	6	3	1	2	12	3	0	4	0	2	7	0	1	0	0	7	1	35
3:15 PM	1	10	2	0	2	13	2	11	1	0	4	14	4	1	4	0	6	9	1	1	1	0	5	3	39
3:30 PM	0	9	3	0	1	12	1	7	0	0	2	8	2	0	1	0	6	3	1	0	1	0	3	2	25
3:45 PM	0	6	1	0	1	7	0	18	1	0	2	19	0	0	2	0	2	2	0	0	0	0	2	0	28
Hourly Total	1	37	9	0	5	47	5	42	5	1	10	53	9	1	11	0	16	21	2	2	2	0	17	6	127
4:00 PM	1	13	3	0	1	17	6	9	0	0	1	15	4	0	4	0	8	8	2	0	1	0	1	3	43
4:15 PM	2	9	2	1	0	14	4	5	1	0	3	10	2	0	5	0	3	7	2	0	2	0	4	4	35

4:30 PM	0	10	3	0	0	13	3	17	1	1	3	22	3	1	4	0	1	8	3	0	1	0	1	4	47
4:45 PM	1	13	3	0	1	17	5	15	4	0	2	24	3	0	5	0	3	8	2	0	2	0	7	4	53
Hourly Total	4	45	11	1	2	61	18	46	6	1	9	71	12	1	18	0	15	31	9	0	6	0	13	15	178
5:00 PM	2	14	1	0	1	17	5	18	2	1	4	26	4	1	2	0	3	7	5	0	2	0	9	7	57
5:15 PM	0	20	4	0	2	24	4	9	0	0	2	13	2	0	5	0	9	7	0	0	1	0	8	1	45
5:30 PM	1	11	0	0	1	12	5	18	1	0	5	24	1	0	3	0	5	4	1	1	0	0	5	2	42
5:45 PM	0	15	5	0	1	20	2	19	1	0	3	22	6	0	4	0	8	10	1	0	1	0	4	2	54
Hourly Total	3	60	10	0	5	73	16	64	4	1	14	85	13	1	14	0	25	28	7	1	4	0	26	12	198
Grand Total	13	281	56	1	28	351	71	279	29	6	62	385	60	7	101	0	121	168	28	15	21	0	122	64	968
Approach %	3.7	80.1	16.0	0.3	-	-	18.4	72.5	7.5	1.6	-	-	35.7	4.2	60.1	0.0	-	-	43.8	23.4	32.8	0.0	-	-	-
Total %	1.3	29.0	5.8	0.1	-	36.3	7.3	28.8	3.0	0.6	-	39.8	6.2	0.7	10.4	0.0	-	17.4	2.9	1.5	2.2	0.0	-	6.6	-
Motorcycles	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	3
% Motorcycles	0.0	0.4	0.0	0.0	-	0.3	0.0	0.4	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	6.7	0.0	-	-	1.6	0.3
Cars & Light Goods	12	274	54	0	-	340	68	267	29	6	-	370	58	6	100	0	-	164	25	12	21	0	-	58	932
% Cars & Light Goods	92.3	97.5	96.4	0.0	-	96.9	95.8	95.7	100.0	100.0	-	96.1	96.7	85.7	99.0	-	-	97.6	89.3	80.0	100.0	-	-	90.6	96.3
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	1	3	2	1	-	7	1	3	0	0	-	4	1	1	1	0	-	3	1	0	0	0	-	1	15
% Single-Unit Trucks	7.7	1.1	3.6	100.0	-	2.0	1.4	1.1	0.0	0.0	-	1.0	1.7	14.3	1.0	-	-	1.8	3.6	0.0	0.0	-	-	1.6	1.5
Articulated Trucks	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7	0.0	0.0	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	3	0	0	-	3	2	6	0	0	-	8	1	0	0	0	-	1	2	2	0	0	-	4	16
% Bicycles on Road	0.0	1.1	0.0	0.0	-	0.9	2.8	2.2	0.0	0.0	-	2.1	1.7	0.0	0.0	-	-	0.6	7.1	13.3	0.0	-	-	6.3	1.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.8	-	-	-	-	-	3.3	-	-
Pedestrians	-	-	-	-	28	-	-	-	-	-	62	-	-	-	-	-	120	-	-	-	-	-	118	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	99.2	-	-	-	-	-	96.7	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hemlock Street & Hickory Street
West
Site Code: 210344
Start Date: 06/10/2021
Page No: 4

Turning Movement Peak Hour Data (9:15 AM)

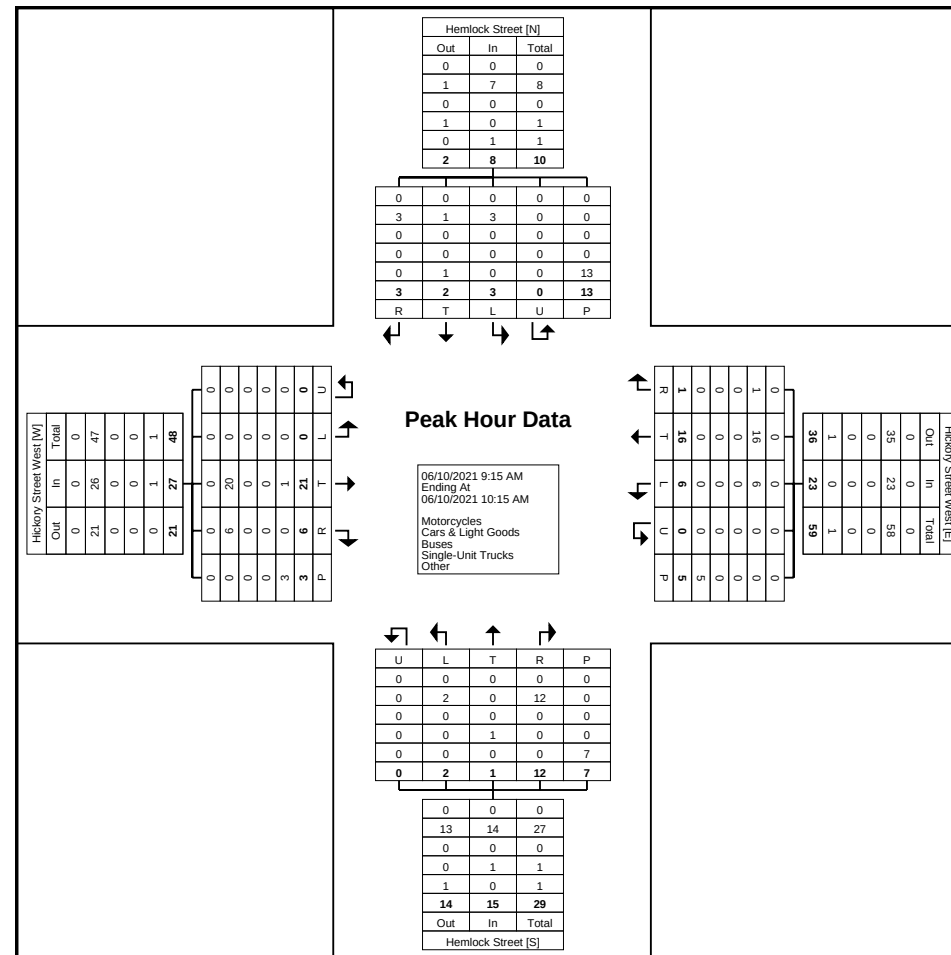
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hemlock Street Northbound						Hemlock Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:15 AM	0	6	1	0	0	7	2	3	0	0	1	5	1	0	3	0	2	4	1	1	2	0	5	4	20
9:30 AM	0	5	2	0	1	7	3	2	1	0	3	6	0	0	3	0	2	3	0	1	1	0	3	2	18
9:45 AM	0	5	1	0	2	6	0	6	0	0	0	6	1	0	3	0	1	4	2	0	0	0	4	2	18
10:00 AM	0	5	2	0	0	7	1	5	0	0	1	6	0	1	3	0	2	4	0	0	0	0	1	0	17
Total	0	21	6	0	3	27	6	16	1	0	5	23	2	1	12	0	7	15	3	2	3	0	13	8	73
Approach %	0.0	77.8	22.2	0.0	-	-	26.1	69.6	4.3	0.0	-	-	13.3	6.7	80.0	0.0	-	-	37.5	25.0	37.5	0.0	-	-	-
Total %	0.0	28.8	8.2	0.0	-	37.0	8.2	21.9	1.4	0.0	-	31.5	2.7	1.4	16.4	0.0	-	20.5	4.1	2.7	4.1	0.0	-	11.0	-
PHF	0.000	0.875	0.750	0.000	-	0.964	0.500	0.667	0.250	0.000	-	0.958	0.500	0.250	1.000	0.000	-	0.938	0.375	0.500	0.375	0.000	-	0.500	0.913
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	0	20	6	0	-	26	6	16	1	0	-	23	2	0	12	0	-	14	3	1	3	0	-	7	70
% Cars & Light Goods	-	95.2	100.0	-	-	96.3	100.0	100.0	100.0	-	-	100.0	100.0	0.0	100.0	-	-	93.3	100.0	50.0	100.0	-	-	87.5	95.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	6.7	0.0	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	2
% Bicycles on Road	-	4.8	0.0	-	-	3.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	50.0	0.0	-	-	12.5	2.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	7.7	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	7	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	92.3	-	-



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519-896-3163 cbowness@pts1.com

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Count Name: Hemlock Street & Hickory Street
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Turning Movement Peak Hour Data (12:00 PM)

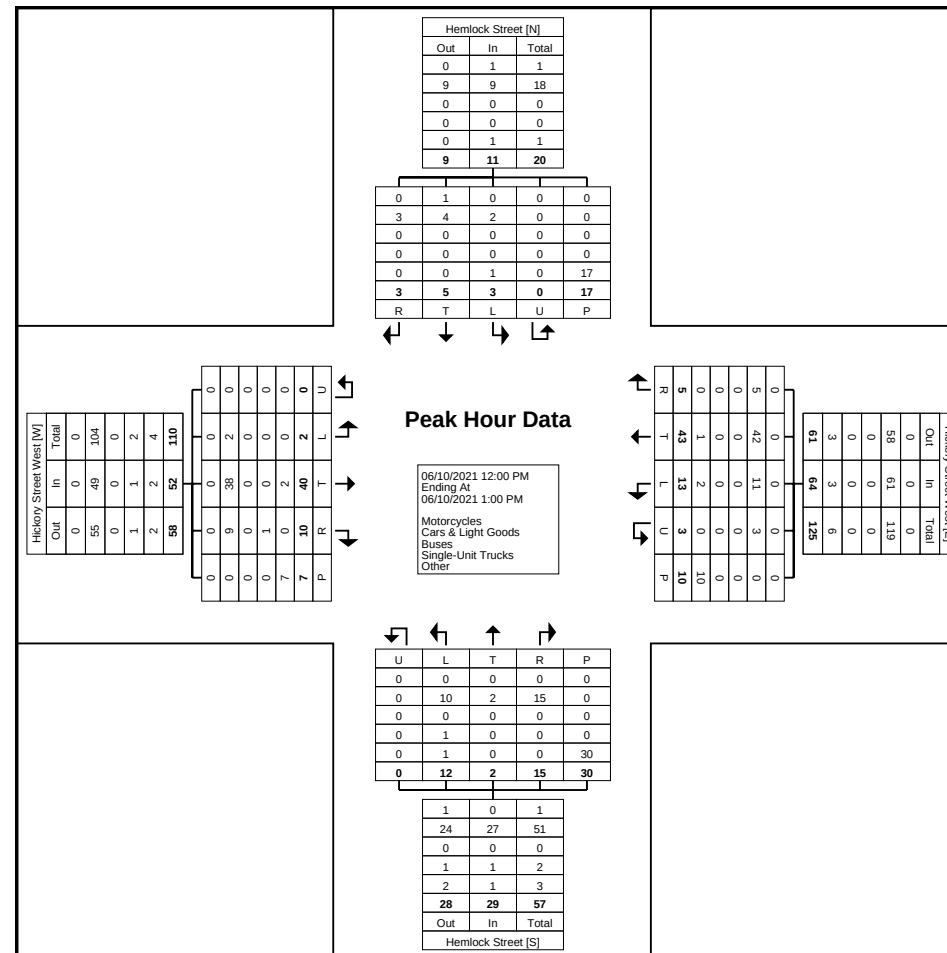
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hemlock Street Northbound						Hemlock Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	1	9	1	0	1	11	5	7	2	0	1	14	2	1	5	0	7	8	0	1	3	0	1	4	37
12:15 PM	0	11	2	0	0	13	5	12	2	0	0	19	4	1	3	0	2	8	1	1	0	0	1	2	42
12:30 PM	1	6	4	0	3	11	2	9	1	0	4	12	1	0	5	0	10	6	1	2	0	0	7	3	32
12:45 PM	0	14	3	0	3	17	1	15	0	3	5	19	5	0	2	0	11	7	1	1	0	0	8	2	45
Total	2	40	10	0	7	52	13	43	5	3	10	64	12	2	15	0	30	29	3	5	3	0	17	11	156
Approach %	3.8	76.9	19.2	0.0	-	-	20.3	67.2	7.8	4.7	-	-	41.4	6.9	51.7	0.0	-	-	27.3	45.5	27.3	0.0	-	-	-
Total %	1.3	25.6	6.4	0.0	-	33.3	8.3	27.6	3.2	1.9	-	41.0	7.7	1.3	9.6	0.0	-	18.6	1.9	3.2	1.9	0.0	-	7.1	-
PHF	0.500	0.714	0.625	0.000	-	0.765	0.650	0.717	0.625	0.250	-	0.842	0.600	0.500	0.750	0.000	-	0.906	0.750	0.625	0.250	0.000	-	0.688	0.867
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	20.0	0.0	-	-	9.1	0.6
Cars & Light Goods	2	38	9	0	-	49	11	42	5	3	-	61	10	2	15	0	-	27	2	4	3	0	-	9	146
% Cars & Light Goods	100.0	95.0	90.0	-	-	94.2	84.6	97.7	100.0	100.0	-	95.3	83.3	100.0	100.0	-	-	93.1	66.7	80.0	100.0	-	-	81.8	93.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	1	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.0	10.0	-	-	1.9	0.0	0.0	0.0	0.0	-	0.0	8.3	0.0	0.0	-	-	3.4	0.0	0.0	0.0	-	-	0.0	1.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	2	0	0	-	2	2	1	0	0	-	3	1	0	0	0	-	1	1	0	0	0	-	1	7
% Bicycles on Road	0.0	5.0	0.0	-	-	3.8	15.4	2.3	0.0	0.0	-	4.7	8.3	0.0	0.0	-	-	3.4	33.3	0.0	0.0	-	-	9.1	4.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	3.3	-	-	-	-	-	5.9	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	10	-	-	-	-	-	29	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	96.7	-	-	-	-	-	94.1	-	-



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Turning Movement Peak Hour Data (4:30 PM)

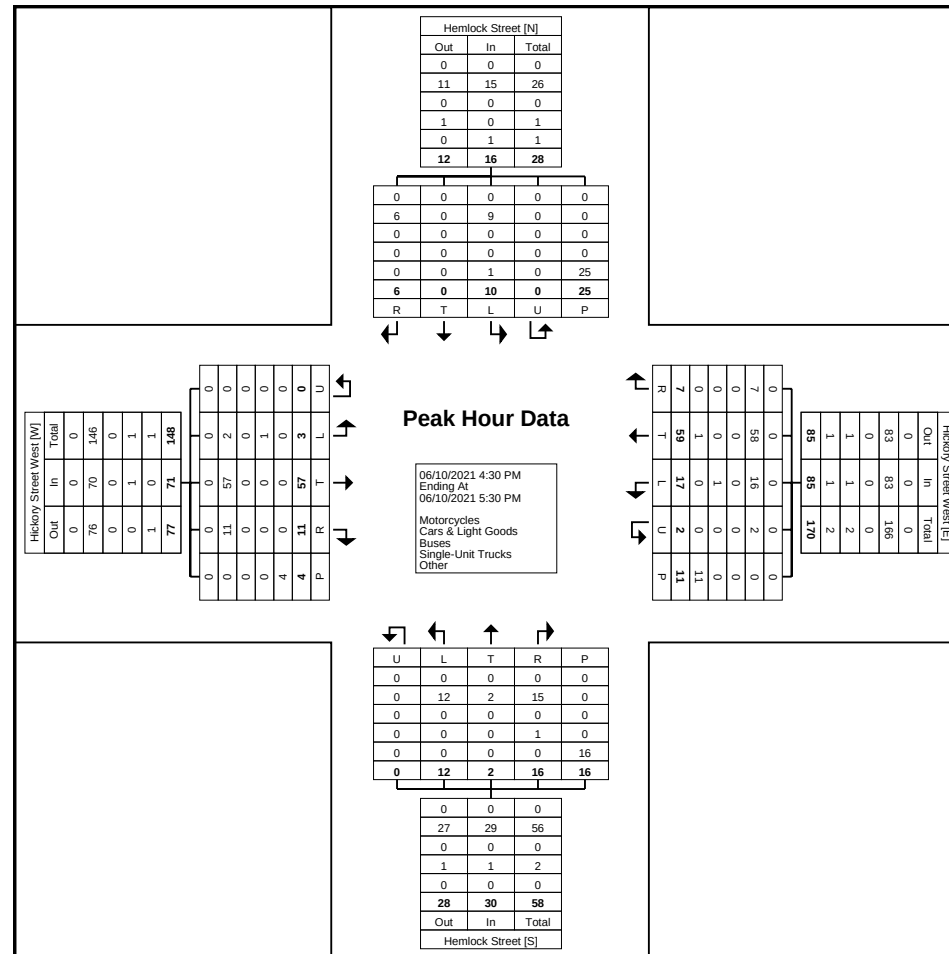
Start Time	Hickory Street West Eastbound						Hickory Street West Westbound						Hemlock Street Northbound						Hemlock Street Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	0	10	3	0	0	13	3	17	1	1	3	22	3	1	4	0	1	8	3	0	1	0	1	4	47
4:45 PM	1	13	3	0	1	17	5	15	4	0	2	24	3	0	5	0	3	8	2	0	2	0	7	4	53
5:00 PM	2	14	1	0	1	17	5	18	2	1	4	26	4	1	2	0	3	7	5	0	2	0	9	7	57
5:15 PM	0	20	4	0	2	24	4	9	0	0	2	13	2	0	5	0	9	7	0	0	1	0	8	1	45
Total	3	57	11	0	4	71	17	59	7	2	11	85	12	2	16	0	16	30	10	0	6	0	25	16	202
Approach %	4.2	80.3	15.5	0.0	-	-	20.0	69.4	8.2	2.4	-	-	40.0	6.7	53.3	0.0	-	-	62.5	0.0	37.5	0.0	-	-	-
Total %	1.5	28.2	5.4	0.0	-	35.1	8.4	29.2	3.5	1.0	-	42.1	5.9	1.0	7.9	0.0	-	14.9	5.0	0.0	3.0	0.0	-	7.9	-
PHF	0.375	0.713	0.688	0.000	-	0.740	0.850	0.819	0.438	0.500	-	0.817	0.750	0.500	0.800	0.000	-	0.938	0.500	0.000	0.750	0.000	-	0.571	0.886
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Cars & Light Goods	2	57	11	0	-	70	16	58	7	2	-	83	12	2	15	0	-	29	9	0	6	0	-	15	197
% Cars & Light Goods	66.7	100.0	100.0	-	-	98.6	94.1	98.3	100.0	100.0	-	97.6	100.0	100.0	93.8	-	-	96.7	90.0	-	100.0	-	-	93.8	97.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Single-Unit Trucks	1	0	0	0	-	1	1	0	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	3
% Single-Unit Trucks	33.3	0.0	0.0	-	-	1.4	5.9	0.0	0.0	0.0	-	1.2	0.0	0.0	6.3	-	-	3.3	0.0	-	0.0	-	-	0.0	1.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	1.7	0.0	0.0	-	1.2	0.0	0.0	0.0	-	-	0.0	10.0	-	0.0	-	-	6.3	1.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	4.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	11	-	-	-	-	-	16	-	-	-	-	-	24	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	96.0	-	-



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519-896-3163 cbowness@pts1.com

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Appendix B

Existing Traffic Operations Reports



Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West Existing AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	22	19	19	14	12	26	5	379	19	29	360	12
Future Volume (vph)	22	19	19	14	12	26	5	379	19	29	360	12
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.932			0.994			0.996	
Frt Protected		0.982			0.987			0.999			0.996	
Satd. Flow (prot)	0	1365	0	0	1321	0	0	1542	0	0	1541	0
Frt Permitted		0.982			0.987			0.999			0.996	
Satd. Flow (perm)	0	1365	0	0	1321	0	0	1542	0	0	1541	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.0			98.8			179.1			128.5	
Travel Time (s)		7.3			7.1			12.9			9.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	25%	0%	0%	20%	9%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	22	19	19	14	12	26	5	379	19	29	360	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	52	0	0	403	0	0	401	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	58.9%											
ICU Level of Service	B											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West Existing AM

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	22	19	19	14	12	26	5	379	19	29	360	12
Future Vol, veh/h	22	19	19	14	12	26	5	379	19	29	360	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	25	0	0	20	9	0	1	0	0	1	0
Mvmt Flow	22	19	19	14	12	26	5	379	19	29	360	12

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	842	832	366	842
Stage 1	424	424	-	399
Stage 2	418	408	-	443
Critical Hdwy	7.1	6.75	6.2	7.1
Critical Hdwy Stg 1	6.1	5.75	-	6.1
Critical Hdwy Stg 2	6.1	5.75	-	6.1
Follow-up Hdwy	3.5	4.225	3.3	3.5
Pot Cap-1 Maneuver	286	280	684	286
Stage 1	612	549	-	631
Stage 2	616	559	-	598
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	258	270	684	256
Mov Cap-2 Maneuver	258	270	-	256
Stage 1	609	532	-	628
Stage 2	576	556	-	543

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	16.1	0.1	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1198	-	-	327	376	-	-	-
HCM Lane V/C Ratio	0.004	-	-	0.183	0.138	0.025	-	-
HCM Control Delay (s)	8	0	-	18.5	16.1	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.5	0.1	-	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West Existing AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	70	20	20	54	3	7	3	40	10	7	10
Future Volume (vph)	0	70	20	20	54	3	7	3	40	10	7	10
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.995			0.892			0.950	
Frt Protected					0.987			0.993			0.982	
Satd. Flow (prot)	0	1487	0	0	1539	0	0	1296	0	0	1462	0
Frt Permitted					0.987			0.993			0.982	
Satd. Flow (perm)	0	1487	0	0	1539	0	0	1296	0	0	1462	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		98.8			236.2			83.5			121.1	
Travel Time (s)		7.4			17.7			6.3			9.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	8%	100%	0%	0%	0%	0%
Adj. Flow (vph)	0	70	20	20	54	3	7	3	40	10	7	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	77	0	0	50	0	0	27	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.4%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West Existing AM

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	70	20	20	54	3	7	3	40	10	7	10
Future Vol, veh/h	0	70	20	20	54	3	7	3	40	10	7	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	10	0	0	0	0	8	100	0	0	0
Mvmt Flow	0	70	20	20	54	3	7	3	40	10	7	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	57	0	0	90	0	0	184	177	80	198	186	56
Stage 1	-	-	-	-	-	-	80	80	-	96	96	-
Stage 2	-	-	-	-	-	-	104	97	-	102	90	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.18	7.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.572	4.9	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1560	-	-	1518	-	-	764	572	986	765	712	1016
Stage 1	-	-	-	-	-	-	914	671	-	916	819	-
Stage 2	-	-	-	-	-	-	887	658	-	909	824	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1560	-	-	1518	-	-	743	564	986	723	702	1016
Mov Cap-2 Maneuver	-	-	-	-	-	-	743	564	-	723	702	-
Stage 1	-	-	-	-	-	-	914	671	-	916	808	-
Stage 2	-	-	-	-	-	-	858	649	-	868	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	9.2	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	904	1560	-	-	1518	-	-	802
HCM Lane V/C Ratio	0.055	-	-	-	0.013	-	-	0.034
HCM Control Delay (s)	9.2	0	-	-	7.4	0	-	9.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St

Existing AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	77	23	30	77	20	23	87	33	30	80	10
Future Volume (vph)	13	77	23	30	77	20	23	87	33	30	80	10
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.979			0.969			0.989	
Frt Protected		0.994			0.988			0.992			0.988	
Satd. Flow (prot)	0	1476	0	0	1437	0	0	1439	0	0	1531	0
Frt Permitted		0.994			0.988			0.992			0.988	
Satd. Flow (perm)	0	1476	0	0	1437	0	0	1439	0	0	1531	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		236.2			82.0			115.0			145.0	
Travel Time (s)		17.0			5.9			8.3			10.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	0%	9%	0%	14%	4%	0%	0%	0%	0%
Adj. Flow (vph)	13	77	23	30	77	20	23	87	33	30	80	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	127	0	0	143	0	0	120	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.4%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th AWSC
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St

Existing AM

Intersection												
Intersection Delay, s/veh	8.6											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol. veh/h	13	77	23	30	77	20	23	87	33	30	80	10
Future Vol. veh/h	13	77	23	30	77	20	23	87	33	30	80	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	9	0	14	4	0	0	0	0
Mvmt Flow	13	77	23	30	77	20	23	87	33	30	80	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	8.4			8.6			8.9			8.5		
HCM LOS	A			A			A			A		

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	12%	24%	25%
Vol Thru, %	61%	68%	61%	67%
Vol Right, %	23%	20%	16%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	143	113	127	120
LT Vol	23	13	30	30
Through Vol	87	77	77	80
RT Vol	33	23	20	10
Lane Flow Rate	143	113	127	120
Geometry Grp	1	1	1	1
Degree of Util (X)	0.188	0.144	0.163	0.154
Departure Headway (Hd)	4.735	4.58	4.614	4.634
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	756	782	776	773
Service Time	2.77	2.615	2.648	2.671
HCM Lane V/C Ratio	0.189	0.145	0.164	0.155
HCM Control Delay	8.9	8.4	8.6	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-ile Q	0.7	0.5	0.6	0.5

Lanes, Volumes, Timings

(220292) 83-85 Hickory St W & 265-267 Hemlock St

1: Albert Street & Hickory Street West

Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	34	44	41	39	58	19	443	44	41	431	31
Future Volume (vph)	25	34	44	41	39	58	19	443	44	41	431	31
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942			0.943			0.988			0.992	
Flt Protected		0.988			0.985			0.998			0.996	
Satd. Flow (prot)	0	1418	0	0	1440	0	0	1523	0	0	1526	0
Flt Permitted		0.988			0.985			0.998			0.996	
Satd. Flow (perm)	0	1418	0	0	1440	0	0	1523	0	0	1526	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		190			319			279			157	
Travel Time (s)		4.3			7.3			6.3			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	0%	4%	0%	0%	6%
Adj. Flow (vph)	25	34	44	41	39	58	19	443	44	41	431	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	0	138	0	0	506	0	0	503	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.3%					ICU Level of Service C						
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West Existing PM

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	25	34	44	41	39	58	19	443	44	41	431	31
Future Vol, veh/h	25	34	44	41	39	58	19	443	44	41	431	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	4	0	0	0	0	0	4	0	0	6
Mvmt Flow	25	34	44	41	39	58	19	443	44	41	431	31

Major/Minor	Minor2		Minor1		Major1		Major2			
Conflicting Flow All	1081	1054	447	1071	1047	465	462	0	0	487
Stage 1	529	529	-	503	503	-	-	-	-	-
Stage 2	552	525	-	568	544	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.2	-	-	2.2
Pot Cap-1 Maneuver	197	228	607	200	230	602	1110	-	-	1086
Stage 1	537	530	-	555	545	-	-	-	-	-
Stage 2	522	533	-	511	522	-	-	-	-	-
Platoon blocked, %										
Mov Cap-1 Maneuver	145	211	607	154	213	602	1110	-	-	1086
Mov Cap-2 Maneuver	145	211	-	154	213	-	-	-	-	-
Stage 1	524	503	-	542	532	-	-	-	-	-
Stage 2	427	520	-	419	495	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.5	35.1	0.3	0.7
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1110	-	-	254	253	1086	-	-
HCM Lane V/C Ratio	0.017	-	-	0.406	0.545	0.038	-	-
HCM Control Delay (s)	8.3	0	-	28.5	35.1	8.4	0	-
HCM Lane LOS	A	A	-	D	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.9	3	0.1	-	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West Existing PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	4	70	14	21	73	9	15	2	20	12	0	7
Future Volume (vph)	4	70	14	21	73	9	15	2	20	12	0	7
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.979		0.988		0.927		0.950		0.950		0.950	
Frt Protected	0.998		0.990		0.980		0.969		0.969		0.969	
Satd. Flow (prot)	0	1492	0	0	1498	0	0	1364	0	0	1427	0
Frt Permitted	0.998		0.990		0.980		0.969		0.969		0.969	
Satd. Flow (perm)	0	1492	0	0	1498	0	0	1364	0	0	1427	0
Link Speed (mph)	30		30		30		30		30		30	
Link Distance (ft)	319		774		278		460		460		460	
Travel Time (s)	7.3		17.6		6.3		10.5		10.5		10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	33%	0%	0%	6%	0%	0%	0%	0%	6%	0%	0%	0%
Adj. Flow (vph)	4	70	14	21	73	9	15	2	20	12	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	0	0	103	0	0	37	0	0	19	0
Sign Control	Free		Free		Stop		Stop		Stop		Stop	

Intersection Summary		
Area Type:	Other	
Control Type:	Unsignalized	
Intersection Capacity Utilization	23.5%	ICU Level of Service A
Analysis Period (min)	15	

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West Existing PM

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	70	14	21	73	9	15	2	20	12	0	7
Future Vol, veh/h	4	70	14	21	73	9	15	2	20	12	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	33	0	0	6	0	0	0	0	6	0	0	0
Mvmt Flow	4	70	14	21	73	9	15	2	20	12	0	7

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	82	0	0	84	0	0	208	209	77	216	212	78
Stage 1	-	-	-	-	-	-	85	85	-	120	120	-
Stage 2	-	-	-	-	-	-	123	124	-	96	92	-
Critical Hdwy	4.43	-	-	4.16	-	-	7.1	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.497	-	-	2.254	-	-	3.5	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1341	-	-	1488	-	-	754	692	973	745	689	988
Stage 1	-	-	-	-	-	-	928	828	-	889	800	-
Stage 2	-	-	-	-	-	-	886	797	-	916	823	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1341	-	-	1488	-	-	738	680	973	718	677	988
Mov Cap-2 Maneuver	-	-	-	-	-	-	738	680	-	718	677	-
Stage 1	-	-	-	-	-	-	925	826	-	886	788	-
Stage 2	-	-	-	-	-	-	867	785	-	892	821	-

Approach	EB		WB		NB		SB
HCM Control Delay, s	0.3		1.5		9.5		9.6
HCM LOS					A		A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	844	1341	-	-	1488	-	-	798
HCM Lane V/C Ratio	0.044	0.003	-	-	0.014	-	-	0.024
HCM Control Delay (s)	9.5	7.7	0	-	7.5	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West Existing PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	81	16	25	81	50	14	55	26	16	65	15
Future Volume (vph)	18	81	16	25	81	50	14	55	26	16	65	15
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981				0.957			0.963			0.979	
Flt Protected	0.992				0.992			0.993			0.992	
Satd. Flow (prot)	0	1508	0	0	1471	0	0	1482	0	0	1505	0
Flt Permitted	0.992				0.992			0.993			0.992	
Satd. Flow (perm)	0	1508	0	0	1471	0	0	1482	0	0	1505	0
Link Speed (mph)	30				30			30			30	
Link Distance (ft)	774				267			282			501	
Travel Time (s)	17.6				6.1			6.4			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	18	81	16	25	81	50	14	55	26	16	65	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	0	0	156	0	0	95	0	0	96	0
Sign Control	Stop				Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th AWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West Existing PM

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	81	16	25	81	50	14	55	26	16	65	15
Future Vol, veh/h	18	81	16	25	81	50	14	55	26	16	65	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	18	81	16	25	81	50	14	55	26	16	65	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

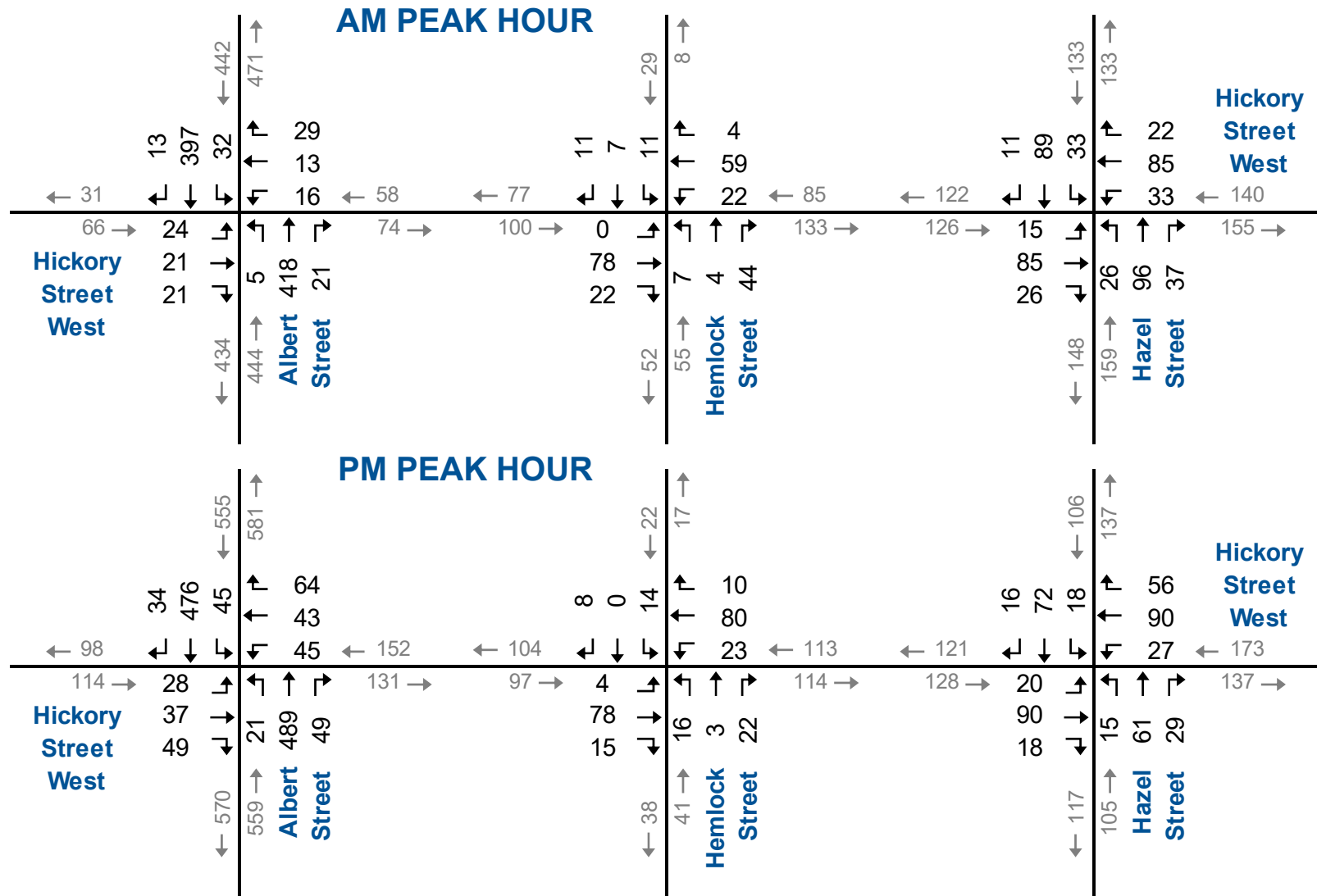
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.3	8.1	8.2
HCM LOS	A	A	A	A

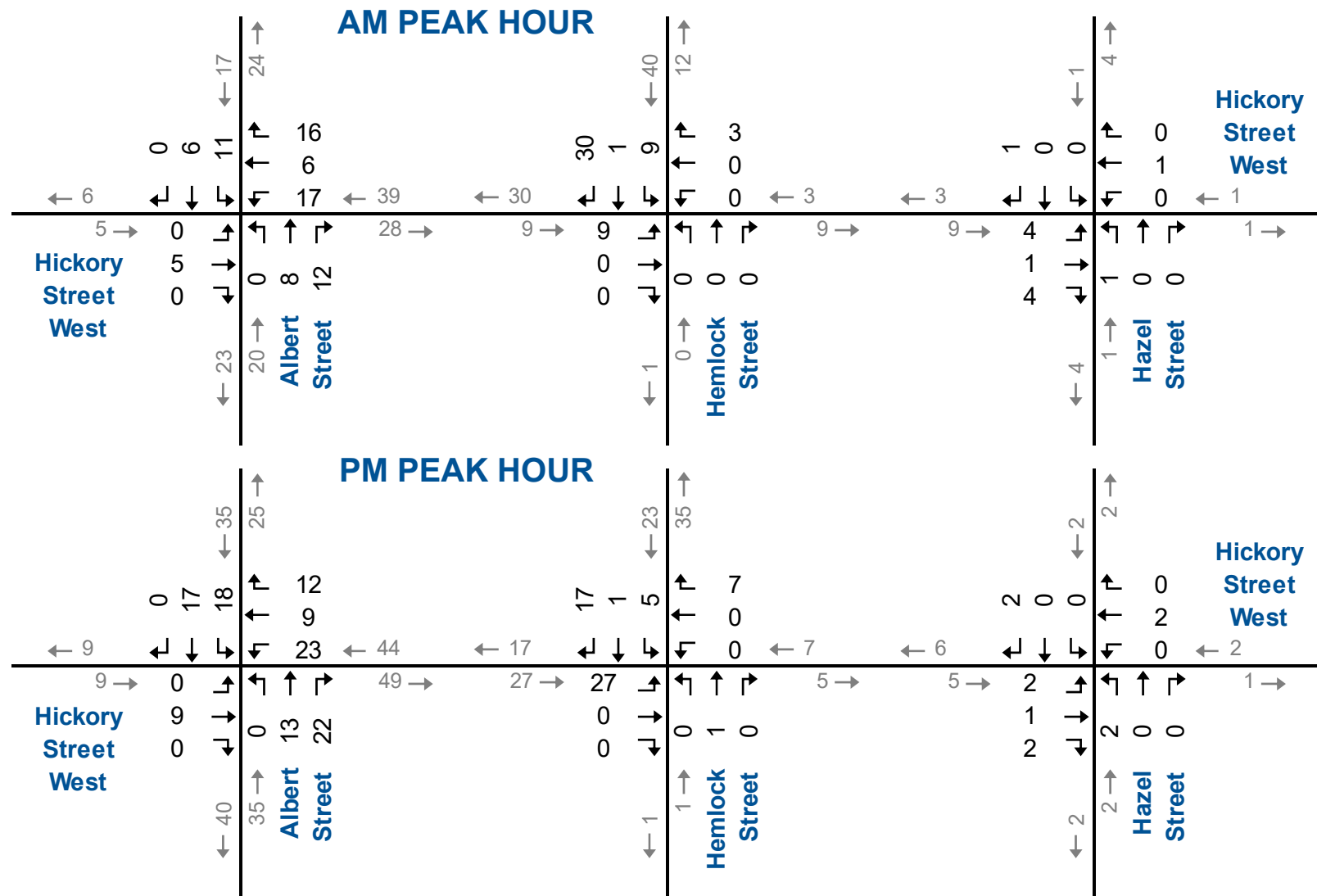
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	16%	16%	17%
Vol Thru, %	58%	70%	52%	68%
Vol Right, %	27%	14%	32%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	115	156	96
LT Vol	14	18	25	16
Through Vol	55	81	81	65
RT Vol	26	16	50	15
Lane Flow Rate	95	115	156	96
Geometry Grp	1	1	1	1
Degree of Util (X)	0.118	0.143	0.187	0.122
Departure Headway (Hd)	4.485	4.461	4.312	4.557
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	804	833	786
Service Time	2.515	2.486	2.335	2.586
HCM Lane V/C Ratio	0.119	0.143	0.187	0.122
HCM Control Delay	8.1	8.2	8.3	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-ile Q	0.4	0.5	0.7	0.4

Appendix C

2027 Background Growth and Development Traffic Volumes







Appendix D

2027 Background Traffic Operations Reports



Lanes, Volumes, Timings
1: Albert Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	24	26	21	33	19	45	5	426	33	43	403	13
Future Volume (vph)	24	26	21	33	19	45	5	426	33	43	403	13
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.960			0.937			0.990			0.996	
Flt Protected		0.983			0.983			0.999			0.995	
Satd. Flow (prot)	0	1355	0	0	1335	0	0	1536	0	0	1540	0
Flt Permitted		0.983			0.983			0.999			0.995	
Satd. Flow (perm)	0	1355	0	0	1335	0	0	1536	0	0	1540	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.0			98.8			179.1			128.5	
Travel Time (s)		7.3			7.1			12.9			9.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	25%	0%	0%	20%	9%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	24	26	21	33	19	45	5	426	33	43	403	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	97	0	0	464	0	0	459	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 76.7% ICU Level of Service D
Analysis Period (min) 15

HCM 6th TWSC
1: Albert Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	24	26	21	33	19	45	5	426	33	43	403	13
Future Vol, veh/h	24	26	21	33	19	45	5	426	33	43	403	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	25	0	0	20	9	0	1	0	0	1	0
Mvmt Flow	24	26	21	33	19	45	5	426	33	43	403	13

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	981	965	410	972
Stage 1	496	496	-	453
Stage 2	485	469	-	519
Critical Hdwy	7.1	6.75	6.2	7.1
Critical Hdwy Stg 1	6.1	5.75	-	6.1
Critical Hdwy Stg 2	6.1	5.75	-	6.1
Follow-up Hdwy	3.5	4.225	3.3	3.5
Pot Cap-1 Maneuver	231	233	646	234
Stage 1	559	509	-	590
Stage 2	567	524	-	544
Platoon blocked, %				
Mov Cap-1 Maneuver	192	220	646	197
Mov Cap-2 Maneuver	192	220	-	197
Stage 1	556	484	-	586
Stage 2	503	521	-	473

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.2	22.8	0.1	0.8
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1154	-	-	258	298	1113	-
HCM Lane V/C Ratio	0.004	-	-	0.275	0.326	0.039	-
HCM Control Delay (s)	8.1	0	-	24.2	22.8	8.4	0
HCM Lane LOS	A	A	-	C	C	A	A
HCM 95th %tile Q(veh)	0	-	-	1.1	1.4	0.1	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	9	78	22	22	59	7	7	4	44	20	8	41
Future Volume (vph)	9	78	22	22	59	7	7	4	44	20	8	41
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.973			0.989			0.892			0.920	
Flt Protected		0.996			0.988			0.994			0.986	
Satd. Flow (prot)	0	1489	0	0	1531	0	0	1283	0	0	1422	0
Flt Permitted		0.996			0.988			0.994			0.986	
Satd. Flow (perm)	0	1489	0	0	1531	0	0	1283	0	0	1422	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		98.8			236.2			83.5			121.1	
Travel Time (s)		7.4			17.7			6.3			9.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	8%	100%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	9	78	22	22	59	7	7	4	44	20	8	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	109	0	0	88	0	0	55	0	0	69	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	28.5%											
ICU Level of Service A												
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background AM

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	9	78	22	22	59	7	7	4	44	20	8	41
Future Vol, veh/h	9	78	22	22	59	7	7	4	44	20	8	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	10	0	0	0	8	100	0	0	0	0
Mvmt Flow	9	78	22	22	59	7	7	4	44	20	8	41

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	66	0	0	100	0	0	238	217	89	238	225	63
Stage 1	-	-	-	-	-	-	107	107	-	107	107	-
Stage 2	-	-	-	-	-	-	131	110	-	131	118	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.18	7.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.572	4.9	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1549	-	-	1505	-	-	704	540	975	721	678	1007
Stage 1	-	-	-	-	-	-	884	651	-	903	811	-
Stage 2	-	-	-	-	-	-	858	649	-	877	802	-
Platoon blocked, %												
Mov Cap-1 Maneuver	1549	-	-	1505	-	-	658	529	975	673	664	1007
Mov Cap-2 Maneuver	-	-	-	-	-	-	658	529	-	673	664	-
Stage 1	-	-	-	-	-	-	879	647	-	898	799	-
Stage 2	-	-	-	-	-	-	803	639	-	827	797	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.9	9.4	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	868	1549	-	-	1505	-	-	837
HCM Lane V/C Ratio	0.063	0.006	-	-	0.015	-	-	0.082
HCM Control Delay (s)	9.4	7.3	0	-	7.4	0	-	9.7
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

Lanes, Volumes, Timings
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	19	86	30	33	86	22	27	96	37	33	89	12
Future Volume (vph)	19	86	30	33	86	22	27	96	37	33	89	12
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.970			0.979			0.969			0.988	
Flt Protected		0.993			0.988			0.992			0.988	
Satd. Flow (prot)	0	1472	0	0	1437	0	0	1438	0	0	1530	0
Flt Permitted		0.993			0.988			0.992			0.988	
Satd. Flow (perm)	0	1472	0	0	1437	0	0	1438	0	0	1530	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		236.2			82.0			115.0			145.0	
Travel Time (s)		17.0			5.9			8.3			10.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	0%	9%	0%	14%	4%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	19	86	30	33	86	22	27	96	37	33	89	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	0	0	141	0	0	160	0	0	134	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 35.8%
Analysis Period (min) 15

HCM 6th AWSC
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM

Intersection

Intersection Delay, s/veh 8.9
Intersection LOS A

Movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	19	86	30	33	86	22	27	96	37	33	89	12
Future Vol, veh/h	19	86	30	33	86	22	27	96	37	33	89	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	9	0	14	4	0	0	0	0
Mvmt Flow	19	86	30	33	86	22	27	96	37	33	89	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	8.9	9.2	8.8
HCM LOS	A	A	A	A

Lane

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	14%	23%	25%
Vol Thru, %	60%	64%	61%	66%
Vol Right, %	23%	22%	16%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	135	141	134
LT Vol	27	19	33	33
Through Vol	96	86	86	89
RT Vol	37	30	22	12
Lane Flow Rate	160	135	141	134
Geometry Grp	1	1	1	1
Degree of Util (X)	0.216	0.176	0.185	0.177
Departure Headway (Hd)	4.852	4.681	4.731	4.751
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	738	763	756	752
Service Time	2.9	2.73	2.78	2.801
HCM Lane V/C Ratio	0.217	0.177	0.187	0.178
HCM Control Delay	9.2	8.7	8.9	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.6	0.7	0.6

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	46	49	68	52	76	21	502	71	63	493	34
Future Volume (vph)	28	46	49	68	52	76	21	502	71	63	493	34
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.946			0.948			0.984			0.992	
Flt Protected		0.989			0.983			0.998			0.995	
Satd. Flow (prot)	0	1427	0	0	1444	0	0	1515	0	0	1525	0
Flt Permitted		0.989			0.983			0.998			0.995	
Satd. Flow (perm)	0	1427	0	0	1444	0	0	1515	0	0	1525	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		190			319			279			157	
Travel Time (s)		4.3			7.3			6.3			3.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	0%	4%	0%	0%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	28	46	49	68	52	76	21	502	71	63	493	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	196	0	0	594	0	0	590	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 94.7%	ICU Level of Service F											
Analysis Period (min) 15												

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Background PM

Intersection												
Int Delay, s/veh	30.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	46	49	68	52	76	21	502	71	63	493	34
Future Vol, veh/h	28	46	49	68	52	76	21	502	71	63	493	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	4	0	0	0	0	0	4	0	0	6
Mvmt Flow	28	46	49	68	52	76	21	502	71	63	493	34
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1280	1251	510	1264	1233	538	527	0	0	573	0	0
Stage 1	636	636	-	580	580	-	-	-	-	-	-	-
Stage 2	644	615	-	684	653	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	144	174	559	148	178	547	1050	-	-	1010	-	-
Stage 1	469	475	-	504	503	-	-	-	-	-	-	-
Stage 2	465	485	-	442	467	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	84	154	559	95	157	547	1050	-	-	1010	-	-
Mov Cap-2 Maneuver	84	154	-	95	157	-	-	-	-	-	-	-
Stage 1	455	433	-	489	488	-	-	-	-	-	-	-
Stage 2	347	470	-	328	425	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	66.8		185.1		0.3		0.9					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1050	-	-	171	165	1010	-	-				
HCM Lane V/C Ratio	0.02	-	-	0.719	1.188	0.062	-	-				
HCM Control Delay (s)	8.5	0	-	66.8	185.1	8.8	0	-				
HCM Lane LOS	A	A	-	F	F	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	4.4	10.7	0.2	-	-				

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	31	78	15	23	80	17	16	4	22	19	1	25
Future Volume (vph)	31	78	15	23	80	17	16	4	22	19	1	25
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.981			0.929			0.925	
Flt Protected		0.988			0.991			0.981			0.979	
Satd. Flow (prot)	0	1392	0	0	1490	0	0	1370	0	0	1404	0
Flt Permitted		0.988			0.991			0.981			0.979	
Satd. Flow (perm)	0	1392	0	0	1490	0	0	1370	0	0	1404	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		319			774			278			460	
Travel Time (s)		7.3			17.6			6.3			10.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	33%	0%	0%	6%	0%	0%	0%	0%	6%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	78	15	23	80	17	16	4	22	19	1	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	124	0	0	120	0	0	42	0	0	45	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 23.2% ICU Level of Service A
Analysis Period (min) 15

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background PM

Intersection

Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	31	78	15	23	80	17	16	4	22	19	1	25
Future Vol, veh/h	31	78	15	23	80	17	16	4	22	19	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	33	0	0	6	0	0	0	0	6	0	0	0
Mvmt Flow	31	78	15	23	80	17	16	4	22	19	1	25

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	97	0	93	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.43	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.497	-	2.254	-
Pot Cap-1 Maneuver	1323	-	1477	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1323	-	1477	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	1.4	10	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	760	1323	-	-	1477	-	-	778
HCM Lane V/C Ratio	0.055	0.023	-	-	0.016	-	-	0.058
HCM Control Delay (s)	10	7.8	0	-	7.5	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.2

Lanes, Volumes, Timings
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W & 265-267 Hemlock St
2027 Background PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	22	91	20	27	92	56	17	61	29	18	72	18
Future Volume (vph)	22	91	20	27	92	56	17	61	29	18	72	18
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980			0.957			0.963			0.977	
Flt Protected		0.992			0.992			0.992			0.992	
Satd. Flow (prot)	0	1507	0	0	1471	0	0	1481	0	0	1502	0
Flt Permitted		0.992			0.992			0.992			0.992	
Satd. Flow (perm)	0	1507	0	0	1471	0	0	1481	0	0	1502	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		774			267			282			501	
Travel Time (s)		17.6			6.1			6.4			11.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	91	20	27	92	56	17	61	29	18	72	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	175	0	0	107	0	0	108	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 32.1%
Analysis Period (min) 15

HCM 6th AWSC
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W & 265-267 Hemlock St
2027 Background PM

Intersection

Intersection Delay, s/veh 8.5
Intersection LOS A

Movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	22	91	20	27	92	56	17	61	29	18	72	18
Future Vol, veh/h	22	91	20	27	92	56	17	61	29	18	72	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	91	20	27	92	56	17	61	29	18	72	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8.6	8.4	8.5
HCM LOS	A	A	A	A

Lane

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	17%	15%	17%
Vol Thru, %	57%	68%	53%	67%
Vol Right, %	27%	15%	32%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	133	175	108
LT Vol	17	22	27	18
Through Vol	61	91	92	72
RT Vol	29	20	56	18
Lane Flow Rate	107	133	175	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.137	0.168	0.214	0.14
Departure Headway (Hd)	4.599	4.544	4.397	4.66
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	778	787	816	768
Service Time	2.637	2.58	2.431	2.698
HCM Lane V/C Ratio	0.138	0.169	0.214	0.141
HCM Control Delay	8.4	8.5	8.6	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.6	0.8	0.5

Appendix E

2027 Total Traffic Operations Reports



Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	28	21	48	24	61	5	426	38	47	403	13
Future Volume (vph)	24	28	21	48	24	61	5	426	38	47	403	13
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.961			0.938			0.989			0.996	
Frt Protected		0.984			0.982			0.999			0.995	
Satd. Flow (prot)	0	1352	0	0	1340	0	0	1534	0	0	1540	0
Frt Permitted		0.984			0.982			0.999			0.995	
Satd. Flow (perm)	0	1352	0	0	1340	0	0	1534	0	0	1540	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.0			98.8			179.1			128.5	
Travel Time (s)		7.3			7.1			12.9			9.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	25%	0%	0%	20%	9%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	24	28	21	48	24	61	5	426	38	47	403	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	133	0	0	469	0	0	463	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	83.6%											
ICU Level of Service	E											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total AM

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	28	21	48	24	61	5	426	38	47	403	13
Future Vol, veh/h	24	28	21	48	24	61	5	426	38	47	403	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	25	0	0	20	9	0	1	0	0	1	0
Mvmt Flow	24	28	21	48	24	61	5	426	38	47	403	13

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1002	978	410	983
Stage 1	504	504	-	455
Stage 2	498	474	-	528
Critical Hdwy	7.1	6.75	6.2	7.1
Critical Hdwy Stg 1	6.1	5.75	-	6.1
Critical Hdwy Stg 2	6.1	5.75	-	6.1
Follow-up Hdwy	3.5	4.225	3.3	3.5
Pot Cap-1 Maneuver	223	229	646	230
Stage 1	554	505	-	589
Stage 2	558	521	-	538
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	176	215	646	191
Mov Cap-2 Maneuver	176	215	-	191
Stage 1	551	477	-	585
Stage 2	476	518	-	463

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.9	27.6	0.1	0.9
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1154	-	-	244	289	1108	-	-
HCM Lane V/C Ratio	0.004	-	-	0.299	0.46	0.042	-	-
HCM Control Delay (s)	8.1	0	-	25.9	27.6	8.4	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.2	2.3	0.1	-	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	78	31	26	59	7	43	4	55	20	8	41
Future Volume (vph)	9	78	31	26	59	7	43	4	55	20	8	41
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.990			0.927			0.920	
Frt Protected		0.996			0.986			0.979			0.986	
Satd. Flow (prot)	0	1468	0	0	1530	0	0	1326	0	0	1422	0
Frt Permitted		0.996			0.986			0.979			0.986	
Satd. Flow (perm)	0	1468	0	0	1530	0	0	1326	0	0	1422	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		98.8			236.2			83.5			121.1	
Travel Time (s)		7.4			17.7			6.3			9.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	8%	100%	0%	0%	0%	0%
Adj. Flow (vph)	9	78	31	26	59	7	43	4	55	20	8	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	92	0	0	102	0	0	69	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	30.8%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total AM

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	78	31	26	59	7	43	4	55	20	8	41
Future Vol, veh/h	9	78	31	26	59	7	43	4	55	20	8	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	10	0	0	0	0	8	100	0	0	0
Mvmt Flow	9	78	31	26	59	7	43	4	55	20	8	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	109	0	0	251	230	94	256	242	63
Stage 1	-	-	-	-	-	-	112	112	-	115	115	-
Stage 2	-	-	-	-	-	-	139	118	-	141	127	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.18	7.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.572	4.9	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1549	-	-	1494	-	-	690	530	968	701	663	1007
Stage 1	-	-	-	-	-	-	879	647	-	895	804	-
Stage 2	-	-	-	-	-	-	850	643	-	867	795	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1549	-	-	1494	-	-	644	517	968	646	647	1007
Mov Cap-2 Maneuver	-	-	-	-	-	-	644	517	-	646	647	-
Stage 1	-	-	-	-	-	-	874	643	-	890	790	-
Stage 2	-	-	-	-	-	-	793	631	-	808	790	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	2.1	10.3	9.8
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	777	1549	-	-	1494	-	-	821
HCM Lane V/C Ratio	0.131	0.006	-	-	0.017	-	-	0.084
HCM Control Delay (s)	10.3	7.3	0	-	7.5	0	-	9.8
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.3

Lanes, Volumes, Timings
3: Hazel Street & Hickory Street West
(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	23	87	35	33	87	22	28	96	37	33	89	13
Future Volume (vph)	23	87	35	33	87	22	28	96	37	33	89	13
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.979			0.969			0.987	
Frt Protected		0.992			0.989			0.991			0.988	
Satd. Flow (prot)	0	1468	0	0	1438	0	0	1436	0	0	1528	0
Frt Permitted		0.992			0.989			0.991			0.988	
Satd. Flow (perm)	0	1468	0	0	1438	0	0	1436	0	0	1528	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		236.2			82.0			115.0			145.0	
Travel Time (s)		17.0			5.9			8.3			10.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	0%	9%	0%	14%	4%	0%	0%	0%	0%
Adj. Flow (vph)	23	87	35	33	87	22	28	96	37	33	89	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	142	0	0	161	0	0	135	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	35.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th AWSC
3: Hazel Street & Hickory Street West
(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM

Intersection												
Intersection Delay, s/veh	9											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	23	87	35	33	87	22	28	96	37	33	89	13
Future Vol, veh/h	23	87	35	33	87	22	28	96	37	33	89	13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	9	0	14	4	0	0	0	0
Mvmt Flow	23	87	35	33	87	22	28	96	37	33	89	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	8.8			8.9			9.3			8.9		
HCM LOS	A			A			A			A		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	17%	16%	23%	24%								
Vol Thru, %	60%	60%	61%	66%								
Vol Right, %	23%	24%	15%	10%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	161	145	142	135								
LT Vol	28	23	33	33								
Through Vol	96	87	87	89								
RT Vol	37	35	22	13								
Lane Flow Rate	161	145	142	135								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.218	0.189	0.187	0.179								
Departure Headway (Hd)	4.882	4.681	4.749	4.776								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	733	763	753	748								
Service Time	2.933	2.732	2.801	2.828								
HCM Lane V/C Ratio	0.22	0.19	0.189	0.18								
HCM Control Delay	9.3	8.8	8.9	8.9								
HCM Lane LOS	A	A	A	A								
HCM 95th-tile Q	0.8	0.7	0.7	0.6								

Lanes, Volumes, Timings
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	46	2	1	55	52	13
Future Volume (vph)	46	2	1	55	52	13
Ideal Flow (vphpl)	1765	1900	1900	1650	1650	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.973	
Frt Protected	0.954			0.999		
Satd. Flow (prot)	1661	0	0	1545	1567	0
Frt Permitted	0.954			0.999		
Satd. Flow (perm)	1661	0	0	1545	1567	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	36.6			54.4	83.5	
Travel Time (s)	2.7			4.1	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	8%	4%	2%
Adj. Flow (vph)	50	2	1	60	57	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	0	61	71	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	14.3%
Analysis Period (min)	15
ICU Level of Service	A

HCM 6th TWSC
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	2	1	55	52	13
Future Vol, veh/h	46	2	1	55	52	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	8	4	2
Mvmt Flow	50	2	1	60	57	14

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	126	64	71
Stage 1	64	-	-
Stage 2	62	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	869	1000	1529
Stage 1	959	-	-
Stage 2	961	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	868	1000	1529
Mov Cap-2 Maneuver	868	-	-
Stage 1	958	-	-
Stage 2	961	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBTEBLn1	SBT	SBR
Capacity (veh/h)	1529	-	873	-
HCM Lane V/C Ratio	0.001	-	0.06	-
HCM Control Delay (s)	7.4	0	9.4	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0.2	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	51	49	77	54	85	21	502	84	76	493	34
Future Volume (vph)	28	51	49	77	54	85	21	502	84	76	493	34
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948			0.947			0.981			0.992	
Frt Protected		0.989			0.982			0.998			0.994	
Satd. Flow (prot)	0	1431	0	0	1441	0	0	1509	0	0	1523	0
Frt Permitted		0.989			0.982			0.998			0.994	
Satd. Flow (perm)	0	1431	0	0	1441	0	0	1509	0	0	1523	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		190			319			279			157	
Travel Time (s)		4.3			7.3			6.3			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	0%	4%	0%	0%	6%
Adj. Flow (vph)	28	51	49	77	54	85	21	502	84	76	493	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	128	0	0	216	0	0	607	0	0	603	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	104.0%											
ICU Level of Service	G											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total PM

Intersection												
Int Delay, s/veh	48.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	51	49	77	54	85	21	502	84	76	493	34
Future Vol, veh/h	28	51	49	77	54	85	21	502	84	76	493	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	4	0	0	0	0	0	4	0	0	6
Mvmt Flow	28	51	49	77	54	85	21	502	84	76	493	34

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1318	1290	510	1298
Stage 1	662	662	-	586
Stage 2	656	628	-	712
Critical Hdwy	7.1	6.5	6.24	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.336	3.5
Pot Cap-1 Maneuver	136	165	559	140
Stage 1	454	462	-	500
Stage 2	458	479	-	427
Platoon blocked, %				
Mov Cap-1 Maneuver	74	143	559	83
Mov Cap-2 Maneuver	74	143	-	83
Stage 1	440	412	-	485
Stage 2	333	465	-	304

Approach	EB	WB	NB	SB
HCM Control Delay, s	88.4	291.6	0.3	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1050	-	-	156	149	999	-	-
HCM Lane V/C Ratio	0.02	-	-	0.821	1.45	0.076	-	-
HCM Control Delay (s)	8.5	0	-	88.4	291.6	8.9	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	5.4	14.1	0.2	-	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	31	78	46	32	80	17	36	4	27	19	1	25
Future Volume (vph)	31	78	46	32	80	17	36	4	27	19	1	25
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.982			0.946			0.925	
Frt Protected		0.990			0.988			0.974			0.979	
Satd. Flow (prot)	0	1382	0	0	1482	0	0	1394	0	0	1404	0
Frt Permitted		0.990			0.988			0.974			0.979	
Satd. Flow (perm)	0	1382	0	0	1482	0	0	1394	0	0	1404	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		319			774			278			460	
Travel Time (s)		7.3			17.6			6.3			10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	33%	0%	0%	6%	0%	0%	0%	0%	6%	0%	0%	0%
Adj. Flow (vph)	31	78	46	32	80	17	36	4	27	19	1	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	155	0	0	129	0	0	67	0	0	45	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	26.6%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total PM

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	31	78	46	32	80	17	36	4	27	19	1	25
Future Vol, veh/h	31	78	46	32	80	17	36	4	27	19	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	33	0	0	6	0	0	0	0	6	0	0	0
Mvmt Flow	31	78	46	32	80	17	36	4	27	19	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	124	0	0	329	324	101	332	339	89
Stage 1	-	-	-	-	-	-	163	163	-	153	153	-
Stage 2	-	-	-	-	-	-	166	161	-	179	186	-
Critical Hdwy	4.43	-	-	4.16	-	-	7.1	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.497	-	-	2.254	-	-	3.5	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1323	-	-	1438	-	-	628	597	943	625	586	975
Stage 1	-	-	-	-	-	-	844	767	-	854	775	-
Stage 2	-	-	-	-	-	-	841	769	-	827	750	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1323	-	-	1438	-	-	588	568	943	581	558	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	588	568	-	581	558	-
Stage 1	-	-	-	-	-	-	823	748	-	833	756	-
Stage 2	-	-	-	-	-	-	799	751	-	779	731	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	1.6		1.9		10.8		10.1	
HCM LOS					B		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	691	1323	-	-	1438	-	-	748
HCM Lane V/C Ratio	0.097	0.023	-	-	0.022	-	-	0.06
HCM Control Delay (s)	10.8	7.8	0	-	7.6	0	-	10.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Total PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	25	92	21	27	94	56	19	61	29	18	72	21
Future Volume (vph)	25	92	21	27	94	56	19	61	29	18	72	21
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.957			0.964			0.974	
Frt Protected		0.991			0.992			0.991			0.992	
Satd. Flow (prot)	0	1504	0	0	1471	0	0	1481	0	0	1498	0
Frt Permitted		0.991			0.992			0.991			0.992	
Satd. Flow (perm)	0	1504	0	0	1471	0	0	1481	0	0	1498	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		774			267			282			501	
Travel Time (s)		17.6			6.1			6.4			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	25	92	21	27	94	56	19	61	29	18	72	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	138	0	0	177	0	0	109	0	0	111	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	32.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th AWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Total PM

Intersection												
Intersection Delay, s/veh	8.6											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	92	21	27	94	56	19	61	29	18	72	21
Future Vol, veh/h	25	92	21	27	94	56	19	61	29	18	72	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	92	21	27	94	56	19	61	29	18	72	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	8.6			8.7			8.4			8.5		
HCM LOS	A			A			A			A		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	17%	18%	15%	16%								
Vol Thru, %	56%	67%	53%	65%								
Vol Right, %	27%	15%	32%	19%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	109	138	177	111								
LT Vol	19	25	27	18								
Through Vol	61	92	94	72								
RT Vol	29	21	56	21								
Lane Flow Rate	109	138	177	111								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.14	0.175	0.217	0.144								
Departure Headway (Hd)	4.626	4.562	4.418	4.666								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	773	785	811	767								
Service Time	2.666	2.599	2.453	2.706								
HCM Lane V/C Ratio	0.141	0.176	0.218	0.145								
HCM Control Delay	8.4	8.6	8.7	8.5								
HCM Lane LOS	A	A	A	A								
HCM 95th-tile Q	0.5	0.6	0.8	0.5								

Lanes, Volumes, Timings
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W & 265-267 Hemlock St
2027 Total PM

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	1	1	41	38	39
Future Volume (vph)	25	1	1	41	38	39
Ideal Flow (vphpl)	1765	1900	1900	1650	1650	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.932	
Frt Protected	0.954			0.999		
Satd. Flow (prot)	1643	0	0	1601	1500	0
Frt Permitted	0.954			0.999		
Satd. Flow (perm)	1643	0	0	1601	1500	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			170	278	
Travel Time (s)	2.6			3.9	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	3%	2%
Adj. Flow (vph)	27	1	1	45	41	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	46	83	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 15.1%	ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W & 265-267 Hemlock St
2027 Total PM

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	1	1	41	38	39
Future Vol, veh/h	25	1	1	41	38	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	3	3	2
Mvmt Flow	27	1	1	45	41	42

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	109	62	83
Stage 1	62	-	-
Stage 2	47	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	888	1003	1514
Stage 1	961	-	-
Stage 2	975	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	887	1003	1514
Mov Cap-2 Maneuver	887	-	-
Stage 1	960	-	-
Stage 2	975	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBTEBLn1	SBT	SBR
Capacity (veh/h)	1514	-	891	-
HCM Lane V/C Ratio	0.001	-	0.032	-
HCM Control Delay (s)	7.4	0	9.2	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0.1	-

Appendix F

Signal Warrant Calculation Worksheet



Signal Justification Calculation for Forecasted Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2027 Total
Region/City/Township: Waterloo

Major Street: Albert Street
Minor Street: Hickory Street West

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection?: N
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

Time Period	Major Street Albert Street						Minor Street Hickory Street West						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
	AM Peak Hour	5	426	38	47	403	13	24	28	21	48	24	
PM Peak Hour	21	502	84	76	493	34	28	51	49	77	54	85	
Avg. Hourly Volume	7	232	31	31	224	12	13	20	18	31	20	37	

Warrant	AHV
1A - All	673
1B - Minor	138
2A - Major	536
2B - Cross	74

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	673
					% Fulfilled	93%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	120	170	120	170	138
					% Fulfilled	81%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	536
					% Fulfilled	74%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	74
					% Fulfilled	98%

Signal Justification Calculation for Forecasted Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2027 Total One Way
Region/City/Township: Waterloo

Major Street: Albert Street
Minor Street: Hickory Street West

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection?: N
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results			
150% Satisfied	No	Justification for new intersections with forecast traffic	
120% Satisfied	No	Justification for existing intersections with forecast traffic	

Time Period	Major Street Albert Street						Minor Street Hickory Street West						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	5	426	0	0	418	13	35	0	31	52	24	70	14
PM Peak Hour	21	502	0	0	506	34	42	0	73	82	54	92	25
Avg. Hourly Volume	7	232	0	0	231	12	19	0	26	34	20	41	10

Warrant	AHV
1A - All	620
1B - Minor	139
2A - Major	481
2B - Cross	82

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	620
					% Fulfilled	86%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	120	170	120	170	139
					% Fulfilled	82%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	481
					% Fulfilled	67%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	82
					% Fulfilled	109%

Appendix G

2027 Background Growth and Development Traffic Volumes Westbound One-way Conversion



Appendix H

2027 Background Traffic Operations Reports with One-way Conversion



Lanes, Volumes, Timings
1: Albert Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	35	0	31	37	19	49	5	426	0	0	414	13
Future Volume (vph)	35	0	31	37	19	49	5	426	0	0	414	13
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.937			0.937						0.996	
Flt Protected		0.974			0.983			0.999				
Satd. Flow (prot)	0	1430	0	0	1339	0	0	1550	0	0	1546	0
Flt Permitted		0.974			0.983			0.999				
Satd. Flow (perm)	0	1430	0	0	1339	0	0	1550	0	0	1546	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		102.0			98.8			179.1			128.5	
Travel Time (s)		7.3			7.1			12.9			9.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	25%	0%	0%	20%	9%	0%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	35	0	31	37	19	49	5	426	0	0	414	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	105	0	0	431	0	0	427	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 47.2% ICU Level of Service A
Analysis Period (min) 15

HCM 6th TWSC
1: Albert Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM_WB One-way Scenario

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	35	0	31	37	19	49	5	426	0	0	414	13
Future Vol, veh/h	35	0	31	37	19	49	5	426	0	0	414	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	25	0	0	20	9	0	1	0	0	1	0
Mvmt Flow	35	0	31	37	19	49	5	426	0	0	414	13

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	891	857	421	872
Stage 1	421	421	-	436
Stage 2	470	436	-	436
Critical Hdwy	7.1	6.75	6.2	7.1
Critical Hdwy Stg 1	6.1	5.75	-	6.1
Critical Hdwy Stg 2	6.1	5.75	-	6.1
Follow-up Hdwy	3.5	4.225	3.3	3.5
Pot Cap-1 Maneuver	265	271	637	273
Stage 1	614	551	-	603
Stage 2	578	543	-	603
Platoon blocked, %				
Mov Cap-1 Maneuver	230	269	637	259
Mov Cap-2 Maneuver	230	269	-	259
Stage 1	610	551	-	599
Stage 2	510	540	-	574

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.7	19.1	0.1	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1143	-	-	329	359	1144	-
HCM Lane V/C Ratio	0.004	-	-	0.201	0.292	-	-
HCM Control Delay (s)	8.2	0	-	18.7	19.1	0	-
HCM Lane LOS	A	A	-	C	C	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	1.2	0	-

Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	22	59	7	13	4	0	0	20	49
Future Volume (vph)	0	0	0	22	59	7	13	4	0	0	20	49
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.989						0.904	
Flt Protected					0.988			0.963				
Satd. Flow (prot)	0	1567	0	0	1531	0	0	1164	0	0	1417	0
Flt Permitted					0.988			0.963				
Satd. Flow (perm)	0	1567	0	0	1531	0	0	1164	0	0	1417	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		98.8			236.2			83.5			121.1	
Travel Time (s)		7.4			17.7			6.3			9.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	8%	100%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	22	59	7	13	4	0	0	20	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	88	0	0	17	0	0	69	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.3%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background AM_WB One-way Scenario

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	0	22	59	7	13	4	0	0	20	49
Future Vol, veh/h	0	0	0	22	59	7	13	4	0	0	20	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	10	0	0	0	8	100	0	0	0	0
Mvmt Flow	0	0	0	22	59	7	13	4	0	0	20	49

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	66	0	0	1	0	0	142	111	1	110	108	63
Stage 1	-	-	-	-	-	1	1	-	107	107	-	-
Stage 2	-	-	-	-	-	141	110	-	3	1	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.18	7.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-	-
Critical Hdwy Stg 2	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.572	4.9	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1549	-	-	1635	-	-	814	628	1090	873	786	1007
Stage 1	-	-	-	-	-	1007	734	-	903	811	-	-
Stage 2	-	-	-	-	-	848	649	-	1025	899	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1549	-	-	1635	-	-	751	619	1090	859	775	1007
Mov Cap-2 Maneuver	-	-	-	-	-	-	751	619	-	859	775	-
Stage 1	-	-	-	-	-	1007	734	-	903	800	-	-
Stage 2	-	-	-	-	-	776	640	-	1019	899	-	-

Approach	EB		WB		NB		SB
HCM Control Delay, s	0		1.8		10.2		9.2
HCM LOS					B		A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	715	1549	-	-	1635	-	-	927
HCM Lane V/C Ratio	0.024	-	-	-	0.013	-	-	0.074
HCM Control Delay (s)	10.2	0	-	-	7.2	0	-	9.2
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	33	86	22	49	96	75	33	89	33
Future Volume (vph)	0	0	0	33	86	22	49	96	75	33	89	33
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.979			0.954			0.971	
Flt Protected					0.988			0.989			0.989	
Satd. Flow (prot)	0	1507	0	0	1437	0	0	1410	0	0	1505	0
Flt Permitted					0.988			0.989			0.989	
Satd. Flow (perm)	0	1507	0	0	1437	0	0	1410	0	0	1505	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		236.2			82.0			115.0			145.0	
Travel Time (s)		17.0			5.9			8.3			10.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	4%	0%	0%	9%	0%	14%	4%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	33	86	22	49	96	75	33	89	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	141	0	0	220	0	0	155	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 36.7%
Analysis Period (min) 15

HCM 6th AWSC
3: Hazel Street & Hickory Street West

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Background AM_WB One-way Scenario

Intersection

Intersection Delay, s/veh 8.9
Intersection LOS A

Movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	0	33	86	22	49	96	75	33	89	33
Future Vol, veh/h	0	0	0	33	86	22	49	96	75	33	89	33
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	9	0	14	4	0	0	0	0
Mvmt Flow	0	0	0	33	86	22	49	96	75	33	89	33
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	0	8.8	9.2	8.5
HCM LOS	-	A	A	A

Lane

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	0%	23%	21%
Vol Thru, %	44%	100%	61%	57%
Vol Right, %	34%	0%	16%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	220	0	141	155
LT Vol	49	0	33	33
Through Vol	96	0	86	89
RT Vol	75	0	22	33
Lane Flow Rate	220	0	141	155
Geometry Grp	1	1	1	1
Degree of Util (X)	0.274	0	0.184	0.19
Departure Headway (Hd)	4.491	5.002	4.695	4.403
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	801	0	764	815
Service Time	2.514	3.042	2.724	2.427
HCM Lane V/C Ratio	0.275	0	0.185	0.19
HCM Control Delay	9.2	8	8.8	8.5
HCM Lane LOS	A	N	A	A
HCM 95th-tile Q	1.1	0	0.7	0.7

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	42	0	73	73	52	81	21	502	0	0	493	34
Future Volume (vph)	42	0	73	73	52	81	21	502	0	0	493	34
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.914			0.947						0.991	
Flt Protected		0.982			0.983			0.998				
Satd. Flow (prot)	0	1357	0	0	1443	0	0	1547	0	0	1530	0
Flt Permitted		0.982			0.983			0.998				
Satd. Flow (perm)	0	1357	0	0	1443	0	0	1547	0	0	1530	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		190			319			279			157	
Travel Time (s)		4.3			7.3			6.3			3.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	0%	4%	0%	0%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	42	0	73	73	52	81	21	502	0	0	493	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	0	0	206	0	0	523	0	0	527	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	78.5%											
ICU Level of Service	D											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Intersection												
Int Delay, s/veh	12.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	42	0	73	73	52	81	21	502	0	0	493	34
Future Vol, veh/h	42	0	73	73	52	81	21	502	0	0	493	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	4	0	0	0	0	0	4	0	0	6
Mvmt Flow	42	0	73	73	52	81	21	502	0	0	493	34
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1121	1054	510	1091	1071	502	527	0	0	502	0	0
Stage 1	510	510	-	544	544	-	-	-	-	-	-	-
Stage 2	611	544	-	547	527	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	185	228	559	194	223	573	1050	-	-	1073	-	-
Stage 1	550	541	-	527	522	-	-	-	-	-	-	-
Stage 2	484	522	-	525	532	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	127	222	559	165	217	573	1050	-	-	1073	-	-
Mov Cap-2 Maneuver	127	222	-	165	217	-	-	-	-	-	-	-
Stage 1	535	541	-	512	507	-	-	-	-	-	-	-
Stage 2	363	507	-	456	532	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	31.3		62.9		0.3		0					
HCM LOS	D		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1050	-	-	249	250	1073	-	-				
HCM Lane V/C Ratio	0.02	-	-	0.462	0.824	-	-	-				
HCM Control Delay (s)	8.5	0	-	31.3	62.9	0	-	-				
HCM Lane LOS	A	A	-	D	F	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	2.3	6.5	0	-	-				

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	23	80	17	20	4	0	5	21	14
Future Volume (vph)	0	0	0	23	80	17	20	4	0	5	21	14
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.981						0.953	
Flt Protected					0.991			0.960			0.994	
Satd. Flow (prot)	0	1550	0	0	1490	0	0	1488	0	0	1468	0
Flt Permitted					0.991			0.960			0.994	
Satd. Flow (perm)	0	1550	0	0	1490	0	0	1488	0	0	1468	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		319			774			278			460	
Travel Time (s)		7.3			17.6			6.3			10.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	33%	0%	0%	6%	0%	0%	0%	0%	6%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	23	80	17	20	4	0	5	21	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	120	0	0	24	0	0	40	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 21.9% ICU Level of Service A
Analysis Period (min) 15

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	0	23	80	17	20	4	0	5	21	14
Future Vol, veh/h	0	0	0	23	80	17	20	4	0	5	21	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	33	0	0	6	0	0	0	0	6	0	0	0
Mvmt Flow	0	0	0	23	80	17	20	4	0	5	21	14

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	97	0	0	1
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.43	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.497	-	2.254	-
Pot Cap-1 Maneuver	1323	-	1596	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1323	-	1596	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.4	9.8	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	774	1323	-	-	1596	-	-	825
HCM Lane V/C Ratio	0.031	-	-	-	0.014	-	-	0.048
HCM Control Delay (s)	9.8	0	-	-	7.3	0	-	9.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	27	92	56	28	61	76	18	72	50
Future Volume (vph)	0	0	0	27	92	56	28	61	76	18	72	50
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.957			0.938			0.952	
Flt Protected					0.992			0.992			0.994	
Satd. Flow (prot)	0	1550	0	0	1471	0	0	1442	0	0	1467	0
Flt Permitted					0.992			0.992			0.994	
Satd. Flow (perm)	0	1550	0	0	1471	0	0	1442	0	0	1467	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		774			267			282			501	
Travel Time (s)		17.6			6.1			6.4			11.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	0	27	92	56	28	61	76	18	72	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	175	0	0	165	0	0	140	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary		
Area Type:	Other	
Control Type:	Unsignalized	
Intersection Capacity Utilization	35.5%	ICU Level of Service A
Analysis Period (min)	15	

HCM 6th AWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Background PM_WB One-way Scenario

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	0	27	92	56	28	61	76	18	72	50
Future Vol, veh/h	0	0	0	27	92	56	28	61	76	18	72	50
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	0	27	92	56	28	61	76	18	72	50
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	0	8.6	8.2	8.2
HCM LOS	-	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	0%	15%	13%
Vol Thru, %	37%	100%	53%	51%
Vol Right, %	46%	0%	32%	36%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	0	175	140
LT Vol	28	0	27	18
Through Vol	61	0	92	72
RT Vol	76	0	56	50
Lane Flow Rate	165	0	175	140
Geometry Grp	1	1	1	1
Degree of Util (X)	0.193	0	0.214	0.167
Departure Headway (Hd)	4.213	4.771	4.397	4.291
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	853	0	817	837
Service Time	2.233	2.802	2.419	2.311
HCM Lane V/C Ratio	0.193	0	0.214	0.167
HCM Control Delay	8.2	7.8	8.6	8.2
HCM Lane LOS	A	N	A	A
HCM 95th-tile Q	0.7	0	0.8	0.6

Appendix I

2027 Total Traffic Operations Reports with One-way Conversion



Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	31	52	24	70	5	426	0	0	418	13
Future Volume (vph)	35	0	31	52	24	70	5	426	0	0	418	13
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.937			0.935						0.996		
Frt Protected	0.974			0.983				0.999				
Satd. Flow (prot)	0	1430	0	0	1339	0	0	1550	0	0	1546	0
Frt Permitted	0.974			0.983				0.999				
Satd. Flow (perm)	0	1430	0	0	1339	0	0	1550	0	0	1546	0
Link Speed (k/h)	50			50				50			50	
Link Distance (m)	102.0			98.8				179.1			128.5	
Travel Time (s)	7.3			7.1				12.9			9.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	25%	0%	0%	20%	9%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	35	0	31	52	24	70	5	426	0	0	418	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	146	0	0	431	0	0	431	0
Sign Control	Stop			Stop				Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 50.5%	ICU Level of Service A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total AM_WB One-way Scenario

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	31	52	24	70	5	426	0	0	418	13
Future Vol, veh/h	35	0	31	52	24	70	5	426	0	0	418	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	25	0	0	20	9	0	1	0	0	1	0
Mvmt Flow	35	0	31	52	24	70	5	426	0	0	418	13
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	908	861	425	876	426	431	0	0	426	0	0	
Stage 1	425	425	-	436	436	-	-	-	-	-	-	-
Stage 2	483	436	-	440	431	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.75	6.2	7.1	6.7	6.29	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.75	-	6.1	5.7	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.75	-	6.1	5.7	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.225	3.3	3.5	4.18	3.381	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	258	269	634	272	272	614	1139	-	-	1144	-	-
Stage 1	611	549	-	603	550	-	-	-	-	-	-	-
Stage 2	569	543	-	600	553	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	212	267	634	258	270	614	1139	-	-	1144	-	-
Mov Cap-2 Maneuver	212	267	-	258	270	-	-	-	-	-	-	-
Stage 1	607	549	-	599	547	-	-	-	-	-	-	-
Stage 2	479	540	-	571	553	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	19.8		21.6		0.1		0					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL		NBT	NBR EBLn1WBLn1		SBL	SBT	SBR				
Capacity (veh/h)	1139		-	-	308	361	1144	-	-			
HCM Lane V/C Ratio	0.004		-	-	0.214	0.404	-	-	-			
HCM Control Delay (s)	8.2		0	-	19.8	21.6	0	-	-			
HCM Lane LOS	A		A	-	C	C	A	-	-			
HCM 95th %tile Q(veh)	0		-	-	0.8	1.9	0	-	-			

Lanes, Volumes, Timings (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	25	59	7	53	4	0	0	20	49
Future Volume (vph)	0	0	0	25	59	7	53	4	0	0	20	49
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.990						0.904		
Frt Protected				0.986				0.956				
Satd. Flow (prot)	0	1567	0	0	1530	0	0	1309	0	0	1417	0
Frt Permitted				0.986				0.956				
Satd. Flow (perm)	0	1567	0	0	1530	0	0	1309	0	0	1417	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		98.8			236.2			83.5			121.1	
Travel Time (s)		7.4			17.7			6.3			9.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	10%	0%	0%	0%	8%	100%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	25	59	7	53	4	0	0	20	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	91	0	0	57	0	0	69	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	23.2%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W& 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total AM_WB One-way Scenario

Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔↔↔↔↔↔↔↔↔↔											
Traffic Vol, veh/h	0	0	0	25	59	7	53	4	0	0	20	49
Future Vol, veh/h	0	0	0	25	59	7	53	4	0	0	20	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	10	0	0	0	8	100	0	0	0	0
Mvmt Flow	0	0	0	25	59	7	53	4	0	0	20	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	1	0	0	148	117	1	116	114	63
Stage 1	-	-	-	-	-	-	1	1	-	113	113	-
Stage 2	-	-	-	-	-	-	147	116	-	3	1	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.18	7.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.572	4.9	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1549	-	-	1635	-	-	807	623	1090	865	780	1007
Stage 1	-	-	-	-	-	-	1007	734	-	897	806	-
Stage 2	-	-	-	-	-	-	842	644	-	1025	899	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1549	-	-	1635	-	-	743	613	1090	850	768	1007
Mov Cap-2 Maneuver	-	-	-	-	-	-	743	613	-	850	768	-
Stage 1	-	-	-	-	-	-	1007	734	-	897	793	-
Stage 2	-	-	-	-	-	-	768	634	-	1019	899	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2			10.3			9.2		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	732	1549	-	-	1635	-	-	924
HCM Lane V/C Ratio	0.078	-	-	-	0.015	-	-	0.075
HCM Control Delay (s)	10.3	0	-	-	7.2	0	-	9.2
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings
 3: Hazel Street & Hickory Street West
 (220292) 83-85 Hickory St W& 265-267 Hemlock St
 2027 Total AM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	0	0	33	87	22	50	96	75	33	89	35
Future Volume (vph)	0	0	0	33	87	22	50	96	75	33	89	35
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979			0.954			0.970	
Frt Protected					0.989			0.989			0.990	
Satd. Flow (prot)	0	1507	0	0	1438	0	0	1410	0	0	1505	0
Frt Permitted					0.989			0.989			0.990	
Satd. Flow (perm)	0	1507	0	0	1438	0	0	1410	0	0	1505	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		236.2			82.0			115.0			145.0	
Travel Time (s)		17.0			5.9			8.3			10.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	0%	9%	0%	14%	4%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	33	87	22	50	96	75	33	89	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	142	0	0	221	0	0	157	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	37.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th AWSC
 3: Hazel Street & Hickory Street West
 (220292) 83-85 Hickory St W& 265-267 Hemlock St
 2027 Total AM_WB One-way Scenario

Intersection												
Intersection Delay, s/veh	8.9											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	33	87	22	50	96	75	33	89	35
Future Vol, veh/h	0	0	0	33	87	22	50	96	75	33	89	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	9	0	14	4	0	0	0	0
Mvmt Flow	0	0	0	33	87	22	50	96	75	33	89	35
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	0			8.8			9.2			8.5		
HCM LOS	-			A			A			A		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	23%	0%	23%	21%								
Vol Thru, %	43%	100%	61%	57%								
Vol Right, %	34%	0%	15%	22%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	221	0	142	157								
LT Vol	50	0	33	33								
Through Vol	96	0	87	89								
RT Vol	75	0	22	35								
Lane Flow Rate	221	0	142	157								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.276	0	0.185	0.192								
Departure Headway (Hd)	4.496	5.009	4.7	4.399								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	800	0	763	816								
Service Time	2.52	3.051	2.731	2.424								
HCM Lane V/C Ratio	0.276	0	0.186	0.192								
HCM Control Delay	9.2	8.1	8.8	8.5								
HCM Lane LOS	A	N	A	A								
HCM 95th-tile Q	1.1	0	0.7	0.7								

Lanes, Volumes, Timings
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM_WB One-way Scenario

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	40	8	11	0	0	3
Future Volume (vph)	40	8	11	0	0	3
Ideal Flow (vphpl)	1765	1900	1900	1650	1650	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977				0.865	
Frt Protected	0.960			0.950		
Satd. Flow (prot)	1641	0	0	1554	1415	0
Frt Permitted	0.960			0.950		
Satd. Flow (perm)	1641	0	0	1554	1415	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	36.6			54.4	83.5	
Travel Time (s)	2.7			4.1	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	29%	0%	2%
Adj. Flow (vph)	43	9	12	0	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	0	12	3	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 17.3%	ICU Level of Service A					
Analysis Period (min) 15						

HCM 6th TWSC
4: Hemlock Street & Site Access

(220292) 83-85 Hickory St W& 265-267 Hemlock St
2027 Total AM_WB One-way Scenario

Intersection						
Int Delay, s/veh	8.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	8	11	0	0	3
Future Vol, veh/h	40	8	11	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	29	0	2
Mvmt Flow	43	9	12	0	0	3
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	26	2	3	0	-	0
Stage 1	2	-	-	-	-	-
Stage 2	24	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	989	1082	1619	-	-	-
Stage 1	1021	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	982	1082	1619	-	-	-
Mov Cap-2 Maneuver	982	-	-	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	7.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1619	-	997	-	-	
HCM Lane V/C Ratio	0.007	-	0.052	-	-	
HCM Control Delay (s)	7.2	0	8.8	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total PM_WB One-way Scenario

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	0	73	82	54	92	21	502	0	0	506	34
Future Volume (vph)	42	0	73	82	54	92	21	502	0	0	506	34
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.914				0.946						0.991	
Frt Protected	0.982				0.982				0.998			
Satd. Flow (prot)	0	1357	0	0	1440	0	0	1547	0	0	1530	0
Frt Permitted	0.982				0.982				0.998			
Satd. Flow (perm)	0	1357	0	0	1440	0	0	1547	0	0	1530	0
Link Speed (mph)	30				30				30			
Link Distance (ft)	190				319				279			
Travel Time (s)	4.3				7.3				6.3			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	0%	4%	0%	0%	6%
Adj. Flow (vph)	42	0	73	82	54	92	21	502	0	0	506	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	0	0	228	0	0	523	0	0	540	0
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type: Unsignalized												
Intersection Capacity Utilization 80.6%												
ICU Level of Service D												
Analysis Period (min) 15												

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
1: Albert Street & Hickory Street West 2027 Total PM_WB One-way Scenario

Intersection												
Int Delay, s/veh	16.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	73	82	54	92	21	502	0	0	506	34
Future Vol, veh/h	42	0	73	82	54	92	21	502	0	0	506	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	4	0	0	0	0	0	4	0	0	6
Mvmt Flow	42	0	73	82	54	92	21	502	0	0	506	34
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	1140	1067	523	1104	1084	502	540	0	0	502	0	0
Stage 1	523	523	-	544	544	-	-	-	-	-	-	-
Stage 2	617	544	-	560	540	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.24	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.336	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	180	224	550	190	219	573	1039	-	-	1073	-	-
Stage 1	541	534	-	527	522	-	-	-	-	-	-	-
Stage 2	481	522	-	516	524	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	119	218	550	161	213	573	1039	-	-	1073	-	-
Mov Cap-2 Maneuver	119	218	-	161	213	-	-	-	-	-	-	-
Stage 1	526	534	-	512	507	-	-	-	-	-	-	-
Stage 2	351	507	-	448	524	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	33.7		82		0.3		0					
HCM LOS	D		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1039	-	-	237	247	1073	-	-				
HCM Lane V/C Ratio	0.02	-	-	0.485	0.923	-	-	-				
HCM Control Delay (s)	8.5	0	-	33.7	82	0	-	-				
HCM Lane LOS	A	A	-	D	F	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	2.4	8.1	0	-	-				

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total PM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	32	80	17	42	4	0	5	21	14
Future Volume (vph)	0	0	0	32	80	17	42	4	0	5	21	14
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.982						0.953		
Frt Protected				0.988				0.956			0.994	
Satd. Flow (prot)	0	1550	0	0	1482	0	0	1482	0	0	1468	0
Frt Permitted				0.988				0.956			0.994	
Satd. Flow (perm)	0	1550	0	0	1482	0	0	1482	0	0	1468	0
Link Speed (mph)	30			30				30			30	
Link Distance (ft)	319			774				278			460	
Travel Time (s)	7.3			17.6				6.3			10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	33%	0%	0%	6%	0%	0%	0%	0%	6%	0%	0%	0%
Adj. Flow (vph)	0	0	0	32	80	17	42	4	0	5	21	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	129	0	0	46	0	0	40	0
Sign Control	Free			Free			Stop			Stop		

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	25.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
2: Hemlock Street & Hickory Street West 2027 Total PM_WB One-way Scenario

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	32	80	17	42	4	0	5	21	14
Future Vol, veh/h	0	0	0	32	80	17	42	4	0	5	21	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	33	0	0	6	0	0	0	0	6	0	0	0
Mvmt Flow	0	0	0	32	80	17	42	4	0	5	21	14

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	97	0	0	1	0	171	162	1	156	154	89	
Stage 1	-	-	-	-	-	-	1	1	-	153	153	-
Stage 2	-	-	-	-	-	-	170	161	-	3	1	-
Critical Hdwy	4.43	-	-	4.16	-	-	7.1	6.5	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.497	-	-	2.254	-	-	3.5	4	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	1323	-	-	1596	-	-	797	734	1072	815	741	975
Stage 1	-	-	-	-	-	-	1027	899	-	854	775	-
Stage 2	-	-	-	-	-	-	837	769	-	1025	899	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1323	-	-	1596	-	-	756	719	1072	799	725	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	756	719	-	799	725	-
Stage 1	-	-	-	-	-	-	1027	899	-	854	759	-
Stage 2	-	-	-	-	-	-	785	753	-	1020	899	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	10.1	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	753	1323	-	-	1596	-	-	807
HCM Lane V/C Ratio	0.061	-	-	-	0.02	-	-	0.05
HCM Control Delay (s)	10.1	0	-	-	7.3	0	-	9.7
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Total PM_WB One-way Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	27	96	56	30	61	76	18	72	53
Future Volume (vph)	0	0	0	27	96	56	30	61	76	18	72	53
Ideal Flow (vphpl)	1900	1550	1900	1900	1550	1900	1900	1550	1900	1900	1550	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.958			0.939			0.950	
Frt Protected					0.993			0.991			0.994	
Satd. Flow (prot)	0	1550	0	0	1475	0	0	1442	0	0	1464	0
Frt Permitted					0.993			0.991			0.994	
Satd. Flow (perm)	0	1550	0	0	1475	0	0	1442	0	0	1464	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		774			267			282			501	
Travel Time (s)		17.6			6.1			6.4			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	27	96	56	30	61	76	18	72	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	179	0	0	167	0	0	143	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	36.5%											
ICU Level of Service	A											
Analysis Period (min)	15											

HCM 6th AWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
3: Hazel Street & Hickory Street West 2027 Total PM_WB One-way Scenario

Intersection												
Intersection Delay, s/veh	8.4											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	27	96	56	30	61	76	18	72	53
Future Vol, veh/h	0	0	0	27	96	56	30	61	76	18	72	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	0	27	96	56	30	61	76	18	72	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	0			8.7			8.3			8.2		
HCM LOS	-			A			A			A		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	18%	0%	15%	13%								
Vol Thru, %	37%	100%	54%	50%								
Vol Right, %	46%	0%	31%	37%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	167	0	179	143								
LT Vol	30	0	27	18								
Through Vol	61	0	96	72								
RT Vol	76	0	56	53								
Lane Flow Rate	167	0	179	143								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.196	0	0.219	0.171								
Departure Headway (Hd)	4.232	4.79	4.414	4.295								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	848	0	814	837								
Service Time	2.252	2.821	2.435	2.315								
HCM Lane V/C Ratio	0.197	0	0.22	0.171								
HCM Control Delay	8.3	7.8	8.7	8.2								
HCM Lane LOS	A	N	A	A								
HCM 95th-ile Q	0.7	0	0.8	0.6								

Lanes, Volumes, Timings (220292) 83-85 Hickory St W & 265-267 Hemlock St
4: Hemlock Street & Site Access 2027 Total PM_WB One-way Scenario

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	22	4	32	0	0	9
Future Volume (vph)	22	4	32	0	0	9
Ideal Flow (vphpl)	1765	1900	1900	1650	1650	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981				0.865	
Frt Protected	0.959			0.950		
Satd. Flow (prot)	1628	0	0	1537	1399	0
Frt Permitted	0.959			0.950		
Satd. Flow (perm)	1628	0	0	1537	1399	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			170	278	
Travel Time (s)	2.6			3.9	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	4%	2%
Adj. Flow (vph)	24	4	35	0	0	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	35	10	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 18.4%				ICU Level of Service A		
Analysis Period (min) 15						

HCM 6th TWSC (220292) 83-85 Hickory St W & 265-267 Hemlock St
4: Hemlock Street & Site Access 2027 Total PM_WB One-way Scenario

Intersection						
Int Delay, s/veh	7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	4	32	0	0	9
Future Vol, veh/h	22	4	32	0	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	0	4	2
Mvmt Flow	24	4	35	0	0	10
Major/Minor						
Minor2	Major1		Major2			
Conflicting Flow All	75	5	10	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	70	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	928	1078	1610	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	953	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	908	1078	1610	-	-	-
Mov Cap-2 Maneuver	908	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	953	-	-	-	-	-
Approach						
EB	NB		SB			
HCM Control Delay, s	9	7.3	0			
HCM LOS	A					
Minor Lane/Major Mvmt						
NBL	NBTEBLn1	SBT	SBR			
Capacity (veh/h)	1610	-	931	-	-	-
HCM Lane V/C Ratio	0.022	-	0.03	-	-	-
HCM Control Delay (s)	7.3	0	9	-	-	-
HCM Lane LOS	A	A	A	-	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	-