



410 Sunset Drive Multi-Residential Proposal

Transportation Impact Study

Municipality of Central Elgin

Prepared for:
Quincy Developments

July 2022

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1 Introduction

This Transportation Impact Study ("TIS") has been prepared in support of planning applications to permit the development of a multi-residential proposal at the northwest corner of Sunset Drive and Karen Street in the Municipality of Central Elgin. This study was undertaken as a submission requirement in accordance with pre-submission consultation with Central Elgin and Elgin County staff and is based on a proposed site plan prepared by Edge Architects. The scope of the TIS was discussed and agreed upon with staff.

The site currently includes an office building on the northern portion of the lands with access to Karen Street. At present there are no tenants in the office building. The proposal is to develop the site in two phases with an initial four-storey apartment building on the vacant southerly portion of the lands. The second phase would include removal of the existing office building to be replaced by a second six-storey building. Phase one of the project would access the road network using the existing driveway connection. Phase two proposes the addition of a secondary access point directly to Sunset Drive.

The primary purpose of this study is to assess the impact of the proposal on the transportation network in the area and identify any improvements that are needed to support the proposal. The study area includes the Karen Street intersection with Sunset Drive along with the two site driveways. The existing site driveway is located opposite the inbound access to the Elgin County municipal offices. The configuration of the municipal access is a wide curb cut with separate inbound and outbound drive aisles separated by the length of two parking spaces. For the purposes of this study, it has been modelled as a standard intersection connection directly opposite the existing site driveway.

It is the finding of this study that the proposal will generate about 64 and 78 trips in the weekday morning and afternoon peak hours, respectively. A short northbound left turn lane is recommended at the Sunset/Karen intersection; with this improvement, site traffic can be accommodated at the study area intersections. Additionally, the proposed parking provision of 1.25 spaces per residential unit and one (1) space for every 36 s.m. of office space is adequate to accommodate parking demand on the site.



2 Proposal and Site Transportation Context

The subject site is located on the west side of Sunset Drive north of Karen Street just south of the City of St. Thomas. There is currently an office building on the site with a driveway connection to Karen Street although the office building is not occupied.

The proposal includes two buildings; the phase one building is four-storeys with 105 residential apartment units and the phase two building is six-storeys with 72 residential apartment units. The existing office building would remain in phase one but would be removed in phase two. The use of the office building in phase one is unknown. If an appropriate tenant is found, it may be leased in the future. However, there is also the opportunity to use the office building as a staging area for the construction of the phase one building, so it may not include office uses.

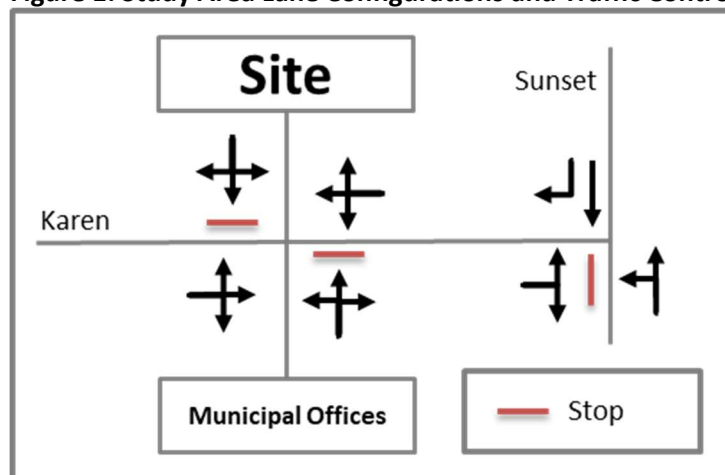
A site location plan and the proposed site plan (including both phases) are included with the figures in Appendix A.

Access to the site is proposed to remain in the current location on Karen Street, with a secondary access connecting directly to Sunset Drive in the second phase of development.

Sunset Drive in the vicinity of the site is a two-lane County road with a posted speed limit of 60 kph and bicycle lanes in both directions. Karen Street is a two-lane municipal road with a posted speed limit of 40 kph. There are no sidewalks on either Karen Street or Sunset Drive.

The Sunset/Karen intersection is stop controlled on the Karen Street approach and there is a short auxiliary right turn lane in the southbound direction on Sunset Drive. The existing driveway connection to Karen Street is stop controlled on both the site driveway approach and on the exit from the municipal parking lot. A figure illustrating the lane configurations and the traffic control in the study area is included below.

Figure 1: Study Area Lane Configurations and Traffic Control



3 Existing Traffic

3.1 Existing Traffic Volumes

Traffic analysis for this assessment is focussed on the weekday morning and afternoon peak hours because these are expected to be the highest generating hours of the proposed development and area traffic. Staff asked that we collect base traffic data on a Friday after the May long weekend as the Sunset Drive corridor is known to have higher summer seasonal traffic. Accordingly, existing traffic count data was collected at the two study area intersections on Friday, June 10th, 2022. Traffic count data was collected from 7 to 9 AM, 11 AM to 2 PM, and 3 PM to 6 PM.

Existing traffic volumes in the study area in the weekday morning and afternoon peak hours are illustrated in the figures attached in Appendix A.

Analysis of the intersection operations at the two existing study area intersections was undertaken using Synchro 11 software. Generally, the default parameters in Synchro were used, including a peak hour factor of 0.92. The results are summarized in Table 1 below. The Synchro analysis worksheets are attached in Appendix B.

Table 1: Existing Traffic Operations

Peak Hour	Intersection	Control Type	Measure of Effectiveness	Direction/Movement/Approach					
				EB	WB	NB	SBT	SBR	SB
AM Peak Hour	Sunset @ Karen	2-way stop	Level of Service	B	-	A	A	A	-
			Delay (s)	13.7	-	0.9	-	-	-
			Volume/Capacity	0.08	-	0.03	0.15	0.03	-
			Q (m) 95 th percentile	2.0	-	0.6	-	-	-
			Available	-	-	-	-	10	-
	Karen @ Site Driveway/ Municipal Driveway	2-way stop	Level of Service	-	A	A	-	-	A
			Delay (s)	-	6.7	8.6	-	-	-
			Volume/Capacity	-	0.05	0.01	-	-	-
			Q (m) 95 th percentile	-	1.2	0.3	-	-	-
			Available	-	-	-	-	-	-
PM Peak Hour	Sunset @ Karen	2-way stop	Level of Service	C	-	A	A	A	-
			Delay (s)	19.8	-	0.1	-	-	-
			Volume/Capacity	0.26	-	-	0.32	0.01	-
			Q (m) 95 th percentile	7.7	-	0.1	-	-	-
			Available	-	-	-	-	10	-
	Karen @ Site Driveway/ Municipal Driveway	2-way stop	Level of Service	A	A	A	-	-	A
			Delay (s)	-	1.4	8.6	-	-	9.5
			Volume/Capacity	-	-	0.06	-	-	-
			Q (m) 95 th percentile	-	0.1	1.6	-	-	-
			Available	-	-	-	-	-	-

The three study area intersections are currently operating at acceptable levels with levels of service C or better on all approaches.



4 Background Traffic

Three future horizon years were chosen for this study:

- 2024 representing the earliest potential build-out of phase one
- 2025 representing the earliest potential build-out of phase two
- 2030 representing five years beyond completion of phase two.

4.1 Background Traffic Forecasts

Background traffic for this study was estimated by including a background growth rate for traffic in the study area. A compounded background growth rate of two (2) percent per year over the three study horizons was applied to estimate background traffic growth related to development outside the study area and general growth in the region. The resulting percentage increase in traffic relative to existing volumes is four percent in 2024, six percent in 2025 and 17 percent in 2030.

Future background traffic volumes in the weekday morning and afternoon peak hours for all three future horizon years are illustrated in the figures attached in Appendix A.

4.2 Background Traffic Assessment

Analysis of the intersection operations at the two existing study area intersections was undertaken for future background traffic conditions. The results are summarized in the tables below. The Synchro analysis worksheets are attached in Appendix C.

Table 2: Future Background Traffic Operations – Sunset/Karen Intersection

Horizon Year	Measure of Effectiveness		AM Peak Hour				PM Peak Hour			
			Direction/Movement/Approach							
			EB	NB	SBT	SBR	EB	NB	SBT	SBR
2024	Level of Service		B	A	-	-	C	A	-	-
	Delay (s)		14.1	0.9	-	-	21.0	0.1	-	-
	Volume/Capacity		0.09	0.03	-	-	0.28	-	-	-
	Q (m)	95 th percentile	2.1	0.6	-	-	8.6	0.1	-	-
		Available	-	-	-	10	-	-	-	10
2025	Level of Service		B	A	-	-	C	A	-	-
	Delay (s)		14.2	0.9	-	-	21.6	0.1	-	-
	Volume/Capacity		0.09	0.03	-	-	0.29	-	-	-
	Q (m)	95 th percentile	2.2	0.6	-	-	9.1	0.1	-	-
		Available	-	-	-	10	-	-	-	10
2030	Level of Service		C	A	-	-	D	A	-	-
	Delay (s)		15.4	0.9	-	-	26.3	0.2	-	-
	Volume/Capacity		0.11	0.03	-	-	0.37	0.01	-	-
	Q (m)	95 th percentile	2.7	0.7	-	-	12.5	0.1	-	-
		Available	-	-	-	10	-	-	-	10



Table 3: Future Background Traffic Operations – Karen/Driveways Intersection

Horizon Year	Measure of Effectiveness	AM Peak Hour				PM Peak Hour			
		Direction/Movement/Approach							
		EB	WB	NB	SB	EB	WB	NB	SB
2024	Level of Service	-	A	A	A	-	A	A	A
	Delay (s)	-	6.8	8.6	-	-	1.3	8.6	9.5
	Volume/Capacity	-	0.05	0.01	-	-	-	0.07	-
	95 th percentile Q (m)	-	1.2	0.3	-	-	0.1	1.6	-
2025	Level of Service	-	A	A	A	-	A	A	A
	Delay (s)	-	6.8	8.6	-	-	1.3	8.7	9.5
	Volume/Capacity	-	0.05	0.01	-	-	-	0.07	-
	95 th percentile Q (m)	-	1.3	0.3	-	-	0.1	1.7	-
2030	Level of Service	-	A	A	A	-	A	A	A
	Delay (s)	-	6.8	8.6	-	-	1.6	8.7	9.7
	Volume/Capacity	-	0.06	0.01	-	-	-	0.07	-
	95 th percentile Q (m)	-	1.4	0.3	-	-	0.1	1.8	-

The three study area intersections are expected to continue operating at acceptable levels under future background traffic conditions with level of service D or better on all movements. Traffic volumes through the Sunset/Karen intersection will meet the warrant criteria for a short northbound left turn lane in the weekday morning peak hour under future background traffic conditions. The potential for a northbound left turn lane at the intersection is explored in more detail later in this report.



5 Site Traffic

The amount of traffic generated by the proposal was estimated based on information in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

The Multifamily Housing (Mid-Rise) category was chosen to best represent the residential apartment uses. The traffic generation estimates for the site in both phases are summarized in the table below. Excerpts from the ITE Trip Generation Manual are included in Appendix D.

Table 4: Site Traffic Generation Estimates

Land Use	Description	Units	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing Mid-Rise (ITE code 221)	Rate trips/unit	-	0.09	0.27	0.36	0.27	0.17	0.44
	P1 Trips	105	10	28	38	28	18	46
	P2 Trips	72	7	19	26	19	12	32
	Total Trips	177	17	47	64	48	30	78

The site is estimated to generate 64 and 78 trips measured in both directions in the weekday morning and afternoon peak hours, respectively, when the site is fully built-out. The estimated traffic from the site was distributed according to local traffic patterns on Sunset Drive as follows:

- 43% southbound and 57% northbound in the morning peak hour
- 54% southbound and 46% northbound in the afternoon peak hour

Site traffic is illustrated in the attached figures in Appendix A.



6 Future Total Traffic

Future total traffic was determined by adding site traffic to future background traffic for all three future scenarios. Phase one site traffic was added to the 2024 horizon year and full build-out site traffic was added to both the 2025 and 2030 horizon years. In addition, in the 2025 and 2030 horizon years, the limited existing traffic from the site was removed. The future total traffic volumes for the two study peak hours and all three future scenarios are illustrated in the figures in Appendix A.

6.1 Auxiliary Turn Lane Assessment

Turn lanes can be provided at intersections to minimize delay to through traffic and to provide additional capacity where they are needed.

Typically, in locations like Central Elgin, right turn lanes are considered when peak hour right turn volumes reach about 60 vehicles in one or both peak hours. The short southbound right turn lane at the Sunset/Karen intersection accommodates the 51 current southbound right turns in the weekday morning peak hour, which is expected to increase up to 62 vehicles under future total 2030 traffic conditions. Southbound right turn volumes in the weekday afternoon peak hour are less – 21 vehicles under existing conditions increasing to 37 and then 31 vehicles under future total 2024 and 2030 conditions. The short right turn lane is appropriate for the intersection.

Elsewhere in the study area, right turn volumes are not expected to reach levels where a right turn lane would be considered.

The need for a left turn lane is typically assessed using information from the Ministry of Transportation (MTO) Design Supplement to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. The assessment is based on the design speed of the road, the percent left turns in the stream of traffic and the traffic volumes at the intersection.

Both through traffic on Karen Street and turning traffic at the site and municipal driveways are expected to be low and left turn lanes will not be warranted. At the site driveway connection to Sunset Drive, the northbound left turning volume is expected to be less than one (1) percent in all future scenarios and a left turn lane will not be warranted in that location.

An assessment was undertaken to determine whether or not a northbound left turn lane will be warranted from Sunset Drive onto Karen Street.

A design speed of 70 kph was chosen for Sunset Drive given the posted speed of 60 kph. In the morning peak hour, the northbound left turn volume to Karen Street is expected to be just under ten percent of the northbound traffic. In the afternoon peak hour, the northbound left turn volume to Karen Street is expected to be about five percent of the northbound traffic. Traffic volumes advancing with and opposing the left turns were plotted on the chosen nomograph as illustrated in the following figures. Three figures have been included: one reflecting future background morning peak hour traffic, a second reflecting future total morning peak hour traffic, and a third reflecting future total afternoon peak hour traffic.

The assessment indicates that a short (15 metre) left turn lane will be warranted northbound on Sunset Drive at Karen Street.



The warrant for a northbound left turn lane at the intersection is largely driven in the morning peak hour by existing traffic presumably accessing the municipal offices as the warrant criteria are met under future background traffic conditions. In the afternoon peak hour, the warrant is largely driven by the proposed residential traffic, as the warrant is only met under future total traffic conditions.

Figure 2: AM Future Background Northbound Left Turn Lane Warrant - Sunset/Karen

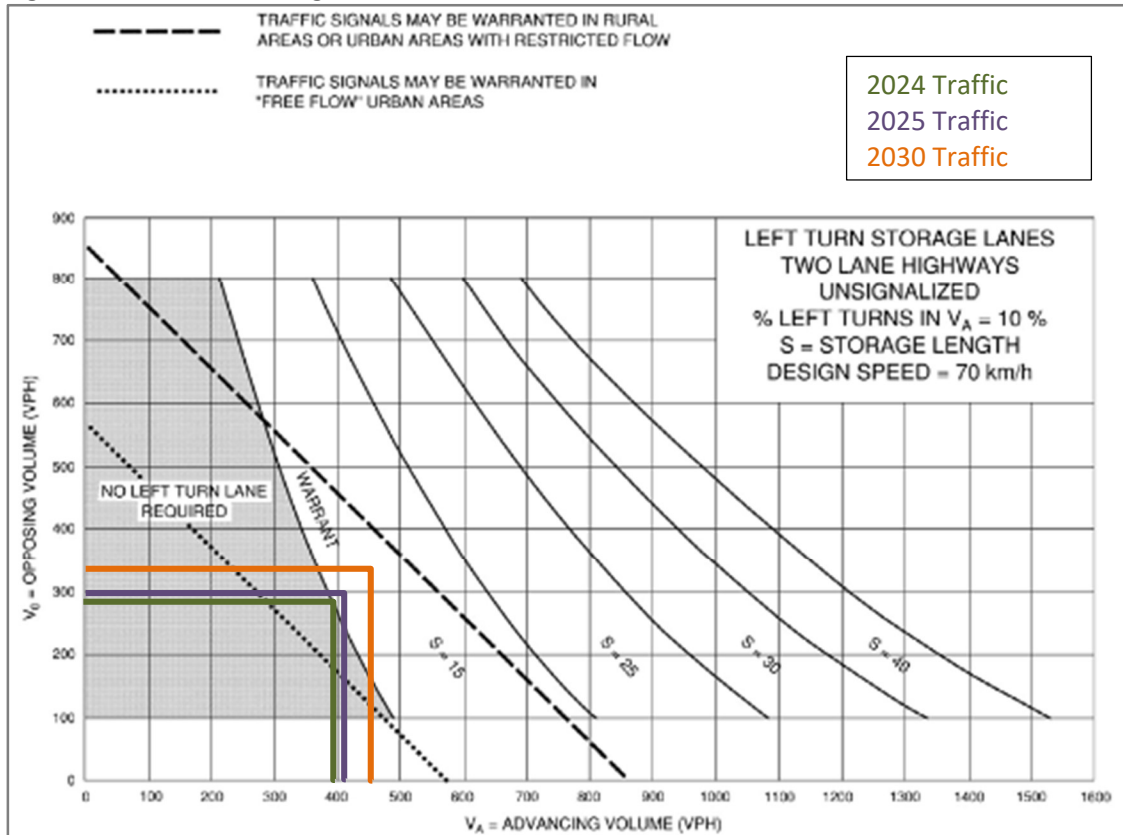


Figure 3: AM Future Total Northbound Left Turn Lane Warrant - Sunset/Karen

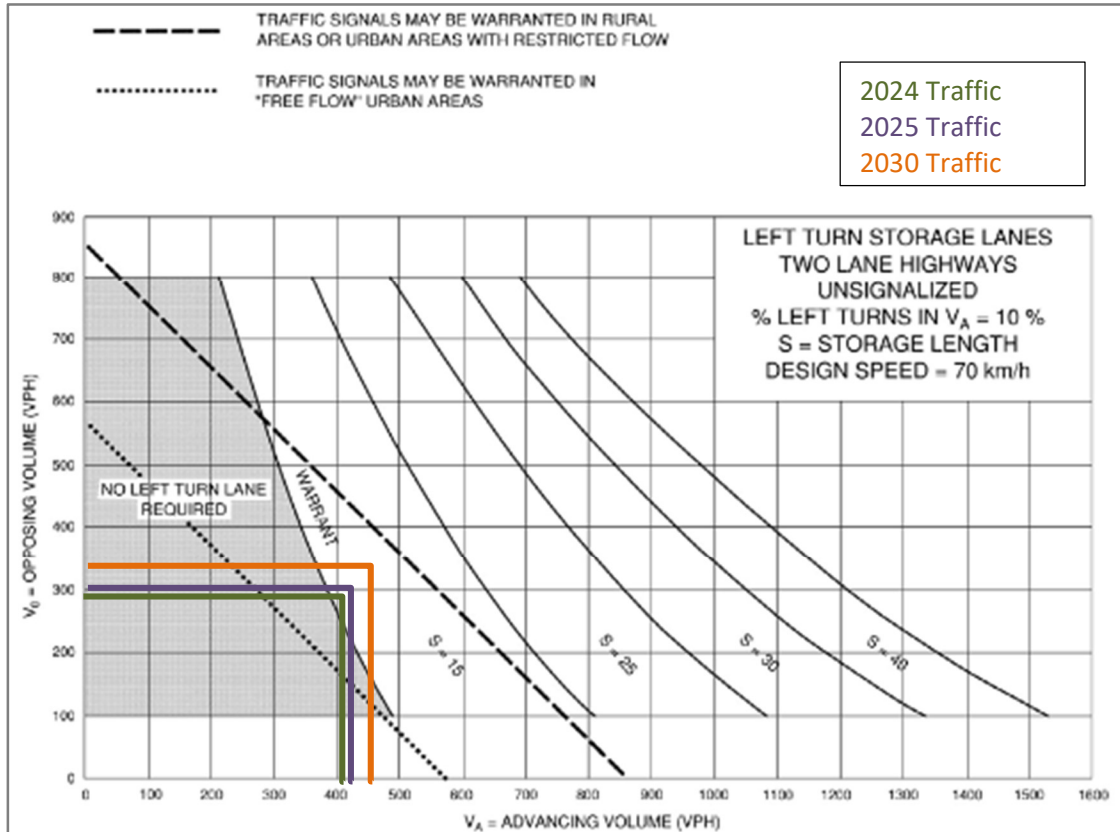
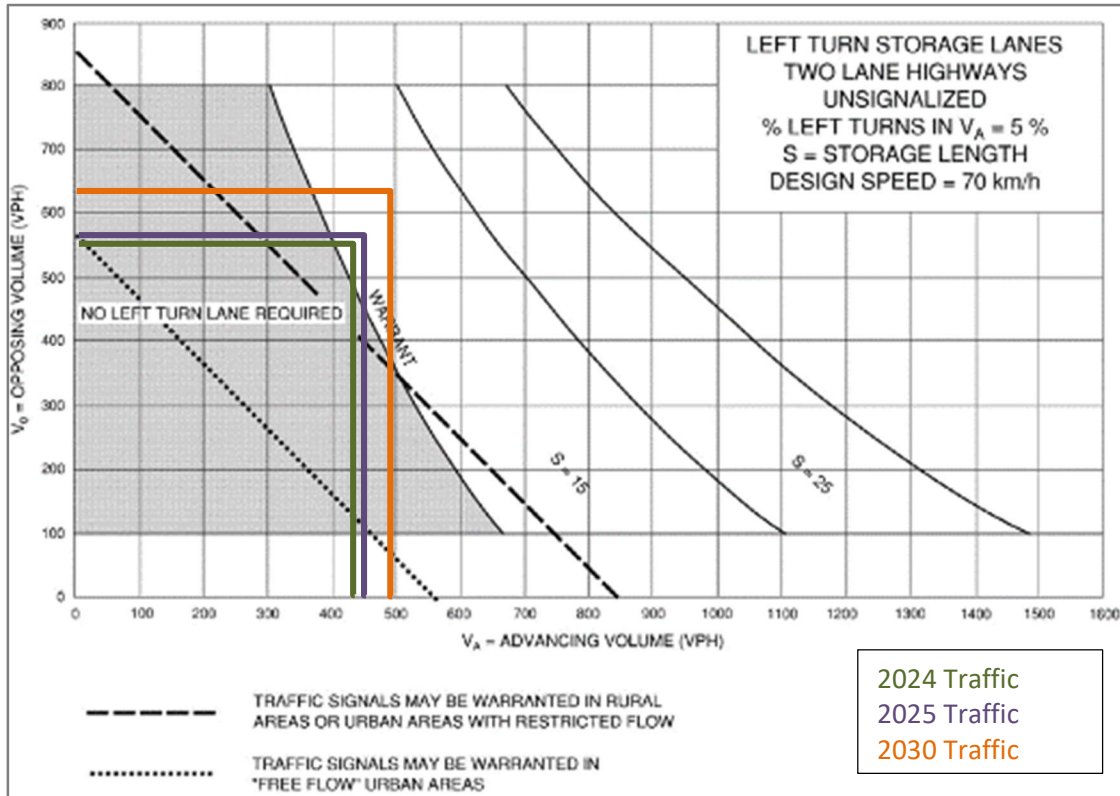


Figure 4: PM Future Total Northbound Left Turn Lane Warrant - Sunset/Karen



6.2 Traffic Operations Assessment

A traffic operations assessment was undertaken for the new driveway connection to Sunset Drive (in 2025 and 2030) along with the existing study area intersections in both the weekday morning and afternoon peak hours for all three future total traffic scenarios. The Sunset/Karen intersection was modelled with an auxiliary northbound left turn lane with 15 metres of storage. The results of the analysis are summarized in the tables below and the detailed worksheets are included in Appendix E.

Table 5: Future Total Traffic Operations – Sunset/Karen Intersection

Horizon Year	Measure of Effectiveness		AM Peak Hour				PM Peak Hour			
			Direction/Movement/Approach							
			EB	NBL	SBT	SBR	EB	NBL	SBT	SBR
2024	Level of Service		B	A	-	-	C	A	-	-
	Delay (s)		14.6	8.0	-	-	22.7	8.7	-	-
	Volume/Capacity		0.15	0.03	-	-	0.35	0.02	-	-
	Q (m)	95 th percentile	4.1	0.7	-	-	11.4	0.4	-	-
		Available	-	-	-	10	-	-	-	10
2025	Level of Service		B	A	-	-	C	A	-	-
	Delay (s)		14.1	8.0	-	-	23.5	8.8	-	-
	Volume/Capacity		0.13	0.03	-	-	0.35	0.02	-	-
	Q (m)	95 th percentile	3.5	0.8	-	-	11.8	0.6	-	-
		Available	-	-	-	10	-	-	-	10
2030	Level of Service		C	A	-	-	D	A	-	-
	Delay (s)		15.3	8.2	-	-	29.5	9.0	-	-
	Volume/Capacity		0.16	0.04	-	-	0.45	0.02	-	-
	Q (m)	95 th percentile	4.3	0.9	-	-	16.5	0.6	-	-
		Available	-	-	-	10	-	-	-	10

Table 6: Future Total Traffic Operations – Karen/Driveways Intersection

Horizon Year	Measure of Effectiveness	AM Peak Hour				PM Peak Hour			
		Direction/Movement/Approach							
		EB	WB	NB	SB	EB	WB	NB	SB
2024	Level of Service	-	A	A	B	-	A	A	A
	Delay (s)	-	6.1	8.6	10.3	-	0.6	8.6	9.7
	Volume/Capacity	-	0.05	0.01	0.04	-	-	0.07	0.03
	95 th percentile Q (m)	-	1.2	0.3	1.0	-	0.1	1.6	0.6
2025	Level of Service	-	A	A	B	-	A	A	A
	Delay (s)	-	6.1	8.5	10.3	-	0.7	8.7	9.7
	Volume/Capacity	-	0.05	0.01	0.03	-	-	0.07	0.02
	95 th percentile Q (m)	-	1.3	0.3	0.8	-	0.1	1.7	0.5
2030	Level of Service	-	A	A	B	-	A	A	A
	Delay (s)	-	6.2	8.5	10.5	-	0.9	8.7	9.9
	Volume/Capacity	-	0.06	0.01	0.04	-	-	0.07	0.02
	95 th percentile Q (m)	-	1.4	0.3	0.8	-	0.1	1.8	0.5



Table 7: Future Total Traffic Operations – Sunset/Site Driveway

Horizon Year	Measure of Effectiveness	AM Peak Hour			PM Peak Hour		
		Direction/Movement/Approach					
		EB	NB	SB	EB	NB	SB
2025	Level of Service	B	A	-	C	A	-
	Delay (s)	14.6	0.1	-	20.0	0.1	-
	Volume/Capacity	0.07	-	-	0.06	0.01	-
	95 th percentile Q (m)	1.6	-	-	1.4	0.1	-
2030	Level of Service	C	A	-	C	A	-
	Delay (s)	15.7	0.1	-	22.6	0.2	-
	Volume/Capacity	0.07	-	-	0.07	0.01	-
	95 th percentile Q (m)	1.8	-	-	1.7	0.1	-

The three study area intersections are expected to operate at acceptable levels under future total traffic conditions with level of service D or better on all movements. The analysis indicates that no eastbound queues are expected at the site driveway intersection with Karen Street, so there are no concerns with eastbound traffic queuing back to block the rail line.



7 Transportation Demand Management and Parking

The site is located in an area where the predominant mode of travel is by car. Sidewalks are generally not available on the roads nearby, but there are well-used bicycle lanes on Sunset Drive, so travel by bicycle is attractive. At this time, public transit services are not available in this area.

The proposed site plan incorporates a number of transportation demand management (TDM) elements to encourage travel by modes other than by single occupant vehicle. The proposed TDM measures include the following:

- Good pedestrian infrastructure within the site is provided that connects the various elements of the site and incorporates a direct link toward the municipal offices across Karen Street.
- Short term bicycle parking for visitors will be provided near the doors to the two buildings. Nine short term bicycle parking spaces have been identified for each building.
- Longer term, secure bicycle parking will be provided in an exterior, weather protected structure between the two buildings. If there is a greater demand for secure bicycle parking for residents, there are several locations throughout the site where additional bicycle parking can be provided.
- Parking for the buildings will be unbundled from the units and will be rented/sold at an additional cost to residents.
- The owners are exploring the potential to provide car share on the site.

The Municipality of Central Elgin does not have a required minimum parking standard for residential apartment uses. The proposal includes for residential parking at a rate of 1.25 spaces per residential unit and one (1) space for every 36 s.m. for the office uses. It is anticipated that most of the residents of the building will own one car, so the provision of 1.25 spaces per unit allows for additional spaces for visitors.



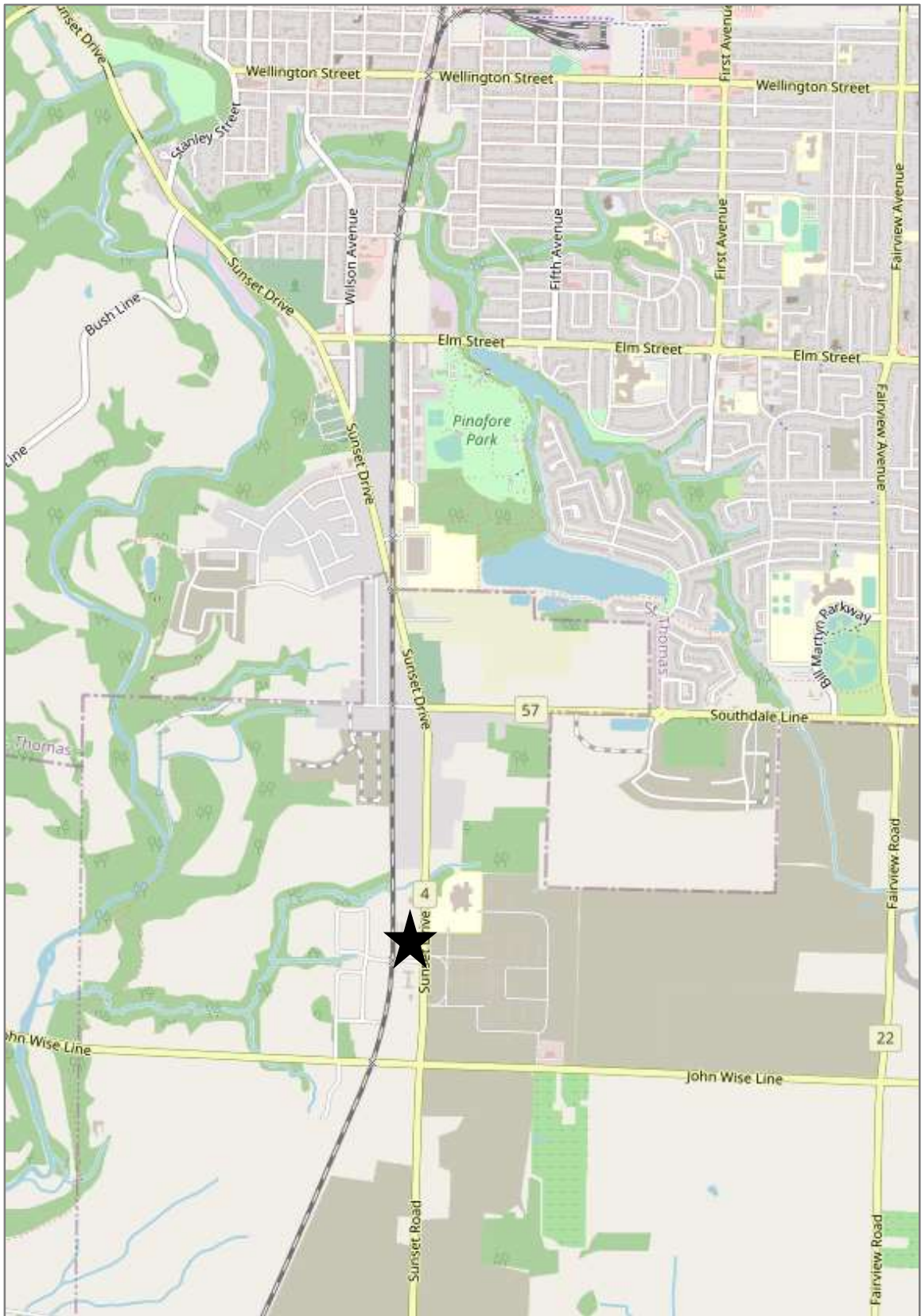
8 Conclusions and Recommendations

This Transportation Impact Study has been undertaken in accordance with requirements agreed to with staff in order to understand the transportation context and infrastructure required to support the proposed multi-residential project at 410 Sunset Drive in Central Elgin. The conclusions and recommendations of this study are as follows:

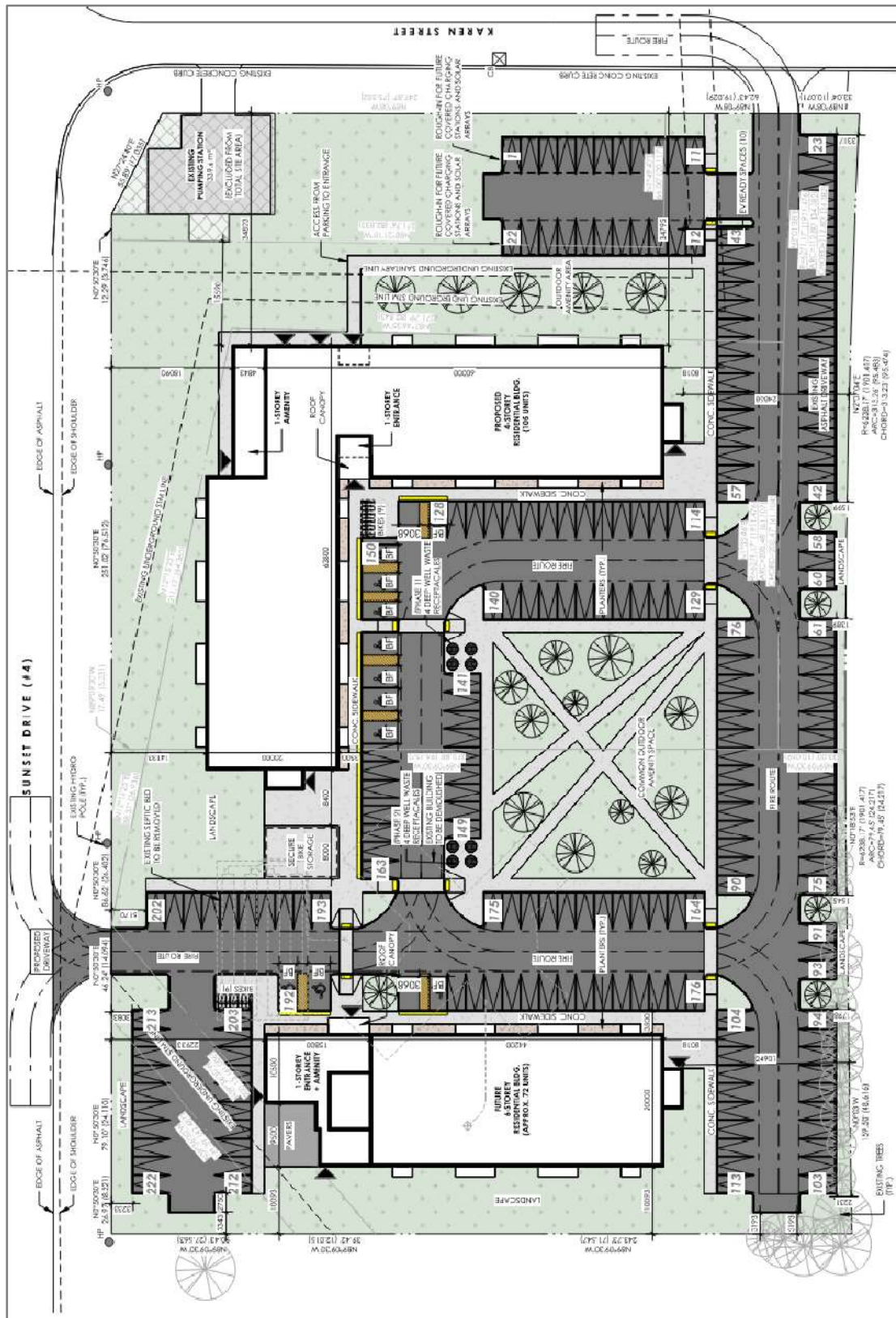
- The site is planned to develop in two phases. The first phase building would be constructed on the vacant part of the site and the office building will be retained. The second phase building would replace the existing office building.
- The site is estimated to generate 64 and 78 vehicle trips in each of the weekday morning and afternoon peak hours, respectively, when the site is fully built-out.
- The two site driveways are anticipated to operate at acceptable levels under all future total scenarios in both the weekday morning and afternoon peak hours.
- The future traffic volumes at the Sunset/Karen intersection warrant the installation of a short (15 metre) northbound left turn lane.
- The Sunset/Karen intersection is forecast to operate at acceptable levels in future with the addition of the northbound left turn lane.
- The proposal can be accommodated on the area transportation network with the addition of the northbound left turn lane at the Sunset/Karen intersection.
- A number of transportation demand management measures have been incorporated in the site design to encourage travel by modes other than by single occupant vehicle.
- Parking for the proposal is proposed at a rate of 1.25 spaces per unit for the residential uses and one space for every 36 s.m. of office uses.



Appendix A: Figures



Site Location Plan
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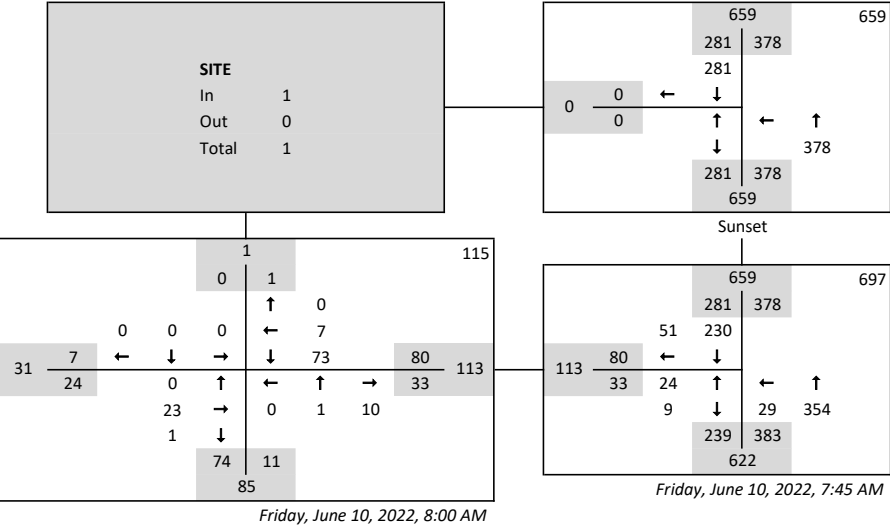


Proposed Site Plan

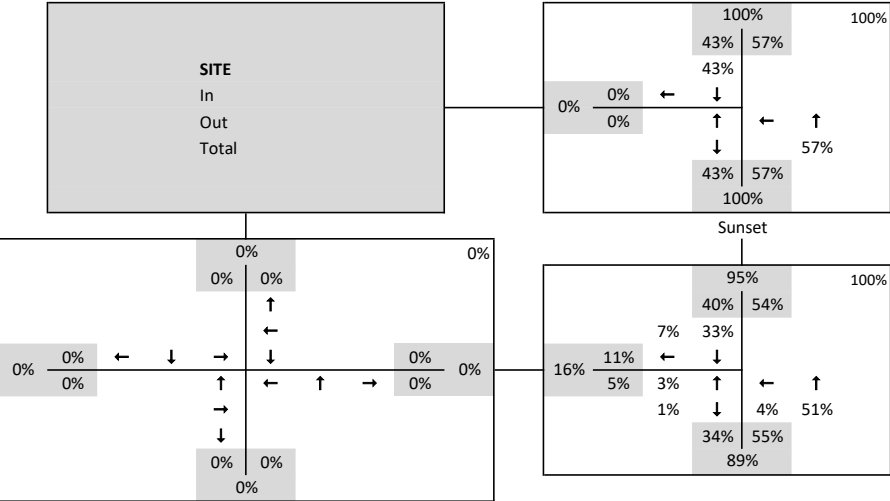
Source: Edge Architects

410 Sunset Drive, Central Elgin
Traffic Volume Diagrams

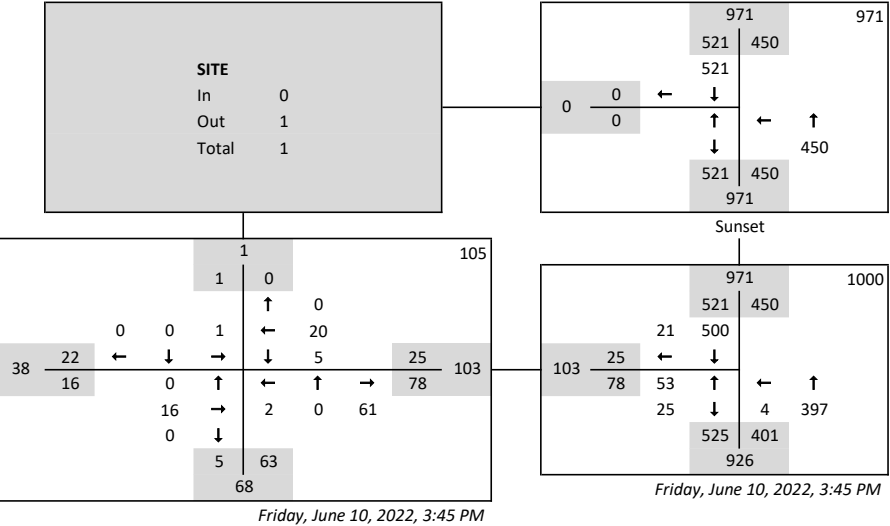
AM Peak Hour
Existing Traffic



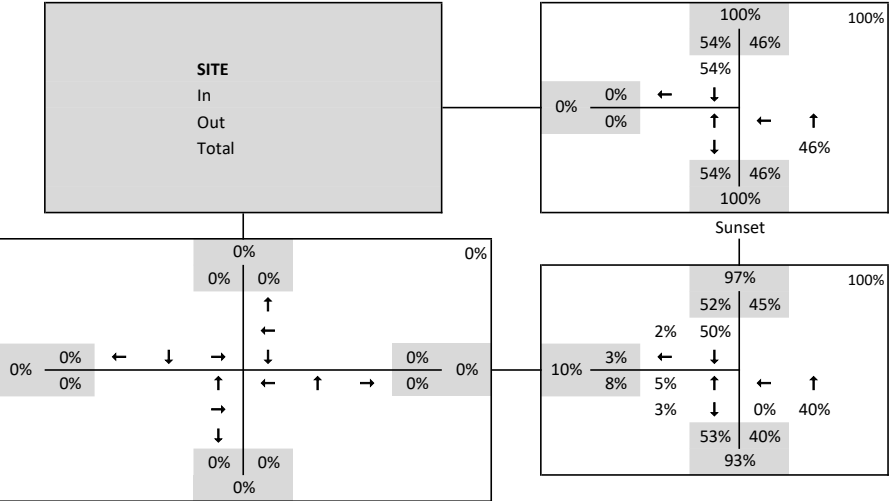
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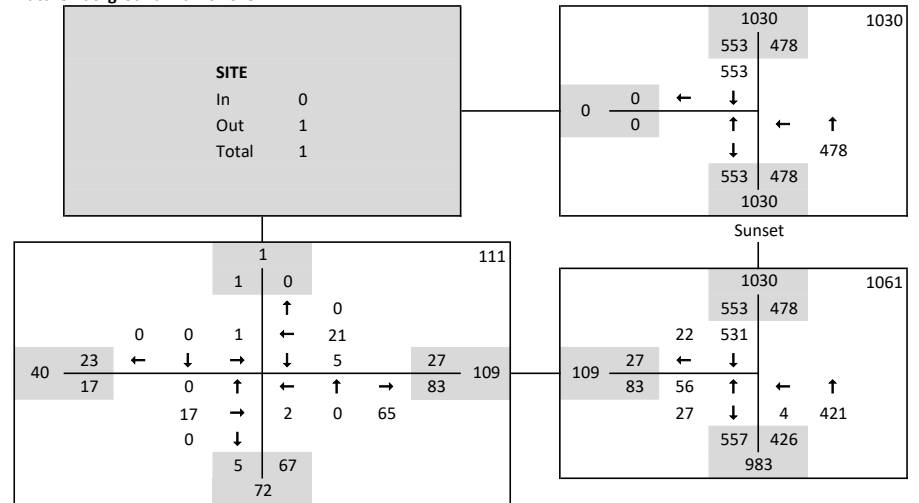
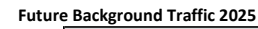
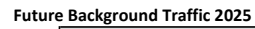
PM Peak Hour
Existing Traffic



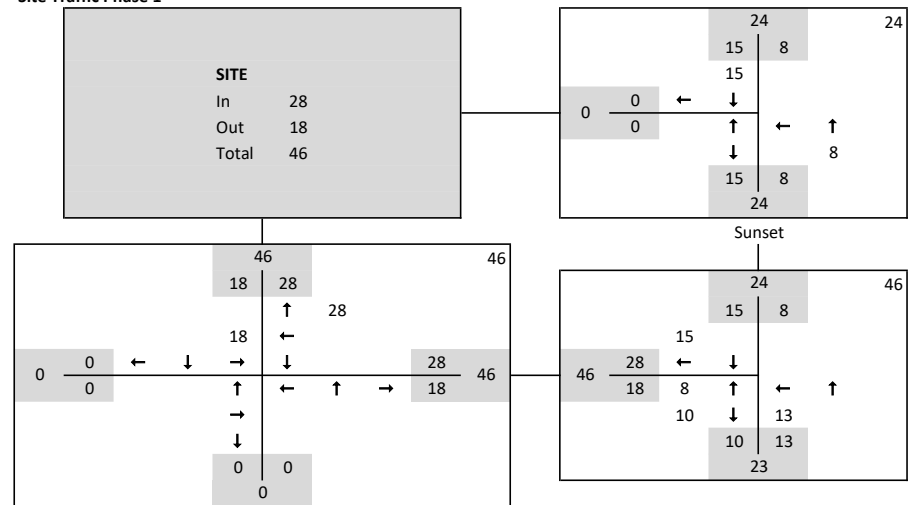
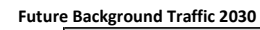
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Future Background Traffic 2024

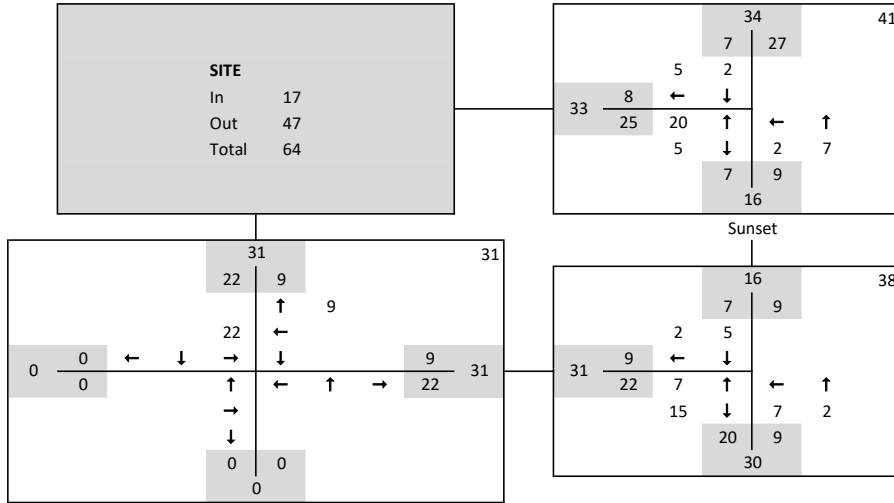


Future Background Traffic 2030

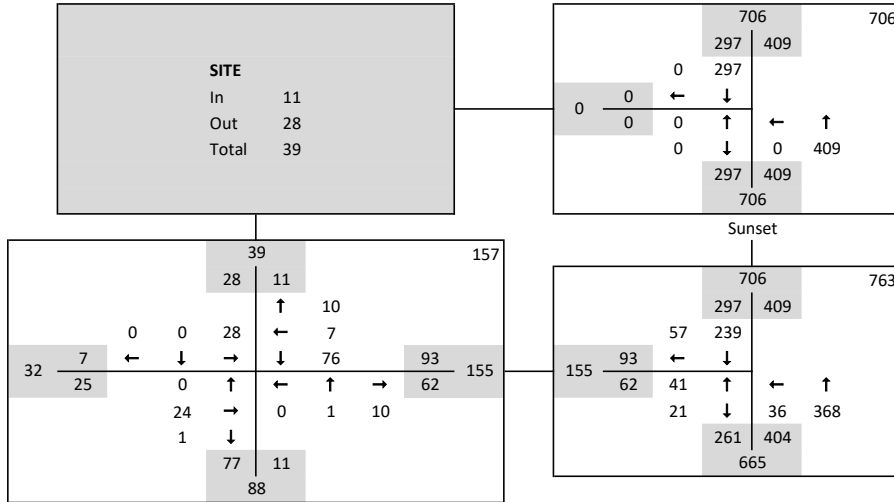


AM Peak Hour

Site Traffic Full Build-Out

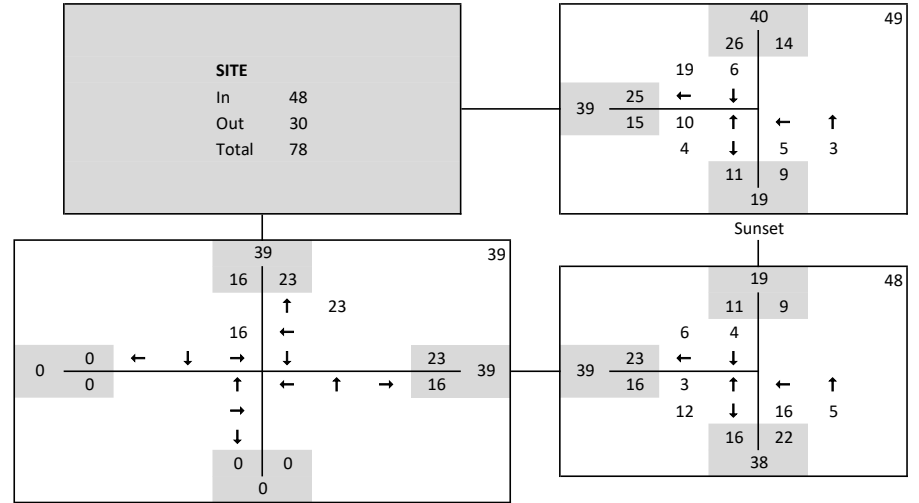


Future Total Traffic 2024

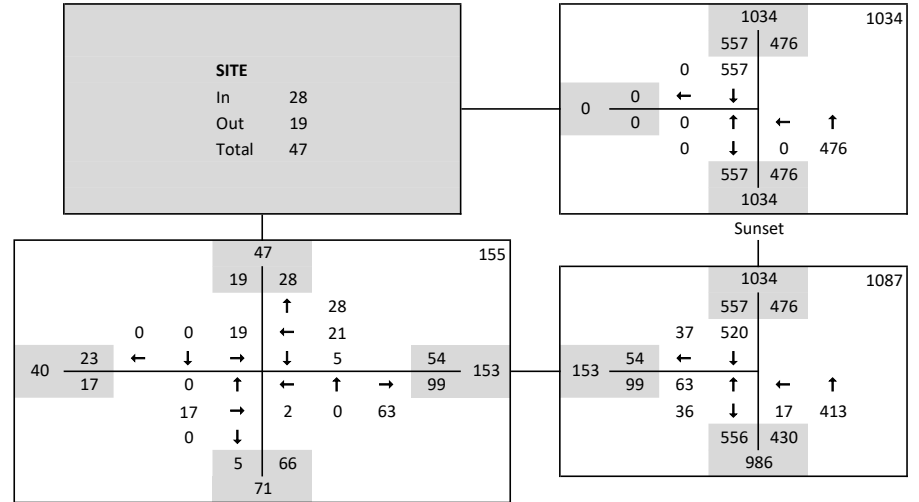


PM Peak Hour

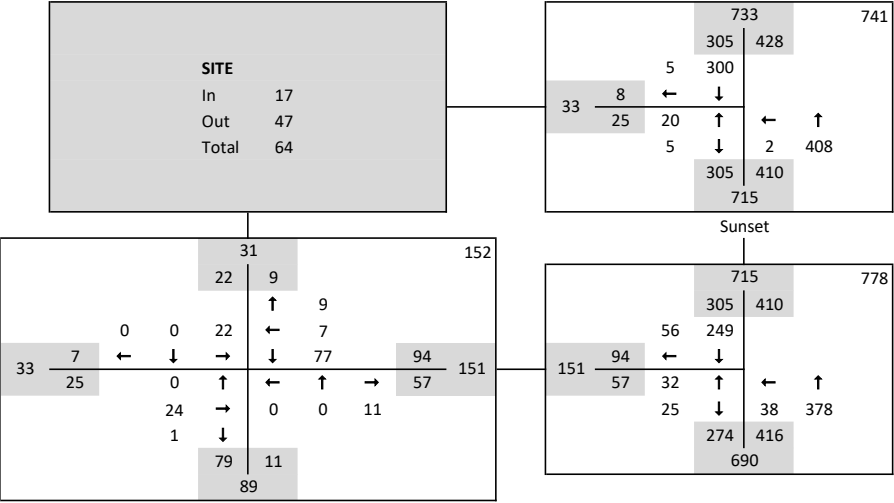
Site Traffic Full Build-Out



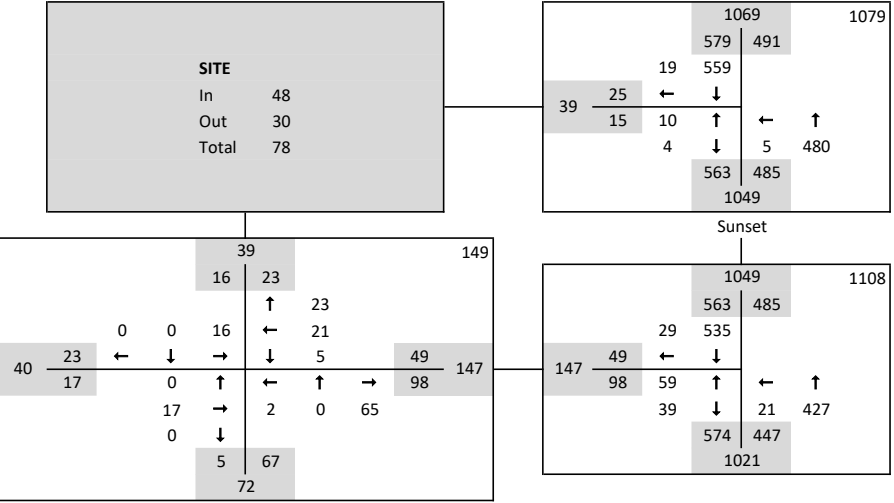
Future Total Traffic 2024



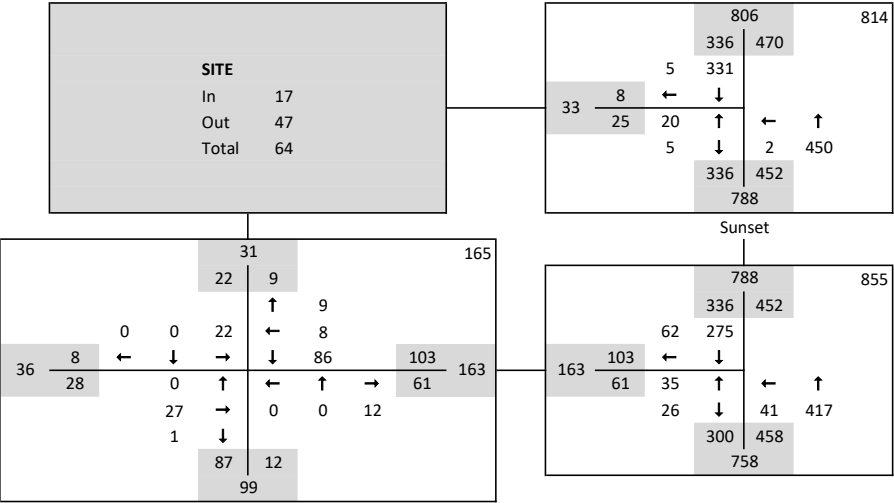
AM Peak Hour
Future Total Traffic 2025



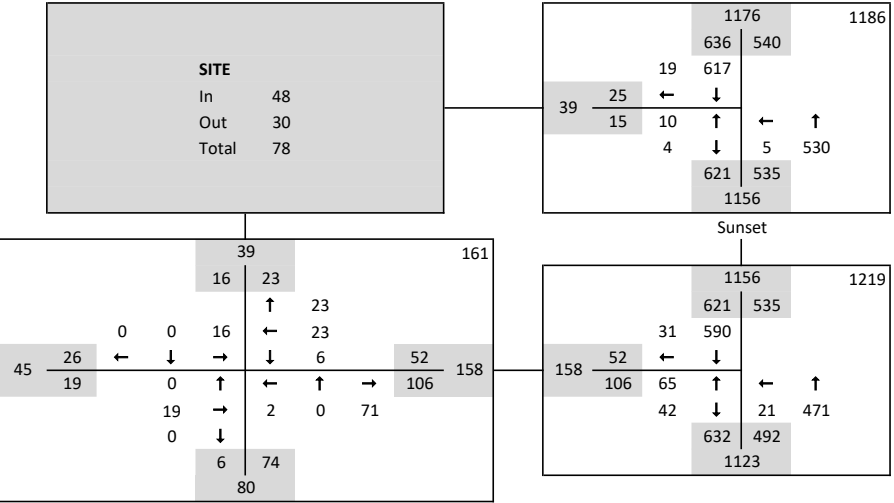
PM Peak Hour
Future Total Traffic 2025



Future Total Traffic 2030



Future Total Traffic 2030













Appendix B: Existing Capacity Analysis

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	9	29	354	230	51
Future Volume (Veh/h)	24	9	29	354	230	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	10	32	385	250	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	699	250	305			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	699	250	305			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	93	99	97			
cM capacity (veh/h)	386	794	1250			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	36	417	250	55		
Volume Left	26	32	0	0		
Volume Right	10	0	0	55		
cSH	450	1250	1700	1700		
Volume to Capacity	0.08	0.03	0.15	0.03		
Queue Length 95th (m)	2.0	0.6	0.0	0.0		
Control Delay (s)	13.7	0.9	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	13.7	0.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		45.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	23	1	73	7	0	0	1	10	0	0	0
Future Volume (Veh/h)	0	23	1	73	7	0	0	1	10	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	25	1	79	8	0	0	1	11	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	8			26			192	192	26	203	192	8
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			26			192	192	26	203	192	8
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	99	100	100	100
cM capacity (veh/h)	1625			1601			744	672	1056	722	672	1080
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	26	87	12	0								
Volume Left	0	79	0	0								
Volume Right	1	0	11	0								
cSH	1625	1601	1008	1700								
Volume to Capacity	0.00	0.05	0.01	0.00								
Queue Length 95th (m)	0.0	1.2	0.3	0.0								
Control Delay (s)	0.0	6.7	8.6	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	6.7	8.6	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.5								
Intersection Capacity Utilization				21.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	25	4	397	500	21
Future Volume (Veh/h)	53	25	4	397	500	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	27	4	432	543	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	983	543	566			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	983	543	566			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	95	100			
cM capacity (veh/h)	277	544	1016			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	85	436	543	23		
Volume Left	58	4	0	0		
Volume Right	27	0	0	23		
cSH	328	1016	1700	1700		
Volume to Capacity	0.26	0.00	0.32	0.01		
Queue Length 95th (m)	7.7	0.1	0.0	0.0		
Control Delay (s)	19.8	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	19.8	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			37.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen

07/28/2022











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	16	0	5	20	0	2	0	61	1	0	0
Future Volume (Veh/h)	0	16	0	5	20	0	2	0	61	1	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	0	5	22	0	2	0	66	1	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	23			18			51	51	19	117	51	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	23			18			51	51	19	117	51	24
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	94	100	100	100
cM capacity (veh/h)	1604			1610			948	840	1063	806	840	1056
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	17	27	68	1								
Volume Left	0	5	2	1								
Volume Right	0	0	66	0								
cSH	1604	1610	1059	806								
Volume to Capacity	0.00	0.00	0.06	0.00								
Queue Length 95th (m)	0.0	0.1	1.6	0.0								
Control Delay (s)	0.0	1.4	8.6	9.5								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	1.4	8.6	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.6								
Intersection Capacity Utilization				16.5%	ICU Level of Service				A			
Analysis Period (min)				15								

Appendix C: Future Background Capacity Analysis

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	9	30	368	239	53
Future Volume (Veh/h)	25	9	30	368	239	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	10	33	400	260	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	726	260	318			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	726	260	318			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	93	99	97			
cM capacity (veh/h)	371	784	1236			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	37	433	260	58		
Volume Left	27	33	0	0		
Volume Right	10	0	0	58		
cSH	433	1236	1700	1700		
Volume to Capacity	0.09	0.03	0.15	0.03		
Queue Length 95th (m)	2.1	0.6	0.0	0.0		
Control Delay (s)	14.1	0.9	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	14.1	0.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			46.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	24	1	76	7	0	0	1	10	0	0	0
Future Volume (Veh/h)	0	24	1	76	7	0	0	1	10	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1	83	8	0	0	1	11	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	8			27			200	200	26	212	201	8
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			27			200	200	26	212	201	8
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	99	100	100	100
cM capacity (veh/h)	1625			1600			732	663	1055	711	662	1080
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	91	12	0								
Volume Left	0	83	0	0								
Volume Right	1	0	11	0								
cSH	1625	1600	1005	1700								
Volume to Capacity	0.00	0.05	0.01	0.00								
Queue Length 95th (m)	0.0	1.2	0.3	0.0								
Control Delay (s)	0.0	6.8	8.6	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	6.8	8.6	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization			21.2%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	31	376	244	54
Future Volume (Veh/h)	25	10	31	376	244	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	11	34	409	265	59
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	742	265	324			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	742	265	324			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	93	99	97			
cM capacity (veh/h)	363	779	1230			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	38	443	265	59		
Volume Left	27	34	0	0		
Volume Right	11	0	0	59		
cSH	429	1230	1700	1700		
Volume to Capacity	0.09	0.03	0.16	0.03		
Queue Length 95th (m)	2.2	0.6	0.0	0.0		
Control Delay (s)	14.2	0.9	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	14.2	0.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		47.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	24	1	77	7	0	0	1	11	0	0	0
Future Volume (Veh/h)	0	24	1	77	7	0	0	1	11	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1	84	8	0	0	1	12	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	8			27			202	202	26	215	203	8
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			27			202	202	26	215	203	8
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	99	100	100	100
cM capacity (veh/h)	1625			1600			730	661	1055	707	660	1080
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	92	13	0								
Volume Left	0	84	0	0								
Volume Right	1	0	12	0								
cSH	1625	1600	1009	1700								
Volume to Capacity	0.00	0.05	0.01	0.00								
Queue Length 95th (m)	0.0	1.3	0.3	0.0								
Control Delay (s)	0.0	6.8	8.6	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	6.8	8.6	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.6								
Intersection Capacity Utilization				21.3%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	11	34	415	269	60
Future Volume (Veh/h)	28	11	34	415	269	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	12	37	451	292	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	817	292	357			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	817	292	357			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	91	98	97			
cM capacity (veh/h)	326	752	1196			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	42	488	292	65		
Volume Left	30	37	0	0		
Volume Right	12	0	0	65		
cSH	389	1196	1700	1700		
Volume to Capacity	0.11	0.03	0.17	0.04		
Queue Length 95th (m)	2.7	0.7	0.0	0.0		
Control Delay (s)	15.4	0.9	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	15.4	0.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			51.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	27	1	86	8	0	0	1	12	0	0	0
Future Volume (Veh/h)	0	27	1	86	8	0	0	1	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	29	1	93	9	0	0	1	13	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	9			30			224	224	30	238	225	9
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			30			224	224	30	238	225	9
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	99	100	100	100
cM capacity (veh/h)	1624			1596			703	639	1051	679	638	1079
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	102	14	0								
Volume Left	0	93	0	0								
Volume Right	1	0	13	0								
cSH	1624	1596	1005	1700								
Volume to Capacity	0.00	0.06	0.01	0.00								
Queue Length 95th (m)	0.0	1.4	0.3	0.0								
Control Delay (s)	0.0	6.8	8.6	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	6.8	8.6	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay	5.6											
Intersection Capacity Utilization	21.9%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	26	4	413	520	22
Future Volume (Veh/h)	55	26	4	413	520	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	28	4	449	565	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1022	565	589			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	565	589			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	95	100			
cM capacity (veh/h)	263	528	996			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	88	453	565	24		
Volume Left	60	4	0	0		
Volume Right	28	0	0	24		
cSH	313	996	1700	1700		
Volume to Capacity	0.28	0.00	0.33	0.01		
Queue Length 95th (m)	8.6	0.1	0.0	0.0		
Control Delay (s)	21.0	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	21.0	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		38.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	17	0	5	21	0	2	0	63	1	0	0
Future Volume (Veh/h)	0	17	0	5	21	0	2	0	63	1	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	0	5	23	0	2	0	68	1	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			19			53	53	20	121	53	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			19			53	53	20	121	53	25
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	94	100	100	100
cM capacity (veh/h)	1602			1609			945	838	1062	799	838	1055
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	70	1								
Volume Left	0	5	2	1								
Volume Right	0	0	68	0								
cSH	1602	1609	1058	799								
Volume to Capacity	0.00	0.00	0.07	0.00								
Queue Length 95th (m)	0.0	0.1	1.6	0.0								
Control Delay (s)	0.0	1.3	8.6	9.5								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	1.3	8.6	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.6								
Intersection Capacity Utilization				16.7%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	27	4	421	531	22
Future Volume (Veh/h)	56	27	4	421	531	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	29	4	458	577	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1043	577	601			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1043	577	601			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	94	100			
cM capacity (veh/h)	255	520	986			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	90	462	577	24		
Volume Left	61	4	0	0		
Volume Right	29	0	0	24		
cSH	305	986	1700	1700		
Volume to Capacity	0.29	0.00	0.34	0.01		
Queue Length 95th (m)	9.1	0.1	0.0	0.0		
Control Delay (s)	21.6	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	21.6	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		39.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen











07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	17	0	5	21	0	2	0	65	1	0	0
Future Volume (Veh/h)	0	17	0	5	21	0	2	0	65	1	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	0	5	23	0	2	0	71	1	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	24			19			53	53	20	124	53	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			19			53	53	20	124	53	25
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	100	100	100
cM capacity (veh/h)	1602			1609			945	838	1062	793	838	1055
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	28	73	1								
Volume Left	0	5	2	1								
Volume Right	0	0	71	0								
cSH	1602	1609	1058	793								
Volume to Capacity	0.00	0.00	0.07	0.00								
Queue Length 95th (m)	0.0	0.1	1.7	0.0								
Control Delay (s)	0.0	1.3	8.7	9.5								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	1.3	8.7	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.7								
Intersection Capacity Utilization				16.8%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	29	5	465	586	25
Future Volume (Veh/h)	62	29	5	465	586	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	32	5	505	637	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1152	637	664			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1152	637	664			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	93	99			
cM capacity (veh/h)	219	481	935			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	99	510	637	27		
Volume Left	67	5	0	0		
Volume Right	32	0	0	27		
cSH	266	935	1700	1700		
Volume to Capacity	0.37	0.01	0.37	0.02		
Queue Length 95th (m)	12.5	0.1	0.0	0.0		
Control Delay (s)	26.3	0.2	0.0	0.0		
Lane LOS	D	A				
Approach Delay (s)	26.3	0.2	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			42.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen

07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	19	0	6	23	0	2	0	71	1	0	0
Future Volume (Veh/h)	0	19	0	6	23	0	2	0	71	1	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	7	25	0	2	0	77	1	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	26			22			62	62	23	139	62	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	26			22			62	62	23	139	62	27
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	100	100	100
cM capacity (veh/h)	1600			1605			932	828	1058	770	828	1052
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	32	79	1								
Volume Left	0	7	2	1								
Volume Right	0	0	77	0								
cSH	1600	1605	1054	770								
Volume to Capacity	0.00	0.00	0.07	0.00								
Queue Length 95th (m)	0.0	0.1	1.8	0.0								
Control Delay (s)	0.0	1.6	8.7	9.7								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	1.6	8.7	9.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.6								
Intersection Capacity Utilization				18.1%	ICU Level of Service				A			
Analysis Period (min)				15								

Appendix D: ITE Trip Generation Manual Excerpts

Multifamily Housing (Mid-Rise) (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 53

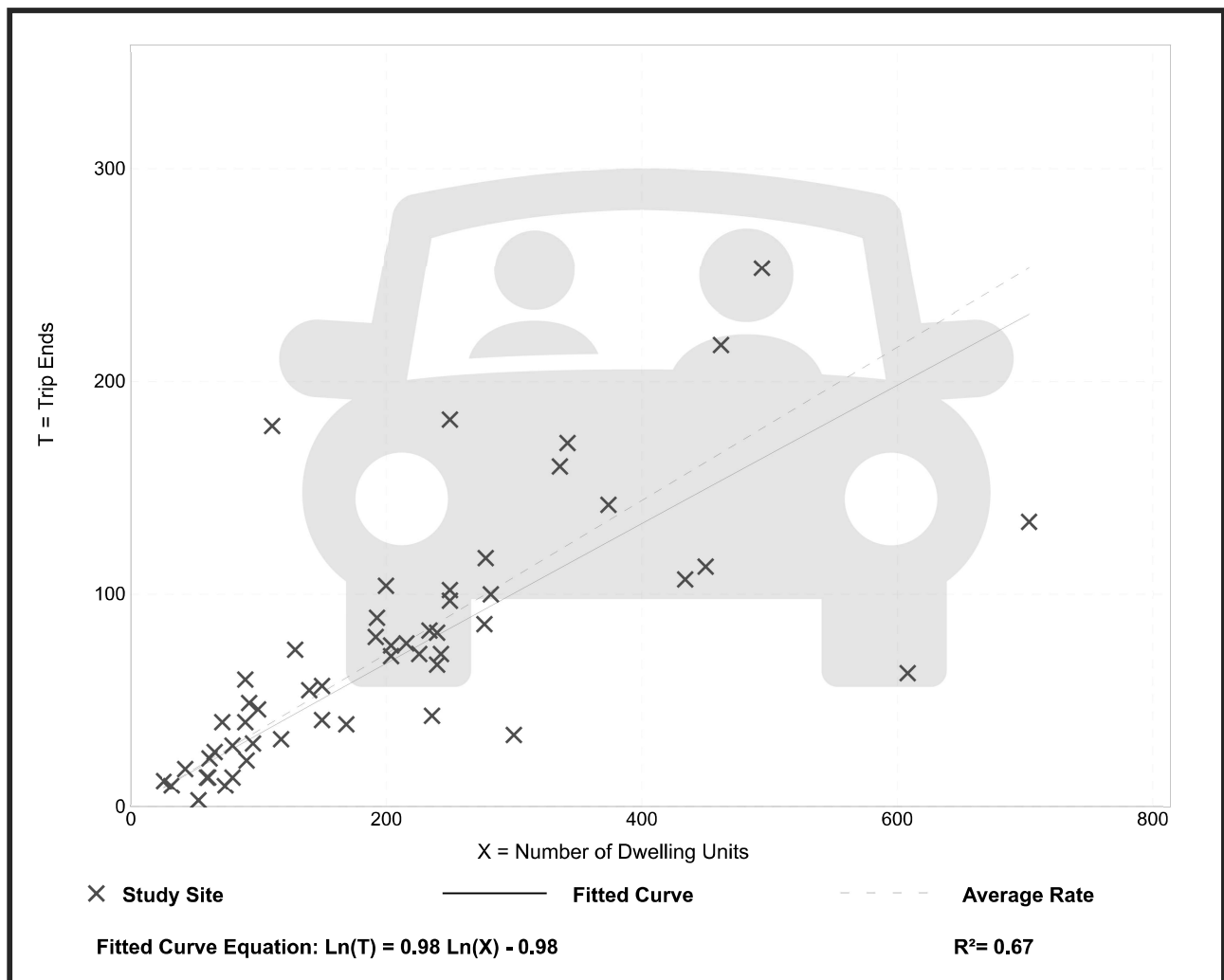
Avg. Num. of Dwelling Units: 207

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Multifamily Housing (Mid-Rise) (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 60

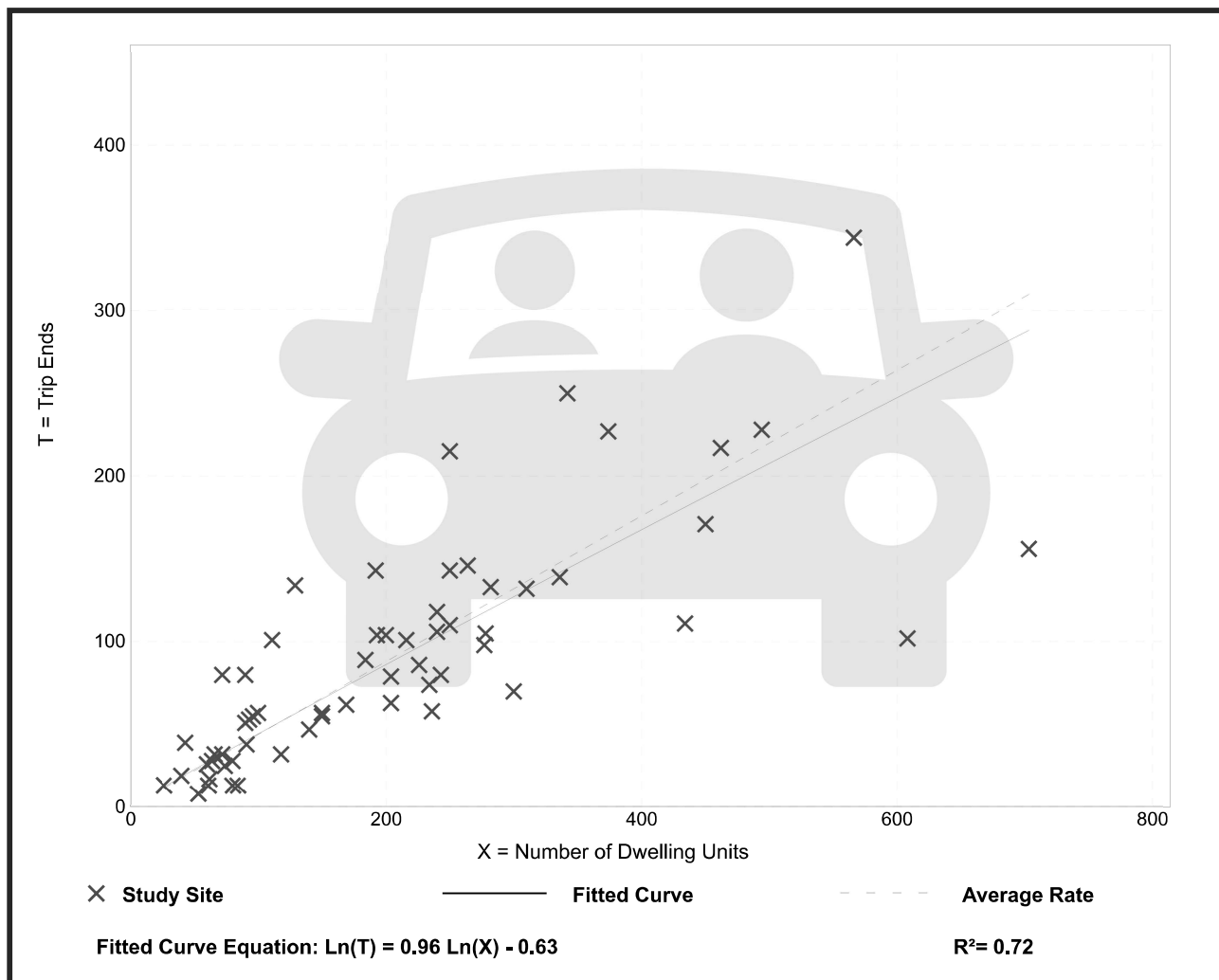
Avg. Num. of Dwelling Units: 208

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation














Appendix E: Future Total Capacity Analysis

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	21	36	368	239	57
Future Volume (Veh/h)	41	21	36	368	239	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	23	39	400	260	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	738	260	322			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	738	260	322			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	88	97	97			
cM capacity (veh/h)	363	784	1232			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	68	39	400	260	62	
Volume Left	45	39	0	0	0	
Volume Right	23	0	0	0	62	
cSH	444	1232	1700	1700	1700	
Volume to Capacity	0.15	0.03	0.24	0.15	0.04	
Queue Length 95th (m)	4.1	0.7	0.0	0.0	0.0	
Control Delay (s)	14.6	8.0	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	14.6	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			29.6%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen












07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	24	1	76	7	10	0	1	10	28	0	0
Future Volume (Veh/h)	0	24	1	76	7	10	0	1	10	28	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1	83	8	11	0	1	11	30	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	19			27			206	212	26	218	206	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	19			27			206	212	26	218	206	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	99	96	100	100
cM capacity (veh/h)	1611			1600			726	654	1055	705	658	1072
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	102	12	30								
Volume Left	0	83	0	30								
Volume Right	1	11	11	0								
cSH	1611	1600	1004	705								
Volume to Capacity	0.00	0.05	0.01	0.04								
Queue Length 95th (m)	0.0	1.2	0.3	1.0								
Control Delay (s)	0.0	6.1	8.6	10.3								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	6.1	8.6	10.3								
Approach LOS			A	B								
Intersection Summary												
Average Delay	6.0											
Intersection Capacity Utilization	26.7%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	25	38	378	249	56
Future Volume (Veh/h)	32	25	38	378	249	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	27	41	411	271	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	764	271	332			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	764	271	332			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	90	97	97			
cM capacity (veh/h)	350	773	1222			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	62	41	411	271	61	
Volume Left	35	41	0	0	0	
Volume Right	27	0	0	0	61	
cSH	459	1222	1700	1700	1700	
Volume to Capacity	0.13	0.03	0.24	0.16	0.04	
Queue Length 95th (m)	3.5	0.8	0.0	0.0	0.0	
Control Delay (s)	14.1	8.0	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	14.1	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			29.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen










07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	24	1	77	7	9	0	0	11	22	0	0
Future Volume (Veh/h)	0	24	1	77	7	9	0	0	11	22	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1	84	8	10	0	0	12	24	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	18			27			208	212	26	220	208	13
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			27			208	212	26	220	208	13
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	99	97	100	100
cM capacity (veh/h)	1612			1600			724	652	1055	703	656	1073
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	102	12	24								
Volume Left	0	84	0	24								
Volume Right	1	10	12	0								
cSH	1612	1600	1055	703								
Volume to Capacity	0.00	0.05	0.01	0.03								
Queue Length 95th (m)	0.0	1.3	0.3	0.8								
Control Delay (s)	0.0	6.1	8.5	10.3								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	6.1	8.5	10.3								
Approach LOS			A	B								
Intersection Summary												
Average Delay	5.9											
Intersection Capacity Utilization	26.4%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

7: Sunset & Site












07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	2	408	300	5
Future Volume (Veh/h)	20	5	2	408	300	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	5	2	443	326	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	776	328	331			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	776	328	331			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	100			
cM capacity (veh/h)	366	713	1228			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	27	445	331			
Volume Left	22	2	0			
Volume Right	5	0	5			
cSH	402	1228	1700			
Volume to Capacity	0.07	0.00	0.19			
Queue Length 95th (m)	1.6	0.0	0.0			
Control Delay (s)	14.6	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.6	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			33.1%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	26	41	417	275	62
Future Volume (Veh/h)	35	26	41	417	275	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	28	45	453	299	67
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	842	299	366			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	842	299	366			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	88	96	96			
cM capacity (veh/h)	313	745	1187			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	66	45	453	299	67	
Volume Left	38	45	0	0	0	
Volume Right	28	0	0	0	67	
cSH	415	1187	1700	1700	1700	
Volume to Capacity	0.16	0.04	0.27	0.18	0.04	
Queue Length 95th (m)	4.3	0.9	0.0	0.0	0.0	
Control Delay (s)	15.3	8.2	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	15.3	0.7		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			32.1%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen










07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	27	1	86	8	9	0	0	12	22	0	0
Future Volume (Veh/h)	0	27	1	86	8	9	0	0	12	22	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	29	1	93	9	10	0	0	13	24	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	19			30			230	234	30	242	230	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	19			30			230	234	30	242	230	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			100	100	99	96	100	100
cM capacity (veh/h)	1611			1596			697	630	1051	675	634	1072
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	112	13	24								
Volume Left	0	93	0	24								
Volume Right	1	10	13	0								
cSH	1611	1596	1051	675								
Volume to Capacity	0.00	0.06	0.01	0.04								
Queue Length 95th (m)	0.0	1.4	0.3	0.8								
Control Delay (s)	0.0	6.2	8.5	10.5								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	6.2	8.5	10.5								
Approach LOS			A	B								
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			27.0%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Sunset & Site












07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	2	450	331	5
Future Volume (Veh/h)	20	5	2	450	331	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	5	2	489	360	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	856	362	365			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	856	362	365			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	100			
cM capacity (veh/h)	328	682	1194			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	27	491	365			
Volume Left	22	2	0			
Volume Right	5	0	5			
cSH	363	1194	1700			
Volume to Capacity	0.07	0.00	0.21			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	15.7	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.7	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		35.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	63	36	17	413	520	37
Future Volume (Veh/h)	63	36	17	413	520	37
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	39	18	449	565	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1050	565	605			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1050	565	605			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	73	93	98			
cM capacity (veh/h)	249	528	983			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	107	18	449	565	40	
Volume Left	68	18	0	0	0	
Volume Right	39	0	0	0	40	
cSH	309	983	1700	1700	1700	
Volume to Capacity	0.35	0.02	0.26	0.33	0.02	
Queue Length 95th (m)	11.4	0.4	0.0	0.0	0.0	
Control Delay (s)	22.7	8.7	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	22.7	0.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			39.7%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen












07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	17	0	5	21	28	2	0	63	19	0	0
Future Volume (Veh/h)	0	17	0	5	21	28	2	0	63	19	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	0	5	23	30	2	0	68	21	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	54			19			68	83	20	136	68	40
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	54			19			68	83	20	136	68	40
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	94	97	100	100
cM capacity (veh/h)	1563			1609			924	807	1062	782	822	1035
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	58	70	21								
Volume Left	0	5	2	21								
Volume Right	0	30	68	0								
cSH	1563	1609	1057	782								
Volume to Capacity	0.00	0.00	0.07	0.03								
Queue Length 95th (m)	0.0	0.1	1.6	0.6								
Control Delay (s)	0.0	0.6	8.6	9.7								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.6	8.6	9.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.1								
Intersection Capacity Utilization				22.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	39	21	427	535	29
Future Volume (Veh/h)	59	39	21	427	535	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	42	23	464	582	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1092	582	614			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	582	614			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	73	92	98			
cM capacity (veh/h)	234	517	975			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	106	23	464	582	32	
Volume Left	64	23	0	0	0	
Volume Right	42	0	0	0	32	
cSH	299	975	1700	1700	1700	
Volume to Capacity	0.35	0.02	0.27	0.34	0.02	
Queue Length 95th (m)	11.8	0.6	0.0	0.0	0.0	
Control Delay (s)	23.5	8.8	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	23.5	0.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			40.5%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen










07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	17	0	5	21	23	2	0	65	16	0	0
Future Volume (Veh/h)	0	17	0	5	21	23	2	0	65	16	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	0	5	23	25	2	0	71	17	0	0
Pedestrians	1			1			1			1		
Lane Width (m)	3.7			3.7			3.7			3.7		
Walking Speed (m/s)	1.1			1.1			1.1			1.1		
Percent Blockage	0			0			0			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	49			19			66	78	20	136	66	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49			19			66	78	20	136	66	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	98	100	100
cM capacity (veh/h)	1569			1609			928	812	1062	779	825	1038
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	18	53	73	17								
Volume Left	0	5	2	17								
Volume Right	0	25	71	0								
cSH	1569	1609	1057	779								
Volume to Capacity	0.00	0.00	0.07	0.02								
Queue Length 95th (m)	0.0	0.1	1.7	0.5								
Control Delay (s)	0.0	0.7	8.7	9.7								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.7	8.7	9.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay				5.2								
Intersection Capacity Utilization				21.7%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Sunset & Site












07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	5	480	559	19
Future Volume (Veh/h)	10	4	5	480	559	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	4	5	522	608	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1150	618	629			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1150	618	629			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	99			
cM capacity (veh/h)	218	489	953			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	15	527	629			
Volume Left	11	5	0			
Volume Right	4	0	21			
cSH	256	953	1700			
Volume to Capacity	0.06	0.01	0.37			
Queue Length 95th (m)	1.4	0.1	0.0			
Control Delay (s)	20.0	0.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	20.0	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		40.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Sunset & Karen

















07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	42	21	471	590	31
Future Volume (Veh/h)	65	42	21	471	590	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	46	23	512	641	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1199	641	675			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1199	641	675			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	90	98			
cM capacity (veh/h)	202	478	926			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	117	23	512	641	34	
Volume Left	71	23	0	0	0	
Volume Right	46	0	0	0	34	
cSH	261	926	1700	1700	1700	
Volume to Capacity	0.45	0.02	0.30	0.38	0.02	
Queue Length 95th (m)	16.5	0.6	0.0	0.0	0.0	
Control Delay (s)	29.5	9.0	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	29.5	0.4		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			43.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Driveway/Site & Karen










07/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	19	0	6	23	23	2	0	71	16	0	0
Future Volume (Veh/h)	0	19	0	6	23	23	2	0	71	16	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	7	25	25	2	0	77	17	0	0
Pedestrians		1			1			1			1	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	51			22			74	87	23	152	74	40
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	51			22			74	87	23	152	74	40
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	98	100	100
cM capacity (veh/h)	1567			1605			914	802	1058	756	815	1036
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	57	79	17								
Volume Left	0	7	2	17								
Volume Right	0	25	77	0								
cSH	1567	1605	1053	756								
Volume to Capacity	0.00	0.00	0.07	0.02								
Queue Length 95th (m)	0.0	0.1	1.8	0.5								
Control Delay (s)	0.0	0.9	8.7	9.9								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	0.9	8.7	9.9								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			22.6%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Sunset & Site

07/28/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	5	530	617	19
Future Volume (Veh/h)	10	4	5	530	617	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	4	5	576	671	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1268	682	692			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1268	682	692			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	185	450	903			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	15	581	692			
Volume Left	11	5	0			
Volume Right	4	0	21			
cSH	220	903	1700			
Volume to Capacity	0.07	0.01	0.41			
Queue Length 95th (m)	1.7	0.1	0.0			
Control Delay (s)	22.6	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	22.6	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization		43.6%		ICU Level of Service		A
Analysis Period (min)		15				