



Transportation Engineering NorthWest

MEMORANDUM

DATE: October 6, 2017

TO: Dave Smith
City of Olympia

FROM: Jeff Schramm
TENW

SUBJECT: Traffic Impact Analysis Addendum for the proposed Views on 5th Ave Mixed-Use
TENW Project No. 5360

This memorandum summarizes the updated trip generation estimate for the Views on 5th Ave project for the purpose of documenting a comparison of the current project proposal to what was analyzed in the prior TIA dated July 20, 2017.

Project Description

The current project proposal, based on the latest site plan, includes 140 apartment units, 5,195 square feet (SF) of restaurant, 660 SF of retail, and a 1,584 SF workout room. Note that the workout room (analyzed in the July TIA as an “athletic club”) will now only be accessible by residents and thus will not generate additional vehicle trips to the site.

Trip Generation

The weekday daily, AM, and PM peak hour trip generation estimates for the proposed Views on 5th Ave mixed-use development have been updated based on the latest site plan. The methodology used to estimate trips is consistent with the methodology outlined in the July TIA. Shown below in **Table 1** is a comparison of the trip generation estimates based on the latest site plan compared to what was analyzed in the July TIA. Detailed trip generation calculations are included in **Attachment A**.

Table 1
Views on 5th Ave – Trip Generation Summary

Time Period	July 2017 TIA			Current Proposal		
	In	Out	Total	In	Out	Total
Weekday Daily	536	536	1,072	511	511	1,022
Weekday AM Peak Hour	33	52	85	29	52	81
Weekday PM Peak Hour	42	23	65	40	22	62

As shown in **Table 1**, the trip generation associated with the current project proposal is less than what was assumed in the July 2017 TIA. Based on this information, the findings and conclusions in the July 2017 remain valid and can be considered conservative since the PM peak hour trip generation is less.

If you have any questions regarding the information presented in this memo, please contact me at (425) 250-0581 or schramm@tenw.com.

ATTACHMENT A

Views on 5th Ave Trip Generation

DAILY									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ³	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	140	DU	220	3.86	50%	50%	270	270	540
Restaurant	5,195	GFA	932	89.01	50%	50%	231	231	462
Retail	660	GFA	820	29.89	50%	50%	10	10	20
NET NEW DAILY TRIP GENERATION =							511	511	1,022
AM PEAK HOUR									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ³	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	140	DU	220	0.30	20%	80%	8	34	42
Restaurant	5,195	GFA	932	7.57	55%	45%	21	18	39
Retail	660	GFA	820	0.67	62%	38%	0	0	0
NET NEW AM PEAK HOUR TRIP GENERATION =							29	52	81
PM PEAK HOUR									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ⁴	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	140	DU	220	0.36	65%	35%	33	17	50
Restaurant	5,195	GLA	932	2.04	60%	40%	7	4	11
Retail	660	GFA	820	2.04	48%	52%	0	1	1
NET NEW PM PEAK HOUR TRIP GENERATION =							40	22	62

Notes:

1. DU = Dwelling Units, GFA = Gross Floor Area.
2. Institute of Transportation Engineers (ITE) *Trip Generation* manual 9th edition land use code.
3. Daily and AM trip rates are ITE rates adjusted to account for City of Olympia trip reductions based on the Olympia Impact Fee Program.
4. Trip rates based on reduced trip rates from the Olympia Impact Fee Program.

Views on 5th Ave

Olympia, WA

Updated Transportation Impact Analysis

July 20, 2017

Prepared for:

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7/20/17

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FINDINGS/CONCLUSIONS

This Transportation Impact Analysis has been prepared for the View on 5th Ave project located in the City of Olympia, WA. This is an update to our previous traffic analysis dated February 10, 2017 and reflects a revised site plan concept with reduced building areas, and a modified access woonerf that is limited to one-way travel east-to-west.

Project Proposal. The proposed Views on 5th Ave mixed-use development is located on the north side of 5th Avenue SW between Simmons Street SW and Sylvester Street SW. The project proposal includes up to 138 apartment units, 5,485 square feet (SF) of restaurant, 1,004 SF of retail, and a 920 SF health club.

Trip Generation. The Views on 5th Ave development is estimated to generate 1,072 new trips per weekday with 85 new trips occurring during the AM peak hour and 65 new trips during the PM peak hour.

Non-Motorized Impacts. Development of the proposed Views on 5th Ave mixed-use development is not expected to create a significant impact to current bicycle, pedestrian, or transit facilities in the immediate site vicinity.

Intersection Level of Service (LOS). The LOS analyses documented in this report were assessed during the weekday PM peak hours at the four adjacent intersections surrounding the site. All four study intersections are anticipated to operate at LOS A in 2018 during the PM peak hour with the proposed project.

Site Access Evaluation. Vehicular access for the Views on 5th Ave mixed-use development is proposed at two locations: one enter only driveway on Sylvester Street and one exit only driveway on Simmons Street. The LOS results indicate that both site access locations are anticipated to operate at LOS A during the PM peak hour with buildout of the Views on 5th Ave mixed-use development.

2040 Simmons Street Analysis. Both study intersections and the proposed site access on Simmons Street are anticipated to operate at LOS B or better in 2040 during the PM peak hour with the proposed project. The proposed Views on 5th Ave project is anticipated to increase the northbound queue on Simmons Street approaching 4th Avenue and the southbound queue on Simmons Street approaching 5th Avenue by up to one (1) vehicle during the PM peak hour.

Mitigation. The following measures have been identified to mitigate transportation impacts of the proposed Views on 5th Ave mixed-use development.

- **City of Olympia Transportation Impact Fees.** To offset the additional demand created by the Views on 5th Ave mixed-use development on public streets and roads, the developer would pay its proportionate share of new public facilities cost through the payment of a traffic impact fee. Per the City's current Transportation Impact Fee Rate Schedule (effective January 1, 2017), the total traffic impact fee for the proposed Views on 5th Ave mixed-use development would be \$167,224.83.

INTRODUCTION

This Transportation Impact Analysis has been prepared for the View on 5th Ave project located in the City of Olympia, WA. This is an update to our previous traffic analysis dated February 10, 2017 and reflects a revised site plan concept with reduced building areas, and a modified access woonerf that is limited to one-way travel east-to-west.

This report documents traffic impacts associated with the proposed Views on 5th Ave development based on the latest site plan. The proposed project is located on the north side of 5th Avenue between Simmons Street and Sylvester Street in the City of Olympia. A site vicinity map is provided in **Figure 1**.

Project Description

The project proposal, based on the latest site plan, includes up to 138 apartment units, 5,485 square feet (SF) of restaurant, 1,004 SF of retail, and a 920 SF health club. The traffic analysis is based on full project buildout by year 2018. A preliminary site plan is shown in **Figure 2**.

Traffic Scoping

The scope of work for this Transportation Impact Analysis was established in coordination with transportation staff from the City of Olympia. The traffic scoping worksheet is provided in **Appendix A**. A total of four study intersections were identified for evaluation during future weekday PM peak hour conditions in year 2018.

Study Area

The study area was established based on City of Olympia TIA Guidelines to include major roadway intersections that are anticipated to be impact 20 or more directional PM peak hour trips. Based on traffic scoping documents, a total of 4 study intersections were identified for evaluation in this traffic impact analysis during weekday PM peak hour conditions.

1. Simmons Street / 4th Avenue (signalized)
2. Simmons Street / 5th Avenue (signalized)
3. Sylvester Street / 4th Avenue (stop-controlled)
4. Sylvester Street / 5th Avenue (stop-controlled)

Project Approach

To analyze the traffic impacts of the Views on 5th Ave development, the following tasks were undertaken to evaluate traffic impacts associated with the project:

- Assessment of existing conditions through field reconnaissance and review of existing planning documents.
- Estimation of weekday vehicular AM peak hour, PM peak hour, and daily trips generated by the development.
- Evaluation of PM peak hour level of service (LOS) at 4 study intersections in Olympia.
- Review of City planning documents to evaluate long-term road improvements plans in project vicinity.
- Evaluation of traffic impacts at the proposed site accesses.
- Estimation of transportation impact fees to offset potential transportation impacts.

Primary Data and Information Sources

- City of Olympia Transportation Impact Fee Rate Schedule (effective January 1, 2017).
- Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition, 2012.
- ITE *Trip Generation Handbook*, 3rd Edition, 2014.
- 2017 2-Hour PM Peak Hour traffic counts by All Traffic Data.
- City of Olympia 2017-2022 Capital Facilities Plan (CFP).
- *Highway Capacity Manual (HCM 6th Edition)*, TRB, 2016.

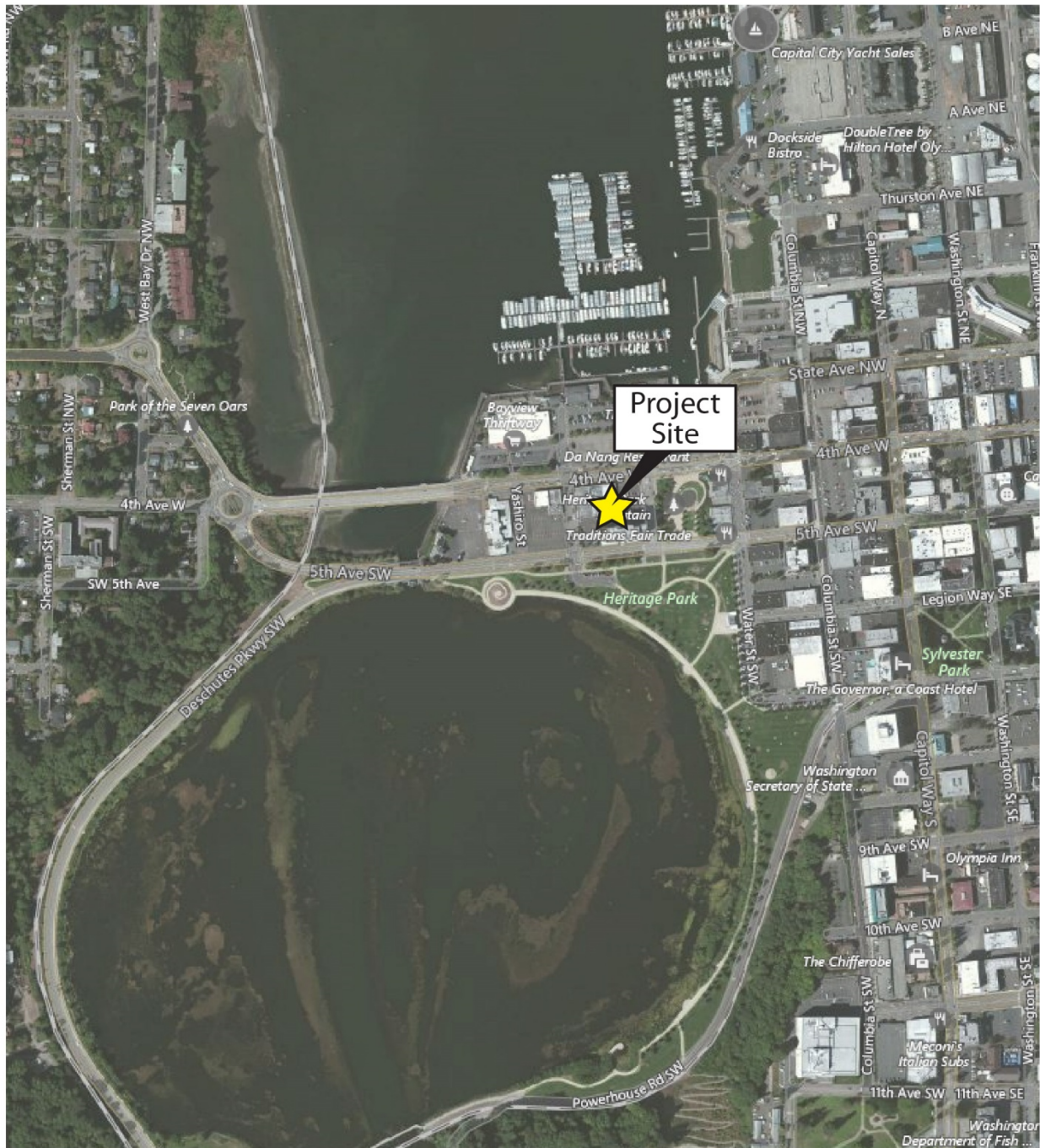


Figure 1: Site Vicinity





Figure 2: Preliminary Site Plan



EXISTING CONDITIONS

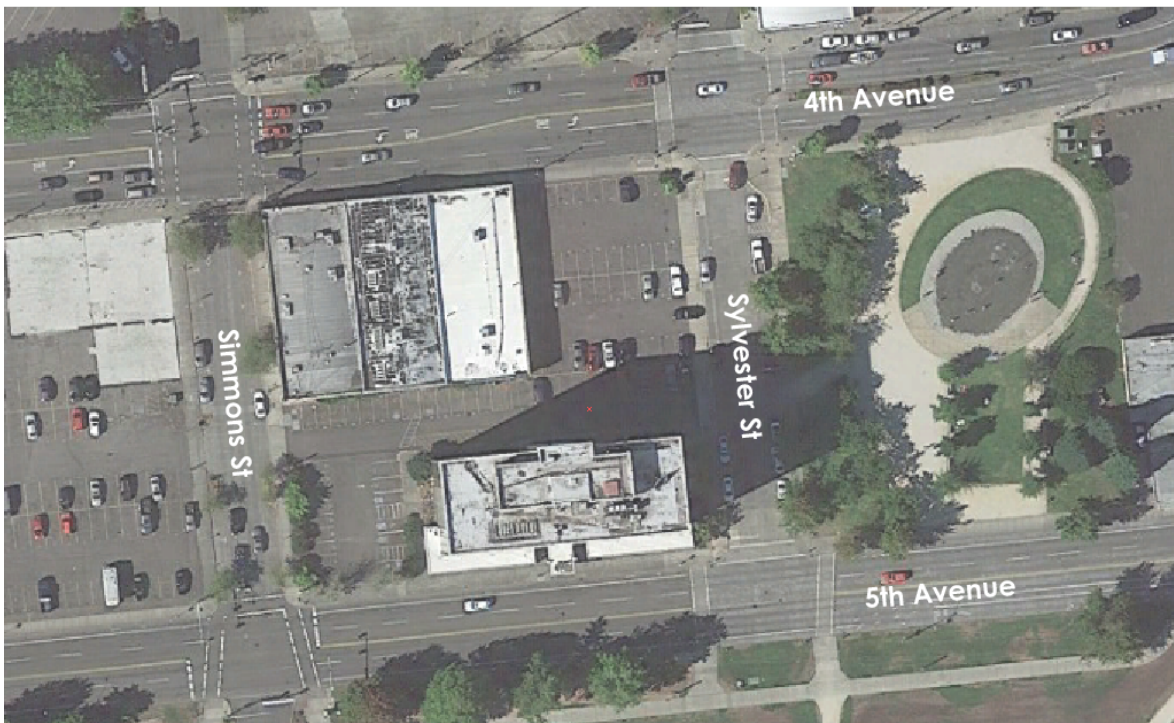
This section describes existing transportation system conditions in the study area. Existing conditions described include an inventory of existing roadways, existing traffic volumes, intersection levels of service (LOS), public transportation services, and non-motorized transportation facilities.

Roadway Network

The existing street characteristics in the vicinity of the proposed Views on 5th Ave mixed-use development are described below in **Table 1**.

Table 1
Existing Roadway Network Summary – Project Site Vicinity

Roadway	Orientation	Classification	Speed Limit	Number of Travel Lanes	Street Parking	Sidewalks	Bicycle Facilities
4 th Ave	East-West	Arterial	25 mph	4	North Side	Both Sides	None
5 th Ave	East-West	Major Collector	25 mph	4	None	Both Sides	Both Sides
Simmons St	North-South	Major Collector	25 mph	2	Both Sides	Both Sides	None
Sylvester St	North-South	Local Access	25 mph	2	Both Sides	Both Sides	None



Traffic Volumes

Figure 3 illustrates 2017 weekday PM peak hour traffic counts at the study intersections and average daily traffic (ADT) on the streets in the project vicinity. The weekday PM peak hour traffic volumes represent a two-hour average volume of vehicles passing through an intersection on a typical weekday during the 4:00 to 6:00 p.m. peak period. ADTs were estimated using a K-factor = 0.10. Traffic counts at the study intersections were collected in January 2017 for this traffic analysis. All existing traffic count sheets are included in **Appendix B**.

Non-motorized Transportation Facilities

There are sidewalks on both sides of 4th Avenue in the vicinity of the site. There are also bike lanes and sidewalks on both sides of 5th Avenue in the vicinity of the site.

Transit Service

The project site is served by Intercity Transit routes 41, 43, 44, 45, 47, and 48 on weekdays. The closest bus stops are on 4th Avenue and 5th Avenue along the project frontage.

Route 41 provides transit service between The Evergreen State College and Downtown Olympia. The current weekday schedule for Route 41 includes 15 minute headways.

Route 43 provides transit service between the Thurston County Courthouse, South Puget Sound Community College, Tumwater Square, and Downtown Olympia. The current weekday schedule for Route 43 includes 15 minute headways.

Route 44 provides transit service between Capital Mall, South Puget Sound Community College, and Downtown Olympia. The current weekday schedule for Route 44 includes 15 minute headways.

Route 45 provides transit service between Capital Mall, Conger, and Downtown Olympia. The current weekday schedule for Route 45 includes 30 minute headways.

Route 47 provides transit service between Capital Medical Center, Capital Mall, and Downtown Olympia. The current weekday schedule for Route 47 includes 30 minute headways.

Route 48 provides transit service between The Evergreen State College, Capital Mall, and Downtown Olympia. The current weekday schedule for Route 48 includes 15 minute headways.

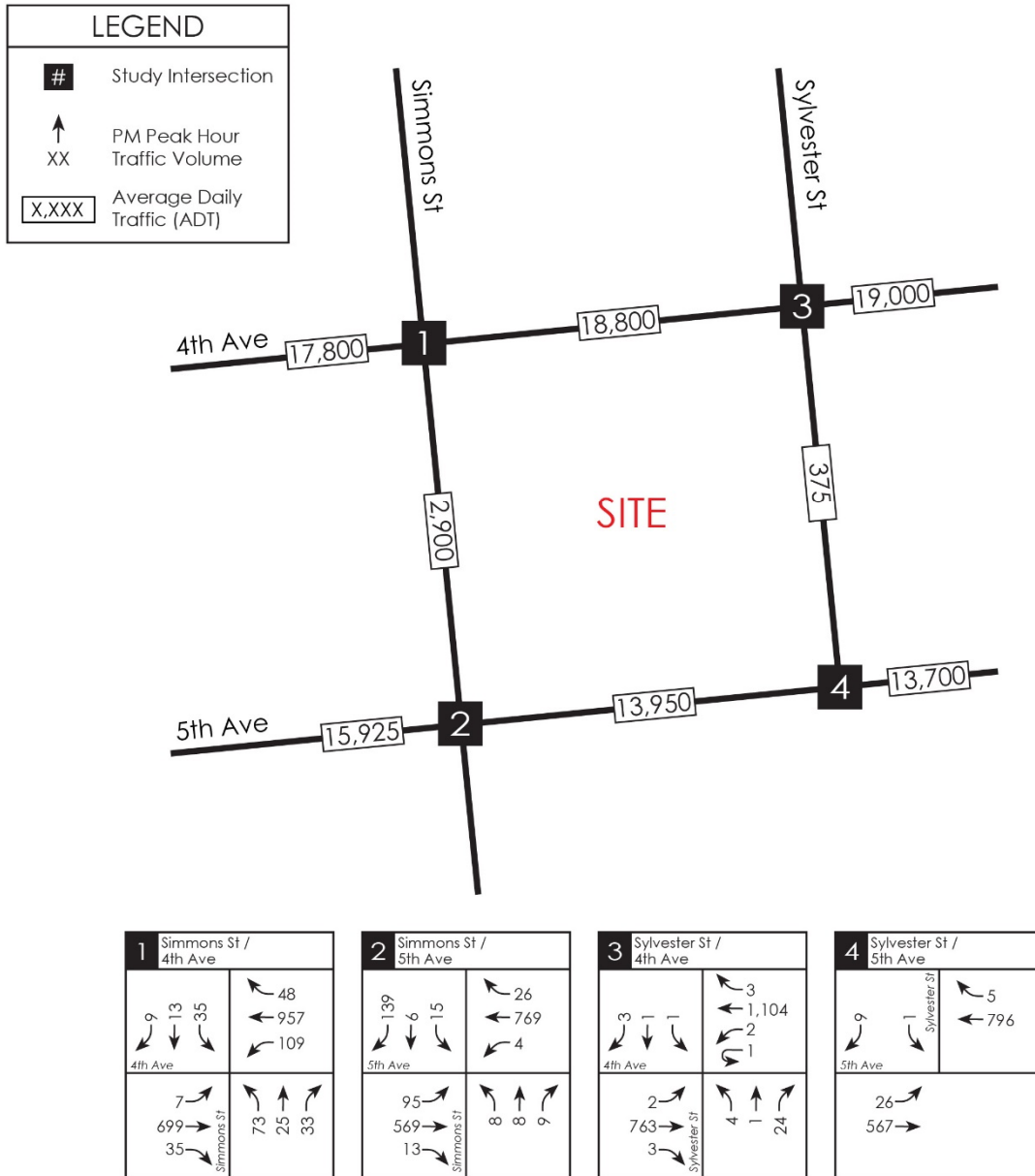


Figure 3: 2017 Existing PM Peak Hour and Daily Traffic Volumes



Collision History

Historic collisions at the study intersections were analyzed for the most recent three-year period from 2014 to 2016. Collision data was provided by the City of Olympia. Summaries of the total and yearly average collisions during this period are provided in **Table 2**.

Table 2
Collision Data Summary, January 1, 2014 to December 31, 2016

Location	2014	2015	2016	Three-Year		Average Annual Collisions
				Total Collisions	Injury Related	
<u>Intersections:</u>						
Simmons Street / 4 th Avenue	1	2	3	6	1	2.00
Simmons Street / 5 th Avenue	0	2	4	6	3	2.00
Sylvester Street / 4 th Avenue	0	4	3	7	3	2.33
Sylvester Street / 5 th Avenue	0	2	0	2	0	0.67

Source: City of Olympia (1/1/14 – 12/31/16).

Intersection Levels of Service

Level of service (LOS) serves as an indicator of the quality of traffic flow and degree of congestion at an intersection or roadway segment. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. The LOS grading ranges from A to F, such that LOS A is assigned when low delays are present and low volumes are experienced. LOS F indicates long delays and/or forced flow.

Table 3 summarizes the delay range for each level of service at signalized and unsignalized intersections. The methods used to calculate the levels of service are based on the *Highway Capacity Manual 6th Edition* (Transportation Research Board, 2016) and *Synchro 10* software.

Table 3
LOS Criteria for Signalized and Two-Way Stop Controlled Intersections¹

Control Delay (sec/veh)	<u>SIGNALIZED INTERSECTIONS</u>		<u>TWO-WAY STOP-CONTROLLED INTERSECTIONS</u>		
	<u>LOS by Volume-to Capacity (V/C) Ratio²</u>		Control Delay (sec/veh)	<u>LOS by Volume-to Capacity (V/C) Ratio³</u>	
	≤ 1.0	> 1.0			≤ 1.0
≤ 10	A	F	≤ 10	A	F
> 10 to ≤ 20	B	F	> 10 to ≤ 15	B	F
> 20 to ≤ 35	C	F	> 15 to ≤ 25	C	F
> 35 to ≤ 55	D	F	> 25 to ≤ 35	D	F
> 55 to ≤ 80	E	F	> 35 to ≤ 50	E	F
> 80	F	F	> 50	F	F

¹ Source: Highway Capacity Manual (6th Edition), Transportation Research Board, 2016.

² For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

³ For two-way stop controlled intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

The City of Olympia has adopted the use of a weighted-average method to calculate LOS at unsignalized intersections. The City methodology takes into account the delay experienced by all vehicles entering the intersection, including through vehicles on the major roadway. The City of Olympia intersection LOS standard is LOS D in the study area.

Existing weekday PM peak hour LOS analyses were conducted at the four study intersections. Existing signal timing used in the analysis was provided by the City of Olympia. The existing LOS results are summarized in **Table 4**. Detailed LOS summary worksheets are provided in **Appendix C**.

Table 4
Existing 2017 PM Peak Hour Level of Service
Summary

Study Intersection	LOS ¹	Delay (sec)
<u>Signalized:</u>		
1. Simmons Street / 4 th Avenue	A	8.8
2. Simmons Street / 5 th Avenue	A	3.5
<u>Stop Controlled (Unsignalized):</u>		
3. Sylvester Street / 4 th Avenue	A	6.1
4. Sylvester Street / 5 th Avenue	A	4.4

1. LOS = Level of Service, reported as intersection average for signalized intersections and weighted-average at stop sign controlled intersections.

As shown in **Table 4**, all four of the study intersections currently operate at LOS A during the PM peak hour.

TRAFFIC IMPACT ANALYSIS

The following section of the report describes the traffic impacts of the proposed Views on 5th Ave mixed-use development on the surrounding arterial network and identified study intersections in the project vicinity.

The analyses of traffic impacts include non-project related traffic forecasts, trip generation, distribution and assignment of project trips, and LOS evaluation at study intersections and site access driveways. The analysis was conducted during the weekday PM peak hour which represents the time period with the highest traffic volumes in the study area.

Project Trip Generation

Weekday daily, AM and PM peak hour trip generation was estimated for the proposed Views on 5th Ave mixed-use development. The PM peak hour trips for the proposed development were based on trip rates provided in the *Olympia Transportation Impact Fee Update*, November 2016. The weekday daily and AM peak hour trips for the proposed development were derived from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition and adjusted to account for standard City of Olympia trip reductions.

Pass-by trip reductions were applied to the retail uses. Pass-by trips are made by vehicles that are already on the adjacent streets and make intermediate stops at the proposed use on route to a primary destination (i.e. on the way from work to home). The pass-by reductions are built into the reduced rates used in the *Olympia Transportation Impact Fee Update*, November 2016.

Table 5 summarizes the net new weekday daily, AM peak hour, and PM peak hour trip generation estimates for the proposed Views on 5th Ave mixed-use development.

Table 5
Views on 5th Ave – Trip Generation Summary

Time Period	In	Out	Total
Weekday Daily	536	536	1,072
Weekday AM Peak Hour	33	52	85
Weekday PM Peak Hour	42	23	65

As shown in **Table 5**, the Views on 5th Ave mixed-use development is estimated to generate 1,072 net new weekday daily trips, with 85 net new weekday AM peak hour trips (33 entering, 52 exiting), and 65 net new weekday PM peak hour trips (42 entering, 23 exiting). The detailed trip generation estimates are provided in **Appendix D**.

Project Trip Distribution and Assignment

To determine trip distribution patterns for the Views on 5th Ave project, the Thurston Regional Planning Council (TRPC) provided a project specific model distribution. The TRPC model distribution was based on the existing 2009 base-year model, and represents the travel patterns in the area of the project based on the site location and anticipated access points on Simmons Street and Sylvester Street. Using the provided model data output and through discussions with the City of Olympia, the study intersections were determined based on the City of Olympia's TIA guidelines.

The 73 weekday PM peak hour project trips (46 in, 27 out) associated with the Views on 5th Ave mixed-use development were assigned to the 4 study intersections based on the established trip distribution patterns from the TRPC model. It should be noted that all entering traffic from the east was routed to enter via 5th Avenue due to the turn restrictions at the Sylvester Street/4th Avenue intersection (no westbound left-turn). The project trip distribution and PM peak hour trip assignment is shown graphically in **Figure 4**. The raw model distribution data is provided in **Appendix E**.

Future Traffic Volumes

Future weekday PM peak hour traffic volumes without the proposed Views on 5th Ave mixed-use project were estimated for future year 2018 conditions, which is the anticipated year of buildout. Future traffic volumes at the study intersections were developed by applying a 2 percent background growth rate to existing PM peak hour traffic counts and adding traffic from the following 4 approved pipeline project developments:

1. 321 Lofts – Residential (36 multi-family units)
2. Columbia Place – Mixed-Use (48,000 SF office, 10,000 SF retail, 115 residential units)
3. Olympia Commons – Residential (43 multi-family units)
4. 123 4th Ave – Mixed-Use (126 multi-family units, 5,099 SF commercial)

Future pipeline project traffic volumes were provided by the City.

The weekday PM peak hour traffic volumes for future year 2018 conditions without the project are shown on **Figure 5**. The weekday PM peak hour traffic volumes for future year 2018 with-project conditions are shown in **Figure 6**.

Future Planned Improvements

There are no planned transportation improvement projects in the *City of Olympia 2017-2022 Capital Facilities Plan (CFP)* located in the project site vicinity that are identified.

Non-Motorized Impacts

Development of the proposed Views on 5th Ave mixed-use development is not expected to create a significant impact to current bicycle, pedestrian, or transit facilities in the immediate site vicinity.

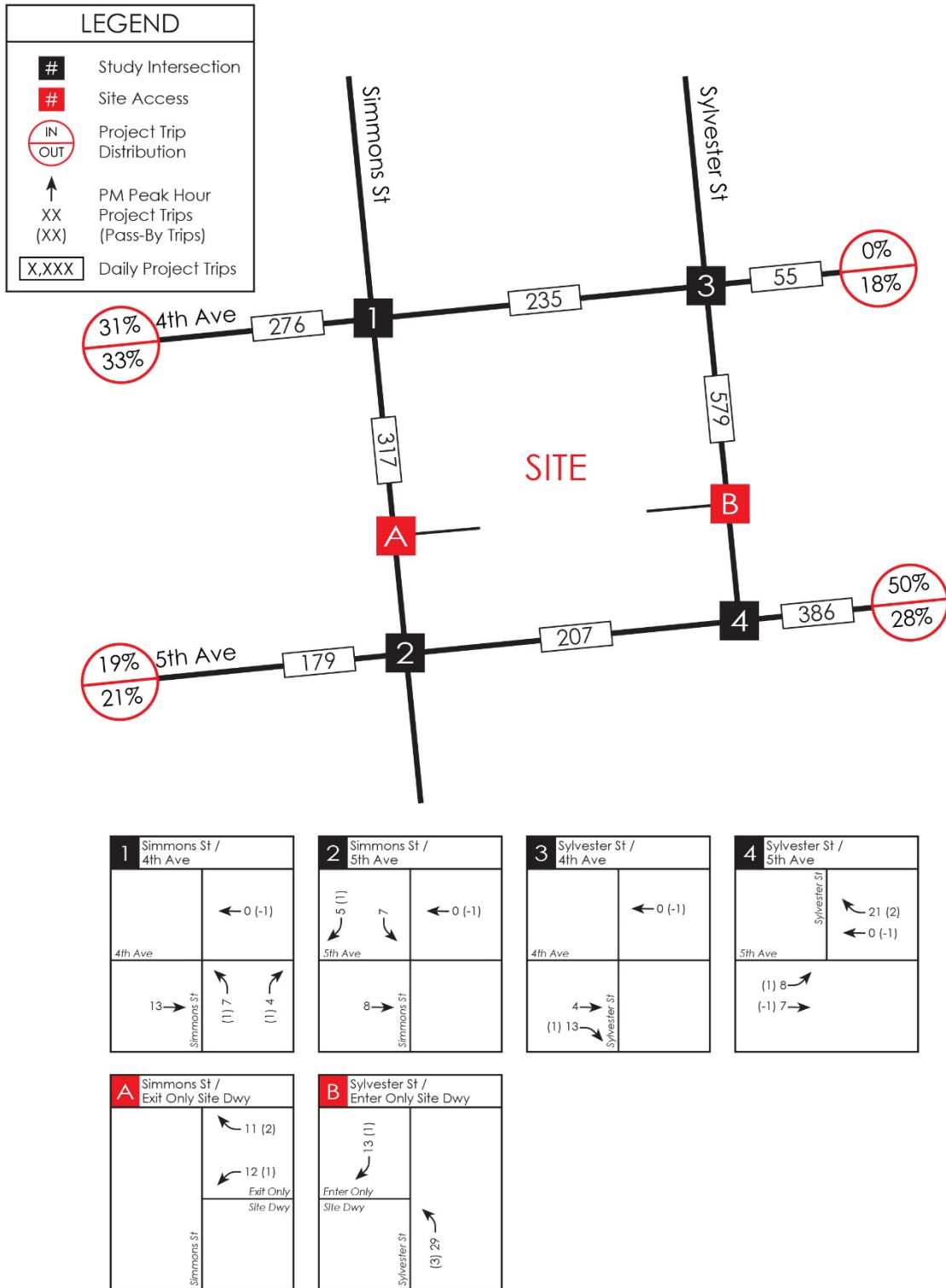


Figure 4: PM Peak Hour and Daily Project Trip Distribution & Assignment



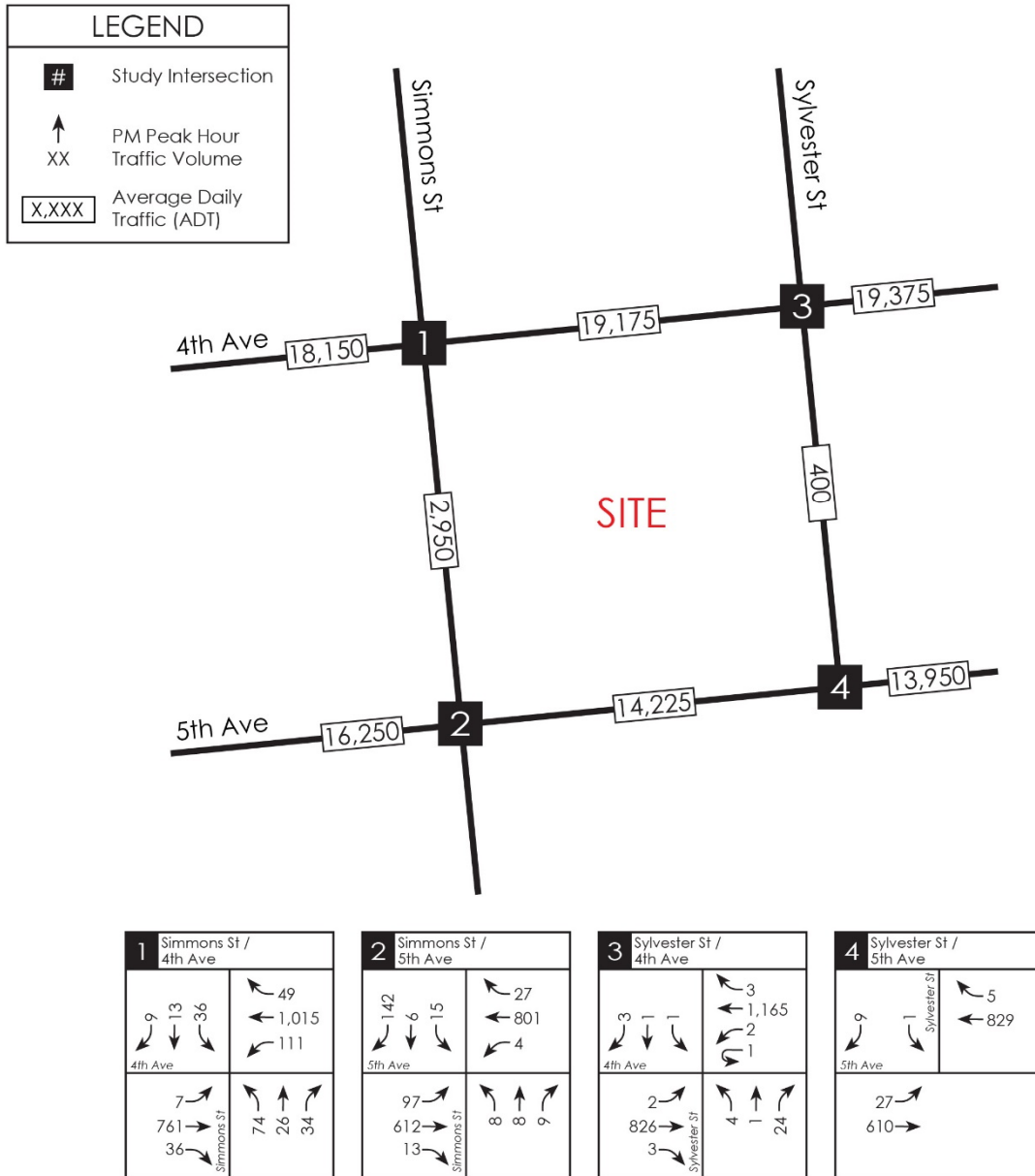


Figure 5: 2018 Baseline PM Peak Hour and Daily Traffic Volumes



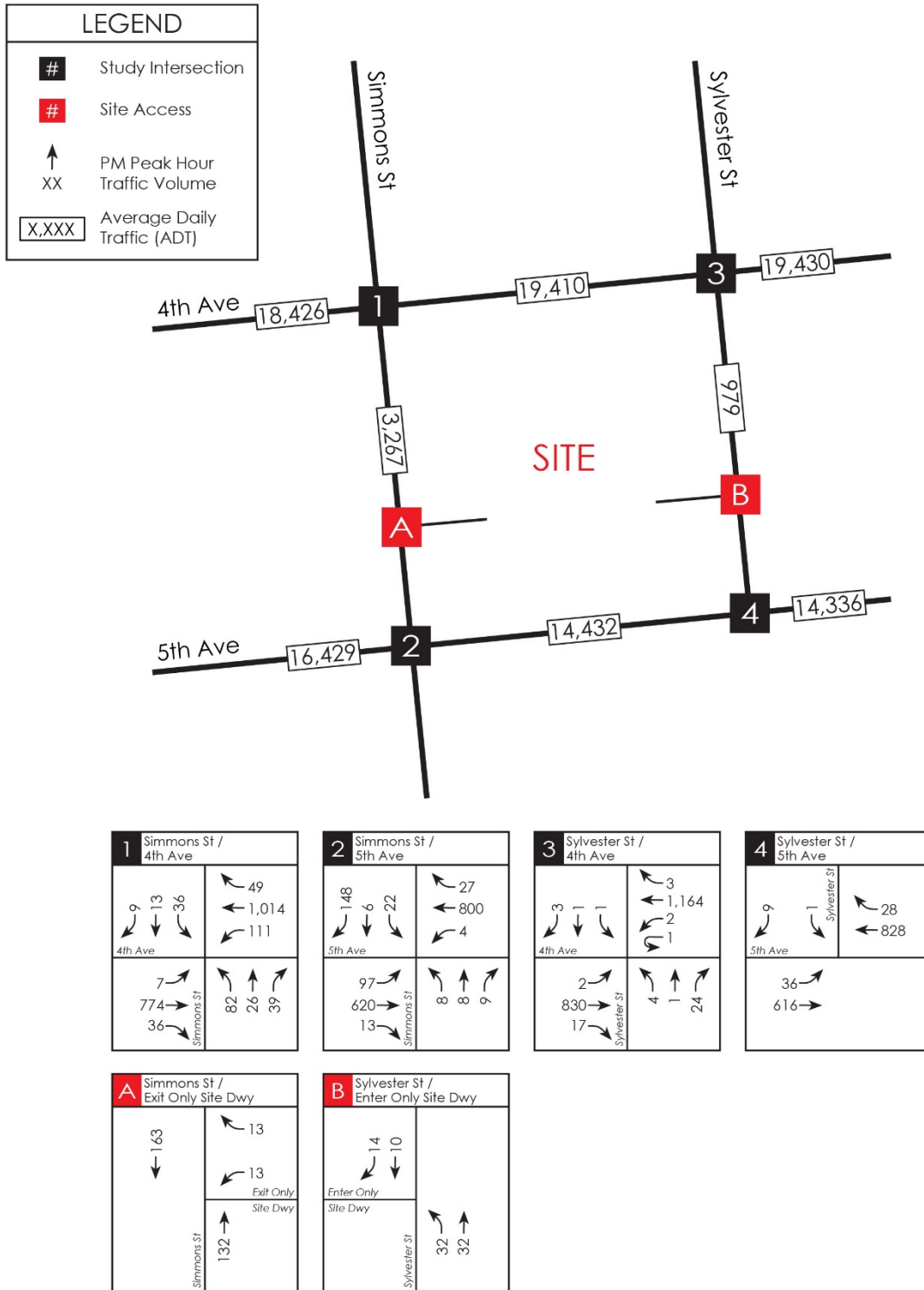


Figure 6: 2018 With-Project PM Peak Hour and Daily Traffic Volumes



Intersection LOS Analysis

Future intersection LOS analyses were evaluated at the 4 study intersections for future year 2018 conditions with and without the Views on 5th Ave mixed-use development; the LOS results are summarized in **Table 6**. The signal timing data used at the signalized study intersections was based on data provided by the City of Olympia. Detailed LOS worksheets are provided in **Appendix C**.

Table 6
2018 Future With and Without-Project PM Peak Hour LOS Summary

Study Intersection	2018 Without Project		2018 With Project	
	LOS ¹	Delay	LOS ¹	Delay
<u>Signalized:</u>				
1. Simmons Street / 4 th Avenue	A	9.2	A	9.9
2. Simmons Street / 5 th Avenue	A	3.6	A	3.9
<u>Stop Controlled (Unsignalized):</u>				
3. Sylvester Street / 4 th Avenue	A	6.2	A	6.3
4. Sylvester Street / 5 th Avenue	A	4.6	A	4.7

1. LOS = Level of Service

As shown in **Table 6**, all of the study intersections are expected to operate at LOS A in 2018 during the PM peak hour without or with the proposed project.

Site Access Evaluation

Vehicular access for the Views on 5th Ave mixed-use development is proposed via a woonerf running east-west through the site resulting in new access intersections at two locations: one enter only access on Sylvester Street and one exit only site access on Simmons Street. The PM peak hour site access analysis is summarized below in **Table 7**.

Table 7
2018 Site Access PM Peak Hour LOS Summary

Study Intersection (controlled movement)	LOS ¹	Delay (sec)	95 th % Queue
A. Simmons Street / Exit Only Site Access			
Westbound Shared Left-Right	A	9.8	< 25'
B. Sylvester Street / Enter Only Site Access			
Northbound Shared Left-Thru	A	7.3	< 25'

1. LOS = Level of Service

As shown in **Table 7**, the turn movements entering and exiting the Views on 5th Ave site are anticipated to operate at LOS A during the PM peak hour with minimal queuing.

With exit-only access onto Simmons Street, there is no need for inbound left-turns, and therefore, no need for a center turn lane on Simmons Street.

2040 Simmons Street Analysis

The City requested evaluation of LOS and queues along Simmons Street between 4th and 5th Ave during the PM peak hour in 2040. The analysis was completed without and with the addition of a future center two-way, left turn lane. Signal timing was optimized for the 2040 without project scenario at the Simmons Street/4th Avenue and Simmons Street/5th Avenue signalized intersections.

Traffic Volumes

Future weekday traffic volumes without the proposed Views on 5th Ave mixed-use project were estimated for future year 2040 conditions in the PM peak hour. Future traffic volumes at the study intersections were developed by applying a 2 percent background growth rate to existing PM peak hour traffic counts. Future pipeline traffic was assumed to be captured with the 2 percent background growth per direction from the City. The weekday PM peak hour traffic volumes for future year 2040 conditions without the project are shown on **Figure 7**. The weekday PM peak hour traffic volumes for future year 2040 with-project conditions are shown in **Figure 8**.

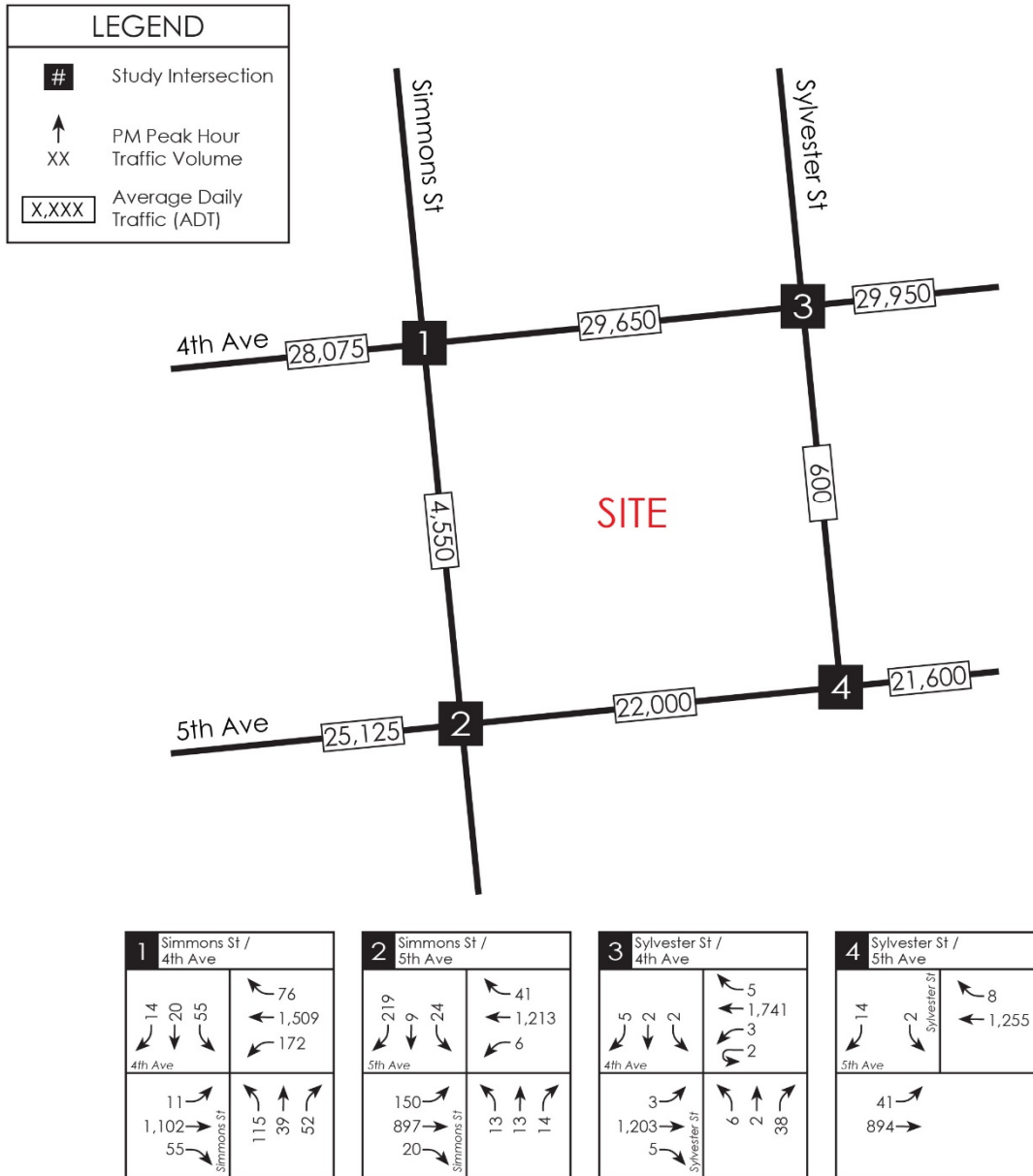


Figure 7: 2040 Baseline PM Peak Hour and Daily Traffic Volumes



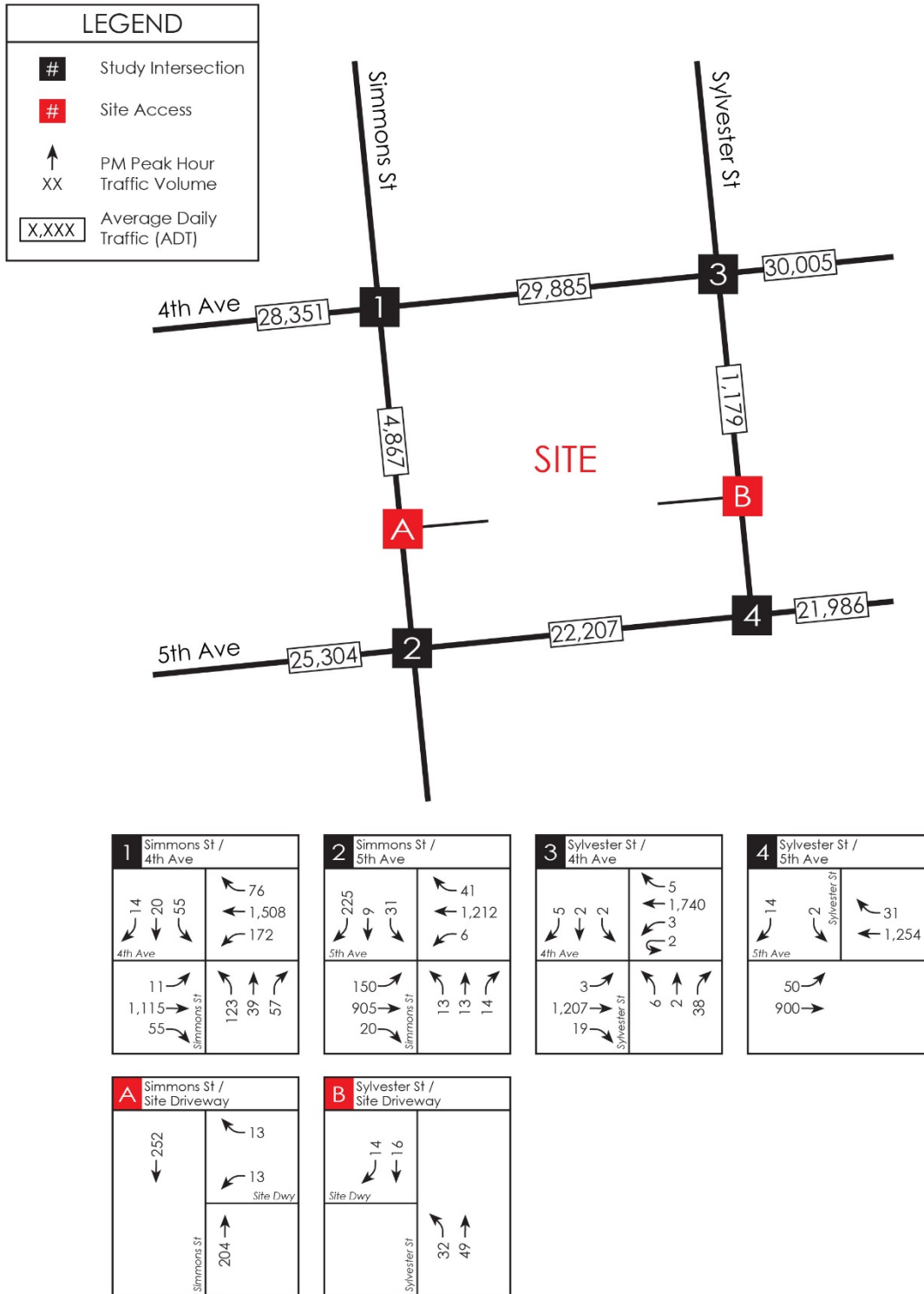


Figure 8: 2040 With-Project PM Peak Hour and Daily Traffic Volumes



LOS and Queuing – Existing Geometry

Tables 8 and 9 summarize the LOS and queue analysis results in 2040 during the PM peak hour while maintaining a 2-lane section on Simmons Street.

Table 8
2040 PM Peak Hour LOS Analysis Summary – Existing Geometry

Study Intersection	2040 Without Project		2040 With Project	
	LOS ¹	Delay	LOS ¹	Delay
<u>Signalized:</u>				
1. Simmons Street / 4 th Avenue	B	17.6	B	18.4
2. Simmons Street / 5 th Avenue	B	13.7	B	14.6
<u>Stop Controlled (Unsignalized):</u>				
A. Simmons Street / Exit Only Site Access	-	-	A	0.6

1. LOS = Level of Service

As shown in Table 8, both study intersections and the proposed site access are expected to operate at LOS B or better in 2040 during the PM peak hour without or with the proposed project while maintaining a 2-lane section on Simmons Street.

Table 9
2040 PM Peak Hour Queue Analysis Summary – Existing Geometry

Study Intersection	2040 Without Project	2040 With Project
	95 th % Queue (ft)	95 th % Queue (ft)
<u>Signalized:</u>		
1. Simmons Street / 4 th Avenue		
Northbound Approach	175'	200'
2. Simmons Street / 5 th Avenue		
Southbound Approach	175'	200'
<u>Stop Controlled (Unsignalized):</u>		
A. Simmons Street / Exit Only Site Access		
Westbound Approach (exiting)	-	< 25'

As shown in Table 9, the 95th-percentile queue for the northbound approach at the intersection of Simmons Street / 4th Avenue is estimated to be 200 feet in 2040 during the PM peak hour with the proposed Views on 5th Ave development while maintaining a two-lane section on Simmons Street. The 95th-percentile queue for the southbound approach at the Simmons Street / 5th Avenue intersection is estimated to be 200 feet in 2040 during the PM peak hour with the proposed Views on 5th Ave development. The proposed Views on 5th Ave development is anticipated to increase the northbound queue on Simmons Street approaching 4th Avenue and the southbound queue on Simmons Street approaching 5th Avenue by one (1) vehicle during the PM peak hour.

LOS and Queuing – With 3-lane Section on Simmons Street

Tables 10 and 11 summarize the LOS and queuing results in 2040 during the PM peak hour with a 3-lane section on Simmons Street including a center two-way left-turn lane. With a 3-lane section on Simmons Street, the analysis assumed exclusive left-turn lanes at the 4th Avenue and 5th Avenue signalized intersections.

Table 10
2040 PM Peak Hour LOS Summary – 3-Lane Section on Simmons Street

Study Intersection	2040 Without Project		2040 With Project	
	LOS ¹	Delay	LOS ¹	Delay
<u>Signalized:</u>				
1. Simmons Street / 4 th Avenue	B	14.9	B	15.3
2. Simmons Street / 5 th Avenue	B	12.7	B	13.1
<u>Stop Controlled (Unsignalized):</u>				
A. Simmons Street / Exit Only Site Access	-	-	A	0.6

1. LOS = Level of Service

As shown in Table 10, under the scenario that includes a 3-lane section on Simmons Street, both study intersections and the proposed site access are expected to operate at LOS B or better in 2040 during the PM peak hour without or with the proposed project.

Table 11
2040 PM Peak Hour Queue Summary – 3-Lane Section on Simmons Street

Study Intersection	2040 Without Project	2040 With Project
	95 th % Queue (ft)	95 th % Queue (ft)
<u>Signalized:</u>		
1. Simmons Street / 4 th Avenue		
Northbound Left-Turn	100'	100'
Northbound Shared Thru-Right	50'	50'
2. Simmons Street / 5 th Avenue		
Southbound Left-Turn	25'	25'
Southbound Shared Thru-Right	150'	150'
<u>Stop Controlled (Unsignalized):</u>		
A. Simmons Street / Exit Only Site Access		
Westbound Approach (exiting)	-	< 25'

As shown in Table 11, the 95th-percentile queue for the northbound left-turn at the intersection of Simmons Street / 4th Avenue is estimated to be 100 feet in 2040 during the PM peak hour with the proposed Views on 5th Ave development and converting Simmons Street to a 3-lane section. The 95th-percentile queue for the northbound shared thru-right is estimated to be 50 feet with the proposed project. The 95th-percentile queue for the southbound left-turn at the Simmons Street / 5th Avenue intersection is estimated to be 25 feet in 2040 during the PM peak hour with the proposed Views

on 5th Ave development and converting Simmons Street to a 3-lane section. The 95th-percentile queue for the southbound shared thru-right is estimated to be 150 feet with the proposed project. The proposed Views on 5th Ave development is not anticipated to increase vehicles queues on Simmons Street.

Conclusion

Based on the analysis in this section, converting the Simmons Street section between 4th Avenue and 5th Avenue to a 3-lane section with center two-way left-turn lane would improve the queuing and operations along this section.

It should also be noted that this conversion is not driven by the Views on 5th development. The Views on 5th Ave site access intersection will be exit-only with no inbound left-turns.

MITIGATION

The following summarizes the measures proposed to mitigate the transportation impacts of the proposed Views on 5th Ave mixed-use development.

City of Olympia Transportation Impact Fees. To offset the additional demand created by the proposed mixed-use development on public streets and roads, the developer would pay its proportionate share of the cost of new public facilities through the payment of a traffic impact fee. Per the City's current Transportation Impact Fee Schedule (effective January 1, 2017), the current impact fee is \$1,004 per apartment unit and \$3.87 per SF GFA for downtown services (retail stores, restaurants, supermarkets, convenience markets, video rentals, banks, health clubs, day cares, and libraries). Based on 138 apartment units, and 7,409 SF of downtown services (5,485 SF restaurant, 1,004 SF retail, 920 SF health club), the total traffic impact fee for the proposed Views on 5th Ave mixed-use development would be \$167,224.83.

Appendix A

Traffic Scoping Worksheet

CITY OF OLYMPIA TRAFFIC IMPACT ANALYSIS SCOPING SHEET

PROJECT INFORMATION

Proposed Use/Size : Views on 5th
135 unit Multi Family
6,364 sq. ft. Restaurant (downtown services)
1,803 sq. ft. Office
5,263 sq. ft. Health Club (downtown services)
Location: 5th and 4th Avenue, East of Simmons St.
Access: Sylvester Street - Simmon St (exit only)

Geographic Distribution

North
South
East 48%
West 52%
Use TRPC Model

Olympia Trip Generation Table: Multi Family 0.36 (65/35)
Office 2.11 (17//83)
Downtown Services 2.91 (48/52)
Pass-By/Capture Rate: Office (10%), Downtown Services (30%)
Year of Occupancy: 2018
Ambient Growth: 2% annual to Year 2040
Related Projects: Columbia Place
321 Loft Apartments
Columbia Heights
Olympia Commons

CRITICAL INTERSECTIONS

- | | |
|-------------------------------|---------------------------------|
| 1 All Site Access | 4 4th Avenue & Sylvester Street |
| 2 4th Avenue & Simmons Street | 5 5th Avenue & Sylvester Street |
| 3 5th Avenue & Simmons Street | |

Note: In addition to the future project build-out year analysis, TIA needs to include a future 2040 year analysis. This is needed to appropriately size Simmons Street to a 2/3 lane section. This analysis must follow City of Olympia guidelines for a Traffic Impact Analysis. Use two hour LOS and unsignalized intersection LOS is determined by the Weighted Average of each approach.

Developer: Ken Brogan
Phone: 360-791-3423

Traffic Consultant: TENW - Spenser Haynie
Phone: 425.889.6747

cc: Impacted jurisdictions - None

Appendix B

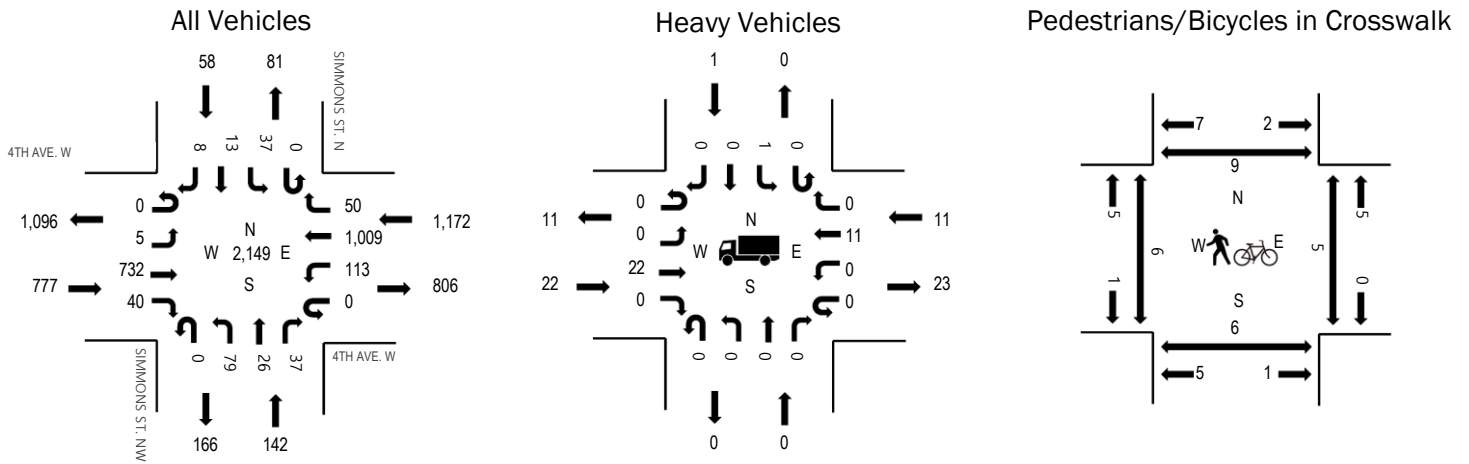
Existing PM Peak Hour Traffic Counts



Location: 1 SIMMONS ST. NW & 4TH AVE. W PM
Date and Start Time: Thursday, January 5, 2017
Peak Hour: 04:30 PM - 05:30 PM

(303) 216-2439
 www.alltrafficdata.net

Peak Hour



	HV%	PHF
EB	2.8%	0.87
WB	0.9%	0.89
NB	0.0%	0.85
SB	1.7%	0.91
All	1.6%	0.90

Traffic Counts - All Vehicles

Interval Start Time	4TH AVE. W Eastbound				4TH AVE. W Westbound				SIMMONS ST. NW Northbound				SIMMONS ST. NW Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	2	163	12	0	29	246	6	0	17	4	8	0	10	5	2	504	2,040
4:15 PM	0	2	187	7	0	26	238	19	0	14	7	7	0	12	3	4	526	2,136
4:30 PM	0	0	172	6	0	26	223	10	0	22	5	11	0	12	1	3	491	2,149
4:45 PM	0	0	177	12	0	27	248	11	0	16	2	11	0	7	6	2	519	2,119
5:00 PM	0	5	210	9	0	29	288	13	0	20	6	7	0	8	5	0	600	2,037
5:15 PM	0	0	173	13	0	31	250	16	0	21	13	8	0	10	1	3	539	
5:30 PM	0	1	157	4	0	31	217	12	0	17	5	8	0	5	3	1	461	
5:45 PM	0	3	158	7	0	19	203	8	0	18	7	6	0	5	1	2	437	
Count Total	0	13	1,397	70	0	218	1,913	95	0	145	49	66	0	69	25	17	4,077	
Peak Hour	0	5	732	40	0	113	1,009	50	0	79	26	37	0	37	13	8	2,149	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Total	Interval Start Time	Pedestrians/Bicycles on Crosswalk					Total
	EB	NB	WB	SB				EB	NB	WB	SB		
4:00 PM	2	0	4	0	6	4:00 PM	0	1	2	6	9		
4:15 PM	4	0	4	0	8	4:15 PM	0	2	0	5	7		
4:30 PM	6	0	2	0	8	4:30 PM	2	1	0	4	7		
4:45 PM	7	0	2	1	10	4:45 PM	4	1	3	2	10		
5:00 PM	4	0	3	0	7	5:00 PM	0	2	0	2	4		
5:15 PM	5	0	4	0	9	5:15 PM	0	2	2	1	5		
5:30 PM	1	0	3	0	4	5:30 PM	1	2	0	2	5		
5:45 PM	3	0	3	0	6	5:45 PM	1	6	0	0	7		
Count Total	32	0	25	1	58	Count Total	8	17	7	22	54		
Peak Hour	22	0	11	1	34	Peak Hour	6	6	5	9	26		



Location: 2 SIMMONS ST. NW & 5TH AVE. SW PM

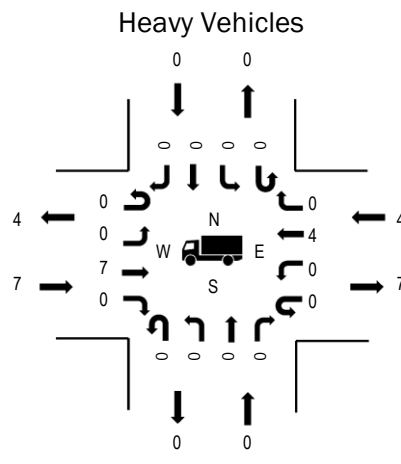
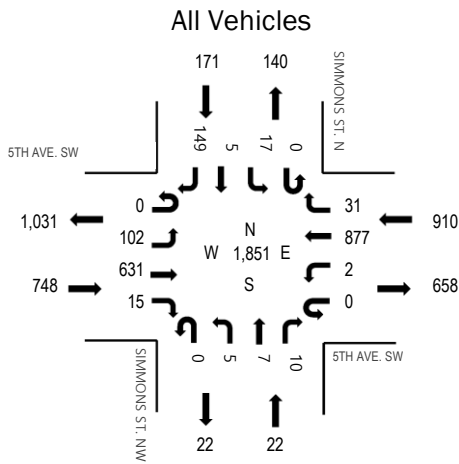
Date and Start Time: Thursday, January 5, 2017

Peak Hour: 04:30 PM - 05:30 PM

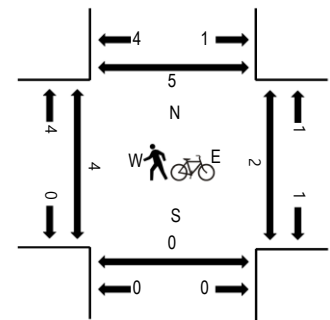
(303) 216-2439

www.alltrafficdata.net

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	0.9%	0.95
WB	0.4%	0.84
NB	0.0%	0.69
SB	0.0%	0.91
All	0.6%	0.90

Traffic Counts - All Vehicles

Interval Start Time	5TH AVE. SW Eastbound				5TH AVE. SW Westbound				SIMMONS ST. NW Northbound				SIMMONS ST. NW Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	20	135	3	0	1	166	3	0	2	5	3	0	3	2	42	385	1,637
4:15 PM	0	22	143	3	0	1	187	5	0	2	2	3	0	4	2	33	407	1,742
4:30 PM	0	26	165	6	0	1	170	8	0	2	3	1	0	4	1	27	414	1,851
4:45 PM	0	27	160	2	0	1	189	4	0	0	0	1	0	6	0	41	431	1,803
5:00 PM	0	23	139	6	0	0	265	5	0	1	4	2	0	3	2	40	490	1,681
5:15 PM	0	26	167	1	0	0	253	14	0	2	0	6	0	4	2	41	516	
5:30 PM	0	22	119	1	0	3	172	7	0	4	1	1	0	3	2	31	366	
5:45 PM	0	24	110	3	0	0	136	6	0	3	0	1	0	3	1	22	309	
Count Total	0	190	1,138	25	0	7	1,538	52	0	16	15	18	0	30	12	277	3,318	
Peak Hour	0	102	631	15	0	2	877	31	0	5	7	10	0	17	5	149	1,851	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

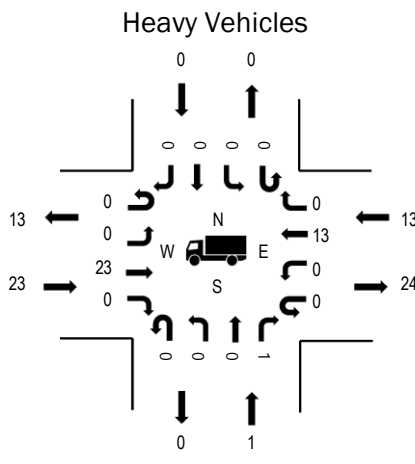
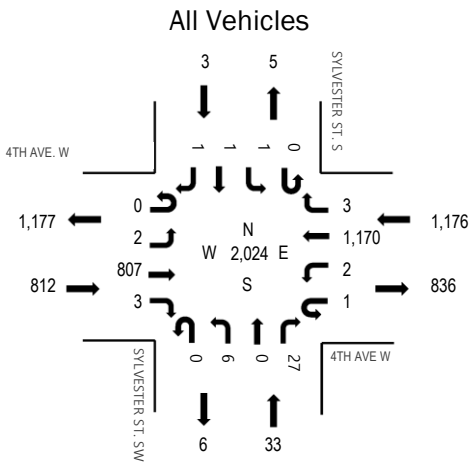
Interval Start Time	Heavy Vehicles					Total	Interval Start Time	Pedestrians/Bicycles on Crosswalk					Total
	EB	NB	WB	SB				EB	NB	WB	SB		
4:00 PM	1	0	1	0	2	2	4:00 PM	1	0	0	0	1	
4:15 PM	1	0	1	0	2	2	4:15 PM	1	0	2	3	6	
4:30 PM	1	0	1	0	2	2	4:30 PM	0	0	0	1	1	
4:45 PM	2	0	1	0	3	3	4:45 PM	2	0	1	0	3	
5:00 PM	2	0	1	0	3	3	5:00 PM	1	0	1	1	3	
5:15 PM	2	0	1	0	3	3	5:15 PM	1	0	0	3	4	
5:30 PM	1	0	1	0	2	2	5:30 PM	0	0	2	0	2	
5:45 PM	2	0	2	0	4	4	5:45 PM	1	0	1	0	2	
Count Total	12	0	9	0	21	21	Count Total	7	0	7	8	22	
Peak Hour	7	0	4	0	11	11	Peak Hour	4	0	2	5	11	



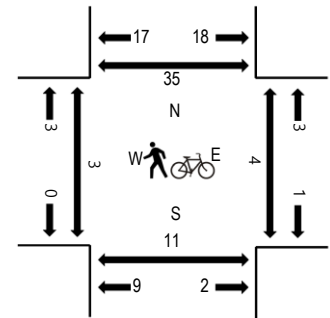
Location: 3 SYLVESTER ST. SW & 4TH AVE W PM
 Date and Start Time: Thursday, January 5, 2017
 Peak Hour: 04:30 PM - 05:30 PM

(303) 216-2439
 www.alltrafficdata.net

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	2.8%	0.90
WB	1.1%	0.90
NB	3.0%	0.83
SB	0.0%	0.75
All	1.8%	0.91

Traffic Counts - All Vehicles

Interval Start Time	4TH AVE. W Eastbound				4TH AVE W Westbound				SYLVESTER ST. SW Northbound				SYLVESTER ST. SW Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	1	184	1	0	0	281	0	0	1	0	6	0	1	0	0	475	1,922
4:15 PM	0	0	200	1	0	0	274	0	0	0	0	6	0	0	0	1	482	2,004
4:30 PM	0	1	199	1	0	1	262	0	0	2	0	8	0	0	0	1	475	2,024
4:45 PM	0	1	191	0	0	0	288	1	0	1	0	8	0	0	0	0	490	1,980
5:00 PM	0	0	225	1	0	1	325	0	0	2	0	2	0	0	1	0	557	1,896
5:15 PM	0	0	192	1	1	0	295	2	0	1	0	9	0	1	0	0	502	
5:30 PM	0	0	169	1	0	0	253	0	0	1	0	5	0	0	0	2	431	
5:45 PM	0	0	166	0	0	1	230	3	0	0	2	3	0	0	0	1	406	
Count Total	0	3	1,526	6	1	3	2,208	6	0	8	2	47	0	2	1	5	3,818	
Peak Hour	0	2	807	3	1	2	1,170	3	0	6	0	27	0	1	1	1	2,024	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Total	Interval Start Time	Pedestrians/Bicycles on Crosswalk					Total
	EB	NB	WB	SB				EB	NB	WB	SB		
4:00 PM	2	0	4	0	6	4:00 PM	0	1	5	12	18		
4:15 PM	4	0	4	0	8	4:15 PM	1	3	6	8	18		
4:30 PM	5	0	3	0	8	4:30 PM	2	2	0	12	16		
4:45 PM	9	0	3	0	12	4:45 PM	1	3	2	4	10		
5:00 PM	4	0	3	0	7	5:00 PM	0	3	2	7	12		
5:15 PM	5	1	4	0	10	5:15 PM	0	3	0	12	15		
5:30 PM	2	0	3	0	5	5:30 PM	1	0	0	7	8		
5:45 PM	3	0	3	0	6	5:45 PM	0	5	0	6	11		
Count Total	34	1	27	0	62	Count Total	5	20	15	68	108		
Peak Hour	23	1	13	0	37	Peak Hour	3	11	4	35	53		



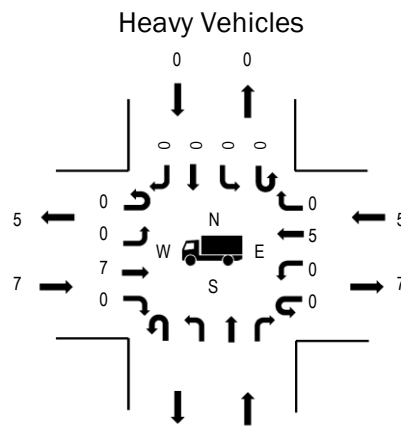
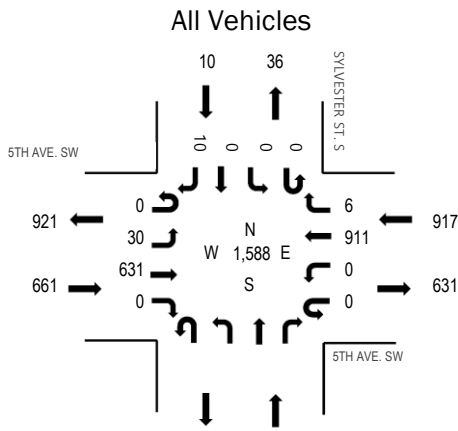
Location: 4 SYLVESTER ST. SW & 5TH AVE. SW PM

Date and Start Time: Thursday, January 5, 2017

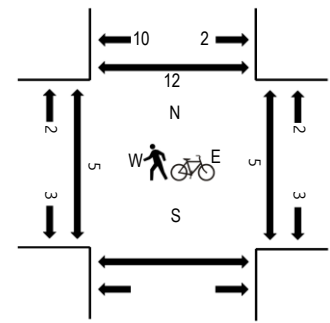
Peak Hour: 04:30 PM - 05:30 PM

(303) 216-2439
www.alltrafficdata.net

Peak Hour



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	1.1%	0.95
WB	0.5%	0.81
NB		
SB	0.0%	0.63
All	0.8%	0.87

Traffic Counts - All Vehicles

Interval Start Time	5TH AVE. SW Eastbound				5TH AVE. SW Westbound				Northbound				SYLVESTER ST. SW Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	7	134	0	0	0	170	1					0	0	0	1	313	1,361
4:15 PM	0	6	134	0	0	0	189	0					0	0	0	1	330	1,462
4:30 PM	0	9	165	0	0	0	181	2					0	0	0	2	359	1,588
4:45 PM	0	7	155	0	0	0	192	1					0	0	0	4	359	1,540
5:00 PM	0	5	149	0	0	0	256	1					0	0	0	3	414	1,444
5:15 PM	0	9	162	0	0	0	282	2					0	0	0	1	456	
5:30 PM	0	6	121	0	0	0	181	1					0	0	0	2	311	
5:45 PM	0	3	114	0	0	0	141	1					0	1	0	3	263	
Count Total	0	52	1,134	0	0	0	1,592	9					0	1	0	17	2,805	
Peak Hour	0	30	631	0	0	0	911	6					0	0	0	10	1,588	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1		1	0	2	4:00 PM	1		3	4	8
4:15 PM	1		2	0	3	4:15 PM	2		5	3	10
4:30 PM	1		2	0	3	4:30 PM	4		3	6	13
4:45 PM	1		1	0	2	4:45 PM	1		2	1	4
5:00 PM	3		1	0	4	5:00 PM	0		0	1	1
5:15 PM	2		1	0	3	5:15 PM	0		0	4	4
5:30 PM	1		1	0	2	5:30 PM	1		0	2	3
5:45 PM	2		1	0	3	5:45 PM	1		0	1	2
Count Total	12		10	0	22	Count Total	10		13	22	45
Peak Hour	7		5	0	12	Peak Hour	5		5	12	22

Appendix C

Level of Service (LOS) Calculations

2017 Existing

Unsignalized LOS Summary (Weighted Average Method)
2017 Existing - PM Peak Hour

Intersection	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	1	2	3	4	5	6	7	8	9	10	11	12
3. Sylvester St / 4th Ave												
Volume (HFR)	2	766		1,109			29			5		
Control Delay	11.8	0	0	9.7	0	0	22.5	0	0	42.3	0	0
Intersection Delay	6.1	A										
4. Sylvester St / 5th Ave												
Volume (HFR)	593				801					10		
Control Delay	10.2	0	0	0	0	0	0	0	0	14.4	0	0
Intersection Delay	4.4	A										

Note: **FOR TOTAL INTERSECTION DELAY**
Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Volume (vph)	7	699	35	109	957	48	73	25	33	35	13	9
Future Volume (vph)	7	699	35	109	957	48	73	25	33	35	13	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	0		0	50		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3156	0	1608	3187	0	0	1600	0	0	1603	0
Flt Permitted	0.236			0.282				0.831			0.787	
Satd. Flow (perm)	394	3156	0	475	3187	0	0	1363	0	0	1298	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			10			18			10	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		730			340			301			272	
Travel Time (s)		19.9			9.3			8.2			7.4	
Lane Group Flow (vph)	8	816	0	121	1116	0	0	146	0	0	63	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	10.0	57.0		10.0	57.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	3.5	2.5		3.5	2.5			2.5			2.5	
Act Effct Green (s)	63.4	58.3		68.7	67.7			15.3			15.3	
Actuated g/C Ratio	0.70	0.65		0.76	0.75			0.17			0.17	
v/c Ratio	0.02	0.40		0.26	0.47			0.59			0.28	
Control Delay	4.1	9.1		3.7	4.3			37.5			29.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.1	9.1		3.7	4.3			37.5			29.6	
LOS	A	A		A	A			D			C	
Approach Delay		9.0			4.3			37.5			29.6	
Approach LOS		A			A			D			C	

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	63 (70%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	8.8
Intersection LOS:	A
Intersection Capacity Utilization:	54.7%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings
2: Simmons St & 5th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (vph)	95	569	13	4	769	26	8	8	9	15	6	139
Future Volume (vph)	95	569	13	4	769	26	8	8	9	15	6	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	0	1475	0
Flt Permitted		0.722			0.953			0.733			0.971	
Satd. Flow (perm)	0	2315	0	0	3047	0	0	1183	0	0	1439	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			11			10			154	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1092			338			151			301	
Travel Time (s)		29.8			9.2			4.1			8.2	
Lane Group Flow (vph)	0	752	0	0	887	0	0	28	0	0	178	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	71.0	71.0		71.0	71.0		19.0	19.0		19.0	19.0	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Act Effct Green (s)		75.0			75.0			10.0			10.0	
Actuated g/C Ratio		0.83			0.83			0.11			0.11	
v/c Ratio		0.39			0.35			0.20			0.60	
Control Delay		2.8			0.9			28.3			15.1	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		2.8			0.9			28.3			15.2	
LOS		A			A			C			B	
Approach Delay		2.8			0.9			28.3			15.2	
Approach LOS		A			A			C			B	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 3.5
 Intersection LOS: A
 Intersection Capacity Utilization 67.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: Simmons St & 5th Ave



Lanes, Volumes, Timings
3: Sylvester St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	763	3	2	1104	3	4	1	24	1	1	3
Future Volume (vph)	2	763	3	2	1104	3	4	1	24	1	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3536	0	0	3574	0	0	1642	0	0	1729	0
Flt Permitted	0.950							0.994			0.990	
Satd. Flow (perm)	1770	3536	0	0	3574	0	0	1642	0	0	1729	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		340			311			302			254	
Travel Time (s)		9.3			8.5			8.2			6.9	
Lane Group Flow (vph)	2	841	0	0	1218	0	0	31	0	0	5	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC
3: Sylvester St & 4th Ave

07/18/2017

Intersection

Int Delay, s/veh 0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕			↕			↕			↕	
Traffic Vol, veh/h	2	763	3	2	1104	3	4	1	24	1	1	3
Future Vol, veh/h	2	763	3	2	1104	3	4	1	24	1	1	3
Conflicting Peds, #/hr	37	0	13	18	0	42	13	0	18	42	0	37
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	2	838	3	2	1213	3	4	1	26	1	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1258	0	0	859	0	0	1510	2124	481	1727	2124	687
Stage 1	-	-	-	-	-	-	862	862	-	1261	1261	-
Stage 2	-	-	-	-	-	-	648	1262	-	466	863	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.54	6.54	6.94	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Follow-up Hdwy	2.22	-	-	2.21	-	-	3.52	4.02	3.32	3.5	4	3.3
Pot Cap-1 Maneuver	549	-	-	784	-	-	83	49	531	58	51	394
Stage 1	-	-	-	-	-	-	316	370	-	183	244	-
Stage 2	-	-	-	-	-	-	425	239	-	551	374	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	530	-	-	772	-	-	76	46	505	50	48	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	76	46	-	50	48	-
Stage 1	-	-	-	-	-	-	310	363	-	176	234	-
Stage 2	-	-	-	-	-	-	403	229	-	501	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	22.5	42.3
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	238	530	-	-	772	-	-	102
HCM Lane V/C Ratio	0.134	0.004	-	-	0.003	-	-	0.054
HCM Control Delay (s)	22.5	11.8	-	-	9.7	-	-	42.3
HCM Lane LOS	C	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings
4: 5th Ave & Sylvester St

07/18/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	26	567	796	5	1	9
Future Volume (vph)	26	567	796	5	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3567	3571	0	1658	0
Flt Permitted		0.998			0.995	
Satd. Flow (perm)	0	3567	3571	0	1658	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		338	314		302	
Travel Time (s)		9.2	8.6		8.2	
Lane Group Flow (vph)	0	682	921	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.0% ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC
4: 5th Ave & Sylvester St

07/18/2017

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↑↔		↔	
Traffic Vol, veh/h	26	567	796	5	1	9
Future Vol, veh/h	26	567	796	5	1	9
Conflicting Peds, #/hr	16	0	0	18	18	16
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	30	652	915	6	1	10

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	939	0	1340
Stage 1	-	-	936
Stage 2	-	-	404
Critical Hdwy	4.12	-	6.8
Critical Hdwy Stg 1	-	-	5.8
Critical Hdwy Stg 2	-	-	5.8
Follow-up Hdwy	2.21	-	3.5
Pot Cap-1 Maneuver	732	-	146
Stage 1	-	-	347
Stage 2	-	-	649
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	721	-	132
Mov Cap-2 Maneuver	-	-	132
Stage 1	-	-	320
Stage 2	-	-	639

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	721	-	-	-	396
HCM Lane V/C Ratio	0.041	-	-	-	0.029
HCM Control Delay (s)	10.2	0.3	-	-	14.4
HCM Lane LOS	B	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

2018 Without-Project

Unsignalized LOS Summary (Weighted Average Method)
2018 Without-Project - PM Peak Hour

Intersection	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	1	2	3	4	5	6	7	8	9	10	11	12
3. Sylvester St / 4th Ave												
Volume (HFR)	2	829		1,170			29			5		
Control Delay	12.2	0	0	10.0	0	0	25.6	0	0	49.7	0	0
Intersection Delay	6.2	A										
4. Sylvester St / 5th Ave												
Volume (HFR)	637				834					10		
Control Delay	10.4	0	0	0	0	0	0	0	0	14.8	0	0
Intersection Delay	4.6	A										

Note: **FOR TOTAL INTERSECTION DELAY**
Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Volume (vph)	7	761	36	111	1015	49	74	26	34	36	13	9
Future Volume (vph)	7	761	36	111	1015	49	74	26	34	36	13	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	0		0	50		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	0	1600	0	0	1603	0
Flt Permitted	0.217			0.257				0.831			0.781	
Satd. Flow (perm)	363	3157	0	433	3187	0	0	1363	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			10			18			10	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		730			340			301			272	
Travel Time (s)		19.9			9.3			8.2			7.4	
Lane Group Flow (vph)	8	886	0	123	1182	0	0	149	0	0	64	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	10.0	57.0		10.0	57.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	3.5	2.5		3.5	2.5			2.5			2.5	
Act Effect Green (s)	63.3	58.1		68.6	67.6			15.4			15.4	
Actuated g/C Ratio	0.70	0.65		0.76	0.75			0.17			0.17	
v/c Ratio	0.02	0.43		0.28	0.49			0.60			0.28	
Control Delay	4.1	9.6		3.8	4.9			37.8			29.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.1	9.6		3.8	4.9			37.8			29.6	
LOS	A	A		A	A			D			C	
Approach Delay		9.5			4.8			37.8			29.6	
Approach LOS		A			A			D			C	

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	63 (70%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	9.2
Intersection LOS:	A
Intersection Capacity Utilization:	56.7%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (vph)	97	612	13	4	801	27	8	8	9	15	6	142
Future Volume (vph)	97	612	13	4	801	27	8	8	9	15	6	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	0	1475	0
Flt Permitted		0.718			0.953			0.732			0.971	
Satd. Flow (perm)	0	2302	0	0	3047	0	0	1181	0	0	1439	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			11			10				158
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1092			338			151				301
Travel Time (s)		29.8			9.2			4.1				8.2
Lane Group Flow (vph)	0	802	0	0	924	0	0	28	0	0	182	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	71.0	71.0		71.0	71.0		19.0	19.0		19.0	19.0	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Act Effct Green (s)		75.0			75.0			10.0			10.0	
Actuated g/C Ratio		0.83			0.83			0.11			0.11	
v/c Ratio		0.42			0.36			0.20			0.61	
Control Delay		3.0			1.0			28.3			15.6	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		3.0			1.0			28.3			15.7	
LOS		A			A			C			B	
Approach Delay		3.0			1.0			28.3			15.7	
Approach LOS		A			A			C			B	

Intersection Summary

Area Type: CBD

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 3.6

Intersection LOS: A

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Simmons St & 5th Ave



Lanes, Volumes, Timings
3: Sylvester St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	826	3	2	1165	3	4	1	24	1	1	3
Future Volume (vph)	2	826	3	2	1165	3	4	1	24	1	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	0	0	3574	0	0	1642	0	0	1729	0
Flt Permitted	0.950							0.994			0.990	
Satd. Flow (perm)	1770	3539	0	0	3574	0	0	1642	0	0	1729	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		340			311			302			254	
Travel Time (s)		9.3			8.5			8.2			6.9	
Lane Group Flow (vph)	2	911	0	0	1285	0	0	31	0	0	5	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC
3: Sylvester St & 4th Ave

07/18/2017

Intersection

Int Delay, s/veh 0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕			↕			↕			↕	
Traffic Vol, veh/h	2	826	3	2	1165	3	4	1	24	1	1	3
Future Vol, veh/h	2	826	3	2	1165	3	4	1	24	1	1	3
Conflicting Peds, #/hr	37	0	13	18	0	42	13	0	18	42	0	37
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	2	908	3	2	1280	3	4	1	26	1	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1325	0	0	929	0	0	1614	2261	516	1829	2261	721
Stage 1	-	-	-	-	-	-	932	932	-	1328	1328	-
Stage 2	-	-	-	-	-	-	682	1329	-	501	933	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.54	6.54	6.94	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Follow-up Hdwy	2.22	-	-	2.21	-	-	3.52	4.02	3.32	3.5	4	3.3
Pot Cap-1 Maneuver	517	-	-	738	-	-	69	40	504	49	42	374
Stage 1	-	-	-	-	-	-	287	343	-	167	226	-
Stage 2	-	-	-	-	-	-	406	222	-	526	348	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	499	-	-	727	-	-	63	37	479	42	39	350
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	37	-	42	39	-
Stage 1	-	-	-	-	-	-	282	336	-	160	216	-
Stage 2	-	-	-	-	-	-	384	212	-	476	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	25.6	49.7
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	206	499	-	-	727	-	-	86
HCM Lane V/C Ratio	0.155	0.004	-	-	0.003	-	-	0.064
HCM Control Delay (s)	25.6	12.2	-	-	10	-	-	49.7
HCM Lane LOS	D	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings
4: 5th Ave & Sylvester St

07/18/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	27	610	829	5	1	9
Future Volume (vph)	27	610	829	5	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3567	3571	0	1658	0
Flt Permitted		0.998			0.995	
Satd. Flow (perm)	0	3567	3571	0	1658	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		338	314		302	
Travel Time (s)		9.2	8.6		8.2	
Lane Group Flow (vph)	0	732	959	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC
4: 5th Ave & Sylvester St

07/18/2017

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↑↔		↔	
Traffic Vol, veh/h	27	610	829	5	1	9
Future Vol, veh/h	27	610	829	5	1	9
Conflicting Peds, #/hr	16	0	0	18	18	16
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	31	701	953	6	1	10

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	977	0	1405
Stage 1	-	-	974
Stage 2	-	-	431
Critical Hdwy	4.12	-	6.8
Critical Hdwy Stg 1	-	-	5.8
Critical Hdwy Stg 2	-	-	5.8
Follow-up Hdwy	2.21	-	3.5
Pot Cap-1 Maneuver	708	-	133
Stage 1	-	-	331
Stage 2	-	-	629
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	697	-	120
Mov Cap-2 Maneuver	-	-	120
Stage 1	-	-	302
Stage 2	-	-	620

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	697	-	-	-	378
HCM Lane V/C Ratio	0.045	-	-	-	0.03
HCM Control Delay (s)	10.4	0.3	-	-	14.8
HCM Lane LOS	B	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

2018 With-Project

Unsignalized LOS Summary (Weighted Average Method)
2018 With-Project - PM Peak Hour

Intersection	Eastbound			Westbound			Northbound			Southbound		
	L 1	T 2	R 3	L 4	T 5	R 6	L 7	T 8	R 9	L 10	T 11	R 12
3. Sylvester St / 4th Ave												
Volume (HFR)	2	847		1,169			29			5		
Control Delay	12.2	0	0	10.1	0	0	25.9	0	0	50.8	0	0
Intersection Delay	6.3	A										
4. Sylvester St / 5th Ave												
Volume (HFR)	652				856					10		
Control Delay	10.6	0	0	0	0	0	0	0	0	15.2	0	0
Intersection Delay	4.7	A										
A. Simmons St / Access												
Volume (HFR)				26				132			163	
Control Delay	0	0	0	9.8	0	0	0	0	0	0	0	0
Intersection Delay	0.8	A										
B. Sylvester St / Access												
Volume (HFR)							64				24	
Control Delay	0	0	0	0	0	0	7.3	0	0	0	0	0
Intersection Delay	5.3	A										

Note: **FOR TOTAL INTERSECTION DELAY**
Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Volume (vph)	7	774	36	111	1014	49	82	26	39	36	13	9
Future Volume (vph)	7	774	36	111	1014	49	82	26	39	36	13	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	0		0	50		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	0	1596	0	0	1603	0
Flt Permitted	0.215			0.249				0.825			0.781	
Satd. Flow (perm)	359	3157	0	420	3187	0	0	1350	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			10			19			10	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		730			340			143			272	
Travel Time (s)		19.9			9.3			3.9			7.4	
Lane Group Flow (vph)	8	900	0	123	1181	0	0	163	0	0	64	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	10.0	57.0		10.0	57.0		23.0	23.0		23.0	23.0	
Total Lost Time (s)	3.5	2.5		3.5	2.5			2.5			2.5	
Act Effct Green (s)	62.3	57.1		67.7	66.7			16.3			16.3	
Actuated g/C Ratio	0.69	0.63		0.75	0.74			0.18			0.18	
v/c Ratio	0.02	0.45		0.29	0.50			0.63			0.26	
Control Delay	4.6	10.3		4.1	5.3			38.4			28.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.6	10.3		4.1	5.3			38.4			28.4	
LOS	A	B		A	A			D			C	
Approach Delay		10.2			5.2			38.4			28.4	
Approach LOS		B			A			D			C	

Intersection Summary

Area Type:	CBD
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	63 (70%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	9.9
Intersection LOS:	A
Intersection Capacity Utilization	57.5%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Volume (vph)	97	620	13	4	800	27	8	8	9	22	6	148
Future Volume (vph)	97	620	13	4	800	27	8	8	9	22	6	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	0	1480	0
Flt Permitted		0.719			0.953			0.744			0.961	
Satd. Flow (perm)	0	2305	0	0	3047	0	0	1201	0	0	1429	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			11			10				164
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1092			338			151				157
Travel Time (s)		29.8			9.2			4.1				4.3
Lane Group Flow (vph)	0	811	0	0	923	0	0	28	0	0	195	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	71.0	71.0		71.0	71.0		19.0	19.0		19.0	19.0	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Act Effct Green (s)		74.6			74.6			10.4			10.4	
Actuated g/C Ratio		0.83			0.83			0.12			0.12	
v/c Ratio		0.42			0.37			0.19			0.63	
Control Delay		3.2			1.0			27.6			16.6	
Queue Delay		0.0			0.0			0.0			0.1	
Total Delay		3.2			1.0			27.6			16.7	
LOS		A			A			C			B	
Approach Delay		3.2			1.0			27.6			16.7	
Approach LOS		A			A			C			B	

Intersection Summary

Area Type: CBD
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 3.9
 Intersection LOS: A
 Intersection Capacity Utilization 71.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: Simmons St & 5th Ave



Lanes, Volumes, Timings
3: Sylvester St & 4th Ave

07/18/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	830	17	2	1164	3	4	1	24	1	1	3
Future Volume (vph)	2	830	17	2	1164	3	4	1	24	1	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3529	0	0	3574	0	0	1642	0	0	1729	0
Flt Permitted	0.950							0.994			0.990	
Satd. Flow (perm)	1770	3529	0	0	3574	0	0	1642	0	0	1729	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		340			311			147			254	
Travel Time (s)		9.3			8.5			4.0			6.9	
Lane Group Flow (vph)	2	931	0	0	1284	0	0	31	0	0	5	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC
3: Sylvester St & 4th Ave

07/18/2017

Intersection

Int Delay, s/veh 0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕			↕			↕			↕	
Traffic Vol, veh/h	2	830	17	2	1164	3	4	1	24	1	1	3
Future Vol, veh/h	2	830	17	2	1164	3	4	1	24	1	1	3
Conflicting Peds, #/hr	37	0	13	18	0	42	13	0	18	42	0	37
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	2	912	19	2	1279	3	4	1	26	1	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1324	0	0	949	0	0	1625	2272	526	1830	2280	720
Stage 1	-	-	-	-	-	-	944	944	-	1327	1327	-
Stage 2	-	-	-	-	-	-	681	1328	-	503	953	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.54	6.54	6.94	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.5	-
Follow-up Hdwy	2.22	-	-	2.21	-	-	3.52	4.02	3.32	3.5	4	3.3
Pot Cap-1 Maneuver	518	-	-	725	-	-	68	40	496	49	40	375
Stage 1	-	-	-	-	-	-	282	339	-	167	227	-
Stage 2	-	-	-	-	-	-	407	223	-	524	340	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	500	-	-	714	-	-	62	37	471	42	37	351
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	37	-	42	37	-
Stage 1	-	-	-	-	-	-	277	333	-	160	217	-
Stage 2	-	-	-	-	-	-	385	213	-	474	334	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	25.9	50.8
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	204	500	-	-	714	-	-	84
HCM Lane V/C Ratio	0.156	0.004	-	-	0.003	-	-	0.065
HCM Control Delay (s)	25.9	12.2	-	-	10.1	-	-	50.8
HCM Lane LOS	D	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.2

Lanes, Volumes, Timings
4: 5th Ave & Sylvester St

07/18/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	36	616	828	28	1	9
Future Volume (vph)	36	616	828	28	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3564	3556	0	1658	0
Flt Permitted		0.997			0.995	
Satd. Flow (perm)	0	3564	3556	0	1658	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		338	314		154	
Travel Time (s)		9.2	8.6		4.2	
Lane Group Flow (vph)	0	749	984	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.1%
Analysis Period (min)	15
	ICU Level of Service B

HCM 6th TWSC
4: 5th Ave & Sylvester St

07/18/2017

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↕	↕↔		↔↕	
Traffic Vol, veh/h	36	616	828	28	1	9
Future Vol, veh/h	36	616	828	28	1	9
Conflicting Peds, #/hr	16	0	0	18	18	16
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	41	708	952	32	1	10

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1002	0	526
Stage 1	-	-	986
Stage 2	-	-	454
Critical Hdwy	4.12	-	6.9
Critical Hdwy Stg 1	-	-	5.8
Critical Hdwy Stg 2	-	-	5.8
Follow-up Hdwy	2.21	-	3.3
Pot Cap-1 Maneuver	693	-	502
Stage 1	-	-	327
Stage 2	-	-	612
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	683	-	488
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	290
Stage 2	-	-	603

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	683	-	-	-	363
HCM Lane V/C Ratio	0.061	-	-	-	0.032
HCM Control Delay (s)	10.6	0.5	-	-	15.2
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1

Lanes, Volumes, Timings
 5: Simmons St & Exit Only Dwy

07/18/2017



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	132	0	0	163
Future Volume (vph)	13	13	132	0	0	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	25	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1694	0	1863	0	0	1863
Flt Permitted	0.976					
Satd. Flow (perm)	1694	0	1863	0	0	1863
Link Speed (mph)	25		25			25
Link Distance (ft)	121		157			143
Travel Time (s)	3.3		4.3			3.9
Lane Group Flow (vph)	28	0	143	0	0	177
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.6%
Analysis Period (min)	15
	ICU Level of Service A

HCM 6th TWSC
5: Simmons St & Exit Only Dwy

07/18/2017

Intersection

Int Delay, s/veh 0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑			↑
Traffic Vol, veh/h	13	13	132	0	0	163
Future Vol, veh/h	13	13	132	0	0	163
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	2	2	2
Mvmt Flow	14	14	143	0	0	177

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	320	143	0
Stage 1	143	-	-
Stage 2	177	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	673	905	0
Stage 1	884	-	0
Stage 2	854	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	673	905	-
Mov Cap-2 Maneuver	673	-	-
Stage 1	884	-	-
Stage 2	854	-	-

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

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 772	-
HCM Lane V/C Ratio	- 0.037	-
HCM Control Delay (s)	- 9.8	-
HCM Lane LOS	- A	-
HCM 95th %tile Q(veh)	- 0.1	-

Lanes, Volumes, Timings
 6: Sylvester St & Enter Only Dwy

07/18/2017



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	32	32	10	14
Future Volume (vph)	0	0	32	32	10	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	0	1818	1717	0
Flt Permitted				0.976		
Satd. Flow (perm)	1863	0	0	1818	1717	0
Link Speed (mph)	25			25	25	
Link Distance (ft)	102			154	147	
Travel Time (s)	2.8			4.2	4.0	
Lane Group Flow (vph)	0	0	0	70	26	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5% ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC
6: Sylvester St & Enter Only Dwy

07/18/2017

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	4	
Traffic Vol, veh/h	0	0	32	32	10	14
Future Vol, veh/h	0	0	32	32	10	14
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	2	2	2
Mvmt Flow	0	0	35	35	11	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	124	19	26	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	105	-	-	-	-	-
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	871	1059	1588	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	919	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	852	1059	1588	-	-	-
Mov Cap-2 Maneuver	852	-	-	-	-	-
Stage 1	982	-	-	-	-	-
Stage 2	919	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	3.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1588	-	-	-	-
HCM Lane V/C Ratio	0.022	-	-	-	-
HCM Control Delay (s)	7.3	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-

2040 Without-Project
(2-Lane Section on Simmons Street)

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1102	55	172	1509	76	115	39	52	55	20	14
Future Volume (vph)	11	1102	55	172	1509	76	115	39	52	55	20	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	0		0	50		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	0	1600	0	0	1602	0
Flt Permitted	0.092			0.112				0.791			0.744	
Satd. Flow (perm)	154	3157	0	190	3187	0	0	1298	0	0	1226	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11			20			12	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		730			340			301			272	
Travel Time (s)		19.9			9.3			8.2			7.4	
Confl. Peds. (#/hr)	11		9	9		11	4		4	4		4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1285	0	191	1761	0	0	229	0	0	99	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	8.6	43.2		14.0	48.6		22.8	22.8		22.8	22.8	
Total Lost Time (s)	3.5	2.5		3.5	2.5			2.5			2.5	
Act Effct Green (s)	48.9	44.3		56.2	55.5			17.8			17.8	
Actuated g/C Ratio	0.61	0.55		0.70	0.69			0.22			0.22	
v/c Ratio	0.06	0.73		0.64	0.80			0.76			0.35	
Control Delay	5.6	17.5		19.9	13.9			42.6			25.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.6	17.5		19.9	13.9			42.6			25.7	
LOS	A	B		B	B			D			C	
Approach Delay		17.4			14.5			42.6			25.7	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	2	258		30	267			95			35	
Queue Length 95th (ft)	7	351		99	#602			#186			77	
Internal Link Dist (ft)		650			260			221			192	
Turn Bay Length (ft)	200			115								
Base Capacity (vph)	194	1753		320	2215			344			320	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.73		0.60	0.80			0.67			0.31	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Lanes, Volumes, Timings

1: Simmons St & 4th Ave

07/20/2017

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 17.6

Intersection LOS: B

Intersection Capacity Utilization 77.4%

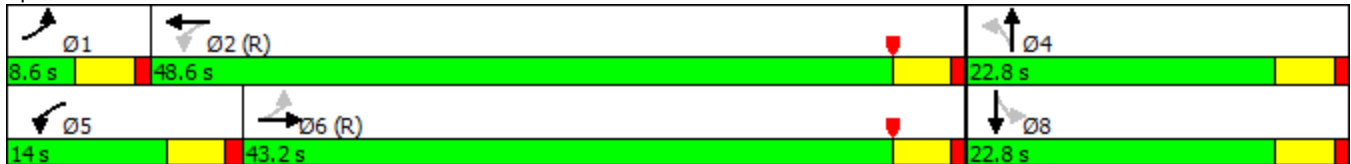
ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings
2: Simmons St & 5th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (vph)	150	897	20	6	1213	41	13	13	14	24	9	219
Future Volume (vph)	150	897	20	6	1213	41	13	13	14	24	9	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	0	1478	0
Flt Permitted		0.596			0.950			0.839			0.972	
Satd. Flow (perm)	0	1911	0	0	3038	0	0	1354	0	0	1443	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12			16			80	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1092			338			151			301	
Travel Time (s)		29.8			9.2			4.1			8.2	
Confl. Peds. (#/hr)	4					4	4		4	4		4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1186	0	0	1401	0	0	44	0	0	280	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	47.5	47.5		47.5	47.5		17.5	17.5		17.5	17.5	
Total Lost Time (s)		2.5			2.5			2.5			2.5	
Act Effct Green (s)		46.4			46.4			13.6			13.6	
Actuated g/C Ratio		0.71			0.71			0.21			0.21	
v/c Ratio		0.92dl			0.65			0.15			0.77	
Control Delay		17.1			7.0			15.9			32.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.1			7.0			15.9			32.5	
LOS		B			A			B			C	
Approach Delay		17.1			7.0			15.9			32.5	
Approach LOS		B			A			B			C	
Queue Length 50th (ft)		159			131			9			72	
Queue Length 95th (ft)		#351			189			32			#177	
Internal Link Dist (ft)		1012			258			71			221	
Turn Bay Length (ft)												
Base Capacity (vph)		1366			2171			324			394	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.87			0.65			0.14			0.71	

Intersection Summary

Area Type: CBD
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 13.7
 Intersection LOS: B

Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/20/2017

Intersection Capacity Utilization 100.4% ICU Level of Service G

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Simmons St & 5th Ave



2040 With-Project
(2-Lane Section on Simmons Street)

Unsignalized LOS Summary (Weighted Average Method)
2040 With-Project - PM Peak Hour (2-Lane Simmons Street)

Intersection	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
A. Simmons St / Access	1	2	3	4	5	6	7	8	9	10	11	12
Volume (HFR)				26				204			252	
Control Delay	0	0	0	10.8	0	0	0	0	0	0	0	0
Intersection Delay	0.6	A										

Note: **FOR TOTAL INTERSECTION DELAY**
Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1115	55	172	1508	76	123	39	57	55	20	14
Future Volume (vph)	11	1115	55	172	1508	76	123	39	57	55	20	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	0		0	50		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	0	1598	0	0	1602	0
Flt Permitted	0.093			0.106				0.787			0.743	
Satd. Flow (perm)	156	3157	0	179	3187	0	0	1290	0	0	1225	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11			21				12
Link Speed (mph)		25			25			25				25
Link Distance (ft)		730			340			143				272
Travel Time (s)		19.9			9.3			3.9				7.4
Lane Group Flow (vph)	12	1300	0	191	1760	0	0	243	0	0	99	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4				8
Permitted Phases	6			2			4			8		
Total Split (s)	8.6	43.2		14.0	48.6		22.8	22.8		22.8		22.8
Total Lost Time (s)	3.5	2.5		3.5	2.5			2.5				2.5
Act Effct Green (s)	48.3	43.9		55.7	55.0			18.3				18.3
Actuated g/C Ratio	0.60	0.55		0.70	0.69			0.23				0.23
v/c Ratio	0.06	0.75		0.65	0.80			0.78				0.34
Control Delay	5.6	18.1		22.1	14.3			44.7				25.3
Queue Delay	0.0	0.0		0.0	0.0			0.0				0.0
Total Delay	5.6	18.1		22.1	14.3			44.7				25.3
LOS	A	B		C	B			D				C
Approach Delay		18.0			15.0			44.7				25.3
Approach LOS		B			B			D				C
Queue Length 50th (ft)	2	267		35	275			101				35
Queue Length 95th (ft)	7	357		#105	#601			#206				77
Internal Link Dist (ft)		650			260			63				192
Turn Bay Length (ft)	200			115								
Base Capacity (vph)	192	1734		312	2195			343				319
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.06	0.75		0.61	0.80			0.71				0.31

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	18.4
Intersection LOS:	B
Intersection Capacity Utilization:	78.3%
ICU Level of Service:	D

Lanes, Volumes, Timings

1: Simmons St & 4th Ave

07/20/2017

Analysis Period (min) 15

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

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings
2: Simmons St & 5th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (vph)	150	905	20	6	1212	41	13	13	14	31	9	225
Future Volume (vph)	150	905	20	6	1212	41	13	13	14	31	9	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	25		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	0	1481	0
Flt Permitted		0.595			0.950			0.836			0.965	
Satd. Flow (perm)	0	1908	0	0	3038	0	0	1349	0	0	1437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12			16				81
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1092			338			151				157
Travel Time (s)		29.8			9.2			4.1				4.3
Lane Group Flow (vph)	0	1195	0	0	1400	0	0	44	0	0	294	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	47.5	47.5		47.5	47.5		17.5	17.5		17.5		17.5
Total Lost Time (s)		2.5			2.5			2.5				2.5
Act Effct Green (s)		46.1			46.1			13.9				13.9
Actuated g/C Ratio		0.71			0.71			0.21				0.21
v/c Ratio		0.93dl			0.65			0.15				0.79
Control Delay		18.3			7.1			15.8				34.9
Queue Delay		0.0			0.0			0.0				0.0
Total Delay		18.3			7.1			15.8				34.9
LOS		B			A			B				C
Approach Delay		18.3			7.1			15.8				34.9
Approach LOS		B			A			B				C
Queue Length 50th (ft)		162			131			9				78
Queue Length 95th (ft)		#355			189			32				#191
Internal Link Dist (ft)		1012			258			71				77
Turn Bay Length (ft)												
Base Capacity (vph)		1355			2157			323				393
Starvation Cap Reductn		0			0			0				0
Spillback Cap Reductn		0			0			0				0
Storage Cap Reductn		0			0			0				0
Reduced v/c Ratio		0.88			0.65			0.14				0.75

Intersection Summary

Area Type:	CBD
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	14.6
Intersection LOS:	B
Intersection Capacity Utilization:	101.8%
ICU Level of Service:	G

Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/20/2017

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Simmons St & 5th Ave



Lanes, Volumes, Timings
 5: Simmons St & Exit Only Dwy

07/20/2017



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	204	0	0	252
Future Volume (vph)	13	13	204	0	0	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1694	0	1863	0	0	1863
Flt Permitted	0.976					
Satd. Flow (perm)	1694	0	1863	0	0	1863
Link Speed (mph)	25		25			25
Link Distance (ft)	121		157			143
Travel Time (s)	3.3		4.3			3.9
Lane Group Flow (vph)	28	0	222	0	0	274
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.3% ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC
5: Simmons St & Exit Only Dwy

07/20/2017

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	13	13	204	0	0	252
Future Vol, veh/h	13	13	204	0	0	252
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	2	2	2
Mvmt Flow	14	14	222	0	0	274

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	496	222	0
Stage 1	222	-	-
Stage 2	274	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	533	818	0
Stage 1	815	-	0
Stage 2	772	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	533	818	-
Mov Cap-2 Maneuver	533	-	-
Stage 1	815	-	-
Stage 2	772	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBTWBLn1	SBT
Capacity (veh/h)	- 645	-
HCM Lane V/C Ratio	- 0.044	-
HCM Control Delay (s)	- 10.8	-
HCM Lane LOS	- B	-
HCM 95th %tile Q(veh)	- 0.1	-

2040 Without-Project
(3-Lane Section on Simmons Street)

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1102	55	172	1509	76	115	39	52	55	20	14
Future Volume (vph)	11	1102	55	172	1509	76	115	39	52	55	20	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	50		0	50		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	1624	1547	0	0	1602	0
Flt Permitted	0.088			0.123			0.691				0.788	
Satd. Flow (perm)	148	3157	0	208	3187	0	1177	1547	0	0	1298	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11			58				12
Link Speed (mph)		25			25			25				25
Link Distance (ft)		730			340			301				272
Travel Time (s)		19.9			9.3			8.2				7.4
Lane Group Flow (vph)	12	1285	0	191	1761	0	128	101	0	0	99	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4				8
Permitted Phases	6			2			4			8		
Total Split (s)	8.6	43.2		14.0	48.6		22.8	22.8		22.8		22.8
Total Lost Time (s)	3.5	2.5		3.5	2.5		2.5	2.5				2.5
Act Effct Green (s)	51.6	46.7		58.9	58.2		15.1	15.1				15.1
Actuated g/C Ratio	0.64	0.58		0.74	0.73		0.19	0.19				0.19
v/c Ratio	0.06	0.70		0.59	0.76		0.58	0.30				0.39
Control Delay	5.2	15.5		15.8	11.8		39.2	15.1				28.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Total Delay	5.2	15.5		15.8	11.8		39.2	15.1				28.0
LOS	A	B		B	B		D	B				C
Approach Delay		15.4			12.2			28.6				28.0
Approach LOS		B			B			C				C
Queue Length 50th (ft)	1	221		23	206		58	18				38
Queue Length 95th (ft)	7	351		92	#602		106	54				76
Internal Link Dist (ft)		650			260			221				192
Turn Bay Length (ft)	200			115			50					
Base Capacity (vph)	201	1848		345	2321		298	435				338
Starvation Cap Reductn	0	0		0	0		0	0				0
Spillback Cap Reductn	0	0		0	0		0	0				0
Storage Cap Reductn	0	0		0	0		0	0				0
Reduced v/c Ratio	0.06	0.70		0.55	0.76		0.43	0.23				0.29

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	14.9
Intersection LOS:	B
Intersection Capacity Utilization:	75.0%
ICU Level of Service:	D

Lanes, Volumes, Timings

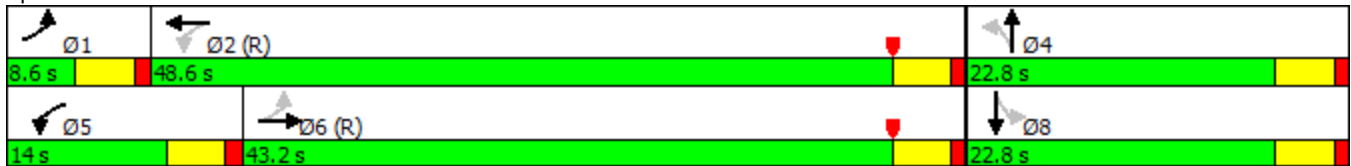
1: Simmons St & 4th Ave

07/20/2017

Analysis Period (min) 15

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

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings
2: Simmons St & 5th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕		↕	↕	
Traffic Volume (vph)	150	897	20	6	1213	41	13	13	14	24	9	219
Future Volume (vph)	150	897	20	6	1213	41	13	13	14	24	9	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	1624	1438	0
Flt Permitted		0.597			0.950			0.833		0.822		
Satd. Flow (perm)	0	1914	0	0	3038	0	0	1344	0	1397	1438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12			16				80
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1092			338			151				301
Travel Time (s)		29.8			9.2			4.1				8.2
Lane Group Flow (vph)	0	1186	0	0	1401	0	0	44	0	27	253	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	47.5	47.5		47.5	47.5		17.5	17.5		17.5		17.5
Total Lost Time (s)		2.5			2.5			2.5		2.5		2.5
Act Effct Green (s)		46.9			46.9			13.1		13.1		13.1
Actuated g/C Ratio		0.72			0.72			0.20		0.20		0.20
v/c Ratio		0.90dl			0.64			0.16		0.10		0.72
Control Delay		16.2			6.7			16.0		20.8		28.4
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		16.2			6.7			16.0		20.8		28.4
LOS		B			A			B		C		C
Approach Delay		16.2			6.7			16.0				27.7
Approach LOS		B			A			B				C
Queue Length 50th (ft)		158			131			9		8		60
Queue Length 95th (ft)		#351			189			32		27		#139
Internal Link Dist (ft)		1012			258			71				221
Turn Bay Length (ft)										50		
Base Capacity (vph)		1384			2197			322		322		393
Starvation Cap Reductn		0			0			0		0		0
Spillback Cap Reductn		0			0			0		0		0
Storage Cap Reductn		0			0			0		0		0
Reduced v/c Ratio		0.86			0.64			0.14		0.08		0.64

Intersection Summary

Area Type:	CBD
Cycle Length:	65
Actuated Cycle Length:	65
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	12.7
Intersection LOS:	B
Intersection Capacity Utilization:	98.0%
ICU Level of Service:	F

Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/20/2017

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Simmons St & 5th Ave



2040 With-Project
(3-Lane Section on Simmons Street)

Unsignalized LOS Summary (Weighted Average Method)
2040 With-Project - PM Peak Hour (3-Lane Simmons Street)

Intersection	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
	1	2	3	4	5	6	7	8	9	10	11	12
A. Simmons St / Access												
Volume (HFR)				26				204			252	
Control Delay	0	0	0	10.8	0	0	0	0	0	0	0	0
Intersection Delay	0.6	A										

Note: **FOR TOTAL INTERSECTION DELAY**
Major Approach: Left-Through-Right Shared is added together and entered as the left movement with the LT delay.
It is assumed drivers do not pass a queued left-turn and are assigned delay.
HCS assumes there is no delay for the TH movement.
If there is an exclusive Left-turn lane enter the Through and the Right volume without delay
Delay max 1000 sec.

Lanes, Volumes, Timings
1: Simmons St & 4th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1115	55	172	1508	76	123	39	57	55	20	14
Future Volume (vph)	11	1115	55	172	1508	76	123	39	57	55	20	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	115		0	50		0	50		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1593	3157	0	1608	3187	0	1624	1542	0	0	1602	0
Flt Permitted	0.088			0.118			0.692				0.787	
Satd. Flow (perm)	148	3157	0	200	3187	0	1178	1542	0	0	1296	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11			63				12
Link Speed (mph)		25			25			25				25
Link Distance (ft)		730			340			143				272
Travel Time (s)		19.9			9.3			3.9				7.4
Lane Group Flow (vph)	12	1300	0	191	1760	0	137	106	0	0	99	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4				8
Permitted Phases	6			2			4			8		
Total Split (s)	8.6	43.2		14.0	48.6		22.8	22.8		22.8		22.8
Total Lost Time (s)	3.5	2.5		3.5	2.5		2.5	2.5				2.5
Act Effct Green (s)	51.3	46.4		58.5	57.8		15.5	15.5				15.5
Actuated g/C Ratio	0.64	0.58		0.73	0.72		0.19	0.19				0.19
v/c Ratio	0.06	0.71		0.61	0.76		0.60	0.30				0.38
Control Delay	5.3	16.0		17.1	12.1		39.9	14.5				27.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0				0.0
Total Delay	5.3	16.0		17.1	12.1		39.9	14.5				27.5
LOS	A	B		B	B		D	B				C
Approach Delay		15.9			12.6			28.8				27.5
Approach LOS		B			B			C				C
Queue Length 50th (ft)	1	231		24	214		62	18				38
Queue Length 95th (ft)	7	357		95	#601		112	55				76
Internal Link Dist (ft)		650			260			63				192
Turn Bay Length (ft)	200			115			50					
Base Capacity (vph)	201	1835		337	2305		298	438				337
Starvation Cap Reductn	0	0		0	0		0	0				0
Spillback Cap Reductn	0	0		0	0		0	0				0
Storage Cap Reductn	0	0		0	0		0	0				0
Reduced v/c Ratio	0.06	0.71		0.57	0.76		0.46	0.24				0.29

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	15.3
Intersection LOS:	B
Intersection Capacity Utilization:	75.0%
ICU Level of Service:	D

Lanes, Volumes, Timings

1: Simmons St & 4th Ave

07/20/2017

Analysis Period (min) 15

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

Splits and Phases: 1: Simmons St & 4th Ave



Lanes, Volumes, Timings
2: Simmons St & 5th Ave

07/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕		↕	↕	
Traffic Volume (vph)	150	905	20	6	1212	41	13	13	14	31	9	225
Future Volume (vph)	150	905	20	6	1212	41	13	13	14	31	9	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3185	0	0	3198	0	0	1590	0	1624	1438	0
Flt Permitted		0.598			0.950			0.821		0.822		
Satd. Flow (perm)	0	1918	0	0	3038	0	0	1325	0	1397	1438	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12			16				81
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1092			338			151				157
Travel Time (s)		29.8			9.2			4.1				4.3
Lane Group Flow (vph)	0	1195	0	0	1400	0	0	44	0	34	260	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	47.5	47.5		47.5	47.5		17.5	17.5		17.5		17.5
Total Lost Time (s)		2.5			2.5			2.5		2.5		2.5
Act Effct Green (s)		46.8			46.8			13.2		13.2		13.2
Actuated g/C Ratio		0.72			0.72			0.20		0.20		0.20
v/c Ratio		0.90dl			0.64			0.16		0.12		0.73
Control Delay		16.7			6.8			16.1		21.2		29.3
Queue Delay		0.0			0.0			0.0		0.0		0.0
Total Delay		16.7			6.8			16.1		21.2		29.3
LOS		B			A			B		C		C
Approach Delay		16.7			6.8			16.1				28.4
Approach LOS		B			A			B				C
Queue Length 50th (ft)		161			131			9		11		63
Queue Length 95th (ft)		#354			189			32		31		#154
Internal Link Dist (ft)		1012			258			71				77
Turn Bay Length (ft)										50		
Base Capacity (vph)		1383			2191			318		322		394
Starvation Cap Reductn		0			0			0		0		0
Spillback Cap Reductn		0			0			0		0		0
Storage Cap Reductn		0			0			0		0		0
Reduced v/c Ratio		0.86			0.64			0.14		0.11		0.66

Intersection Summary

Area Type: CBD

Cycle Length: 65

Actuated Cycle Length: 65

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 13.1

Intersection LOS: B

Intersection Capacity Utilization 98.6%

ICU Level of Service F

Lanes, Volumes, Timings

2: Simmons St & 5th Ave

07/20/2017

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 2: Simmons St & 5th Ave



Lanes, Volumes, Timings
 5: Simmons St & Exit Only Dwy

07/20/2017



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	204	0	0	252
Future Volume (vph)	13	13	204	0	0	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1694	0	1863	0	0	1863
Flt Permitted	0.976					
Satd. Flow (perm)	1694	0	1863	0	0	1863
Link Speed (mph)	25		25			25
Link Distance (ft)	121		157			143
Travel Time (s)	3.3		4.3			3.9
Lane Group Flow (vph)	28	0	222	0	0	274
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.3% ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC
5: Simmons St & Exit Only Dwy

07/20/2017

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	YY		↑			↑
Traffic Vol, veh/h	13	13	204	0	0	252
Future Vol, veh/h	13	13	204	0	0	252
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, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	14	222	0	0	274
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	496	222	0	-	-	-
Stage 1	222	-	-	-	-	-
Stage 2	274	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	533	818	-	0	0	-
Stage 1	815	-	-	0	0	-
Stage 2	772	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	533	818	-	-	-	-
Mov Cap-2 Maneuver	605	-	-	-	-	-
Stage 1	815	-	-	-	-	-
Stage 2	772	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	10.4		0		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1	SBT				
Capacity (veh/h)	- 696	-				
HCM Lane V/C Ratio	- 0.041	-				
HCM Control Delay (s)	- 10.4	-				
HCM Lane LOS	- B	-				
HCM 95th %tile Q(veh)	- 0.1	-				

Appendix D

Trip Generation Calculations

Views on 5th Ave Trip Generation

DAILY									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ³	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	138	DU	220	3.86	50%	50%	266	267	533
Restaurant	5,485	GFA	932	89.01	50%	50%	244	244	488
Retail	1,004	GFA	820	29.89	50%	50%	15	15	30
Health Club	920	GFA	492	23.05	50%	50%	11	10	21
NET NEW DAILY TRIP GENERATION =							536	536	1,072
AM PEAK HOUR									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ³	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	138	DU	220	0.30	20%	80%	8	33	41
Restaurant	5,485	GFA	932	7.57	55%	45%	23	19	42
Retail	1,004	GFA	820	0.67	62%	38%	1	0	1
Health Club	920	GFA	492	0.99	50%	50%	1	0	1
NET NEW AM PEAK HOUR TRIP GENERATION =							33	52	85
PM PEAK HOUR									
Land Use	Area	Units ¹	ITE LUC ²	Trip Rate ⁴	Directional Split		Trips Generated		
					In	Out	In	Out	Total
Proposed Use:									
Apartments	138	DU	220	0.36	65%	35%	33	17	50
Restaurant	5,485	GLA	932	2.04	60%	40%	7	4	11
Retail	1,004	GFA	820	2.04	48%	52%	1	1	2
Health Club	920	GLA	492	2.04	57%	43%	1	1	2
NET NEW PM PEAK HOUR TRIP GENERATION =							42	23	65

Notes:

1. DU = Dwelling Units, GFA = Gross Floor Area.
2. Institute of Transportation Engineers (ITE) *Trip Generation* manual 9th edition land use code.
3. Daily and AM trip rates are ITE rates adjusted to account for City of Olympia trip reductions based on the Olympia Impact Fee Program.
4. Trip rates based on reduced trip rates from the Olympia Impact Fee Program.

Appendix E

TRPC Traffic Model Distribution

