Chick-fil-A

Renton, WA
PRE17-000838

Transportation Impact Analysis
August 13, 2018

Prepared for:

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EXHIBIT 16

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FINDINGS/CONCLUSIONS

This transportation impact analysis (TIA) has been prepared for the proposed Chick-fil-A Restaurant project located at 361 Rainier Avenue S in Renton.

Project Proposal. The project proposal includes a 4,195 square foot (SF) Chick-fil-A fast-food restaurant with a drive-through window on a site that is currently vacant (formerly occupied by Diamond Lil's Restaurant). Vehicular access to the site is proposed at two locations: one via the Rainier Avenue S / S 3rd Place signalized intersection and the other via a right-in/right-out driveway north of the signal. Full buildout of the project is estimated to occur in 2020.

Trip Generation. The proposed project is estimated to generate 988 new weekday daily trips with 86 new trips occurring during the weekday AM peak hour (44 entering, 22 exiting) and 68 new trips occurring during the weekday PM peak hour (35 entering, 33 exiting).

Future Year LOS. LOS analyses were conducted for future year 2020 AM and PM peak hour conditions at the Rainier Avenue S / S 3rd Place signalized intersection. Based on the analysis results, the signalized study intersection is expected to operate at LOS C or better in 2020 with the proposed Chick-fil-A Restaurant project.

Site Access Analysis. The individual movements at the proposed right-in/right-out driveway on Rainier Avenue S are expected to operate at LOS B or better in 2019 with 95th percentile queues anticipated to be less than 25 feet during both the AM and PM peak hours.

Parking Evaluation. The project proposes a total of 42 on-site surface parking stalls. Peak parking demand was estimated based on rates included in the *ITE Parking Generation* manual, which has an average peak period parking demand rate for a fast-food restaurant with drive-through window of 9.98 vehicles per 1,000 SF. Applying the peak parking demand rate to the proposed Chick-fil-A Restaurant results in a total estimated peak parking demand of 42 stalls (9.98 X 4,195 / 1000). The 42 proposed on-site parking stalls would accommodate this peak parking demand.

Parking Modification. The project proposes 42 stalls which exceeds the City coded allowance of 1 stall per 75 SF of dining area. To ensure public safety and minimize impact to adjacent properties, it is imperative that adequate on-site parking is provided for customers and to accommodate traffic circulation. Having adequate on-site parking and drive-thru queuing will prevent parking spill-over onto adjacent businesses and neighborhoods. If delays in the drive-thru are too long, customers will intuitively park on-site and go inside the restaurant. Without adequate on-site parking and good circulation, dine-in customers will create parking spillover. This can be avoiding by allowing the site to provide the amount of proposed parking greater than code allows.

Mitigation.

Off-Site Improvements. Based on the results of the analysis, the existing transportation facilities are anticipated to accommodate the additional traffic generated by the proposed Chick-fil-A Restaurant project. No project-specific off-site transportation mitigation is proposed.

Transportation Impact Fees. To mitigate long-term traffic impacts, the City of Renton requires payment of a traffic impact fee. The City's currently adopted impact fee rates are $90.36 per square foot of fast-food restaurant with drive-through window use and $30.48 per square foot of sit-down restaurant use. Based on the current site plan, with credit for the former Diamond Lil's Restaurant, the net impact fee for the proposed project would be $225,166.68. The City's impact fee rate is subject to change.

Traffic and Parking Management Plan. During the opening weeks of the Chick-fil-A Restaurant, it is expected that higher traffic levels and parking needs will be generated similar to other recent openings in the region. As a result, a *Traffic and Parking Management Plan* has been developed that will help direct entering and exiting vehicles for Chick-fil-A drive-through and walk-up patrons to areas within the site to help reduce impacts to the shared parking areas and drive aisles of the retail center, and to eliminate queue spill-back onto adjacent streets.

Implementation of the *Traffic and Parking Management Plan* is proposed to mitigate short-term transportation impacts, and payment of the pro-rata transportation costs is proposed to mitigate long-term transportation impacts of the proposed Chick-fil-A development.

INTRODUCTION

This transportation impact analysis (TIA) has been prepared for the proposed Chick-fil-A Restaurant project located at 361 Rainier Avenue S in Renton as shown in the Figure 1 Vicinity Map.

Project Description

The project proposal includes a 4,195 square foot (SF) Chick-fil-A fast-food restaurant with a drive-through window and 42 parking stalls on a site that is currently vacant (formerly Diamond Lil's Restaurant). Vehicular access to the site is proposed at two locations: one on S 3rd Place west of Rainier Avenue S signalized intersection, other via a right-in/right-out driveway north of the signal. Full buildout of the project is anticipated in 2020. A preliminary site plan is provided in Figure 2.

Project Approach

To analyze the traffic impacts from the project, the following tasks were undertaken:

- Assessed existing conditions through field reconnaissance and reviewed existing planning documents;
- Described and assessed existing transportation conditions in the area;
- Documented collision histories at study intersections;
- Documented planned transportation improvements in the site vicinity;
- Documented existing traffic volumes and intersection levels of service (LOS) at the Rainier Avenue S / S 3rd Place study intersection during the weekday AM and PM peak hours;
- Estimated trip generation and documented trip distribution and assignment of AM and PM peak hour project-generated traffic;
- Documented traffic forecasts and assumptions for year 2020 conditions at the off-site study intersection without and with the proposed development;
- Analyzed weekday AM and PM peak hour LOS for year 2020 conditions at the off-site study intersection without and with the proposed development;
- Assessed operations at the proposed site access locations, including LOS and queuing during weekday AM and PM peak hour conditions;
- Identified transportation mitigation to the City of Renton.

Primary Data and Information Sources

- City of Renton *Comprehensive Plan Transportation Element*, June 22, 2015.
- City of Renton *2018 - 2023 Transportation Improvement Program*.
- ITE *Trip Generation* Manual, 10th Edition, 2017.
- AM and PM Peak Hour traffic counts by All Traffic Data, June 2018.
- *Highway Capacity Manual (HCM 6th Edition),* 2016.
- Washington State Department of Transportation (WSDOT) Collision Data, 2015-2017.

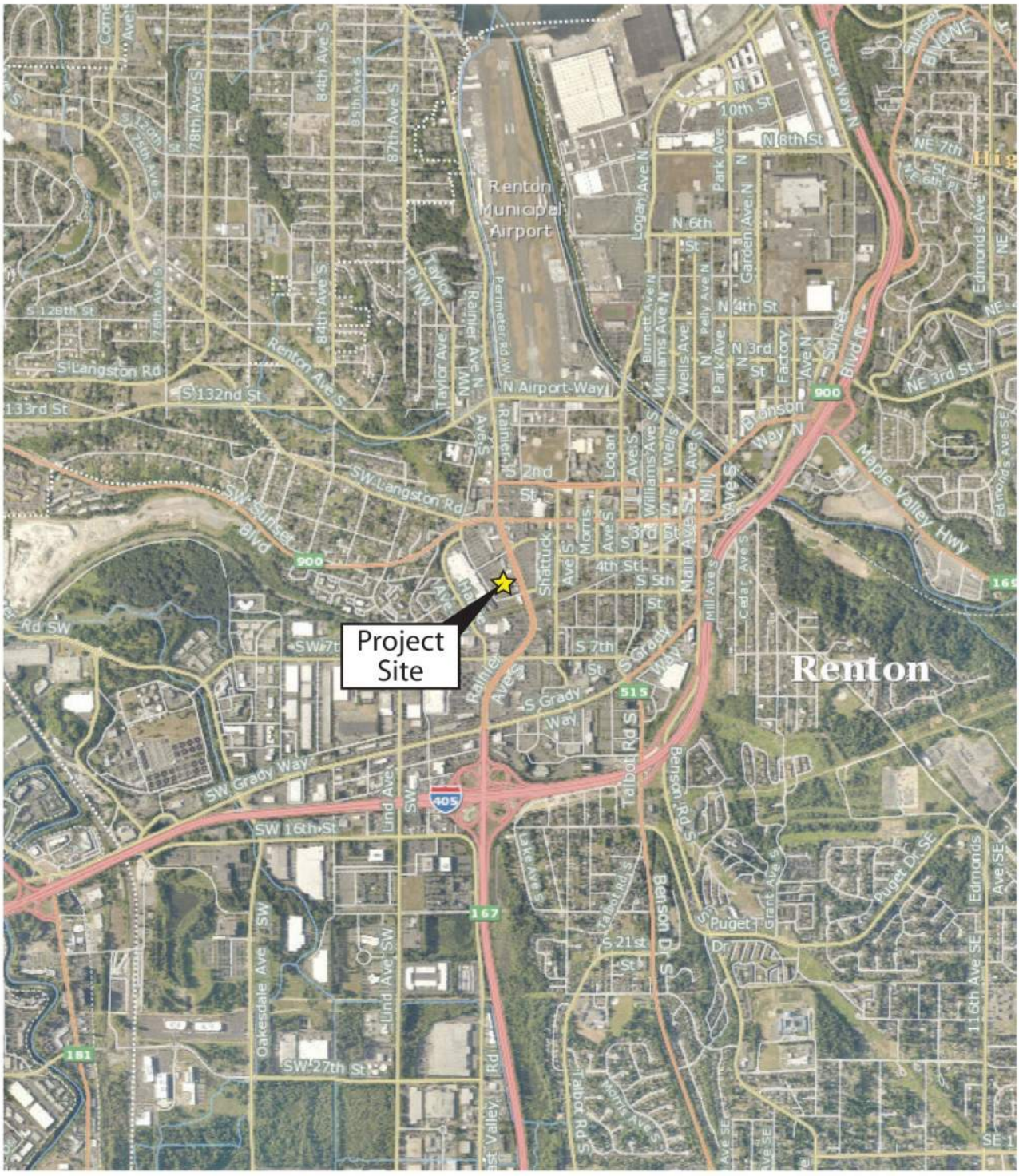

Figure 1: Project Site Vicinity

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NOT TO SCALE

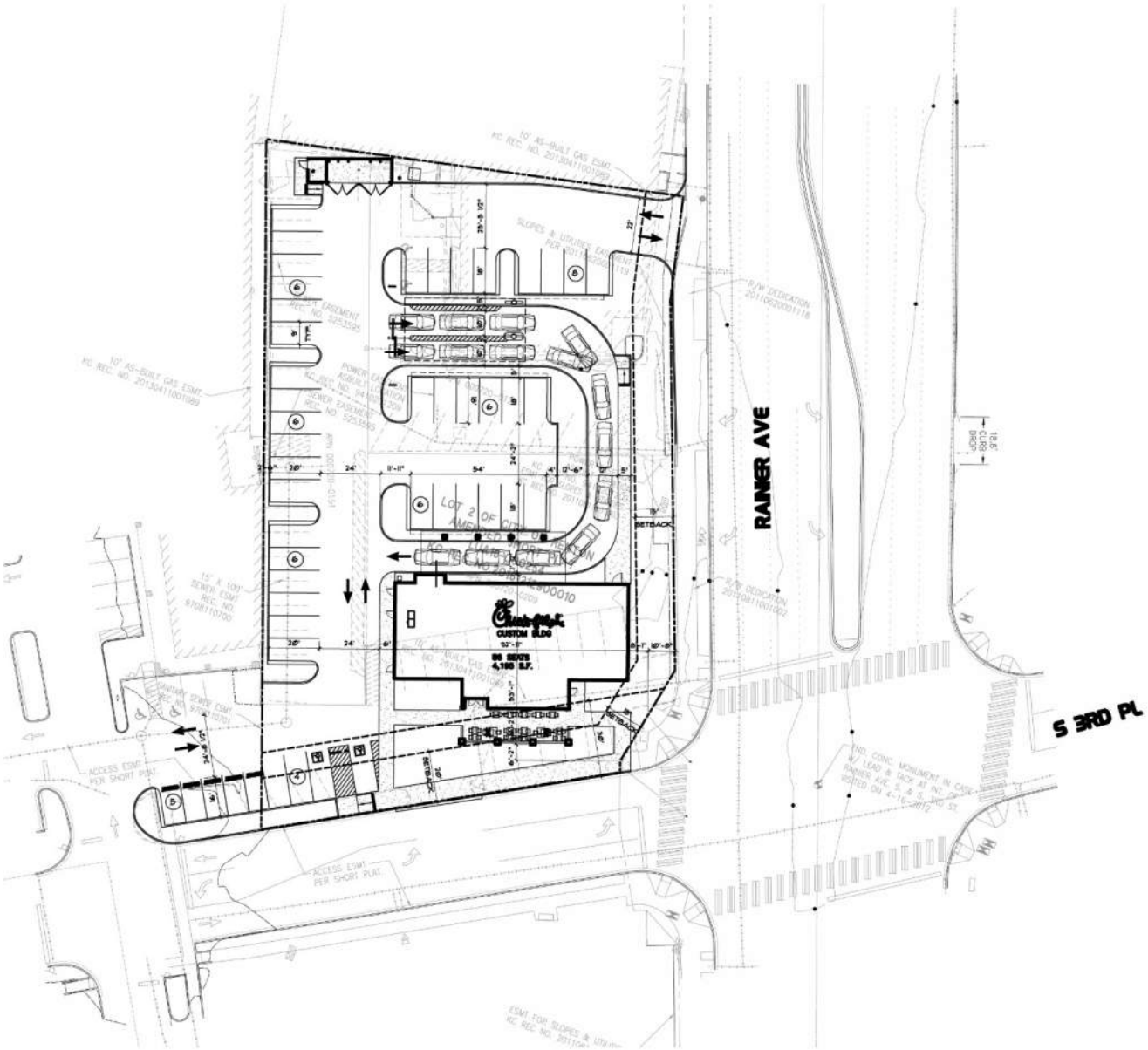


Figure 2: Preliminary Site Plan

EXISTING CONDITIONS

Roadway Network

The primary anticipated travel route to and from the site in the City of Renton includes Rainier Avenue S. Descriptions of this roadway are included in Table 1 below.

Table 1
Existing Roadway Network Summary – Project Site Vicinity

Roadway	Orientation	Classification	Speed Limit	Number of Lanes	Street Parking	Sidewalks
Rainier Avenue S	N-S	Principal Arterial	35	6	None	Both Sides

The intersection of Rainier Ave S and S 3rd Place is identified as a study intersection for the purpose of this traffic analysis. The intersection is signalized with crosswalks on all 4 legs.

Existing Traffic Volumes

Existing weekday AM and PM peak hour traffic volumes at the Rainier Avenue S / S 3rd Place off-site study intersection were based on counts conducted by All Traffic Data in June 2018. Figure 3 illustrates the 2018 existing AM and PM peak hour traffic volumes at the study intersection. The detailed peak hour turning movement count sheets are provided in Appendix A.

Public Transportation Services

Public transportation in the immediate project vicinity is served by King County Metro Transit. The closet transit stop is located on Rainier Avenue S, south of S 3rd Place. This stop provide access to King County Metro Transit routes 102, 167, 169, and RapidRide F Line.

Route 102 offers weekday service between Fairwood and Downtown Seattle. Weekday service runs from approximately 4:45 a.m. to 7:00 p.m. with approximate 15-minute headways.

Route 167 offers weekday service between South Renton Park & Ride and University District. Weekday service runs from approximately 6:00 a.m. to 6:30 p.m. with approximate 30-minute headways.

Route 169 offers weekday service between Kent Station and the Renton Transit Center. Weekday service runs from approximately 4:30 a.m. to 1:00 a.m. with approximate 30-minute headways.

RapidRide F Line offers weekday and weekend service between Burien, Tukwila International Blvd Link Station, the Renton Transit Center, and The Landing. Weekday service runs from approximately 4:45 a.m. to 1:00 a.m. with approximate 15-minute headways.

Figure 3: AM Peak Hour Traffic Volumes

Figure 4: PM Peak Hour Traffic Volumes

Level of Service

Level of service (LOS) analyses were conducted at the Rainier Avenue S / S 3rd Place off-site study intersection during the weekday AM and PM peak hours.

LOS generally refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS. At signalized intersections, LOS A represents free-flow conditions (motorists experience little or no delays), and LOS F represents forced-flow conditions where motorists experience an average delay in excess of 80 seconds per vehicle.

The LOS reported for signalized intersections represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only).

The LOS reported at stop-controlled intersections is based on the average control delay and can be reported for each controlled minor approach, controlled minor lane group, and controlled major-street movement (and for the overall intersection at all-way stop controlled intersections. Additional v/c ratio criteria apply to lane group or movement LOS only). Table 2 outlines the current HCM 6th Edition LOS criteria for signalized and stop-controlled intersections based on these methodologies.

Table 2
LOS Criteria for Signalized and Stop-Controlled Intersections[1]

SIGNALIZED INTERSECTIONS			STOP-CONTROLLED INTERSECTIONS		
	LOS by Volume-to Capacity (V/C) Ratio[2]			LOS by Volume-to Capacity (V/C) Ratio[3]	
Control Delay (sec/veh)	≤ 1.0	> 1.0	Control Delay (sec/veh)	≤ 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 at two-way stop controlled intersections. For approach-based and intersection-wide assessments at all-way stop controlled intersections, LOS is solely defined by control delay.

Level of service calculations for intersections were based on methodology and procedures outlined in the latest *Highway Capacity Manual (6th Edition)* using *Synchro 10.1* traffic analysis software. The 2018 existing AM and PM peak hour LOS analysis results for the Rainier Avenue S / S 3rd Place study intersection are summarized in Table 3. The 2018 existing LOS worksheets are included in Appendix B.

Table 3
2018 Existing Peak Hour Level of Service Summary

Time Period / Study Intersection	2018 Existing LOS	2018 Existing Delay (sec)
AM Peak Hour		
Rainier Avenue S / S 3rd Place	B	12.8
PM Peak Hour		
Rainier Avenue S / S 3rd Place	C	25.7

1. Results based on HCM Methodologies (6th Edition).

As shown in Table 3, the existing Rainier Avenue S / S 3rd Place signalized intersection currently operates at LOS C or better during both the AM and PM peak hours.

Collision History

Historic collisions at the study intersections were analyzed for the three-year period from 2015 to 2017. Collision data was provided by WSDOT. Summaries of the total and yearly average collisions during this period are provided in Table 4.

Table 4
Collision Data Summary, January 1, 2014 to December 31, 2016

Location	2015	2016	2017	Three-Year Total Collisions	Average Annual Collisions
Intersection					
Rainier Avenue S / S 3rd Place	7	2	7	16	5.33
Segment					
Rainier Avenue S between SW Sunset Blvd and S 3rd Pl	8	6	10	24	8.00

Source: WSDOT Collision Records.

FUTURE TRAFFIC CONDITIONS AND TRAFFIC IMPACTS

Planned Transportation Improvements

This section documents the known planned transportation improvements included in the City of Renton's 2018-2023 *Transportation Improvement Program (TIP)*. Based on the most recent TIP, there are no planned improvements in the project study area.

Project Trip Generation

The trip generation estimate for the proposed 4,195 SF Chick-fil-A Restaurant with drive-thru was based on methodology included in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th edition for Land Use Code (LUC) 934 (Fast-Food Restaurant with Drive-Through Window).

Adjustments to the trip generation estimates were made to account for pass-by trips which are made by vehicles that are already on adjacent streets and make intermediate stops at the site en-route to a primary destination (e.g. on the way home from work). The resulting net new weekday daily, AM, and PM peak hour trip generation associated with the proposed project is summarized in Table 5.

Table 5
Trip Generation Summary

	Net New Trips Generated		
Weekday Time Period	In	Out	Total
Weekday Daily	494	494	988
Weekday AM Peak Hour	44	42	86
Weekday PM Peak Hour	35	33	68

As shown in Table 5, the proposed project is estimated to generate 988 net new weekday daily trips, with 86 net new trips occurring during the weekday AM peak hour (44 entering, 42 exiting), and 68 net new trips occurring during the weekday PM peak hour (35 entering, 33 exiting). Detailed trip generation calculations are included in Attachment C.

Project Trip Distribution and Assignment

The distribution and assignment of the net new AM and PM peak hour project trips were estimated based existing traffic counts in the area and anticipated travel patterns. The following Table 6 summarizes the general trip distribution patterns. The project trip distribution and assignment through the site driveways and the study intersection are shown in Figure 4.

Table 6
Project Trip Distribution

Route (Direction)	Trip Distribution
Rainier Avenue S (north)	50%
Rainier Avenue S (south)	45%
S 3rd Place (east)	5%
TOTAL	**100%**

Future Traffic Volumes

Year 2020 No Action (without project) peak hour traffic volumes were estimated by applying a 3 percent annual background growth rate to the existing volumes (confirmed by City staff). The 2020 With-Project traffic volumes were determined by adding the trip assignment from the proposed development to the future 2020 No Action traffic volumes.

The 2020 No Action and 2020 With-Project AM and PM peak hour traffic volumes were shown previously in Figures 3 and 4.

Future Level of Service

Future year 2020 Level of Service (LOS) analyses were conducted at the Rainier Avenue S / S 3rd Place off-site study intersection for year 2020 weekday AM and PM peak hour No Action (without project) conditions and for year 2020 With-Project conditions.

Existing intersection geometry was assumed at the study intersection as there are no planned improvements at this intersection.

The 2020 weekday AM and PM peak hour LOS results at the study intersection without and with the proposed project are summarized in Table 7. The LOS worksheets are included in Appendix C.

Table 7
Year 2020 Peak Hour Level of Service Summary

	2020 No Action		2020 With-Project	
Time Period / Study Intersection	LOS	Delay (sec)	LOS	Delay (sec)
AM Peak Hour				
Rainier Avenue S / S 3rd Place	B	13.3	B	18.2
PM Peak Hour				
Rainier Avenue S / S 3rd Place	C	26.9	C	29.9

1. Results based on HCM Methodologies (6th Edition).

As shown in Table 7, the Rainier Avenue / S 3rd Place signalized intersection is anticipated to operate at LOS C or better in 2020 during both the weekday AM and PM peak hours with or without the proposed Chick-fil-A project.

Site Access Assessment

Vehicular access to the site is proposed at two driveway locations:

(1) on S 3rd Place just west of the Rainier Avenue S signalized intersection

(2) a right-in/right-out driveway north of the signal.

To evaluate operations of the proposed site access on Rainier Avenue S, level of service (LOS) and queuing were analyzed, which are described next.

LOS and Queue Analysis

The LOS and queue calculations were conducted using *Synchro 10.1* software based on methodology outlined in the latest edition of the *Highway Capacity Manual* (6th Edition). The reported queues are estimated 95th percentile queues that are exceeded only 5 percent of the time.

Table 8 summarizes the results of the 2020 with-project LOS and queue analyses. The LOS and queue calculation sheets are included in Appendix D.

Table 8
Site Access Peak Hour LOS & Queue Summary

	AM Peak Hour			PM Peak Hour		
Study Intersection (movement)	LOS	Delay (sec)	95th % Queue	LOS	Delay (sec)	95th % Queue
Rainier Avenue S / RIRO Driveway						
Eastbound Right-Turn	B	13.4	< 25'	C	22.0	< 25'

1. Results based on HCM Methodologies (6th Edition).

As shown in Table 8, the exiting right-turn movement at the proposed site access driveway on Rainier Avenue S is expected to operate at an acceptable level (LOS C or better) during the weekday AM and PM peak hours in 2020 with the proposed project. Vehicle queues are all estimated to be statistically 1 vehicle or less.

Parking Analysis

A parking analysis was completed for the proposed Chick-fil-A Restaurant project to evaluate the estimated peak parking demand as it compares proposed parking supply, and to propose a modification to allow more than the maximum allowed by code (1 stall per 75 SF of dining area).

Parking Supply. The project proposes a total of 42 on-site surface parking stalls.

Parking Demand. The peak parking demand for the proposed 4,195 SF fast-food restaurant was estimated based on rates included in the *ITE Parking Generation* manual, 4th edition for LUC 934 (Fast-Food Restaurant with Drive-Through Window). Per ITE, the average peak period parking demand rate for a fast-food restaurant with drive-through window is 9.98 vehicles per 1,000 SF. Applying the peak parking demand rate to the proposed Chick-fil-A Restaurant results in a total

estimated peak parking demand of 42 stalls (9.98 X 4,195 / 1000). The 42 proposed on-site parking stalls would accommodate this peak parking demand.

Code Required Parking Supply. Per City of Renton Municipal Code section 4-4-080 (Parking, Loading, and Driveway Regulations), a minimum and maximum of 1 stall per 75 SF of dining area is required. The proposed Chick-fil-A Restaurant consists of 1,473 SF of dining area, which results in a minimum and maximum required parking supply of 20 stalls (1,473 SF / 75).

Code Required Drive-Through Stacking. City of Renton Municipal Code section 4-4-080 (Parking, Loading, and Driveway Regulations), the drive-through facility shall provide sufficient on-site vehicle stacking space (typically 5 spaces per window are required). The proposed Chick-fil-A Restaurant includes drive-through stacking space for 15 vehicles, which is intended to minimize drive-through impacts to on-site circulation and parking.

Justification for Parking Modification. To ensure public safety and minimize impact to adjacent properties, it is imperative that adequate on-site parking is provided for customers and to accommodate traffic circulation. Having adequate on-site parking and drive-thru queuing will prevent parking spill-over onto adjacent businesses and neighborhoods. If delays in the drive-thru are too long, customers will intuitively park on-site and go inside the restaurant. Without adequate on-site parking and good circulation, dine-in customers will create parking spillover. This can be avoided by allowing the site to provide the amount of proposed parking greater than code allows.

Traffic and Parking Management Plan

During *Opening Weeks*, a combination of manual control and signage is proposed to be utilized. Manual control will include presence of a Chick-fil-A staff, certified flagger, and/or police officer that will be positioned strategically on the site to help direct entering Chick-fil-A vehicle traffic. Any traffic in the public ROW will be managed by a police officer. Signage will direct customers and used to restrict parking for Chick-fil-A customers in neighboring properties. The following measures are proposed:

- Chick-fil-A drive-through traffic will be directed to access the drive-through from either access on Rainier and 3rd Place. A police officer will be positioned at the Rainier Ave S driveway to ensure drive-through queues do not extend back onto Rainier Ave S.
- A Chick-fil-A staff member will be positioned at the exit of the drive-through to direct exiting traffic to use the southwest access to S 3rd Place.
- Signage will be located at the southwest access indicating no Chick-fil-A parking on adjacent businesses.

These traffic management plan measures are intended to help direct entering vehicles to the on-site drive-through queue area and eliminate queue spill-back onto adjacent streets. It is expected that the duration of the management plan will be reviewed and collaborated with City staff.

MITIGATION

The following measures are proposed to mitigation the transportation and parking impacts of the proposed 4,195 SF Chick-fil-A restaurant with drive-through.

Off-Site Improvements. Based on the results of the analysis, the existing transportation facilities are anticipated to accommodate the additional traffic generated by the proposed project. No project-specific off-site transportation improvements are proposed.

Transportation Impact Fees. To mitigate long-term traffic impacts, the City of Renton requires payment of a traffic impact fee. The City's currently adopted impact fee rates are $90.36 per SF of fast-food restaurant with drive-through window use and $30.48 per SF of sit-down restaurant use.

Based on the proposed 4,195 SF fast-food restaurant with drive-through window, the impact fee associated with the proposed use would be $379,060.20 (4,195 SF X $90.36/SF). Based on 5,049 SF of existing sit-down restaurant use, the impact fee credit associated with the existing use would be $153,893.52 (5,049 SF X $30.48/SF). The resulting net impact fee for the proposed project is $225,166.68.

Traffic and Parking Management Plan. During the opening weeks of the Chick-fil-A Restaurant, it is expected that higher traffic levels and parking needs will be generated similar to other recent openings in the region. As a result, a *Traffic and Parking Management Plan* has been developed that will help direct entering and exiting vehicles for Chick-fil-A drive-through and walk-up patrons to areas within the site to help reduce impacts to the shared parking areas and drive aisles of the retail center, and to eliminate queue spill-back onto adjacent streets.

Implementation of the *Traffic and Parking Management Plan* is proposed to mitigate short-term transportation impacts, and payment of the pro-rata transportation costs is proposed to mitigate long-term transportation impacts of the proposed Chick-fil-A development.

Appendix A

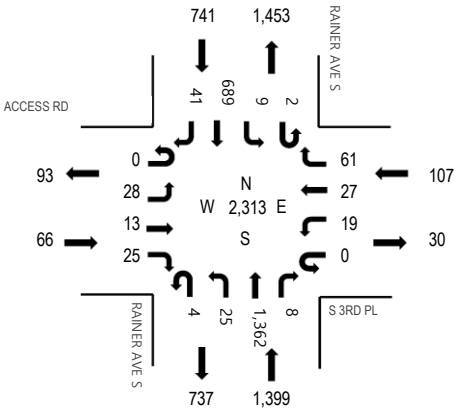
Peak Hour Turning Movement Counts

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

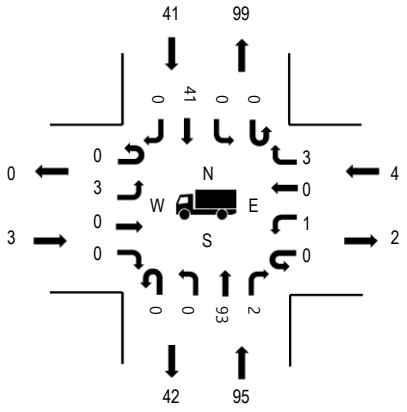
Location: 4 RAINER AVE S & S 3RD PL AM
Date and Start Time: Thursday, June 28, 2018
Peak Hour: 07:15 AM - 08:15 AM

Peak Hour

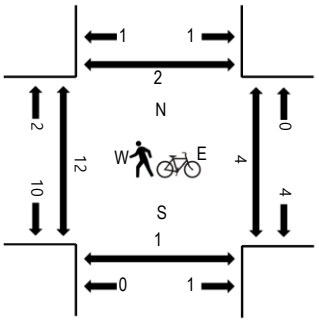
All Vehicles



Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



	HV%	PHF
EB	4.5%	0.69
WB	3.7%	0.89
NB	6.8%	0.89
SB	5.5%	0.84
All	6.2%	0.94

Traffic Counts - All Vehicles

Interval Start Time	ACCESS RD Eastbound				S 3RD PL Westbound				RAINER AVE S Northbound				RAINER AVE S Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	7	1	2	0	5	4	18	0	12	362	6	0	4	99	5	525	2,303
7:15 AM	0	6	2	3	0	5	9	16	1	8	343	2	0	1	152	7	555	2,313
7:30 AM	0	6	4	4	0	3	4	12	1	6	382	2	0	0	174	7	605	2,297
7:45 AM	0	7	3	7	0	4	8	17	1	3	347	1	2	4	206	8	618	2,271
8:00 AM	0	9	4	11	0	7	6	16	1	8	290	3	0	4	157	19	535	2,198
8:15 AM	0	4	4	8	0	6	7	17	0	7	300	1	0	2	173	10	539	
8:30 AM	0	6	3	11	0	3	9	12	0	9	319	5	0	6	178	18	579	
8:45 AM	0	6	9	9	0	2	6	16	0	16	272	1	4	10	182	12	545	
Count Total	0	51	30	55	0	35	53	124	4	69	2,615	21	6	31	1,321	86	4,501	
Peak Hour	0	28	13	25	0	19	27	61	4	25	1,362	8	2	9	689	41	2,313	

Traffic Counts - Heavy Vehicles and Pedestrians/Bicycles in Crosswalk

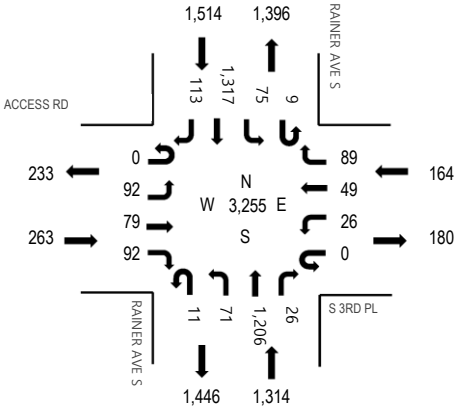
Interval Start Time	Heavy Vehicles					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	26	0	8	34	7:00 AM	1	0	0	0	1
7:15 AM	1	20	1	10	32	7:15 AM	5	0	2	1	8
7:30 AM	0	26	3	9	38	7:30 AM	2	0	2	1	5
7:45 AM	0	23	0	12	35	7:45 AM	3	0	0	0	3
8:00 AM	2	26	0	10	38	8:00 AM	2	1	0	0	3
8:15 AM	0	26	1	10	37	8:15 AM	0	1	2	0	3
8:30 AM	0	23	0	10	33	8:30 AM	3	0	1	1	5
8:45 AM	0	22	0	15	37	8:45 AM	7	2	1	1	11
Count Total	3	192	5	84	284	Count Total	23	4	8	4	39
Peak Hour	3	95	4	41	143	Peak Hour	12	1	4	2	19

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: 4 RAINER AVE S & S 3RD PL PM
Date and Start Time: Thursday, June 28, 2018
Peak Hour: 04:15 PM - 05:15 PM

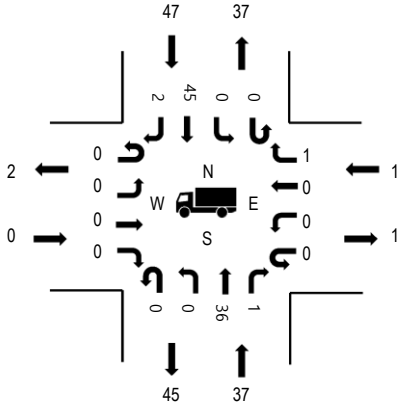
Peak Hour

All Vehicles

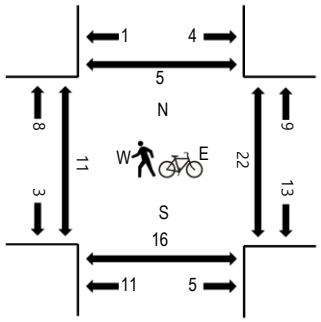


	HV%	PHF
EB	0.0%	0.93
WB	0.6%	0.85
NB	2.8%	0.97
SB	3.1%	0.94
All	2.6%	0.98

Heavy Vehicles



Pedestrians/Bicycles in Crosswalk



Traffic Counts - All Vehicles

Interval Start Time	ACCESS RD Eastbound				S 3RD PL Westbound				RAINER AVE S Northbound				RAINER AVE S 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	23	16	28	0	5	14	18	1	19	267	6	1	14	359	27	798	3,220
4:15 PM	0	20	20	28	0	5	14	19	3	23	296	7	0	16	325	30	806	3,255
4:30 PM	0	20	16	17	0	8	9	21	2	22	310	4	5	30	341	28	833	3,248
4:45 PM	0	26	25	20	0	7	15	18	2	12	295	6	4	14	310	29	783	3,251
5:00 PM	0	26	18	27	0	6	11	31	4	14	305	9	0	15	341	26	833	3,177
5:15 PM	0	29	25	24	0	5	10	16	5	19	288	6	5	14	325	28	799	
5:30 PM	0	26	29	28	0	9	12	17	1	25	298	6	4	18	344	19	836	
5:45 PM	0	32	15	21	0	7	14	21	3	27	270	6	3	16	249	25	709	
Count Total	0	202	164	193	0	52	99	161	21	161	2,329	50	22	137	2,594	212	6,397	
Peak Hour	0	92	79	92	0	26	49	89	11	71	1,206	26	9	75	1,317	113	3,255	

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	0	7	0	12	19	4:00 PM	1	5	13	2	21
4:15 PM	0	12	0	16	28	4:15 PM	8	4	3	0	15
4:30 PM	0	7	0	11	18	4:30 PM	1	4	8	2	15
4:45 PM	0	10	1	10	21	4:45 PM	0	6	5	1	12
5:00 PM	0	8	0	10	18	5:00 PM	2	2	6	2	12
5:15 PM	2	3	0	14	19	5:15 PM	8	5	3	1	17
5:30 PM	0	11	0	11	22	5:30 PM	3	9	2	7	21
5:45 PM	0	7	1	11	19	5:45 PM	3	6	6	0	15
Count Total	2	65	2	95	164	Count Total	26	41	46	15	128
Peak Hour	0	37	1	47	85	Peak Hour	11	16	22	5	54

Appendix B

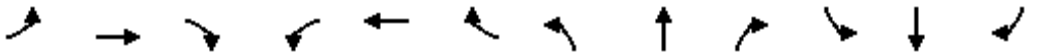
Level of Service (LOS) Calculations

2018 Existing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	13	25	19	27	61	29	1362	8	11	689	41
Future Volume (vph)	28	13	25	19	27	61	29	1362	8	11	689	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			265	
Travel Time (s)		15.8			21.4			14.0			5.2	
Confl. Peds. (#/hr)	2		1	1		2			4			12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	55.0	55.0		55.0	55.0		19.0	83.0	83.0	18.0	82.0	82.0
Total Split (%)	35.3%	35.3%		35.3%	35.3%		12.2%	53.2%	53.2%	11.5%	52.6%	52.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 36 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	13	25	19	27	61	29	1362	8	11	689	41
Future Volume (veh/h)	28	13	25	19	27	61	29	1362	8	11	689	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1841	1841	1841	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	30	14	27	20	29	65	31	1449	9	12	733	44
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	4	4	4	7	7	7	6	6	6
Cap, veh/h	111	59	113	157	53	119	39	2689	1196	18	2668	1181
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.79	0.79	0.01	0.78	0.78
Sat Flow, veh/h	1266	555	1071	1338	503	1127	1711	3413	1518	1725	3441	1523
Grp Volume(v), veh/h	30	0	41	20	0	94	31	1449	9	12	733	44
Grp Sat Flow(s),veh/h/ln	1266	0	1626	1338	0	1630	1711	1706	1518	1725	1721	1523
Q Serve(g_s), s	3.6	0.0	3.6	2.2	0.0	8.5	2.8	24.4	0.2	1.1	9.5	1.0
Cycle Q Clear(g_c), s	12.1	0.0	3.6	5.8	0.0	8.5	2.8	24.4	0.2	1.1	9.5	1.0
Prop In Lane	1.00		0.66	1.00		0.69	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	172	157	0	172	39	2689	1196	18	2668	1181
V/C Ratio(X)	0.27	0.00	0.24	0.13	0.00	0.55	0.79	0.54	0.01	0.67	0.27	0.04
Avail Cap(c_a), veh/h	383	0	521	444	0	523	154	2689	1196	144	2668	1181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.0	0.0	64.0	66.7	0.0	66.2	75.8	6.1	3.5	76.9	5.0	4.1
Incr Delay (d2), s/veh	1.9	0.0	1.0	0.5	0.0	3.8	28.8	0.8	0.0	35.4	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	1.6	0.8	0.0	3.8	1.6	8.0	0.1	0.7	3.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.8	0.0	65.0	67.2	0.0	70.0	104.6	6.9	3.5	112.4	5.3	4.1
LnGrp LOS	E	A	E	E	A	E	F	A	A	F	A	A
Approach Vol, veh/h		71			114			1489			789	
Approach Delay, s/veh		68.7			69.5			8.9			6.8	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	127.9		21.5	8.6	125.9		21.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	13.0	78.0		50.0	14.0	77.0		50.0				
Max Q Clear Time (g_c+I1), s	3.1	26.4		14.1	4.8	11.5		10.5				
Green Ext Time (p_c), s	0.0	37.5		0.5	0.0	17.5		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		12.8	
HCM 6th LOS		B	

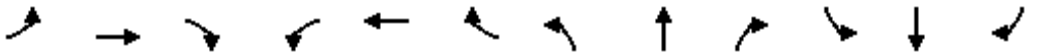
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	79	92	26	49	89	82	1206	26	84	1317	113
Future Volume (vph)	92	79	92	26	49	89	82	1206	26	84	1317	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			242	
Travel Time (s)		15.8			21.4			14.0			4.7	
Confl. Peds. (#/hr)	5		16	16		5			22			11
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	45.0	45.0		45.0	45.0		22.0	89.0	89.0	22.0	89.0	89.0
Total Split (%)	28.8%	28.8%		28.8%	28.8%		14.1%	57.1%	57.1%	14.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 40 (26%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl

HCM 6th Signalized Intersection Summary
1: Rainier Ave S & S 3rd Pl

07/18/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	79	92	26	49	89	82	1206	26	84	1317	113
Future Volume (veh/h)	92	79	92	26	49	89	82	1206	26	84	1317	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	94	81	94	27	50	91	84	1231	27	86	1344	115
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	1	1	1	3	3	3	3	3	3
Cap, veh/h	208	161	187	181	120	218	104	2258	990	106	2262	1000
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.06	0.64	0.64	0.06	0.64	0.64
Sat Flow, veh/h	1247	791	918	1202	589	1072	1767	3526	1545	1767	3526	1559
Grp Volume(v), veh/h	94	0	175	27	0	141	84	1231	27	86	1344	115
Grp Sat Flow(s),veh/h/ln	1247	0	1709	1202	0	1662	1767	1763	1545	1767	1763	1559
Q Serve(g_s), s	11.1	0.0	14.2	3.2	0.0	11.5	7.3	30.1	1.0	7.5	34.4	4.5
Cycle Q Clear(g_c), s	22.6	0.0	14.2	17.4	0.0	11.5	7.3	30.1	1.0	7.5	34.4	4.5
Prop In Lane	1.00		0.54	1.00		0.65	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	0	347	181	0	338	104	2258	990	106	2262	1000
V/C Ratio(X)	0.45	0.00	0.50	0.15	0.00	0.42	0.81	0.55	0.03	0.81	0.59	0.11
Avail Cap(c_a), veh/h	274	0	438	245	0	426	193	2258	990	193	2262	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.9	0.0	55.2	62.9	0.0	54.1	72.5	15.5	10.3	72.4	16.2	10.8
Incr Delay (d2), s/veh	2.2	0.0	1.6	0.5	0.0	1.2	13.7	1.0	0.1	13.6	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	6.4	1.0	0.0	5.0	3.7	12.1	0.4	3.8	13.8	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.1	0.0	56.8	63.4	0.0	55.3	86.2	16.4	10.3	86.0	17.3	11.0
LnGrp LOS	E	A	E	E	A	E	F	B	B	F	B	B
Approach Vol, veh/h		269			168			1342			1545	
Approach Delay, s/veh		60.0			56.6			20.7			20.7	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.4	104.9		36.7	14.2	105.1		36.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	84.0		40.0	17.0	84.0		40.0				
Max Q Clear Time (g_c+I1), s	9.5	32.1		24.6	9.3	36.4		19.4				
Green Ext Time (p_c), s	0.1	31.6		1.7	0.1	34.2		1.2				

Intersection Summary			
HCM 6th Ctrl Delay		25.7	
HCM 6th LOS		C	

2020 No Action

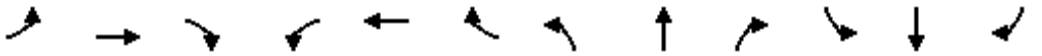
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	14	27	20	29	65	31	1445	8	12	731	43
Future Volume (vph)	30	14	27	20	29	65	31	1445	8	12	731	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			265	
Travel Time (s)		15.8			21.4			14.0			5.2	
Confl. Peds. (#/hr)	2		1	1		2			4			12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	55.0	55.0		55.0	55.0		19.0	83.0	83.0	18.0	82.0	82.0
Total Split (%)	35.3%	35.3%		35.3%	35.3%		12.2%	53.2%	53.2%	11.5%	52.6%	52.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 36 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl

HCM 6th Signalized Intersection Summary
1: Rainier Ave S & S 3rd Pl

07/18/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	14	27	20	29	65	31	1445	8	12	731	43
Future Volume (veh/h)	30	14	27	20	29	65	31	1445	8	12	731	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1841	1841	1841	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	32	15	29	21	31	69	33	1537	9	13	778	46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	4	4	4	7	7	7	6	6	6
Cap, veh/h	112	61	118	161	56	124	42	2670	1188	19	2646	1171
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.02	0.78	0.78	0.01	0.77	0.77
Sat Flow, veh/h	1260	554	1072	1335	506	1125	1711	3413	1518	1725	3441	1523
Grp Volume(v), veh/h	32	0	44	21	0	100	33	1537	9	13	778	46
Grp Sat Flow(s),veh/h/ln	1260	0	1626	1335	0	1631	1711	1706	1518	1725	1721	1523
Q Serve(g_s), s	3.9	0.0	3.9	2.3	0.0	9.1	3.0	27.8	0.2	1.2	10.5	1.1
Cycle Q Clear(g_c), s	12.9	0.0	3.9	6.1	0.0	9.1	3.0	27.8	0.2	1.2	10.5	1.1
Prop In Lane	1.00		0.66	1.00		0.69	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	0	180	161	0	180	42	2670	1188	19	2646	1171
V/C Ratio(X)	0.29	0.00	0.24	0.13	0.00	0.55	0.79	0.58	0.01	0.68	0.29	0.04
Avail Cap(c_a), veh/h	377	0	521	441	0	523	154	2670	1188	144	2646	1171
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	71.9	0.0	63.4	66.2	0.0	65.7	75.7	6.7	3.7	76.9	5.4	4.3
Incr Delay (d2), s/veh	2.0	0.0	1.0	0.5	0.0	3.8	27.0	0.9	0.0	35.2	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	1.7	0.8	0.0	4.0	1.6	9.2	0.1	0.7	3.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.8	0.0	64.4	66.8	0.0	69.5	102.7	7.6	3.7	112.1	5.7	4.4
LnGrp LOS	E	A	E	E	A	E	F	A	A	F	A	A
Approach Vol, veh/h		76			121			1579			837	
Approach Delay, s/veh		68.4			69.0			9.6			7.2	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	127.0		22.2	8.8	124.9		22.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	13.0	78.0		50.0	14.0	77.0		50.0				
Max Q Clear Time (g_c+I1), s	3.2	29.8		14.9	5.0	12.5		11.1				
Green Ext Time (p_c), s	0.0	37.6		0.5	0.0	18.9		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		13.3	
HCM 6th LOS		B	

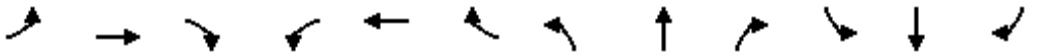
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	84	98	28	52	94	87	1279	28	90	1397	120
Future Volume (vph)	98	84	98	28	52	94	87	1279	28	90	1397	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			242	
Travel Time (s)		15.8			21.4			14.0			4.7	
Confl. Peds. (#/hr)	5		16	16		5			22			11
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	45.0	45.0		45.0	45.0		22.0	89.0	89.0	22.0	89.0	89.0
Total Split (%)	28.8%	28.8%		28.8%	28.8%		14.1%	57.1%	57.1%	14.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 40 (26%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl

HCM 6th Signalized Intersection Summary
1: Rainier Ave S & S 3rd Pl

07/18/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	84	98	28	52	94	87	1279	28	90	1397	120
Future Volume (veh/h)	98	84	98	28	52	94	87	1279	28	90	1397	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	100	86	100	29	53	96	89	1305	29	92	1426	122
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	1	1	1	3	3	3	3	3	3
Cap, veh/h	207	164	191	179	123	223	109	2228	977	112	2235	988
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.06	0.63	0.63	0.06	0.63	0.63
Sat Flow, veh/h	1239	790	919	1191	591	1071	1767	3526	1545	1767	3526	1559
Grp Volume(v), veh/h	100	0	186	29	0	149	89	1305	29	92	1426	122
Grp Sat Flow(s),veh/h/ln	1239	0	1709	1191	0	1663	1767	1763	1545	1767	1763	1559
Q Serve(g_s), s	11.9	0.0	15.1	3.5	0.0	12.2	7.8	33.7	1.1	8.0	38.8	4.8
Cycle Q Clear(g_c), s	24.1	0.0	15.1	18.5	0.0	12.2	7.8	33.7	1.1	8.0	38.8	4.8
Prop In Lane	1.00		0.54	1.00		0.64	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	356	179	0	346	109	2228	977	112	2235	988
V/C Ratio(X)	0.48	0.00	0.52	0.16	0.00	0.43	0.81	0.59	0.03	0.82	0.64	0.12
Avail Cap(c_a), veh/h	267	0	438	236	0	426	193	2228	977	193	2235	988
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	0.0	54.9	63.1	0.0	53.7	72.3	16.8	10.8	72.1	17.6	11.3
Incr Delay (d2), s/veh	2.5	0.0	1.7	0.6	0.0	1.2	13.4	1.1	0.1	13.3	1.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	6.8	1.1	0.0	5.3	3.9	13.6	0.4	4.1	15.7	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.7	0.0	56.6	63.7	0.0	54.9	85.7	17.9	10.8	85.5	19.0	11.6
LnGrp LOS	E	A	E	E	A	D	F	B	B	F	B	B
Approach Vol, veh/h		286			178			1423			1640	
Approach Delay, s/veh		60.1			56.4			22.0			22.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.9	103.6		37.5	14.6	103.9		37.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	84.0		40.0	17.0	84.0		40.0				
Max Q Clear Time (g_c+I1), s	10.0	35.7		26.1	9.8	40.8		20.5				
Green Ext Time (p_c), s	0.1	32.3		1.7	0.1	33.5		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			26.9									
HCM 6th LOS			C									

2020 With-Project

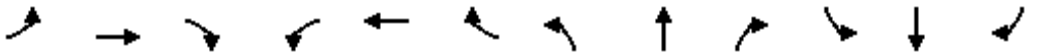
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	16	44	20	32	64	78	1418	8	12	735	46
Future Volume (vph)	76	16	44	20	32	64	78	1418	8	12	735	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			265	
Travel Time (s)		15.8			21.4			14.0			5.2	
Confl. Peds. (#/hr)	2		1	1		2			4			12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	55.0	55.0		55.0	55.0		19.0	83.0	83.0	18.0	82.0	82.0
Total Split (%)	35.3%	35.3%		35.3%	35.3%		12.2%	53.2%	53.2%	11.5%	52.6%	52.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 36 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl

HCM 6th Signalized Intersection Summary
1: Rainier Ave S & S 3rd Pl

08/07/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	16	44	20	32	64	78	1418	8	12	735	46
Future Volume (veh/h)	76	16	44	20	32	64	78	1418	8	12	735	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1841	1841	1841	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	81	17	47	21	34	68	83	1509	9	13	782	49
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	4	4	4	7	7	7	6	6	6
Cap, veh/h	159	63	173	192	80	160	102	2547	1133	19	2401	1062
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.75	0.75	0.01	0.70	0.70
Sat Flow, veh/h	1258	427	1181	1312	546	1093	1711	3413	1518	1725	3441	1522
Grp Volume(v), veh/h	81	0	64	21	0	102	83	1509	9	13	782	49
Grp Sat Flow(s),veh/h/ln	1258	0	1608	1312	0	1639	1711	1706	1518	1725	1721	1522
Q Serve(g_s), s	9.8	0.0	5.5	2.3	0.0	8.8	7.5	31.4	0.2	1.2	13.9	1.6
Cycle Q Clear(g_c), s	18.6	0.0	5.5	7.8	0.0	8.8	7.5	31.4	0.2	1.2	13.9	1.6
Prop In Lane	1.00		0.73	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	0	236	192	0	240	102	2547	1133	19	2401	1062
V/C Ratio(X)	0.51	0.00	0.27	0.11	0.00	0.42	0.82	0.59	0.01	0.68	0.33	0.05
Avail Cap(c_a), veh/h	378	0	515	420	0	525	154	2547	1133	144	2401	1062
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.0	0.0	59.2	62.6	0.0	60.6	72.5	9.0	5.1	76.9	9.2	7.4
Incr Delay (d2), s/veh	3.5	0.0	0.9	0.4	0.0	1.7	18.0	1.0	0.0	35.2	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	2.3	0.8	0.0	3.8	3.8	11.0	0.1	0.7	5.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.6	0.0	60.0	63.0	0.0	62.3	90.5	10.0	5.1	112.1	9.6	7.4
LnGrp LOS	E	A	E	E	A	E	F	B	A	F	A	A
Approach Vol, veh/h		145			123			1601			844	
Approach Delay, s/veh		67.0			62.4			14.2			11.0	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	121.4		27.9	14.3	113.9		27.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	13.0	78.0		50.0	14.0	77.0		50.0				
Max Q Clear Time (g_c+I1), s	3.2	33.4		20.6	9.5	15.9		10.8				
Green Ext Time (p_c), s	0.0	34.8		1.0	0.1	18.9		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		18.2	
HCM 6th LOS		B	

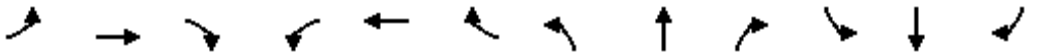
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	87	114	28	56	92	119	1263	28	89	1395	124
Future Volume (vph)	130	87	114	28	56	92	119	1263	28	89	1395	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		0	225		0	150		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		578			783			719			242	
Travel Time (s)		15.8			21.4			14.0			4.7	
Confl. Peds. (#/hr)	5		16	16		5			22			11
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0
Minimum Split (s)	42.0	42.0		43.0	43.0		9.0	28.0	28.0	9.0	26.0	26.0
Total Split (s)	45.0	45.0		45.0	45.0		22.0	89.0	89.0	22.0	89.0	89.0
Total Split (%)	28.8%	28.8%		28.8%	28.8%		14.1%	57.1%	57.1%	14.1%	57.1%	57.1%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 156	
Actuated Cycle Length: 156	
Offset: 40 (26%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Rainier Ave S & S 3rd Pl

HCM 6th Signalized Intersection Summary
1: Rainier Ave S & S 3rd Pl

08/07/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	87	114	28	56	92	119	1263	28	89	1395	124
Future Volume (veh/h)	130	87	114	28	56	92	119	1263	28	89	1395	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	133	89	116	29	57	94	121	1289	29	91	1423	127
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	1	1	1	3	3	3	3	3	3
Cap, veh/h	224	163	213	180	139	230	142	2185	957	111	2124	939
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.08	0.62	0.62	0.06	0.60	0.60
Sat Flow, veh/h	1238	739	963	1172	631	1040	1767	3526	1545	1767	3526	1558
Grp Volume(v), veh/h	133	0	205	29	0	151	121	1289	29	91	1423	127
Grp Sat Flow(s),veh/h/ln	1238	0	1701	1172	0	1671	1767	1763	1545	1767	1763	1558
Q Serve(g_s), s	16.1	0.0	16.6	3.5	0.0	12.1	10.5	34.2	1.1	7.9	42.0	5.5
Cycle Q Clear(g_c), s	28.2	0.0	16.6	20.2	0.0	12.1	10.5	34.2	1.1	7.9	42.0	5.5
Prop In Lane	1.00		0.57	1.00		0.62	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	224	0	376	180	0	369	142	2185	957	111	2124	939
V/C Ratio(X)	0.59	0.00	0.55	0.16	0.00	0.41	0.85	0.59	0.03	0.82	0.67	0.14
Avail Cap(c_a), veh/h	268	0	436	222	0	428	193	2185	957	193	2124	939
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.1	0.0	53.8	62.8	0.0	52.0	70.8	17.8	11.5	72.2	20.7	13.4
Incr Delay (d2), s/veh	3.6	0.0	1.8	0.6	0.0	1.0	22.3	1.2	0.1	13.4	1.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	7.4	1.1	0.0	5.3	5.7	13.9	0.4	4.0	17.4	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.7	0.0	55.6	63.3	0.0	53.1	93.1	18.9	11.5	85.6	22.4	13.7
LnGrp LOS	E	A	E	E	A	D	F	B	B	F	C	B
Approach Vol, veh/h		338			180			1439			1641	
Approach Delay, s/veh		60.3			54.7			25.0			25.2	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.8	101.7		39.5	17.6	99.0		39.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	84.0		40.0	17.0	84.0		40.0				
Max Q Clear Time (g_c+I1), s	9.9	36.2		30.2	12.5	44.0		22.2				
Green Ext Time (p_c), s	0.1	31.7		1.7	0.1	31.5		1.2				

Intersection Summary			
HCM 6th Ctrl Delay		29.9	
HCM 6th LOS		C	

Appendix C

Trip Generation Calculations

Chick-fil-A Renton
Trip Generation Summary

Land Use	Area	Units [1]	ITE LUC [2]	Directional Distribution In	Directional Distribution Out	Trip Rate	Trips Generated In	Trips Generated Out	Trips Generated Total
Weekday Daily									
Proposed Use:									
Fast-Food Rest. with Drive-Thru	4,195	GFA	934	50%	50%	470.95	988	988	1,976
Pass-By Trips [3]	*50%*						*-494*	*-494*	*-988*
						Net Proposed Trips =	494	494	988
						Net New Weekday Daily Trips =	**494**	**494**	**988**
Weekday AM Peak Hour									
Proposed Use:									
Fast-Food Rest. with Drive-Thru	4,195	GFA	934	51%	49%	40.19	86	83	169
Pass-By Trips [3]	*49%*						*-42*	*-41*	*-83*
						Net Proposed Trips =	44	42	86
						Net New Weekday AM Peak Hour Trips =	**44**	**42**	**86**
Weekday PM Peak Hour									
Proposed Use:									
Fast-Food Rest. with Drive-Thru	4,195	GFA	934	52%	48%	32.67	71	66	137
Pass-By Trips [3]	*50%*						-36	-33	-69
						Net Proposed Trips =	35	33	68
						Net New Weekday PM Peak Hour Trips =	**35**	**33**	**68**

Notes:

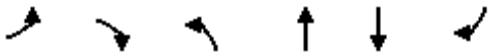
[1] GFA = Gross Floor Area.

[2] Institute of Transportation Engineers, Trip Generation Manual, 10th edition Land Use Code.

[3] Pass-by percentage based on studies documents in the ITE Trip Generation Handbook, 3rd Edition, 2017.

Appendix D

Site Access LOS and Queue Calculations



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	0	1560	777	33
Future Volume (vph)	0	18	0	1560	777	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	296			265	341	
Travel Time (s)	8.1			5.2	6.6	
Confl. Peds. (#/hr)	14	14	14			14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	7%	7%	6%	6%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

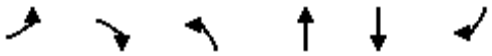
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	0	1560	777	33
Future Vol, veh/h	0	18	0	1560	777	33
Conflicting Peds, #/hr	14	14	14	0	0	14
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, %	3	3	7	7	6	6
Mvmt Flow	0	20	0	1696	845	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	469	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	461	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	449	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	449	-	-
HCM Lane V/C Ratio	-	0.044	-	-
HCM Control Delay (s)	-	13.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	1495	1593	31
Future Volume (vph)	0	15	0	1495	1593	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			35	35	
Link Distance (ft)	242			242	364	
Travel Time (s)	6.6			4.7	7.1	
Confl. Peds. (#/hr)	16	16	16			16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	15	0	1495	1593	31
Future Vol, veh/h	0	15	0	1495	1593	31
Conflicting Peds, #/hr	16	16	16	0	0	16
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, %	3	3	3	3	3	3
Mvmt Flow	0	16	0	1625	1732	34

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	915	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	235	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	228	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	228	-	-
HCM Lane V/C Ratio	-	0.072	-	-
HCM Control Delay (s)	-	22	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-