

LMC Marymoor

Redmond, WA

Updated Transportation Impact Study

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FINDINGS/CONCLUSIONS

This traffic impact analysis has been prepared for the proposed LMC Marymoor project located at 17611 NE 70th Street in Redmond, WA. This is an update to our previous traffic analysis dated January 16, 2019 and addresses City of Redmond PREP 3 comments received January 30, 2019.

Project Proposal. The LMC Marymoor site is located within the Marymoor Design District 2 (MDD2) zone of Southeast (SE) Redmond, WA. The proposed project includes the development of 450 multi-family residential (apartment) units, up to 17,000 square feet (SF) of ground floor retail space, and a 20,000 SF daycare with a capacity of up to 248 students. The existing site is currently occupied by a total of approximately 13,190 SF on industrial and manufacturing uses. Vehicular access to the site would be provided at two locations; a new full access driveway on 176th Ave NE and a new full access driveway on NE 68th Street. The project is anticipated to be completed and occupied in 2022.

Trip Generation. The proposed LMC Marymoor development is estimated to generate 4,055 new weekday daily trips with 382 new trips occurring during the weekday AM peak hour (174 in, 208 out) and 405 new trips occurring during the weekday PM peak hour (216 in, 189 out).

Transportation Concurrence. A concurrence application is being submitted to the City of Redmond along with this traffic study. It is anticipated that the project will meet the City of Redmond's transportation concurrence requirements and be issued a certificate of concurrence.

2022 Traffic Operations Analysis. A level of service (LOS) analysis was conducted at ten off-site study intersections for weekday AM and PM peak hour conditions. Based on the results of the LOS analysis, there are several signalized study intersections along Redmond Way that are anticipated to operate at LOS E or LOS F without or with the proposed LMC Marymoor project in 2022 during the AM and PM peak hours. There are improvements planned by the City and/or Sound Transit at the majority of the LOS E/F intersections that will improve future operations at these intersections. At intersections that are anticipated to operate at LOS E/F in 2022 without planned improvements, the proposed LMC Marymoor project has insignificant impacts.

Site Access Analysis. Results of the LOS and queue analysis at the proposed site access locations on 176th Ave NE (at NE 69th Street and NE 68th Street) show that the controlled movements are expected to operate at LOS C or better with minimal vehicle queues during the weekday AM and PM peak hours in 2022.

2026 Analysis. Per the City's request, a LOS and queue analysis was conducted at the intersection of NE 70th Street/176th Ave NE and the site access locations for year 2026 AM and PM peak hour conditions with occupancy of the Sound Transit SE Redmond Station and with the LMC Marymoor project. Based on the results of the analysis, the future signalized intersection of NE 70th Street/176th Ave NE is anticipated to operate at LOS D or better during the AM and PM peak hours in 2026.

The results of the 2026 queuing analysis of the northbound approach at NE 70th Street/176th Ave NE show that it may be difficult for drivers to access 176th Ave NE from NE 69th Street during the peak hours. However, queuing from adjacent signalized intersections during peak hours in the Marymoor Village urban area is not unexpected and residents of the project will have alternate access to 176th Ave NE via NE 68th Street which will operate better than NE 69th Street.

Mitigation

Frontage & Roadway Improvements

Frontage/Roadway improvements are proposed to include the following:

NE 70th Street:

- 19' dedication for Type I street.
- Curb set to accommodate planned Sound Transit layout of NE 70th Street.
- New curb, gutter, sidewalk, landscaping with street trees, and street lighting along project frontage.

176th Ave NE:

- 21' dedication for Type I street.
- Removal of one existing driveway and replace with one new driveway curb-cut at approximately NE 69th Street.
- New curb, gutter, sidewalk, landscaping with street trees, street lighting, cycle track, and on-street parking along project frontage.

NE 68th Street:

- 36' dedication for new Type II street.
- New curb, gutter, sidewalk, landscaping with street trees, and street lighting along project frontage.

Non-Motorized Improvements

The LMC Marymoor project is designing NE 69th Street as a Type III “woonerf” Street that will provide a 40-foot shared space on-site for east/west non-motorized (pedestrian and bicycle) access through the site. Additionally, in the center of the project, a public multi-purpose trail connector is planned in the north/south direction between NE 69th Street and NE 68th Street through the site. Both of these on-site non-motorized improvements will provide pedestrian and bicycle connections to local and regional destinations, including Marymoor Park to the south, the East Lake Sammamish Trail and adjacent retail center to the east, and the future Sound Transit Light Rail Station to the northwest.

In addition to the on-site non-motorized improvements, the LMC Marymoor project proposes to construct two new crosswalks from their site to the regional East Lake Sammamish Trail through the existing King County parking lot located directly east of the LMC Marymoor site. One crosswalk would be located at approximately NE 69th Street and would connect to both the trail and the existing pathway to/from the Whole Foods retail shopping center and the second crosswalk would be located at approximately NE 68th Street.

The project is also constructing a cycle track on 176th Ave NE along the project frontage and new sidewalks on NE 70th Street, 176th Ave NE, and NE 68th Street along the project frontages.

The on-site non-motorized connections through the LMC site, the new crosswalks through the King County parking lot, the new cycle track on 176th Ave NE, and the new sidewalks that will be constructed along the project frontage will provide a pedestrian/bicycle grid connection to and through the site and the Marymoor Village area as intended by the City and will accommodate all pedestrian and bicycle trips between the LMC site, the East Lake Sammamish Trail, and the adjacent Whole Foods retail shopping center.

Off-Site Improvements

The applicant will construct a northbound right-turn lane at the intersection of NE 70th Street/176th Ave NE along their project frontage. Based on the results of the analysis shown in this report, no other project-specific off-site transportation mitigation is proposed for concurrency or SEPA purposes.

Transportation Impact Fees

Long-term traffic impacts in the City of Redmond are mitigated by the projects included in the City's Transportation Facilities Plan (TFP). The TFP projects are funded through the payment of City of Redmond transportation impact fees. Based on this process, a fee is assessed upon a development to pay for a proportionate share of the cost of public facilities needed to serve new growth and development.

The final impact fee calculation will be based on the rates and project size in effect at the time of building permit issuance. The project Applicant is working with the City on adjustments to the impact fee calculations to account for the anticipated reduced vehicular trip generation of the LMC Marymoor site as a result of being a TOD development located adjacent to the planned Sound Transit SE Redmond Station. Any applicable credits for transportation infrastructure will be addressed in the Development Agreement.

INTRODUCTION

This traffic impact analysis has been prepared for the proposed LMC Marymoor project located at 17611 NE 70th Street in Redmond, WA. This is an update to our previous traffic analysis dated January 16, 2019 and addresses City of Redmond PREP 3 comments received January 30, 2019.

Project Description

The LMC Marymoor site is located within the Marymoor Design District 2 (MDD2) zone of Southeast (SE) Redmond, WA. A vicinity map showing the location of the site and the surrounding area is included in **Figure 1**. The proposed project includes the development of 450 multi-family residential (apartment) units, up to 17,000 square feet (SF) of ground floor retail space, and a 20,000 SF daycare with a capacity of up to 248 students. The existing site is currently occupied by a total of approximately 13,190 SF on industrial and manufacturing uses.

Vehicular access to the site would be provided at two locations; a new full access driveway on 176th Ave NE and a new full access driveway on NE 68th Street. The project is anticipated to be completed and occupied in 2022. A preliminary site plan concept is shown in **Figure 2**.

Project Approach

The specific scope items used in the evaluation of traffic impacts were discussed and confirmed by City staff. To analyze the traffic impacts from the LMC Marymoor project, the following tasks were undertaken:

- Assessed existing conditions through field reconnaissance and reviewed existing planning documents.
- Described existing roads, nonmotorized transportation facilities, and transit facilities in the project vicinity.
- Documented traffic collisions in the project vicinity.
- Documented existing traffic volumes and intersection LOS during the weekday AM and PM peak hours.
- Documented future planned roadway improvements in the project vicinity.
- Developed weekday daily, AM, and PM peak hour trip generation estimates.
- Assigned weekday AM and PM peak hour project-generated trips onto a future road network with the NE 70th Street Extension.
- Analyzed weekday AM and PM peak hour LOS for future conditions without and with the project at the following study intersections:
 1. Redmond Way / 170th Ave NE (signalized)
 2. Redmond Way / NE 76th Street / SR 520 Westbound on-ramp (signalized)
 3. Redmond Way / SR 520 Eastbound off-ramp (signalized)
 4. Redmond Way / NE 70th Street (signalized)
 5. NE 70th Street / 176th Ave NE (northbound stop-controlled, future signal)

6. Redmond Way / E Lk Sammamish Pkwy NE / 180th Ave NE (signalized)
 7. NE 65th Street / E Lk Sammamish Pkwy NE (signalized)
 8. Redmond Way / 185th Ave NE (signalized)
 9. Redmond Way / 188th Ave NE (signalized)
 10. NE 76th Street / 180th Ave NE / 178th Ave NE (signalized)
- Analyzed the weekday AM and PM peak hour operations at the site access driveways on 176th Ave NE at NE 68th Street and NE 69th Street.
 - Documented proposed traffic mitigation including frontage/roadway improvements, non-motorized improvements, off-site improvements, and payment of transportation impact fees.

Primary Data and Information Sources

- Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.
- Institute of Transportation Engineers (ITE), *Trip Generation Handbook*, 3rd Edition, 2017.
- WSDOT collision data, January 1, 2016 to December 31, 2018.
- 2018 AM and PM peak hour traffic counts, City of Redmond and All Traffic Data.
- City of Redmond 2019-2024 TIP and 2013-2030 TFP.
- *Highway Capacity Manual (HCM)*, 6th Edition, 2016.
- City of Redmond *Impact Fee Schedule*, effective January 1, 2019.



Figure 1: Project Site Vicinity

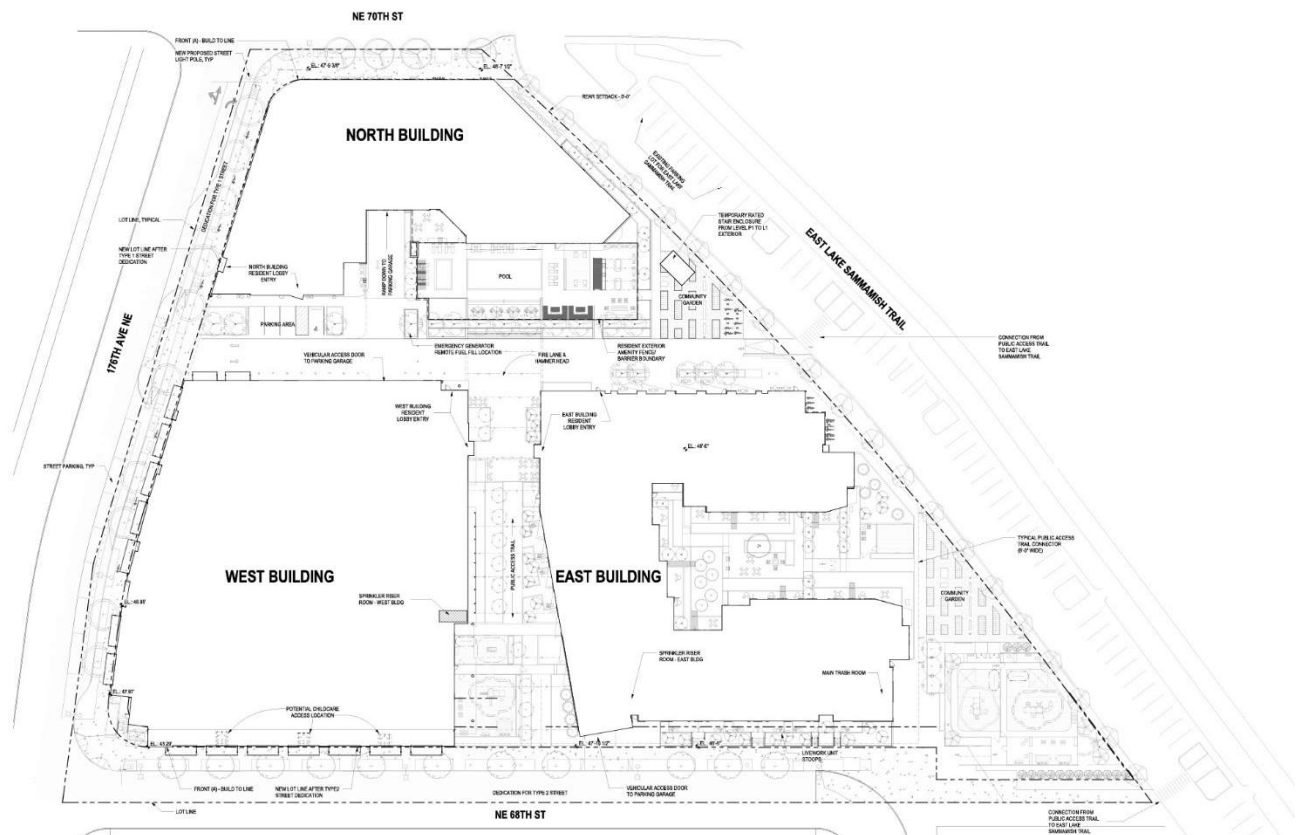


Figure 2: Preliminary Site Plan

EXISTING CONDITIONS

Roadway Network

Table 1 describes the existing characteristics of the streets that would be used as primary routes to and from the site. Roadway characteristics are described in terms of orientation, arterial classification, number of lanes, posted speed limits, parking, pedestrian facilities, and bicycle facilities. The relationship of these roadways to the project site is shown in **Figure 1**. An aerial view of the transportation network in the site vicinity is shown on the next page.

Table 1
Existing Study Area Roadway Network

Roadway	Orientation	Arterial Classification	# of Travel Lanes	Posted Speed Limit (mph)	Parking	Sidewalks	Bicycle Facilities
Redmond Way (SR 202)	E/W	Principal Arterial	5/6	30 to 45	No	Both Sides	Bike Lanes on South Side or Both Sides
E Lk Sammamish Pkwy	N/S	Minor Arterial	2	35	No	Both Sides	Bike Lanes on Both Sides
180 th Ave NE	N/S	Collector Arterial	2+	35	No	Both Sides	Bike Lanes on Both Sides
NE 70 th Street	E/W	Collector Arterial	2	30	No	intermittent	None
176 th Ave NE	N/S	Local Street (Planned Collector Arterial)	2	25	No	intermittent	None

+ includes center two-way left-turn lane (TWLTL)

Nonmotorized Transportation Facilities

Pedestrian facilities in the immediate project vicinity include sidewalks on the south side of NE 70th Street east of the East Lake Sammamish Trail, and sidewalks on both sides of Redmond Way. The East Lake Sammamish Trail is located directly east of the project site and provides a protected trail for pedestrians and bicycles. Other pedestrian facilities include curb ramps and crosswalks at signalized intersections.

Bicycle facilities in the project vicinity include bike lanes on both sides of 180th Ave NE and E Lk Sammamish Pkwy NE. There are also bike lanes on the south side of Redmond Way west of 180th Ave NE and on both sides of Redmond Way east of 180th Ave NE.

Transit Service

Transit service to and from the project vicinity is provided by King County Metro Transit and Sound Transit. The nearest public transit stops are located on the north side of Redmond Way at NE 70th Street and on the east side of 180th Ave NE at approximately NE 70th Street. The transit stop on Redmond Way provides access to the Redmond LOOP. The transit stop on 180th Ave NE provides

access to Metro Transit routes 216, 268, and 269. In addition, the Bear Creek Park & Ride is located approximately 2/3 mile north of the site at 7760 178th Ave NE.



Aerial View of Project Vicinity (2018)

Collision History

Intersection Collisions

Collisions at the study intersections were summarized for the most recent three-year period from January 1, 2016 to December 31, 2018. Collision data was provided by the Washington State Department of Transportation (WSDOT). Summaries of the total, yearly average, and collisions per million entering vehicles (MEV) are provided in **Table 2**. Summaries of collisions by type are provided in **Table 3**.

Table 2
Collision Data Summary, January 1, 2016 to December 31, 2018

Intersection	Number of Collisions					Estimated Daily Volumes AWDT ¹	Collisions per MEV ²
	2016	2017	2018	3-Year Total	Average Annual		
1. Redmond Way/170 th Ave NE	14	8	6	28	9.33	33,320	0.77
2. Redmond Way/NE 76 th St	4	2	5	11	3.67	37,520	0.27
3. Redmond Way/SR 520 off-ramp	2	4	15	21	7.00	38,300	0.50
4. Redmond Way/NE 70 th St	5	5	7	17	5.67	46,670	0.33
5. NE 70 th St/176 th Ave NE	0	0	0	0	0.00	5,110	0.00
6. Redmond Way/E Lk Samm/180 th	18	8	9	35	11.67	49,690	0.64
7. E Lk Samm/NE 65 th St	4	2	3	9	3.00	25,050	0.33
8. Redmond Way/185 th Ave NE	5	5	3	13	4.33	33,870	0.35
9. Redmond Way/188 th Ave NE	6	2	5	13	4.33	34,420	0.34
10. 180 th Ave NE/NE 76 th St	8	3	3	14	4.67	20,540	0.62

Source: WSDOT Collision Records.

¹ AWDT = Average Weekday Daily Traffic. Estimated daily volumes are based on 2018 PM volumes and a K-factor of 10.

² Collision rate per MEV = Collision rate per Million Entering Vehicles.

Table 3
Collision Data Summary by Type, January 1, 2016 to December 31, 2018

Intersection	3-Year Total Collisions	Average Annual Collision Rate	Collision Type						
			Approach Turn	Parked Veh/ Fixed Object	Sideswipe	Right Angle	Rear-end	Ped/Bike Involved	Other
1. Redmond Way / 170 th Ave NE	28	9.33	8	0	6	5	8	1	0
2. Redmond Way / NE 76 th St	11	3.67	0	1	3	3	3	1	0
3. Redmond Way / SR 520 off-ramp	21	7.00	0	0	1	4	14	1	1
4. Redmond Way / NE 70 th St	17	5.67	0	0	3	2	10	2	0
5. NE 70 th St / 176 th Ave NE	0	0.00	0	0	0	0	0	0	0
6. Redmond Way / E Lk Samm / 180 th	35	11.67	1	0	7	6	18	1	2
7. E Lk Samm / NE 65 th St	9	3.00	3	0	0	1	3	1	1
8. Redmond Way / 185 th Ave NE	13	4.33	0	1	2	4	5	0	1
9. Redmond Way / 188 th Ave NE	13	4.33	0	1	1	6	5	0	0
10. 180 th Ave NE / NE 76 th St	14	4.67	8	2	0	1	3	0	0

Source: WSDOT Collision Records.

Intersection collision rates over 1.0 collision per MEV generally warrant further review to determine if any patterns exist. Based on the collision data shown in **Table 2**, all of the study intersections have a collision rate that is less than 1.0 collision per MEV.

Collisions on 176th Ave NE

TENW also reviewed the most recent 5-year collision history along the project frontage on 176th Ave NE between NE 70th Street and approximately NE 68th Street. The collision history was provided by WSDOT.

The collision records included one incident that occurred on 176th Ave NE 200 feet south of NE 70th Street. The collision records indicate that this collision was between a stopped vehicle parked illegally in the southbound direction and a vehicle travelling southbound.

With only one collision in the last 5 years near the location of the proposed LMC Marymoor site access driveways on 176th Ave NE, there are no existing safety issues or collision patterns that must be considered relative to the proposed accesses on 176th Ave NE.

Existing Traffic Volumes

Existing weekday AM and PM peak hour traffic volumes at the ten study intersections were based on counts conducted in 2018 by the City of Redmond and All Traffic Data. **Figure 3 and Figure 4** illustrate the existing 2018 AM and PM peak hour traffic volumes at the study intersections. *It should be noted that per the request of the City, the peak hour eastbound and westbound volumes on Redmond Way between the SR 520 on-ramp and the SR 520 off ramp were balanced.*

Existing Level of Service

Per City of Redmond Traffic Study Phase 2 requirements, all signalized intersections impacted by 20 or more PM peak hour trips are required as study intersections. Based on the trip distribution and assignment shown later in **Figure 5** and our scoping discussions with the City of Redmond, an existing weekday AM and PM peak hour level of service (LOS) analysis was conducted at the following study intersections:

1. Redmond Way / 170th Ave NE (signalized)
2. Redmond Way / NE 76th Street / SR 520 Westbound on-ramp (signalized)
3. Redmond Way / SR 520 Eastbound off-ramp (signalized)
4. Redmond Way / NE 70th Street (signalized)
5. NE 70th Street / 176th Ave NE (northbound stop-controlled)
6. Redmond Way / E Lk Sammamish Pkwy NE / 180th Ave NE (signalized)
7. NE 65th Street / E Lk Sammamish Pkwy NE (signalized)
8. Redmond Way / 185th Ave NE (signalized)
9. Redmond Way / 188th Ave NE (signalized)
10. NE 76th Street / 180th Ave NE / 178th Ave NE (signalized)

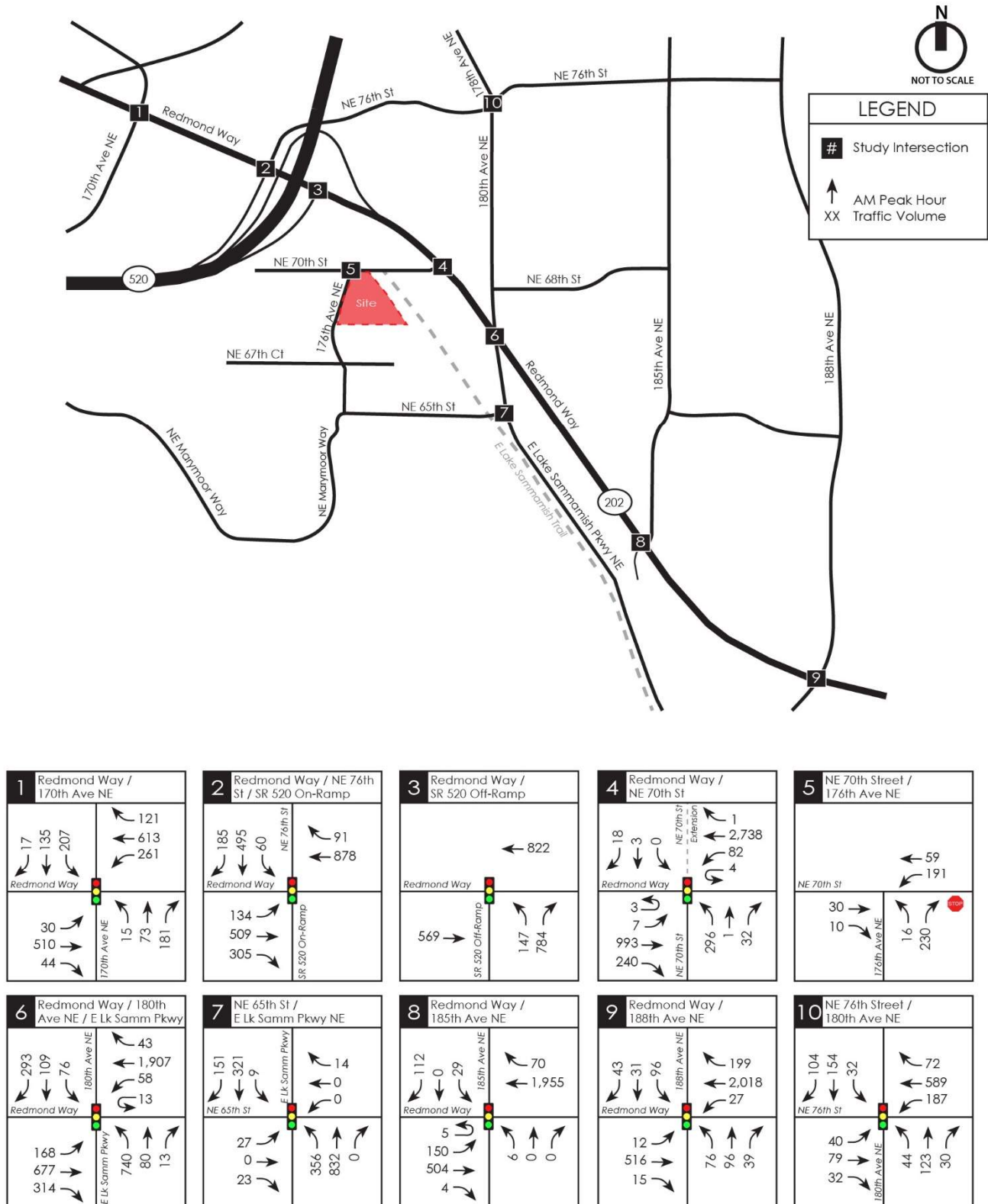


Figure 3: 2018 Existing AM Peak Hour Traffic Volumes

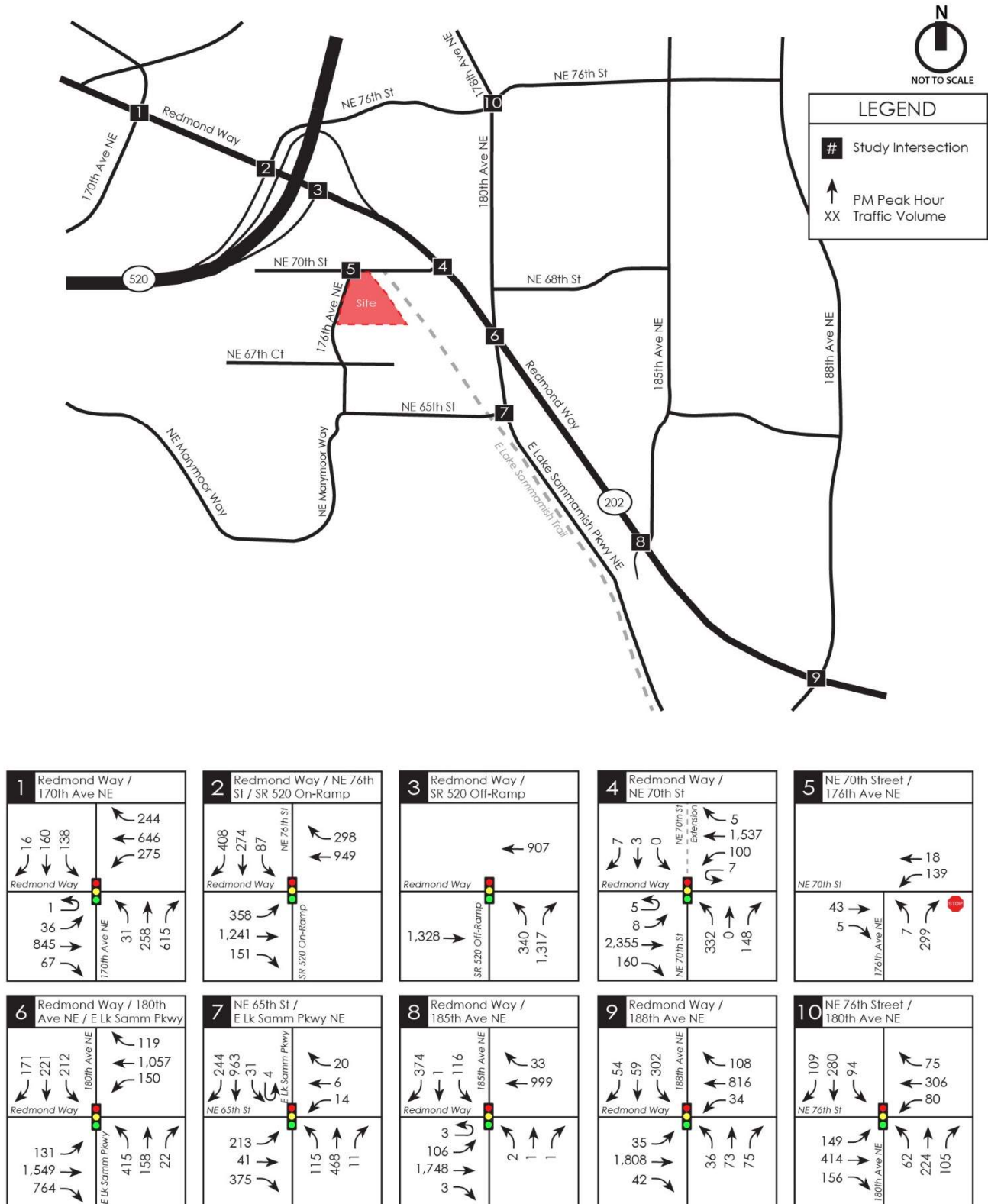


Figure 4: 2018 Existing PM Peak Hour Traffic Volumes

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 4** outlines the current HCM (6th Edition) LOS criteria for signalized and stop-controlled intersections based on these methodologies.

Table 4
LOS Criteria for Signalized and Stop-Controlled Intersections¹

SIGNALIZED INTERSECTIONS			STOP-CONTROLLED INTERSECTIONS		
Control Delay (sec/veh)	LOS by Volume-to Capacity (V/C) Ratio ²		Control Delay (sec/veh)	LOS by Volume-to Capacity (V/C) Ratio ³	
	≤ 1.0	> 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 (HCM), Transportation Research Board, 6th Edition, 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 current HCM (6th edition) using *Synchro 10.3* traffic analysis software. Existing signal timing used in the analysis was provided by the City of Redmond and the Washington State Department of Transportation (WSDOT).

The 2018 existing weekday PM peak hour LOS analysis results at the ten study intersections are summarized in **Table 5**. The 2018 existing LOS worksheets are included in **Appendix A**.

Table 5
2018 Existing Peak Hour Level of Service Summary

Study Intersection / Movement	2018 Existing AM Peak Hour		2018 Existing PM Peak Hour	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Signalized Intersections</u>				
1. Redmond Way / 170 th Ave NE	C	29.3	D	49.9
2. Redmond Way / NE 76 th St / SR 520 on-ramp	E	60.6	C	33.7
3. Redmond Way / SR 520 Eastbound off-ramp	C	24.2	C	28.3
4. Redmond Way / NE 70 th Street	B	18.8	B	19.0
6. Redmond Way / E Lk Samm Pkwy / 180 th	E	64.4	E	72.5
7. NE 65 th Street / E Lk Samm Pkwy	B	11.1	C	25.8
8. Redmond Way / 185 th Ave NE	E	71.4	C	21.4
9. Redmond Way / 188 th Ave NE	F	88.0	C	30.5
10. NE 76 th Street / 180 th Ave NE / 176 th Ave NE	C	32.1	C	22.1
<u>Stop Controlled Intersections</u>				
5. NE 70 th Street / 176 th Ave NE				
Northbound Shared Left-Right (stop)	B	10.4	B	10.7
Westbound Left-Turn	A	7.7	A	7.6

AM Peak Hour

As shown in **Table 5**, all signalized study intersections and individual lane groups at the stop controlled study intersection are estimated to operate at LOS D or better during the AM peak hour with exception to the following:

- Redmond Way / NE 76th St / SR 520 on-ramp (#2) currently operates at LOS E.
- Redmond Way / E Lk Samm Pkwy NE (#6) currently operates at LOS E.
- Redmond Way / 185th Ave NE (#8) currently operates at LOS E.
- Redmond Way / 188th Ave NE (#9) currently operates at LOS F.

PM Peak Hour

As shown in **Table 5**, all signalized study intersections and individual lane groups at the stop controlled study intersection are estimated to operate at LOS D or better during the PM peak hour with exception to the signalized intersection of Redmond Way/E Lk Samm Pkwy/180th Ave NE which is estimated to operate at LOS E under 2018 existing conditions.

FUTURE CONDITIONS

Planned Transportation Improvements

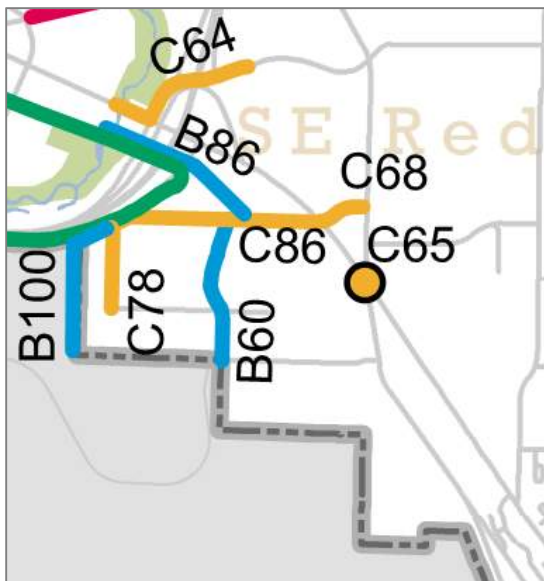
This section documents the known planned transportation improvements in the study area by Sound Transit (ST) and the City of Redmond.

Sound Transit East Link Extension

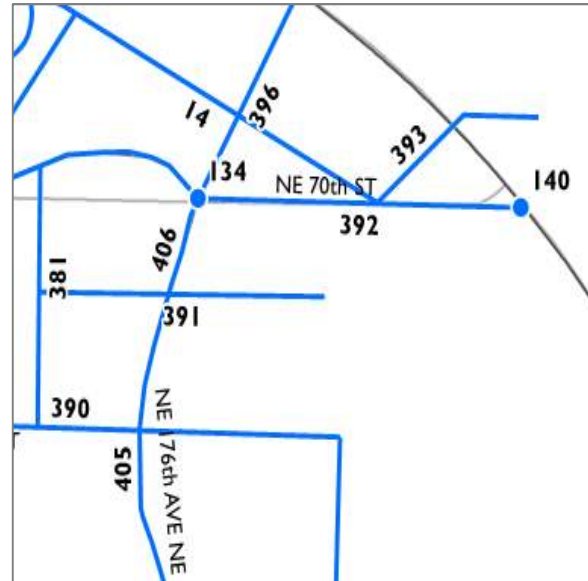
Sound Transit's Downtown Redmond East Link Extension project will extend light rail between Overlake and downtown Redmond with a station in SE Redmond located in the Marymoor Village subarea. The SE Redmond Station is anticipated to be complete in 2024 and will also provide additional local and regional bus transit by King County Metro Transit in addition to light rail. Plans for the SE Redmond Station include a 1,400-stall parking garage for park and ride use located on the north leg of the intersection of NE 70th Street/176th Ave NE. Sound Transit has identified multiple transportation improvements in the Marymoor Village subarea to mitigate the anticipated traffic impacts of the proposed SE Redmond Station. These mitigation improvements are being coordinated with the City of Redmond and include:

- Widening and improvement of NE 70th Street between 173rd Ave NE and Redmond Way
- Construction of a traffic signal at the intersection of NE 70th Street/176th Ave NE
- Construction of eastbound right-turn lane and second westbound left-turn lane on Redmond Way at NE 70th Street
- Construction of second eastbound left-turn lane at Redmond Way/NE 76th Street
- Extension of East Lake Sammamish Trail through SR 520 interchange area to connect with Redmond Central Connector.
- Intersection improvements at Redmond Way/E Lk Samm Pkwy/180th Ave NE

Planned transportation improvement projects identified in the City of Redmond's current 2019-2024 TIP, 2013-2030 TFP, and 2013-2030 TMP Unfunded Buildout Plan are included below.



2019-2024 TIP Projects



2013-2030 TMP Projects

- **TIP #C64 (TFP #84) – Redmond Way Bridge Modifications and 76th Street Widening**
Description:
This project will add a second eastbound left-turn lane on Redmond Way and include associated widening on NE 76th Street to accommodate the dual left-turns from Redmond Way. The scheduled start of the project is 2024.
- **TIP #C65 (TMP #133 and #244) – Redmond Way and East Lake Sammamish Pkwy Intersection Improvements**
Description:
Increase capacity at Redmond Way/East Lake Sammamish Parkway by physically separating the eastbound right-turn from the westbound left-turn and by converting the northbound triple left-turns (on ELSP) to two left-turns and one through lane to better balance traffic between the three lanes. The pedestrian crossings would also be revised to provide one crossing at each leg of the intersection. The scheduled start of the project is 2021.
- **TIP #C68 (TFP #360) – NE 70th Street Improvements**
Description:
The project will complete the NE 70th Street Extension from Redmond Way to 180th Ave NE per the Marymoor subarea Plan. The scheduled start of the project is 2024.
- **TIP #C78 (TMP #378) – 173rd Ave NE Completion (NE 67th St to NE 70th St)**
Description:
The project will complete 173rd Ave NE from NE 67th Street to NE 70th Street per the Marymoor subarea Plan. The scheduled start of the project is 2024.
- **TIP #C86 (TMP #392) – 70th Street Improvements (Redmond Way to 173rd Ave NE)**
Description:
The project will construct new 70th Street from Redmond Way to the Marymoor Light Rail Station and 173rd Ave NE. Intersection improvements include an additional northbound left-turn lane on Redmond Way to 70th Street. The scheduled start of the project is 2020.
- **TIP #B60 – 176th Ave NE Sidewalk (NE 65th St to NE 70th St)**
Description:
The project will add sidewalk on 176th Ave NE between NE 65th and NE 70th Streets. The scheduled start of the project is 2023.
- **TIP #B86 – East Lake Sammamish Trail/RCC Connection (SR 520 Undercrossing)**
Description:
Provide grade separated trail through the SR 520/SR 202 Interchange area along the planned light rail alignment, connecting East Lake Sammamish Trail and Redmond Central Connector. Provide access to the planned Southeast Redmond light rail station. The scheduled start of the project is 2020.
- **TIP #B100 – SE Redmond Trail - ELST to Station to Marymoor Connector**
Description:
Construct a regional paved trail connecting the East Lake Sammamish Trail to the Southeast Redmond Light Rail Station to the Marymoor Park Trail per the Marymoor Infrastructure Report. The scheduled start of the project is 2024.

- **TMP #97 – East Lake Sammamish Pkwy from Redmond Way to 187th Ave NE**
Description:
Widen East Lake Sammamish Pkwy from Redmond Way to 187th Ave NE. Improvements include 1 through lane in each direction, left turn lanes where needed, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power, and right-of-way.
- **TMP #134 – NE 70th/176th Ave Truck Movement Enhancement**
Description:
Improve intersection geometry and traffic control for trucks and traffic at NE 70th Street/176th Ave NE.
- **TMP #393 – Redmond Way non-motorized crossing near SE Redmond Light Rail Station**
Description:
Consistent with the Southeast Redmond Neighborhood Plan, provide a non-motorized crossing of Redmond Way between the westbound SR 520 on-ramp and NE 70th Street that increases route directness to/from the Southeast Redmond light rail station and minimizes potential conflicts with vehicles.
- **TMP #390 – NE 68th St Connection**
Description:
Construct connector street from 173rd Ave NE to 177th Ave NE.
- **TMP #391 – NE 69th St Woonerf**
Description:
Construct woonerf-style local access facility from 175th Pl NE to 177th Ave NE.

Project Trip Generation

The proposed LMC Marymoor project includes the development of 450 multi-family residential (apartment) units, up to 17,000 square feet (SF) of ground floor retail space, and a 20,000 SF daycare with a capacity of up to 248 students. The existing site is currently occupied by a total of approximately 13,190 SF on industrial and manufacturing uses which would be removed with the proposed project.

Proposed Uses

The gross, unadjusted weekday daily, AM peak hour, and PM peak hour trip generation estimates for the proposed uses were based on the trip rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition for Land Use Code (LUC) 221 (Multifamily Housing – Midrise), LUC 820 (Shopping Center), and LUC 565 (Daycare). Adjustments to the gross trip generation of the proposed uses were made to account for internal trips and non-vehicle trips.

Internal and Non-Vehicle Trips. Reductions to the gross trip generation of the proposed mixed-use development were taken to account for internal trips and non-vehicle trips. The non-vehicle trips include walking, biking, and transit trips and are intended to reflect an anticipated reduction in vehicular trips for the LMC Marymoor site given its location in the Marymoor subarea and its proximity to the planned Sound Transit SE Redmond Station.

The internal and non-vehicle trip reduction for the proposed land use in the LMC Marymoor project was estimated based on the MXD+ methodology which takes a blended calculation of the MXD and

NCHRP calculation results for internal capture and adds in walk and transit travel reductions based on the MXD calculations. The MXD methodology was developed by the Environmental Protection Agency (EPA) in conjunction with the Institute of Transportation Engineers (ITE). The “EPA” method considers the site’s size, mix of uses, and proximity to transit and employment to estimate the internal capture of trips within the mixed-use development (MXD) as well as estimates of off-site walking and transit usage for trips starting or ending in the mixed-use development.

The specific estimated MXD+ external vehicle trip reduction calculations for the LMC Marymoor site were 29% for weekday daily, 22% for weekday AM peak hour, and 29% for weekday PM peak hour. These external vehicle trip reductions were very similar to the calculations documented in the HDR *Marymoor Subarea Traffic Analysis* (27% for weekday daily, 30% for weekday AM peak hour, and 28% for weekday PM peak hour) which estimated internal and non-vehicle trips using only the MXD methodology. As a conservative estimate, and as approved in discussions with the City, a 20% reduction was applied to the proposed residential and retail uses and a 25% reduction was applied to the proposed daycare use for the weekday daily, AM peak hour, and PM peak hour trip generation estimates. The trip reductions account for internal trips and non-vehicle trips (walking/biking and transit) associated with the LMC Marymoor site being located in the Marymoor Village subarea and adjacent to the planned Sound Transit SE Redmond station and the East Lake Sammamish Trail. *Note that the 25% daycare trip reduction is intended to account for linked trips between the daycare and the Sound Transit SE Redmond Station and conservatively assumes no internal trip reductions between the daycare and the residential/retail uses on the LMC site.*

Pass-by Trips. Consistent with methodology and studies documented in the ITE *Trip Generation Handbook*, 3rd Edition, 2017, reductions in the vehicular trip generation of the retail use are typically taken to account for pass-by trips (after internal and non-vehicle adjustments). Pass-by trips are made by vehicles that are already on the adjacent streets and make intermediate stops at the site on route to a primary destination (i.e. on the way from work to home). Pass-by trips are trips that are diverted from the through movements on the adjacent streets, and therefore still impact operations at the site access points. *Based on discussions with the City, as a conservative measure, no pass-by trip reductions were included in the weekday daily, AM peak hour, or PM peak hour trip estimates.*

Trip Credit for Existing Uses

The applicant will receive trip generation credits for the existing industrial uses that will be demolished. Existing use trip generation estimates were based on ITE methodology for LUC 110 (General Light Industrial).

Net New Trips

The net new trips associated with the LMC Marymoor development were determined by subtracting the existing site trips from the proposed trips. A summary of the net new weekday daily, AM peak hour, and PM peak hour vehicular trip generation estimates for the LMC Marymoor project is shown in **Table 6**. A detailed trip generation estimate is included in **Attachment B**.

Table 6
Trip Generation Summary

Weekday Time Period	Net New Trips Generated		
	In	Out	Total
Weekday Daily	2,027	2,028	4,055
Weekday AM Peak Hour	174	208	382
Weekday PM Peak Hour	216	189	405

As shown in **Table 6**, the proposed LMC Marymoor development is estimated to generate 4,055 new weekday daily trips with 382 new trips occurring during the weekday AM peak hour (174 in, 208 out) and 405 new trips occurring during the weekday PM peak hour (216 in, 189 out).

Project Trip Distribution and Assignment

The distribution of trips generated by the proposed LMC Marymoor mixed-use project was estimated based previously approved residential projects and existing travel patterns in the vicinity of the site based on a review of existing traffic count data. The distribution of trips also assumes that the NE 70th Street Extension between Redmond Way and 180th Ave NE will be constructed and operational prior to occupancy of the proposed CVS project. The new AM and PM peak hour project-generated trips were generally distributed as follows:

- 10 percent to/from the west on Redmond Way
- 35 percent to/from the west on SR 520
- 10 percent to/from the east on Redmond Way
- 5 percent to/from the east on NE 68th St
- 15 percent to/from the south on East Lake Sammamish Parkway
- 15 percent to/from the north on 180th Ave NE
- 10 percent local within Marymoor Village

The distribution and assignment of the net new AM and PM peak hour project trips at the study intersections and site access driveways is illustrated in **Figure 5**.

Transportation Concurrency

A concurrency application is being submitted to the City of Redmond along with this traffic study. Using the information in the application, the City evaluates whether enough MUs from the six-year program and the Transportation Facility Plan (TFP) can be supplied to meet travel demand from the development at the time of opening, or within six years. If the MU supply is available to serve the MU demand from the development, the City will issue a certificate of concurrency. The current MU supply will accommodate the additional MU demand created by the proposed LMC Marymoor project. Therefore, it is anticipated that a certificate of concurrency will be issued for the project.

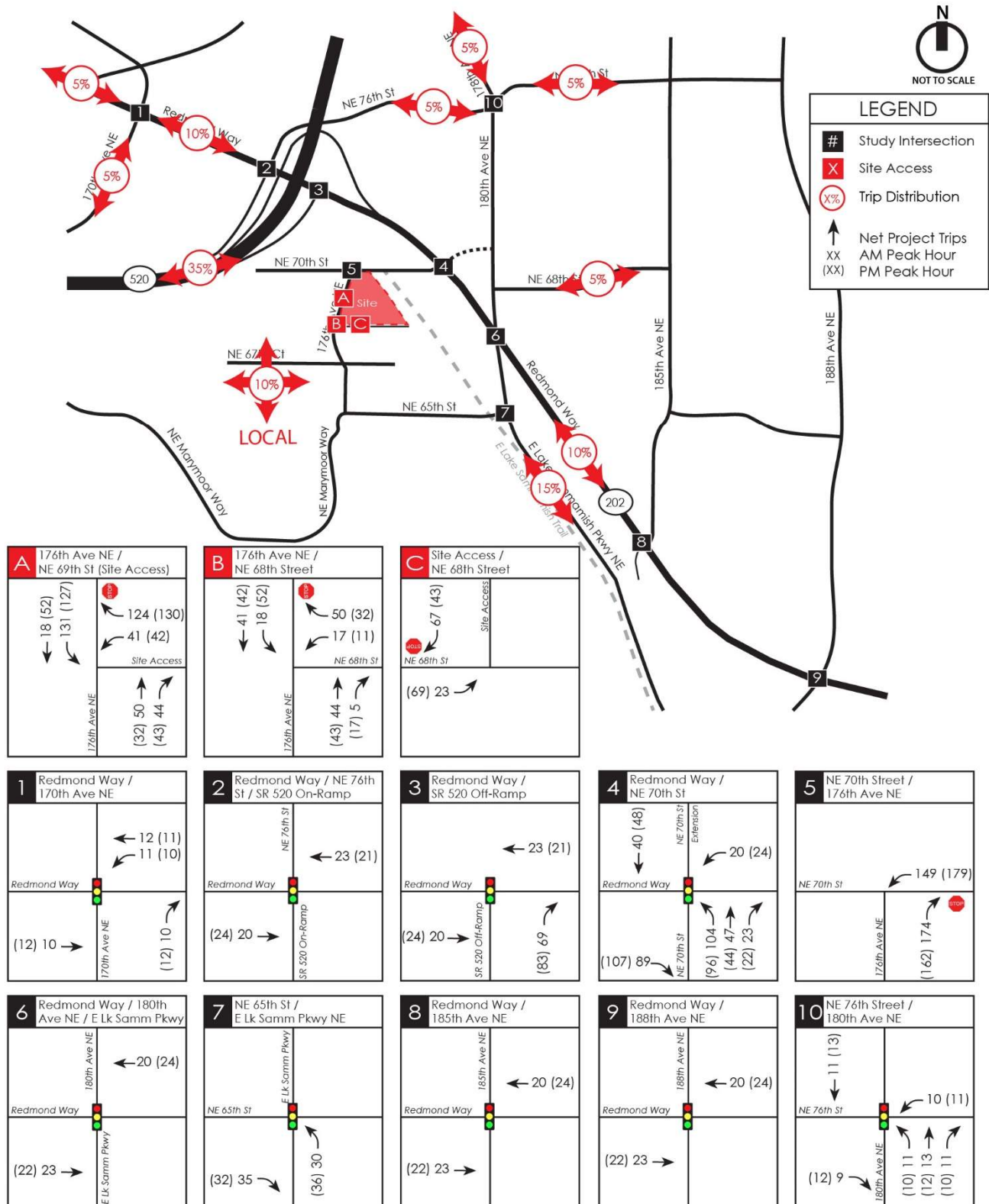


Figure 5: Peak Hour Project Trip Distribution and Assignment

Future 2022 Traffic Operations

Future Traffic Volumes

Future 2022 No Action Traffic Volumes with NE 70th Street Extension

To estimate the future 2022 No Action (without project) AM and PM peak hour traffic volumes, a 2 percent annual growth rate (based on the City's Phase 2 Traffic Study guidelines) was applied to the 2018 existing traffic volumes. In addition to the 2 percent annual background growth rate, trips from the following 5 pipeline projects (as directed by the City) were included in the future without-project traffic volumes:

- Alexan Marymoor
- Union Hill Car Wash
- Redmond Driver's Club/Metro AutoPark
- Bond Apartments
- CVS Pharmacy

The NE 70th Street Extension project between Redmond Way and 180th Ave NE is proposed to be constructed in conjunction with the CVS Pharmacy pipeline project. Although the City's TIP assumes the NE 70th Street Extension would be completed in 2024, it was assumed to be completed for the future year 2022 analysis documented in this traffic study. The redistribution of background traffic associated with the new NE 70th Street Extension was estimated based on adjustments documented in the *Woodspring Suites Traffic Impact Study* (Gibson Traffic Consultants, 2015) which were based on volume forecasts documented in the City of Redmond's *NE 70th Street Extension Study* (W&H Pacific). **Figure 6 and Figure 7** illustrate the future 2022 No Action AM and PM peak hour traffic volumes with the NE 70th Street Extension at the study intersections.

Future 2022 Traffic Volumes With-Project

To estimate the future year 2022 with-project traffic volumes, the new project-generated trips which are shown in **Figure 5** were added to the future 2022 No Action volumes with the NE 70th Street Extension (see **Figure 6 and Figure 7**) to obtain future with-project traffic volumes. The resulting total 2022 with-project AM and PM peak hour traffic volumes (with the NE 70th Street Extension) at the study intersections and site access driveways are shown in **Figure 8 and Figure 9**.

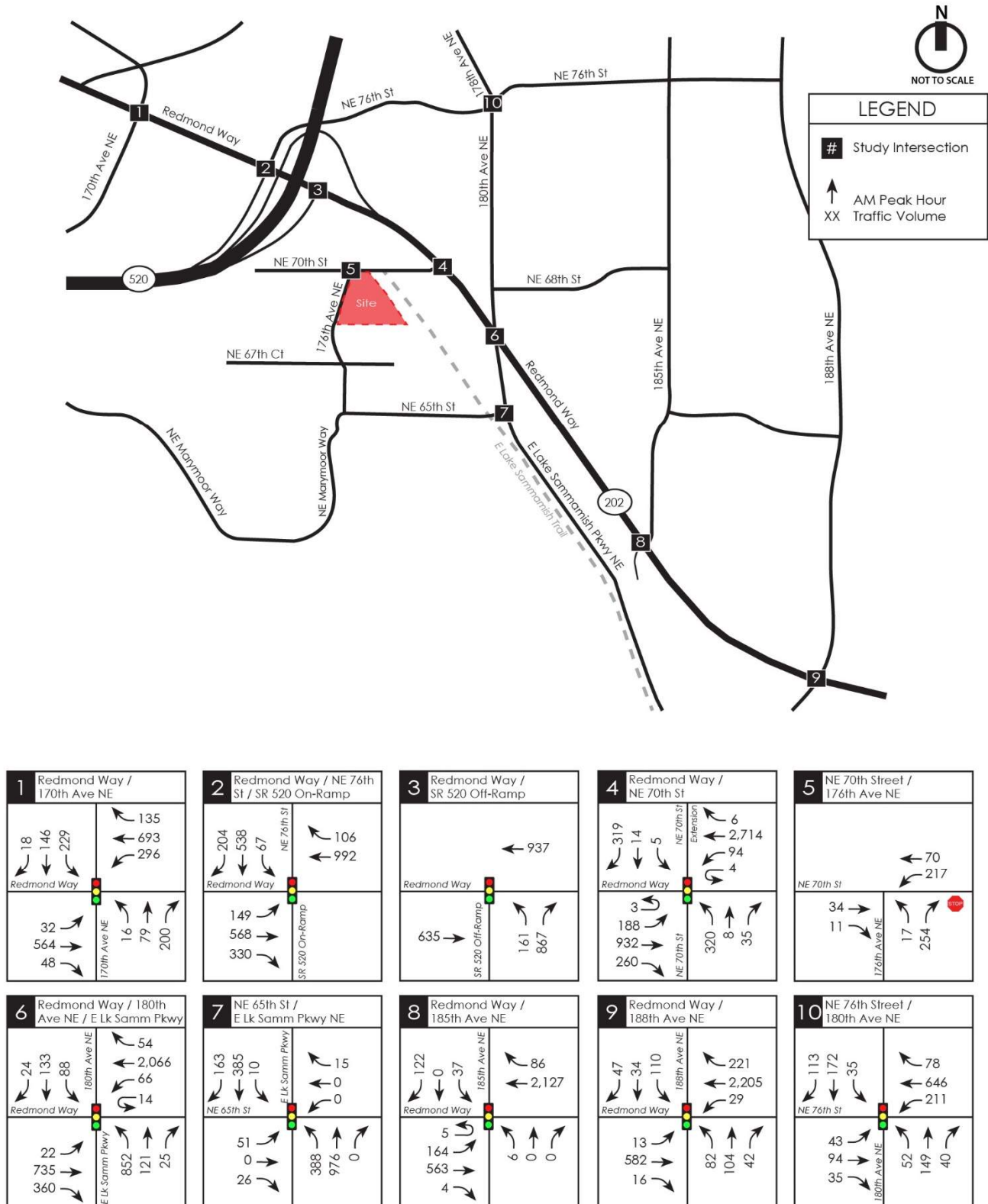


Figure 6: 2022 No Action AM Peak Hour Traffic Volumes

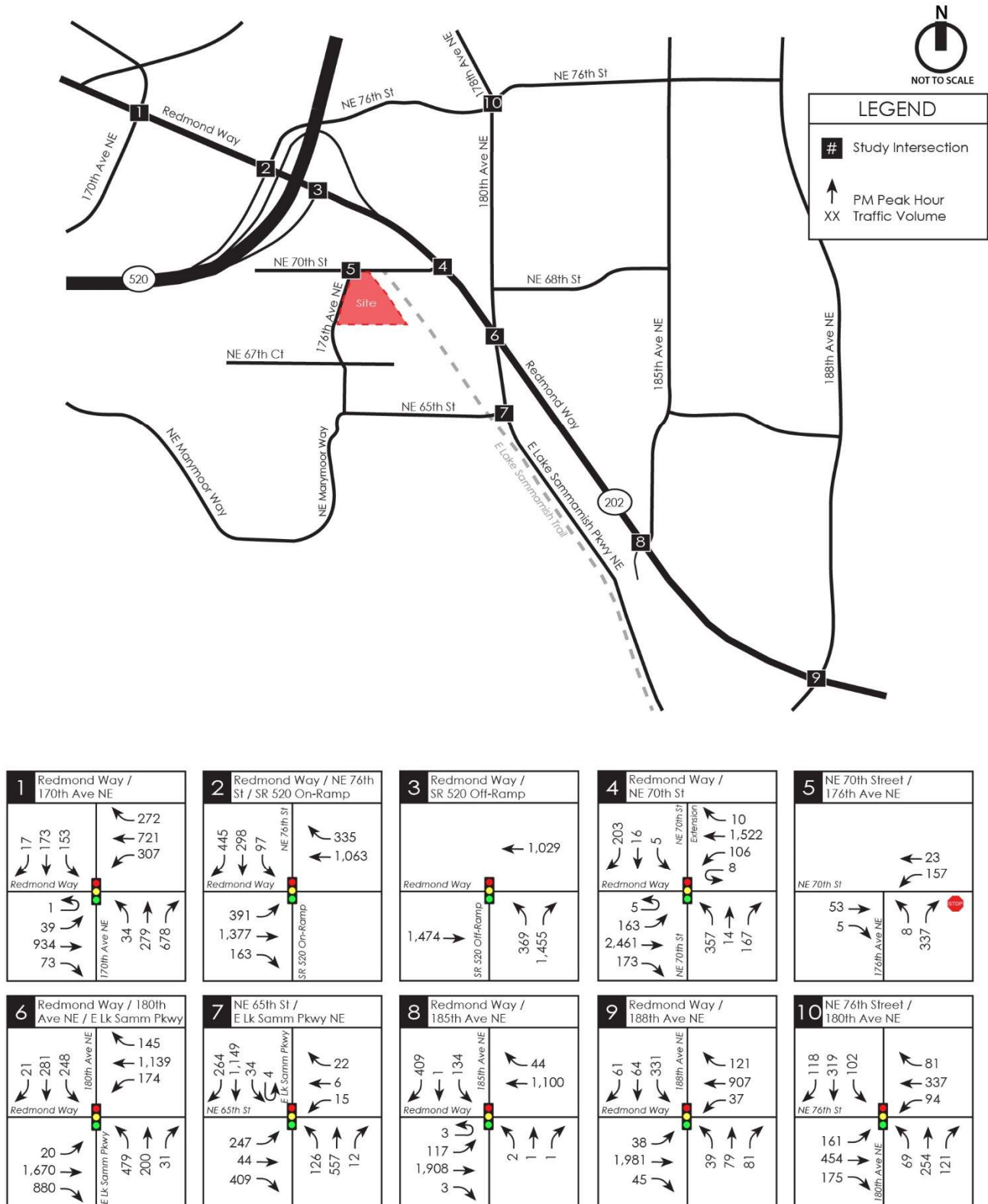


Figure 7: 2022 No Action PM Peak Hour Traffic Volumes

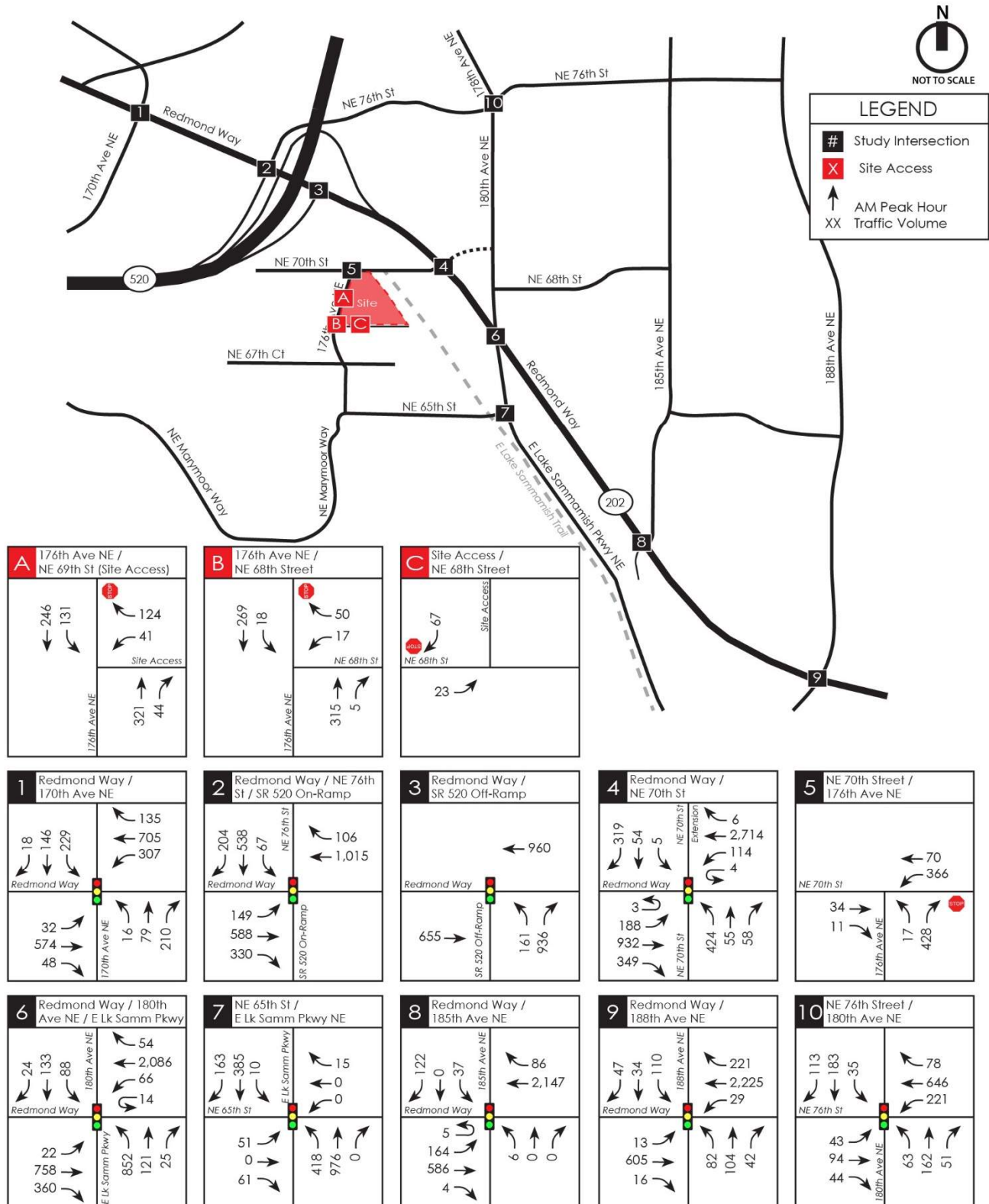


Figure 8: 2022 With Project AM Peak Hour Traffic Volumes

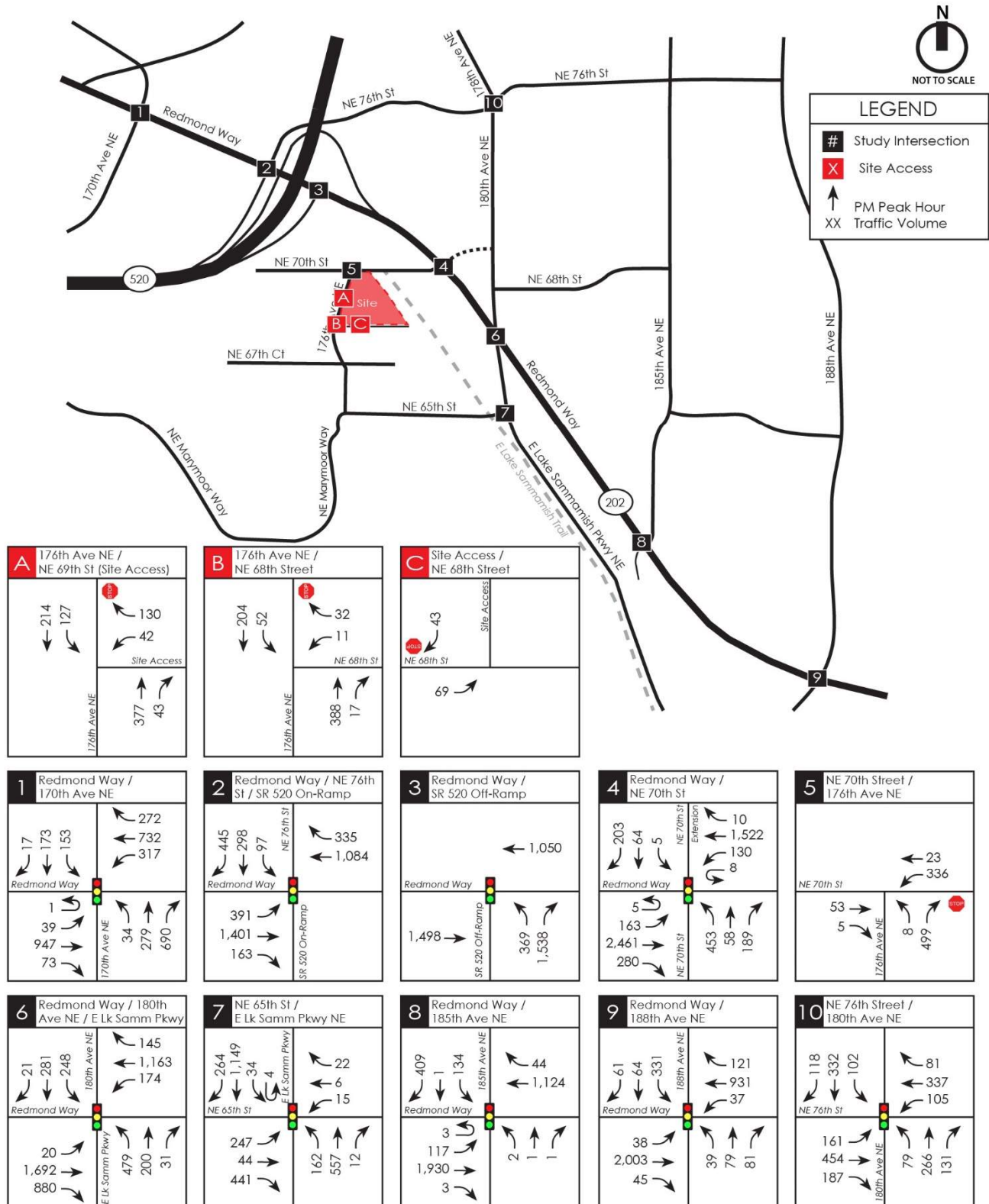


Figure 9: 2022 With Project PM Peak Hour Traffic Volumes

Future Level of Service

A future Level of Service (LOS) analysis was conducted at the ten study intersections for weekday AM and PM peak hour No Action (without project) conditions and for future with-project conditions.

The channelization and signal timing assumptions for the future year 2022 LOS analyses were consistent with existing conditions, except at the intersection of Redmond Way/NE 70th Street where the channelization and signal timing assumptions for the future year 2022 with-project LOS analyses assume the NE 70th Street Extension between Redmond Way and 180th Ave NE is completed. Therefore, the future year 2022 analysis at Redmond Way/NE 70th Street (#4) includes new channelization for the southbound approach, protected northbound and southbound left-turn phasing, and optimized splits.

The future weekday AM peak hour LOS results at the study intersections with and without the proposed LMC Marymoor project are summarized in **Table 7** and the PM peak hour LOS results at the study intersections without and with the proposed LMC Marymoor project are summarized in **Table 8**. The LOS worksheets are included in **Appendix A**.

Table 7
Future 2022 AM Peak Hour Level of Service Summary

Study Intersection / Movement	<u>2022 No Action</u> <u>AM Peak Hour</u>		<u>2022 With-Project</u> <u>AM Peak Hour</u>	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Signalized Intersections</u>				
1. Redmond Way / 170 th Ave NE	C	31.4	C	31.0
2. Redmond Way / NE 76 th / SR 520 on-ramp	E	69.7	E	69.0
3. Redmond Way / SR 520 EB off-ramp	C	31.4	D	36.5
4. Redmond Way / NE 70 th St	F	91.0	F	110.9
6. Redmond Way / E Lk Samm Pkwy / 180 th	F	114.9	F	129.5
7. NE 65 th St / E Lk Samm Pkwy	B	11.1	B	11.8
8. Redmond Way / 185 th Ave NE	F	101.0	F	104.0
9. Redmond Way / 188 th Ave NE	F	117.7	F	120.5
10. NE 76 th St / 180 th Ave NE / 178 th Ave NE	D	48.3	D	51.7
<u>Stop Controlled Intersection</u>				
5. NE 70 th Street / 176 th Ave NE				
Northbound Left-Right (stop)	B	10.7	--	--
Northbound Left (stop)	--	--	C	22.9
Northbound Right (stop)	--	--	B	11.5
Westbound Left	A	7.7	A	8.1

Table 8
Future 2022 PM Peak Hour Level of Service Summary

Study Intersection / Movement	<u>2022 No Action</u> <u>PM Peak Hour</u>		<u>2022 With-Project</u> <u>PM Peak Hour</u>	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Signalized Intersections</u>				
1. Redmond Way / 170 th Ave NE	E	59.0	E	60.2
2. Redmond Way / NE 76 th / SR 520 on-ramp	D	35.9	D	35.7
3. Redmond Way / SR 520 EB off-ramp	D	40.6	D	49.7
4. Redmond Way / NE 70 th St	D	45.6	D	51.4
6. Redmond Way / E Lk Samm Pkwy / 180 th	F	109.3	F	114.7
7. NE 65 th St / E Lk Samm Pkwy	D	37.4	D	36.6
8. Redmond Way / 185 th Ave NE	C	26.9	C	27.0
9. Redmond Way / 188 th Ave NE	C	34.3	C	34.6
10. NE 76 th St / 180 th Ave NE / 178 th Ave NE	C	26.0	C	27.3
<u>Stop Controlled Intersection</u>				
5. NE 70 th Street / 176 th Ave NE				
Northbound Left-Right (stop)	B	11.3	--	--
Northbound Left (stop)	--	--	C	21.0
Northbound Right (stop)	--	--	B	13.6
Westbound Left	A	7.7	A	8.2

AM Peak Hour

As shown in **Table 7**, all signalized study intersections and individual lane groups at the stop controlled study intersection are estimated to operate at LOS D or better during the AM peak hour in 2022 without or with the proposed LMC Marymoor project with exception to the following:

- Redmond Way / NE 76th St/SR 520 on-ramp (#2) is anticipated to operate at LOS E.
- Redmond Way / NE 70th Street (#4) is anticipated to operate at LOS F.
- Redmond Way / E Lk Samm Pkwy NE (#6) is anticipated to operate at LOS F.
- Redmond Way / 185th Ave NE (#8) is anticipated to operate at LOS F.
- Redmond Way / 188th Ave NE (#9) is anticipated to operate at LOS F.

PM Peak Hour

As shown in **Table 8**, all signalized study intersections and individual lane groups at the stop controlled study intersection are estimated to operate at LOS D or better during the PM peak hour in 2022 without or with the proposed LMC Marymoor project with exception to the following:

- Redmond Way / 170th Ave NE (#1) is anticipated to operate at LOS E.
- Redmond Way/E Lk Samm Pkwy/180th Ave NE (#6) is estimated to operate at LOS F.

The specific study intersections that are anticipated to operate at LOS E or LOS F in 2022 without or with the proposed LMC Marymoor project are discussed in more detail below.

Redmond Way / 170th Ave NE (#1)

The intersection of Redmond Way/NE 76th Street/SR 520 WB on-ramp (#2) is anticipated to operate at LOS E during the PM peak hour in 2022 without or with the proposed project. The vehicular delay is anticipated to increase by only 1.2 seconds per vehicle as a result of the additional 45 PM peak hour trips that the proposed LMC Marymoor project is estimated to add to the intersection (LMC project traffic = 1.2 percent of total traffic).

Redmond Way / NE 76th Street / SR 520 WB on-ramp (#2)

The intersection of Redmond Way/NE 76th Street/SR 520 WB on-ramp (#2) is anticipated to operate at LOS E during the AM peak hour in 2022 without or with the proposed project. The LMC Marymoor project is estimated to add 43 AM peak hour trips to the intersection (LMC project traffic = 1.4 percent of total traffic). The City's TIP (Project #C64) identifies planned improvements at this intersection that include the construction of a second eastbound left-turn lane on Redmond Way and associated widening on NE 76th Street to accommodate the dual left-turns from Redmond Way. These improvements will improve future operations at the intersection. Sound Transit is committed to completing these improvements with the SE Redmond station project.

Redmond Way / NE 70th Street (#4)

The intersection of Redmond Way/NE 70th Street (#4) is anticipated to operate at LOS F during the AM peak hour in 2022 without or with the proposed project. The LMC Marymoor project is estimated to add 323 AM peak hour trips to the intersection (LMC project traffic = 6.2 percent of total traffic). The City's TIP (Project #C86) and Sound Transit's design plans identify planned improvements at this intersection that include the addition of an eastbound right-turn lane on Redmond Way and the addition of a second westbound left-turn lane on Redmond Way. These improvements will improve future operations at the intersection. Sound Transit is committed to completing these improvements with the SE Redmond station project.

Redmond Way/E Lk Samm Pkwy/180th Ave NE (#6)

The intersection of Redmond Way/E Lk Samm Pkwy/180th Ave NE (#6) is anticipated to operate at LOS F during the AM and PM peak hours in 2022 without or with the proposed project. The vehicular delay is anticipated to increase by 14.6 seconds per vehicle during the AM peak as a result of the additional 43 AM peak hour trips that the proposed LMC Marymoor project is estimated to add to the intersection (LMC project traffic = 0.9 percent of total traffic). Also, the vehicular delay is anticipated to increase by 5.4 seconds per vehicle during the PM peak as a result of the additional 46 PM peak hour trips that the proposed LMC Marymoor project is estimated to add to the intersection (LMC project traffic = 0.9 percent of total traffic). The City's TIP (Project #C65) identifies planned improvements at this intersection that include physically separating the eastbound right-turn from the westbound left-turn, converting the channelization on the northbound approach to two left-turns and a through lane, and revising the pedestrian crossings. These improvements will be jointly funded by the City and Sound Transit and will improve both operations and safety at the intersection.

Redmond Way / 185th Ave NE (#8)

The intersection of Redmond Way / 185th Ave NE (#8) is anticipated to operate at LOS F during the AM peak hour in 2022 without or with the proposed project. The vehicular delay

is anticipated to increase by only 3.0 seconds per vehicle as a result of the additional 43 PM peak hour trips that the proposed LMC Marymoor project is estimated to add to the intersection (1.4 percent project traffic to total traffic).

Redmond Way / 188th Ave NE (#9)

The intersection of Redmond Way / 188th Ave NE (#9) is anticipated to operate at LOS F during the AM peak hour in 2022 without or with the proposed project. The vehicular delay is anticipated to increase by only 2.8 seconds per vehicle as a result of the additional 43 PM peak hour trips that the proposed LMC Marymoor project is estimated to add to the intersection (1.2 percent project traffic to total traffic).

Site Access Analysis

To evaluate the operations of the proposed site access driveways, a level of service (LOS) and queue analysis was completed.

As shown in **Figure 2**, vehicular access to the LMC Marymoor site would be provided at two locations: (1) a new full access driveway on 176th Ave NE, and (2) a new full access driveway on NE 68th Street. *It should be noted that a LOS calculation was not conducted at the residential site access driveway on NE 68th Street since NE 68th Street will be a dead-end street and the LMC Marymoor project trips will be the only volumes on NE 68th Street at year of opening (2022). Therefore, a LOS calculation was completed at the two-way stop controlled intersection of 176th Ave NE/NE 68th Street instead.*

The weekday AM and PM peak hour LOS and queue analysis at the site access locations were based on the methodology outlined in the 6th Edition of the *Highway Capacity Manual* using Synchro 10.0 software. The estimated future weekday AM and PM peak hour traffic volumes with the proposed project at the site driveways are shown in **Figure 8** and **Figure 9**. **Table 9** summarizes the calculated LOS and the 95th percentile queues at the controlled movements at the proposed site access driveways during the weekday AM and PM peak hours. The reported 95th percentile queues represent a condition that is exceeded only 5 percent of the time. Detailed LOS and queue calculation worksheets are included in **Appendix A**.

Table 9
Future 2022 Peak Hour Site Access Level of Service and Queuing

Site Access Controlled Movements	2022 With Project		
	LOS	Delay (sec)	95 th Percentile Queue (ft) ¹
<u>AM Peak Hour</u>			
A. 176 th Ave NE / NE 69 th St (Site Access)			
Southbound Left (entering)	A	8.6	< 25'
Westbound Left-Right (exiting)	C	17.0	50'
B. 176 th Ave NE / NE 68 th St (Site Access)			
Southbound Left (entering)	A	8.0	< 25'
Westbound Left-Right (exiting)	B	11.9	< 25'
<u>PM Peak Hour</u>			
A. 176 th Ave NE / NE 69 th St (Site Access)			
Southbound Left (entering)	A	8.7	< 25'
Westbound Left-Right (exiting)	C	18.4	50'
B. 176 th Ave NE / NE 68 th St (Site Access)			
Southbound Left (entering)	A	8.4	< 25'
Westbound Left-Right (exiting)	B	12.6	< 25'

1. Queues are 95th Percentile queues. <25' indicates 95th Percentile queue statistically less than 1 veh.

As shown in **Table 9**, based on our analysis, the controlled movements at the proposed site access locations on 176th Ave NE (at NE 69th Street and NE 68th Street) are expected to operate at LOS C or better with minimal vehicle queues during the weekday AM and PM peak hours in 2022.

Future 2026 Traffic Operations

The Sound Transit (ST) SE Redmond Light Rail Station is anticipated to be operational in 2024, two years after the anticipated completion of the LMC Marymoor project. Per the request of the City, a future year Level of Service (LOS) and queue analysis was conducted at the study intersection of NE 70th Street/176th Ave NE (#5) and at the site access locations for weekday AM and PM peak hour conditions in 2026 with the Sound Transit SE Redmond Light Rail Station and with the LMC Marymoor project.

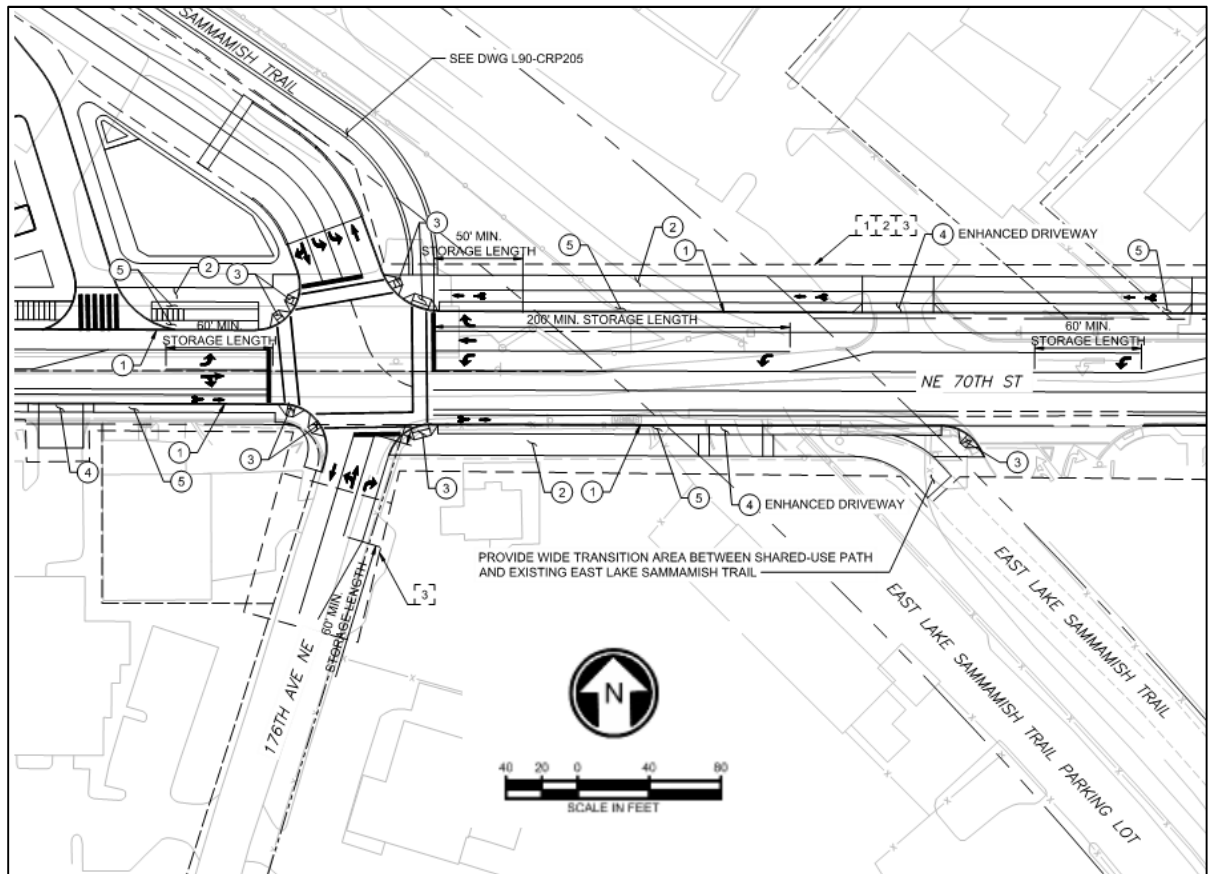
Traffic Volumes

The future 2026 AM and PM peak hour traffic volumes were estimated by applying a 2 percent annual growth rate to the 2022 No Action traffic volumes (see **Figure 6** and **Figure 7**), adding Sound Transit station area vehicle trips as documented in the *Downtown Redmond Link Extension SEPA Addendum* (Sound Transit, August 2018), and adding the LMC Marymoor project trips (see **Figure 5**). *It should be noted that the station area trips are 2035 design year forecasts, and therefore it is likely conservative to assume that the full 2035 design year station area vehicle trips would be generated by the Sound Transit SE Redmond Station in 2026.*

The future year 2026 AM and PM peak hour traffic volumes with Sound Transit and with the LMC Marymoor project at the intersection of NE 70th Street/176th Ave NE are included in **Appendix C**.

LOS Analysis

The channelization assumptions for the future year 2026 LOS analysis at the intersection of NE 70th Street/176th Ave NE were based on *Sound Transit's Downtown Link Extension Conceptual Design Drawings* (9/24/18) which show the intersection will be signalized and the north leg of the intersection will provide access to the 1,400 stall Sound Transit parking garage. A preliminary plan showing the proposed intersection configuration is provided below.



The signal phasing assumptions for the future year 2026 LOS analysis at the intersection of NE 70th Street/176th Ave NE were based on the mitigation documented in the *Downtown Redmond Link Extension SEPA Addendum* (Sound Transit, August 2018) which identifies that the northbound and southbound approaches should be split phased and there should be a pedestrian scramble phase. The cycle length and splits were optimized for the AM and PM peak hours at NE 70th Street/176th Ave NE in 2026 with Sound Transit and the LMC Marymoor project.

The future year 2026 weekday AM and PM peak hour LOS results at NE 70th Street/176th Ave NE with the proposed LMC Marymoor project are summarized in **Table 10**. The LOS worksheets are included in **Appendix C**.

Table 10
Future 2026 Peak Hour Level of Service Summary

Study Intersection	2026 AM Peak Hour		2026 PM Peak Hour	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Signalized Intersection</u>				
5. NE 70 th Street / 176 th Ave NE	B	17.3	D	40.4

As shown in **Table 10**, the future signalized intersection of NE 70th Street/176th Ave NE is anticipated to operate at LOS B during the AM peak hour and LOS D during the PM peak hour in 2026 with Sound Transit and with the LMC Marymoor project.

Site Access Analysis

To evaluate the operations of the proposed site access driveways in 2026 with Sound Transit and the LMC Marymoor project, a level of service (LOS) and queue analysis was completed. The year 2026 weekday AM and PM peak hour LOS and queue analysis at the site access locations were based on the methodology outlined in the 6th Edition of the *Highway Capacity Manual* using Synchro 10 software. The estimated future weekday AM and PM peak hour traffic volumes with the proposed project at the site driveways are shown in **Appendix C**. **Table 11** summarizes the calculated LOS and the 95th percentile queues for the controlled movements at the proposed site access driveways during the weekday AM and PM peak hours in 2026 with Sound Transit. The reported 95th percentile queues represent a condition that is exceeded only 5 percent of the time. Detailed LOS and queue calculation worksheets are included in **Appendix A**.

Table 11
Future 2026 Peak Hour Site Access LOS and Queuing

Site Access Controlled Movements	Future 2026 With Project		
	LOS	Delay (sec)	95 th Percentile Queue (ft) ¹
<u>AM Peak Hour</u>			
A. 176 th Ave NE / NE 69 th St (Site Access)			
Southbound Left (entering)	B	10.3	25'
Westbound Left-Right (exiting)	E	43.3	125'
B. 176 th Ave NE / NE 68 th St (Site Access)			
Southbound Left (entering)	A	9.3	< 25'
Westbound Left-Right (exiting)	C	18.4	25'
<u>PM Peak Hour</u>			
A. 176 th Ave NE / NE 69 th St (Site Access)			
Southbound Left (entering)	A	9.9	25'
Westbound Left-Right (exiting)	D	36.4	100'
B. 176 th Ave NE / NE 68 th St (Site Access)			
Southbound Left (entering)	A	9.3	< 25'
Westbound Left-Right (exiting)	C	17.1	25'

1. Queues are 95th Percentile queues. <25' indicates 95th Percentile queue statistically less than 1 veh.

As shown in **Table 11**, based on our analysis, the controlled movements at the proposed site access locations on 176th Ave NE (at NE 69th Street and NE 68th Street) are expected to operate at LOS C or better with vehicle queues of 25 feet (1 vehicle) or less during the weekday AM and PM peak hours in 2026, with exception to the westbound shared left-right exiting the site onto 176th Ave NE at NE 69th Street. This movement is anticipated to operate at LOS E during the AM peak hour with a 95th percentile queue of 125 feet and LOS D during the PM peak hour with a 95th percentile queue of 100 feet. This does not account for queuing from the adjacent intersection at NE 70th Street/176th Ave NE which is analyzed below.

Queue Analysis

Vehicle queues at the study intersection of NE 70th Street/176th Ave NE for future year 2026 conditions with Sound Transit and with the LMC Marymoor project were analyzed to determine the potential effect of on-street queuing on LMC Marymoor site access operations.

The queue results were based on the methodology used by the *Synchro 10* traffic software program and were rounded to the nearest 25 feet. The reported queue lengths are 95th percentile queues and represent a condition that is exceeded only five percent of the time.

The results of the AM and PM peak hour queuing analysis are summarized in **Table 12**. The queue results are summarized for the northbound approach to evaluate the effect of queuing on operations at the LMC Marymoor site access on 176th Ave NE (NE 69th Street). The queue calculation worksheets are included in **Appendix C**.

Table 12
2026 Peak Hour Queuing Analysis at NE 70th Street/176th Ave NE

Intersection / Movement	Storage (ft)	2026 AM Peak Hour		2026 PM Peak Hour		
		50 th % Queue Length (ft) ¹	95 th % Queue Length (ft) ¹	50 th % Queue Length (ft) ¹	95 th % Queue Length (ft) ¹	
5) NE 70 th St / 176 th Ave NE						
Northbound Left-Thru	160' ²	100'	175'	25'	50'	
Northbound Right-Turn	60'	25'	100'	200'	650'	

1. Queues are rounded to the nearest 25 feet.
2. Storage for northbound left-turn is measured to proposed LMC site access at NE 69th Street.

As shown in **Table 12**, during the AM peak hour in 2026 with Sound Transit and the LMC Marymoor project, the 95th percentile queue for the northbound left-thru lane at NE 70th Street/176th Ave NE (175 feet) would be anticipated to extend to just beyond the LMC site access at NE 69th Street (160 feet); however, the average (50th percentile) queue would not reach NE 69th Street. Additionally, the 95th percentile queue for the northbound right-turn at NE 70th Street/176th Ave NE (100 feet) would be anticipated to exceed the available storage (60 feet) during the AM peak hour in 2026 but would not extend beyond the LMC site access at NE 69th Street and the average (50th percentile) northbound right-turn queue would be accommodated within the turn pocket.

During the PM peak hour in 2026 with Sound Transit and the LMC Marymoor project, the 50th and 95th percentile for the northbound left-thru at NE 70th Street/176th Ave NE would not be anticipated to extend to NE 69th Street. However, both the 50th and 95th percentile queues for the northbound right-turn would be anticipated to extend out of the turn pocket and beyond the LMC site access at NE 69th Street.

The northbound right-turn volume at NE 70th Street/176th Ave NE is relatively high with or without the LMC Marymoor project. Based on our review of traffic volumes in the vicinity, much of this traffic likely consists of drivers using NE 65th and 176th Ave NE as a by-pass to travel from Eastlake Sammamish Parkway to Redmond Way. In addition, the Sound Transit traffic analysis for the SE Redmond Station assumes that all drop-offs at the station would drop-off on NE 70th Street west of 176th Ave NE and then would circulate counterclockwise back to NE 70th Street via 176th Ave NE which adds even more traffic to the northbound right-turn movement. In summary, queuing on the northbound approach is primarily due to background traffic and Sound Transit and are not LMC Marymoor project impacts.

The queuing on the northbound approach at NE 70th Street/176th Ave NE shows that it may be difficult for drivers to access 176th Ave NE from NE 69th Street during the peak hours. Residents of the project will have alternate access to 176th Ave NE via NE 68th Street which will operate better than NE 69th Street. This level of queuing in an urban area is not unexpected. With the new grid system of streets being implemented in Marymoor, queues during the peak hours will inevitably back up between adjacent intersections during the peak hours. Drivers will either create gaps to avoid completely blocking intersections, or drivers leaving the LMC Marymoor project will need to wait for the queue to clear on a green light at NE 70th Street/176th Ave NE. In terms of mitigation, the LMC Marymoor project is widening NE 70th Street and 176th Ave NE to accommodate the ultimate improvements planned by the City and Sound Transit, including the addition of a northbound right-turn lane at the intersection.

East Lake Sammamish Trail

As shown in **Figure 2**, the LMC Marymoor project is proposing to construct two new crosswalks from their site to the East Lake Sammamish Trail and adjacent retail property through the existing King County parking lot located directly east of the LMC Marymoor site. One crosswalk would be located at approximately NE 69th Street and would connect to both the trail and the existing pathway to/from the Whole Foods retail shopping center and the second crosswalk would be located at approximately NE 68th Street.

It is difficult to accurately predict the number of pedestrians and bicycles anticipated to cross between the LMC Marymoor site and the regional East Lake Sammamish Trail and/or the adjacent retail via the King County parking lot. However, the pedestrian and bike connections from the LMC Marymoor site to the regional bike trail and adjacent retail property are critical for connecting this new mixed use development to the greater neighborhood. The LMC Marymoor project is part of the greater Marymoor Village neighborhood promoting bicycle and pedestrian connectivity to the Redmond region. It is anticipated that as the Marymoor Village neighborhood develops and the City's planned grid connections are made, both proposed connections will act as pedestrian and bike routes to and through the neighborhood as intended. Residents of the LMC Marymoor development will want to access the regional trail from the on-site trail and access the existing portal connections to the east retail and Whole Foods site on a daily basis because of its convenience. These proposed pedestrian/bicycle connections will promote alternatives to vehicle traffic. Additionally, users of the regional trail to/from the south will want to conveniently access the LMC Marymoor sites public areas and retail shops without having to travel north to NE 70th Street.

It should be noted that the project Applicant is actively working with King County to design the appropriate safe connections and crossings to and through their property. Marked crossings alerting both pedestrians and vehicles of designated crossings is appropriate at these connection points where vehicles, bicycles, and pedestrians will mix. The project Applicant will provide the City with the design solutions at both locations once they are approved by King County.

The LMC project will also construct new sidewalk along their project frontage along the south side of NE 70th Street, along the north side of NE 68th Street, and along the east side of 176th Ave NE. These new crosswalks and sidewalks, along with the regional trail connections through the King County parking lot and the on-site trail connections through the LMC site, will accommodate all pedestrian and bicycle trips between the LMC site and the East Lake Sammamish Trail.

Parking

The LMC Marymoor project proposes to provide a total of 550 parking stalls. Of the 550 total parking stalls, 456 parking stalls will be designated for the proposed residential use, 34 parking stalls will be designated for the proposed retail use, and 60 parking stalls will be designated for the proposed daycare use. A summary of the proposed parking supply and minimum parking supply required per City of Redmond Zoning Code is included in **Table 13**.

Table 13
Parking Summary

Proposed Use	Size	REDMOND ZONING CODE Section 21.13.080B MDD2		Proposed Parking Supply	Supply Meets Code?
		Minimum Parking Ratio	Minimum Parking Required		
Apartments	450 DU	1.25 per DU	563	456	No
Retail	17,000 SF	2.00 per 1,000 sf	34	34	Yes
Day Care	46 employees	1 per employee on max shift	46	60	Yes
		Totals	643	550	

As shown in **Table 13**, the proposed parking supply for the residential use (456 stalls) would not meet current City of Redmond Zoning Code requirements (563 stalls). A separate Parking Modification Request memo has been submitted to the City of Redmond requesting a parking modification to allow for a minimum parking ratio of 1.00 stall per dwelling unit rather than the code-required 1.25 stalls per dwelling unit. The residential Parking Modification Request is anticipated to be approved by the City.

As also shown in **Table 13**, the proposed parking supply for the retail use (34 stalls) would meet minimum code requirements (34 stalls).

As also shown in **Table 13**, the proposed supply for the daycare use (60 stalls) would meet minimum code requirements (46 stalls). Per Table 21.13.080B in the City's zoning code, the code-required parking ratio for a day care center states "enough to accommodate peak use" but under special regulations says "1 per employee on maximum shift."

Based on data presented in ITE *Parking Generation*, the weekday peak parking demand for a day care is 0.24 stalls per student. For a projected maximum student enrollment of 248 students at the LMC Marymoor day care, the resulting weekday peak parking demand is estimated to be 60 stalls (0.24 stalls/student X 248 students). Therefore, the applicant proposes to supply a total of 60 stalls for the proposed day care. Of the 60 total day care stalls, a minimum of 14 stalls would be located within Level 1 of the parking garage at a location that is convenient for parents dropping off or picking up their children (near the elevator/stairs to the ground floor day care center) and would include signage indicating "Day Care Parking Only" to designate the short-term day care use.

MITIGATION

Frontage and Roadway Improvements

Frontage/Roadway improvements are proposed to include the following:

NE 70th Street:

- 19' dedication for Type I street.
- Curb set to accommodate planned Sound Transit layout of NE 70th Street.
- New curb, gutter, sidewalk, landscaping with street trees, and street lighting along project frontage.

176th Ave NE:

- 21' dedication for Type I street.
- Removal of one existing driveway and replace with one new driveway curb-cut at approximately NE 69th Street.
- New curb, gutter, sidewalk, landscaping with street trees, street lighting, cycle track, and on-street parking along project frontage.

NE 68th Street:

- 36' dedication for new Type II street.
- New curb, gutter, sidewalk, landscaping with street trees, and street lighting along project frontage.

Non-Motorized Improvements

The LMC Marymoor project is designing NE 69th Street as a Type III “woonerf” Street that will provide a 40-foot shared space on-site for east/west non-motorized (pedestrian and bicycle) access through the site. Additionally, in the center of the project, a public multi-purpose trail connector is planned in the north/south direction between NE 69th Street and NE 68th Street through the site. Both of these on-site non-motorized improvements will provide pedestrian and bicycle connections to local and regional destinations, including Marymoor Park to the south, the East Lake Sammamish Trail and adjacent retail center to the east, and the future Sound Transit Light Rail Station to the northwest.

In addition to the on-site non-motorized improvements, the LMC Marymoor project proposes to construct two new crosswalks from their site to the regional East Lake Sammamish Trail through the existing King County parking lot located directly east of the LMC Marymoor site. One crosswalk would be located at approximately NE 69th Street and would connect to both the trail and the existing pathway to/from the Whole Foods retail shopping center and the second crosswalk would be located at approximately NE 68th Street.

The project is also constructing a cycle track on 176th Ave NE along the project frontage and new sidewalks on NE 70th Street, 176th Ave NE, and NE 68th Street along the project frontages.

The on-site non-motorized connections through the LMC site, the new crosswalks through the King County parking lot, the new cycle track on 176th Ave NE, and the new sidewalks that will be constructed along the project frontage will provide a pedestrian/bicycle grid connection to and through the site and the Marymoor Village area as intended by the City and will accommodate all pedestrian and bicycle trips between the LMC site, the East Lake Sammamish Trail, and the adjacent Whole Foods retail shopping center.

Off-Site Improvements

The applicant will construct a northbound right-turn lane at the intersection of NE 70th Street/176th Ave NE along their project frontage. Based on the results of the analysis shown in this report, no other project-specific off-site transportation mitigation is proposed for concurrency or SEPA purposes.

Transportation Impact Fees

Long-term traffic impacts in the City of Redmond are mitigated by the projects included in the City's Transportation Facilities Plan (TFP). The TFP projects are funded through the payment of City of Redmond transportation impact fees. Based on this process, a fee is assessed upon a development to pay for a proportionate share of the cost of public facilities needed to serve new growth and development.

The final impact fee calculation will be based on the rates and project size in effect at the time of building permit issuance. The project Applicant is working with the City on adjustments to the impact fee calculations to account for the anticipated reduced vehicular trip generation of the LMC Marymoor site as a result of being a TOD development located adjacent to the planned Sound Transit SE Redmond Station. Any applicable credits for transportation infrastructure will be addressed in the Development Agreement.

Appendix A

Level of Service (LOS) Calculations at Study Intersections

2018 Existing AM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	510	44	261	613	121	15	73	181	207	135	17
Future Volume (vph)	30	510	44	261	613	121	15	73	181	207	135	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			2			3	5		7	7		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	16.0	32.0		20.0	36.0	36.0	11.0	27.0	20.0	11.0	27.0	
Total Split (%)	17.8%	35.6%		22.2%	40.0%	40.0%	12.2%	30.0%	22.2%	12.2%	30.0%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 90

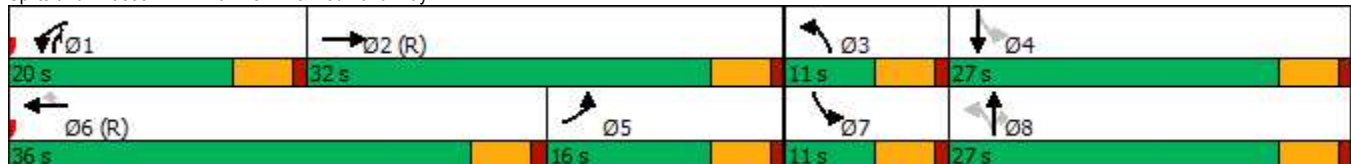
Actuated Cycle Length: 90

Offset: 42 (47%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	510	44	261	613	121	15	73	181	207	135	17
Future Volume (veh/h)	30	510	44	261	613	121	15	73	181	207	135	17
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	0.98		0.97	0.99		0.98
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	1841	1841	1841	1856	1856	1856	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	33	560	48	287	674	0	16	80	81	227	148	19
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	3	3	3	2	2	2	1	1	1
Cap, veh/h	499	1698	145	371	1214	542	165	154	298	250	213	27
Arrive On Green	0.28	0.52	0.52	0.11	0.34	0.00	0.02	0.08	0.08	0.07	0.13	0.13
Sat Flow, veh/h	1753	3260	279	3428	3526	1572	1781	1870	1545	1795	1634	210
Grp Volume(v), veh/h	33	300	308	287	674	0	16	80	81	227	0	167
Grp Sat Flow(s),veh/h/ln	1753	1749	1790	1714	1763	1572	1781	1870	1545	1795	0	1843
Q Serve(g_s), s	1.2	8.9	9.0	7.3	13.9	0.0	0.7	3.7	4.0	6.0	0.0	7.8
Cycle Q Clear(g_c), s	1.2	8.9	9.0	7.3	13.9	0.0	0.7	3.7	4.0	6.0	0.0	7.8
Prop In Lane	1.00		0.16	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	499	911	932	371	1214	542	165	154	298	250	0	241
V/C Ratio(X)	0.07	0.33	0.33	0.77	0.56	0.00	0.10	0.52	0.27	0.91	0.00	0.69
Avail Cap(c_a), veh/h	499	911	932	571	1214	542	251	457	549	250	0	451
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)	0.95	0.95	0.95	1.00	1.00	0.00	0.95	0.95	0.95	0.47	0.00	0.47
Uniform Delay (d), s/veh	23.5	12.5	12.5	39.1	23.9	0.0	36.8	39.6	31.1	38.4	0.0	37.4
Incr Delay (d2), s/veh	0.0	0.9	0.9	1.4	1.8	0.0	0.1	1.0	0.2	19.1	0.0	0.6
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	0.5	3.5	3.6	3.1	5.9	0.0	0.3	1.7	1.5	3.4	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	13.4	13.4	40.5	25.7	0.0	36.9	40.6	31.3	57.5	0.0	38.0
LnGrp LOS	C	B	B	D	C	A	D	D	C	E	A	D
Approach Vol, veh/h	641			961			177			394		
Approach Delay, s/veh	13.9			30.1			36.0			49.3		
Approach LOS	B			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.7	51.9	6.6	16.7	30.6	36.0	11.0	12.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	27.0	6.0	22.0	11.0	31.0	6.0	22.0				
Max Q Clear Time (g_c+l1), s	9.3	11.0	2.7	9.8	3.2	15.9	8.0	6.0				
Green Ext Time (p_c), s	0.4	2.3	0.0	0.3	0.0	2.9	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	29.3											
HCM 6th LOS	C											

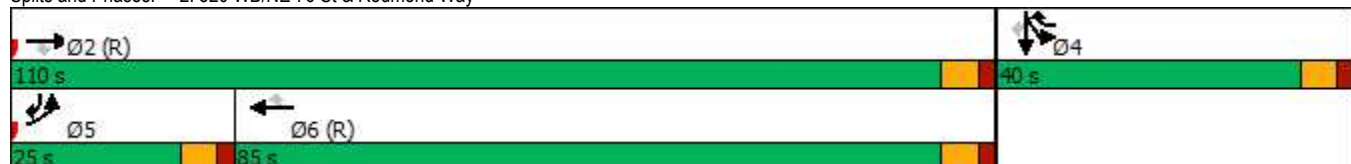
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	134	509	305	0	878	91	0	0	0	60	495	185
Future Volume (vph)	134	509	305	0	878	91	0	0	0	60	495	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			4			2						
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	5%	3%	0%	2%	4%	0%	0%	0%	5%	9%	15%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	25.0	110.0	110.0		85.0	40.0				40.0	40.0	25.0
Total Split (%)	16.7%	73.3%	73.3%		56.7%	26.7%				26.7%	26.7%	16.7%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	150											
Actuated Cycle Length:	150											
Offset:	90 (60%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green											
Natural Cycle:	80											
Control Type:	Actuated-Coordinated											

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	134	509	305	0	878	91	0	0	0	60	495	185
Future Volume (veh/h)	134	509	305	0	878	91	0	0	0	60	495	185
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1781	1826	1856	0	1870	1841				1826	1767	1678
Adj Flow Rate, veh/h	144	547	328	0	944	73				65	532	128
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	8	5	3	0	2	4				5	9	15
Cap, veh/h	166	2398	1085	0	1967	1215				394	400	461
Arrive On Green	0.10	0.69	0.69	0.00	0.55	0.55				0.23	0.23	0.23
Sat Flow, veh/h	1697	3469	1570	0	3647	1557				1739	1767	1422
Grp Volume(v), veh/h	144	547	328	0	944	73				65	532	128
Grp Sat Flow(s),veh/h/ln	1697	1735	1570	0	1777	1557				1739	1767	1422
Q Serve(g_s), s	12.6	8.7	12.2	0.0	24.2	1.6				4.5	34.0	10.0
Cycle Q Clear(g_c), s	12.6	8.7	12.2	0.0	24.2	1.6				4.5	34.0	10.0
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	166	2398	1085	0	1967	1215				394	400	461
V/C Ratio(X)	0.87	0.23	0.30	0.00	0.48	0.06				0.16	1.33	0.28
Avail Cap(c_a), veh/h	215	2398	1085	0	1967	1215				394	400	461
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	66.7	8.5	9.0	0.0	20.4	3.8				46.6	58.0	37.6
Incr Delay (d2), s/veh	23.4	0.2	0.7	0.0	0.8	0.1				0.2	164.2	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
%ile BackOfQ(50%),veh/ln	6.5	3.2	4.2	0.0	10.3	1.2				2.0	33.4	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	90.1	8.7	9.7	0.0	21.2	3.9				46.8	222.2	37.9
LnGrp LOS	F	A	A	A	C	A				D	F	D
Approach Vol, veh/h		1019			1017						725	
Approach Delay, s/veh		20.5			20.0						174.0	
Approach LOS		C			B						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		110.0		40.0	20.7	89.3						
Change Period (Y+Rc), s		6.3		6.0	6.0	6.3						
Max Green Setting (Gmax), s		103.7		34.0	19.0	78.7						
Max Q Clear Time (g_c+l1), s		14.2		36.0	14.6	26.2						
Green Ext Time (p_c), s		7.3		0.0	0.2	9.6						
Intersection Summary												
HCM 6th Ctrl Delay			60.6									
HCM 6th LOS			E									

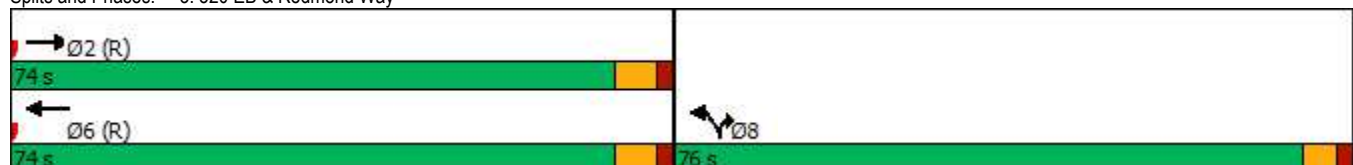
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	569	0	0	822	147	784
Future Volume (vph)	569	0	0	822	147	784
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	0%	0%	3%	8%	4%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	2.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	74.0			74.0	76.0	76.0
Total Split (%)	49.3%			49.3%	50.7%	50.7%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	150					
Actuated Cycle Length:	150					
Offset:	85 (57%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	65					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	569	0	0	822	147	784
Future Volume (veh/h)	569	0	0	822	147	784
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	0	0	1856	1781	1841
Adj Flow Rate, veh/h	581	0	0	839	150	800
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	0	3	8	4
Cap, veh/h	2973	0	0	2069	560	906
Arrive On Green	0.59	0.00	0.00	1.00	0.33	0.33
Sat Flow, veh/h	5400	0	0	3711	1697	2745
Grp Volume(v), veh/h	581	0	0	839	150	800
Grp Sat Flow(s),veh/h/ln	1689	0	0	1763	1697	1373
Q Serve(g_s), s	8.0	0.0	0.0	0.0	9.7	41.3
Cycle Q Clear(g_c), s	8.0	0.0	0.0	0.0	9.7	41.3
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2973	0	0	2069	560	906
V/C Ratio(X)	0.20	0.00	0.00	0.41	0.27	0.88
Avail Cap(c_a), veh/h	2973	0	0	2069	794	1285
HCM Platoon Ratio	1.00	1.00	1.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	0.0	0.0	37.0	47.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.3	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	0.2	4.0	14.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.6	0.0	0.0	0.6	37.3	53.5
LnGrp LOS	B	A	A	A	D	D
Approach Vol, veh/h	581			839	950	
Approach Delay, s/veh	14.6			0.6	50.9	
Approach LOS	B			A	D	
Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	94.7				94.7	55.3
Change Period (Y+Rc), s	6.7				6.7	5.8
Max Green Setting (Gmax), s	67.3				67.3	70.2
Max Q Clear Time (g_c+l1), s	10.0				2.0	43.3
Green Ext Time (p_c), s	4.5				7.1	6.1
Intersection Summary						
HCM 6th Ctrl Delay			24.2			
HCM 6th LOS			C			
Notes						

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	993	240	86	2738	1	296	1	32	0	3	18
Future Volume (vph)	10	993	240	86	2738	1	296	1	32	0	3	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			158	
Travel Time (s)		17.7			12.2			13.0			4.3	
Confl. Peds. (#/hr)			7			12			14			
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%	7%	2%	6%	2%	0%	4%	0%	16%	0%	0%	6%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Split	NA			NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	12.0	39.0		12.0	39.0		37.0	37.0		10.0	10.0	
Total Split (s)	15.0	82.0		25.0	92.0		33.0	33.0		10.0	10.0	
Total Split (%)	10.0%	54.7%		16.7%	61.3%		22.0%	22.0%		6.7%	6.7%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 150

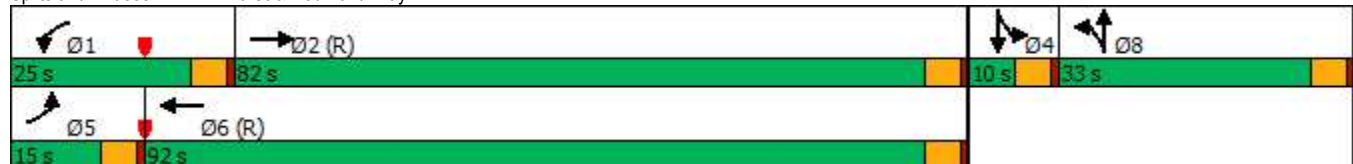
Actuated Cycle Length: 150

Offset: 128 (85%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	993	240	86	2738	1	296	1	32	0	3	18
Future Volume (veh/h)	10	993	240	86	2738	1	296	1	32	0	3	18
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		0.97	1.00		1.00
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	1796	1796	1811	1870	1870	1841	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	10	1013	245	88	2794	1	302	1	33	0	3	18
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	7	7	6	2	2	4	0	0	0	0	0
Cap, veh/h	21	2596	627	108	3746	1	426	6	190	0	5	27
Arrive On Green	0.01	0.66	0.66	0.06	0.71	0.71	0.13	0.13	0.13	0.00	0.02	0.02
Sat Flow, veh/h	1810	3937	951	1725	5272	2	3401	46	1518	0	235	1411
Grp Volume(v), veh/h	10	841	417	88	1804	991	302	0	34	0	0	21
Grp Sat Flow(s),veh/h/ln	1810	1635	1619	1725	1702	1870	1700	0	1565	0	0	1646
Q Serve(g_s), s	0.8	17.7	17.7	7.6	48.9	49.0	12.8	0.0	2.9	0.0	0.0	1.9
Cycle Q Clear(g_c), s	0.8	17.7	17.7	7.6	48.9	49.0	12.8	0.0	2.9	0.0	0.0	1.9
Prop In Lane	1.00		0.59	1.00		0.00	1.00		0.97	0.00		0.86
Lane Grp Cap(c), veh/h	21	2155	1067	108	2419	1329	426	0	196	0	0	32
V/C Ratio(X)	0.49	0.39	0.39	0.81	0.75	0.75	0.71	0.00	0.17	0.00	0.00	0.66
Avail Cap(c_a), veh/h	121	2155	1067	230	2419	1329	635	0	292	0	0	55
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	1.00	1.00	0.20	0.20	0.20	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	73.7	11.7	11.7	69.4	13.4	13.4	63.0	0.0	58.7	0.0	0.0	73.0
Incr Delay (d2), s/veh	6.5	0.5	1.1	1.2	0.4	0.8	0.8	0.0	0.2	0.0	0.0	8.2
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	0.4	6.3	6.4	3.3	16.9	18.7	5.6	0.0	1.2	0.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.2	12.3	12.8	70.6	13.8	14.2	63.8	0.0	58.8	0.0	0.0	81.2
LnGrp LOS	F	B	B	E	B	B	E	A	E	A	A	F
Approach Vol, veh/h	1268			2883			336			21		
Approach Delay, s/veh	13.0			15.7			63.3			81.2		
Approach LOS	B			B			E			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.4	103.9		7.9	6.7	111.6		23.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	77.0		5.0	10.0	87.0		28.0				
Max Q Clear Time (g_c+I1), s	9.6	19.7		3.9	2.8	51.0		14.8				
Green Ext Time (p_c), s	0.1	12.0		0.0	0.0	30.2		0.8				
Intersection Summary												
HCM 6th Ctrl Delay	18.8											
HCM 6th LOS	B											
Notes												

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	30	10	191	59	16	230
Future Volume (vph)	30	10	191	59	16	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	749	
Travel Time (s)	9.1			7.6	20.4	
Confl. Peds. (#/hr)		3	3		3	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	10%	0%	2%	2%	6%	4%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	7.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	10	191	59	16	230
Future Vol, veh/h	30	10	191	59	16	230
Conflicting Peds, #/hr	0	3	3	0	3	3
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	93	93	93	93	93	93
Heavy Vehicles, %	10	0	2	2	6	4
Mvmt Flow	32	11	205	63	17	247
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	46	0	517	44
Stage 1	-	-	-	-	41	-
Stage 2	-	-	-	-	476	-
Critical Hdwy	-	-	4.12	-	6.46	6.24
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.336
Pot Cap-1 Maneuver	-	-	1562	-	511	1020
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	617	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1558	-	440	1015
Mov Cap-2 Maneuver	-	-	-	-	440	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	532	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	5.9		10.4		
HCM LOS				B		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	935	-	-	1558	-	
HCM Lane V/C Ratio	0.283	-	-	0.132	-	
HCM Control Delay (s)	10.4	-	-	7.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1.2	-	-	0.5	-	

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	677	314	71	1907	43	740	80	13	76	109	293
Future Volume (vph)	168	677	314	71	1907	43	740	80	13	76	109	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	3471	1553	1787	5117	0	2910	1472	0	1447	1519	1363
Flt Permitted	0.950			0.950			0.950	0.968		0.950	0.997	
Satd. Flow (perm)	1736	3471	1553	1787	5117	0	2910	1472	0	1447	1519	1363
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					3			1				242
Link Speed (mph)		40			45			35			35	
Link Distance (ft)		717			2432			760			335	
Travel Time (s)		12.2			36.8			14.8			6.5	
Confl. Peds. (#/hr)						3						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	6%	6%	6%
Shared Lane Traffic (%)							25%			10%		
Lane Group Flow (vph)	173	698	324	73	2010	0	572	286	0	70	120	302
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					66.0		32.0	32.0		20.0	20.0	20.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	21.6	71.2	87.7	14.5	64.3		26.0	26.0		13.7	13.7	13.7
Actuated g/C Ratio	0.14	0.47	0.58	0.10	0.43		0.17	0.17		0.09	0.09	0.09
v/c Ratio	0.69	0.42	0.36	0.42	0.92		1.13	1.12		0.53	0.87	0.88
Control Delay	95.3	13.2	13.4	58.0	55.6		136.8	147.2		80.0	113.8	40.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	95.3	13.2	13.4	58.0	55.6		136.8	147.2		80.0	113.8	40.8
LOS	F	B	B	E	E		F	F		F	F	D
Approach Delay		25.2			55.7			140.3			64.2	
Approach LOS		C			E			F			E	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 64.4

Intersection LOS: E

Intersection Capacity Utilization 91.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way

											
Ø8	Ø1		Ø9		Ø2 (R)		Ø3		Ø4		
25 s			34 s		28 s		20 s		32 s		11 s
											
Ø5			Ø6 (R)								
21 s			66 s								

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Confl. Peds. (#/hr)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	25.0	28.0	21.0	11.0	34.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

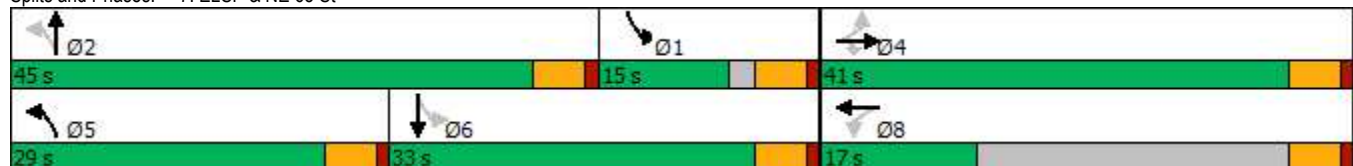
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	0	23	0	0	14	356	832	0	9	321	151
Future Volume (vph)	27	0	23	0	0	14	356	832	0	9	321	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	1					1	3		5	5		3
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 (%)	7%	0%	4%	0%	0%	0%	1%	2%	0%	0%	8%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm		NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		5.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		10.0	22.0	
Total Split (s)	41.0	41.0	41.0	17.0	17.0		29.0	45.0		15.0	33.0	
Total Split (%)	39.8%	39.8%	39.8%	16.5%	16.5%		28.2%	43.7%		14.6%	32.0%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 103												
Actuated Cycle Length: 48												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	0	23	0	0	14	356	832	0	9	321	151
Future Volume (veh/h)	27	0	23	0	0	14	356	832	0	9	321	151
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	1900	1900	1841	1876	1876	1876	1885	1870	1870	1900	1781	1781
Adj Flow Rate, veh/h	28	0	23	0	0	14	363	849	0	9	328	154
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	4	0	0	0	1	2	2	0	8	8
Cap, veh/h	274	0	90	0	0	91	678	1353	0	451	569	261
Arrive On Green	0.06	0.00	0.06	0.00	0.00	0.06	0.26	0.38	0.00	0.14	0.25	0.25
Sat Flow, veh/h	1209	0	1556	0	0	1586	1795	3647	0	1810	2245	1031
Grp Volume(v), veh/h	28	0	23	0	0	14	363	849	0	9	246	236
Grp Sat Flow(s),veh/h/ln	1209	0	1556	0	0	1586	1795	1777	0	1810	1692	1584
Q Serve(g_s), s	0.7	0.0	0.5	0.0	0.0	0.3	6.3	6.9	0.0	0.0	4.5	4.6
Cycle Q Clear(g_c), s	1.0	0.0	0.5	0.0	0.0	0.3	6.3	6.9	0.0	0.0	4.5	4.6
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.00	1.00		0.65
Lane Grp Cap(c), veh/h	274	0	90	0	0	91	678	1353	0	451	429	401
V/C Ratio(X)	0.10	0.00	0.26	0.00	0.00	0.15	0.54	0.63	0.00	0.02	0.57	0.59
Avail Cap(c_a), veh/h	1634	0	1586	0	0	539	1424	4025	0	716	1342	1255
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(l)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.3	0.0	15.9	0.0	0.0	15.8	11.0	8.9	0.0	13.2	11.5	11.6
Incr Delay (d2), s/veh	0.2	0.0	1.5	0.0	0.0	0.8	0.7	0.5	0.0	0.0	1.2	1.4
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	0.2	0.0	0.2	0.0	0.0	0.1	1.8	1.7	0.0	0.1	1.4	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	17.4	0.0	0.0	16.6	11.7	9.4	0.0	13.2	12.7	12.9
LnGrp LOS	B	A	B	A	A	B	B	A	A	B	B	B
Approach Vol, veh/h		51			14			1212			491	
Approach Delay, s/veh		16.9			16.6			10.1			12.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	18.5		7.0	14.3	14.0		7.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		36.0	24.0	28.0		12.0				
Max Q Clear Time (g_c+l1), s	2.0	8.9		3.0	8.3	6.6		2.3				
Green Ext Time (p_c), s	0.0	4.4		0.2	1.3	1.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.1									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	504	4	0	1955	70	6	0	0	29	0	112
Future Volume (vph)	155	504	4	0	1955	70	6	0	0	29	0	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			4			2	11		4	4		11
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 (%)	4%	7%	25%	0%	2%	4%	0%	0%	0%	28%	0%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	35.0	115.0			80.0	80.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	23.3%	76.7%			53.3%	53.3%	23.3%	23.3%		23.3%	23.3%	23.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None

Intersection Summary

Area Type: Other

Cycle Length: 150

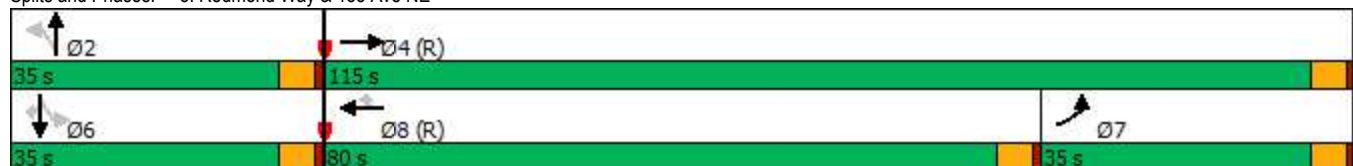
Actuated Cycle Length: 150

Offset: 55 (37%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	504	4	0	1955	70	6	0	0	29	0	112
Future Volume (veh/h)	155	504	4	0	1955	70	6	0	0	29	0	112
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	0.96		1.00	0.95		1.00
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	1788	1743	1743	0	1949	1919	1900	1900	1900	1979	1979	1964
Adj Flow Rate, veh/h	165	536	4	0	2080	74	6	0	0	31	0	0
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, %	4	7	7	0	2	4	0	0	0	0	0	1
Cap, veh/h	564	2913	22	0	1851	811	150	0	0	147	0	114
Arrive On Green	0.66	1.00	1.00	0.00	0.50	0.50	0.07	0.00	0.00	0.07	0.00	0.00
Sat Flow, veh/h	1703	3370	25	0	3800	1623	1483	0	0	1447	0	1664
Grp Volume(v), veh/h	165	263	277	0	2080	74	6	0	0	31	0	0
Grp Sat Flow(s),veh/h/ln	1703	1656	1739	0	1851	1623	1483	0	0	1447	0	1664
Q Serve(g_s), s	6.1	0.0	0.0	0.0	75.0	3.6	0.0	0.0	0.0	2.5	0.0	0.0
Cycle Q Clear(g_c), s	6.1	0.0	0.0	0.0	75.0	3.6	0.5	0.0	0.0	3.0	0.0	0.0
Prop In Lane	1.00		0.01	0.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	564	1432	1503	0	1851	811	150	0	0	147	0	114
V/C Ratio(X)	0.29	0.18	0.18	0.00	1.12	0.09	0.04	0.00	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	564	1432	1503	0	1851	811	331	0	0	335	0	333
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.00	0.34	0.34	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.9	0.0	0.0	0.0	37.5	19.6	65.3	0.0	0.0	66.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.2	0.0	58.5	0.1	0.1	0.0	0.0	0.3	0.0	0.0
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	2.2	0.1	0.1	0.0	47.0	1.4	0.2	0.0	0.0	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.3	0.2	0.0	96.0	19.7	65.4	0.0	0.0	66.6	0.0	0.0
LnGrp LOS	B	A	A	A	F	B	E	A	A	E	A	A
Approach Vol, veh/h	705				2154				6			
Approach Delay, s/veh	4.5				93.4				65.4			
Approach LOS	A				F				E			
Timer - Assigned Phs	2			4			6		7		8	
Phs Duration (G+Y+Rc), s	15.3			134.7			15.3		54.7		80.0	
Change Period (Y+Rc), s	5.0			5.0			5.0		5.0		5.0	
Max Green Setting (Gmax), s	30.0			110.0			30.0		30.0		75.0	
Max Q Clear Time (g_c+l1), s	2.5			2.0			5.0		8.1		77.0	
Green Ext Time (p_c), s	0.0			1.0			0.1		0.5		0.0	
Intersection Summary												
HCM 6th Ctrl Delay	71.4											
HCM 6th LOS	E											

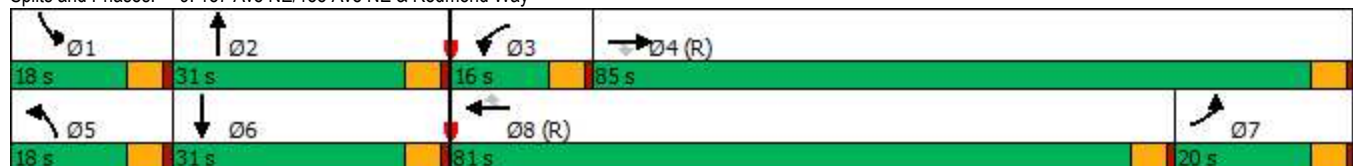
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	516	15	27	2018	199	76	96	39	96	31	43
Future Volume (vph)	12	516	15	27	2018	199	76	96	39	96	31	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)			1			1			3			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	17%	8%	7%	4%	2%	11%	0%	2%	0%	25%	3%	7%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	85.0	85.0	16.0	81.0	81.0	18.0	31.0		18.0	31.0	
Total Split (%)	13.3%	56.7%	56.7%	10.7%	54.0%	54.0%	12.0%	20.7%		12.0%	20.7%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 75 (50%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green												
Natural Cycle: 130												
Control Type: Actuated-Coordinated												

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	516	15	27	2018	199	76	96	39	96	31	43
Future Volume (veh/h)	12	516	15	27	2018	199	76	96	39	96	31	43
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		0.99	1.00		1.00
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	1648	1781	1796	1841	1870	1737	1900	1870	1870	1530	1856	1856
Adj Flow Rate, veh/h	12	538	0	28	2102	155	79	100	41	100	32	45
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	17	8	7	4	2	11	0	2	2	25	3	3
Cap, veh/h	335	2359	1061	40	1801	745	99	124	51	137	64	90
Arrive On Green	0.43	1.00	0.00	0.02	0.51	0.51	0.05	0.10	0.10	0.05	0.09	0.09
Sat Flow, veh/h	1570	3385	1522	1753	3554	1471	1810	1257	515	2826	698	981
Grp Volume(v), veh/h	12	538	0	28	2102	155	79	0	141	100	0	77
Grp Sat Flow(s),veh/h/ln	1570	1692	1522	1753	1777	1471	1810	0	1772	1413	0	1679
Q Serve(g_s), s	0.7	0.0	0.0	2.4	76.0	6.7	6.5	0.0	11.7	5.2	0.0	6.5
Cycle Q Clear(g_c), s	0.7	0.0	0.0	2.4	76.0	6.7	6.5	0.0	11.7	5.2	0.0	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.58
Lane Grp Cap(c), veh/h	335	2359	1061	40	1801	745	99	0	174	137	0	154
V/C Ratio(X)	0.04	0.23	0.00	0.70	1.17	0.21	0.80	0.00	0.81	0.73	0.00	0.50
Avail Cap(c_a), veh/h	335	2359	1061	129	1801	745	157	0	307	245	0	291
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.0	0.0	0.0	72.8	37.0	12.0	70.1	0.0	66.2	70.4	0.0	64.8
Incr Delay (d2), s/veh	0.0	0.2	0.0	18.9	81.6	0.6	13.7	0.0	8.6	7.3	0.0	2.5
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	0.3	0.1	0.0	1.3	51.4	3.0	3.4	0.0	5.7	2.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	0.2	0.0	91.6	118.6	12.6	83.7	0.0	74.8	77.7	0.0	67.3
LnGrp LOS	C	A	A	F	F	B	F	A	E	E	A	E
Approach Vol, veh/h	550				2285				220		177	
Approach Delay, s/veh	1.0				111.1				78.0		73.2	
Approach LOS	A				F				E		E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.3	19.8	8.4	109.5	13.2	18.8	37.0	81.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	13.0	26.0	11.0	80.0	13.0	26.0	15.0	76.0				
Max Q Clear Time (g_c+I1), s	7.2	13.7	4.4	2.0	8.5	8.5	2.7	78.0				
Green Ext Time (p_c), s	0.1	0.4	0.0	2.5	0.1	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	88.0											
HCM 6th LOS	F											
Notes												

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	79	32	187	589	72	44	123	30	32	154	104
Future Volume (vph)	40	79	32	187	589	72	44	123	30	32	154	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	6		5	5		6	7		7	7		7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	23%	9%	6%	6%	9%	10%	9%	15%	17%	16%	5%	15%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	25.0	43.0	43.0	25.0	37.0		25.0	37.0		25.0	37.0	
Total Split (%)	19.2%	33.1%	33.1%	19.2%	28.5%		19.2%	28.5%		19.2%	28.5%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length:	130											
Actuated Cycle Length:	76.9											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

 Ø1	 Ø2	 Ø3	 Ø4
25 s	37 s	25 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8
25 s	37 s	25 s	43 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	79	32	187	589	72	44	123	30	32	154	104
Future Volume (veh/h)	40	79	32	187	589	72	44	123	30	32	154	104
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	0.99		0.99	0.99		0.98	0.99		0.98
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	1559	1767	1811	1811	1767	1767	1767	1678	1678	1663	1826	1826
Adj Flow Rate, veh/h	45	89	0	210	662	81	49	138	34	36	173	117
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	23	9	6	6	9	9	9	15	15	16	5	5
Cap, veh/h	165	660		708	685	84	206	280	69	276	212	143
Arrive On Green	0.03	0.37	0.00	0.10	0.44	0.44	0.03	0.22	0.22	0.03	0.21	0.21
Sat Flow, veh/h	1485	1767	1535	1725	1542	189	1682	1295	319	1584	1008	682
Grp Volume(v), veh/h	45	89	0	210	0	743	49	0	172	36	0	290
Grp Sat Flow(s),veh/h/ln	1485	1767	1535	1725	0	1731	1682	0	1614	1584	0	1690
Q Serve(g_s), s	1.3	2.4	0.0	4.9	0.0	30.1	1.6	0.0	6.7	1.3	0.0	11.8
Cycle Q Clear(g_c), s	1.3	2.4	0.0	4.9	0.0	30.1	1.6	0.0	6.7	1.3	0.0	11.8
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.20	1.00		0.40
Lane Grp Cap(c), veh/h	165	660		708	0	769	206	0	349	276	0	355
V/C Ratio(X)	0.27	0.13		0.30	0.00	0.97	0.24	0.00	0.49	0.13	0.00	0.82
Avail Cap(c_a), veh/h	528	932		1008	0	769	615	0	717	671	0	751
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	14.9	0.0	10.2	0.0	19.5	22.2	0.0	24.7	21.6	0.0	27.1
Incr Delay (d2), s/veh	0.9	0.1	0.0	0.2	0.0	24.3	0.6	0.0	1.1	0.2	0.0	4.6
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	0.5	0.9	0.0	1.7	0.0	15.9	0.6	0.0	2.5	0.5	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	15.0	0.0	10.4	0.0	43.8	22.7	0.0	25.8	21.8	0.0	31.7
LnGrp LOS	B	B		B	A	D	C	A	C	C	A	C
Approach Vol, veh/h	134		A		953		221				326	
Approach Delay, s/veh	16.2				36.4		25.1				30.6	
Approach LOS	B				D		C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.5	20.1	7.4	37.0	7.1	20.6	12.5	31.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	32.0	20.0	32.0	20.0	32.0	20.0	38.0				
Max Q Clear Time (g_c+I1), s	3.6	13.8	3.3	32.1	3.3	8.7	6.9	4.4				
Green Ext Time (p_c), s	0.1	1.1	0.1	0.0	0.1	0.6	0.6	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			32.1									
HCM 6th LOS			C									
Notes												

2018 Existing PM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	845	67	275	646	244	31	258	615	138	160	16
Future Volume (vph)	36	845	67	275	646	244	31	258	615	138	160	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			16			16	8		12	12		8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	32.0	36.0		29.0	33.0	33.0	12.0	25.0	29.0	12.0	25.0	
Total Split (%)	31.4%	35.3%		28.4%	32.4%	32.4%	11.8%	24.5%	28.4%	11.8%	24.5%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 102

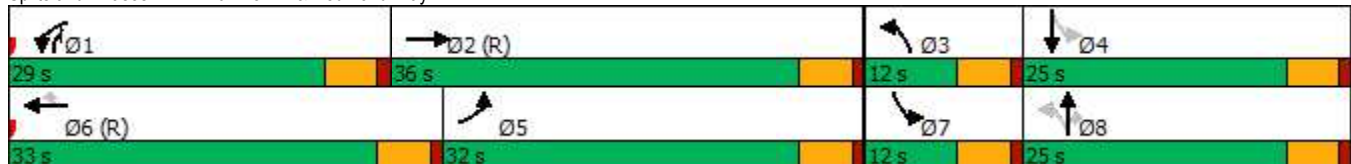
Actuated Cycle Length: 102

Offset: 93 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	845	67	275	646	244	31	258	615	138	160	16
Future Volume (veh/h)	36	845	67	275	646	244	31	258	615	138	160	16
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		0.97	0.99		0.98	1.00		0.98
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	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	37	871	69	284	666	106	32	266	589	142	165	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	472	1446	115	367	983	426	328	370	476	235	398	39
Arrive On Green	0.53	0.87	0.87	0.11	0.27	0.27	0.03	0.20	0.20	0.14	0.47	0.47
Sat Flow, veh/h	1781	3332	264	3483	3582	1551	1795	1885	1568	1795	1689	164
Grp Volume(v), veh/h	37	464	476	284	666	106	32	266	589	142	0	181
Grp Sat Flow(s),veh/h/ln	1781	1777	1819	1742	1791	1551	1795	1885	1568	1795	0	1853
Q Serve(g_s), s	1.0	7.4	7.4	8.1	16.9	4.2	1.4	13.5	20.0	6.4	0.0	6.6
Cycle Q Clear(g_c), s	1.0	7.4	7.4	8.1	16.9	4.2	1.4	13.5	20.0	6.4	0.0	6.6
Prop In Lane	1.00		0.15	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	472	771	789	367	983	426	328	370	476	235	0	436
V/C Ratio(X)	0.08	0.60	0.60	0.77	0.68	0.25	0.10	0.72	1.24	0.60	0.00	0.41
Avail Cap(c_a), veh/h	472	771	789	820	983	426	399	370	476	235	0	436
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.47	0.00	0.47
Uniform Delay (d), s/veh	17.9	4.3	4.3	44.4	33.0	17.1	31.2	38.4	35.7	28.2	0.0	22.4
Incr Delay (d2), s/veh	0.0	3.3	3.2	1.3	3.7	1.4	0.0	5.5	123.2	1.5	0.0	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	0.4	2.2	2.3	3.5	7.7	2.1	0.6	6.7	27.8	2.6	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	7.6	7.5	45.8	36.7	18.5	31.2	43.9	158.9	29.7	0.0	22.5
LnGrp LOS	B	A	A	D	D	B	C	D	F	C	A	C
Approach Vol, veh/h		977			1056			887			323	
Approach Delay, s/veh		8.0			37.3			119.8			25.6	
Approach LOS		A			D			F			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.7	49.3	8.0	29.0	32.0	33.0	12.0	25.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	24.0	31.0	7.0	20.0	27.0	28.0	7.0	20.0				
Max Q Clear Time (g_c+l1), s	10.1	9.4	3.4	8.6	3.0	18.9	8.4	22.0				
Green Ext Time (p_c), s	0.7	4.2	0.0	0.3	0.0	2.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			49.9									
HCM 6th LOS			D									

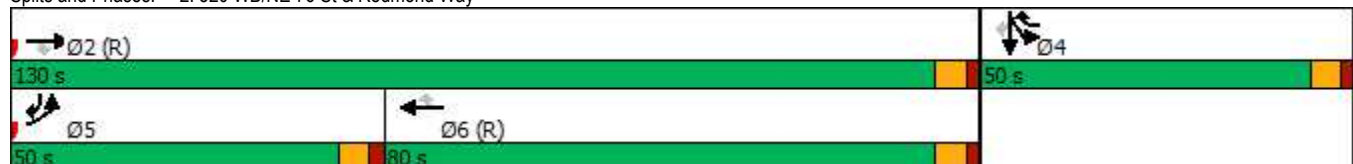
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	358	1241	151	0	949	298	0	0	0	87	274	408
Future Volume (vph)	358	1241	151	0	949	298	0	0	0	87	274	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			6			4						1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	1%	1%	0%	1%	2%	0%	0%	0%	1%	3%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	50.0	130.0	130.0		80.0	50.0				50.0	50.0	50.0
Total Split (%)	27.8%	72.2%	72.2%		44.4%	27.8%				27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	358	1241	151	0	949	298	0	0	0	87	274	408
Future Volume (veh/h)	358	1241	151	0	949	298	0	0	0	87	274	408
Initial Q (Qb), veh	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
Parking Bus, Adj	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		
Adj Sat Flow, veh/h/ln	1841	1885	1885	0	1885	1870				1885	1856	1870
Adj Flow Rate, veh/h	362	1254	153	0	959	249				88	277	384
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99				0.99	0.99	0.99
Percent Heavy Veh, %	4	1	1	0	1	2				1	3	2
Cap, veh/h	383	2592	1153	0	1691	1075				373	386	675
Arrive On Green	0.22	0.72	0.72	0.00	0.47	0.47				0.21	0.21	0.21
Sat Flow, veh/h	1753	3582	1594	0	3676	1578				1795	1856	1583
Grp Volume(v), veh/h	362	1254	153	0	959	249				88	277	384
Grp Sat Flow(s),veh/h/ln	1753	1791	1594	0	1791	1578				1795	1856	1583
Q Serve(g_s), s	36.6	26.8	5.3	0.0	34.8	10.8				7.3	25.0	33.1
Cycle Q Clear(g_c), s	36.6	26.8	5.3	0.0	34.8	10.8				7.3	25.0	33.1
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	383	2592	1153	0	1691	1075				373	386	675
V/C Ratio(X)	0.95	0.48	0.13	0.00	0.57	0.23				0.24	0.72	0.57
Avail Cap(c_a), veh/h	429	2592	1153	0	1691	1075				439	454	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	69.3	10.6	7.6	0.0	34.3	10.9				59.4	66.4	39.1
Incr Delay (d2), s/veh	23.0	0.5	0.2	0.0	1.4	0.5				0.3	4.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.7	10.3	1.8	0.0	15.7	7.1				3.4	12.4	30.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.3	11.0	7.8	0.0	35.7	11.5				59.7	70.8	40.0
LnGrp LOS	F	B	A	A	D	B				E	E	D
Approach Vol, veh/h	1769			1208			749					
Approach Delay, s/veh	27.4			30.7			53.7					
Approach LOS	C			C			D					
Timer - Assigned Phs	2			4			5			6		
Phs Duration (G+Y+Rc), s	136.6			43.4			45.3			91.3		
Change Period (Y+Rc), s	6.3			6.0			6.0			6.3		
Max Green Setting (Gmax), s	123.7			44.0			44.0			73.7		
Max Q Clear Time (g_c+I1), s	28.8			35.1			38.6			36.8		
Green Ext Time (p_c), s	15.9			2.4			0.7			11.3		
Intersection Summary												
HCM 6th Ctrl Delay	33.7											
HCM 6th LOS	C											

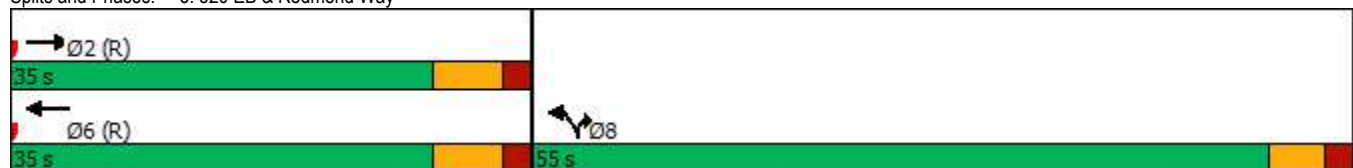
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	1328	0	0	907	340	1317
Future Volume (vph)	1328	0	0	907	340	1317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	1%	2%	1%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	10.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	35.0			35.0	55.0	55.0
Total Split (%)	38.9%			38.9%	61.1%	61.1%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Offset:	80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	75					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↖	↗↗
Traffic Volume (veh/h)	1328	0	0	907	340	1317
Future Volume (veh/h)	1328	0	0	907	340	1317
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	0	0	1885	1870	1885
Adj Flow Rate, veh/h	1383	0	0	945	354	1372
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	0	1	2	1
Cap, veh/h	1718	0	0	1195	939	1483
Arrive On Green	0.33	0.00	0.00	0.44	0.53	0.53
Sat Flow, veh/h	5486	0	0	3770	1781	2812
Grp Volume(v), veh/h	1383	0	0	945	354	1372
Grp Sat Flow(s),veh/h/ln	1716	0	0	1791	1781	1406
Q Serve(g_s), s	22.0	0.0	0.0	20.3	10.6	40.5
Cycle Q Clear(g_c), s	22.0	0.0	0.0	20.3	10.6	40.5
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1718	0	0	1195	939	1483
V/C Ratio(X)	0.81	0.00	0.00	0.79	0.38	0.93
Avail Cap(c_a), veh/h	1718	0	0	1195	974	1537
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	0.0	0.0	22.3	12.5	19.6
Incr Delay (d2), s/veh	4.1	0.0	0.0	5.4	0.3	9.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	0.0	0.0	7.8	3.5	12.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.4	0.0	0.0	27.7	12.8	29.4
LnGrp LOS	C	A	A	C	B	C
Approach Vol, veh/h	1383			945	1726	
Approach Delay, s/veh	31.4			27.7	26.0	
Approach LOS	C			C	C	
Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		36.7			36.7	53.3
Change Period (Y+Rc), s		6.7			6.7	5.8
Max Green Setting (Gmax), s		28.3			28.3	49.2
Max Q Clear Time (g_c+l1), s		24.0			22.3	42.5
Green Ext Time (p_c), s		3.1			3.1	4.9
Intersection Summary						
HCM 6th Ctrl Delay			28.3			
HCM 6th LOS			C			

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	2355	160	107	1537	5	332	0	148	0	3	7
Future Volume (vph)	13	2355	160	107	1537	5	332	0	148	0	3	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			158	
Travel Time (s)		17.7			12.2			13.0			4.3	
Confl. Peds. (#/hr)			5			5			4			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Split	NA			NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases												
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	39.0		10.0	15.0		37.0	37.0		10.0	10.0	
Total Split (s)	12.0	98.0		27.0	113.0		43.0	43.0		12.0	12.0	
Total Split (%)	6.7%	54.4%		15.0%	62.8%		23.9%	23.9%		6.7%	6.7%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 180

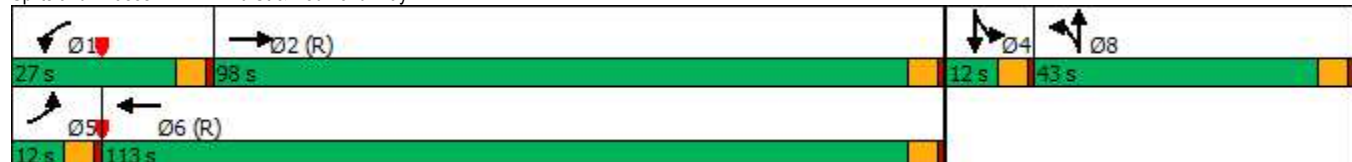
Actuated Cycle Length: 180

Offset: 130 (72%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	2355	160	107	1537	5	332	0	148	0	3	7
Future Volume (veh/h)	13	2355	160	107	1537	5	332	0	148	0	3	7
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		0.99	1.00		1.00
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	1885	1885	1870	1856	1856	1885	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	14	2453	167	111	1601	5	346	0	154	0	3	7
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	1	2	3	3	1	0	0	0	0	0
Cap, veh/h	25	3364	226	131	3870	12	424	0	194	0	6	13
Arrive On Green	0.03	1.00	1.00	0.05	0.50	0.50	0.12	0.00	0.12	0.00	0.01	0.01
Sat Flow, veh/h	1810	4925	331	1781	5213	16	3483	0	1594	0	506	1181
Grp Volume(v), veh/h	14	1698	922	111	1037	569	346	0	154	0	0	10
Grp Sat Flow(s),veh/h/ln	1810	1716	1824	1781	1689	1853	1742	0	1594	0	0	1687
Q Serve(g_s), s	1.4	0.0	0.0	11.1	35.0	35.0	17.4	0.0	16.9	0.0	0.0	1.1
Cycle Q Clear(g_c), s	1.4	0.0	0.0	11.1	35.0	35.0	17.4	0.0	16.9	0.0	0.0	1.1
Prop In Lane	1.00		0.18	1.00		0.01	1.00		1.00	0.00		0.70
Lane Grp Cap(c), veh/h	25	2343	1246	131	2507	1375	424	0	194	0	0	18
V/C Ratio(X)	0.55	0.72	0.74	0.85	0.41	0.41	0.82	0.00	0.79	0.00	0.00	0.54
Avail Cap(c_a), veh/h	70	2343	1246	218	2507	1375	735	0	337	0	0	66
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.75	0.75	0.75	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	86.9	0.0	0.0	84.6	20.5	20.5	77.1	0.0	76.9	0.0	0.0	88.6
Incr Delay (d2), s/veh	6.8	2.0	4.0	5.4	0.4	0.7	1.5	0.0	2.8	0.0	0.0	8.9
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	0.7	0.6	1.4	5.4	15.1	16.7	8.0	0.0	7.2	0.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.8	2.0	4.0	90.0	20.8	21.1	78.6	0.0	79.6	0.0	0.0	97.5
LnGrp LOS	F	A	A	F	C	C	E	A	E	A	A	F
Approach Vol, veh/h	2634			1717			500			10		
Approach Delay, s/veh	3.2			25.4			78.9			97.5		
Approach LOS	A			C			E			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.2	127.9		7.0	7.5	138.6		26.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	22.0	93.0		7.0	7.0	108.0		38.0				
Max Q Clear Time (g_c+l1), s	13.1	2.0		3.1	3.4	37.0		19.4				
Green Ext Time (p_c), s	0.1	54.3		0.0	0.0	18.0		1.4				
Intersection Summary												
HCM 6th Ctrl Delay	19.0											
HCM 6th LOS	B											

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕			↕	↕	
Traffic Volume (vph)	43	5	139	18	7	299
Future Volume (vph)	43	5	139	18	7	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	749	
Travel Time (s)	9.1			7.6	20.4	
Confl. Peds. (#/hr)		1	1		1	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	3%	0%	0%	1%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	8.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	5	139	18	7	299
Future Vol, veh/h	43	5	139	18	7	299
Conflicting Peds, #/hr	0	1	1	0	1	1
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	85	85	85	85	85	85
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	51	6	164	21	8	352
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	405	56
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	350	-
Critical Hdwy	-	-	4.13	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	1540	-	606	1013
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	718	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1539	-	539	1011
Mov Cap-2 Maneuver	-	-	-	-	539	-
Stage 1	-	-	-	-	972	-
Stage 2	-	-	-	-	640	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		6.7		10.7	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	991	-	-	1539	-	
HCM Lane V/C Ratio	0.363	-	-	0.106	-	
HCM Control Delay (s)	10.7	-	-	7.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1.7	-	-	0.4	-	

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	1549	764	150	1057	119	415	158	22	212	221	171
Future Volume (vph)	131	1549	764	150	1057	119	415	158	22	212	221	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1752	4960	0	2854	1466	0	1504	1577	1417
Flt Permitted	0.950			0.950			0.950	0.991		0.950	0.996	
Satd. Flow (perm)	1770	3539	1583	1752	4960	0	2854	1466	0	1504	1577	1417
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					12			2				142
Link Speed (mph)		40			45			35				35
Link Distance (ft)		717			2432			760				335
Travel Time (s)		12.2			36.8			14.8				6.5
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 (%)	2%	2%	2%	3%	3%	3%	3%	3%	3%	2%	2%	2%
Shared Lane Traffic (%)							10%			10%		
Lane Group Flow (vph)	134	1581	780	153	1200	0	381	225	0	194	248	174
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					73.0		27.0	27.0		25.0	25.0	25.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	19.9	95.5	99.0	20.0	95.8		21.0	21.0		19.0	19.0	19.0
Actuated g/C Ratio	0.11	0.53	0.55	0.11	0.53		0.12	0.12		0.11	0.11	0.11
v/c Ratio	0.69	0.84	0.90	0.78	0.45		1.15	1.31		1.23	1.49	0.63
Control Delay	110.0	21.5	40.9	104.4	34.6		152.6	221.8		207.1	300.5	28.5
Queue Delay	0.0	1.2	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	110.0	22.6	40.9	104.4	34.6		152.6	221.8		207.1	300.5	28.5
LOS	F	C	D	F	C		F	F		F	F	C
Approach Delay		33.0			42.5			178.3			194.3	
Approach LOS		C			D			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length: 180												
Actuated Cycle Length: 180												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.49												
Intersection Signal Delay: 72.5	Intersection LOS: E											
Intersection Capacity Utilization 96.8%	ICU Level of Service F											
Analysis Period (min) 15												

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way

					
Ø1	Ø9	Ø2 (R)	Ø3	Ø4	Ø8
20 s	45 s	28 s	25 s	27 s	35 s
					
Ø5	Ø6 (R)				
20 s	73 s				

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	20.0	28.0	20.0	35.0	45.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

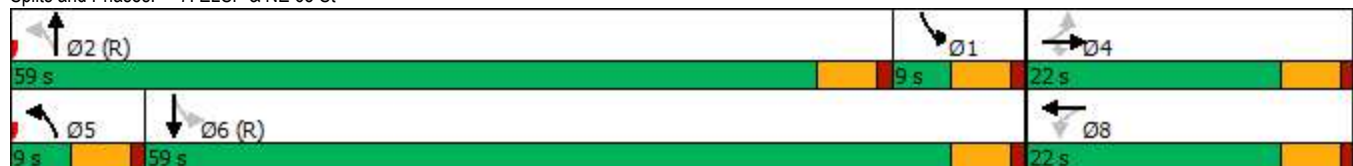
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	41	375	14	6	20	115	468	11	35	963	244
Future Volume (vph)	213	41	375	14	6	20	115	468	11	35	963	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	2		20	20		2	3		9	9		3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	59.0		9.0	59.0	
Total Split (%)	24.4%	24.4%	24.4%	24.4%	24.4%		10.0%	65.6%		10.0%	65.6%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	41	375	14	6	20	115	468	11	35	963	244
Future Volume (veh/h)	213	41	375	14	6	20	115	468	11	35	963	244
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.97	1.00		0.99	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	1885	1885	1885	1876	1876	1876	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	224	43	268	15	6	21	121	493	12	37	1014	257
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	206	25	292	54	33	33	379	2144	52	588	1697	428
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.60	0.60	0.09	1.00	1.00
Sat Flow, veh/h	703	135	1547	0	175	175	1795	3573	87	1795	2828	714
Grp Volume(v), veh/h	267	0	268	42	0	0	121	247	258	37	641	630
Grp Sat Flow(s),veh/h/ln	838	0	1547	350	0	0	1795	1791	1869	1795	1791	1750
Q Serve(g_s), s	0.0	0.0	15.3	0.0	0.0	0.0	2.8	5.8	5.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	17.0	0.0	15.3	17.0	0.0	0.0	2.8	5.8	5.8	0.0	0.0	0.0
Prop In Lane	0.84		1.00	0.36		0.50	1.00		0.05	1.00		0.41
Lane Grp Cap(c), veh/h	232	0	292	120	0	0	379	1075	1121	588	1075	1050
V/C Ratio(X)	1.15	0.00	0.92	0.35	0.00	0.00	0.32	0.23	0.23	0.06	0.60	0.60
Avail Cap(c_a), veh/h	232	0	292	120	0	0	379	1075	1121	588	1075	1050
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	39.2	0.0	35.8	31.4	0.0	0.0	9.1	8.4	8.4	10.2	0.0	0.0
Incr Delay (d2), s/veh	106.3	0.0	32.0	1.7	0.0	0.0	0.5	0.5	0.5	0.0	0.2	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	12.0	0.0	8.2	0.8	0.0	0.0	1.0	2.1	2.2	0.3	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	145.5	0.0	67.8	33.1	0.0	0.0	9.6	8.9	8.8	10.2	0.2	0.2
LnGrp LOS	F	A	E	C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		535			42			626			1308	
Approach Delay, s/veh		106.5			33.1			9.0			0.5	
Approach LOS		F			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	59.0		22.0	9.0	59.0		22.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	4.0	54.0		17.0	4.0	54.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	7.8		19.0	4.8	2.0		19.0				
Green Ext Time (p_c), s	0.0	2.0		0.0	0.0	7.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									

Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	1748	3	0	999	33	2	1	1	116	1	374
Future Volume (vph)	109	1748	3	0	999	33	2	1	1	116	1	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			6			1	27		2	2		27
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 (%)	1%	1%	1%	2%	2%	2%	25%	25%	25%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	26.0	118.0			92.0	92.0	62.0	62.0		62.0	62.0	62.0
Total Split (%)	14.4%	65.6%			51.1%	51.1%	34.4%	34.4%		34.4%	34.4%	34.4%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None

Intersection Summary

Area Type: Other

Cycle Length: 180

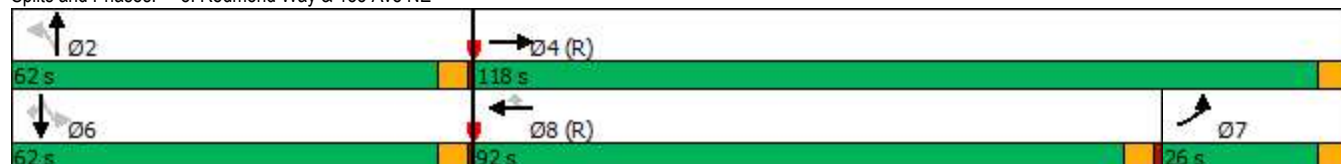
Actuated Cycle Length: 180

Offset: 168 (93%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	1748	3	0	999	33	2	1	1	116	1	374
Future Volume (veh/h)	109	1748	3	0	999	33	2	1	1	116	1	374
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		0.96	1.00		0.96
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	1832	1832	1832	0	1949	1949	1530	1530	1530	1964	1964	1964
Adj Flow Rate, veh/h	111	1784	3	0	1019	34	2	1	1	118	1	269
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, %	1	1	1	0	2	2	25	25	25	1	1	1
Cap, veh/h	435	2712	5	0	1790	797	70	32	24	258	2	292
Arrive On Green	0.50	1.00	1.00	0.00	0.48	0.48	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1745	3566	6	0	3800	1650	220	176	132	1187	10	1591
Grp Volume(v), veh/h	111	871	916	0	1019	34	4	0	0	119	0	269
Grp Sat Flow(s),veh/h/ln	1745	1741	1831	0	1851	1650	528	0	0	1197	0	1591
Q Serve(g_s), s	6.6	0.0	0.0	0.0	35.3	2.0	0.1	0.0	0.0	0.0	0.0	29.9
Cycle Q Clear(g_c), s	6.6	0.0	0.0	0.0	35.3	2.0	19.8	0.0	0.0	19.7	0.0	29.9
Prop In Lane	1.00		0.00	0.00		1.00	0.50		0.25	0.99		1.00
Lane Grp Cap(c), veh/h	435	1324	1393	0	1790	797	127	0	0	260	0	292
V/C Ratio(X)	0.25	0.66	0.66	0.00	0.57	0.04	0.03	0.00	0.00	0.46	0.00	0.92
Avail Cap(c_a), veh/h	435	1324	1393	0	1790	797	272	0	0	457	0	504
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.35	0.35	0.35	0.00	0.91	0.91	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.5	0.0	0.0	0.0	33.1	24.5	61.0	0.0	0.0	68.0	0.0	72.1
Incr Delay (d2), s/veh	0.1	0.9	0.9	0.0	1.2	0.1	0.1	0.0	0.0	0.5	0.0	8.2
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	2.6	0.3	0.3	0.0	15.9	0.8	0.2	0.0	0.0	5.2	0.0	25.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.6	0.9	0.9	0.0	34.4	24.6	61.1	0.0	0.0	68.5	0.0	80.3
LnGrp LOS	D	A	A	A	C	C	E	A	A	E	A	F
Approach Vol, veh/h	1898			1053			4			388		
Approach Delay, s/veh	2.9			34.0			61.1			76.7		
Approach LOS	A			C			E			E		
Timer - Assigned Phs	2			4			6			7		
Phs Duration (G+Y+Rc), s	38.1			141.9			38.1			49.9		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	57.0			113.0			57.0			21.0		
Max Q Clear Time (g_c+l1), s	21.8			2.0			31.9			8.6		
Green Ext Time (p_c), s	0.0			5.1			1.2			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	21.4											
HCM 6th LOS	C											

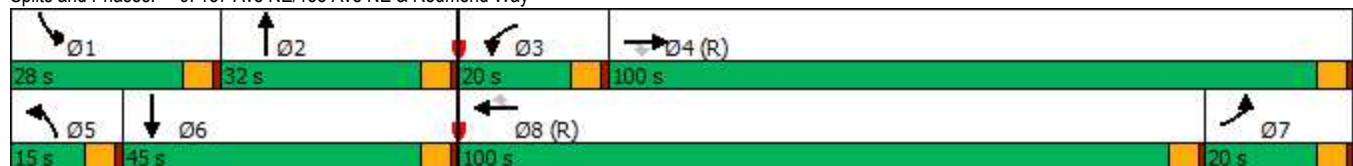
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1808	42	34	816	108	36	73	75	302	59	54
Future Volume (vph)	35	1808	42	34	816	108	36	73	75	302	59	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)						3			1			3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	5%	9%	4%	8%	6%	1%	1%	4%	0%	17%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	100.0	100.0	20.0	100.0	100.0	15.0	32.0		28.0	45.0	
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	8.3%	17.8%		15.6%	25.0%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 180												
Actuated Cycle Length: 180												
Offset: 13 (7%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green												
Natural Cycle: 130												
Control Type: Actuated-Coordinated												

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	1808	42	34	816	108	36	73	75	302	59	54
Future Volume (veh/h)	35	1808	42	34	816	108	36	73	75	302	59	54
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		1.00
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	1885	1826	1767	1841	1781	1811	1885	1885	1841	1900	1900
Adj Flow Rate, veh/h	37	1903	4	36	859	0	38	77	79	318	62	57
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	5	9	4	8	6	1	1	4	0	0
Cap, veh/h	274	2335	1009	46	1846	797	49	88	90	362	165	152
Arrive On Green	0.20	0.87	0.87	0.03	0.53	0.00	0.03	0.10	0.10	0.11	0.18	0.18
Sat Flow, veh/h	1810	3582	1547	1682	3497	1510	1725	851	874	3401	909	836
Grp Volume(v), veh/h	37	1903	4	36	859	0	38	0	156	318	0	119
Grp Sat Flow(s),veh/h/ln	1810	1791	1547	1682	1749	1510	1725	0	1725	1700	0	1745
Q Serve(g_s), s	3.0	43.3	0.1	3.8	27.7	0.0	3.9	0.0	16.0	16.6	0.0	10.8
Cycle Q Clear(g_c), s	3.0	43.3	0.1	3.8	27.7	0.0	3.9	0.0	16.0	16.6	0.0	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.51	1.00		0.48
Lane Grp Cap(c), veh/h	274	2335	1009	46	1846	797	49	0	178	362	0	317
V/C Ratio(X)	0.14	0.81	0.00	0.79	0.47	0.00	0.78	0.00	0.88	0.88	0.00	0.38
Avail Cap(c_a), veh/h	274	2335	1009	140	1846	797	96	0	259	435	0	388
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	0.97	0.97	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.2	7.0	4.2	87.0	26.6	0.0	86.9	0.0	79.6	79.3	0.0	64.7
Incr Delay (d2), s/veh	0.2	2.4	0.0	24.3	0.8	0.0	23.3	0.0	19.8	16.1	0.0	0.7
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	1.4	7.1	0.0	2.0	11.6	0.0	2.1	0.0	8.2	8.1	0.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	9.5	4.2	111.3	27.4	0.0	110.2	0.0	99.3	95.4	0.0	65.4
LnGrp LOS	E	A	A	F	C	A	F	A	F	F	A	E
Approach Vol, veh/h	1944				895				194		437	
Approach Delay, s/veh	10.5				30.8				101.4		87.2	
Approach LOS	B				C				F		F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.2	23.6	9.9	122.3	10.1	37.7	32.2	100.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	23.0	27.0	15.0	95.0	10.0	40.0	15.0	95.0				
Max Q Clear Time (g_c+I1), s	18.6	18.0	5.8	45.3	5.9	12.8	5.0	29.7				
Green Ext Time (p_c), s	0.6	0.3	0.0	15.7	0.0	0.4	0.0	4.3				
Intersection Summary												
HCM 6th Ctrl Delay	30.5											
HCM 6th LOS	C											

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	414	156	80	306	75	62	224	105	94	280	109
Future Volume (vph)	149	414	156	80	306	75	62	224	105	94	280	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	2		5	5		2	5		5	5		5
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	7%	3%	0%	0%	1%	4%	0%	6%	6%	9%	6%	9%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	13.0	41.0	41.0	9.0	37.0		10.0	31.0		9.0	30.0	
Total Split (%)	14.4%	45.6%	45.6%	10.0%	41.1%		11.1%	34.4%		10.0%	33.3%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 70.1												
Natural Cycle: 65												
Control Type: Actuated-Uncoordinated												

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

			
Ø1	Ø2	Ø3	Ø4
10 s	30 s	13 s	37 s
			
Ø5	Ø6	Ø7	Ø8
9 s	31 s	9 s	41 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	414	156	80	306	75	62	224	105	94	280	109
Future Volume (veh/h)	149	414	156	80	306	75	62	224	105	94	280	109
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		0.99	1.00		0.99	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	1796	1856	1900	1900	1885	1885	1900	1811	1811	1767	1811	1811
Adj Flow Rate, veh/h	151	418	0	81	309	76	63	226	106	95	283	110
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	7	3	0	0	1	1	0	6	6	9	6	6
Cap, veh/h	333	558		306	379	93	254	297	139	295	335	130
Arrive On Green	0.09	0.30	0.00	0.05	0.26	0.26	0.04	0.26	0.26	0.06	0.27	0.27
Sat Flow, veh/h	1711	1856	1610	1810	1458	359	1810	1162	545	1682	1238	481
Grp Volume(v), veh/h	151	418	0	81	0	385	63	0	332	95	0	393
Grp Sat Flow(s),veh/h/ln	1711	1856	1610	1810	0	1817	1810	0	1707	1682	0	1719
Q Serve(g_s), s	3.8	12.1	0.0	1.9	0.0	11.9	1.5	0.0	10.7	2.4	0.0	12.9
Cycle Q Clear(g_c), s	3.8	12.1	0.0	1.9	0.0	11.9	1.5	0.0	10.7	2.4	0.0	12.9
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.32	1.00		0.28
Lane Grp Cap(c), veh/h	333	558		306	0	472	254	0	436	295	0	466
V/C Ratio(X)	0.45	0.75		0.26	0.00	0.82	0.25	0.00	0.76	0.32	0.00	0.84
Avail Cap(c_a), veh/h	409	1120		338	0	975	328	0	744	308	0	721
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	18.8	0.0	15.7	0.0	20.7	16.5	0.0	20.5	15.9	0.0	20.5
Incr Delay (d2), s/veh	1.0	2.0	0.0	0.5	0.0	3.5	0.5	0.0	2.8	0.6	0.0	5.6
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	1.4	5.0	0.0	0.8	0.0	5.0	0.6	0.0	4.1	0.9	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	20.9	0.0	16.2	0.0	24.2	17.0	0.0	23.3	16.5	0.0	26.1
LnGrp LOS	B	C		B	A	C	B	A	C	B	A	C
Approach Vol, veh/h	569			466			395			488		
Approach Delay, s/veh	19.6			22.8			22.3			24.2		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	21.2	10.4	20.5	8.5	20.2	8.0	22.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	25.0	8.0	32.0	4.0	26.0	4.0	36.0				
Max Q Clear Time (g_c+l1), s	3.5	14.9	5.8	13.9	4.4	12.7	3.9	14.1				
Green Ext Time (p_c), s	0.0	1.2	0.1	1.5	0.0	1.1	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	22.1											
HCM 6th LOS	C											
Notes												

Future 2022 No Action AM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	564	48	296	693	135	16	79	200	229	146	18
Future Volume (vph)	32	564	48	296	693	135	16	79	200	229	146	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			2			3	5		7	7		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	16.0	32.0		20.0	36.0	36.0	11.0	27.0	20.0	11.0	27.0	
Total Split (%)	17.8%	35.6%		22.2%	40.0%	40.0%	12.2%	30.0%	22.2%	12.2%	30.0%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 90

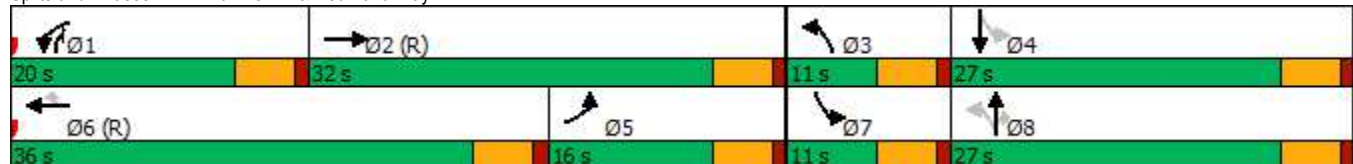
Actuated Cycle Length: 90

Offset: 42 (47%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	32	564	48	296	693	135	16	79	200	229	146	18			
Future Volume (veh/h)	32	564	48	296	693	135	16	79	200	229	146	18			
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	0.99		0.98	0.99		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	1841	1841	1841	1856	1856	1856	1870	1870	1870	1885	1885	1885			
Adj Flow Rate, veh/h	35	620	53	325	762	0	18	87	107	252	160	20			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	4	4	4	3	3	3	2	2	2	1	1	1			
Cap, veh/h	475	1619	138	408	1214	542	175	179	337	261	233	29			
Arrive On Green	0.27	0.50	0.50	0.12	0.34	0.00	0.02	0.10	0.10	0.07	0.14	0.14			
Sat Flow, veh/h	1753	3261	278	3428	3526	1572	1781	1870	1550	1795	1640	205			
Grp Volume(v), veh/h	35	332	341	325	762	0	18	87	107	252	0	180			
Grp Sat Flow(s),veh/h/ln	1753	1749	1790	1714	1763	1572	1781	1870	1550	1795	0	1845			
Q Serve(g_s), s	1.3	10.6	10.7	8.3	16.3	0.0	0.8	4.0	5.2	6.0	0.0	8.3			
Cycle Q Clear(g_c), s	1.3	10.6	10.7	8.3	16.3	0.0	0.8	4.0	5.2	6.0	0.0	8.3			
Prop In Lane	1.00		0.16	1.00		1.00	1.00		1.00	1.00		0.11			
Lane Grp Cap(c), veh/h	475	868	889	408	1214	542	175	179	337	261	0	262			
V/C Ratio(X)	0.07	0.38	0.38	0.80	0.63	0.00	0.10	0.49	0.32	0.97	0.00	0.69			
Avail Cap(c_a), veh/h	475	868	889	571	1214	542	258	457	568	261	0	451			
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)	0.95	0.95	0.95	1.00	1.00	0.00	0.95	0.95	0.95	0.47	0.00	0.47			
Uniform Delay (d), s/veh	24.4	14.1	14.1	38.6	24.7	0.0	35.6	38.6	29.8	38.4	0.0	36.7			
Incr Delay (d2), s/veh	0.0	1.2	1.2	3.4	2.5	0.0	0.1	0.7	0.2	29.6	0.0	0.6			
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	0.6	4.3	4.4	3.6	7.0	0.0	0.4	1.8	1.9	4.7	0.0	3.7			
Unsig. Movement Delay, s/veh															
LnGrp Delay(d),s/veh	24.4	15.3	15.3	42.0	27.1	0.0	35.7	39.3	30.0	67.9	0.0	37.3			
LnGrp LOS	C	B	B	D	C	A	D	D	C	E	A	D			
Approach Vol, veh/h	708			1087			212			432					
Approach Delay, s/veh	15.7			31.6			34.3			55.2					
Approach LOS	B			C			C			E					
Timer - Assigned Phs	1	2	3	4	5	6	7	8							
Phs Duration (G+Y+Rc), s	15.7	49.7	6.8	17.8	29.4	36.0	11.0	13.6							
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0							
Max Green Setting (Gmax), s	15.0	27.0	6.0	22.0	11.0	31.0	6.0	22.0							
Max Q Clear Time (g_c+l1), s	10.3	12.7	2.8	10.3	3.3	18.3	8.0	7.2							
Green Ext Time (p_c), s	0.4	2.5	0.0	0.3	0.0	3.1	0.0	0.4							
Intersection Summary															
HCM 6th Ctrl Delay	31.4														
HCM 6th LOS	C														

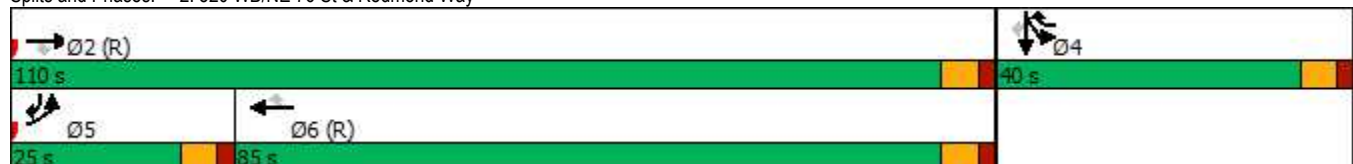
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	149	568	330	0	992	106	0	0	0	67	538	204
Future Volume (vph)	149	568	330	0	992	106	0	0	0	67	538	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			4			2						
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	5%	3%	0%	2%	4%	0%	0%	0%	5%	9%	15%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	25.0	110.0	110.0		85.0	40.0				40.0	40.0	25.0
Total Split (%)	16.7%	73.3%	73.3%		56.7%	26.7%				26.7%	26.7%	16.7%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	150											
Actuated Cycle Length:	150											
Offset:	87 (58%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	149	568	330	0	992	106	0	0	0	67	538	204
Future Volume (veh/h)	149	568	330	0	992	106	0	0	0	67	538	204
Initial Q (Qb), veh	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
Parking Bus, Adj	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		
Adj Sat Flow, veh/h/ln	1781	1826	1856	0	1870	1841				1826	1767	1678
Adj Flow Rate, veh/h	160	611	355	0	1067	85				72	578	168
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	8	5	3	0	2	4				5	9	15
Cap, veh/h	182	2398	1085	0	1934	1201				394	400	475
Arrive On Green	0.11	0.69	0.69	0.00	0.54	0.54				0.23	0.23	0.23
Sat Flow, veh/h	1697	3469	1570	0	3647	1557				1739	1767	1422
Grp Volume(v), veh/h	160	611	355	0	1067	85				72	578	168
Grp Sat Flow(s),veh/h/ln	1697	1735	1570	0	1777	1557				1739	1767	1422
Q Serve(g_s), s	13.9	9.9	13.5	0.0	29.3	2.0				5.0	34.0	13.4
Cycle Q Clear(g_c), s	13.9	9.9	13.5	0.0	29.3	2.0				5.0	34.0	13.4
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	182	2398	1085	0	1934	1201				394	400	475
V/C Ratio(X)	0.88	0.25	0.33	0.00	0.55	0.07				0.18	1.44	0.35
Avail Cap(c_a), veh/h	215	2398	1085	0	1934	1201				394	400	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	66.0	8.7	9.2	0.0	22.3	4.2				46.8	58.0	37.7
Incr Delay (d2), s/veh	27.1	0.2	0.7	0.0	1.1	0.1				0.2	213.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	3.6	4.6	0.0	12.6	1.5				2.2	38.9	11.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.1	8.9	10.0	0.0	23.4	4.3				47.0	271.2	38.2
LnGrp LOS	F	A	A	A	C	A				D	F	D
Approach Vol, veh/h	1126			1152						818		
Approach Delay, s/veh	21.2			22.0						203.6		
Approach LOS	C			C						F		
Timer - Assigned Phs	2			4			5			6		
Phs Duration (G+Y+Rc), s	110.0			40.0			22.1			87.9		
Change Period (Y+Rc), s	6.3			6.0			6.0			6.3		
Max Green Setting (Gmax), s	103.7			34.0			19.0			78.7		
Max Q Clear Time (g_c+l1), s	15.5			36.0			15.9			31.3		
Green Ext Time (p_c), s	8.3			0.0			0.1			11.5		
Intersection Summary												
HCM 6th Ctrl Delay	69.7											
HCM 6th LOS	E											

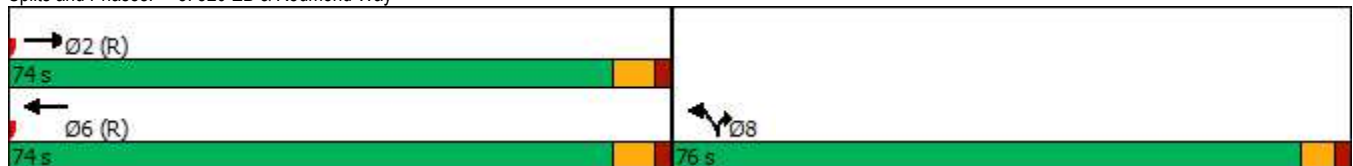
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	635	0	0	937	161	867
Future Volume (vph)	635	0	0	937	161	867
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	0%	0%	3%	8%	4%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	2.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	74.0			74.0	76.0	76.0
Total Split (%)	49.3%			49.3%	50.7%	50.7%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	150					
Actuated Cycle Length:	150					
Offset:	82 (55%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	65					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↖	↗↗
Traffic Volume (veh/h)	635	0	0	937	161	867
Future Volume (veh/h)	635	0	0	937	161	867
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	0	0	1856	1781	1841
Adj Flow Rate, veh/h	648	0	0	956	164	885
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	0	3	8	4
Cap, veh/h	2814	0	0	1958	613	992
Arrive On Green	0.56	0.00	0.00	0.56	0.36	0.36
Sat Flow, veh/h	5400	0	0	3711	1697	2745
Grp Volume(v), veh/h	648	0	0	956	164	885
Grp Sat Flow(s),veh/h/ln	1689	0	0	1763	1697	1373
Q Serve(g_s), s	9.8	0.0	0.0	24.8	10.3	45.6
Cycle Q Clear(g_c), s	9.8	0.0	0.0	24.8	10.3	45.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2814	0	0	1958	613	992
V/C Ratio(X)	0.23	0.00	0.00	0.49	0.27	0.89
Avail Cap(c_a), veh/h	2814	0	0	1958	794	1285
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	0.0	20.3	33.9	45.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.9	0.3	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	10.2	4.2	15.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.2	0.0	0.0	21.2	34.2	52.2
LnGrp LOS	B	A	A	C	C	D
Approach Vol, veh/h	648			956	1049	
Approach Delay, s/veh	17.2			21.2	49.4	
Approach LOS	B			C	D	
Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		90.0			90.0	60.0
Change Period (Y+Rc), s		6.7			6.7	5.8
Max Green Setting (Gmax), s		67.3			67.3	70.2
Max Q Clear Time (g_c+l1), s		11.8			26.8	47.6
Green Ext Time (p_c), s		5.1			8.3	6.6
Intersection Summary						
HCM 6th Ctrl Delay			31.4			
HCM 6th LOS			C			
Notes						
User approved pedestrian interval to be less than phase max green.						

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	932	260	94	2417	6	320	8	35	5	14	319
Future Volume (vph)	191	932	260	94	2417	6	320	8	35	5	14	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			284	
Travel Time (s)		17.7			12.2			13.0			7.7	
Confl. Peds. (#/hr)			7			12			14			
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%	7%	2%	6%	2%	0%	4%	0%	16%	0%	0%	6%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	38.0		10.0	15.0		33.0	33.0		10.0	10.0	
Total Split (s)	21.0	75.0		21.0	75.0		33.0	44.0		10.0	21.0	
Total Split (%)	14.0%	50.0%		14.0%	50.0%		22.0%	29.3%		6.7%	14.0%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 150

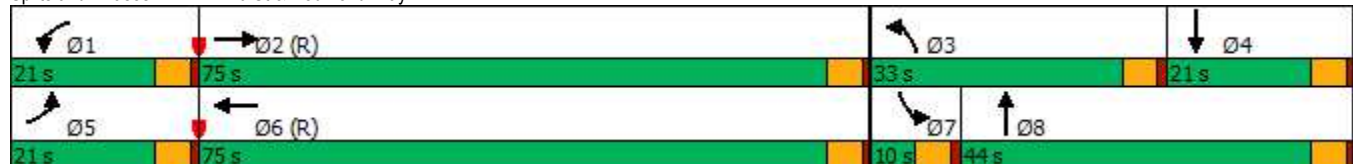
Actuated Cycle Length: 150

Offset: 145 (97%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	932	260	94	2417	6	320	8	35	5	14	319
Future Volume (veh/h)	191	932	260	94	2417	6	320	8	35	5	14	319
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		0.98	1.00		1.00
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	1796	1796	1811	1870	1870	1841	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	195	951	265	96	2466	6	327	8	36	5	14	326
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	7	7	6	2	2	4	0	0	0	0	0
Cap, veh/h	193	2203	612	117	2837	7	387	63	285	11	7	166
Arrive On Green	0.04	0.19	0.19	0.02	0.18	0.18	0.11	0.21	0.21	0.01	0.11	0.11
Sat Flow, veh/h	1810	3809	1059	1725	5259	13	3401	296	1333	1810	67	1554
Grp Volume(v), veh/h	195	816	400	96	1596	876	327	0	44	5	0	340
Grp Sat Flow(s),veh/h/ln	1810	1635	1598	1725	1702	1868	1700	0	1629	1810	0	1620
Q Serve(g_s), s	16.0	33.0	33.1	8.3	68.4	68.4	14.1	0.0	3.3	0.4	0.0	16.0
Cycle Q Clear(g_c), s	16.0	33.0	33.1	8.3	68.4	68.4	14.1	0.0	3.3	0.4	0.0	16.0
Prop In Lane	1.00		0.66	1.00		0.01	1.00		0.82	1.00		0.96
Lane Grp Cap(c), veh/h	193	1890	924	117	1837	1008	387	0	349	11	0	173
V/C Ratio(X)	1.01	0.43	0.43	0.82	0.87	0.87	0.84	0.00	0.13	0.44	0.00	1.97
Avail Cap(c_a), veh/h	193	1890	924	184	1837	1008	635	0	423	60	0	173
HCM Platoon Ratio	0.33	0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	72.4	38.9	39.0	72.4	56.5	56.5	65.2	0.0	47.6	74.3	0.0	67.0
Incr Delay (d2), s/veh	67.5	0.7	1.5	0.7	0.6	1.1	4.1	0.0	0.1	24.6	0.0	455.5
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	11.4	14.7	14.6	3.8	31.4	34.7	6.4	0.0	1.4	0.3	0.0	28.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	139.8	39.7	40.5	73.2	57.1	57.6	69.3	0.0	47.7	98.9	0.0	522.5
LnGrp LOS	F	D	D	E	E	E	E	A	D	F	A	F
Approach Vol, veh/h	1411			2568			371			345		
Approach Delay, s/veh	53.7			57.8			66.7			516.3		
Approach LOS	D			E			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	91.7	22.1	21.0	21.0	85.9	5.9	37.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	16.0	70.0	28.0	16.0	16.0	70.0	5.0	39.0				
Max Q Clear Time (g_c+l1), s	10.3	35.1	16.1	18.0	18.0	70.4	2.4	5.3				
Green Ext Time (p_c), s	0.1	4.5	0.9	0.0	0.0	0.0	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	91.0											
HCM 6th LOS	F											
Notes												

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (vph)	34	11	217	70	17	254
Future Volume (vph)	34	11	217	70	17	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	749	
Travel Time (s)	9.1			7.6	20.4	
Confl. Peds. (#/hr)		3	3		3	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	10%	0%	2%	2%	6%	4%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	7.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	34	11	217	70	17	254
Future Vol, veh/h	34	11	217	70	17	254
Conflicting Peds, #/hr	0	3	3	0	3	3
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	93	93	93	93	93	93
Heavy Vehicles, %	10	0	2	2	6	4
Mvmt Flow	37	12	233	75	18	273
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	52	0	590	49
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	544	-
Critical Hdwy	-	-	4.12	-	6.46	6.24
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.336
Pot Cap-1 Maneuver	-	-	1554	-	464	1014
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1550	-	390	1009
Mov Cap-2 Maneuver	-	-	-	-	390	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	483	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		5.8		10.7	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	918	-	-	1550	-	
HCM Lane V/C Ratio	0.317	-	-	0.151	-	
HCM Control Delay (s)	10.7	-	-	7.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	1.4	-	-	0.5	-	

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	735	360	80	2066	54	852	121	25	88	133	24
Future Volume (vph)	22	735	360	80	2066	54	852	121	25	88	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	3471	1553	1787	5111	0	2910	1474	0	1447	1519	1363
Flt Permitted	0.950			0.950			0.950	0.973		0.950	0.997	
Satd. Flow (perm)	1736	3471	1553	1787	5111	0	2910	1474	0	1447	1519	1363
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					3			2				171
Link Speed (mph)		40			45			35			35	
Link Distance (ft)		717			2432			760			335	
Travel Time (s)		12.2			36.8			14.8			6.5	
Confl. Peds. (#/hr)						3						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	6%	6%	6%
Shared Lane Traffic (%)							22%			10%		
Lane Group Flow (vph)	23	758	371	82	2186	0	685	344	0	82	146	25
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					60.0		27.0	27.0		16.0	16.0	16.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	28.0	70.5	82.0	24.0	71.5		21.0	21.0		10.0	10.0	10.0
Actuated g/C Ratio	0.19	0.47	0.55	0.16	0.48		0.14	0.14		0.07	0.07	0.07
v/c Ratio	0.07	0.46	0.44	0.29	0.90		1.68	1.65		0.85	1.45	0.10
Control Delay	70.0	16.4	15.6	41.6	44.1		355.1	352.4		126.3	293.2	0.8
Queue Delay	0.0	0.0	0.0	0.0	1.4		0.0	0.0		0.0	0.0	0.0
Total Delay	70.0	16.4	15.6	41.6	45.5		355.1	352.4		126.3	293.2	0.8
LOS	E	B	B	D	D		F	F		F	F	A
Approach Delay		17.2			45.4			354.2			210.2	
Approach LOS		B			D			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.68												
Intersection Signal Delay: 114.9	Intersection LOS: F											
Intersection Capacity Utilization 95.6%	ICU Level of Service F											
Analysis Period (min) 15												

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way

											
Ø1	Ø9	Ø2 (R)	Ø3	Ø4	Ø8	Ø5	Ø6 (R)				
8 s	40 s	24 s	16 s	27 s	35 s	12 s	60 s				

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Confl. Peds. (#/hr)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	8.0	24.0	12.0	35.0	40.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

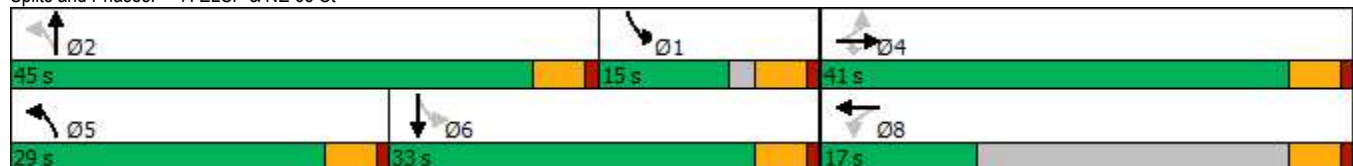
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	0	26	0	0	15	388	976	0	10	385	163
Future Volume (vph)	51	0	26	0	0	15	388	976	0	10	385	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	1					1	3		5	5		3
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 (%)	7%	0%	4%	0%	0%	0%	1%	2%	0%	0%	8%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm		NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		5.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		10.0	22.0	
Total Split (s)	41.0	41.0	41.0	17.0	17.0		29.0	45.0		15.0	33.0	
Total Split (%)	39.8%	39.8%	39.8%	16.5%	16.5%		28.2%	43.7%		14.6%	32.0%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 103												
Actuated Cycle Length: 54												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	0	26	0	0	15	388	976	0	10	385	163
Future Volume (veh/h)	51	0	26	0	0	15	388	976	0	10	385	163
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	0.85		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	1841	1876	1876	1876	1885	1870	1870	1900	1781	1781
Adj Flow Rate, veh/h	52	0	0	0	0	15	396	996	0	10	393	166
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	4	0	0	0	1	2	2	0	8	8
Cap, veh/h	260	0	90	0	0	91	680	1500	0	414	633	264
Arrive On Green	0.06	0.00	0.00	0.00	0.00	0.06	0.27	0.42	0.00	0.12	0.27	0.27
Sat Flow, veh/h	1193	0	1560	0	0	1586	1795	3647	0	1810	2322	967
Grp Volume(v), veh/h	52	0	0	0	0	15	396	996	0	10	285	274
Grp Sat Flow(s),veh/h/ln	1193	0	1560	0	0	1586	1795	1777	0	1810	1692	1597
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.3	7.0	8.5	0.0	0.0	5.6	5.7
Cycle Q Clear(g_c), s	1.7	0.0	0.0	0.0	0.0	0.3	7.0	8.5	0.0	0.0	5.6	5.7
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.00	1.00		0.61
Lane Grp Cap(c), veh/h	260	0	90	0	0	91	680	1500	0	414	461	435
V/C Ratio(X)	0.20	0.00	0.00	0.00	0.00	0.16	0.58	0.66	0.00	0.02	0.62	0.63
Avail Cap(c_a), veh/h	1526	0	1487	0	0	504	1332	3765	0	671	1255	1184
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(l)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	0.0	0.0	0.0	0.0	16.9	10.6	8.8	0.0	14.5	12.0	12.1
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.0	0.0	0.8	0.8	0.5	0.0	0.0	1.4	1.5
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	0.4	0.0	0.0	0.0	0.0	0.1	2.1	2.2	0.0	0.1	1.7	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	0.0	0.0	0.0	17.8	11.4	9.3	0.0	14.5	13.4	13.6
LnGrp LOS	B	A	A	A	A	B	B	A	A	B	B	B
Approach Vol, veh/h		52			15			1392			569	
Approach Delay, s/veh		18.1			17.8			9.9			13.5	
Approach LOS		B			B			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	20.9		7.2	15.3	15.3		7.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		36.0	24.0	28.0		12.0				
Max Q Clear Time (g_c+l1), s	2.0	10.5		3.7	9.0	7.7		2.3				
Green Ext Time (p_c), s	0.0	5.4		0.2	1.4	2.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.1									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

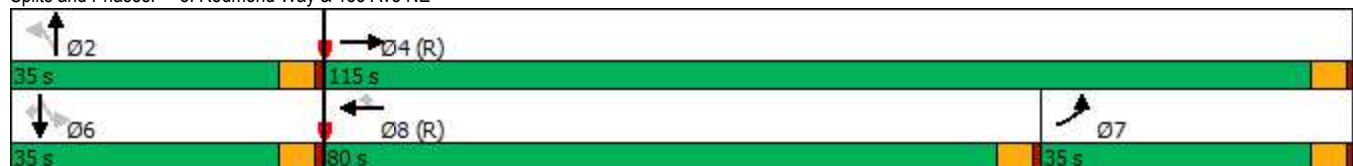
Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	563	4	0	2127	86	6	0	0	37	0	122
Future Volume (vph)	169	563	4	0	2127	86	6	0	0	37	0	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			4			2	11		4	4		11
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 (%)	4%	7%	25%	0%	2%	4%	0%	0%	0%	28%	0%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	35.0	115.0			80.0	80.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	23.3%	76.7%			53.3%	53.3%	23.3%	23.3%		23.3%	23.3%	23.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 52 (35%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green												
Natural Cycle: 130												
Control Type: Actuated-Coordinated												

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	563	4	0	2127	86	6	0	0	37	0	122
Future Volume (veh/h)	169	563	4	0	2127	86	6	0	0	37	0	122
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	0.96		1.00	0.95		1.00
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	1788	1743	1743	0	1949	1919	1900	1900	1900	1979	1979	1964
Adj Flow Rate, veh/h	180	599	4	0	2263	91	6	0	0	39	0	0
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, %	4	7	7	0	2	4	0	0	0	0	0	1
Cap, veh/h	562	2912	19	0	1851	811	154	0	0	149	0	116
Arrive On Green	0.66	1.00	1.00	0.00	0.50	0.50	0.07	0.00	0.00	0.07	0.00	0.00
Sat Flow, veh/h	1703	3373	23	0	3800	1623	1512	0	0	1447	0	1664
Grp Volume(v), veh/h	180	294	309	0	2263	91	6	0	0	39	0	0
Grp Sat Flow(s),veh/h/ln	1703	1656	1739	0	1851	1623	1512	0	0	1447	0	1664
Q Serve(g_s), s	6.8	0.0	0.0	0.0	75.0	4.5	0.0	0.0	0.0	3.3	0.0	0.0
Cycle Q Clear(g_c), s	6.8	0.0	0.0	0.0	75.0	4.5	0.5	0.0	0.0	3.8	0.0	0.0
Prop In Lane	1.00		0.01	0.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	562	1430	1502	0	1851	811	154	0	0	149	0	116
V/C Ratio(X)	0.32	0.21	0.21	0.00	1.22	0.11	0.04	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	562	1430	1502	0	1851	811	334	0	0	335	0	333
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	0.00	0.14	0.14	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.2	0.0	0.0	0.0	37.5	19.9	65.1	0.0	0.0	66.6	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.0	100.8	0.0	0.1	0.0	0.0	0.3	0.0	0.0
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	2.4	0.1	0.1	0.0	57.9	1.7	0.2	0.0	0.0	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	0.3	0.3	0.0	138.3	19.9	65.2	0.0	0.0	66.9	0.0	0.0
LnGrp LOS	B	A	A	A	F	B	E	A	A	E	A	A
Approach Vol, veh/h		783			2354			6			39	
Approach Delay, s/veh		4.5			133.8			65.2			66.9	
Approach LOS		A			F			E			E	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		15.5		134.5		15.5	54.5	80.0				
Change Period (Y+Rc), s		5.0		5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		30.0		110.0		30.0	30.0	75.0				
Max Q Clear Time (g_c+l1), s		2.5		2.0		5.8	8.8	77.0				
Green Ext Time (p_c), s		0.0		1.2		0.1	0.6	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				101.0								
HCM 6th LOS				F								

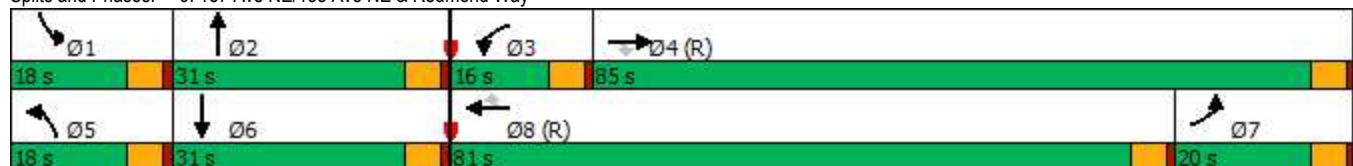
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	582	16	29	2205	221	82	104	42	110	34	47
Future Volume (vph)	13	582	16	29	2205	221	82	104	42	110	34	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)			1			1			3			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	17%	8%	7%	4%	2%	11%	0%	2%	0%	25%	3%	7%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	85.0	85.0	16.0	81.0	81.0	18.0	31.0		18.0	31.0	
Total Split (%)	13.3%	56.7%	56.7%	10.7%	54.0%	54.0%	12.0%	20.7%		12.0%	20.7%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 72 (48%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green												
Natural Cycle: 140												
Control Type: Actuated-Coordinated												

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	582	16	29	2205	221	82	104	42	110	34	47
Future Volume (veh/h)	13	582	16	29	2205	221	82	104	42	110	34	47
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		0.99	1.00		1.00
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	1648	1781	1796	1841	1870	1737	1900	1870	1870	1530	1856	1856
Adj Flow Rate, veh/h	14	606	0	30	2297	173	85	108	44	115	35	49
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	17	8	7	4	2	11	0	2	2	25	3	3
Cap, veh/h	317	2317	1042	42	1801	745	106	131	53	153	70	98
Arrive On Green	0.40	1.00	0.00	0.02	0.51	0.51	0.06	0.10	0.10	0.05	0.10	0.10
Sat Flow, veh/h	1570	3385	1522	1753	3554	1471	1810	1260	513	2826	700	980
Grp Volume(v), veh/h	14	606	0	30	2297	173	85	0	152	115	0	84
Grp Sat Flow(s),veh/h/ln	1570	1692	1522	1753	1777	1471	1810	0	1773	1413	0	1679
Q Serve(g_s), s	0.8	0.0	0.0	2.5	76.0	7.5	7.0	0.0	12.6	6.0	0.0	7.1
Cycle Q Clear(g_c), s	0.8	0.0	0.0	2.5	76.0	7.5	7.0	0.0	12.6	6.0	0.0	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.58
Lane Grp Cap(c), veh/h	317	2317	1042	42	1801	745	106	0	185	153	0	168
V/C Ratio(X)	0.04	0.26	0.00	0.72	1.28	0.23	0.80	0.00	0.82	0.75	0.00	0.50
Avail Cap(c_a), veh/h	317	2317	1042	129	1801	745	157	0	307	245	0	291
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	0.0	72.7	37.0	11.8	69.8	0.0	65.8	70.0	0.0	64.0
Incr Delay (d2), s/veh	0.1	0.3	0.0	20.0	128.4	0.7	16.5	0.0	8.8	7.3	0.0	2.3
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	0.3	0.1	0.0	1.4	63.1	3.4	3.7	0.0	6.2	2.3	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.3	0.0	92.8	165.4	12.5	86.3	0.0	74.6	77.2	0.0	66.3
LnGrp LOS	D	A	A	F	F	B	F	A	E	E	A	E
Approach Vol, veh/h	620				2500				237		199	
Approach Delay, s/veh	1.1				154.0				78.8		72.6	
Approach LOS	A				F				E		E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	20.6	8.6	107.7	13.8	20.0	35.3	81.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	13.0	26.0	11.0	80.0	13.0	26.0	15.0	76.0				
Max Q Clear Time (g_c+l1), s	8.0	14.6	4.5	2.0	9.0	9.1	2.8	78.0				
Green Ext Time (p_c), s	0.2	0.4	0.0	2.8	0.1	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	117.7											
HCM 6th LOS	F											
Notes												

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	94	35	211	646	78	52	149	40	35	172	113
Future Volume (vph)	43	94	35	211	646	78	52	149	40	35	172	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	6		5	5		6	7		7	7		7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	23%	9%	6%	6%	9%	10%	9%	15%	17%	16%	5%	15%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	25.0	43.0	43.0	25.0	37.0		25.0	37.0		25.0	37.0	
Total Split (%)	19.2%	33.1%	33.1%	19.2%	28.5%		19.2%	28.5%		19.2%	28.5%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 82.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

 Ø1	 Ø2	 Ø3	 Ø4
25 s	37 s	25 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8
25 s	37 s	25 s	43 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	43	94	35	211	646	78	52	149	40	35	172	113			
Future Volume (veh/h)	43	94	35	211	646	78	52	149	40	35	172	113			
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	0.99		0.99	0.99		0.98	0.99		0.98			
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	1559	1767	1811	1811	1767	1767	1767	1678	1678	1663	1826	1826			
Adj Flow Rate, veh/h	48	106	0	237	726	88	58	167	45	39	193	127			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	23	9	6	6	9	9	9	15	15	16	5	5			
Cap, veh/h	148	619		681	668	81	205	296	80	265	229	151			
Arrive On Green	0.03	0.35	0.00	0.12	0.43	0.43	0.04	0.23	0.23	0.03	0.22	0.22			
Sat Flow, veh/h	1485	1767	1535	1725	1544	187	1682	1268	342	1584	1021	672			
Grp Volume(v), veh/h	48	106	0	237	0	814	58	0	212	39	0	320			
Grp Sat Flow(s),veh/h/ln	1485	1767	1535	1725	0	1731	1682	0	1610	1584	0	1692			
Q Serve(g_s), s	1.5	3.1	0.0	6.0	0.0	32.0	1.9	0.0	8.6	1.4	0.0	13.4			
Cycle Q Clear(g_c), s	1.5	3.1	0.0	6.0	0.0	32.0	1.9	0.0	8.6	1.4	0.0	13.4			
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.21	1.00		0.40			
Lane Grp Cap(c), veh/h	148	619		681	0	749	205	0	375	265	0	380			
V/C Ratio(X)	0.32	0.17		0.35	0.00	1.09	0.28	0.00	0.57	0.15	0.00	0.84			
Avail Cap(c_a), veh/h	499	908		947	0	749	596	0	697	646	0	732			
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.0	16.6	0.0	11.2	0.0	21.0	22.1	0.0	25.0	21.5	0.0	27.4			
Incr Delay (d2), s/veh	1.3	0.1	0.0	0.3	0.0	58.8	0.7	0.0	1.3	0.3	0.0	5.1			
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	0.5	1.2	0.0	2.1	0.0	23.8	0.8	0.0	3.2	0.5	0.0	5.6			
Unsig. Movement Delay, s/veh															
LnGrp Delay(d),s/veh	20.3	16.7	0.0	11.5	0.0	79.8	22.8	0.0	26.4	21.8	0.0	32.5			
LnGrp LOS	C	B		B	A	F	C	A	C	C	A	C			
Approach Vol, veh/h	154			A			1051			270					
Approach Delay, s/veh	17.8						64.4			25.6					
Approach LOS	B						E			C					
Timer - Assigned Phs	1	2	3	4	5	6	7	8							
Phs Duration (G+Y+Rc), s	7.8	21.6	7.5	37.0	7.2	22.2	13.6	30.9							
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0							
Max Green Setting (Gmax), s	20.0	32.0	20.0	32.0	20.0	32.0	20.0	38.0							
Max Q Clear Time (g_c+l1), s	3.9	15.4	3.5	34.0	3.4	10.6	8.0	5.1							
Green Ext Time (p_c), s	0.1	1.2	0.1	0.0	0.1	0.8	0.7	0.4							
Intersection Summary															
HCM 6th Ctrl Delay	48.3														
HCM 6th LOS	D														
Notes															

Future 2022 No Action PM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	934	73	307	721	272	34	279	678	153	173	17
Future Volume (vph)	40	934	73	307	721	272	34	279	678	153	173	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			16			16	8		12	12		8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	32.0	36.0		29.0	33.0	33.0	12.0	25.0	29.0	12.0	25.0	
Total Split (%)	31.4%	35.3%		28.4%	32.4%	32.4%	11.8%	24.5%	28.4%	11.8%	24.5%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 102

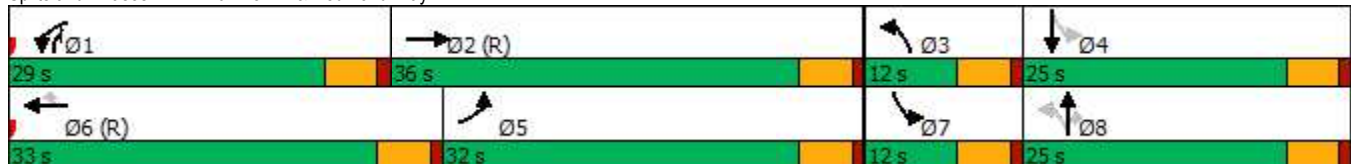
Actuated Cycle Length: 102

Offset: 93 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	934	73	307	721	272	34	279	678	153	173	17
Future Volume (veh/h)	40	934	73	307	721	272	34	279	678	153	173	17
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		0.97	0.99		0.98	1.00		0.98
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	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	41	963	75	316	743	117	35	288	656	158	178	18
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	472	1416	110	400	983	426	318	370	491	224	393	40
Arrive On Green	0.53	0.85	0.85	0.11	0.27	0.27	0.03	0.20	0.20	0.14	0.47	0.47
Sat Flow, veh/h	1781	3337	260	3483	3582	1551	1795	1885	1568	1795	1681	170
Grp Volume(v), veh/h	41	513	525	316	743	117	35	288	656	158	0	196
Grp Sat Flow(s),veh/h/ln	1781	1777	1820	1742	1791	1551	1795	1885	1568	1795	0	1851
Q Serve(g_s), s	1.2	10.5	10.5	9.0	19.4	4.7	1.6	14.8	20.0	7.0	0.0	7.3
Cycle Q Clear(g_c), s	1.2	10.5	10.5	9.0	19.4	4.7	1.6	14.8	20.0	7.0	0.0	7.3
Prop In Lane	1.00		0.14	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	472	754	772	400	983	426	318	370	491	224	0	433
V/C Ratio(X)	0.09	0.68	0.68	0.79	0.76	0.27	0.11	0.78	1.34	0.70	0.00	0.45
Avail Cap(c_a), veh/h	472	754	772	820	983	426	386	370	491	224	0	433
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.47	0.00	0.47
Uniform Delay (d), s/veh	17.9	5.2	5.2	43.9	33.9	17.2	31.1	38.9	35.2	29.5	0.0	22.7
Incr Delay (d2), s/veh	0.0	4.7	4.6	1.3	5.4	1.6	0.1	8.9	163.8	4.0	0.0	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	0.5	2.9	3.0	3.9	9.0	2.4	0.7	7.7	34.2	3.1	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	9.9	9.8	45.3	39.3	18.8	31.2	47.8	199.0	33.5	0.0	22.9
LnGrp LOS	B	A	A	D	D	B	C	D	F	C	A	C
Approach Vol, veh/h	1079				1176				979			
Approach Delay, s/veh	10.2				38.8				148.5			
Approach LOS	B				D				F			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.7	48.3	8.1	28.9	32.0	33.0	12.0	25.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	24.0	31.0	7.0	20.0	27.0	28.0	7.0	20.0				
Max Q Clear Time (g_c+l1), s	11.0	12.5	3.6	9.3	3.2	21.4	9.0	22.0				
Green Ext Time (p_c), s	0.7	4.6	0.0	0.3	0.1	2.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			59.0									
HCM 6th LOS			E									

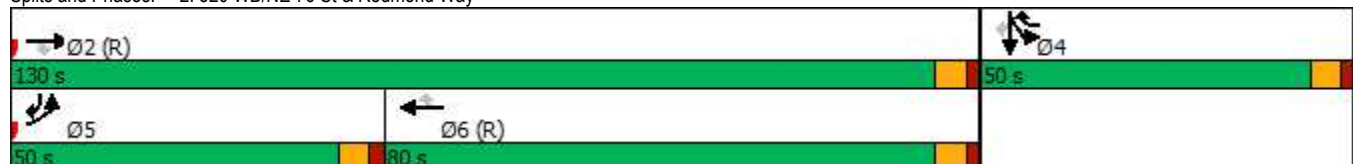
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	391	1377	163	0	1063	335	0	0	0	97	298	445
Future Volume (vph)	391	1377	163	0	1063	335	0	0	0	97	298	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			6			4						1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	1%	1%	0%	1%	2%	0%	0%	0%	1%	3%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	50.0	130.0	130.0		80.0	50.0				50.0	50.0	50.0
Total Split (%)	27.8%	72.2%	72.2%		44.4%	27.8%				27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	180											
Actuated Cycle Length:	180											
Offset:	85 (47%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green											
Natural Cycle:	100											
Control Type:	Actuated-Coordinated											

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	391	1377	163	0	1063	335	0	0	0	97	298	445
Future Volume (veh/h)	391	1377	163	0	1063	335	0	0	0	97	298	445
Initial Q (Qb), veh	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
Parking Bus, Adj	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		
Adj Sat Flow, veh/h/ln	1841	1885	1885	0	1885	1870				1885	1856	1870
Adj Flow Rate, veh/h	395	1391	165	0	1074	294				98	301	431
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99				0.99	0.99	0.99
Percent Heavy Veh, %	4	1	1	0	1	2				1	3	2
Cap, veh/h	413	2534	1127	0	1571	1048				403	416	728
Arrive On Green	0.24	0.71	0.71	0.00	0.44	0.44				0.22	0.22	0.22
Sat Flow, veh/h	1753	3582	1594	0	3676	1578				1795	1856	1583
Grp Volume(v), veh/h	395	1391	165	0	1074	294				98	301	431
Grp Sat Flow(s),veh/h/ln	1753	1791	1594	0	1791	1578				1795	1856	1583
Q Serve(g_s), s	40.0	33.4	6.1	0.0	43.3	13.9				8.1	27.0	36.4
Cycle Q Clear(g_c), s	40.0	33.4	6.1	0.0	43.3	13.9				8.1	27.0	36.4
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	413	2534	1127	0	1571	1048				403	416	728
V/C Ratio(X)	0.96	0.55	0.15	0.00	0.68	0.28				0.24	0.72	0.59
Avail Cap(c_a), veh/h	429	2534	1127	0	1571	1048				439	454	760
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.66	0.66	0.66	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	12.6	8.6	0.0	40.5	12.6				57.3	64.7	36.1
Incr Delay (d2), s/veh	24.7	0.6	0.2	0.0	2.4	0.7				0.3	5.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.6	13.0	2.1	0.0	19.8	9.3				3.8	13.5	33.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.6	13.2	8.8	0.0	42.9	13.2				57.6	69.8	37.3
LnGrp LOS	F	B	A	A	D	B				E	E	D
Approach Vol, veh/h	1951			1368			830					
Approach Delay, s/veh	28.9			36.5			51.5					
Approach LOS	C			D			D					
Timer - Assigned Phs	2			4			5			6		
Phs Duration (G+Y+Rc), s	133.6			46.4			48.4			85.3		
Change Period (Y+Rc), s	6.3			6.0			6.0			6.3		
Max Green Setting (Gmax), s	123.7			44.0			44.0			73.7		
Max Q Clear Time (g_c+l1), s	35.4			38.4			42.0			45.3		
Green Ext Time (p_c), s	19.4			2.0			0.3			12.1		
Intersection Summary												
HCM 6th Ctrl Delay	35.9											
HCM 6th LOS	D											

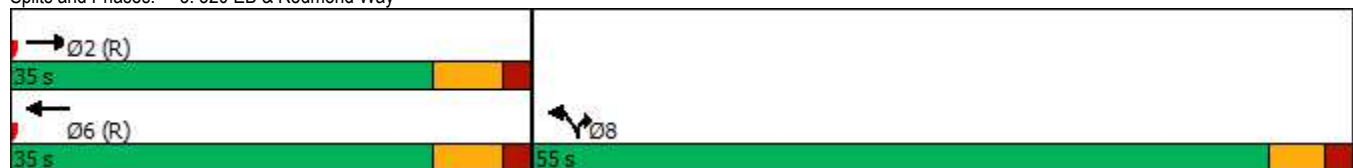
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	1474	0	0	1029	369	1457
Future Volume (vph)	1474	0	0	1029	369	1457
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	1%	2%	1%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	10.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	35.0			35.0	55.0	55.0
Total Split (%)	38.9%			38.9%	61.1%	61.1%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Offset:	80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	90					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1474	0	0	1029	369	1457
Future Volume (veh/h)	1474	0	0	1029	369	1457
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	0	0	1885	1870	1885
Adj Flow Rate, veh/h	1535	0	0	1072	384	1518
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	0	1	2	1
Cap, veh/h	1618	0	0	1126	974	1537
Arrive On Green	0.31	0.00	0.00	0.31	0.55	0.55
Sat Flow, veh/h	5486	0	0	3770	1781	2812
Grp Volume(v), veh/h	1535	0	0	1072	384	1518
Grp Sat Flow(s),veh/h/ln	1716	0	0	1791	1781	1406
Q Serve(g_s), s	26.2	0.0	0.0	26.4	11.2	47.9
Cycle Q Clear(g_c), s	26.2	0.0	0.0	26.4	11.2	47.9
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1618	0	0	1126	974	1537
V/C Ratio(X)	0.95	0.00	0.00	0.95	0.39	0.99
Avail Cap(c_a), veh/h	1618	0	0	1126	974	1537
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	0.0	30.2	11.8	20.1
Incr Delay (d2), s/veh	13.1	0.0	0.0	17.5	0.3	20.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.0	0.0	0.0	13.3	3.7	16.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.2	0.0	0.0	47.7	12.1	40.1
LnGrp LOS	D	A	A	D	B	D
Approach Vol, veh/h	1535			1072	1902	
Approach Delay, s/veh	43.2			47.7	34.4	
Approach LOS	D			D	C	
Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	35.0				35.0	55.0
Change Period (Y+Rc), s	6.7				6.7	5.8
Max Green Setting (Gmax), s	28.3				28.3	49.2
Max Q Clear Time (g_c+I1), s	28.2				28.4	49.9
Green Ext Time (p_c), s	0.1				0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			40.6			
HCM 6th LOS			D			

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	2461	173	114	1522	10	357	14	167	5	16	203
Future Volume (vph)	168	2461	173	114	1522	10	357	14	167	5	16	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			284	
Travel Time (s)		17.7			12.2			13.0			7.7	
Confl. Peds. (#/hr)			5			5			4			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	38.0		10.0	15.0		33.0	33.0		10.0	10.0	
Total Split (s)	33.0	106.0		21.0	94.0		33.0	43.0		10.0	20.0	
Total Split (%)	18.3%	58.9%		11.7%	52.2%		18.3%	23.9%		5.6%	11.1%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 180

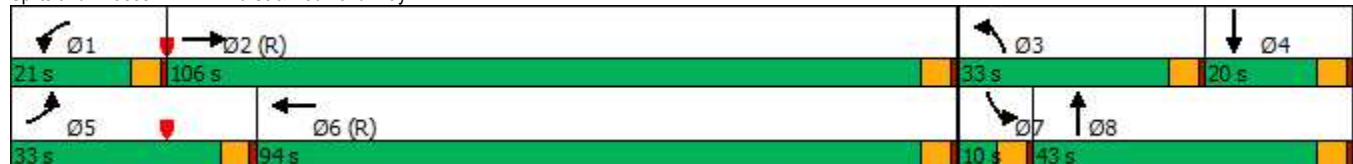
Actuated Cycle Length: 180

Offset: 141 (78%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	2461	173	114	1522	10	357	14	167	5	16	203
Future Volume (veh/h)	168	2461	173	114	1522	10	357	14	167	5	16	203
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		0.99	1.00		1.00
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	1885	1885	1870	1856	1856	1885	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	175	2564	180	119	1585	10	372	15	174	5	17	211
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	1	2	3	3	1	0	0	0	0	0
Cap, veh/h	193	2985	206	138	3003	19	421	25	295	11	10	126
Arrive On Green	0.21	1.00	1.00	0.05	0.39	0.39	0.12	0.20	0.20	0.01	0.08	0.08
Sat Flow, veh/h	1810	4915	339	1781	5194	33	3483	129	1492	1810	121	1507
Grp Volume(v), veh/h	175	1776	968	119	1031	564	372	0	189	5	0	228
Grp Sat Flow(s),veh/h/ln	1810	1716	1823	1781	1689	1849	1742	0	1621	1810	0	1629
Q Serve(g_s), s	17.0	0.0	0.0	11.9	42.3	42.3	18.9	0.0	19.1	0.5	0.0	15.0
Cycle Q Clear(g_c), s	17.0	0.0	0.0	11.9	42.3	42.3	18.9	0.0	19.1	0.5	0.0	15.0
Prop In Lane	1.00		0.19	1.00		0.02	1.00		0.92	1.00		0.93
Lane Grp Cap(c), veh/h	193	2084	1107	138	1953	1069	421	0	321	11	0	136
V/C Ratio(X)	0.91	0.85	0.87	0.86	0.53	0.53	0.88	0.00	0.59	0.45	0.00	1.68
Avail Cap(c_a), veh/h	281	2084	1107	158	1953	1069	542	0	342	50	0	136
HCM Platoon Ratio	2.00	2.00	2.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.69	0.69	0.69	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	69.9	0.0	0.0	84.4	36.2	36.2	77.9	0.0	65.5	89.1	0.0	82.5
Incr Delay (d2), s/veh	19.0	4.7	9.7	22.5	0.7	1.3	12.3	0.0	1.9	25.9	0.0	335.8
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	8.1	1.3	3.0	6.5	18.6	20.5	9.3	0.0	8.2	0.3	0.0	19.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.0	4.7	9.7	106.9	36.9	37.5	90.2	0.0	67.4	115.0	0.0	418.3
LnGrp LOS	F	A	A	F	D	D	F	A	E	F	A	F
Approach Vol, veh/h	2919				1714				561			
Approach Delay, s/veh	11.4				42.0				82.5			
Approach LOS	B				D				F			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.9	114.3	26.7	20.0	24.2	109.1	6.1	40.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	16.0	101.0	28.0	15.0	28.0	89.0	5.0	38.0				
Max Q Clear Time (g_c+l1), s	13.9	2.0	20.9	17.0	19.0	44.3	2.5	21.1				
Green Ext Time (p_c), s	0.0	20.5	0.8	0.0	0.2	6.3	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	45.6											
HCM 6th LOS	D											

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕			↕	↕	
Traffic Volume (vph)	53	5	157	23	8	337
Future Volume (vph)	53	5	157	23	8	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	749	
Travel Time (s)	9.1			7.6	20.4	
Confl. Peds. (#/hr)		1	1		1	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	3%	0%	0%	1%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	8.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	5	157	23	8	337
Future Vol, veh/h	53	5	157	23	8	337
Conflicting Peds, #/hr	0	1	1	0	1	1
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	85	85	85	85	85	85
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	62	6	185	27	9	396
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	69	0	464	67
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	398	-
Critical Hdwy	-	-	4.13	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	1526	-	560	999
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1525	-	490	997
Mov Cap-2 Maneuver	-	-	-	-	490	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	598	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		6.7		11.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	974	-	-	1525	-	
HCM Lane V/C Ratio	0.417	-	-	0.121	-	
HCM Control Delay (s)	11.3	-	-	7.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	2.1	-	-	0.4	-	

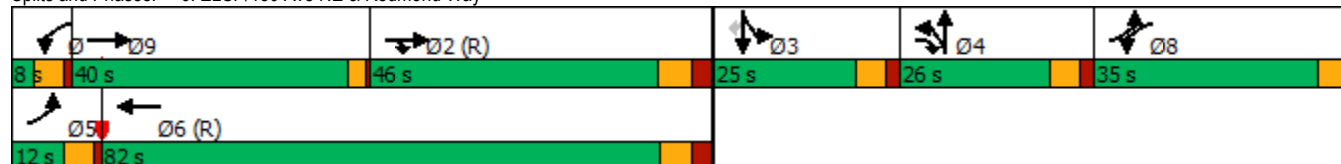
Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1670	880	174	1139	145	479	200	31	248	281	21
Future Volume (vph)	20	1670	880	174	1139	145	479	200	31	248	281	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1752	4950	0	2854	1463	0	1504	1577	1417
Flt Permitted	0.950			0.950			0.950	0.991		0.950	0.996	
Satd. Flow (perm)	1770	3539	1583	1752	4950	0	2854	1463	0	1504	1577	1417
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					15			3				142
Link Speed (mph)		40			45			35				35
Link Distance (ft)		717			2432			760				335
Travel Time (s)		12.2			36.8			14.8				6.5
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 (%)	2%	2%	2%	3%	3%	3%	3%	3%	3%	2%	2%	2%
Shared Lane Traffic (%)							10%			10%		
Lane Group Flow (vph)	20	1704	898	178	1310	0	440	285	0	228	312	21
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					82.0		26.0	26.0		25.0	25.0	25.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	14.0	106.5	109.0	10.0	107.5		20.0	20.0		19.0	19.0	19.0
Actuated g/C Ratio	0.08	0.59	0.61	0.06	0.60		0.11	0.11		0.11	0.11	0.11
v/c Ratio	0.15	0.81	0.94	1.84	0.44		1.39	1.73		1.44	1.88	0.08
Control Delay	101.8	9.8	33.7	444.9	28.7		240.3	386.6		282.4	455.5	0.5
Queue Delay	0.0	0.8	0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	101.8	10.6	33.8	444.9	28.7		240.3	386.6		282.4	455.5	0.5
LOS	F	B	C	F	C		F	F		F	F	A
Approach Delay		19.3			78.5			297.8			368.1	
Approach LOS		B			E			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length: 180												
Actuated Cycle Length: 180												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.88												
Intersection Signal Delay: 109.3	Intersection LOS: F											
Intersection Capacity Utilization 107.3%	ICU Level of Service G											
Analysis Period (min) 15												

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way



Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	8.0	46.0	12.0	35.0	40.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

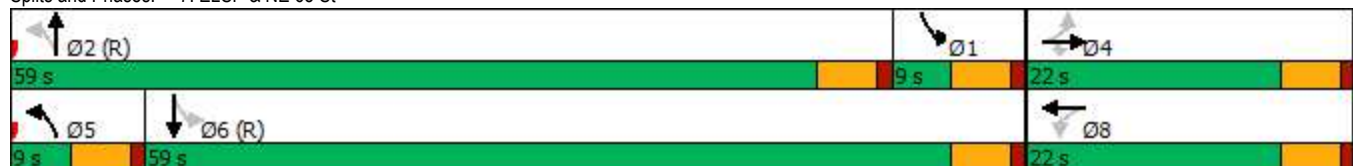
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	247	44	409	15	6	22	126	557	12	38	1149	264
Future Volume (vph)	247	44	409	15	6	22	126	557	12	38	1149	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	2		20	20		2	3		9	9		3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	59.0		9.0	59.0	
Total Split (%)	24.4%	24.4%	24.4%	24.4%	24.4%		10.0%	65.6%		10.0%	65.6%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green												
Natural Cycle: 70												
Control Type: Actuated-Coordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	247	44	409	15	6	22	126	557	12	38	1149	264
Future Volume (veh/h)	247	44	409	15	6	22	126	557	12	38	1149	264
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.97	1.00		0.99	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	1885	1885	1885	1876	1876	1876	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	260	46	291	16	6	23	133	586	13	40	1209	278
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	207	24	292	54	32	34	269	2149	48	553	1736	395
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.60	0.60	0.06	0.80	0.80
Sat Flow, veh/h	705	125	1547	0	172	180	1795	3582	79	1795	2894	658
Grp Volume(v), veh/h	306	0	291	45	0	0	133	293	306	40	743	744
Grp Sat Flow(s),veh/h/ln	830	0	1547	351	0	0	1795	1791	1870	1795	1791	1761
Q Serve(g_s), s	0.0	0.0	16.9	0.0	0.0	0.0	3.1	7.0	7.0	0.0	16.8	17.5
Cycle Q Clear(g_c), s	17.0	0.0	16.9	17.0	0.0	0.0	3.1	7.0	7.0	0.0	16.8	17.5
Prop In Lane	0.85		1.00	0.36		0.51	1.00		0.04	1.00		0.37
Lane Grp Cap(c), veh/h	231	0	292	121	0	0	269	1075	1122	553	1075	1057
V/C Ratio(X)	1.33	0.00	1.00	0.37	0.00	0.00	0.49	0.27	0.27	0.07	0.69	0.70
Avail Cap(c_a), veh/h	231	0	292	121	0	0	269	1075	1122	553	1075	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	39.2	0.0	36.5	31.4	0.0	0.0	12.5	8.6	8.6	10.6	5.3	5.4
Incr Delay (d2), s/veh	173.7	0.0	51.5	1.9	0.0	0.0	1.4	0.6	0.6	0.0	0.3	0.4
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	16.2	0.0	10.4	0.9	0.0	0.0	1.2	2.6	2.7	0.4	3.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	212.9	0.0	87.9	33.3	0.0	0.0	13.9	9.2	9.2	10.6	5.7	5.8
LnGrp LOS	F	A	F	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		597			45			732			1527	
Approach Delay, s/veh		152.0			33.3			10.1			5.9	
Approach LOS		F			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	59.0		22.0	9.0	59.0		22.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	4.0	54.0		17.0	4.0	54.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	9.0		19.0	5.1	19.5		19.0				
Green Ext Time (p_c), s	0.0	2.5		0.0	0.0	8.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			37.4									
HCM 6th LOS			D									

Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1908	3	0	1100	44	2	1	1	134	1	409
Future Volume (vph)	120	1908	3	0	1100	44	2	1	1	134	1	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			6			1	27		2	2		27
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 (%)	1%	1%	1%	2%	2%	2%	25%	25%	25%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	26.0	118.0			92.0	92.0	62.0	62.0		62.0	62.0	62.0
Total Split (%)	14.4%	65.6%			51.1%	51.1%	34.4%	34.4%		34.4%	34.4%	34.4%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None

Intersection Summary

Area Type: Other

Cycle Length: 180

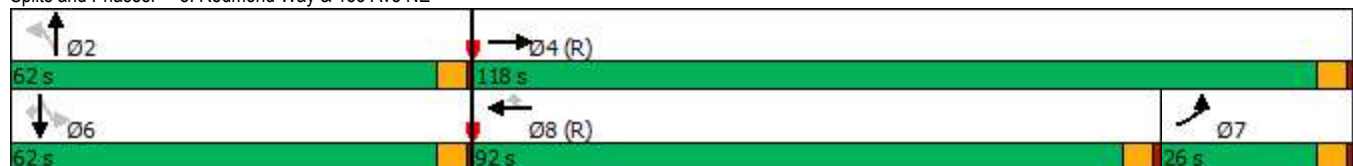
Actuated Cycle Length: 180

Offset: 168 (93%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1908	3	0	1100	44	2	1	1	134	1	409
Future Volume (veh/h)	120	1908	3	0	1100	44	2	1	1	134	1	409
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		0.96	1.00		0.96
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	1832	1832	1832	0	1949	1949	1530	1530	1530	1964	1964	1964
Adj Flow Rate, veh/h	122	1947	3	0	1122	45	2	1	1	137	1	293
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, %	1	1	1	0	2	2	25	25	25	1	1	1
Cap, veh/h	410	2660	4	0	1790	797	68	31	23	270	2	317
Arrive On Green	0.31	0.99	0.99	0.00	0.32	0.32	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1745	3566	5	0	3800	1650	190	155	115	1160	8	1596
Grp Volume(v), veh/h	122	950	1000	0	1122	45	4	0	0	138	0	293
Grp Sat Flow(s),veh/h/ln	1745	1741	1831	0	1851	1650	460	0	0	1169	0	1596
Q Serve(g_s), s	9.5	2.9	2.9	0.0	46.3	3.4	0.1	0.0	0.0	0.0	0.0	32.4
Cycle Q Clear(g_c), s	9.5	2.9	2.9	0.0	46.3	3.4	23.3	0.0	0.0	23.2	0.0	32.4
Prop In Lane	1.00		0.00	0.00		1.00	0.50		0.25	0.99		1.00
Lane Grp Cap(c), veh/h	410	1298	1366	0	1790	797	121	0	0	272	0	317
V/C Ratio(X)	0.30	0.73	0.73	0.00	0.63	0.06	0.03	0.00	0.00	0.51	0.00	0.92
Avail Cap(c_a), veh/h	410	1298	1366	0	1790	797	249	0	0	448	0	505
HCM Platoon Ratio	1.33	1.33	1.33	1.00	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.34	0.34	0.34	0.00	0.88	0.88	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.7	0.2	0.2	0.0	47.1	32.6	59.2	0.0	0.0	67.1	0.0	70.8
Incr Delay (d2), s/veh	0.1	1.3	1.2	0.0	1.5	0.1	0.1	0.0	0.0	0.5	0.0	11.7
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	4.1	0.7	0.8	0.0	22.5	1.4	0.2	0.0	0.0	6.0	0.0	27.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	1.5	1.4	0.0	48.6	32.7	59.3	0.0	0.0	67.6	0.0	82.5
LnGrp LOS	D	A	A	A	D	C	E	A	A	E	A	F
Approach Vol, veh/h	2072			1167			4			431		
Approach Delay, s/veh	4.3			48.0			59.3			77.7		
Approach LOS	A			D			E			E		
Timer - Assigned Phs	2			4			6			7		
Phs Duration (G+Y+Rc), s	40.8			139.2			40.8			47.2		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	57.0			113.0			57.0			21.0		
Max Q Clear Time (g_c+l1), s	25.3			4.9			34.4			11.5		
Green Ext Time (p_c), s	0.0			6.0			1.3			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	26.9											
HCM 6th LOS	C											

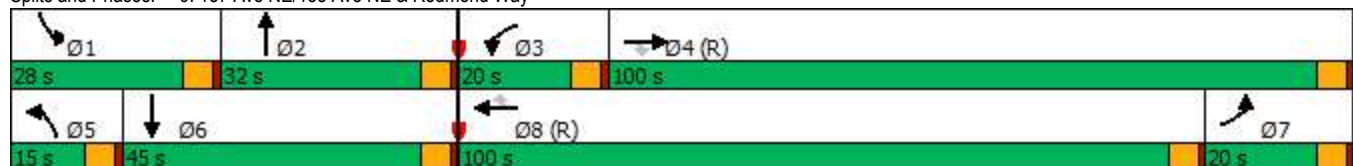
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (vph)	38	1981	45	37	907	121	39	79	81	331	64	61
Future Volume (vph)	38	1981	45	37	907	121	39	79	81	331	64	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)						3			1			3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	5%	9%	4%	8%	6%	1%	1%	4%	0%	17%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	100.0	100.0	20.0	100.0	100.0	15.0	32.0		28.0	45.0	
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	8.3%	17.8%		15.6%	25.0%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	1981	45	37	907	121	39	79	81	331	64	61
Future Volume (veh/h)	38	1981	45	37	907	121	39	79	81	331	64	61
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		1.00
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	1885	1826	1767	1841	1781	1811	1885	1885	1841	1900	1900
Adj Flow Rate, veh/h	40	2085	4	39	955	0	41	83	85	348	67	64
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	5	9	4	8	6	1	1	4	0	0
Cap, veh/h	247	2274	982	50	1846	797	52	94	96	389	173	165
Arrive On Green	0.18	0.84	0.84	0.03	0.53	0.00	0.03	0.11	0.11	0.11	0.19	0.19
Sat Flow, veh/h	1810	3582	1547	1682	3497	1510	1725	852	873	3401	891	851
Grp Volume(v), veh/h	40	2085	4	39	955	0	41	0	168	348	0	131
Grp Sat Flow(s),veh/h/ln	1810	1791	1547	1682	1749	1510	1725	0	1725	1700	0	1742
Q Serve(g_s), s	3.4	72.2	0.1	4.1	31.9	0.0	4.2	0.0	17.3	18.2	0.0	11.8
Cycle Q Clear(g_c), s	3.4	72.2	0.1	4.1	31.9	0.0	4.2	0.0	17.3	18.2	0.0	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.51	1.00		0.49
Lane Grp Cap(c), veh/h	247	2274	982	50	1846	797	52	0	190	389	0	338
V/C Ratio(X)	0.16	0.92	0.00	0.79	0.52	0.00	0.78	0.00	0.88	0.89	0.00	0.39
Avail Cap(c_a), veh/h	247	2274	982	140	1846	797	96	0	259	435	0	387
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.62	0.62	0.62	0.97	0.97	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.0	10.7	5.1	86.8	27.6	0.0	86.7	0.0	79.0	78.6	0.0	63.2
Incr Delay (d2), s/veh	0.2	4.8	0.0	22.7	1.0	0.0	21.9	0.0	22.8	19.1	0.0	0.7
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	1.5	15.6	0.0	2.1	13.4	0.0	2.2	0.0	8.9	9.0	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	15.5	5.1	109.5	28.6	0.0	108.6	0.0	101.7	97.7	0.0	63.9
LnGrp LOS	E	B	A	F	C	A	F	A	F	F	A	E
Approach Vol, veh/h	2129				994				209			
Approach Delay, s/veh	16.4				31.8				103.1			
Approach LOS	B				C				F			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.6	24.8	10.3	119.3	10.5	40.0	29.6	100.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	23.0	27.0	15.0	95.0	10.0	40.0	15.0	95.0				
Max Q Clear Time (g_c+I1), s	20.2	19.3	6.1	74.2	6.2	13.8	5.4	33.9				
Green Ext Time (p_c), s	0.4	0.3	0.0	12.6	0.0	0.5	0.0	5.0				
Intersection Summary												
HCM 6th Ctrl Delay	34.3											
HCM 6th LOS	C											

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	454	175	94	337	81	69	254	121	102	319	118
Future Volume (vph)	161	454	175	94	337	81	69	254	121	102	319	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	2		5	5		2	5		5	5		5
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	7%	3%	0%	0%	1%	4%	0%	6%	6%	9%	6%	9%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	13.0	41.0	41.0	9.0	37.0		10.0	31.0		9.0	30.0	
Total Split (%)	14.4%	45.6%	45.6%	10.0%	41.1%		11.1%	34.4%		10.0%	33.3%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 76.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

			
Ø1	Ø2	Ø3	Ø4
10 s	30 s	13 s	37 s
			
Ø5	Ø6	Ø7	Ø8
9 s	31 s	9 s	41 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	454	175	94	337	81	69	254	121	102	319	118
Future Volume (veh/h)	161	454	175	94	337	81	69	254	121	102	319	118
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		0.99	1.00		0.99	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	1796	1856	1900	1900	1885	1885	1900	1811	1811	1767	1811	1811
Adj Flow Rate, veh/h	163	459	0	95	340	82	70	257	122	103	322	119
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	7	3	0	0	1	1	0	6	6	9	6	6
Cap, veh/h	317	577		288	401	97	231	317	150	272	365	135
Arrive On Green	0.09	0.31	0.00	0.06	0.27	0.27	0.04	0.27	0.27	0.06	0.29	0.29
Sat Flow, veh/h	1711	1856	1610	1810	1465	353	1810	1157	549	1682	1258	465
Grp Volume(v), veh/h	163	459	0	95	0	422	70	0	379	103	0	441
Grp Sat Flow(s),veh/h/ln	1711	1856	1610	1810	0	1818	1810	0	1706	1682	0	1723
Q Serve(g_s), s	4.5	15.1	0.0	2.5	0.0	14.7	1.8	0.0	13.8	2.9	0.0	16.3
Cycle Q Clear(g_c), s	4.5	15.1	0.0	2.5	0.0	14.7	1.8	0.0	13.8	2.9	0.0	16.3
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.32	1.00		0.27
Lane Grp Cap(c), veh/h	317	577		288	0	497	231	0	467	272	0	500
V/C Ratio(X)	0.51	0.80		0.33	0.00	0.85	0.30	0.00	0.81	0.38	0.00	0.88
Avail Cap(c_a), veh/h	363	1000		296	0	871	288	0	664	272	0	645
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	21.1	0.0	17.2	0.0	23.0	18.0	0.0	22.6	17.4	0.0	22.6
Incr Delay (d2), s/veh	1.3	2.5	0.0	0.7	0.0	4.1	0.7	0.0	5.1	0.9	0.0	11.2
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	1.7	6.5	0.0	1.0	0.0	6.4	0.7	0.0	5.7	1.1	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	23.6	0.0	17.8	0.0	27.1	18.8	0.0	27.7	18.3	0.0	33.8
LnGrp LOS	B	C		B	A	C	B	A	C	B	A	C
Approach Vol, veh/h		622	A		517			449			544	
Approach Delay, s/veh		22.2			25.4			26.3			30.8	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	24.4	11.2	23.3	9.0	23.3	8.7	25.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	25.0	8.0	32.0	4.0	26.0	4.0	36.0				
Max Q Clear Time (g_c+l1), s	3.8	18.3	6.5	16.7	4.9	15.8	4.5	17.1				
Green Ext Time (p_c), s	0.0	1.1	0.1	1.6	0.0	1.2	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			26.0									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

Future 2022 With-Project AM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	574	48	307	705	135	16	79	210	229	146	18
Future Volume (vph)	32	574	48	307	705	135	16	79	210	229	146	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			2			3	5		7	7		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	16.0	32.0		20.0	36.0	36.0	11.0	27.0	20.0	11.0	27.0	
Total Split (%)	17.8%	35.6%		22.2%	40.0%	40.0%	12.2%	30.0%	22.2%	12.2%	30.0%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 90

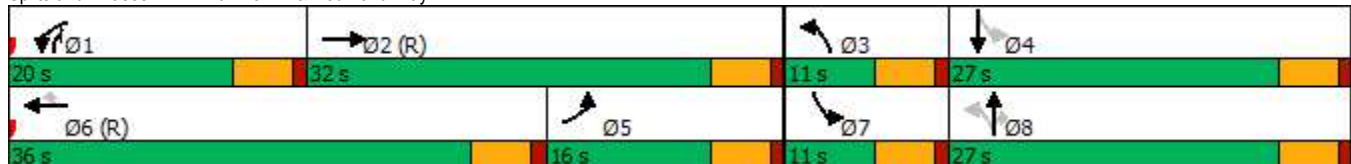
Actuated Cycle Length: 90

Offset: 42 (47%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	574	48	307	705	135	16	79	210	229	146	18
Future Volume (veh/h)	32	574	48	307	705	135	16	79	210	229	146	18
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	0.99		0.98	0.99		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	1841	1841	1841	1856	1856	1856	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	35	631	53	337	775	0	18	87	118	252	160	20
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	3	3	3	2	2	2	1	1	1
Cap, veh/h	465	1592	134	420	1214	542	182	189	351	267	242	30
Arrive On Green	0.27	0.49	0.49	0.12	0.34	0.00	0.02	0.10	0.10	0.07	0.15	0.15
Sat Flow, veh/h	1753	3266	274	3428	3526	1572	1781	1870	1552	1795	1640	205
Grp Volume(v), veh/h	35	338	346	337	775	0	18	87	118	252	0	180
Grp Sat Flow(s),veh/h/ln	1753	1749	1791	1714	1763	1572	1781	1870	1552	1795	0	1845
Q Serve(g_s), s	1.3	11.0	11.1	8.6	16.6	0.0	0.8	3.9	5.7	6.0	0.0	8.3
Cycle Q Clear(g_c), s	1.3	11.0	11.1	8.6	16.6	0.0	0.8	3.9	5.7	6.0	0.0	8.3
Prop In Lane	1.00		0.15	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	465	852	873	420	1214	542	182	189	351	267	0	272
V/C Ratio(X)	0.08	0.40	0.40	0.80	0.64	0.00	0.10	0.46	0.34	0.94	0.00	0.66
Avail Cap(c_a), veh/h	465	852	873	571	1214	542	265	457	574	267	0	451
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)	0.95	0.95	0.95	1.00	1.00	0.00	0.95	0.95	0.95	0.47	0.00	0.47
Uniform Delay (d), s/veh	24.8	14.6	14.7	38.4	24.8	0.0	35.2	38.1	29.4	38.0	0.0	36.2
Incr Delay (d2), s/veh	0.0	1.3	1.3	4.1	2.6	0.0	0.1	0.6	0.2	24.3	0.0	0.5
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	0.6	4.5	4.6	3.8	7.1	0.0	0.3	1.8	2.1	4.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	16.0	15.9	42.5	27.4	0.0	35.3	38.7	29.6	62.3	0.0	36.7
LnGrp LOS	C	B	B	D	C	A	D	D	C	E	A	D
Approach Vol, veh/h	719			1112			223			432		
Approach Delay, s/veh	16.4			32.0			33.6			51.7		
Approach LOS	B			C			C			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	48.9	6.8	18.3	28.9	36.0	11.0	14.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	27.0	6.0	22.0	11.0	31.0	6.0	22.0				
Max Q Clear Time (g_c+l1), s	10.6	13.1	2.8	10.3	3.3	18.6	8.0	7.7				
Green Ext Time (p_c), s	0.4	2.5	0.0	0.3	0.0	3.1	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay	31.0											
HCM 6th LOS	C											

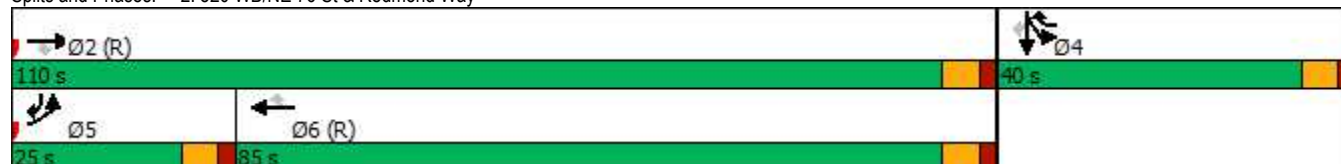
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	149	588	330	0	1015	106	0	0	0	67	538	204
Future Volume (vph)	149	588	330	0	1015	106	0	0	0	67	538	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			4			2						
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	5%	3%	0%	2%	4%	0%	0%	0%	5%	9%	15%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	25.0	110.0	110.0		85.0	40.0				40.0	40.0	25.0
Total Split (%)	16.7%	73.3%	73.3%		56.7%	26.7%				26.7%	26.7%	16.7%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	150											
Actuated Cycle Length:	150											
Offset:	90 (60%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	149	588	330	0	1015	106	0	0	0	67	538	204
Future Volume (veh/h)	149	588	330	0	1015	106	0	0	0	67	538	204
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1781	1826	1856	0	1870	1841				1826	1767	1678
Adj Flow Rate, veh/h	160	632	355	0	1091	85				72	578	172
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	8	5	3	0	2	4				5	9	15
Cap, veh/h	182	2398	1085	0	1934	1201				394	400	475
Arrive On Green	0.11	0.69	0.69	0.00	0.54	0.54				0.23	0.23	0.23
Sat Flow, veh/h	1697	3469	1570	0	3647	1557				1739	1767	1422
Grp Volume(v), veh/h	160	632	355	0	1091	85				72	578	172
Grp Sat Flow(s),veh/h/ln	1697	1735	1570	0	1777	1557				1739	1767	1422
Q Serve(g_s), s	13.9	10.3	13.5	0.0	30.3	2.0				5.0	34.0	13.8
Cycle Q Clear(g_c), s	13.9	10.3	13.5	0.0	30.3	2.0				5.0	34.0	13.8
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	182	2398	1085	0	1934	1201				394	400	475
V/C Ratio(X)	0.88	0.26	0.33	0.00	0.56	0.07				0.18	1.44	0.36
Avail Cap(c_a), veh/h	215	2398	1085	0	1934	1201				394	400	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.93	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	66.0	8.7	9.2	0.0	22.5	4.2				46.8	58.0	37.9
Incr Delay (d2), s/veh	27.1	0.2	0.7	0.0	1.2	0.1				0.2	213.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	3.8	4.6	0.0	13.0	1.5				2.2	38.9	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.1	9.0	10.0	0.0	23.7	4.3				47.0	271.2	38.3
LnGrp LOS	F	A	A	A	C	A				D	F	D
Approach Vol, veh/h		1147			1176						822	
Approach Delay, s/veh		21.0			22.3						202.9	
Approach LOS		C			C						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		110.0		40.0	22.1	87.9						
Change Period (Y+Rc), s		6.3		6.0	6.0	6.3						
Max Green Setting (Gmax), s		103.7		34.0	19.0	78.7						
Max Q Clear Time (g_c+l1), s		15.5		36.0	15.9	32.3						
Green Ext Time (p_c), s		8.6		0.0	0.1	11.8						
Intersection Summary												
HCM 6th Ctrl Delay			69.0									
HCM 6th LOS			E									

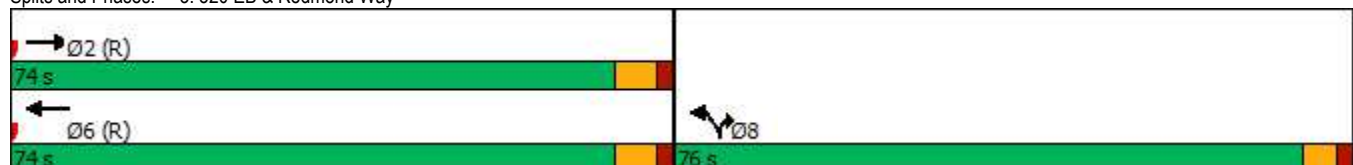
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	655	0	0	960	161	936
Future Volume (vph)	655	0	0	960	161	936
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	0%	0%	3%	8%	4%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	2.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	74.0			74.0	76.0	76.0
Total Split (%)	49.3%			49.3%	50.7%	50.7%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	150					
Actuated Cycle Length:	150					
Offset:	85 (57%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	65					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	655	0	0	960	161	936
Future Volume (veh/h)	655	0	0	960	161	936
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	0	0	1856	1781	1841
Adj Flow Rate, veh/h	668	0	0	980	164	955
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	0	0	3	8	4
Cap, veh/h	2690	0	0	1872	654	1059
Arrive On Green	0.53	0.00	0.00	0.36	0.39	0.39
Sat Flow, veh/h	5400	0	0	3711	1697	2745
Grp Volume(v), veh/h	668	0	0	980	164	955
Grp Sat Flow(s),veh/h/ln	1689	0	0	1763	1697	1373
Q Serve(g_s), s	10.7	0.0	0.0	33.0	9.9	49.1
Cycle Q Clear(g_c), s	10.7	0.0	0.0	33.0	9.9	49.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	2690	0	0	1872	654	1059
V/C Ratio(X)	0.25	0.00	0.00	0.52	0.25	0.90
Avail Cap(c_a), veh/h	2690	0	0	1872	794	1285
HCM Platoon Ratio	1.00	1.00	1.00	0.67	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	0.0	0.0	33.3	31.3	43.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.1	0.2	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	15.1	4.0	17.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.2	0.0	0.0	34.4	31.6	51.6
LnGrp LOS	B	A	A	C	C	D
Approach Vol, veh/h	668			980	1119	
Approach Delay, s/veh	19.2			34.4	48.6	
Approach LOS	B			C	D	
Timer - Assigned Phs	2				6	8
Phs Duration (G+Y+Rc), s	86.3				86.3	63.7
Change Period (Y+Rc), s	6.7				6.7	5.8
Max Green Setting (Gmax), s	67.3				67.3	70.2
Max Q Clear Time (g_c+l1), s	12.7				35.0	51.1
Green Ext Time (p_c), s	5.3				8.2	6.7
Intersection Summary						
HCM 6th Ctrl Delay			36.5			
HCM 6th LOS			D			
Notes						

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	932	349	118	2714	6	424	55	58	5	54	319
Future Volume (vph)	191	932	349	118	2714	6	424	55	58	5	54	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			284	
Travel Time (s)		17.7			12.2			13.0			7.7	
Confl. Peds. (#/hr)			7			12			14			
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%	7%	2%	6%	2%	0%	4%	0%	16%	0%	0%	6%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	38.0		10.0	15.0		33.0	33.0		10.0	10.0	
Total Split (s)	21.0	75.0		21.0	75.0		33.0	44.0		10.0	21.0	
Total Split (%)	14.0%	50.0%		14.0%	50.0%		22.0%	29.3%		6.7%	14.0%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 150

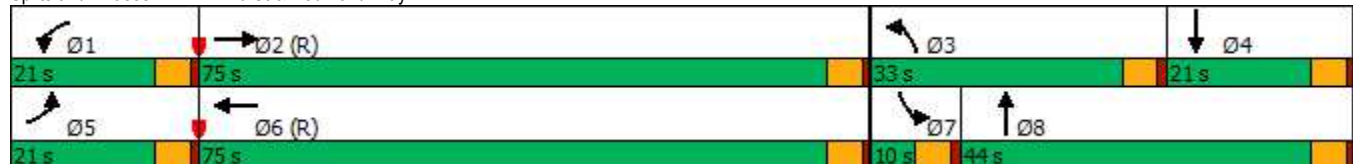
Actuated Cycle Length: 150

Offset: 148 (99%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	932	349	118	2714	6	424	55	58	5	54	319
Future Volume (veh/h)	191	932	349	118	2714	6	424	55	58	5	54	319
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		0.98	1.00		1.00
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	1796	1796	1811	1870	1870	1841	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	195	951	356	120	2769	6	433	56	59	5	55	326
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	7	7	6	2	2	4	0	0	0	0	0
Cap, veh/h	193	1869	699	142	2675	6	492	206	217	11	25	150
Arrive On Green	0.04	0.18	0.18	0.03	0.17	0.17	0.14	0.25	0.25	0.01	0.11	0.11
Sat Flow, veh/h	1810	3508	1311	1725	5261	11	3401	839	884	1810	238	1409
Grp Volume(v), veh/h	195	886	421	120	1791	984	433	0	115	5	0	381
Grp Sat Flow(s),veh/h/ln	1810	1635	1550	1725	1702	1868	1700	0	1723	1810	0	1646
Q Serve(g_s), s	16.0	36.8	36.9	10.4	76.3	76.3	18.7	0.0	8.1	0.4	0.0	16.0
Cycle Q Clear(g_c), s	16.0	36.8	36.9	10.4	76.3	76.3	18.7	0.0	8.1	0.4	0.0	16.0
Prop In Lane	1.00		0.85	1.00		0.01	1.00		0.51	1.00		0.86
Lane Grp Cap(c), veh/h	193	1742	826	142	1731	950	492	0	422	11	0	176
V/C Ratio(X)	1.01	0.51	0.51	0.84	1.03	1.04	0.88	0.00	0.27	0.44	0.00	2.17
Avail Cap(c_a), veh/h	193	1742	826	184	1731	950	635	0	448	60	0	176
HCM Platoon Ratio	0.33	0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	72.4	44.1	44.1	72.0	62.4	62.4	62.9	0.0	45.8	74.3	0.0	67.0
Incr Delay (d2), s/veh	67.5	1.1	2.2	2.2	18.0	20.0	10.2	0.0	0.2	24.6	0.0	544.6
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	11.4	16.4	15.9	4.9	39.3	43.6	8.9	0.0	3.6	0.3	0.0	33.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	139.8	45.1	46.3	74.1	80.4	82.4	73.1	0.0	46.0	98.9	0.0	611.6
LnGrp LOS	F	D	D	E	F	F	E	A	D	F	A	F
Approach Vol, veh/h	1502			2895			548			386		
Approach Delay, s/veh	57.7			80.8			67.4			605.0		
Approach LOS	E			F			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.4	84.9	26.7	21.0	21.0	81.3	5.9	41.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	16.0	70.0	28.0	16.0	16.0	70.0	5.0	39.0				
Max Q Clear Time (g_c+l1), s	12.4	38.9	20.7	18.0	18.0	78.3	2.4	10.1				
Green Ext Time (p_c), s	0.1	5.0	1.0	0.0	0.0	0.0	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	110.9											
HCM 6th LOS	F											
Notes												

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	34	11	366	70	17	428
Future Volume (vph)	34	11	366	70	17	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	228	
Travel Time (s)	9.1			7.6	6.2	
Confl. Peds. (#/hr)		3	3		3	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	10%	0%	2%	2%	6%	4%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	8.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	34	11	366	70	17	428
Future Vol, veh/h	34	11	366	70	17	428
Conflicting Peds, #/hr	0	3	3	0	3	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	10	0	2	2	6	4
Mvmt Flow	37	12	394	75	18	460
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	52	0	912	49
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	866	-
Critical Hdwy	-	-	4.12	-	6.46	6.24
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.336
Pot Cap-1 Maneuver	-	-	1554	-	299	1014
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	405	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1550	-	219	1009
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	964	-
Stage 2	-	-	-	-	297	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		6.8		11.9	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	219	1009	-	-	1550	-
HCM Lane V/C Ratio	0.083	0.456	-	-	0.254	-
HCM Control Delay (s)	22.9	11.5	-	-	8.1	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	2.4	-	-	1	-

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	758	360	66	2086	54	852	121	25	88	133	24
Future Volume (vph)	22	758	360	66	2086	54	852	121	25	88	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1736	3471	1553	1787	5111	0	2910	1474	0	1447	1519	1363
Flt Permitted	0.950			0.950			0.950	0.973		0.950	0.997	
Satd. Flow (perm)	1736	3471	1553	1787	5111	0	2910	1474	0	1447	1519	1363
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					3			2				171
Link Speed (mph)		40			45			35			35	
Link Distance (ft)		717			2432			760			335	
Travel Time (s)		12.2			36.8			14.8			6.5	
Confl. Peds. (#/hr)						3						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	6%	6%	6%
Shared Lane Traffic (%)							22%			10%		
Lane Group Flow (vph)	23	781	371	68	2207	0	685	344	0	82	146	25
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					60.0		27.0	27.0		16.0	16.0	16.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	28.0	72.1	85.1	24.0	71.5		21.0	21.0		10.0	10.0	10.0
Actuated g/C Ratio	0.19	0.48	0.57	0.16	0.48		0.14	0.14		0.07	0.07	0.07
v/c Ratio	0.07	0.47	0.42	0.24	0.91		1.68	1.65		0.85	1.45	0.10
Control Delay	64.3	17.9	15.1	42.6	41.1		355.1	352.4		126.3	293.2	0.8
Queue Delay	0.0	0.0	0.0	0.0	36.5		0.0	0.0		0.0	0.0	0.0
Total Delay	64.3	17.9	15.1	42.6	77.6		355.1	352.4		126.3	293.2	0.8
LOS	E	B	B	D	E		F	F		F	F	A
Approach Delay		17.9			76.6			354.2			210.2	
Approach LOS		B			E			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.68												
Intersection Signal Delay: 129.5	Intersection LOS: F											
Intersection Capacity Utilization 95.9%	ICU Level of Service F											
Analysis Period (min) 15												

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way

																				
8 s	40 s	24 s	16 s	27 s	35 s	12 s	60 s													
																				

Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Confl. Peds. (#/hr)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	8.0	24.0	12.0	35.0	40.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

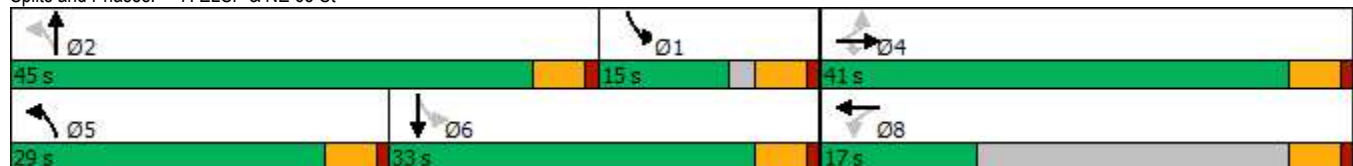
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	0	61	0	0	15	418	976	0	10	385	163
Future Volume (vph)	51	0	61	0	0	15	418	976	0	10	385	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	1					1	3		5	5		3
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 (%)	7%	0%	4%	0%	0%	0%	1%	2%	0%	0%	8%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm		NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		5.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		10.0	22.0	
Total Split (s)	41.0	41.0	41.0	17.0	17.0		29.0	45.0		15.0	33.0	
Total Split (%)	39.8%	39.8%	39.8%	16.5%	16.5%		28.2%	43.7%		14.6%	32.0%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 103												
Actuated Cycle Length: 57.9												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	0	61	0	0	15	418	976	0	10	385	163
Future Volume (veh/h)	51	0	61	0	0	15	418	976	0	10	385	163
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	0.93		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	1841	1876	1876	1876	1885	1870	1870	1900	1781	1781
Adj Flow Rate, veh/h	52	0	0	0	0	15	427	996	0	10	393	166
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	4	0	0	0	1	2	2	0	8	8
Cap, veh/h	251	0	89	0	0	90	709	1478	0	447	623	260
Arrive On Green	0.06	0.00	0.00	0.00	0.00	0.06	0.29	0.42	0.00	0.15	0.27	0.27
Sat Flow, veh/h	1190	0	1560	0	0	1586	1795	3647	0	1810	2322	967
Grp Volume(v), veh/h	52	0	0	0	0	15	427	996	0	10	285	274
Grp Sat Flow(s),veh/h/ln	1190	0	1560	0	0	1586	1795	1777	0	1810	1692	1597
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.4	8.1	8.9	0.0	0.0	5.8	6.0
Cycle Q Clear(g_c), s	1.8	0.0	0.0	0.0	0.0	0.4	8.1	8.9	0.0	0.0	5.8	6.0
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.00	1.00		0.61
Lane Grp Cap(c), veh/h	251	0	89	0	0	90	709	1478	0	447	454	429
V/C Ratio(X)	0.21	0.00	0.00	0.00	0.00	0.17	0.60	0.67	0.00	0.02	0.63	0.64
Avail Cap(c_a), veh/h	1465	0	1429	0	0	484	1279	3616	0	643	1205	1137
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(l)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	0.0	0.0	0.0	17.6	11.3	9.3	0.0	14.3	12.6	12.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.0	0.0	0.9	0.8	0.5	0.0	0.0	1.4	1.6
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	0.4	0.0	0.0	0.0	0.0	0.1	2.4	2.4	0.0	0.1	1.9	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	0.0	0.0	0.0	18.5	12.1	9.9	0.0	14.4	14.1	14.3
LnGrp LOS	B	A	A	A	A	B	B	A	A	B	B	B
Approach Vol, veh/h		52			15			1423			569	
Approach Delay, s/veh		18.9			18.5			10.5			14.2	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	21.3		7.2	16.5	15.6		7.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		36.0	24.0	28.0		12.0				
Max Q Clear Time (g_c+l1), s	2.0	10.9		3.8	10.1	8.0		2.4				
Green Ext Time (p_c), s	0.0	5.4		0.2	1.5	2.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.8									
HCM 6th LOS			B									
Notes												
User approved pedestrian interval to be less than phase max green.												

Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	586	4	0	2147	86	6	0	0	37	0	122
Future Volume (vph)	169	586	4	0	2147	86	6	0	0	37	0	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			4			2	11		4	4		11
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 (%)	4%	7%	25%	0%	2%	4%	0%	0%	0%	28%	0%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	35.0	115.0			80.0	80.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	23.3%	76.7%			53.3%	53.3%	23.3%	23.3%		23.3%	23.3%	23.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None

Intersection Summary

Area Type: Other

Cycle Length: 150

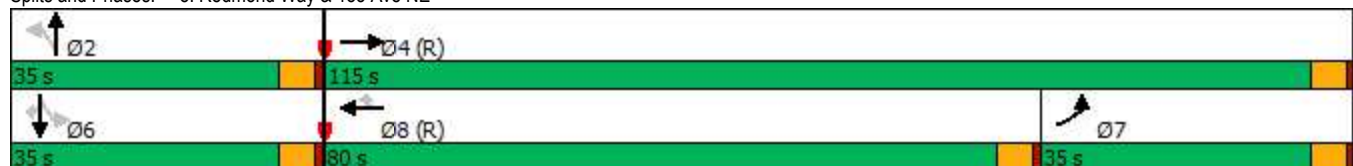
Actuated Cycle Length: 150

Offset: 55 (37%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	586	4	0	2147	86	6	0	0	37	0	122
Future Volume (veh/h)	169	586	4	0	2147	86	6	0	0	37	0	122
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	0.96		1.00	0.95		1.00
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	1788	1743	1743	0	1949	1919	1900	1900	1900	1979	1979	1964
Adj Flow Rate, veh/h	180	623	4	0	2284	91	6	0	0	39	0	0
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, %	4	7	7	0	2	4	0	0	0	0	0	1
Cap, veh/h	562	2913	19	0	1851	811	154	0	0	149	0	116
Arrive On Green	0.66	1.00	1.00	0.00	0.50	0.50	0.07	0.00	0.00	0.07	0.00	0.00
Sat Flow, veh/h	1703	3374	22	0	3800	1623	1512	0	0	1447	0	1664
Grp Volume(v), veh/h	180	306	321	0	2284	91	6	0	0	39	0	0
Grp Sat Flow(s),veh/h/ln	1703	1656	1739	0	1851	1623	1512	0	0	1447	0	1664
Q Serve(g_s), s	6.8	0.0	0.0	0.0	75.0	4.5	0.0	0.0	0.0	3.3	0.0	0.0
Cycle Q Clear(g_c), s	6.8	0.0	0.0	0.0	75.0	4.5	0.5	0.0	0.0	3.8	0.0	0.0
Prop In Lane	1.00		0.01	0.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	562	1430	1502	0	1851	811	154	0	0	149	0	116
V/C Ratio(X)	0.32	0.21	0.21	0.00	1.23	0.11	0.04	0.00	0.00	0.26	0.00	0.00
Avail Cap(c_a), veh/h	562	1430	1502	0	1851	811	334	0	0	335	0	333
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.00	0.12	0.12	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.2	0.0	0.0	0.0	37.5	19.9	65.1	0.0	0.0	66.6	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.0	105.8	0.0	0.1	0.0	0.0	0.3	0.0	0.0
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	2.4	0.1	0.1	0.0	59.2	1.7	0.2	0.0	0.0	1.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	0.3	0.3	0.0	143.3	19.9	65.2	0.0	0.0	66.9	0.0	0.0
LnGrp LOS	B	A	A	A	F	B	E	A	A	E	A	A
Approach Vol, veh/h	807				2375				6			
Approach Delay, s/veh	4.4				138.6				65.2			
Approach LOS	A				F				E			
Timer - Assigned Phs	2			4			6		7		8	
Phs Duration (G+Y+Rc), s	15.5			134.5			15.5		54.5		80.0	
Change Period (Y+Rc), s	5.0			5.0			5.0		5.0		5.0	
Max Green Setting (Gmax), s	30.0			110.0			30.0		30.0		75.0	
Max Q Clear Time (g_c+l1), s	2.5			2.0			5.8		8.8		77.0	
Green Ext Time (p_c), s	0.0			1.2			0.1		0.6		0.0	
Intersection Summary												
HCM 6th Ctrl Delay	104.0											
HCM 6th LOS	F											

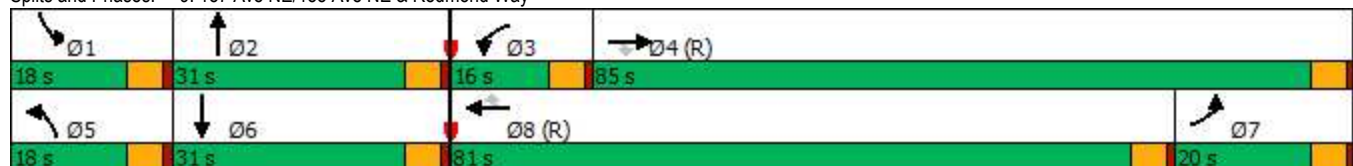
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	605	16	29	2225	221	82	104	42	110	34	47
Future Volume (vph)	13	605	16	29	2225	221	82	104	42	110	34	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)			1			1			3			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	17%	8%	7%	4%	2%	11%	0%	2%	0%	25%	3%	7%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	85.0	85.0	16.0	81.0	81.0	18.0	31.0		18.0	31.0	
Total Split (%)	13.3%	56.7%	56.7%	10.7%	54.0%	54.0%	12.0%	20.7%		12.0%	20.7%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 150												
Actuated Cycle Length: 150												
Offset: 75 (50%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green												
Natural Cycle: 140												
Control Type: Actuated-Coordinated												

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	605	16	29	2225	221	82	104	42	110	34	47
Future Volume (veh/h)	13	605	16	29	2225	221	82	104	42	110	34	47
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		0.99	1.00		1.00
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	1648	1781	1796	1841	1870	1737	1900	1870	1870	1530	1856	1856
Adj Flow Rate, veh/h	14	630	0	30	2318	173	85	108	44	115	35	49
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	17	8	7	4	2	11	0	2	2	25	3	3
Cap, veh/h	317	2317	1042	42	1801	745	106	131	53	153	70	98
Arrive On Green	0.40	1.00	0.00	0.02	0.51	0.51	0.06	0.10	0.10	0.05	0.10	0.10
Sat Flow, veh/h	1570	3385	1522	1753	3554	1471	1810	1260	513	2826	700	980
Grp Volume(v), veh/h	14	630	0	30	2318	173	85	0	152	115	0	84
Grp Sat Flow(s),veh/h/ln	1570	1692	1522	1753	1777	1471	1810	0	1773	1413	0	1679
Q Serve(g_s), s	0.8	0.0	0.0	2.5	76.0	7.5	7.0	0.0	12.6	6.0	0.0	7.1
Cycle Q Clear(g_c), s	0.8	0.0	0.0	2.5	76.0	7.5	7.0	0.0	12.6	6.0	0.0	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.58
Lane Grp Cap(c), veh/h	317	2317	1042	42	1801	745	106	0	185	153	0	168
V/C Ratio(X)	0.04	0.27	0.00	0.72	1.29	0.23	0.80	0.00	0.82	0.75	0.00	0.50
Avail Cap(c_a), veh/h	317	2317	1042	129	1801	745	157	0	307	245	0	291
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	0.0	72.7	37.0	11.8	69.8	0.0	65.8	70.0	0.0	64.0
Incr Delay (d2), s/veh	0.1	0.3	0.0	20.0	133.5	0.7	16.5	0.0	8.8	7.3	0.0	2.3
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	0.3	0.1	0.0	1.4	64.4	3.4	3.7	0.0	6.2	2.3	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.3	0.0	92.8	170.5	12.5	86.3	0.0	74.6	77.2	0.0	66.3
LnGrp LOS	D	A	A	F	F	B	F	A	E	E	A	E
Approach Vol, veh/h		644			2521			237			199	
Approach Delay, s/veh		1.1			158.8			78.8			72.6	
Approach LOS		A			F			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.1	20.6	8.6	107.7	13.8	20.0	35.3	81.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	13.0	26.0	11.0	80.0	13.0	26.0	15.0	76.0				
Max Q Clear Time (g_c+l1), s	8.0	14.6	4.5	2.0	9.0	9.1	2.8	78.0				
Green Ext Time (p_c), s	0.2	0.4	0.0	3.0	0.1	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			120.5									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	94	44	221	646	78	63	162	51	35	183	113
Future Volume (vph)	43	94	44	221	646	78	63	162	51	35	183	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	6		5	5		6	7		7	7		7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	23%	9%	6%	6%	9%	10%	9%	15%	17%	16%	5%	15%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	25.0	43.0	43.0	25.0	37.0		25.0	37.0		25.0	37.0	
Total Split (%)	19.2%	33.1%	33.1%	19.2%	28.5%		19.2%	28.5%		19.2%	28.5%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length: 130												
Actuated Cycle Length: 86												
Natural Cycle: 90												
Control Type: Actuated-Uncoordinated												

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

 Ø1	 Ø2	 Ø3	 Ø4
25 s	37 s	25 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8
25 s	37 s	25 s	43 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	94	44	221	646	78	63	162	51	35	183	113
Future Volume (veh/h)	43	94	44	221	646	78	63	162	51	35	183	113
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	0.99		0.99	0.99		0.99	0.99		0.98
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	1559	1767	1811	1811	1767	1767	1767	1678	1678	1663	1826	1826
Adj Flow Rate, veh/h	48	106	0	248	726	88	71	182	57	39	206	127
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	23	9	6	6	9	9	9	15	15	16	5	5
Cap, veh/h	145	593		670	655	79	216	302	95	259	242	149
Arrive On Green	0.03	0.34	0.00	0.12	0.42	0.42	0.05	0.25	0.25	0.03	0.23	0.23
Sat Flow, veh/h	1485	1767	1535	1725	1544	187	1682	1220	382	1584	1050	647
Grp Volume(v), veh/h	48	106	0	248	0	814	71	0	239	39	0	333
Grp Sat Flow(s),veh/h/ln	1485	1767	1535	1725	0	1731	1682	0	1602	1584	0	1698
Q Serve(g_s), s	1.6	3.2	0.0	6.5	0.0	32.0	2.4	0.0	10.0	1.4	0.0	14.2
Cycle Q Clear(g_c), s	1.6	3.2	0.0	6.5	0.0	32.0	2.4	0.0	10.0	1.4	0.0	14.2
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.24	1.00		0.38
Lane Grp Cap(c), veh/h	145	593		670	0	734	216	0	397	259	0	391
V/C Ratio(X)	0.33	0.18		0.37	0.00	1.11	0.33	0.00	0.60	0.15	0.00	0.85
Avail Cap(c_a), veh/h	489	890		917	0	734	583	0	680	632	0	720
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	17.7	0.0	11.9	0.0	21.7	22.0	0.0	25.1	21.7	0.0	27.8
Incr Delay (d2), s/veh	1.3	0.1	0.0	0.3	0.0	67.0	0.9	0.0	1.5	0.3	0.0	5.3
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	0.6	1.3	0.0	2.3	0.0	25.4	0.9	0.0	3.7	0.5	0.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	17.9	0.0	12.3	0.0	88.8	22.9	0.0	26.6	22.0	0.0	33.1
LnGrp LOS	C	B		B	A	F	C	A	C	C	A	C
Approach Vol, veh/h	154			A			1062			310		
Approach Delay, s/veh	18.9			70.9			25.7			31.9		
Approach LOS	B			E			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	22.4	7.5	37.0	7.2	23.7	14.2	30.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	32.0	20.0	32.0	20.0	32.0	20.0	38.0				
Max Q Clear Time (g_c+l1), s	4.4	16.2	3.6	34.0	3.4	12.0	8.5	5.2				
Green Ext Time (p_c), s	0.2	1.2	0.1	0.0	0.1	0.9	0.7	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			51.7									
HCM 6th LOS			D									
Notes												

Lanes, Volumes, Timings

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	124	321	44	131	246
Future Volume (vph)	41	124	321	44	131	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	244		230			228
Travel Time (s)	6.7		6.3			6.2
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					

HCM 6th TWSC

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	124	321	44	131	246
Future Vol, veh/h	41	124	321	44	131	246
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, %	3	3	3	3	3	3
Mvmt Flow	45	135	349	48	142	267
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	924	373	0	0	397	0
Stage 1	373	-	-	-	-	-
Stage 2	551	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	298	671	-	-	1156	-
Stage 1	694	-	-	-	-	-
Stage 2	575	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	255	671	-	-	1156	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	492	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17	0		3		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	477	1156	-	
HCM Lane V/C Ratio	-	-	0.376	0.123	-	
HCM Control Delay (s)	-	-	17	8.6	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.7	0.4	-	

Lanes, Volumes, Timings

B : 176th Ave NE & NE 68th St

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	50	315	5	18	269
Future Volume (vph)	17	50	315	5	18	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	360		291			230
Travel Time (s)	9.8		7.9			6.3
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					

HCM 6th TWSC

B : 176th Ave NE & NE 68th St

02/20/2019

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	50	315	5	18	269
Future Vol, veh/h	17	50	315	5	18	269
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, %	3	3	3	3	3	3
Mvmt Flow	18	54	342	5	20	292
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	677	345	0	0	347	0
Stage 1	345	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	417	696	-	-	1206	-
Stage 1	715	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	409	696	-	-	1206	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	711	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.9	0		0.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	591	1206	-	
HCM Lane V/C Ratio	-	-	0.123	0.016	-	
HCM Control Delay (s)	-	-	11.9	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.4	0	-	

Future 2022 With-Project PM Peak Hour

Lanes, Volumes, Timings

1: 170 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	947	73	317	732	272	34	279	690	153	173	17
Future Volume (vph)	40	947	73	317	732	272	34	279	690	153	173	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	275		0	170		0	150		0
Storage Lanes	1		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			468			498			439	
Travel Time (s)		13.3			10.6			11.3			10.0	
Confl. Peds. (#/hr)			16			16	8		12	12		8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases						6	8		8	4		
Detector Phase	5	2		1	6	6	3 8	8	1	7 4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		6.0	6.0	6.0	5.0	5.0	6.0	5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0	24.0	10.0	25.0	11.0	10.0	25.0	
Total Split (s)	32.0	36.0		29.0	33.0	33.0	12.0	25.0	29.0	12.0	25.0	
Total Split (%)	31.4%	35.3%		28.4%	32.4%	32.4%	11.8%	24.5%	28.4%	11.8%	24.5%	
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	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	

Intersection Summary

Area Type: Other

Cycle Length: 102

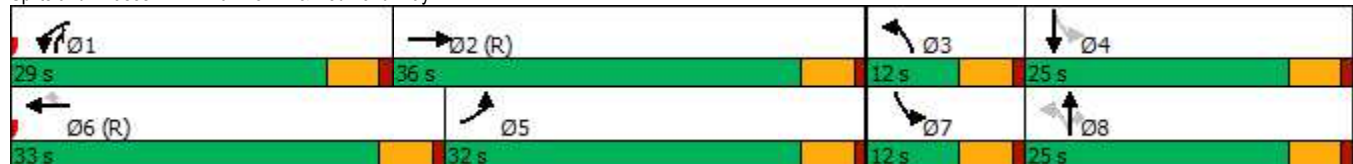
Actuated Cycle Length: 102

Offset: 93 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Splits and Phases: 1: 170 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary

1: 170 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	947	73	317	732	272	34	279	690	153	173	17
Future Volume (veh/h)	40	947	73	317	732	272	34	279	690	153	173	17
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		0.97	0.99		0.98	1.00		0.98
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	1870	1870	1870	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	41	976	75	327	755	117	35	288	668	158	178	18
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	1	1	1
Cap, veh/h	472	1406	108	412	983	426	318	370	496	224	393	40
Arrive On Green	0.53	0.84	0.84	0.12	0.27	0.27	0.03	0.20	0.20	0.14	0.47	0.47
Sat Flow, veh/h	1781	3341	257	3483	3582	1551	1795	1885	1568	1795	1681	170
Grp Volume(v), veh/h	41	519	532	327	755	117	35	288	668	158	0	196
Grp Sat Flow(s),veh/h/ln	1781	1777	1821	1742	1791	1551	1795	1885	1568	1795	0	1851
Q Serve(g_s), s	1.2	11.3	11.3	9.3	19.8	4.7	1.6	14.8	20.0	7.0	0.0	7.3
Cycle Q Clear(g_c), s	1.2	11.3	11.3	9.3	19.8	4.7	1.6	14.8	20.0	7.0	0.0	7.3
Prop In Lane	1.00		0.14	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	472	748	766	412	983	426	318	370	496	224	0	433
V/C Ratio(X)	0.09	0.69	0.69	0.79	0.77	0.27	0.11	0.78	1.35	0.71	0.00	0.45
Avail Cap(c_a), veh/h	472	748	766	820	983	426	386	370	496	224	0	433
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.47	0.00	0.47
Uniform Delay (d), s/veh	17.9	5.6	5.6	43.8	34.0	17.2	31.1	38.9	35.0	29.5	0.0	22.7
Incr Delay (d2), s/veh	0.0	5.0	4.9	1.3	5.7	1.6	0.1	8.9	168.0	4.0	0.0	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	0.5	3.1	3.2	4.1	9.2	2.4	0.7	7.7	35.1	3.1	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	10.6	10.5	45.1	39.8	18.8	31.2	47.8	203.0	33.6	0.0	22.9
LnGrp LOS	B	B	B	D	D	B	C	D	F	C	A	C
Approach Vol, veh/h		1092			1199			991			354	
Approach Delay, s/veh		10.8			39.2			151.8			27.6	
Approach LOS		B			D			F			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.1	47.9	8.1	28.9	32.0	33.0	12.0	25.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	24.0	31.0	7.0	20.0	27.0	28.0	7.0	20.0				
Max Q Clear Time (g_c+l1), s	11.3	13.3	3.6	9.3	3.2	21.8	9.0	22.0				
Green Ext Time (p_c), s	0.7	4.6	0.0	0.3	0.1	2.3	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			60.2									
HCM 6th LOS			E									

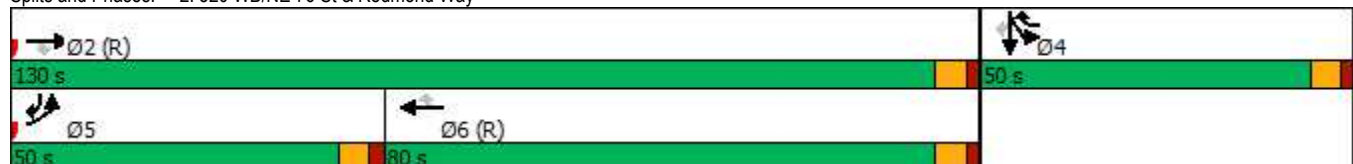
Lanes, Volumes, Timings

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	391	1401	163	0	1084	335	0	0	0	97	298	445
Future Volume (vph)	391	1401	163	0	1084	335	0	0	0	97	298	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		110	0		0	0		0	400		350
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			30			30			30	
Link Distance (ft)		588			86			347			459	
Travel Time (s)		10.0			2.0			7.9			10.4	
Confl. Peds. (#/hr)			6			4						1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	4%	1%	1%	0%	1%	2%	0%	0%	0%	1%	3%	2%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm		NA	pm+ov				Split	NA	pm+ov
Protected Phases	5	2			6	4				4	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	2		6	6				4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0		7.0	5.0				5.0	5.0	5.0
Minimum Split (s)	11.0	24.3	24.3		30.3	38.0				38.0	38.0	11.0
Total Split (s)	50.0	130.0	130.0		80.0	50.0				50.0	50.0	50.0
Total Split (%)	27.8%	72.2%	72.2%		44.4%	27.8%				27.8%	27.8%	27.8%
Yellow Time (s)	4.0	4.3	4.3		4.3	4.0				4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)	6.0	6.3	6.3		6.3	6.0				6.0	6.0	6.0
Lead/Lag	Lead				Lag							Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min	C-Min		C-Min	None				None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	180											
Actuated Cycle Length:	180											
Offset:	85 (47%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green											
Natural Cycle:	100											
Control Type:	Actuated-Coordinated											

Splits and Phases: 2: 520 WB/NE 76 St & Redmond Way



HCM 6th Signalized Intersection Summary

2: 520 WB/NE 76 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	391	1401	163	0	1084	335	0	0	0	97	298	445
Future Volume (veh/h)	391	1401	163	0	1084	335	0	0	0	97	298	445
Initial Q (Qb), veh	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
Parking Bus, Adj	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		
Adj Sat Flow, veh/h/ln	1841	1885	1885	0	1885	1870				1885	1856	1870
Adj Flow Rate, veh/h	395	1415	165	0	1095	294				98	301	432
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99				0.99	0.99	0.99
Percent Heavy Veh, %	4	1	1	0	1	2				1	3	2
Cap, veh/h	413	2533	1127	0	1570	1048				403	417	729
Arrive On Green	0.24	0.71	0.71	0.00	0.44	0.44				0.22	0.22	0.22
Sat Flow, veh/h	1753	3582	1594	0	3676	1578				1795	1856	1583
Grp Volume(v), veh/h	395	1415	165	0	1095	294				98	301	432
Grp Sat Flow(s),veh/h/ln	1753	1791	1594	0	1791	1578				1795	1856	1583
Q Serve(g_s), s	40.0	34.4	6.1	0.0	44.5	13.9				8.1	27.0	36.5
Cycle Q Clear(g_c), s	40.0	34.4	6.1	0.0	44.5	13.9				8.1	27.0	36.5
Prop In Lane	1.00		1.00	0.00		1.00				1.00		1.00
Lane Grp Cap(c), veh/h	413	2533	1127	0	1570	1048				403	417	729
V/C Ratio(X)	0.96	0.56	0.15	0.00	0.70	0.28				0.24	0.72	0.59
Avail Cap(c_a), veh/h	429	2533	1127	0	1570	1048				439	454	760
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.54	0.54	0.54	0.00	1.00	1.00				1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	12.8	8.6	0.0	40.9	12.6				57.2	64.6	36.1
Incr Delay (d2), s/veh	21.7	0.5	0.1	0.0	2.6	0.7				0.3	5.1	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.3	13.4	2.1	0.0	20.4	9.3				3.8	13.5	33.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.6	13.2	8.8	0.0	43.5	13.2				57.5	69.7	37.3
LnGrp LOS	F	B	A	A	D	B				E	E	D
Approach Vol, veh/h	1975			1389			831					
Approach Delay, s/veh	28.2			37.1			51.4					
Approach LOS	C			D			D					
Timer - Assigned Phs	2			4			5			6		
Phs Duration (G+Y+Rc), s	133.6			46.4			48.4			85.2		
Change Period (Y+Rc), s	6.3			6.0			6.0			6.3		
Max Green Setting (Gmax), s	123.7			44.0			44.0			73.7		
Max Q Clear Time (g_c+I1), s	36.4			38.5			42.0			46.5		
Green Ext Time (p_c), s	20.0			1.9			0.3			12.1		
Intersection Summary												
HCM 6th Ctrl Delay	35.7											
HCM 6th LOS	D											

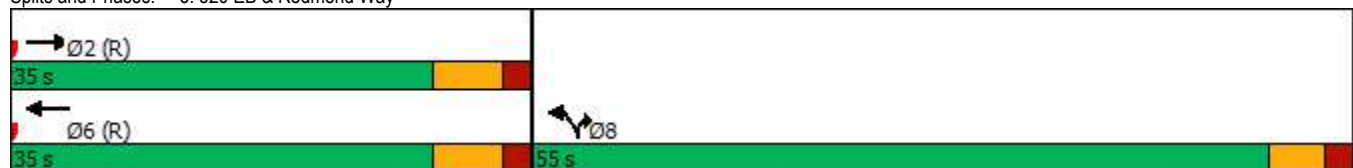
Lanes, Volumes, Timings

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↘	↗↗
Traffic Volume (vph)	1498	0	0	1050	369	1538
Future Volume (vph)	1498	0	0	1050	369	1538
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		400	0		0	0
Storage Lanes		1	0		1	2
Taper Length (ft)			25		25	
Right Turn on Red		Yes				Yes
Link Speed (mph)	40			40	55	
Link Distance (ft)	390			283	1084	
Travel Time (s)	6.6			4.8	13.4	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	1%	2%	1%
Shared Lane Traffic (%)						
Turn Type	NA			NA	Prot	Prot
Protected Phases	2			6	8	8
Permitted Phases						
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	10.0			10.0	5.0	5.0
Minimum Split (s)	25.7			16.7	37.8	37.8
Total Split (s)	35.0			35.0	55.0	55.0
Total Split (%)	38.9%			38.9%	61.1%	61.1%
Yellow Time (s)	4.7			4.7	3.8	3.8
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.7			6.7	5.8	5.8
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min			C-Min	None	None
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Offset:	80 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green					
Natural Cycle:	110					
Control Type:	Actuated-Coordinated					

Splits and Phases: 3: 520 EB & Redmond Way



HCM 6th Signalized Intersection Summary

3: 520 EB & Redmond Way

02/20/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↖	↗↗
Traffic Volume (veh/h)	1498	0	0	1050	369	1538
Future Volume (veh/h)	1498	0	0	1050	369	1538
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1885	0	0	1885	1870	1885
Adj Flow Rate, veh/h	1560	0	0	1094	384	1602
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	0	0	1	2	1
Cap, veh/h	1618	0	0	1126	974	1537
Arrive On Green	0.31	0.00	0.00	0.10	0.55	0.55
Sat Flow, veh/h	5486	0	0	3770	1781	2812
Grp Volume(v), veh/h	1560	0	0	1094	384	1602
Grp Sat Flow(s),veh/h/ln	1716	0	0	1791	1781	1406
Q Serve(g_s), s	26.8	0.0	0.0	27.4	11.2	49.2
Cycle Q Clear(g_c), s	26.8	0.0	0.0	27.4	11.2	49.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1618	0	0	1126	974	1537
V/C Ratio(X)	0.96	0.00	0.00	0.97	0.39	1.04
Avail Cap(c_a), veh/h	1618	0	0	1126	974	1537
HCM Platoon Ratio	1.00	1.00	1.00	0.33	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	0.0	39.9	11.8	20.4
Incr Delay (d2), s/veh	15.3	0.0	0.0	20.8	0.3	34.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	0.0	0.0	16.2	3.7	19.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.7	0.0	0.0	60.7	12.1	55.2
LnGrp LOS	D	A	A	E	B	F
Approach Vol, veh/h	1560			1094	1986	
Approach Delay, s/veh	45.7			60.7	46.9	
Approach LOS	D			E	D	
Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		35.0			35.0	55.0
Change Period (Y+Rc), s		6.7			6.7	5.8
Max Green Setting (Gmax), s		28.3			28.3	49.2
Max Q Clear Time (g_c+l1), s		28.8			29.4	51.2
Green Ext Time (p_c), s		0.0			0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			49.7			
HCM 6th LOS			D			

Lanes, Volumes, Timings

4: NE 70 St & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	2461	280	138	1522	10	453	58	189	5	64	203
Future Volume (vph)	168	2461	280	138	1522	10	453	58	189	5	64	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	160		0	250		300	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			25			25	
Link Distance (ft)		1038			717			477			284	
Travel Time (s)		17.7			12.2			13.0			7.7	
Confl. Peds. (#/hr)			5			5			4			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	3%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	38.0		10.0	15.0		33.0	33.0		10.0	10.0	
Total Split (s)	33.0	106.0		21.0	94.0		33.0	43.0		10.0	20.0	
Total Split (%)	18.3%	58.9%		11.7%	52.2%		18.3%	23.9%		5.6%	11.1%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	

Intersection Summary

Area Type: Other

Cycle Length: 180

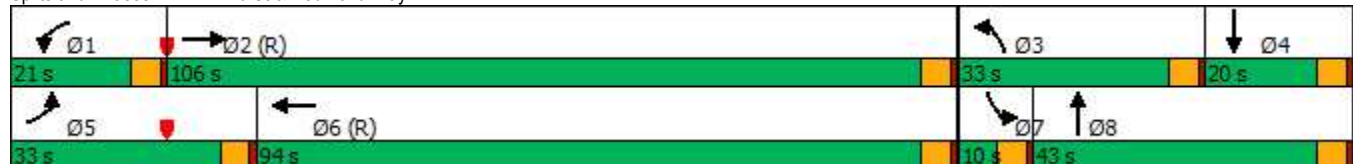
Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Splits and Phases: 4: NE 70 St & Redmond Way



HCM 6th Signalized Intersection Summary

4: NE 70 St & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	2461	280	138	1522	10	453	58	189	5	64	203
Future Volume (veh/h)	168	2461	280	138	1522	10	453	58	189	5	64	203
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		0.99	1.00		1.00
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	1885	1885	1870	1856	1856	1885	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	175	2564	292	144	1585	10	472	60	197	5	67	211
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	1	1	2	3	3	1	0	0	0	0	0
Cap, veh/h	193	2679	295	158	2867	18	512	87	286	11	34	106
Arrive On Green	0.21	1.00	1.00	0.18	1.00	1.00	0.15	0.22	0.22	0.01	0.08	0.08
Sat Flow, veh/h	1810	4703	517	1781	5194	33	3483	388	1274	1810	403	1269
Grp Volume(v), veh/h	175	1846	1010	144	1031	564	472	0	257	5	0	278
Grp Sat Flow(s),veh/h/ln	1810	1716	1789	1781	1689	1849	1742	0	1663	1810	0	1672
Q Serve(g_s), s	17.0	0.0	0.0	14.3	0.0	0.0	24.1	0.0	25.5	0.5	0.0	15.0
Cycle Q Clear(g_c), s	17.0	0.0	0.0	14.3	0.0	0.0	24.1	0.0	25.5	0.5	0.0	15.0
Prop In Lane	1.00		0.29	1.00		0.02	1.00		0.77	1.00		0.76
Lane Grp Cap(c), veh/h	193	1954	1019	158	1864	1021	512	0	373	11	0	139
V/C Ratio(X)	0.91	0.94	0.99	0.91	0.55	0.55	0.92	0.00	0.69	0.45	0.00	2.00
Avail Cap(c_a), veh/h	281	1954	1019	158	1864	1021	542	0	373	50	0	139
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.68	0.68	0.68	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	69.9	0.0	0.0	73.3	0.0	0.0	75.7	0.0	64.1	89.1	0.0	82.5
Incr Delay (d2), s/veh	19.0	10.9	26.0	34.9	0.8	1.5	20.4	0.0	4.9	25.9	0.0	472.6
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	8.1	3.0	7.4	7.4	0.2	0.4	12.4	0.0	11.5	0.3	0.0	24.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.0	10.9	26.0	108.2	0.8	1.5	96.2	0.0	68.9	115.0	0.0	555.1
LnGrp LOS	F	B	C	F	A	A	F	A	E	F	A	F
Approach Vol, veh/h	3031			1739			729			283		
Approach Delay, s/veh	20.5			9.9			86.6			547.3		
Approach LOS	C			A			F			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	107.5	31.5	20.0	24.2	104.3	6.1	45.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	16.0	101.0	28.0	15.0	28.0	89.0	5.0	38.0				
Max Q Clear Time (g_c+I1), s	16.3	2.0	26.1	17.0	19.0	2.0	2.5	27.5				
Green Ext Time (p_c), s	0.0	23.3	0.4	0.0	0.2	6.4	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	51.4											
HCM 6th LOS	D											

Lanes, Volumes, Timings

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	53	5	336	23	8	499
Future Volume (vph)	53	5	336	23	8	499
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Link Speed (mph)	25			25	25	
Link Distance (ft)	334			279	228	
Travel Time (s)	9.1			7.6	6.2	
Confl. Peds. (#/hr)		1	1		1	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	3%	0%	0%	1%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

5: 176th Ave NE & NE 70th St/NE 70 St

02/20/2019

Intersection						
Int Delay, s/veh	10.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	53	5	336	23	8	499
Future Vol, veh/h	53	5	336	23	8	499
Conflicting Peds, #/hr	0	1	1	0	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	62	6	395	27	9	587
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	69	0	884	67
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	818	-
Critical Hdwy	-	-	4.13	-	6.4	6.21
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.309
Pot Cap-1 Maneuver	-	-	1526	-	318	999
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	437	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1525	-	234	997
Mov Cap-2 Maneuver	-	-	-	-	234	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	322	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		7.7		13.7	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	234	997	-	-	1525	-
HCM Lane V/C Ratio	0.04	0.589	-	-	0.259	-
HCM Control Delay (s)	21	13.6	-	-	8.2	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	4	-	-	1	-

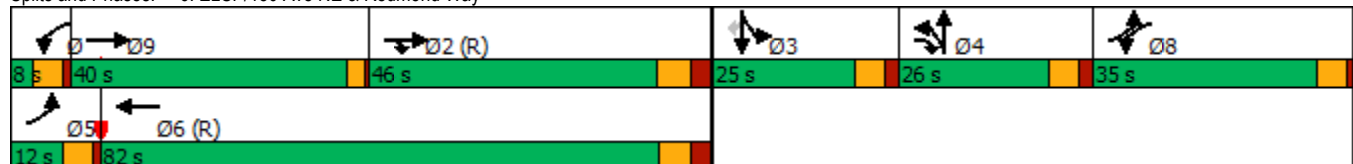
Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1692	880	174	1163	145	479	200	31	248	281	21
Future Volume (vph)	20	1692	880	174	1163	145	479	200	31	248	281	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1700	1700	1700	1700	1700	1700
Storage Length (ft)	320		0	125		620	390		0	200		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1752	4950	0	2854	1463	0	1504	1577	1417
Flt Permitted	0.950			0.950			0.950	0.991		0.950	0.996	
Satd. Flow (perm)	1770	3539	1583	1752	4950	0	2854	1463	0	1504	1577	1417
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					15			3				142
Link Speed (mph)		40			45			35				35
Link Distance (ft)		717			2432			760				335
Travel Time (s)		12.2			36.8			14.8				6.5
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 (%)	2%	2%	2%	3%	3%	3%	3%	3%	3%	2%	2%	2%
Shared Lane Traffic (%)							10%			10%		
Lane Group Flow (vph)	20	1727	898	178	1335	0	440	285	0	228	312	21
Turn Type	Prot	NA	custom	Prot	NA		Split	NA		Split	NA	Perm
Protected Phases	5 8	2 9	2 4	1 8	6		4	4		3	3	
Permitted Phases												3
Total Split (s)					82.0		26.0	26.0		25.0	25.0	25.0
Total Lost Time (s)					7.3		6.0	6.0		6.0	6.0	6.0
Act Effct Green (s)	14.0	106.5	109.0	10.0	107.5		20.0	20.0		19.0	19.0	19.0
Actuated g/C Ratio	0.08	0.59	0.61	0.06	0.60		0.11	0.11		0.11	0.11	0.11
v/c Ratio	0.15	0.83	0.94	1.84	0.45		1.39	1.73		1.44	1.88	0.08
Control Delay	72.1	29.5	31.0	444.6	28.6		240.3	386.6		282.4	455.5	0.5
Queue Delay	0.0	1.4	1.9	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.1	30.9	32.9	444.6	28.6		240.3	386.6		282.4	455.5	0.5
LOS	E	C	C	F	C		F	F		F	F	A
Approach Delay		31.9			77.6			297.8			368.1	
Approach LOS		C			E			F			F	
Intersection Summary												
Area Type:	Other											
Cycle Length: 180												
Actuated Cycle Length: 180												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green, Master Intersection												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 1.88												
Intersection Signal Delay: 114.7	Intersection LOS: F											
Intersection Capacity Utilization 107.9%	ICU Level of Service G											
Analysis Period (min) 15												

Splits and Phases: 6: ELSP/180 Ave NE & Redmond Way



Lanes, Volumes, Timings

6: ELSP/180 Ave NE & Redmond Way

02/20/2019

Lane Group	Ø1	Ø2	Ø5	Ø8	Ø9
Lane Configurations					
Traffic Volume (vph)					
Future Volume (vph)					
Ideal Flow (vphpl)					
Storage Length (ft)					
Storage Lanes					
Taper Length (ft)					
Satd. Flow (prot)					
Flt Permitted					
Satd. Flow (perm)					
Right Turn on Red					
Satd. Flow (RTOR)					
Link Speed (mph)					
Link Distance (ft)					
Travel Time (s)					
Peak Hour Factor					
Heavy Vehicles (%)					
Shared Lane Traffic (%)					
Lane Group Flow (vph)					
Turn Type					
Protected Phases	1	2	5	8	9
Permitted Phases					
Total Split (s)	8.0	46.0	12.0	35.0	40.0
Total Lost Time (s)					
Act Effct Green (s)					
Actuated g/C Ratio					
v/c Ratio					
Control Delay					
Queue Delay					
Total Delay					
LOS					
Approach Delay					
Approach LOS					
Intersection Summary					

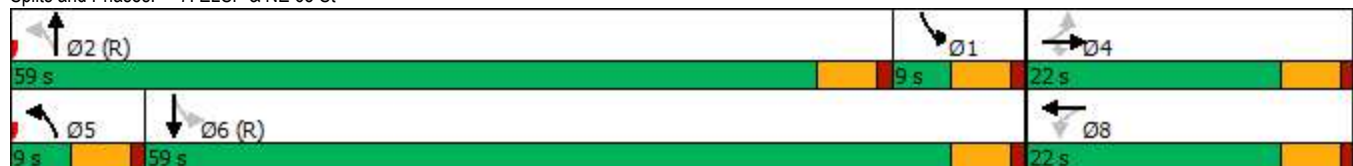
Lanes, Volumes, Timings

7: ELSP & NE 65 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	247	44	441	15	6	22	162	557	12	38	1149	264
Future Volume (vph)	247	44	441	15	6	22	162	557	12	38	1149	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			2%			0%			0%	
Storage Length (ft)	0		130	0		0	120		0	100		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1006			120			1689			760	
Travel Time (s)		22.9			2.7			32.9			14.8	
Confl. Peds. (#/hr)	2		20	20		2	3		9	9		3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0		9.0	59.0		9.0	59.0	
Total Split (%)	24.4%	24.4%	24.4%	24.4%	24.4%		10.0%	65.6%		10.0%	65.6%	
Yellow Time (s)	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	
Lost Time Adjust (s)		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	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green												
Natural Cycle: 70												
Control Type: Actuated-Coordinated												

Splits and Phases: 7: ELSP & NE 65 St



HCM 6th Signalized Intersection Summary

7: ELSP & NE 65 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	247	44	441	15	6	22	162	557	12	38	1149	264
Future Volume (veh/h)	247	44	441	15	6	22	162	557	12	38	1149	264
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.97	1.00		0.99	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	1885	1885	1885	1876	1876	1876	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	260	46	284	16	6	23	171	586	13	40	1209	278
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	207	24	292	54	32	34	269	2149	48	553	1736	395
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.60	0.60	0.06	0.80	0.80
Sat Flow, veh/h	705	125	1547	0	172	180	1795	3582	79	1795	2894	658
Grp Volume(v), veh/h	306	0	284	45	0	0	171	293	306	40	743	744
Grp Sat Flow(s),veh/h/ln	830	0	1547	351	0	0	1795	1791	1870	1795	1791	1761
Q Serve(g_s), s	0.0	0.0	16.4	0.0	0.0	0.0	4.0	7.0	7.0	0.0	16.8	17.5
Cycle Q Clear(g_c), s	17.0	0.0	16.4	17.0	0.0	0.0	4.0	7.0	7.0	0.0	16.8	17.5
Prop In Lane	0.85		1.00	0.36		0.51	1.00		0.04	1.00		0.37
Lane Grp Cap(c), veh/h	231	0	292	121	0	0	269	1075	1122	553	1075	1057
V/C Ratio(X)	1.33	0.00	0.97	0.37	0.00	0.00	0.64	0.27	0.27	0.07	0.69	0.70
Avail Cap(c_a), veh/h	231	0	292	121	0	0	269	1075	1122	553	1075	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	39.2	0.0	36.3	31.4	0.0	0.0	13.8	8.6	8.6	10.6	5.3	5.4
Incr Delay (d2), s/veh	173.7	0.0	44.8	1.9	0.0	0.0	4.9	0.6	0.6	0.0	0.3	0.4
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	16.2	0.0	9.7	0.9	0.0	0.0	1.8	2.6	2.7	0.4	3.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	212.9	0.0	81.1	33.3	0.0	0.0	18.7	9.2	9.2	10.6	5.7	5.8
LnGrp LOS	F	A	F	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		590			45			770			1527	
Approach Delay, s/veh		149.5			33.3			11.3			5.9	
Approach LOS		F			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	59.0		22.0	9.0	59.0		22.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	4.0	54.0		17.0	4.0	54.0		17.0				
Max Q Clear Time (g_c+l1), s	2.0	9.0		19.0	6.0	19.5		19.0				
Green Ext Time (p_c), s	0.0	2.5		0.0	0.0	8.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			36.6									
HCM 6th LOS			D									

Lanes, Volumes, Timings

8: Redmond Way & 185 Ave NE

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1930	3	0	1124	44	2	1	1	134	1	409
Future Volume (vph)	120	1930	3	0	1124	44	2	1	1	134	1	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-2%			0%			-2%	
Storage Length (ft)	250		0	0		390	0		0	0		175
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		2432			2038			222			990	
Travel Time (s)		36.8			30.9			6.1			22.5	
Confl. Peds. (#/hr)			6			1	27		2	2		27
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 (%)	1%	1%	1%	2%	2%	2%	25%	25%	25%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	NA			NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4			8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	12.0			5.0	5.0	5.0	5.0		12.0	12.0	12.0
Minimum Split (s)	10.0	17.0			28.0	28.0	26.0	26.0		17.0	17.0	17.0
Total Split (s)	26.0	118.0			92.0	92.0	62.0	62.0		62.0	62.0	62.0
Total Split (%)	14.4%	65.6%			51.1%	51.1%	34.4%	34.4%		34.4%	34.4%	34.4%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None		None	None	None

Intersection Summary

Area Type: Other

Cycle Length: 180

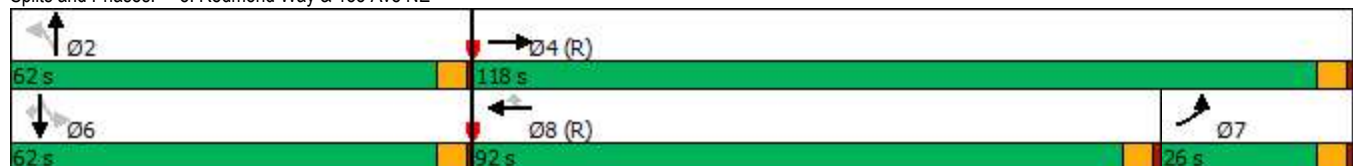
Actuated Cycle Length: 180

Offset: 168 (93%), Referenced to phase 4:EBT and 8:WBT, Start of 1st Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Splits and Phases: 8: Redmond Way & 185 Ave NE



HCM 6th Signalized Intersection Summary

8: Redmond Way & 185 Ave NE

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	1930	3	0	1124	44	2	1	1	134	1	409
Future Volume (veh/h)	120	1930	3	0	1124	44	2	1	1	134	1	409
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		0.96	1.00		0.96
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	1832	1832	1832	0	1949	1949	1530	1530	1530	1964	1964	1964
Adj Flow Rate, veh/h	122	1969	3	0	1147	45	2	1	1	137	1	293
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, %	1	1	1	0	2	2	25	25	25	1	1	1
Cap, veh/h	410	2660	4	0	1790	797	68	31	23	270	2	317
Arrive On Green	0.31	0.99	0.99	0.00	0.32	0.32	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1745	3566	5	0	3800	1650	190	155	115	1160	8	1596
Grp Volume(v), veh/h	122	961	1011	0	1147	45	4	0	0	138	0	293
Grp Sat Flow(s),veh/h/ln	1745	1741	1831	0	1851	1650	460	0	0	1169	0	1596
Q Serve(g_s), s	9.5	3.0	3.0	0.0	47.6	3.4	0.1	0.0	0.0	0.0	0.0	32.4
Cycle Q Clear(g_c), s	9.5	3.0	3.0	0.0	47.6	3.4	23.3	0.0	0.0	23.2	0.0	32.4
Prop In Lane	1.00		0.00	0.00		1.00	0.50		0.25	0.99		1.00
Lane Grp Cap(c), veh/h	410	1298	1366	0	1790	797	121	0	0	272	0	317
V/C Ratio(X)	0.30	0.74	0.74	0.00	0.64	0.06	0.03	0.00	0.00	0.51	0.00	0.92
Avail Cap(c_a), veh/h	410	1298	1366	0	1790	797	249	0	0	448	0	505
HCM Platoon Ratio	1.33	1.33	1.33	1.00	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.32	0.32	0.32	0.00	0.87	0.87	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.7	0.2	0.2	0.0	47.5	32.6	59.2	0.0	0.0	67.1	0.0	70.8
Incr Delay (d2), s/veh	0.1	1.3	1.2	0.0	1.5	0.1	0.1	0.0	0.0	0.5	0.0	11.7
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	4.1	0.7	0.8	0.0	23.1	1.4	0.2	0.0	0.0	6.0	0.0	27.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	1.4	1.4	0.0	49.1	32.7	59.3	0.0	0.0	67.6	0.0	82.5
LnGrp LOS	D	A	A	A	D	C	E	A	A	E	A	F
Approach Vol, veh/h	2094			1192			4			431		
Approach Delay, s/veh	4.3			48.5			59.3			77.7		
Approach LOS	A			D			E			E		
Timer - Assigned Phs	2			4			6			7		
Phs Duration (G+Y+Rc), s	40.8			139.2			40.8			47.2		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	57.0			113.0			57.0			21.0		
Max Q Clear Time (g_c+l1), s	25.3			5.0			34.4			11.5		
Green Ext Time (p_c), s	0.0			6.2			1.3			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	27.0											
HCM 6th LOS	C											

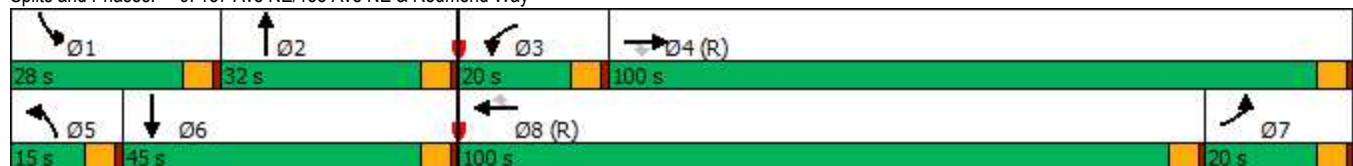
Lanes, Volumes, Timings

9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 	 	
Traffic Volume (vph)	38	2003	45	37	931	121	39	79	81	331	64	61
Future Volume (vph)	38	2003	45	37	931	121	39	79	81	331	64	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	110		0	110		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			30			35	
Link Distance (ft)		2038			889			536			672	
Travel Time (s)		30.9			13.5			12.2			13.1	
Confl. Peds. (#/hr)						3			1			3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	5%	9%	4%	8%	6%	1%	1%	4%	0%	17%
Parking (#/hr)							0					
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	25.0	25.0	10.0	26.0	26.0	10.0	32.0		10.0	30.0	
Total Split (s)	20.0	100.0	100.0	20.0	100.0	100.0	15.0	32.0		28.0	45.0	
Total Split (%)	11.1%	55.6%	55.6%	11.1%	55.6%	55.6%	8.3%	17.8%		15.6%	25.0%	
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	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	

Splits and Phases: 9: 187 Ave NE/188 Ave NE & Redmond Way



HCM 6th Signalized Intersection Summary9: 187 Ave NE/188 Ave NE & Redmond Way

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	2003	45	37	931	121	39	79	81	331	64	61
Future Volume (veh/h)	38	2003	45	37	931	121	39	79	81	331	64	61
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		1.00
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	1885	1826	1767	1841	1781	1811	1885	1885	1841	1900	1900
Adj Flow Rate, veh/h	40	2108	4	39	980	0	41	83	85	348	67	64
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	5	9	4	8	6	1	1	4	0	0
Cap, veh/h	247	2274	982	50	1846	797	52	94	96	389	173	165
Arrive On Green	0.18	0.84	0.84	0.03	0.53	0.00	0.03	0.11	0.11	0.11	0.19	0.19
Sat Flow, veh/h	1810	3582	1547	1682	3497	1510	1725	852	873	3401	891	851
Grp Volume(v), veh/h	40	2108	4	39	980	0	41	0	168	348	0	131
Grp Sat Flow(s),veh/h/ln	1810	1791	1547	1682	1749	1510	1725	0	1725	1700	0	1742
Q Serve(g_s), s	3.4	75.9	0.1	4.1	33.1	0.0	4.2	0.0	17.3	18.2	0.0	11.8
Cycle Q Clear(g_c), s	3.4	75.9	0.1	4.1	33.1	0.0	4.2	0.0	17.3	18.2	0.0	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.51	1.00		0.49
Lane Grp Cap(c), veh/h	247	2274	982	50	1846	797	52	0	190	389	0	338
V/C Ratio(X)	0.16	0.93	0.00	0.79	0.53	0.00	0.78	0.00	0.88	0.89	0.00	0.39
Avail Cap(c_a), veh/h	247	2274	982	140	1846	797	96	0	259	435	0	387
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	0.97	0.97	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.0	11.0	5.1	86.8	27.9	0.0	86.7	0.0	79.0	78.6	0.0	63.2
Incr Delay (d2), s/veh	0.2	5.3	0.0	22.7	1.1	0.0	21.9	0.0	22.8	19.1	0.0	0.7
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	1.5	16.5	0.0	2.1	13.9	0.0	2.2	0.0	8.9	9.0	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	16.3	5.1	109.5	28.9	0.0	108.6	0.0	101.7	97.7	0.0	63.9
LnGrp LOS	E	B	A	F	C	A	F	A	F	F	A	E
Approach Vol, veh/h	2152				1019				209		479	
Approach Delay, s/veh	17.2				32.0				103.1		88.5	
Approach LOS	B				C				F		F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.6	24.8	10.3	119.3	10.5	40.0	29.6	100.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	23.0	27.0	15.0	95.0	10.0	40.0	15.0	95.0				
Max Q Clear Time (g_c+I1), s	20.2	19.3	6.1	77.9	6.2	13.8	5.4	35.1				
Green Ext Time (p_c), s	0.4	0.3	0.0	11.2	0.0	0.5	0.0	5.2				
Intersection Summary												
HCM 6th Ctrl Delay	34.6											
HCM 6th LOS	C											

Lanes, Volumes, Timings

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	454	187	105	337	81	79	266	131	102	332	118
Future Volume (vph)	161	454	187	105	337	81	79	266	131	102	332	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		220	120		0	150		0	150		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1106			328			1701			743	
Travel Time (s)		25.1			7.5			33.1			14.5	
Confl. Peds. (#/hr)	2		5	5		2	5		5	5		5
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	7%	3%	0%	0%	1%	4%	0%	6%	6%	9%	6%	9%
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4			6			2		
Detector Phase	3	8	8	7	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	22.0	22.0	9.0	22.0		9.0	22.0		9.0	22.0	
Total Split (s)	13.0	41.0	41.0	9.0	37.0		10.0	31.0		9.0	30.0	
Total Split (%)	14.4%	45.6%	45.6%	10.0%	41.1%		11.1%	34.4%		10.0%	33.3%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	77.1											
Natural Cycle:	70											
Control Type:	Actuated-Uncoordinated											

Splits and Phases: 10: 180 Ave NE/178 PI NE & NE 76 St

			
Ø1	Ø2	Ø3	Ø4
10 s	30 s	13 s	37 s
			
Ø5	Ø6	Ø7	Ø8
9 s	31 s	9 s	41 s

HCM 6th Signalized Intersection Summary

10: 180 Ave NE/178 PI NE & NE 76 St

02/20/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	454	187	105	337	81	79	266	131	102	332	118
Future Volume (veh/h)	161	454	187	105	337	81	79	266	131	102	332	118
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		0.99	1.00		0.99	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	1796	1856	1900	1900	1885	1885	1900	1811	1811	1767	1811	1811
Adj Flow Rate, veh/h	163	459	0	106	340	82	80	269	132	103	335	119
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	7	3	0	0	1	1	0	6	6	9	6	6
Cap, veh/h	312	569		285	399	96	232	325	160	263	376	134
Arrive On Green	0.09	0.31	0.00	0.06	0.27	0.27	0.05	0.28	0.28	0.06	0.30	0.30
Sat Flow, veh/h	1711	1856	1610	1810	1465	353	1810	1143	561	1682	1273	452
Grp Volume(v), veh/h	163	459	0	106	0	422	80	0	401	103	0	454
Grp Sat Flow(s),veh/h/ln	1711	1856	1610	1810	0	1818	1810	0	1704	1682	0	1725
Q Serve(g_s), s	4.6	15.6	0.0	2.9	0.0	15.1	2.1	0.0	15.1	2.9	0.0	17.2
Cycle Q Clear(g_c), s	4.6	15.6	0.0	2.9	0.0	15.1	2.1	0.0	15.1	2.9	0.0	17.2
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.33	1.00		0.26
Lane Grp Cap(c), veh/h	312	569		285	0	495	232	0	485	263	0	510
V/C Ratio(X)	0.52	0.81		0.37	0.00	0.85	0.34	0.00	0.83	0.39	0.00	0.89
Avail Cap(c_a), veh/h	353	976		285	0	850	279	0	647	263	0	630
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	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	21.9	0.0	17.7	0.0	23.6	18.2	0.0	22.9	17.6	0.0	23.1
Incr Delay (d2), s/veh	1.4	2.8	0.0	0.8	0.0	4.3	0.9	0.0	6.6	0.9	0.0	12.8
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	1.8	6.7	0.0	1.2	0.0	6.6	0.9	0.0	6.4	1.1	0.0	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	24.6	0.0	18.5	0.0	27.9	19.0	0.0	29.6	18.6	0.0	35.8
LnGrp LOS	B	C		B	A	C	B	A	C	B	A	D
Approach Vol, veh/h	622		A		528		481				557	
Approach Delay, s/veh	23.1				26.0		27.8				32.6	
Approach LOS	C				C		C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	25.2	11.4	23.6	9.0	24.5	9.0	26.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	25.0	8.0	32.0	4.0	26.0	4.0	36.0				
Max Q Clear Time (g_c+I1), s	4.1	19.2	6.6	17.1	4.9	17.1	4.9	17.6				
Green Ext Time (p_c), s	0.0	1.0	0.1	1.6	0.0	1.2	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			27.3									
HCM 6th LOS			C									
Notes												

Lanes, Volumes, Timings

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	42	130	377	43	127	214
Future Volume (vph)	42	130	377	43	127	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	250		230			228
Travel Time (s)	6.8		6.3			6.2
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					

HCM 6th TWSC

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

Intersection						
Int Delay, s/veh	4.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	130	377	43	127	214
Future Vol, veh/h	42	130	377	43	127	214
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, %	3	3	3	3	3	3
Mvmt Flow	46	141	410	47	138	233
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	943	434	0	0	457	0
Stage 1	434	-	-	-	-	-
Stage 2	509	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	290	620	-	-	1099	-
Stage 1	651	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	248	620	-	-	1099	-
Mov Cap-2 Maneuver	248	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	18.4	0		3.3		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	454	1099	-	
HCM Lane V/C Ratio	-	-	0.412	0.126	-	
HCM Control Delay (s)	-	-	18.4	8.7	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	2	0.4	-	

Lanes, Volumes, Timings

B : 176th Ave NE & NE 68th St

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	32	388	17	52	204
Future Volume (vph)	11	32	388	17	52	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	360		241			230
Travel Time (s)	9.8		6.6			6.3
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					

HCM 6th TWSC

B : 176th Ave NE & NE 68th St

02/20/2019

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	32	388	17	52	204
Future Vol, veh/h	11	32	388	17	52	204
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, %	3	3	3	3	3	3
Mvmt Flow	12	35	422	18	57	222
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	767	431	0	0	440	0
Stage 1	431	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	369	622	-	-	1115	-
Stage 1	653	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	348	622	-	-	1115	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.6	0		1.7		
HCM LOS	B					
Minor Lane/Major Mvmt		NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)		-	-	518	1115	-
HCM Lane V/C Ratio		-	-	0.09	0.051	-
HCM Control Delay (s)		-	-	12.6	8.4	0
HCM Lane LOS		-	-	B	A	A
HCM 95th %tile Q(veh)		-	-	0.3	0.2	-

Appendix B

Trip Generation Calculations

**LMC Marymoor
Trip Generation Estimate (DAILY)**

Land Use	Size	Units ¹	ITE LUC ²	Trip Rate	Directional Split		Vehicle Trip Generation		
					Enter	Exit	Enter	Exit	Total
DAILY									
<u>Proposed Uses:</u>									
Multifamily Housing (Mid-Rise)	450	DU	221	Equation	50%	50%	1,225	1,226	2,451
Internal/TOD Reduction ³	20%						-245	-245	-490
							980	981	1,961
Retail	17,000	GLA	820	Equation	50%	50%	901	901	1,802
Internal/TOD Reduction ³	20%						-180	-180	-360
							721	721	1,442
Daycare	248	Students	565	4.09	50%	50%	507	507	1,014
Internal/TOD Reduction ⁴	25%						-127	-127	-254
							380	380	760
<u>Existing Uses:</u>									
Industrial	13,190	GFA	110	Equation	50%	50%	-54	-54	-108
GROSS DAILY TRIP GENERATION =							2,633	2,634	5,267
Internal/TOD Reduction =							-552	-552	-1,104
NET TRIP GENERATION (NOT INCLUDING EXISTING USE CREDIT)							2,081	2,082	4,163
EXISTING USES - NET TRIP GENERATION							-54	-54	-108
TOTAL NET NEW TRIP GENERATION (PROPOSED LESS EXISTING)							2,027	2,028	4,055

¹ DU = Dwelling Units, GFA = Gross Floor Area, GLA = Gross Leasable Area.

² Land Use Code from ITE 10th Edition *Trip Generation* Manual, updated 2017.

³ Internal/TOD reduction for residential and retail uses estimated based on EPA MXD+ mixed-use calculation for LMC Marymoor site and accounts for internal trips, walking trips, and transit trips. MXD+ calculation resulted in estimated 28% reduction in daily external vehicle trips. As a conservative assumption, a 20% reduction was applied.

⁴ Pass-by/TOD reduction for daycare based on 25% TOD reduction for "internal" trips between proposed daycare and Sound Transit SE Redmond light rail station.

LMC Marymoor
Trip Generation Estimate (AM PEAK HOUR)

Land Use	Size	Units ¹	ITE LUC ²	Trip Rate	Directional Split		Vehicle Trip Generation		
					Enter	Exit	Enter	Exit	Total
AM PEAK HOUR									
<u>Proposed Uses:</u>									
Multifamily Housing (Mid-Rise)	450	DU	221	Equation	26%	74%	39	110	149
	Internal/TOD Reduction ³						20%	-8	-22
							31	88	119
Retail	17,000	GLA	820	Equation	62%	38%	99	61	160
	Internal/TOD Reduction ³						20%	-20	-12
							79	49	128
Daycare	248	Students	565	0.78	53%	47%	97	96	193
	Internal/TOD Reduction ⁴						25%	-24	-24
							73	72	145
<u>Existing Uses:</u>									
Industrial	13,190	GFA	110	Equation	88%	12%	-9	-1	-10
GROSS AM PEAK HOUR TRIP GENERATION =							235	267	502
Internal/TOD Reduction =							-52	-58	-110
NET TRIP GENERATION (NOT INCLUDING EXISTING USE CREDIT)							183	209	392
EXISTING USES - NET TRIP GENERATION							-9	-1	-10
TOTAL NET NEW TRIP GENERATION (PROPOSED LESS EXISTING)							174	208	382

¹ DU = Dwelling Units, GFA = Gross Floor Area, GLA = Gross Leasable Area.

² Land Use Code from ITE 10th Edition *Trip Generation* Manual, updated 2017.

³ Internal/TOD reduction for residential and retail uses estimated based on EPA MXD+ mixed-use calculation for LMC Marymoor site and accounts for internal trips, walking trips, and transit trips. MXD+ calculation resulted in estimated 24% reduction in AM Peak Hour external vehicle trips. As a conservative assumption, a 20% reduction was applied.

⁴ Pass-by/TOD reduction for daycare based on 25% TOD reduction for "internal" trips between proposed daycare and Sound Transit SE Redmond light rail station.

LMC Marymoor
Trip Generation Estimate (PM PEAK HOUR)

Land Use	Size	Units ¹	ITE LUC ²	Trip Rate	Directional Split		Vehicle Trip Generation		
					Enter	Exit	Enter	Exit	Total
PM PEAK HOUR									
<u>Proposed Uses:</u>									
Multifamily Housing (Mid-Rise)	450	DU	221	Equation	61%	39%	115	73	188
Internal/TOD Reduction ³	20%						-23	-15	-38
							92	58	150
Retail	17,000	GLA	820	Equation	48%	52%	70	76	146
Internal/TOD Reduction ³	20%						-14	-15	-29
							56	61	117
Daycare	248	Students	565	0.79	47%	53%	92	104	196
Internal/TOD Reduction ⁴	25%						-23	-26	-49
							69	78	147
<u>Existing Uses:</u>									
Industrial	13,190	GFA	110	Equation	13%	87%	-1	-8	-9
GROSS PM PEAK HOUR TRIP GENERATION =							277	253	530
Internal/TOD Reduction =							-60	-56	-116
NET TRIP GENERATION (NOT INCLUDING EXISTING USE CREDIT)							217	197	414
EXISTING USES - NET TRIP GENERATION							-1	-8	-9
TOTAL NET NEW TRIP GENERATION (PROPOSED LESS EXISTING)							216	189	405

¹ DU = Dwelling Units, GFA = Gross Floor Area, GLA = Gross Leasable Area.

² Land Use Code from ITE 10th Edition *Trip Generation* Manual, updated 2017.

³ Internal/TOD reduction for residential and retail uses estimated based on EPA MXD+ mixed-use calculation for LMC Marymoor site and accounts for internal trips, walking trips, and transit trips. MXD+ calculation resulted in estimated 25% reduction in PM Peak Hour external vehicle trips. As a conservative assumption, a 20% reduction was applied.

⁴ Pass-by/TOD reduction for daycare based on 25% TOD reduction for "internal" trips between proposed daycare and Sound Transit SE Redmond light rail station.

Appendix C

Year 2026 Traffic Volumes and LOS/Queue Calculations

Turning Movement Volumes - AM Peak HourProject Name: LMC MarymoorProject #: #5607Peak Hour: AM Peak

TM INFO	TM Count - Peak Hour	2022 Baseline	2026 Baseline	ST Station Area Veh Trips	2026 with Sound Transit	LMC Project Trips	2026 With Project
Count Date: Tue 12/4/18 Count Source: ATD	All Vehicles	WITH 70TH ST EXTENSION		755 in 230 out			198 in 232 out
Count Peak Hour: 7:45 to 8:45	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St
EB 7.5% WB 1.6% NB 4.5% SB 0.0% Total 3.4%	PHF 0.93 Blue = Pedestrians						
Count Date: Tue 12/4/18 Count Source: ATD	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)	2018 176th Ave NE / NE 69th Street (Site Access)
EB 0.0% WB 0.0% NB 4.5% SB 1.5% Total 3.1%	PHF 0.93 Blue = Pedestrians						
Count Date: Tue 12/4/18 Count Source: ATD	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street
EB 0.0% WB 0.0% NB 4.5% SB 1.5% Total 3.1%	PHF 0.93 Blue = Pedestrians						

Turning Movement Volumes - AM Peak HourProject Name: LMC MarymoorProject #: #5607Peak Hour: AM Peak

TM INFO	TM Count - Peak Hour	2022 Baseline	2026 Baseline	ST Station Area Veh Trips	2026 with Sound Transit	LMC Project Trips	2026 With Project
Count Date: Tue 12/4/18 Count Source: ATD	All Vehicles	WITH 70TH ST EXTENSION		755 in 230 out			198 in 232 out
Count Peak Hour: 7:45 to 8:45	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St	2018 176th Ave NE / NE 70th St
EB 7.5% WB 1.6% NB 4.5% SB 0.0% Total 3.4%	PHF 0.93						
Count Peak Hour: 7:45 to 8:45	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)	Count Source: 11 176th Ave NE / NE 69th Street (Site Access)
EB 0.0% WB 0.0% NB 4.5% SB 1.5% Total 3.1%	PHF 0.93						
Count Date: Tue 12/4/18 Count Source: ATD	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street	2018 176th Ave NE / NE 68th Street
EB 0.0% WB 0.0% NB 4.5% SB 1.5% Total 3.1%	PHF 0.93						

Queues

5: 176th Ave NE/Sound Transit & NE 70 St

02/21/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	42	17	389	236	490	78	60	669	0	5	0
Future Volume (vph)	0	42	17	389	236	490	78	60	669	0	5	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	200		0	0		60	0		125
Storage Lanes	1		0	1		1	0		1	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1845	1767	0	1752	1845	1568	0	1793	1568	3579	1845	0
Flt Permitted				0.600				0.972				
Satd. Flow (perm)	1845	1767	0	1107	1845	1568	0	1793	1568	3579	1845	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				533			674			
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		334			279			228			330	
Travel Time (s)		9.1			7.6			6.2			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	0	423	257	533	0	150	727	0	5	0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Split	NA	pm+ov	Split	NA	
Protected Phases	7	4		3	8	6	2	2	3	6	6	
Permitted Phases	4			8		8			2			
Total Split (s)	15.0	26.0		16.0	27.0	26.0	26.0	26.0	16.0	26.0	26.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Act Effect Green (s)		26.9		59.1	59.1	73.9		15.3	42.5		9.8	
Actuated g/C Ratio		0.22		0.49	0.49	0.62		0.13	0.35		0.08	
v/c Ratio		0.16		0.61	0.28	0.46		0.66	0.73		0.03	
Control Delay		35.0		30.3	23.4	2.6		63.1	7.3		46.8	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay		35.0		30.3	23.4	2.6		63.1	7.3		46.8	
LOS		C		C	C	A		E	A		D	
Approach Delay		35.0			16.7			16.8			46.8	
Approach LOS		C			B			B			D	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 17.3

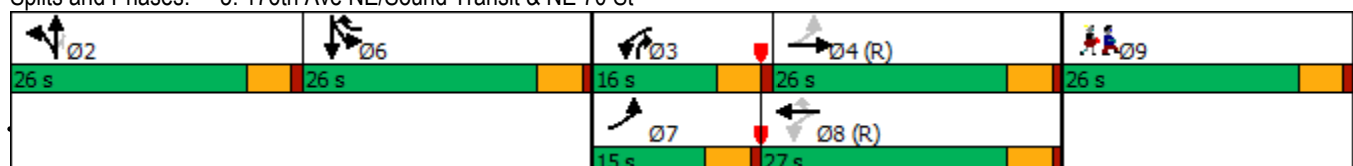
Intersection LOS: B

Intersection Capacity Utilization 53.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: 176th Ave NE/Sound Transit & NE 70 St



2026 With ST & With-Project - AM Peak Hour

Page 1

Queues

5: 176th Ave NE/Sound Transit & NE 70 St

02/21/2019

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Total Split (s)	26.0
Total Lost Time (s)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues

5: 176th Ave NE/Sound Transit & NE 70 St

02/21/2019



Lane Group	EBT	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	64	423	257	533	150	727	5
v/c Ratio	0.16	0.61	0.28	0.46	0.66	0.73	0.03
Control Delay	35.0	30.3	23.4	2.6	63.1	7.3	46.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	30.3	23.4	2.6	63.1	7.3	46.8
Queue Length 50th (ft)	33	221	118	0	112	19	4
Queue Length 95th (ft)	74	#534	234	52	174	96	15
Internal Link Dist (ft)	254		199		148		250
Turn Bay Length (ft)		200				60	
Base Capacity (vph)	407	691	909	1165	313	990	322
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	0.16	0.61	0.28	0.46	0.48	0.73	0.02

Intersection Summary

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

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	124	683	44	131	280
Future Volume (vph)	41	124	683	44	131	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	244		230			228
Travel Time (s)	6.7		6.3			6.2
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					

HCM 6th TWSC

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	41	124	683	44	131	280
Future Vol, veh/h	41	124	683	44	131	280
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, %	3	3	3	3	3	3
Mvmt Flow	45	135	742	48	142	304
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1354	766	0	0	790	0
Stage 1	766	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	164	401	-	-	826	-
Stage 1	457	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	130	401	-	-	826	-
Mov Cap-2 Maneuver	130	-	-	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	43.3	0	3.3			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	264	826	-	
HCM Lane V/C Ratio	-	-	0.679	0.172	-	
HCM Control Delay (s)	-	-	43.3	10.3	0	
HCM Lane LOS	-	-	E	B	A	
HCM 95th %tile Q(veh)	-	-	4.5	0.6	-	

Lanes, Volumes, Timings
B : 176th Ave NE & NE 68th St

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	50	677	5	18	303
Future Volume (vph)	17	50	677	5	18	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		25			25
Link Distance (ft)	360		291			230
Travel Time (s)	9.8		7.9			6.3
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					

HCM 6th TWSC

B : 176th Ave NE & NE 68th St

02/20/2019

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	50	677	5	18	303
Future Vol, veh/h	17	50	677	5	18	303
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, %	3	3	3	3	3	3
Mvmt Flow	18	54	736	5	20	329
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1108	739	0	0	741	0
Stage 1	739	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	231	416	-	-	861	-
Stage 1	471	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	225	416	-	-	861	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	18.4	0		0.5		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	342	861	-	
HCM Lane V/C Ratio	-	-	0.213	0.023	-	
HCM Control Delay (s)	-	-	18.4	9.3	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-	

Lanes, Volumes, Timings

5: 176th Ave NE/Sound Transit & NE 70th St

02/20/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	67	10	349	255	0	19	0	727	490	65	5
Future Volume (vph)	0	67	10	349	255	0	19	0	727	490	65	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	200		0	0		60	0		125
Storage Lanes	1		0	1		1	0		1	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1845	1808	0	1752	1845	1845	0	1752	1568	3400	1826	0
Flt Permitted				0.593				0.950		0.950		
Satd. Flow (perm)	1845	1808	0	1094	1845	1845	0	1752	1568	3400	1826	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5							582		3	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		334			279			228			304	
Travel Time (s)		9.1			7.6			6.2			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	379	277	0	0	21	790	533	76	0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Split	NA	pm+ov	Split	NA	
Protected Phases	7	4		3	8	6	2	2	3	6	6	
Permitted Phases	4			8		8			2			
Total Split (s)	15.0	26.0		16.0	27.0	26.0	26.0	26.0	16.0	26.0	26.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Act Effct Green (s)		31.0		57.8	57.8			7.0	25.2	26.0	26.0	
Actuated g/C Ratio		0.26		0.48	0.48			0.06	0.21	0.22	0.22	
v/c Ratio		0.18		0.59	0.31			0.21	1.00	0.72	0.19	
Control Delay		40.0		31.2	25.2			57.9	44.1	49.2	36.5	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		40.0		31.2	25.2			57.9	44.1	49.2	36.5	
LOS		D		C	C			E	D	D	D	
Approach Delay		40.0			28.7			44.4			47.6	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 40.4

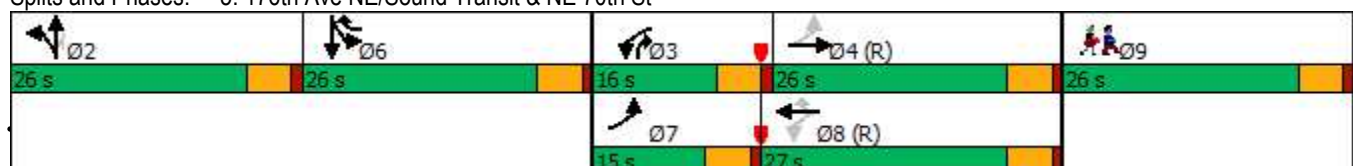
Intersection LOS: D

Intersection Capacity Utilization 75.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: 176th Ave NE/Sound Transit & NE 70th St



2026 With ST & With-Project - PM Peak Hour

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Lanes, Volumes, Timings

5: 176th Ave NE/Sound Transit & NE 70th St

02/20/2019

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Total Split (s)	26.0
Total Lost Time (s)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues

5: 176th Ave NE/Sound Transit & NE 70th St

02/20/2019



Lane Group	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	84	379	277	21	790	533	76
v/c Ratio	0.18	0.59	0.31	0.21	1.00	0.72	0.19
Control Delay	40.0	31.2	25.2	57.9	44.1	49.2	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	31.2	25.2	57.9	44.1	49.2	36.5
Queue Length 50th (ft)	53	190	128	16	192	197	46
Queue Length 95th (ft)	102	#476	257	42	#644	242	84
Internal Link Dist (ft)	254		199	148			224
Turn Bay Length (ft)		200			60		
Base Capacity (vph)	470	646	889	306	789	746	403
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	0.18	0.59	0.31	0.07	1.00	0.71	0.19

Intersection Summary

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

Lanes, Volumes, Timings

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	42	130	616	43	127	297
Future Volume (vph)	42	130	616	43	127	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.898		0.991			
Flt Protected	0.988					0.985
Satd. Flow (prot)	1637	0	1828	0	0	1817
Flt Permitted	0.988					0.985
Satd. Flow (perm)	1637	0	1828	0	0	1817
Link Speed (mph)	25		25			25
Link Distance (ft)	250		230			228
Travel Time (s)	6.8		6.3			6.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	46	141	670	47	138	323
Shared Lane Traffic (%)						
Lane Group Flow (vph)	187	0	717	0	0	461
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	78.0%			ICU Level of Service D		
Analysis Period (min)	15					

HCM 6th TWSC

A : 176th Ave NE & NE 69th St (Site Access)

02/20/2019

Intersection						
Int Delay, s/veh	6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	130	616	43	127	297
Future Vol, veh/h	42	130	616	43	127	297
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, %	3	3	3	3	3	3
Mvmt Flow	46	141	670	47	138	323
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1293	694	0	0	717	0
Stage 1	694	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	179	441	-	-	879	-
Stage 1	494	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	145	441	-	-	879	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	36.4	0	3			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	294	879	-	
HCM Lane V/C Ratio	-	-	0.636	0.157	-	
HCM Control Delay (s)	-	-	36.4	9.9	0	
HCM Lane LOS	-	-	E	A	A	
HCM 95th %tile Q(veh)	-	-	4	0.6	-	

Lanes, Volumes, Timings
B : 176th Ave NE & NE 68th St

02/20/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	32	627	17	52	287
Future Volume (vph)	11	32	627	17	52	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.899		0.997			
Flt Protected	0.987					0.992
Satd. Flow (prot)	1637	0	1839	0	0	1830
Flt Permitted	0.987					0.992
Satd. Flow (perm)	1637	0	1839	0	0	1830
Link Speed (mph)	25		25			25
Link Distance (ft)	360		241			230
Travel Time (s)	9.8		6.6			6.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	12	35	682	18	57	312
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	0	700	0	0	369
Enter Blocked Intersection	Yes	Yes	Yes	Yes	Yes	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	65.3%			ICU Level of Service C		
Analysis Period (min)	15					

HCM 6th TWSC

B : 176th Ave NE & NE 68th St

02/20/2019

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	32	627	17	52	287
Future Vol, veh/h	11	32	627	17	52	287
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, %	3	3	3	3	3	3
Mvmt Flow	12	35	682	18	57	312
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1117	691	0	0	700	0
Stage 1	691	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	228	443	-	-	892	-
Stage 1	495	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	210	443	-	-	892	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	17.1	0	1.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	345	892	-	
HCM Lane V/C Ratio	-	-	0.135	0.063	-	
HCM Control Delay (s)	-	-	17.1	9.3	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.5	0.2	-	