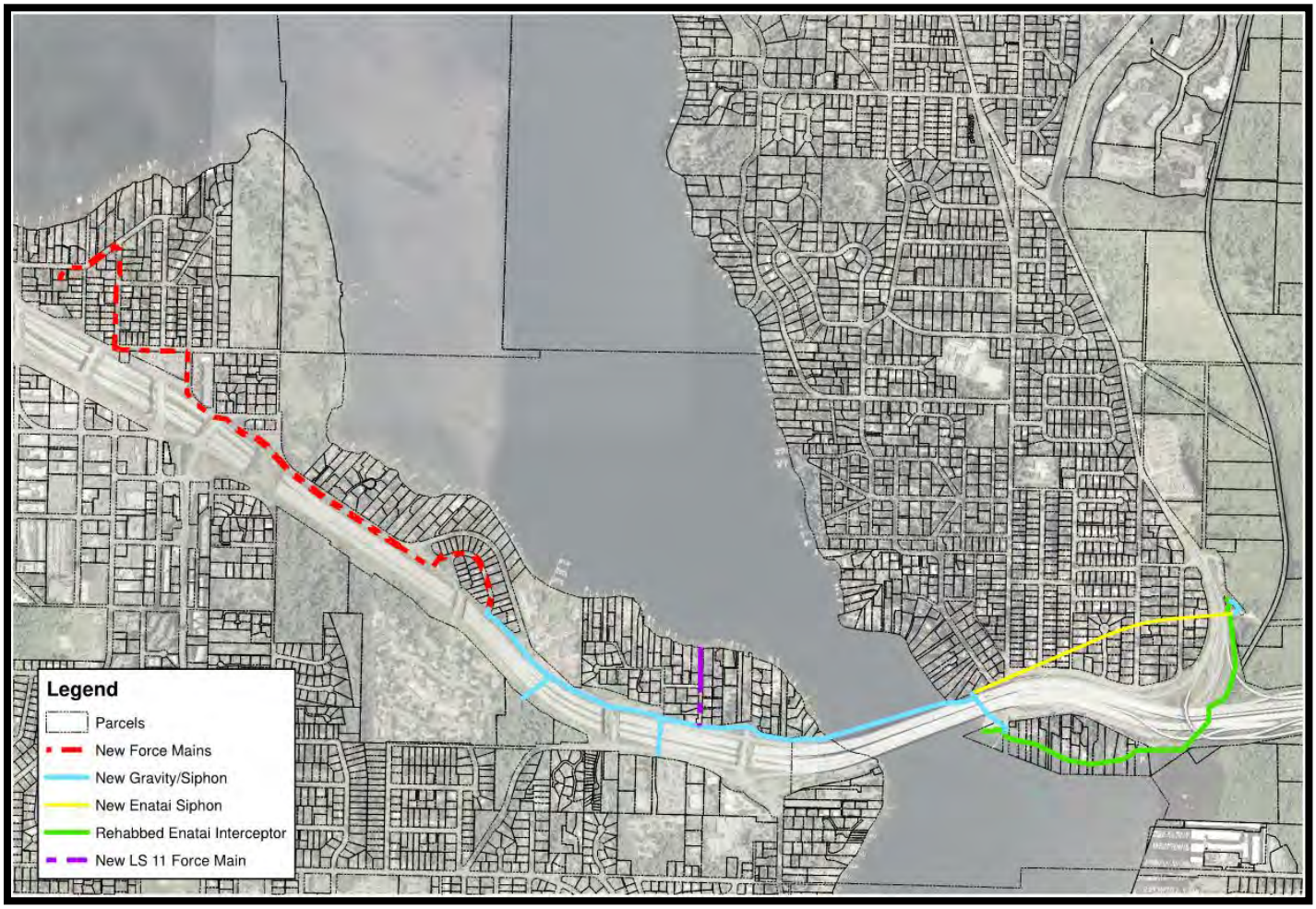
King County
Department of Natural Resources and Parks
Wastewater Treatment Division

TETRA TECH
and Associated Firms

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project

Transportation Study

Final



JACOBS

September 2018

Transportation Study

September 2018

PREPARED FOR

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Wastewater Treatment Division
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EXECUTIVE SUMMARY

King County Wastewater Treatment Division (WTD) is upgrading the North Mercer Island Interceptor and Enatai Interceptor components of its regional wastewater conveyance system to increase reliability and capacity. Improvements include upgrades to WTD's North Mercer Pump Station, installation of approximately 3,400 feet of new gravity sewer pipe and 7,100 feet of dual force main sewer pipe, upgrades to the City of Mercer Island's Lift Station 11, rehabilitation of approximately 3,900 feet of the existing Enatai Interceptor, and installation of new Enatai and East Channel siphons. See Figure 1 for the project overview and alignment.

This transportation study describes existing conditions within the project area, evaluates the temporary transportation impacts and measures that could be implemented to mitigate those impacts associated with construction, and describes the future conditions associated with operation and maintenance of these WTD facilities after the project is complete. The study was completed to support environmental review under the State Environmental Policy Act (SEPA) and project permitting.

For the purposes of this study, the project has been divided into three areas based on the existing features, nature of the work, and the anticipated transportation impacts. Area 1 begins at the North Mercer Pump Station and includes the work through the intersection of North Mercer Way and Island Crest Way. Construction in this area will be within public right of way and will primarily occur within streets operated by the City of Mercer Island or WSDOT. In general, this work will require flagging of traffic through the construction area, but several signalized intersections will also be impacted and will require the development of detour routes and traffic rerouting. Area 2 covers the remaining work on Mercer Island from just east of the intersection of North Mercer Way and Island Crest Way to Mercer Island Boat Lauch. Construction in this area will primarily be within public right of way with work taking place on both the I-90 Trail and city streets. The I-90 Trail serves both bicycles and pedestrians for recreational and commuting purposes. The work in city streets in this area will primarily affect local access and parking on several deadend residential streets including 90th Pl SE, 97th Ave SE, and SE 35th Pl. Area 3 covers work occurring in the City of Bellevue which includes construction at Enatai Beach Park, along the I-90 Trail, and on SE 30th Street near the Sweyolocken Pump Station and Boat Launch. Work in this area will primarily occur in Enatai Beach Park, along the I-90 Trail, private property, and on SE 30th Street near the Sweyolocken Pump Station.

To evaluate traffic impacts in Area 1 resulting from the required detours, a model was created using Synchro software version 9 to analyze project construction impacts for the section of N Mercer Way between 81st Ave SE and SE 26th St on the City of Mercer Island. Synchro utilizes the procedure defined in the Highway Capacity Manual (HCM). Existing 2017, future 2020 and three construction detour scenarios (2020) were analyzed. The analysis was completed using industry standard practices and WSDOT Traffic Analysis guidelines (Design Manual Chapter 320). In addition to vehicle turning movement counts, pedestrian and bicycle counts were included in the Synchro inputs for intersection analysis. Mitigation was identified to ensure that level of service (LOS) minimum standards for City of Mercer Island and WSDOT operated intersections are maintained during construction. Other transportation impacts in Area 1 will include flagged traffic, local access disruptions, reduced street parking, pedestrian detours, and bicyle detours. These activities will be focused around the active construction area which will be actively moving along the alignment and will serve to limit the duration that any

one area is impacted. These localized impacts will be mitigated during design and construction through community outreach, coordination, and advanced notice of planned work.

Work in Area 2 will be primarily on the I-90 Trail and through several local access only residential streets. Bicycle and pedestrian detours will be needed during construction on the I-90 trail. These detours will be along North Mercer Way and SE 36th Street and will use a combination of existing sidewalks, shoulder areas, and closing traffic lanes as needed to provide safe detour routes. Transportation impacts on residential streets will include flagged traffic, local access disruptions, and temporary restrictions on street parking.

Work in Area 3 will be located at Enatai Beach Park, along the I-90 Trail, and at SE 30th Street near the Sweyolocken Pump Station and Boat Launch. Local bicycles and pedestrians will be impacted during work on the I-90 Trail. This will primarily be by short duration closures and flagged traffic to bring vehicles and equipment to and from work areas along the trail. Work near the Sweyolocken boat launch will require a bike and pedestrian detour; options for a local detour are being evaluated but a long detour through the Enatai neighborhood may be required. During the work at Sweyolocken, the unmarked parking area at the boat launch will be closed. Work at Enatai Beach Park will impact the lower parking lot and require the temporary closure of between three and nine spots.

1. INTRODUCTION

King County WTD is upgrading the North Mercer Island Interceptor and Enatai Interceptor components of its regional wastewater conveyance system to increase reliability and capacity. Improvements include upgrades to WTD's North Mercer Pump Station, installation of approximately 3,400 feet of new gravity sewer pipe and 7,100 feet of dual force main sewer pipe, upgrades to the City of Mercer Island's Lift Station 11, rehabilitation of approximately 3,900 feet of the existing Enatai Interceptor, and installation of new Enatai and East Channel siphons. See Figure 1 for the project overview and alignment.

This transportation study evaluates the temporary transportation impacts and measures that could be implemented to mitigate those impacts associated with construction of the project from the North Mercer Pump Station located off SE 22nd St to the new Enatai Siphon outlet located in the City of Bellevue near the I-90 Trail and WTD's Sweyolocken Pump Station. It also describes transportation impacts associated with operation and maintenance of these WTD facilities after the project is complete. The study was completed to support environmental review under the State Environmental Policy Act (SEPA) and project permitting.

A preliminary construction schedule at the predesign level has been prepared for this project and has been used to determine the approximate durations which are stated in this study. The Contractor's selected means and methods may result in these durations changing or the order of work items shifting. Construction is expected to begin in 2020 and will last approximately 3 years. Work at the North Mercer Pump Station is anticipated to be ongoing for the total duration of the project. The modifications to Lift Station 11 are smaller in scale, and should be completed within approximately 12 months. Pipeline work will be ongoing for the duration of the contract, but will generally progress along the alignment, and it is not anticipated that any one area will be actively under construction for the total duration.

1.1 PROJECT DESCRIPTION

The proposed pipeline alignment on Mercer Island is completely on land. Dual force mains from the North Mercer Pump Station (16 and 18 inches in diameter) will extend along SE 22nd Street, south on 78th Avenue SE, east on SE 24th Street, south on 81st Avenue SE, and east along North Mercer Way. From there, the force mains will continue along the I-90 Trail to 90th Place SE. The force mains will be routed along 90th Place SE to a force main discharge structure.

From the force main discharge structure at the end of 90th Place SE, flow will be conveyed east along the I-90 Trail through sections of single 24-inch and 30-inch diameter gravity pipe to the west shore of the East Channel of Lake Washington. At the East Channel, flow will travel through a siphon inlet structure into a new East Channel Siphon.

The new East Channel Siphon will be a triple-barrel siphon (one 12-inch pipe and two 18-inch diameter pipes) north of the I-90 Bridge. At the end of the siphon, a flow diversion structure will direct flow in one of two directions:

- Low flow will be conveyed through a new 24-inch diameter gravity line to a point along the upper end of the existing in-water Enatai Interceptor, which will convey these low flows to the Sweyolocken Pump Station.
- High flow will be discharged from the flow diversion structure to a new 30-inch inside diameter upland Enatai Siphon pipe, which will convey the flow under Enatai hillside to the Sweyolocken Pump Station.

All pipeline installation on Mercer Island and across the East Channel will be by open-cut construction. Open-cut construction also will be used for the new gravity pipeline connecting the new East Channel Siphon to the existing in-water Enatai Interceptor, and for the gravity pipeline connecting the new upland Enatai Siphon to the Sweyolocken Pump Station influent pipeline.

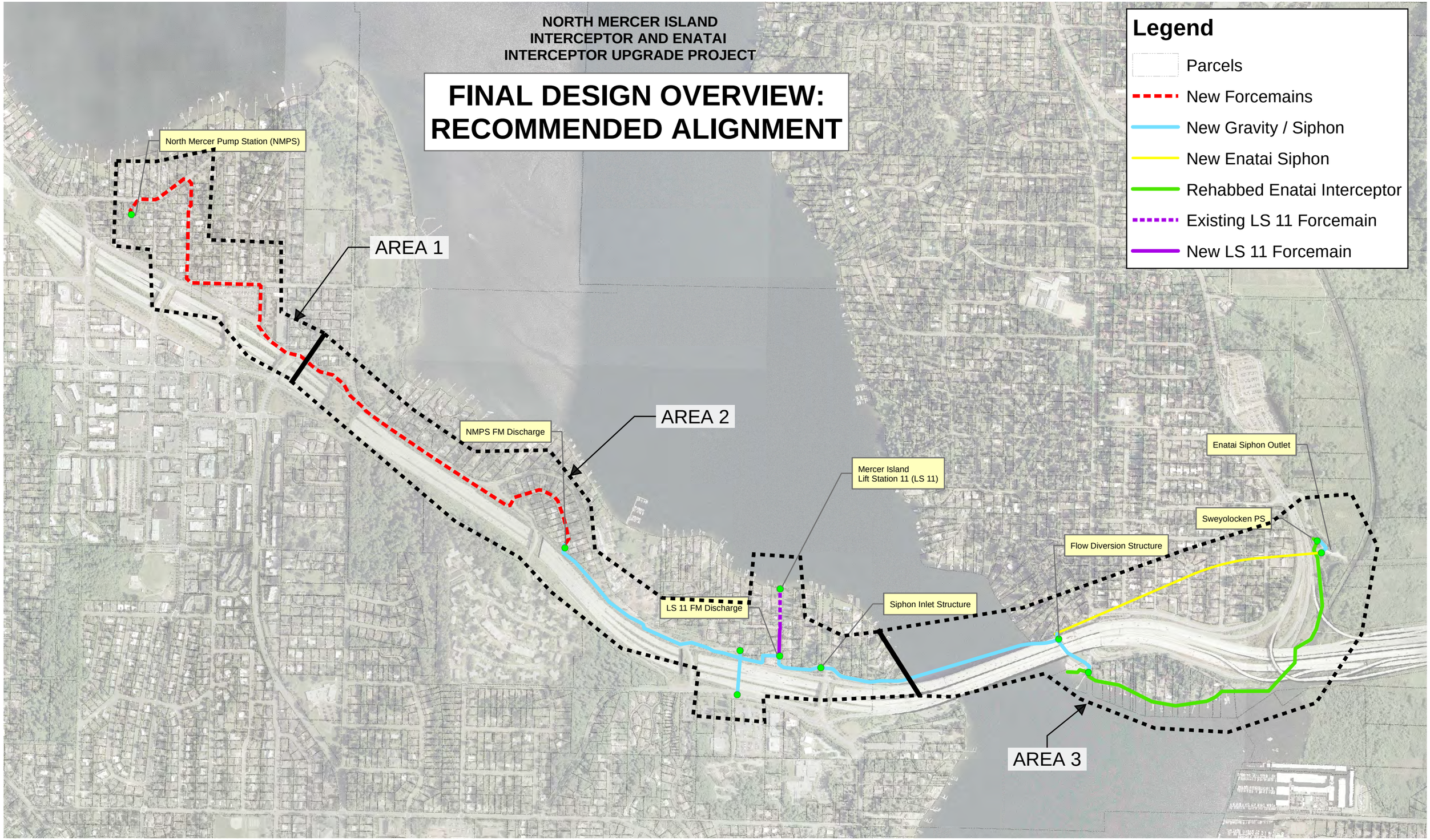
Trenchless construction (horizontal directional drilling) will be used for the new upland Enatai Siphon under the Enatai hillside. The existing in-water Enatai Interceptor will be rehabilitated from Enatai Beach Park to the Sweyolocken Pump Station using a cured-in-place pipe lining method to extend its useful life.

1.2 TRANSPORTATION STUDY AREAS

For the purposes of this study, the project has been divided into three areas based on the existing features, nature of the work, and the anticipated transportation impacts; these areas are outlined in Figure 1. Area 1 begins at the North Mercer Pump Station and includes the work through the intersection of North Mercer Way and Island Crest Way. Construction in this area will be within public right of way and will primarily occur within streets operated by the City of Mercer Island or WSDOT. In general this work will require flagging of traffic through the construction area, but several signalized intersections will also be impacted and will require the development of detour routes and traffic rerouting. Area 2 covers the remaining work on Mercer Island from just east of the intersection of North Mercer Way and Island Crest Way to Mercer Island Boat Lauch. Construction in this area will primarily be within public right of way with work taking place on both the I-90 Trail and city streets. The I-90 Trail serves both bikes and pedestrians for recreational and commuting purposes. The work in city streets in this area will primarily affect local access and parking on several dead-end residential streets including 90th Pl SE, 97th Ave SE, and SE 35th Pl. Area 3 covers work occurring in the City of Bellevue which includes construction at the Enatai Beach Park, along the I-90 Trail, and on SE 30th Street near the Sweyolocken Pump Station and Boat Launch. Work in this area will primarily occur in the Enatai Beach Park, along the I-90 Trail, private property, and on SE 30th Street near the Sweyolocken Pump Station.

NORTH MERCER ISLAND
INTERCEPTOR AND ENATAI
INTERCEPTOR UPGRADE PROJECT

FINAL DESIGN OVERVIEW: RECOMMENDED ALIGNMENT



PLOT DATE/TIME: 3/16/2018 8:39:00 AM

TETRA TECH

JACOBS™

DESIGNED/DRAWN BY: ISAAC D'AURIA

N

0 500 1,000 Feet

1 inch = 870 feet

2. EXISTING CONDITIONS

2.1 SUMMARY OF STREETS BY AREA

The project area passes through residential neighborhoods, local city streets, local parks, the I-90 Trail (a portion of the Mountains-to-Sound Greenway), and WSDOT ROW associated with Interstate 90 which runs parallel to the alignment. The project will directly impact or be in close proximity to the streets that are cataloged by Area in the tables below. Other types of existing transportation facilities are described in Section 2.4.

Area 1

Street	Description
SE 22nd St	Residential street with on-street parking
SE 22nd Pl	Residential street with on-street parking
78th Ave SE	Residential street with on-street parking
SE 24th St	Residential street with on-street parking
81st Ave SE	Residential street with on-street parking
I-90 Exit 7, WB Off-Ramp	Limited Access off-ramp from I-90 at the intersection of N Mercer Way and Island Crest Way/SE 26th St
N Mercer Way	Urban major collector
SE 26th St	Urban major collector

Area 2

Street	Notes
N Mercer Way	Arterial street, parallel to alignment
90th Pl SE	Dead-end residential street with on-street parking

SE 35th St	Residential street
97th Ave SE	Residential street with on-street parking
SE 35th Pl	Dead-end residential street with on-street parking

Area 3

Street	Notes
SE 30th St	Dead-end street, access to Sweyolocken Pump Station and Sweyolocken boat launch

2.2 TRAFFIC INVENTORY, AREA 1

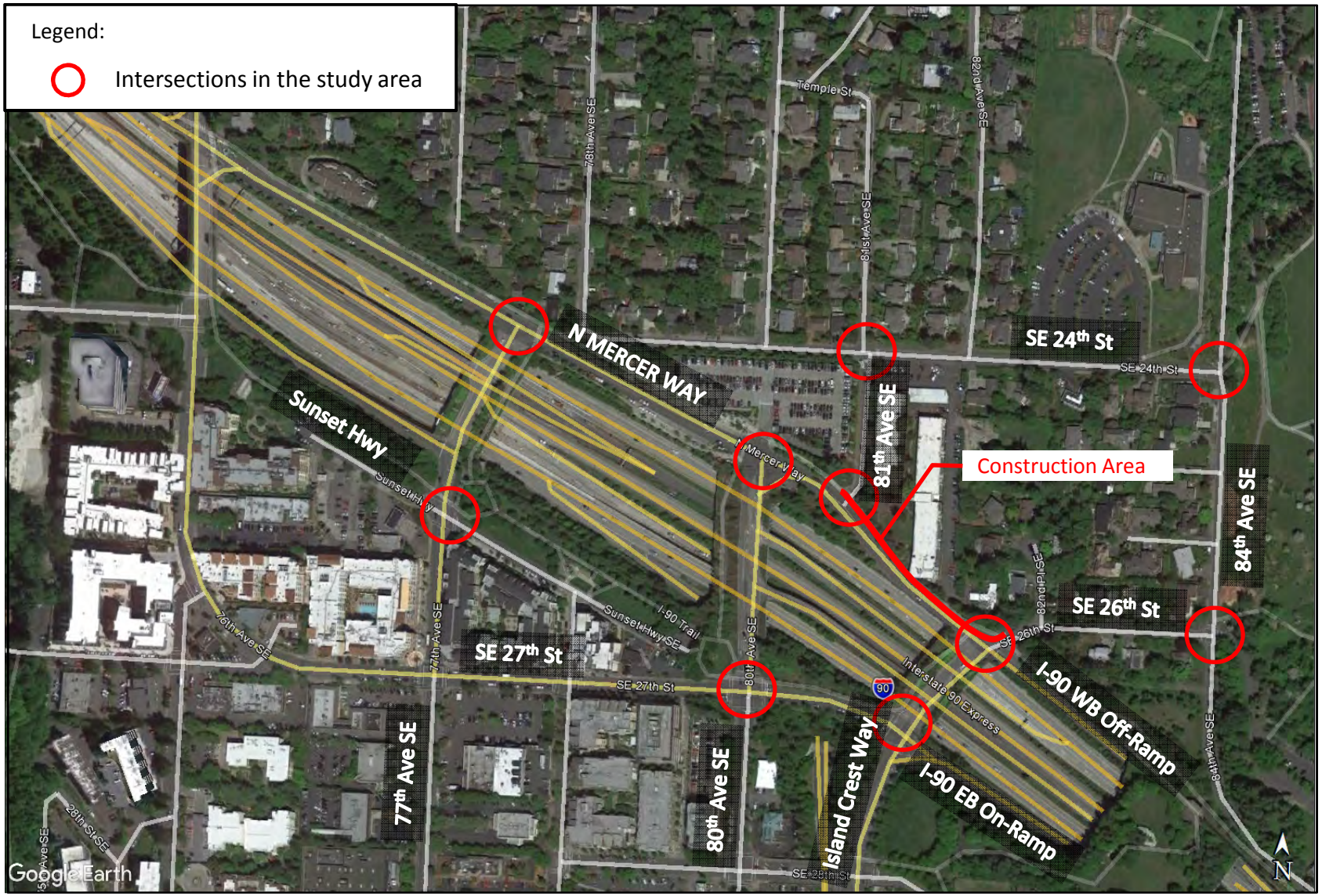
Due to extent of the traffic impacts anticipated in Area 1, a traffic study was performed to evaluate ten intersections in this area that will be affected by the construction vehicle detours and traffic rerouting. The traffic study included a traffic inventory of the following intersections:

1. 77th Ave SE & N Mercer Way
2. 80th Ave SE & N Mercer Way
3. N Mercer Way & 81st Ave SE
4. N Mercer Way & SE 26th St
5. SE 26th St & 84th Ave SE
6. 84th Ave SE & SE 24th St
7. 81st Ave SE & SE 24th St
8. Sunset Hwy & 77th Ave SE
9. SE 27th St & 80th Ave SE
10. SE 27th St & Island Crest Way

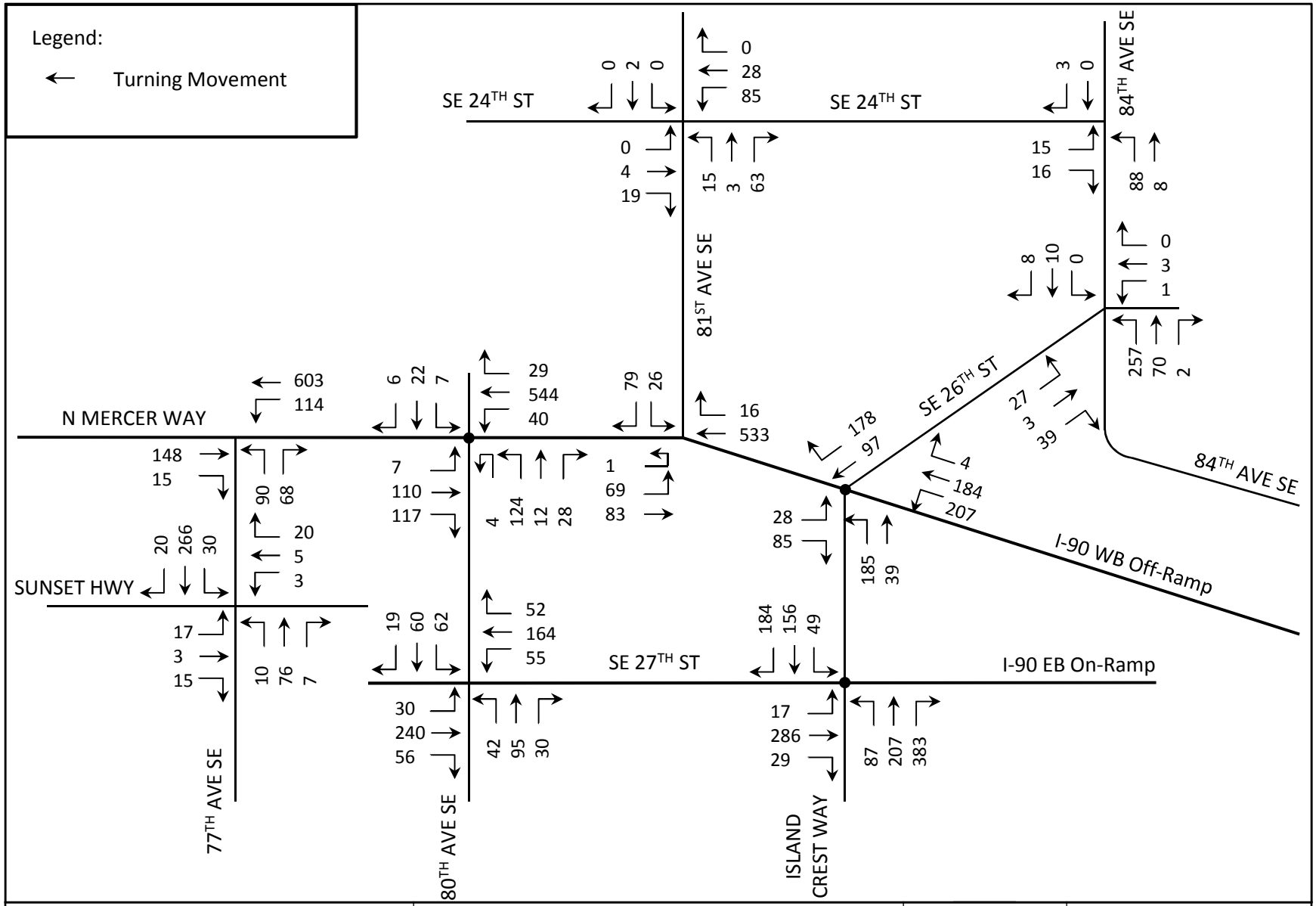
Figure 2 shows the intersections analyzed. In general local/ residential streets are one lane in each direction, and sidewalks are provided on one side of the street. However, N MercerWay from 77th Ave SE to 80th Ave SE, 81st Ave SE from N Mercer Way to SE 24th St, and SE 27th St from 80th Ave SE to Island Crest Way have sidewalks along both directions. Collector and arterial streets are also typically one lane in each direction with two-way left-turn lanes or left-turn lanes and curbs and sidewalks. In the project analysis area, the posted speeds are: 25 mph posted at the intersection of 81st Ave SE & SE 24th St and 30 mph posted at N Mercer Way.

Vehicle turning movement counts (TMC) and pedestrian and bicycle counts were collected at nine intersections on Tuesday, October 17, 2017. Counts were collected between 6:00 a.m. and 9:00 a.m. and between 3:00 p.m. and 6:00 p.m. The City of Mercer Island provided vehicle TMC for the intersection of SE 27th St & Island Crest Way collected on Tuesday, October 3, 2017. Counts provided were collected between 7:00 am and 9:00 am and between 4:00 pm and 6:00 pm. Appendix A presents the collected turning movement counts.

In addition, 24 hour volume counts were taken from October 14, 2017 to October 20, 2017 at N Mercer Way to determine the AM and PM peak hours (see Appendix B). Using the 24 hour volume counts, it was determined that the AM peak hour occurs between 8:00 a.m. and 9:00 a.m. and the PM peak hour occurs between 5:30 p.m. and 6:30 p.m. As there was only a difference of 8 vehicles between the 5:00 pm and 5:30 pm hourly volumes, it was reasonable to use 5:00 pm to 6:00 pm as the PM peak hour for the analysis. Night-time, non-peak daytime and weekend volumes are substantially lower than peak hour volumes; therefore, counts and traffic analysis for those periods are not included in this study. Existing vehicle TMC for the AM and PM peak hours are shown in Figure 3 and Figure 5, respectively. Existing pedestrian and bicycle counts for the AM and PM peak hours are shown in Figure 4 and Figure 6, respectively.



JACOBS	Analyzed Traffic Intersection Mercer Island, WA	N Scale: NTS	Figure: 2



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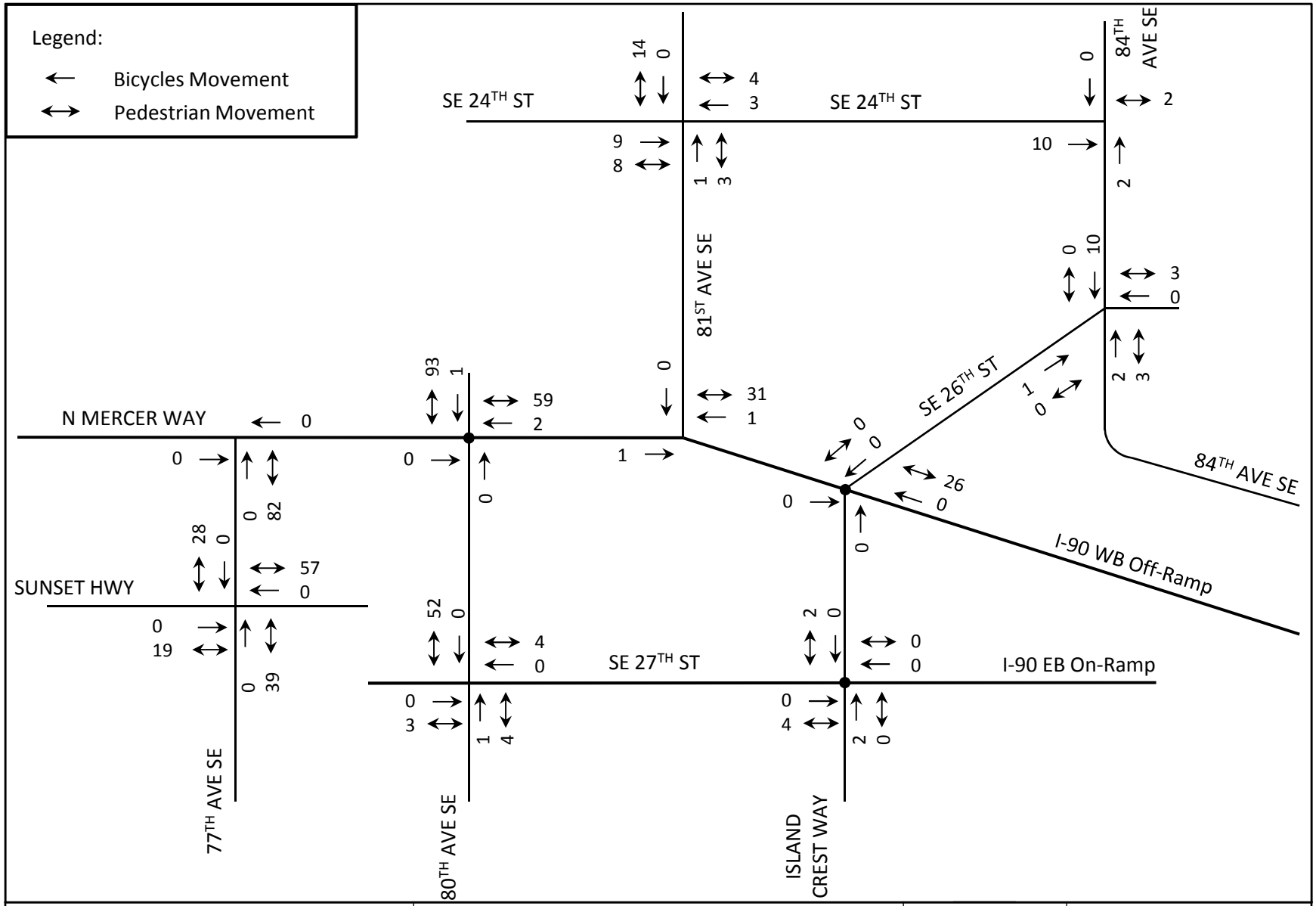
Traffic Counts-Existing 2017
AM Peak Hour
Mercer Island, WA

Scale: NTS

Figure: 3



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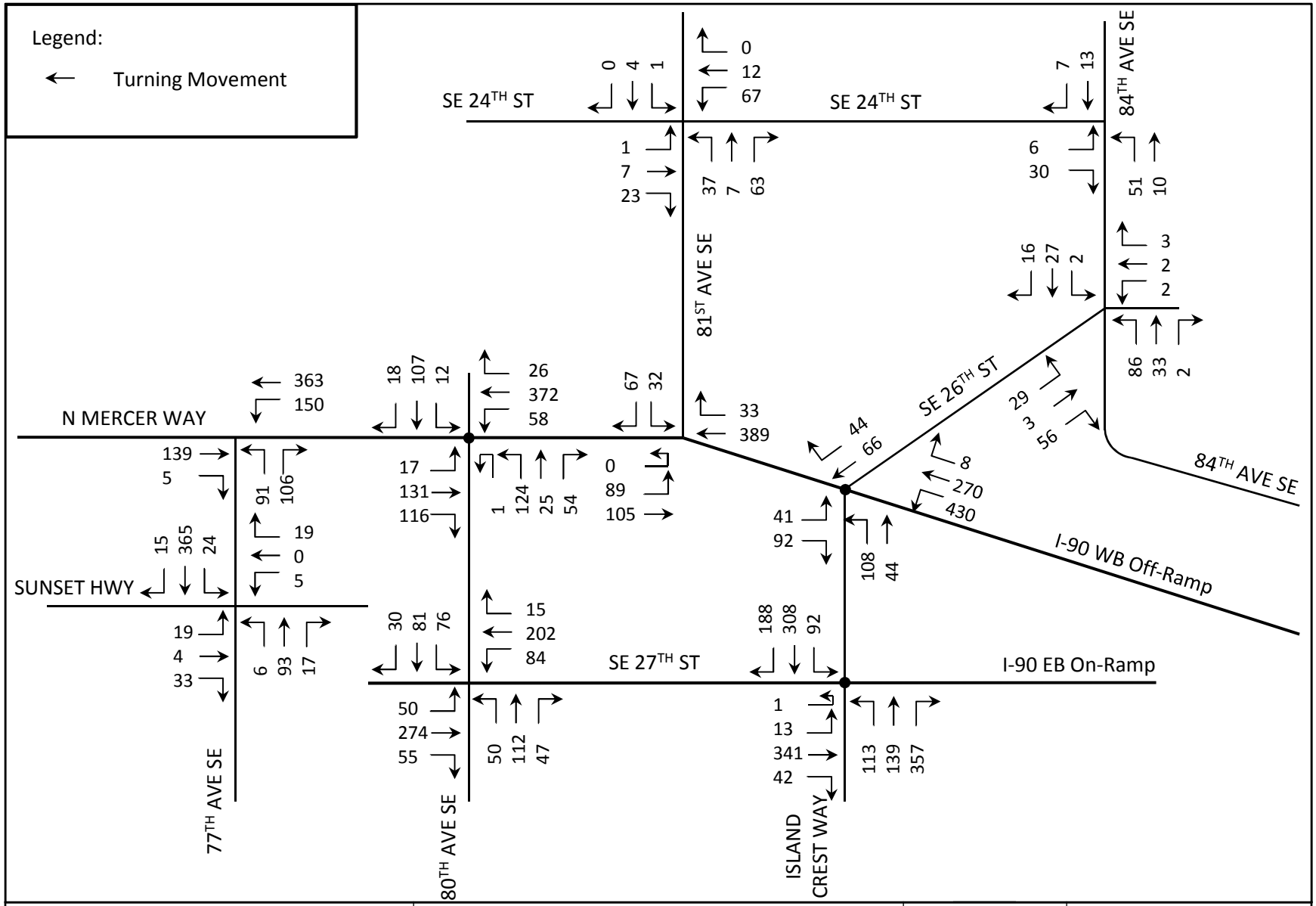
Pedestrian/Bicycle Counts- Existing 2017
AM Peak Hour
Mercer Island, WA

Scale: NTS

Figure: 4



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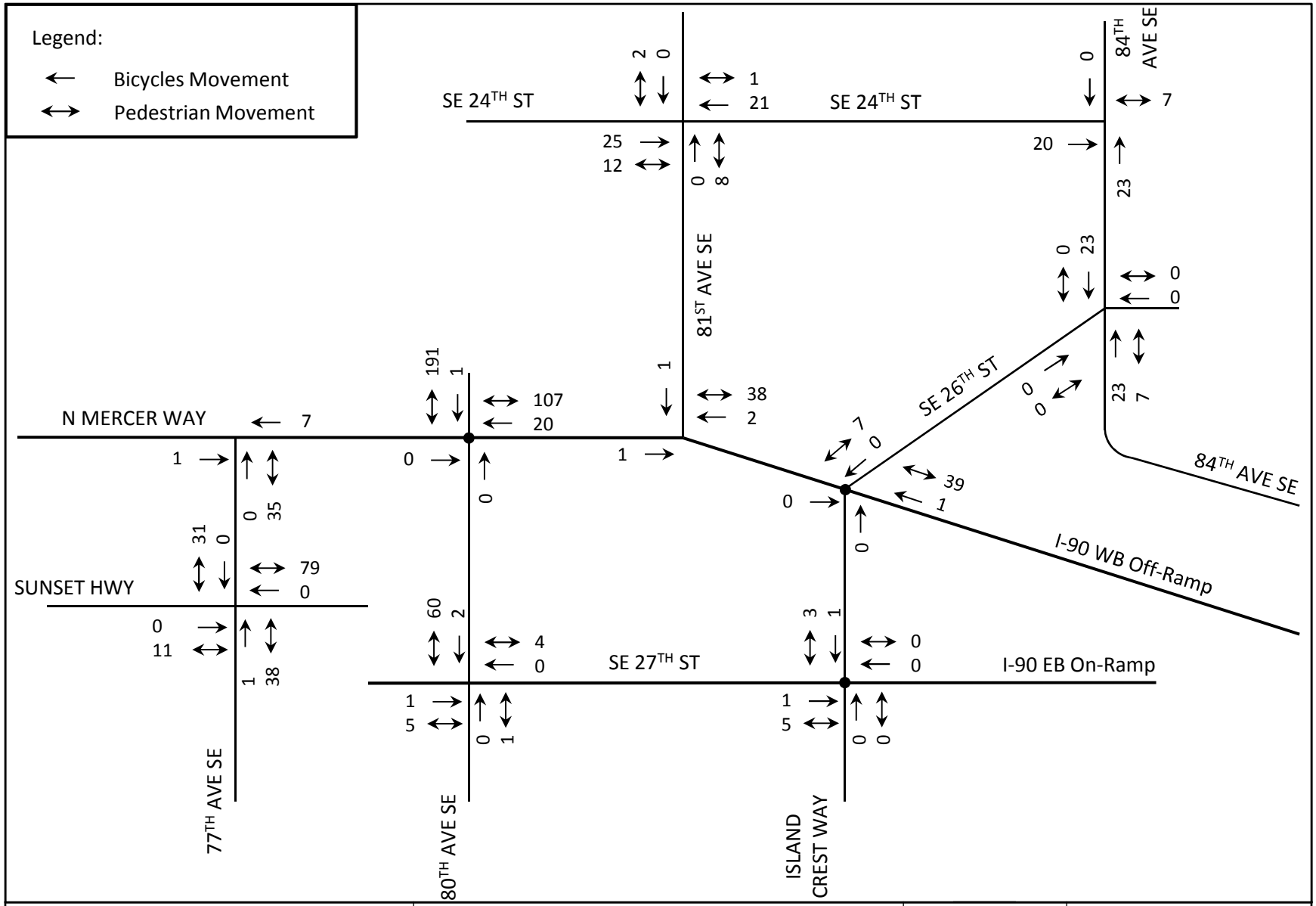
Traffic Counts-Existing 2017
PM Peak Hour
Mercer Island, WA

Scale: NTS

Figure: 5



JACOBS	Pedestrian/Bicycle Counts- Existing 2017 PM Peak Hour Mercer Island, WA	N Scale: NTS	Figure: 6

2.3 TRAFFIC OPERATING CONDITIONS ASSESSMENT

The level of service (LOS) at an intersection is based on the average delay per vehicle for the movements within the intersection. The intersection delay accounts for the delay caused by traffic signals, vehicle queues, and turning movement delays that block through traffic. The table below shows the LOS criteria for signalized intersections, as determined by HCM.

Level of Service Criteria for Signalized Intersections

Level of Service	HCM Average Delay (seconds/vehicle)
A	0-10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

The LOS for unsignalized intersections is measured based on Intersection Capacity Utilization (ICU) 2003 criteria, see table below. The ICU predicts congestion at an intersection instead of delay.

Level of Service Criteria for Unsignalized Intersections

Level of Service	ICU Utilization
A	0 -55%
B	>55%-64%
C	>64%-73%
D	>73%-82%
E	>82%-91%
F	>91%-100%
G	>100%-109%
H	>109%

The City of Mercer Island LOS standard for intersections near the city center is LOS C, and in other city areas is LOS D. The project study intersections are located outside the City Center, with the exception of intersection SE 27th St & 80th Ave SE. The WSDOT controlled intersection standard is LOS D.

Table 1 shows the existing peak hour intersection level of service and average delay. As indicated in Table 1, all intersections are operating within the standard LOS under existing conditions.

Table 2 shows existing peak hour queue lengths and volume to capacity (v/c) ratios for the signalized intersections. One intersection, N Mercer Way & SE 26th St, is showing a v/c ratio of 1.01 at the westbound approach during the PM peak hour. This is the I-90 westbound off-ramp. It is noted that this ramp does exceed capacity at times and backs up to mainline I-90.

Existing signal operations, cycle length, phasing, and detection and coordination provisions provided by WSDOT are presented in Appendix C. Appendix D provides the Synchro summary report for existing conditions.

Table 1
Existing Peak Hour Intersection Level of Service and Average Delay

Intersection	Traffic Control	Standard LOS	AM Peak Hour				PM Peak Hour			
			Critical Approach	LOS	HCM Average Delay (sec)	ICU Utilization (%)	Critical Approach	LOS	HCM Average Delay (sec)	ICU Utilization (%)
77th Ave SE & N Mercer Way	South leg Stop	D	NB	A	-	51.2	NB	A	-	36.7
80th Ave SE & N Mercer Way	Signalized	D	WB	C	32.6	-	SB	C	28.2	73.5
N Mercer Way & 81st Ave SE	North leg Stop	D	SB	A	-	50.8	SB	A	-	44.6
N Mercer Way & SE 26th St	Signalized	D	WB	C	28.0	-	WB	D	43.3	-
SE 26th St & 84th Ave SE	All-way Stop	D	NB	A	-	37.9	NB	A	-	27.3
84th Ave SE & SE 24th St	All-way Stop	D	NB	A	-	22.0	NB	A	-	20.0
81st Ave SE & SE 24th St	Two-way Stop	D	SB	A	-	31.5	SB	A	-	29.4
Sunset Hwy & 77th Ave SE	Two-way Stop	D	EB	A	-	34.1	EB	A	-	39.7
SE 27th St & 80th Ave SE	All-way Stop	C	EB	A	-	48.0	EB	A	-	51.7
SE 27th St & Island Crest Way	Signalized	D	EB	C	24.6	-	EB	C	28.7	-

Table 2
Existing Peak Hour Signalized Intersection Queue Length Summary

Intersection	Critical Approach	AM Peak Hour		PM Peak Hour	
		Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach
80th Ave SE & N Mercer Way	WB	#552	0.83	322	0.58
N Mercer Way & SE 26th St	WB	#227	0.80	#636	1.01
SE 27th St & Island Crest Way	EB	311	0.57	391	0.68

95th Percentile volume exceeds capacity, queue may be longer

2.4 PARKING AND ALTERNATIVE TRANSPORTATION MODES BY AREA

Areas 1 and Area 2

The residential streets in Area 1 (SE 22nd PL, 78th Ave SE, SE 24th St, 81st Ave SE, and 97th Ave SE) include on-street parking within the ROW. With the exception of SE 22nd PL, this area is considered a restricted parking district which requires residential parking permits due to the proximity of the Mercer Island Park and Ride. Within Area 2, there are two on-street parking areas: residential on-street parking at 90th Pl SE and along the eastbound lane west of Fortuna Dr.

Mercer Island Park and Ride is located southwest of the project alignment in Area 1. There are two bus stops adjacent to the park and ride, N Mercer Way and 80th Ave SE- Bay 1 and Bay 2. Bay 1 currently serves routes 201, 204, 216, 550, 554, 630, and 989. Bay 2 currently serves routes 892 and 981 in addition to the routes served by Bay 1. Additionally, route 894 extends through both Areas 1 and 2 with a stop located at SE 26th St & 82nd Pl SE and multiple stops adjactent to the alignment along N Mercer Way. Figure 7 shows bus stops within Areas 1 and 2.

There are no dedicated bicycle lanes on the adjacent roads, and bicycles use the vehicle travel lanes or the I-90 trail which is the main shared-use path through the project area. However, there are additional sidewalks and pedestrian trails which are used by both bicycles and pedestrians. Bicycle routes and pedestrian trails are shown in Figure 8.

Area 3

The Enatai Beach Park has an upper and lower parking lot which are within the project area. Additionally, there is an area at the end of SE 30th near the Sweyolocken boat launch that is used by people accessing the boat launch and adjacent walking and biking trails including the I-90 Trail. There are no dedicated bicycle lanes on the adjacent roads, and bicycles use the vehicle travel lanes or the I-90 Trail which is the main shared-use path through the project area.

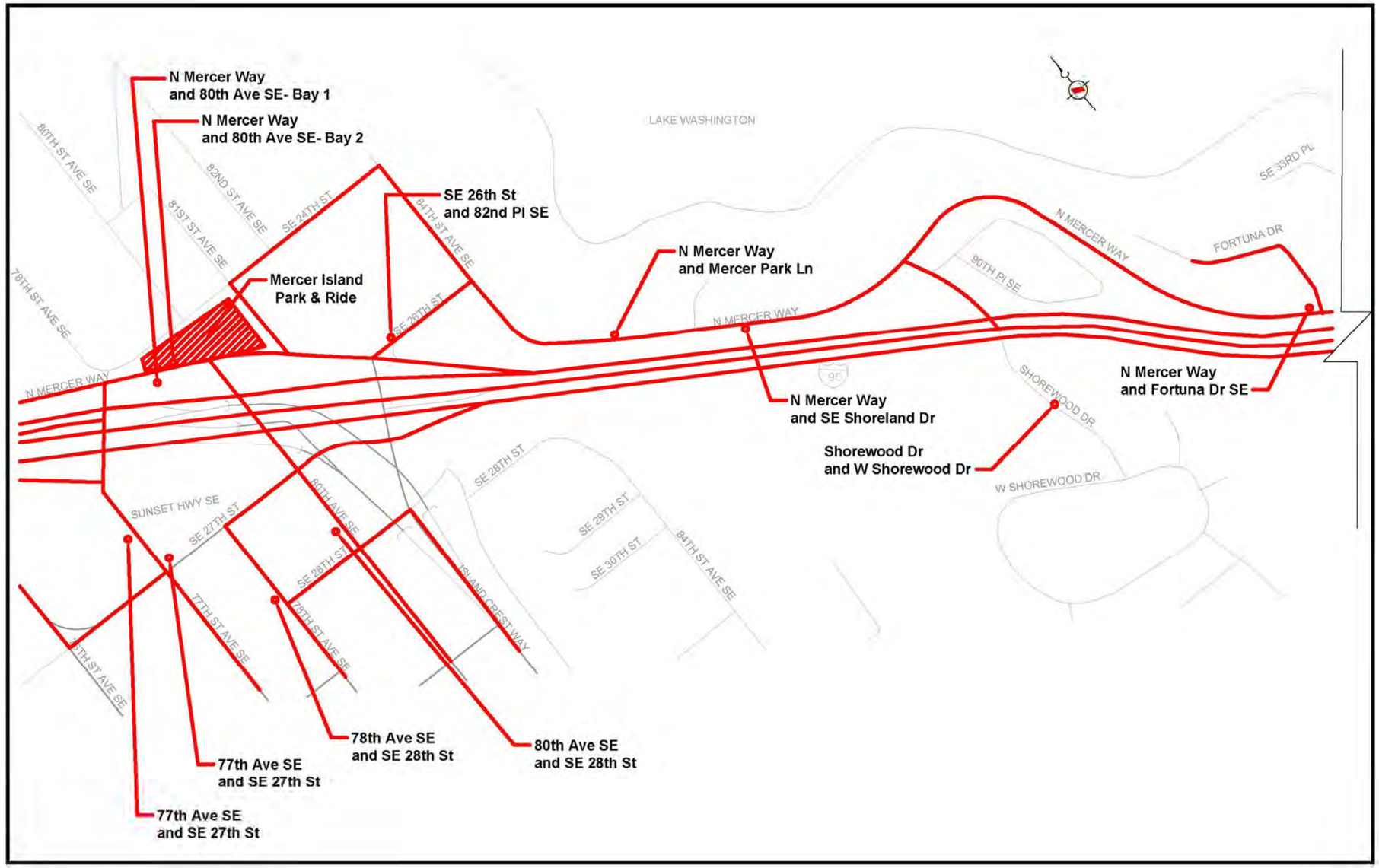


Figure 7: Map- Transit Routes and Stops

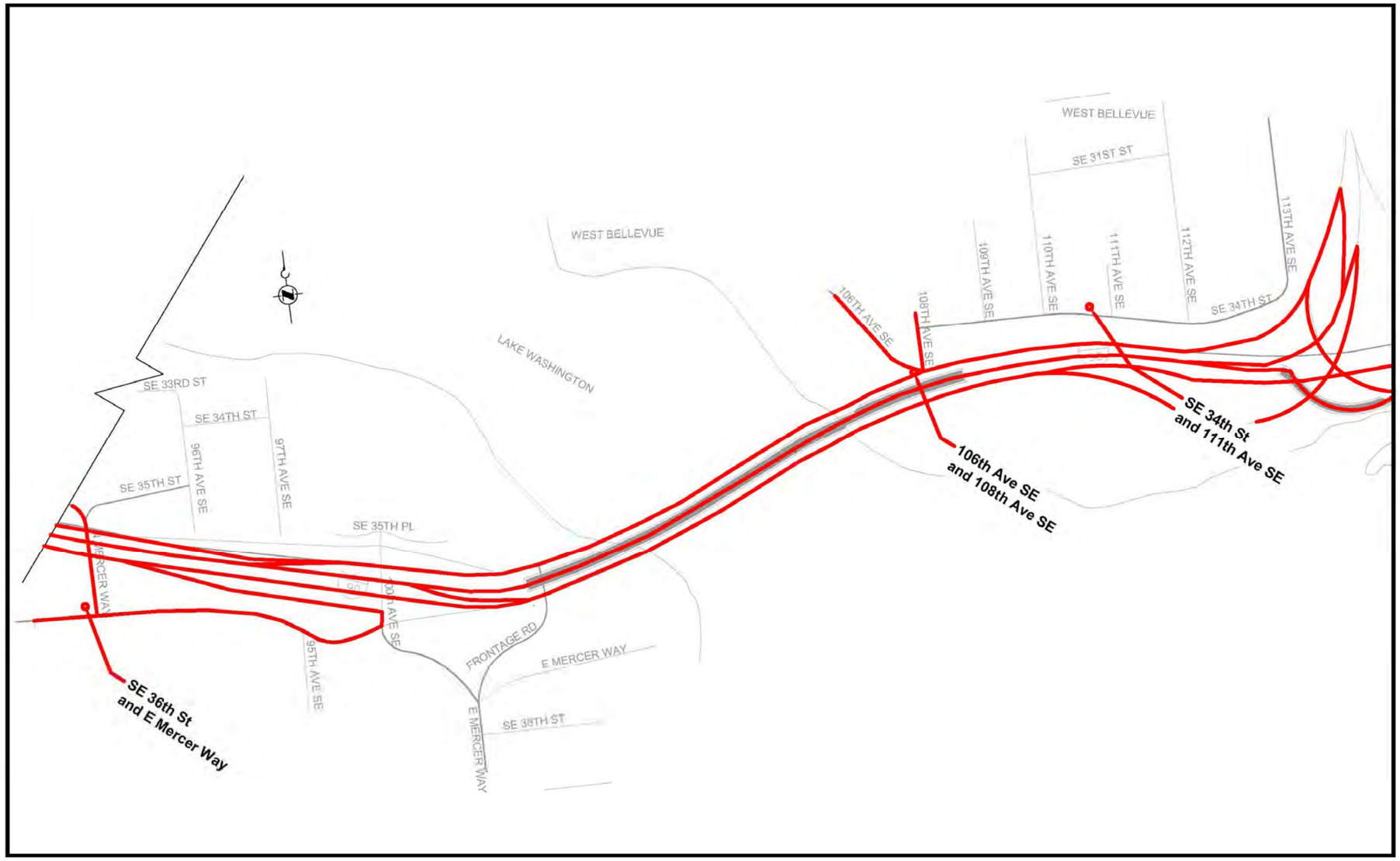


Figure 7 (continued): Map- Transit Routes and Stops

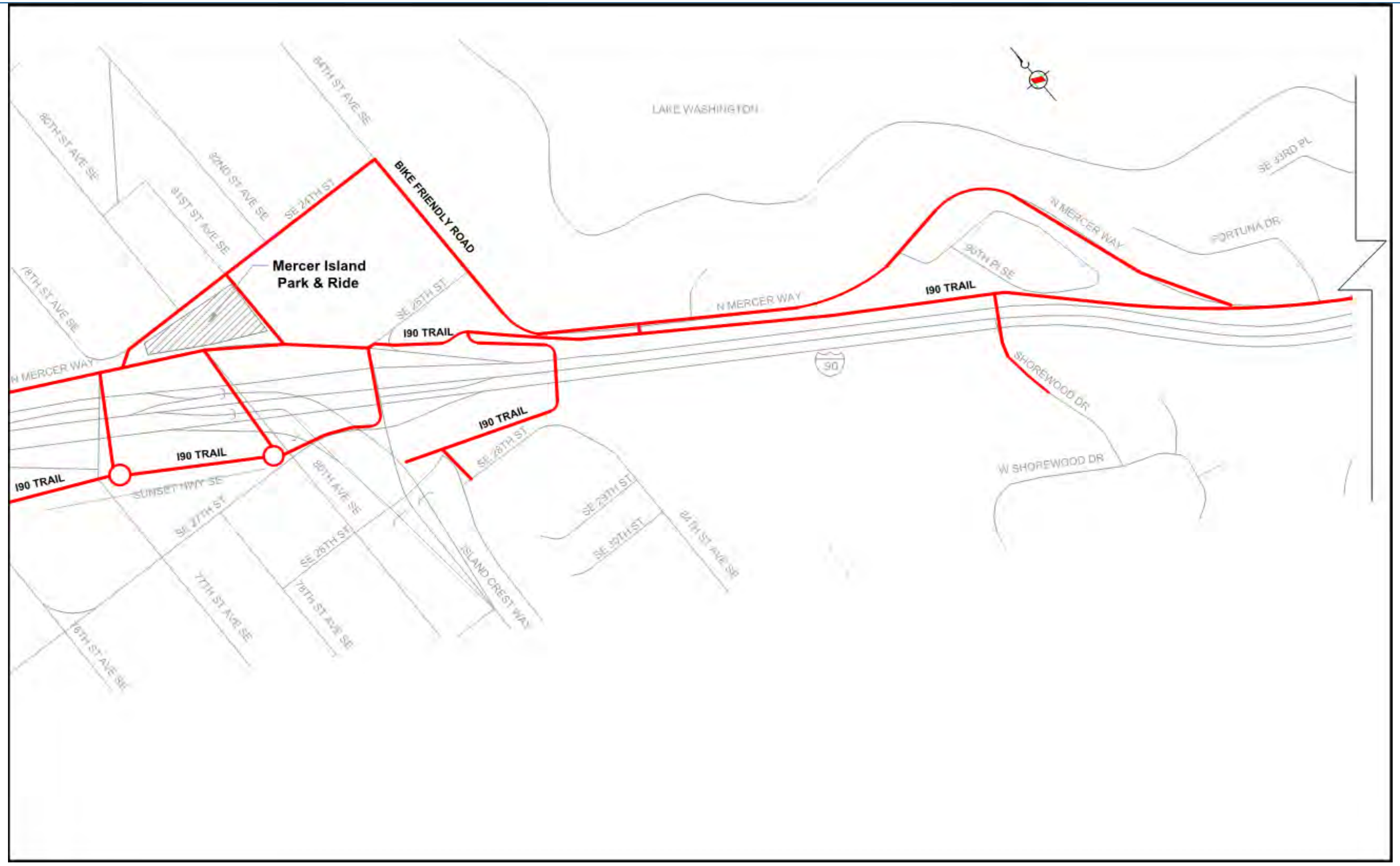


Figure 8: Map- Bicycle Routes and Pedestrian Trails

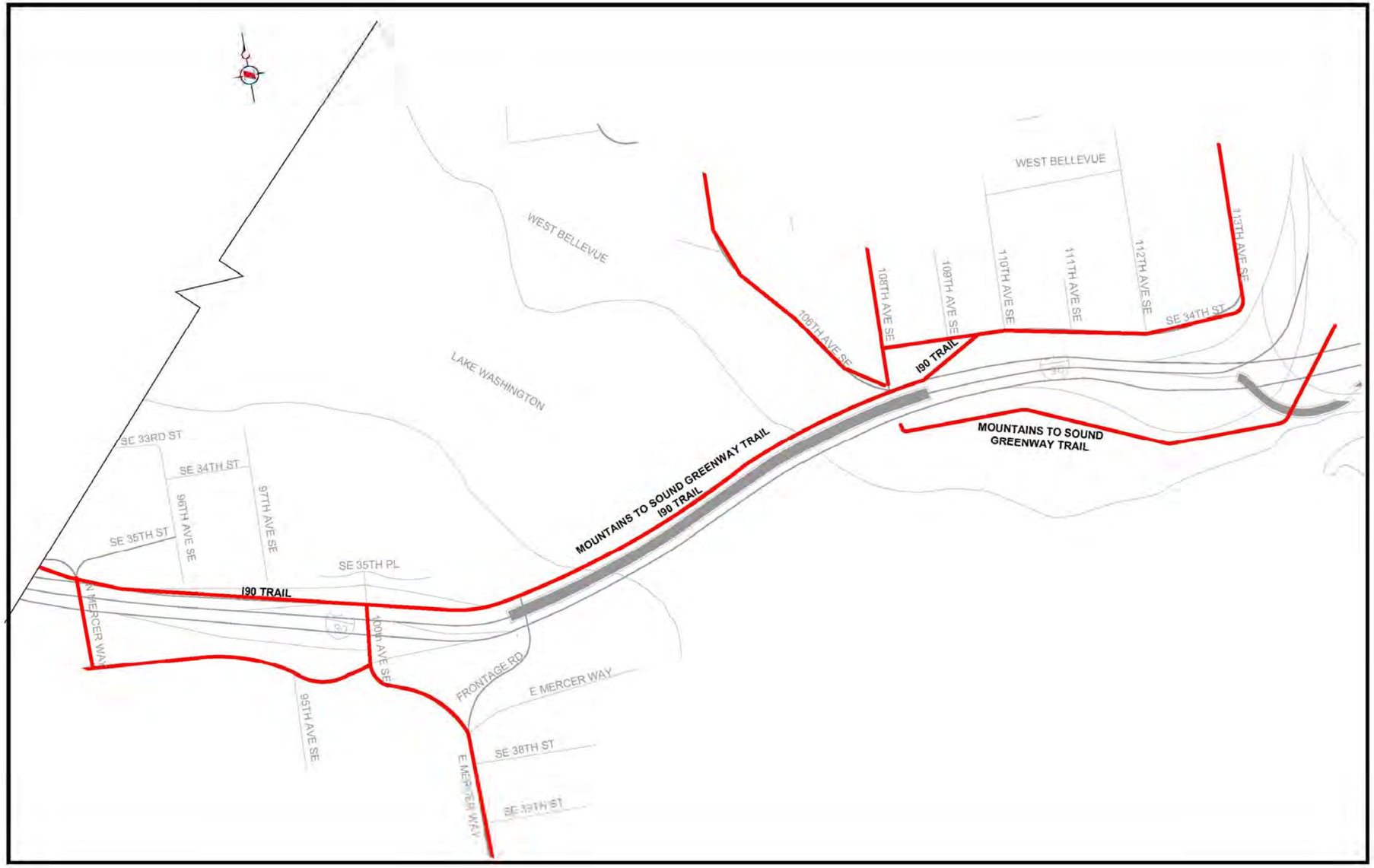


Figure 8 (continued): Map- Bicycle Routes and Pedestrian Trails

3. FUTURE CONDITIONS

3.1 PLANNED AND PROGRAMMED TRANSPORTATION IMPROVEMENTS

Area 1

There are no current planned or programmed transportation improvements that will affect the 2020 construction detour intersection conditions. Several documents were referenced to confirm the future intersection configurations.

The City of Mercer Island "KPG Traffic Analysis for Mercer Island I-90 Access Options" dated November 7, 2016 was completed in response to a letter from the Federal Highway Administration (FHWA) dated August 5, 2016. This letter indicates High Occupancy Vehicle (HOV) lanes cannot be used by Single Occupancy Vehicle (SOV) vehicles. Therefore, the Island Crest West westbound I-90 on-ramp has been operating permanently as HOV only since June 2017. The KPG report states that any future improvements or configuration revisions implemented by Sound Transit are required to be complete by 2023. This project construction will take place in 2020. Therefore, the Island Crest Way westbound I-90 on-ramp is considered as open to only HOV vehicles in the 2020 construction condition. SOV vehicle must be diverted to other on-ramps in the vicinity.

The East Link Project Final EIS dated July 2011 mentions ramp closures and revisions on I-90 near the project vicinity. These changes, implemented in June of 2017, include: 77th Ave SE reversible ramp to/from center roadway closed, Island Crest Way westbound on-ramp to center roadway closed, 76th Ave SE westbound on-ramp widened to add HOV bypass lane and Island Crest Way eastbound off-ramp from center roadway will be relocated. All of the changes are on mainline I-90 and do not affect the intersections analysis for this report. Also, the East Link EIS does not mention reconfiguring the Island Crest Way westbound on-ramp to HOV only.

Sound Transit has programmed the construction of a roundabout at 77th Ave SE & N Mercer Way as part of the East Link mitigation plan. Construction is scheduled to start in 2020. Changes to this intersection are not anticipated to affect the analysis for this report.

Area 2 and Area 3

The Aubrey-Davis Park master plan which is currently in progress, will provide a comprehensive plan for programmatic improvements along the I-90 trail (a portion of the Mountains-to-Sound Greenway) through the project areas. Coordination meetings with the project team have taken place with both the Cities of Mercer Island and Bellevue and WSDOT, and trail improvements and/or restoration will continue to be discussed as details of the master plan are made available.

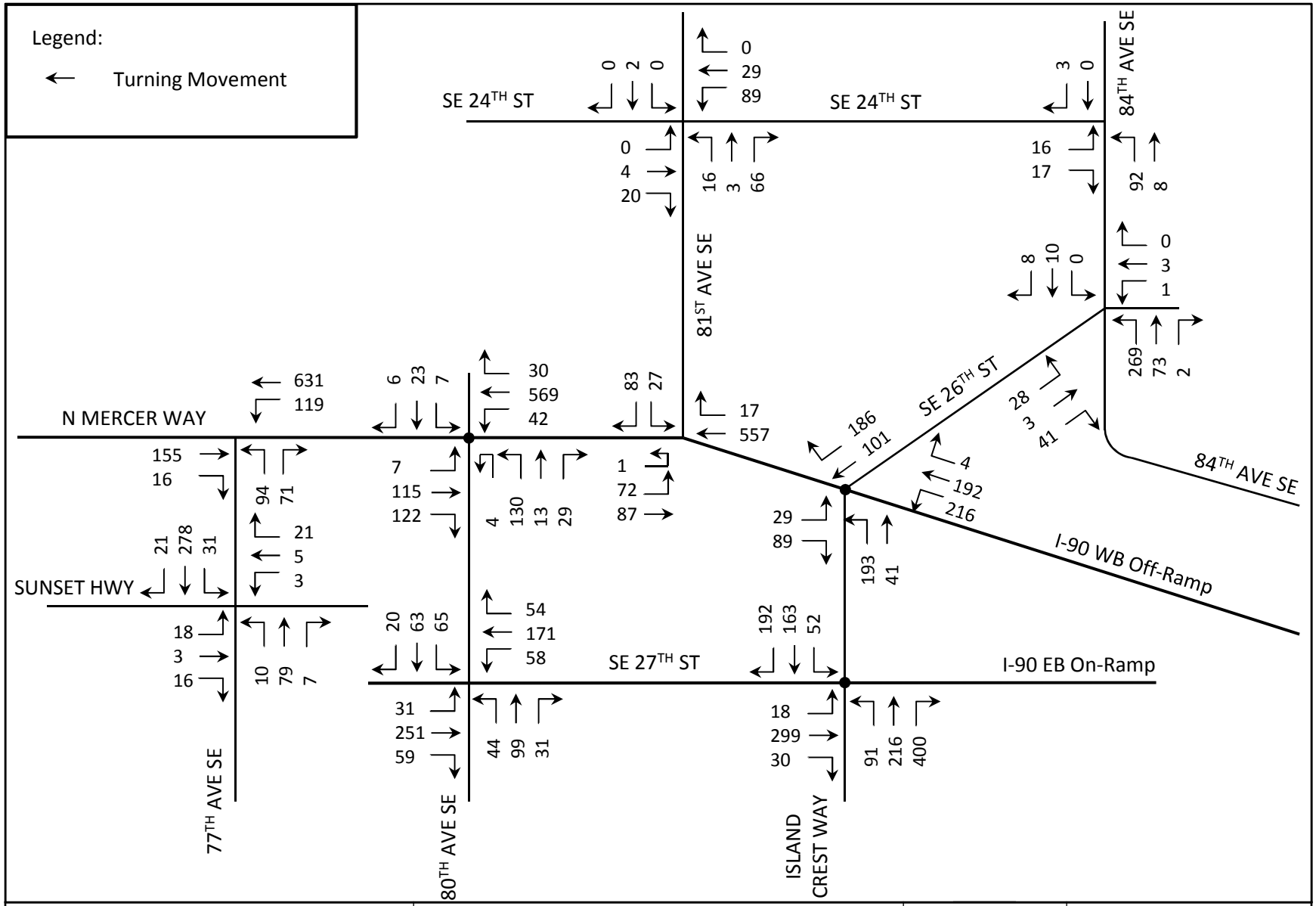
3.2 TRAFFIC FORECAST, AREA 1

Within the Area 1 traffic study limits, 77th Ave SE and Island Crest Way, the future traffic conditions were evaluated. This portion of the project is expected to be completed by 2023. For this analysis, existing traffic was increased by 1.5 percent per year based on the City of Mercer Island Comprehensive Plan (updated in 2016). After project completion, roadways and traffic control should return to existing conditions. Future traffic counts

for the AM and PM peak hour are shown in Figure 9 and Figure 10, respectively. Appendix E provides the Synchro summary report for future 2020 conditions.

Table 3 presents the future LOS and average delay. As indicated in the table, the intersections are expected to operate within the standard LOS. Table 4 presents the queue length at signalized intersections. Longer queue lengths at intersections 80th Ave SE & N Mercer Way and N Mercer Way & SE 26th St are not related to the project, but rather projected traffic growth.

The WTD conveyance system upgrades are expected to generate very few trips after project completion, approximately 68 trips per year (approximately 6 trips per month). These trips will be County vehicles accessing the pump station and siphons for routine maintenance. The approximately 68 trips per year are negligible on the roadway network as a whole, and were not included in the Synchro analysis, as all intersections operate at acceptable LOS levels in existing and future 2020 conditions



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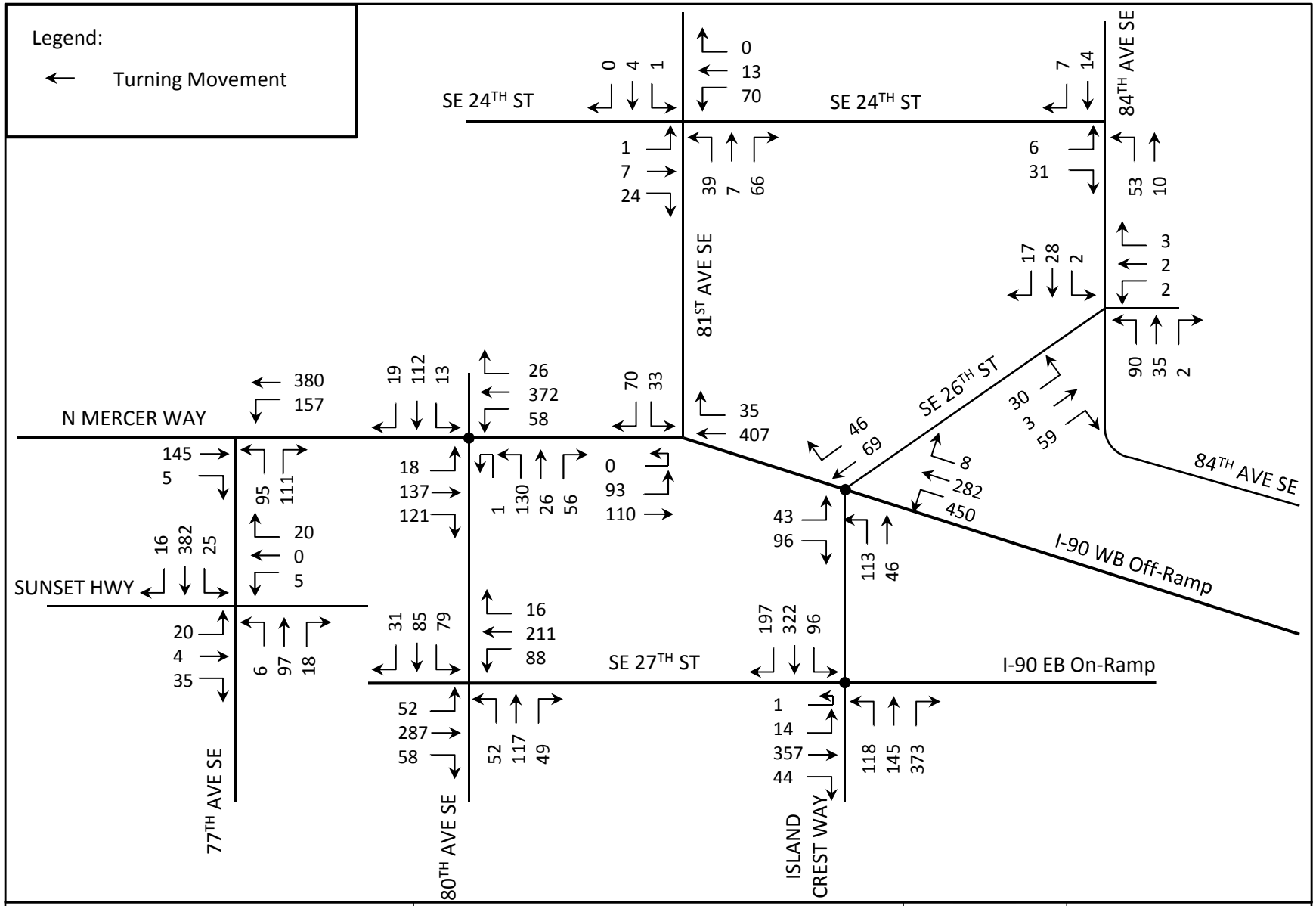
Traffic Counts-Future 2020
AM Peak Hour
Mercer Island, WA

Scale: NTS

Figure: 9



JACOBS

Traffic Counts-Future 2020
PM Peak Hour
Mercer Island, WA

Scale: NTS

Figure: 10

Table 3
Future 2020 Peak Hour Intersection Level of Service and Average Delay

Intersection	Traffic Control	AM Peak Hour				PM Peak Hour			
		Critical Approach	LOS	HCM Average Delay (sec)	ICU Utilization (%)	Critical Approach	LOS	HCM Average Delay (sec)	ICU Utilization (%)
77th Ave SE & N Mercer Way	South leg Stop	NB	A	-	52.7	NB	A	-	37.6
80th Ave SE & N Mercer Way	Signalized	WB	C	34.3	-	SB	C	28.5	-
N Mercer Way & 81st Ave SE	North leg Stop	SB	A		52.6	SB	A	-	46.2
N Mercer Way & SE 26th St	Signalized	WB	C	29.6	-	WB	D	51.7	-
SE 26th St & 84th Ave SE	All-way Stop	NB	A	-	39.0	NB	A	-	27.9
84th Ave SE & SE 24th St	All-way Stop	NB	A	-	22.2	NB	A	-	20.1
81st Ave SE & SE 24th St	Two-way Stop	SB	A	-	32.0	SB	A	-	30.1
Sunset Hwy & 77th Ave SE	Two-way Stop	EB	A	-	35.0	EB	A	-	40.7
SE 27th St & 80th Ave SE	All-way Stop	EB	A	-	49.0	EB	A	-	52.9
SE 27th St & Island Crest Way	Signalized	EB	C	24.9	-	EB	C	29.2	-

Table 4
Future 2020 Peak Hour Signalized Intersection Queue Length

Intersection	Critical Approach	AM Peak Hour		PM Peak Hour	
		Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach
80th Ave SE & N Mercer Way	WB	#594	0.86	339	0.60
N Mercer Way & SE 26th St	WB	#245	0.83	#680	1.06
SE 27th St & Island Crest Way	EB	328	0.60	414	0.71

4. CONSTRUCTION CONDITIONS

4.1 OVERVIEW OF CONSTRUCTION IMPACTS TO STREET TRAFFIC

Pipeline construction will be transient in nature with the Contractor generally completing construction within a local area as they advance along the alignment (i.e., rolling work zones). This will lead to construction activities being concentrated in an individual area for only a portion of the total construction duration and then moving on to an adjacent street or series of streets. While work is being completed within a particular area, vehicular, pedestrian, or bicycle traffic may need to be controlled through the work zone using traffic control devices and/or flaggers. Construction will generally occur during the normal work hours allowed by the local permitting agencies (WSDOT, City of Mercer Island, or City of Bellevue). However, some areas may require special considerations which could result in a shorter or longer work window being allowed to the Contractor. If a need for night or weekend work is identified, a noise variance from the City will be required in advance of construction. Anticipated impacts and estimated durations are summarized in the table below; actual impacts and durations will be determined by the permit conditions and requirements and the contractor's means and methods.

Area 1

Street	Anticipated Impact	Estimated Duration
SE 22nd St	Traffic will be flagged through the work zone during construction	• 3 weeks for pipeline installation in roadway • Work at North Mercer Pump Station will be on-going for from the summer of 2020 to spring 2023.
SE 22nd Pl	Traffic will be flagged through the work zone during construction	4 weeks
78th Ave SE	Traffic will be flagged through the work zone during construction	9 weeks
SE 24th St	Traffic will be flagged through the work zone during construction	6 weeks
81st Ave SE	Traffic will be flagged through the work zone during construction,	4 weeks
I-90 Exit 7, WB Off-Ramp	See sections 4.2 and 4.3 for details	6 weeks
N Mercer Way	Detours required, see sections 4.2 and 4.3 for details	7 weeks
SE 26th St	Detours required, see sections 4.2 and 4.3 for details	6 weeks

Area 2

Street	Anticipated Impact	Estimated Duration
N Mercer Way	Flagging and lane closures during construction hours will be needed to detour pedestrians off of the I-90 Trail and to provide access for construction vehicles.	33 weeks
90th Pl SE	Dead-end street; flagging will be needed and residential access will likely be constrained during construction hours.	9 weeks
SE 35th St	Traffic will be flagged through the work zone during construction.	6 weeks
97th Ave SE	Traffic will be flagged through the work zone during construction.	9 weeks
SE 35th Pl	Dead-end street; flagging will be needed and residential access will likely be constrained during construction hours. This work is not anticipated to impact the I-90 WB Off-Ramp for exit 8. Most of the traffic from this off-ramp turns left away from construction. Traffic turning right primarily accesses SE 35th Pl which is a residential dead end road (approximately 20-30 homes).	16 weeks

Area 3

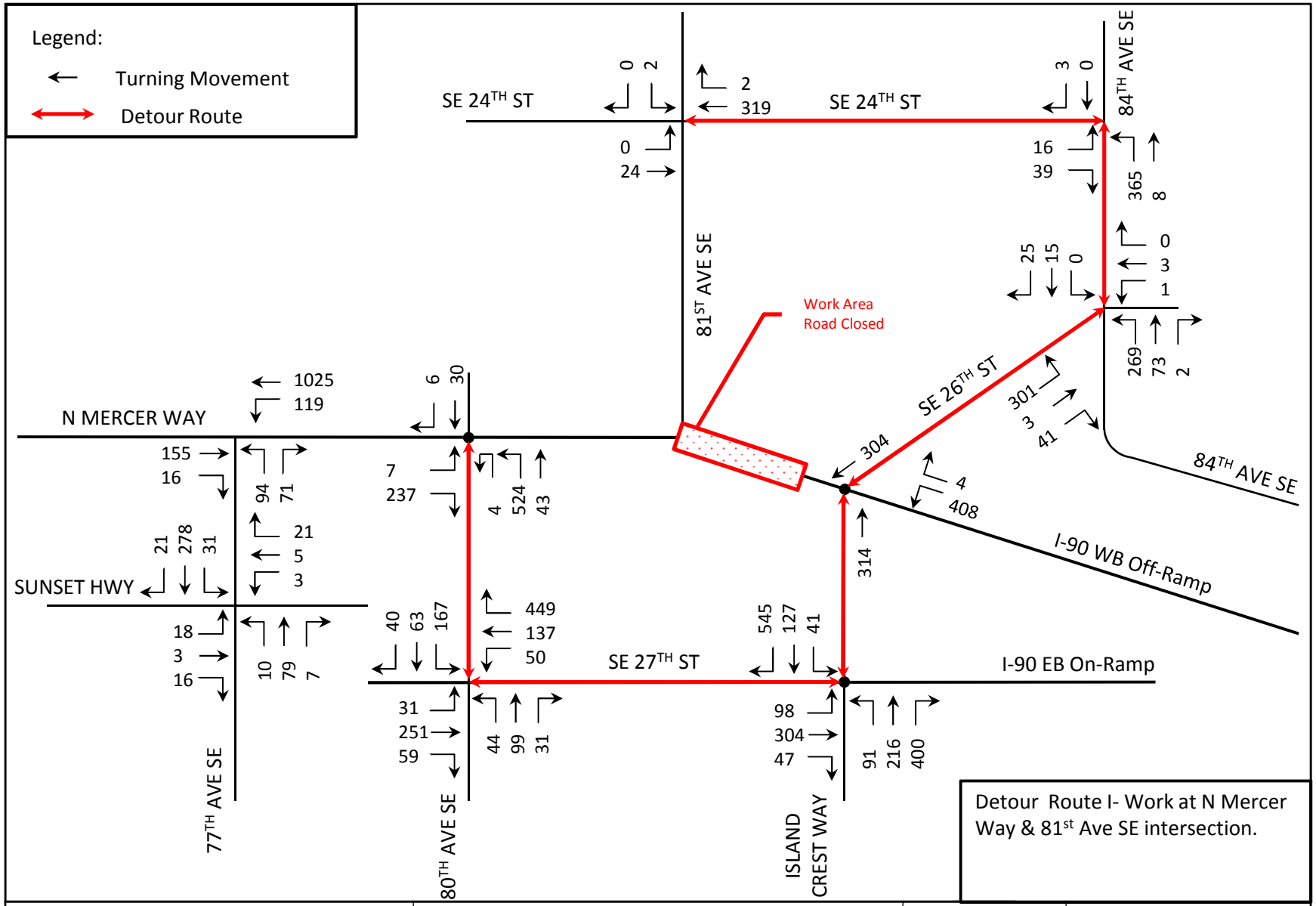
Street	Anticipated Impact	Approx. Duration
SE 30th St	Dead-end street; access to the Sweyolocken boat launch and parking will be restricted during construction.	• 30 weeks for HDD work • 5 weeks for piping work

4.2 AREA 1, DETOUR ROUTES

Three detour configurations were analyzed at N Mercer Way between 81st Ave SE and the I-90 Trail. Full or partial closure of two intersections and one roadway is recommended at this construction area. Detour routes were determined based on least traffic impacts and discussions with King County and City of Mercer Island; scheduling will not be detailed until final design has been approved. Work areas are shown in Appendix L, drawings T105, T105A, T106, and T106A. Pedestrians and bicycle closures and paths are shown in drawings T107 and T108. Description of the vehicle detour routes is as follows:

- Detour Route I (drawings T105 and T105A): Work at N Mercer Way & 81st Ave SE Intersection. No trips will be permitted between: 80th Ave SE and 81st Ave SE, Island Crest Way and 81st Ave SE, and N Mercer Way and SE 24th St. Traffic will be detoured at intersections: 80th Ave SE & N Mercer Way, N Mercer Way & SE 26th St, SE 26th St & 84th Ave SE, 84th Ave SE & SE 24th St, 81st Ave SE & SE 24th St, SE 27th St & 80th Ave SE, and SE 27th St & Island Crest Way. Detour Route I configuration and traffic volume rerouting are graphically shown on

- Figure 11 and Figure 12 for the AM and PM peak hours, respectively.
- Detour Route II (drawing T106): Work at N Mercer Way & SE 26th St Intersection. Only westbound right turns will be permitted at this intersection. No trips will be permitted between: N Mercer Way & 81st Ave SE and N Mercer Way & SE 26th St, SE 27th St & Island Crest Way and N Mercer Way & SE 26th St. At the Intersection of SE 26th St & 84th Ave SE no westbound trips will be permitted. Detour Route II configuration and traffic volume rerouting are graphically shown on Figure 13 and Figure 14 for the AM and PM peak hours, respectively.
- Detour Route III (drawing T106A): Work at N Mercer Way & SE 26th St southbound leg. No southbound trips will be permitted at N Mercer Way & SE 26th St intersection. No westbound trips will be permitted at SE 26th St & 84th Ave SE intersection. Detour Route III configuration and traffic volume rerouting are graphically shown on Figure 15 and Figure 16 for the AM and PM peak hours, respectively.



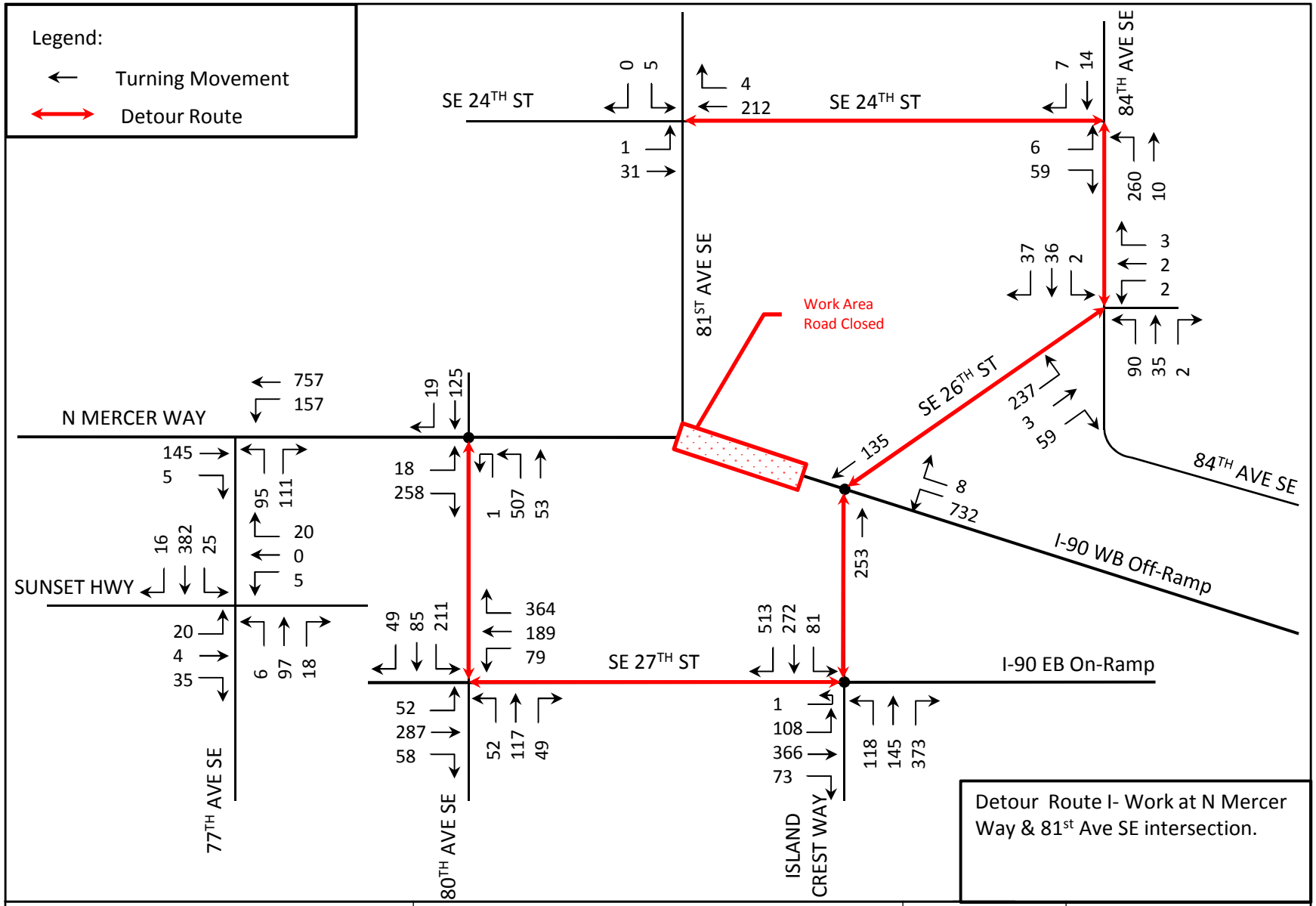
Detour Route I- Work at N Mercer Way & 81st Ave SE intersection.

JACOBS

Traffic Counts- Detour Route I 2020
AM Peak Hour
Mercer Island, WA

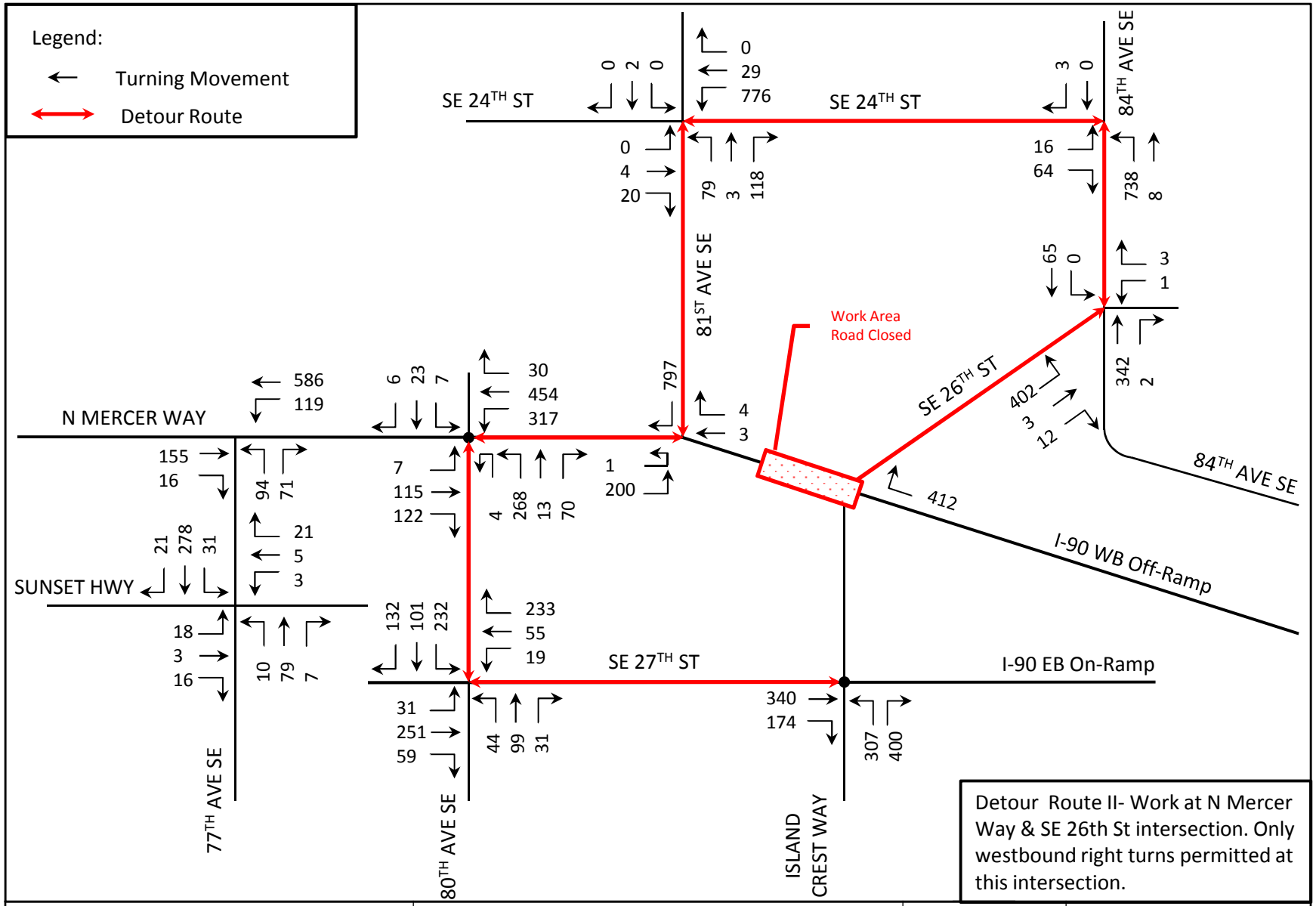
Scale: NTS

Figure: 11



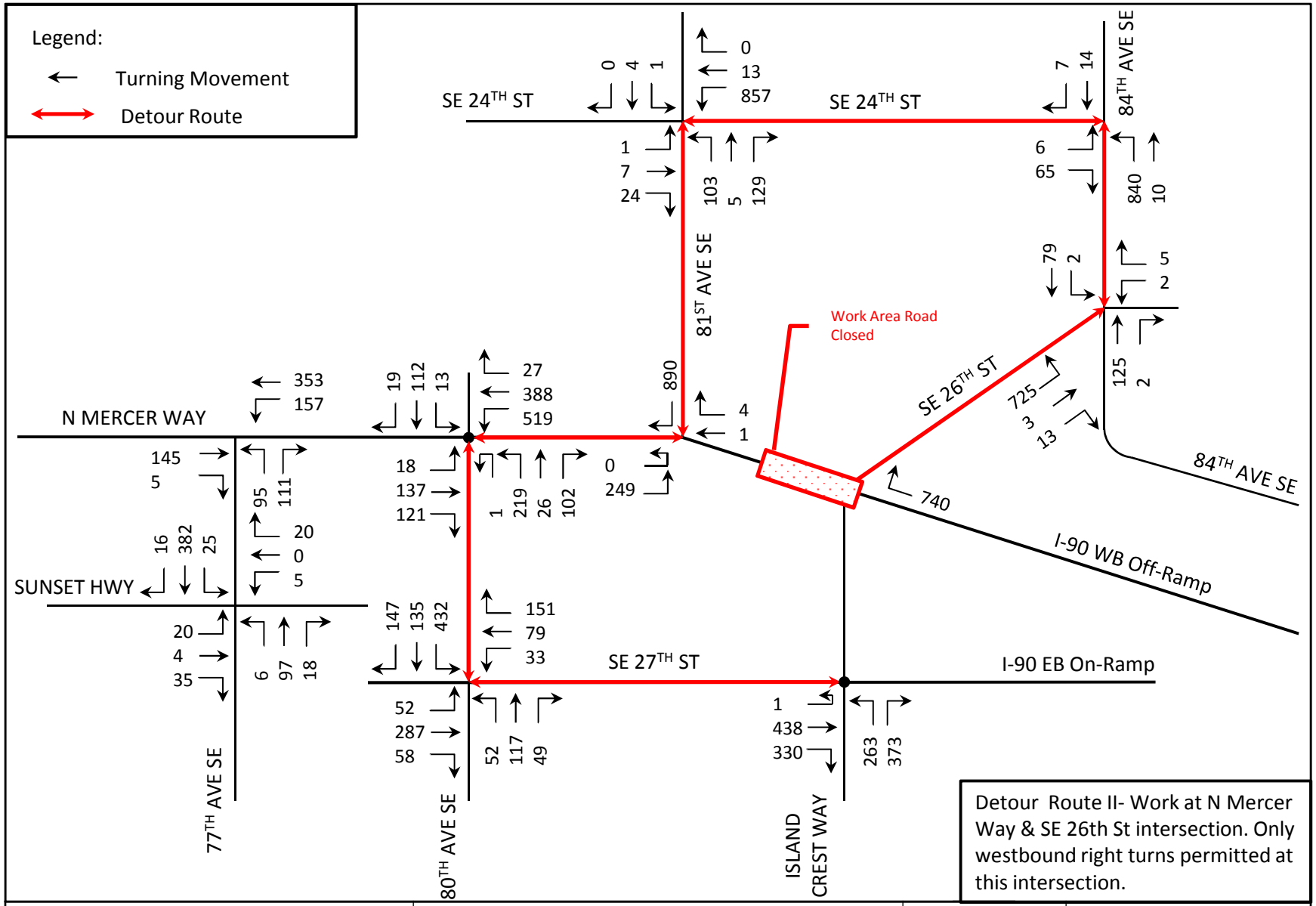
Detour Route I- Work at N Mercer Way & 81st Ave SE intersection.

JACOBS	Traffic Counts- Detour Route I 2020 PM Peak Hour Mercer Island, WA	Scale: NTS	Figure: 12



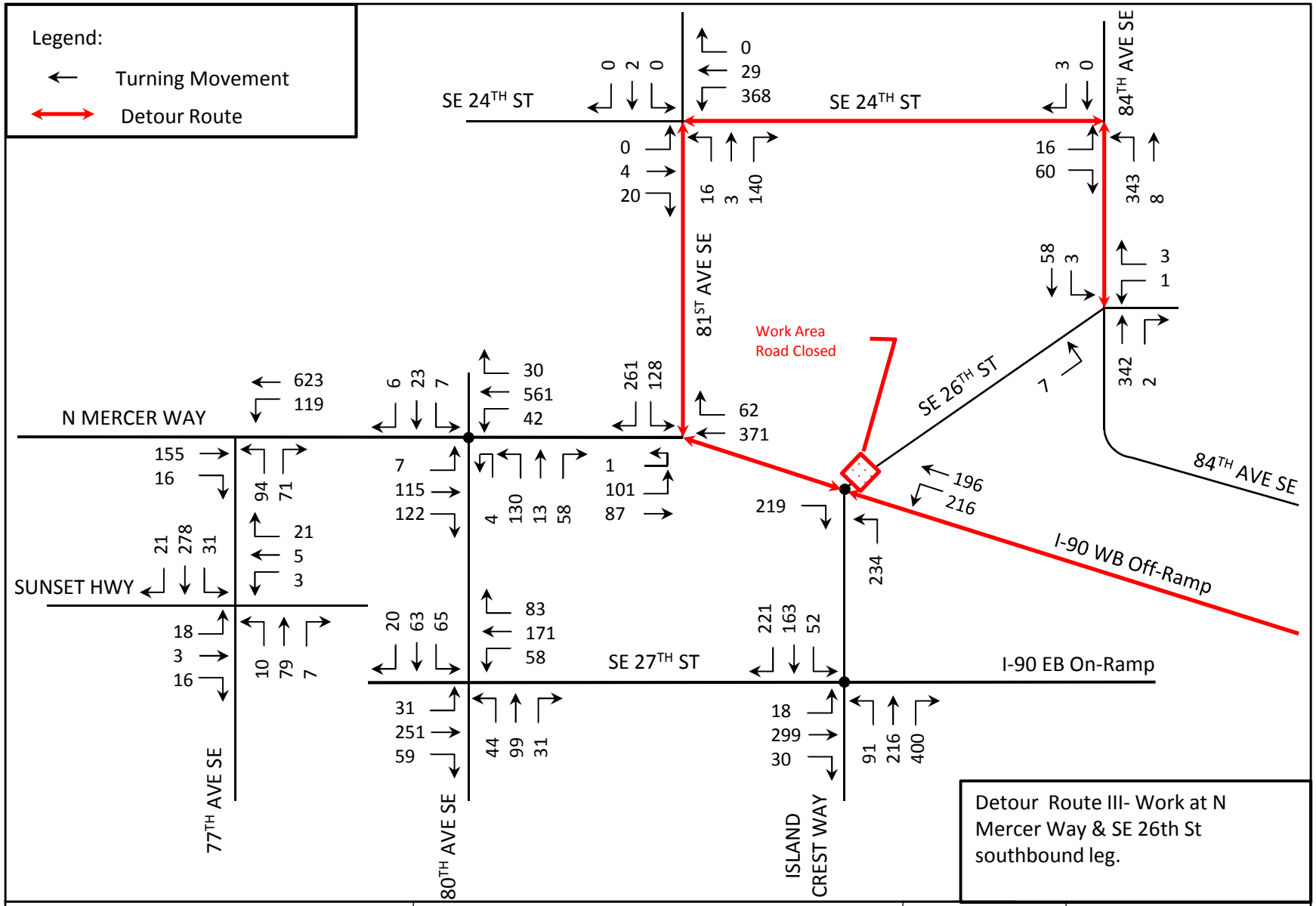
Detour Route II- Work at N Mercer Way & SE 26th St intersection. Only westbound right turns permitted at this intersection.

JACOBS	Traffic Counts- Detour Route II 2020 AM Peak Hour Mercer Island, WA	N Scale: NTS	Figure: 13



Detour Route II- Work at N Mercer Way & SE 26th St intersection. Only westbound right turns permitted at this intersection.

JACOBS	Traffic Counts- Detour Route II 2020 PM Peak Hour Mercer Island, WA	N Scale: NTS	Figure: 14



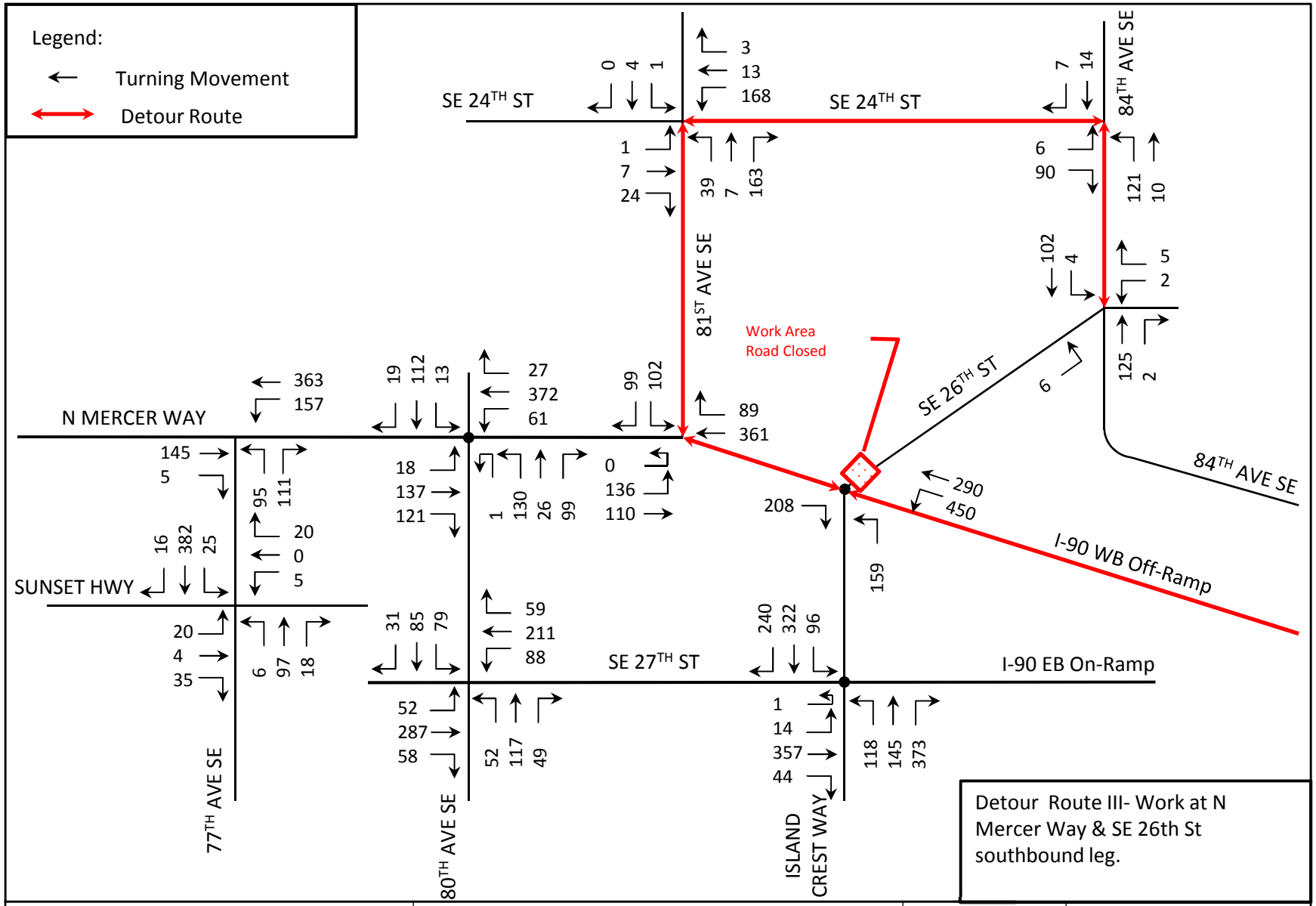
JACOBS

Traffic Counts- Detour Route III 2020
AM Peak Hour
Mercer Island, WA

N

Scale: NTS

Figure: 15



Detour Route III- Work at N Mercer Way & SE 26th St southbound leg.

JACOBS

Traffic Counts- Detour Route III 2020
PM Peak Hour
Mercer Island, WA

N

Scale: NTS

Figure: 16

4.3 AREA 1, TRAFFIC OPERATIONS ANALYSIS OF CONSTRUCTION CONFIGURATIONS

An intersection operations analysis was prepared for weekday peak-hour conditions for each construction configuration. Synchro software was used to assess intersection delay and LOS for each intersection under study. Evening and overnight conditions were not analyzed in terms of LOS. Table 5 summarizes the LOS and Average Delay for each construction configuration for the AM Peak hours (8:00 am-9:00 am) and PM Peak hours(5:00 pm-6:00 pm).

4.3.1 Unsignalized Intersections

The City of Mercer Island will have jurisdiction over the unsignalized intersections in the study area. LOS standard for these intersections is LOS D. Configuration Detour Route II shows two unsignalized intersections expected to operate below LOS D during the PM peak hour, N Mercer Way & 81st Ave SE and 81st Ave SE & SE 24th St.

Configuration for Detour Route II recommendations:

- Intersection of N Mercer Way & 81st Ave SE: it is recommended to control the intersection using flaggers during the PM peak hour to mitigate delays at the southbound approach. This will allow more detour vehicles to flow through the intersection without having to stop one car at a time.
- Intersection of 81st Ave SE & SE 24th St: it is recommended to control the intersection using flaggers during the PM peak hour to mitigate delays at the northbound approach.

4.3.2 Signalized Intersections

WSDOT operates the signalized intersections in the study area. The WSDOT LOS standard for signalized intersections is LOS D. Configurations for Detour Route I, Detour Route II, and Detour Route III show one intersection per detour route expected to operate below LOS D; these are 80th Ave SE & N Mercer Way (Detour Route I), N Mercer Way & SE 26th St (Detour Route III), and SE 27th St & Island Crest Way (Detour Route II). In addition, the queue length and v/c ratios were analyzed at these intersections. Table 6 summarizes the intersection queue length, v/c ratios, and LOS before and after proposed mitigations have been implemented. If I-90 westbound off-ramp backs up onto the mainline even with mitigation, it is recommended that further optimization be coordinated with WSDOT on revising the signal timings.

Configuration for Detour Route I recommendations:

- Intersection of 80th Ave SE & N Mercer Way: it is recommended to update the signal timing during AM and PM peak hours to mitigate the queue length at the northbound approach and expected LOS at the intersection. Westbound green time was reduced to the minimum allowed to increase the northbound left turn green time. Additionally, green time for eastbound traffic (left and right turns) was adjusted.
- Intersection of N Mercer Way & SE 26th St: it is recommended to update the signal timing during AM and PM peak hours to mitigate the queue length at the westbound approach. Eastbound green time was reduced to the minimum allowed. Since there will be no eastbound traffic, the westbound traffic will not have delays caused by the opposing traffic. The northbound left turn phase was removed to balance the green time between northbound and southbound through traffic. The LOS at this intersection meet standards before and after mitigations were implemented.

- Intersection SE 27th St & Island Crest Way: it is recommended to update the signal timing during PM peak hours to mitigate the queue length at the eastbound approach. Green time for northbound and southbound lanes was reduced to assign more time to the eastbound lane. The LOS at this intersection meets standards before and after mitigations were implemented during the PM peak hour. Mitigations are not recommended for the AM peak hour since it meets LOS and queue length standards.
- Cycle length was not changed as part of the signal optimizations. Appendix G provides Synchro worksheets showing optimized signal timing for Detour Route I.

Configuration for Detour Route II recommendations:

- Intersection of 80th Ave SE & N Mercer Way: it is recommended to update the signal timing during PM peak hours to mitigate the queue length at the westbound approach. The existing cycle length is 105 seconds. A cycle length of 120 seconds is recommended during the PM peak hour for mitigation. Increasing the cycle length will allow more time on the westbound through and left-turn lanes. Additionally, to balance the cycle's phases at the intersection, eastbound green time was reduced and northbound and southbound green time was increased. The LOS at this intersection meets standards after mitigations were implemented. Mitigations are not recommended for the AM peak hour since it meets LOS and queue length standards.
- Intersection of N Mercer Way & SE 26th St: no mitigation is required.
- Intersection of SE 27th St & Island Crest Way: it is recommended to update the signal timing during AM and PM peak hours to mitigate the queue length at the northbound and eastbound approach and expected LOS during the PM Peak hour. Southbound green time was reduced to the minimum allowed to increase the eastbound and northbound green time. The LOS at this intersection meets standards during the AM peak hour period before and after mitigations were implemented. The LOS during the PM peak hour meets standards after mitigations were implemented.
- Cycle length at the intersections of N Mercer Way & SE 26th St and SE 27th St & Island Crest Way were not changed as part of the signal optimizations. Appendix I provides Synchro worksheets showing optimized signal timings for Detour Route II.

Configuration for Detour Route III recommendations:

- Intersection of 80th Ave SE & N Mercer Way: it is recommended to update the signal timing during AM peak hours to mitigate the queue length at the westbound approach. The existing cycle length is 105 seconds. A cycle length of 120 seconds is recommended during the AM peak hour for mitigation. Increasing the cycle length will allow more time on the westbound and eastbound through lanes. Additionally, to balance the cycle's phases at the intersection, northbound and southbound green time was reduced and northbound left turn was increased. The LOS at this intersection meets standards during the AM and PM peak hour before and after mitigations were implemented.
- Intersection of N Mercer Way & SE 26th St: it is recommended to update the signal timing during AM and PM peak hours to mitigate the queue length at the westbound approach and expected LOS during the PM peak hour. Southbound green time was reduced to the minimum allowed to increase the eastbound and westbound green time. Additionally, northbound through phase was removed allowing all green time to be used by the northbound left turn lane. The LOS at this intersection meets standards during the AM peak hour before and after mitigations were implemented. The LOS during the PM peak hour meets standards after mitigations were implemented.

- Intersection SE 27th St & Island Crest Way: no mitigation is required.
- Appendix K provides Synchro worksheets showing optimized signal timings for Detour Route III.

An additional mitigation option was discussed with WSDOT. The Eastlink EIS mentioned the 80th St HOV ramps could be used by SOV traffic in future conditions. However, WSDOT and the FHWA did not approve this use of the HOV ramps. Therefore, this was not considered as a mitigation option in this analysis.

Table 5
LOS Impacts by Construction Configuration

Intersection	Traffic Control	Detour Route I							Detour Route II							Detour Route III						
		Critical Approach	AM Peak Hour			PM Peak Hour			Critical Approach	AM Peak Hour			PM Peak Hour			Critical Approach	AM Peak Hour			PM Peak Hour		
			LOS	HCM Average Delay (Sec)	ICU Utilization (%)	LOS	HCM Average Delay (Sec)	ICU Utilization (%)		LOS	HCM Average Delay (Sec)	ICU Utilization (%)	LOS	HCM Average Delay (Sec)	ICU Utilization (%)		LOS	HCM Average Delay (Sec)	ICU Utilization (%)	LOS	HCM Average Delay (Sec)	ICU Utilization (%)
77th Ave SE & N Mercer Way	South leg Stop	NB	D	-	73.5	B	-	57.5	NB	A	-	50.4	A	-	37.6	NB	A	-	52.3	A	-	37.6
80th Ave SE & N Mercer Way	Signalized	NB	**F**	144.1	-	**F**	170.6	-	SB/WB^	C	29.8	-	D	52.3	-	WB/SB^	C	33.4	-	C	28.1	-
N Mercer Way & 81st Ave SE	North leg Stop	**Closed**							SB	D	-	80.4	E	-	89.6	SB	B	-	63.5	B	-	55.4
N Mercer Way & SE 26th St	Signalized	WB	D	48.6	-	D	44.9		WB	B*	12.5	-	B*	15.9	-	NB/WB^	C	21.3	-	**F**	81.9	-
SE 26th St & 84th Ave SE	All-way Stop	EB	B	-	58.2	A	-	43.8	EB	A	-	54.6	B	-	62.5	NB	A	-	29.1	A	-	18.6
84th Ave SE & SE 24th St	All-way Stop	NB	A	-	37.3	A	-	32.2	NB	B	-	59.5	C	-	64.7	NB	A	-	37.3	A	-	26.5
81st Ave SE & SE 24th St	Two-way Stop	SB	A	-	30.8	A	-	23.8	NB	D	-	76.5	E	-	82.5	SB	A	-	51.9	A	-	40.5
Sunset Hwy & 77th Ave SE	Two-way Stop	EB	A	-	35.0	A	-	40.7	EB	A	-	35.0	A	-	40.7	EB	A	-	35.0	A	-	40.7
SE 27th St & 80th Ave SE	All-way Stop	WB	C	-	68.8	C	-	70.2	EB/SB^	A	-	54.9	C	-	68.6	EB	A	-	48.9	A	-	52.9
SE 27th St & Island Crest Way	Signalized	EB	C	27.3	-	C	30.7	-	EB	E	66.1	-	F	150.3	-	EB	C	25.0	-	C	29.3	-

* Only WBR trips

ND- No data. Volume is higher than capacity

^AM/PM

Table 6
Signalized Intersections with Mitigations: Queue Length, v/c Ratio, LOS

Signalized Intersections	Critical Approach	AM Peak Hour						PM Peak Hour					
		Detour Route I			Detour Route I With Mitigation			Detour Route I			Detour Route I With Mitigation		
		Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS
80th Ave SE & N Mercer Way	NB	#709	1.39	F	273	0.69	C	#720	1.56	F	267	0.73	C
N Mercer Way & SE 26th St	WB	#358	1.09	D	247	0.63	C	#623	1.0	D	638	0.84	C
SE 27th St & Island Crest Way	EB	352	0.64	C	NM	NM	C	#464	0.79	C	394	0.62	C

Signalized Intersections	Critical Approach	AM Peak Hour						PM Peak Hour					
		Detour Route II			Detour Route II With Mitigation			Detour Route II			Detour Route II With Mitigation		
		Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS
80th Ave SE & N Mercer Way	WB	411	0.7	C	NM	NM	C	#576	1.12	D	424	0.8	D
N Mercer Way & SE 26th St	WB	0	0.34	B	NM	NM	B	0	0.6	B	NM	NM	B
SE 27th St & Island Crest Way	NB/EB^	#486	1.15	E	259	0.44	C	#1102	1.41	F	662	0.81	C

Signalized Intersections	Critical Approach	AM Peak Hour						PM Peak Hour					
		Detour Route III			Detour Route III With Mitigation			Detour Route III			Detour Route III With Mitigation		
		Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS	Queue Length 95th at Critical Approach	v/c Ratio at Critical Approach	Intersection LOS
80th Ave SE & N Mercer Way	WB	#583	0.85	C	549	0.75	C	324	0.58	C	NM	NM	C
N Mercer Way & SE 26th St	WB	#352	0.77	C	190	0.43	B	#716	1.19	F	323	0.64	B
SE 27th St & Island Crest Way	EB	328	0.6	C	NM	NM	C	414	0.71	C	NM	NM	C

95th Percentile volume exceeds capacity, queue may be longer
NM- No Mitigation Required
^AM/PM

4.4 ANALYSIS OF CONSTRUCTION IMPACTS TO PARKING AND ALTERNATIVE TRANSPORTATION MODES

Area 1

Construction activities will impact parking on the residential streets in Area 1 as the Contractor progresses along the alignment. These streets generally include on-street shoulder parking within the ROW which will likely be used by the Contractor for material and equipment staging as the construction zone advances. The duration of these impacts will be limited to the time that the Contractor is actively working within a given section of the alignment, and will not be seen for the total duration of the contract. For reference, pipeline construction is expected to generally advance at a rate of approximately 50 LF per day. Additionally, access to off-street parking at individual residences will be impacted during the construction hours each day as construction moves past individual homes; the Contractor will be required to coordinate with individual homeowners to mitigate this type of impact.

Bus stops at the Mercer Island Park and Ride will be temporarily affected by the road closure at the construction area. For buses currently routed westbound through I-90 off-ramp to N Mercer Way, it is recommended to use the HOV off-ramp to 80th Ave SE while Detour Route I and Detour Route II are in effect.

An additional bus stop affected by the project is at SE 26th St & 82nd Pl SE. During Detour Route II and Detour Route III, it is recommended to reroute the bus to follow the vehicle detour shown in Figure 13 and Figure 15, respectively. Also, the bus stop should be temporarily relocated to the intersection of SE 26th St & 84th Ave. Further coordination by the County and contractor with the school district and Metro will be required prior to construction.

There are no dedicated bicycle lanes affected within Area 1. However, SE 24th St is used by many cyclists and is signed as an alternate bike route. Bicycles riding in the roadway will be flagged through work on SE 24th , and vehicle traffic construction ahead signs will be utilized which will give bikers the opportunity to stay on the main I-90 trail which parallels North Mercer Way near the Mercer Island Park and Ride.

Pedestrians at the intersection of N Mercer Way & SE 26th St will not have access to the southbound leg crosswalk during one weekend while Detour Route III is in process. Pedestrians will be rerouted, likely through the trail at southbound Island Crest Way to the pedestrian trail at SE 27th St. From the pedestrian trail at SE 27th St & 80th Ave SE, pedestrians can be routed through 80th Ave SE northbound to the Park and Ride. Figure 17 shows the recommended bicycle and pedestrians detour. Alternatively, bicycles and pedestrians could be detoured from the trail and routed along 84th Ave to SE 24th then back to the I-90 trail.

Area 2

The I-90 Trail will be temporarily closed between SE 35th St & E Mercer Way and east of SE 26th St & Shorewood Dr. For the extent of the closure between SE 35th St & E Mercer Way, pedestrians and bicycles will be detoured through SE 36th St back to the I-90 Trail at 100th Ave SE. For this detour the pedestrian and bicyclists must cross SE 36th St at N Mercer Way to access the sidewalk, but there is currently no crosswalk across SE 36th St at this intersection. A new crosswalk may be installed by the City of Mercer Island before construction begins. This crossing will be coordinated with the City in advance of construction and if the crosswalk will not be installed by the City before the detour is needed, a temporary crosswalk will be completed by this project. During construction east of SE 26th St & Shorewood Dr, N Mercer Way will be reconfigured to one-way for vehicular traffic and pedestrians and bicycles will be detoured using the N Mercer Way eastbound vehicle lane. Existing pedestrian counts are included in the synchro intersection analysis. As construction is

short-term, pedestrians are not anticipated to significantly impact Area 1 during the construction conditions. Appendix L presents the pedestrian and bicycle detour for both cases, drawings T107 and T108.

During construction on 90th Pl SE, residential on-street parking will be restricted. Residents will have local access, but individual on-street parking areas on 90th Pl SE will be temporarily closed for construction and contractor staging for some portion of the work. On-street parking located on the eastbound lane west of Fortuna Dr will be closed during construction on the I-90 Trail. This parking area is approximately 160 ft long with capacity for at least seven cars. There is no existing on-street parking in other areas of the project.

Area 3

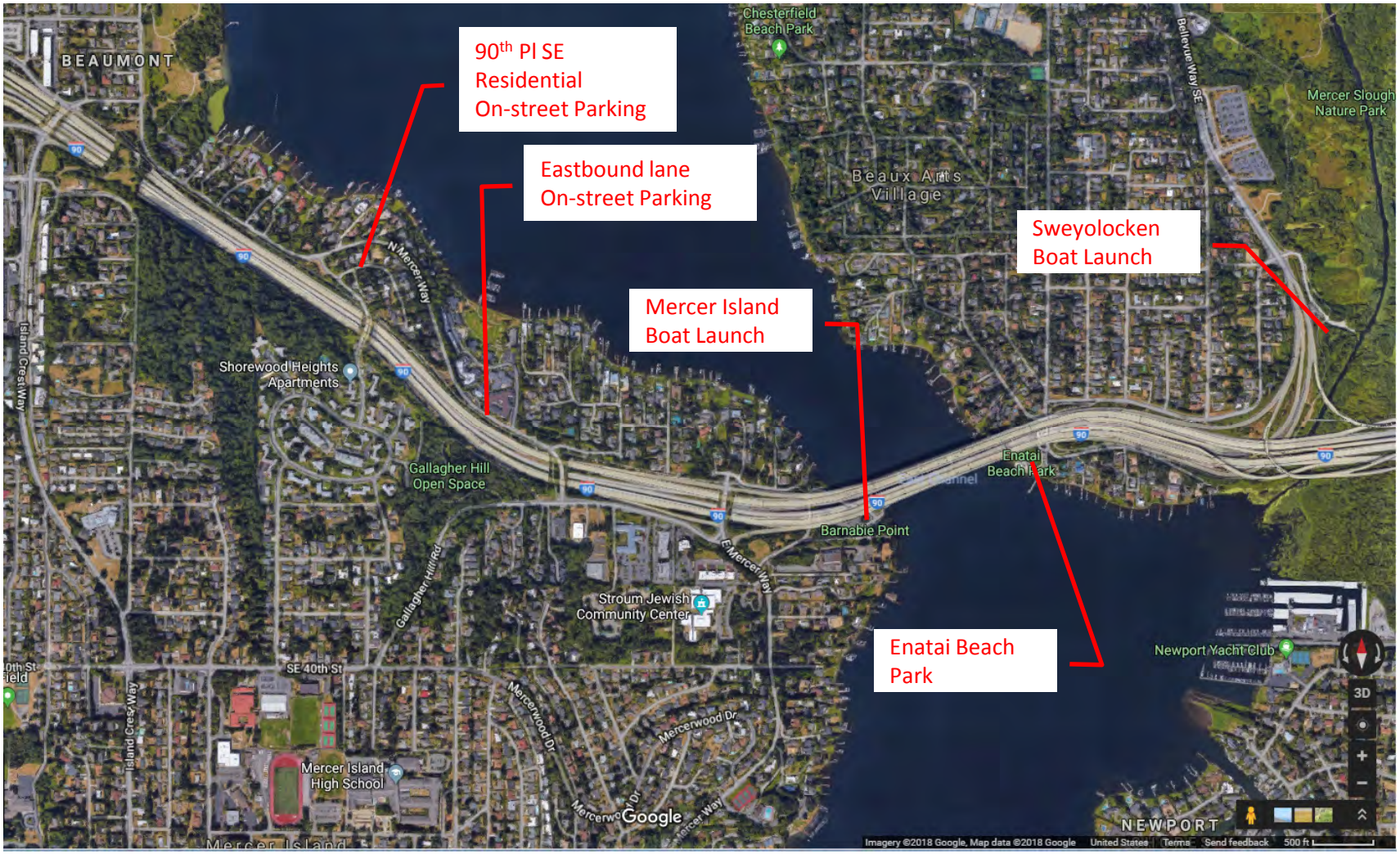
Approximately half of the parking lot at Mercer Island Boat Launch and between three to nine parking spots at the Enatai Beach Park lower lot will be closed to the public during construction. These two lots will be used for construction activities, access, and staging. Additionally, areas along the I-90 Trail in Bellevue will be used for construction staging of vehicles and equipment. These areas will be separated from bicycle and pedestrian traffic by fencing while in use. During the construction of the Enatai Siphon, the temporary closure of the Sweyolocken boat launch and the associated parking area (approximately 20 unmarked spots) will be required. This area will be part of the construction zone and used to stage equipment and materials for horizontal direction drilling which will be used to install the Enatai Siphon pipeline.

During the rehabilitation of the existing Enatai Interceptor, commuters along the I-90 trail between the Sweyolocken Pump Station and Enatai Beach Park will be periodically delayed due to construction equipment and vehicles that will need to access staging areas for pipe rehabilitation at manholes and angle structures along the existing Enatai Interceptor. Signage will be placed ahead of impacts, and flaggers will direct pedestrian and bike traffic while construction equipment moves along the trails to staging areas. Additionally, when work will be occurring adjacent to the I-90 Trail, barriers/fencing will separate trail bicycle and pedestrian traffic. Signage requiring cyclists to reduce speed may be needed.

Bike and pedestrian traffic along the trail between the Sweyolocken Pump Station and Enatai Beach Park will also be impacted by the horizontal directional drilling work and the temporary closure of Sweyolocken Boat Launch parking area. Bicycles and pedestrians traveling along Bellevue Way SE towards the I-90 Trail are required to cross through the Sweyolocken boat launch area to continue along the local trail system. A local detour around the work zone in close proximity to the exiting trail is the preferred mitigation option but may not be feasible based on the limited area available. The alternative detour is substantial and requires directing bicycles and pedestrians into the Enatai neighborhood along 112th Ave SE and SE 34th St to avoid construction and get back onto the I-90 Trail.

Figure 18 shows the location of parking areas affected by construction.

JACOBS	Bicycle and Pedestrians Detour Mercer Island, WA	N Scale: NTS	Figure: 17



JACOBS	Parking Areas Affected by Construction Mercer Island, WA	N Scale: NTS	Figure: 18

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 AREA 1

The traffic impact analysis for Area 1 was conducted to evaluate the temporary transportation impacts associated with construction of the project and recommend measures to mitigate those impacts. The results of the study are summarized below:

Existing Conditions:

- All signalized and unsignalized intersections are operating at an acceptable LOS during the peak hours.

Future Conditions:

- Signalized and unsignalized intersections are operating at an acceptable LOS during the peak hours.
- Transportation impacts associated with operation and maintenance of the upgraded WTD facilities after the project is complete are not expected to affect the roadway network.

Detour Route I:

- Signalized intersection 80th Ave SE & N Mercer Way is not expected to operate at an acceptable LOS during peak hours. The northbound queue length exceeds lane capacity during peak hours. Recommended mitigation is to update signal timing to improve LOS and queue length at northbound approach.
- Signalized intersection N Mercer Way & SE 26th St is expected to operate at an acceptable LOS during peak hour. The westbound queue length exceeds lane capacity during peak hours. Recommended mitigation is to update signal timing to improve queue length at westbound approach.
- Signalized intersection SE 27th St & Island Crest Way is expected to operate at an acceptable LOS during peak hour. The eastbound queue length exceeds lane capacity during peak hours. Recommended mitigation is to update signal timing to improve queue length at eastbound approach.

Detour Route II:

- Signalized intersection 80th Ave SE & N Mercer Way is expected to operate at an acceptable LOS during peak hours. The westbound queue length exceeds lane capacity during PM peak hour. Recommended mitigation is to update signal timing to improve queue length at westbound approach.
- Unsignalized intersection N Mercer Way & 81st Ave SE is not expected to operate at an acceptable LOS during PM peak hour. Recommended mitigation is to control the intersection using flaggers during the PM peak hour to improve delays at the southbound approach.
- Signalized intersection N Mercer Way & SE 26th St is operating at an acceptable LOS during the peak hours. Volume meets capacity at all intersection approaches.
- Unsignalized intersection 81st Ave SE & SE 24th St is not expected to operate at an acceptable LOS during PM peak hour. Recommended mitigation is to control the intersection using flaggers during the PM peak hour to improve delays at the northbound approach.

- Signalized intersection SE 27th St & Island Crest Way is not expected to operate at an acceptable LOS during PM peak hour. The northbound and eastbound queue length exceeds lane capacity during peak hours. Recommended mitigation is to update signal timing to improve LOS and the queue length at northbound and eastbound approaches.

Detour Route III:

- Signalized intersection 80th Ave SE & N Mercer Way is expected to operate at an acceptable LOS during peak hours. The westbound queue length exceeds lane capacity during AM peak hours. Recommended mitigation is to update signal timing to improve queue length at westbound approach.
- Signalized intersection N Mercer Way & SE 26th St is not expected to operate at an acceptable LOS PM during peak hour. The westbound queue length exceeds lane capacity during peak hours. Recommended mitigation is to update signal timing during peak hours to improve queue length at westbound approach.

In Area 1, there are minimal impacts anticipated to transit and pedestrians. Transit routes and pedestrians will be detoured around closed areas as required. To mitigate road closures and detours, advanced notice will be provided to the community. On-street parking will be directly impacted by construction activities as the work progresses along each street. Additionally, the contractor will likely use the shoulder area in the vicinity of the active work zone for staging of material and equipment during active construction. Parking impacts will be limited to the area where the contractor is actively performing work and will not impact anyone area for an extended period of time. To minimize the impact to residents, it is recommended that the contractor not be allowed to use shoulder parking along streets for longterm storage or stockpiling of material or equipment and that normal daytime construction hours are used. Our current traffic modeling analysis (with adjusted signal timing) does show that we do not cause any further backups during construction than normal baseline conditions. At this time, we propose to adjust signal timing, and if more mitigation is needed during construction adding a police officer for additional traffic control at peak times.

There are no issues identified that will require further analysis or investigation.

5.2 AREA 2

During construction, temporary traffic impacts are anticipated along North Mercer Way from 84th Ave SE to Fortuna Drive. These impacts will include flagging construction traffic in and out of the work zone on the I-90 Trail and sections of flagger controlled one-way traffic to allow for pedestrian and bicycle detours.

Work along 90th Pl SE, SE 35th St, 97th Ave SE, and SE 35th Pl will impact access and parking for local residents during construction hours. Direct coordination with residents during design and construction will be required to minimize disruptions, and open trenches will be plated over during off hours to allow better access.

A large portion of the work in Area 2 will take place within the I-90 Trail which will directly impact pedestrians and bicycle users. When work is occurring on the trail between SE 26th Street and SE 35th St, detour routes will be provided along North Mercer Way to facilitate the movement through the work area. These detours will include the use of existing sidewalk, paved and un-paved shoulders, and closed traffic lanes. Flaggers will be used to allow bikes and pedestrians safely crossing North Mercer Way in areas without existing crosswalks. To mitigate road closures and detours in area 2, advanced notice will be provided to the community.

Street parking thoughout this area will be impacted by construction activities including bike/pedestrian detours. These impacts will generally be limited to the time it takes the contractor to move through the immediate area. However, shoulder parking on North Mercer Way will be impacted for a longer duration as it will serve as a bike/detour route while work is being done along portions of the I-90 Trail. Half of the parking lot at the Mercer

Island Boat Launch will be impacted by construction activities; signage will be provided in advance of construction activities.

5.3 AREA 3

Traffic impacts in this area are expected to be minimal as none of the work will be directly occurring in through streets. However, a large portion of the work in Area 3 will occur on or adjacent to the I-90 Trail and will require the use of the trail for access and a short term closure of the section near the Sweyolocken Boat Launch which will directly impact pedestrians and bicycle users. To mitigate impacts to trail users, work will be staged off of the trail or a detour route will be provided around the work area. A local detour route for the work at the Sweyolocken Boat Launch is preferred but may not be possible. If it is determined that a local detour around the construction zone is not safe or feasible, a longer detour through the Enatai neighborhood may be required. Additionally, short-term closures of other portions of the trail will be needed to move equipment to the work locations. During these closures, flaggers will stop users to prevent conflicts with vehicles being moved down the trail which will result in short delays. To mitigate this impact, closure times and dates will be posted in advance and will be set to avoid peak commute hours.

Parking at the Enatai Beach Park and the Sweyolocken Boat launch will be impacted by construction activities. Impacts to the parking at the Sweyolocken Boat Launch will be for a limited period while construction is active at this location. Since the boat launch will be closed during this period and the local trail will be detoured around the immediate area, the temporary closure of this parking should have a limited impact.

REFERENCES

City of Mercer Island. November 7, 2016. KPG Traffic Analysis for Mercer Island I-90 Access Options

Sound Transit. July 2011. East Link Project Final EIS, Chapter 3 Transportation Consequences

Idax. October 2017. Turning Movement Counts and Volume-Only Tube Counts for nine intersections (provided 10-23-17 and 10-30-17)

Idax. October 2017. Turning movement counts for Island Crest Way & SE 27th Street (provided by the City of Mercer Island 10-30-17)

Transportation Research Board. 2010. Highway Capacity Manual

City of Mercer Island. 2016 Updates. Comprehensive Plan

Trafficware. 2003. Intersection Capacity Utilization.

Traffic Impact Study

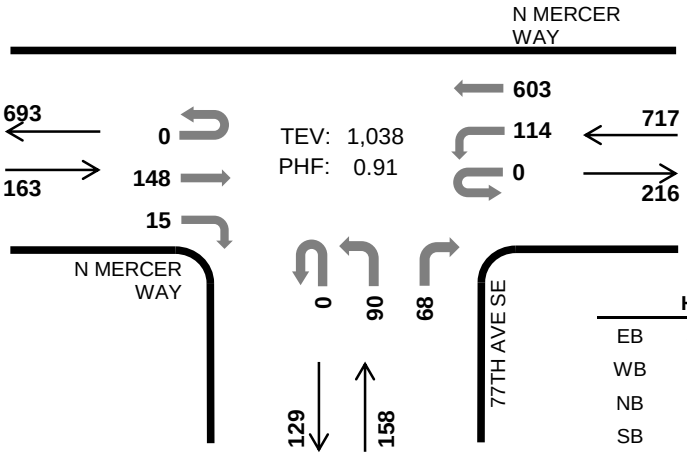
Appendix A. Existing Traffic Count Data

77TH AVE SE
N MERCER WAY

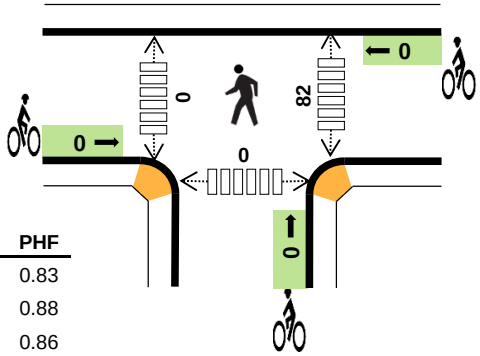
N

Peak Hour

Date: Tue, Oct 17, 2017
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	4.3%	0.83
WB	5.3%	0.88
NB	7.6%	0.86
SB	-	-
TOTAL	5.5%	0.91



Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				77TH AVE SE Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
8:00 AM	0	0	44	5	0	33	145	0	0	24	0	19	0	0	0	0	270	0
8:15 AM	0	0	33	1	0	29	175	0	0	30	0	16	0	0	0	0	284	0
8:30 AM	0	0	33	3	0	21	142	0	0	18	0	17	0	0	0	0	234	0
8:45 AM	0	0	38	6	0	31	141	0	0	18	0	16	0	0	0	0	250	1,038
Peak Hour	0	0	148	15	0	114	603	0	0	90	0	68	0	0	0	0	1,038	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
8:00 AM	1	10	3	0	*14*	0	0	0	0	*0*	29	0	0	0	*29*
8:15 AM	1	9	4	0	*14*	0	0	0	0	*0*	29	0	0	0	*29*
8:30 AM	1	9	2	0	*12*	0	0	0	0	*0*	12	0	0	0	*12*
8:45 AM	4	10	3	0	*17*	0	0	0	0	*0*	12	0	0	0	*12*
Peak Hour	7	38	12	0	*57*	0	0	0	0	*0*	82	0	0	0	*82*

Three-Hour Count Summaries

Interval Start	N MERCER WAY				N MERCER WAY				77TH AVE SE				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	0	8	0	0	20	39	0	0	11	0	11	0	0	0	0	89	0
6:15 AM	0	0	11	2	0	23	59	0	0	2	0	15	0	0	0	0	112	0
6:30 AM	0	0	17	1	0	22	74	0	0	18	0	15	0	0	0	0	147	0
6:45 AM	0	0	25	1	0	21	74	0	0	14	0	14	0	0	0	0	149	497
7:00 AM	0	0	30	2	0	29	120	0	0	17	0	12	0	0	0	0	210	618
7:15 AM	0	0	33	2	0	28	126	0	0	27	0	11	0	0	0	0	227	733
7:30 AM	0	0	38	3	0	27	137	0	0	23	0	15	0	0	0	0	243	829
7:45 AM	0	0	39	5	0	25	131	0	0	21	0	13	0	0	0	0	234	914
8:00 AM	**0**	**0**	**44**	**5**	**0**	**33**	**145**	**0**	**0**	**24**	**0**	**19**	**0**	**0**	**0**	**0**	**270**	974
8:15 AM	**0**	**0**	**33**	**1**	**0**	**29**	**175**	**0**	**0**	**30**	**0**	**16**	**0**	**0**	**0**	**0**	**284**	1,031
8:30 AM	**0**	**0**	**33**	**3**	**0**	**21**	**142**	**0**	**0**	**18**	**0**	**17**	**0**	**0**	**0**	**0**	**234**	1,022
8:45 AM	**0**	**0**	**38**	**6**	**0**	**31**	**141**	**0**	**0**	**18**	**0**	**16**	**0**	**0**	**0**	**0**	**250**	**1,038**
Count Total	0	0	349	31	0	309	1,363	0	0	223	0	174	0	0	0	0	2,449	0
Peak Hour	**0**	**0**	**148**	**15**	**0**	**114**	**603**	**0**	**0**	**90**	**0**	**68**	**0**	**0**	**0**	**0**	**1,038**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

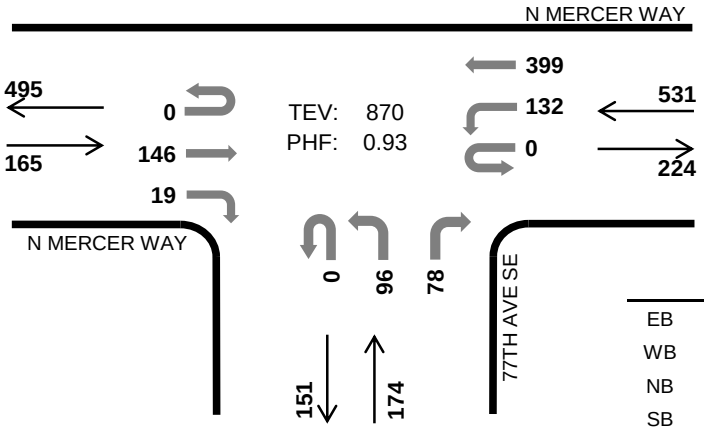
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	3	2	0	*5*	0	1	0	0	*1*	1	0	0	0	*1*
6:15 AM	1	5	2	0	*8*	0	0	0	0	*0*	2	0	0	0	*2*
6:30 AM	0	4	3	0	*7*	1	3	0	0	*4*	5	0	0	0	*5*
6:45 AM	1	6	3	0	*10*	0	0	0	0	*0*	4	0	0	0	*4*
7:00 AM	1	10	1	0	*12*	0	0	0	0	*0*	10	0	0	0	*10*
7:15 AM	3	5	3	0	*11*	1	1	0	0	*2*	15	0	0	0	*15*
7:30 AM	1	16	3	0	*20*	0	1	0	0	*1*	18	0	0	0	*18*
7:45 AM	4	7	5	0	*16*	1	0	0	0	*1*	20	0	0	0	*20*
8:00 AM	**1**	**10**	**3**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**29**	**0**	**0**	**0**	*29*
8:15 AM	**1**	**9**	**4**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**29**	**0**	**0**	**0**	*29*
8:30 AM	**1**	**9**	**2**	**0**	***12***	**0**	**0**	**0**	**0**	***0***	**12**	**0**	**0**	**0**	*12*
8:45 AM	**4**	**10**	**3**	**0**	***17***	**0**	**0**	**0**	**0**	***0***	**12**	**0**	**0**	**0**	***12***
Count Total	18	94	34	0	*146*	3	6	0	0	*9*	157	0	0	0	*157*
Peak Hr	**7**	**38**	**12**	**0**	***57***	**0**	**0**	**0**	**0**	***0***	**82**	**0**	**0**	**0**	***82***

77TH AVE SE
N MERCER WAY

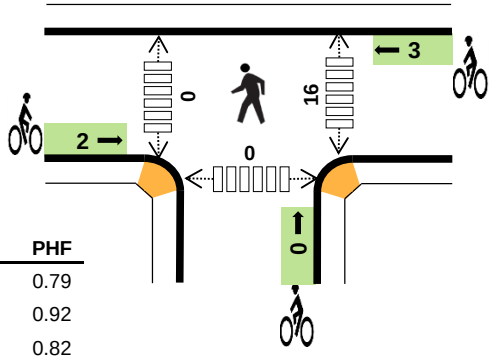
N

Peak Hour

Date: Tue, Oct 17, 2017
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	4.8%	0.79
WB	3.8%	0.92
NB	11.5%	0.82
SB	-	-
TOTAL	5.5%	0.93



Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				77TH AVE SE Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	44	8	0	28	112	0	0	21	0	20	0	0	0	0	233	0
4:15 PM	0	0	35	4	0	33	99	0	0	23	0	20	0	0	0	0	214	0
4:30 PM	0	0	31	3	0	24	91	0	0	34	0	19	0	0	0	0	202	0
4:45 PM	0	0	36	4	0	47	97	0	0	18	0	19	0	0	0	0	221	870
Peak Hour	0	0	146	19	0	132	399	0	0	96	0	78	0	0	0	0	870	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	5	6	0	*15*	0	0	0	0	*0*	2	0	0	0	*2*
4:15 PM	2	5	5	0	*12*	1	1	0	0	*2*	4	0	0	0	*4*
4:30 PM	1	4	5	0	*10*	1	0	0	0	*1*	5	0	0	0	*5*
4:45 PM	1	6	4	0	*11*	0	2	0	0	*2*	5	0	0	0	*5*
Peak Hour	8	20	20	0	*48*	2	3	0	0	*5*	16	0	0	0	*16*

Three-Hour Count Summaries

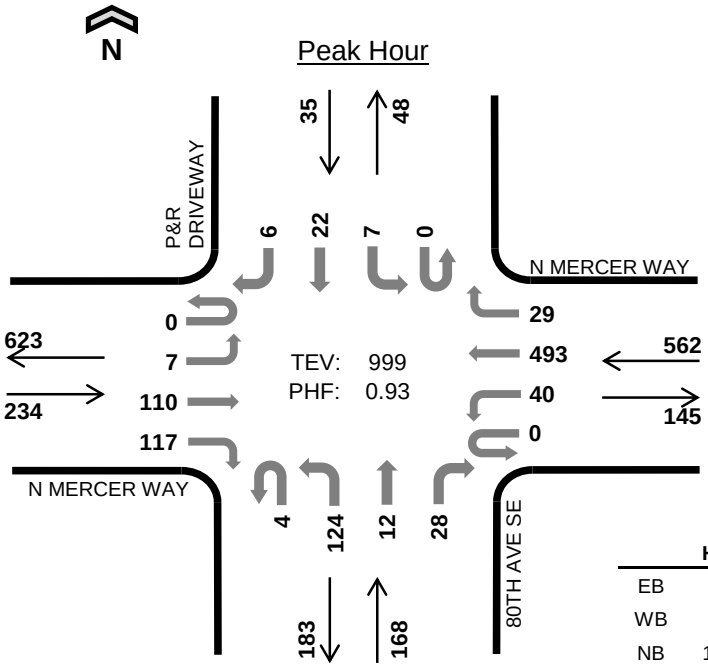
Interval Start	N MERCER WAY				N MERCER WAY				77TH AVE SE				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	45	3	0	33	97	0	0	30	0	24	0	0	0	0	232	0
3:15 PM	0	0	40	4	0	27	104	0	0	24	0	24	0	0	0	0	223	0
3:30 PM	0	0	39	1	1	33	68	0	0	28	0	31	0	0	0	0	201	0
3:45 PM	0	0	27	3	0	21	77	0	0	23	0	31	0	0	0	0	182	838
4:00 PM	**0**	**0**	**44**	**8**	**0**	**28**	**112**	**0**	**0**	**21**	**0**	**20**	**0**	**0**	**0**	**0**	**233**	839
4:15 PM	**0**	**0**	**35**	**4**	**0**	**33**	**99**	**0**	**0**	**23**	**0**	**20**	**0**	**0**	**0**	**0**	**214**	830
4:30 PM	**0**	**0**	**31**	**3**	**0**	**24**	**91**	**0**	**0**	**34**	**0**	**19**	**0**	**0**	**0**	**0**	**202**	831
4:45 PM	**0**	**0**	**36**	**4**	**0**	**47**	**97**	**0**	**0**	**18**	**0**	**19**	**0**	**0**	**0**	**0**	**221**	**870**
5:00 PM	0	0	33	0	0	31	106	0	0	35	0	24	0	0	0	0	229	866
5:15 PM	0	0	35	1	0	44	97	0	0	17	0	21	0	0	0	0	215	867
5:30 PM	0	0	26	2	0	43	78	0	0	20	0	36	0	0	0	0	205	870
5:45 PM	0	0	45	2	0	32	82	0	0	19	0	25	0	0	0	0	205	854
Count Total	0	0	436	35	1	396	1,108	0	0	292	0	294	0	0	0	0	2,562	0
Peak Hour	**0**	**0**	**146**	**19**	**0**	**132**	**399**	**0**	**0**	**96**	**0**	**78**	**0**	**0**	**0**	**0**	**870**	**0**

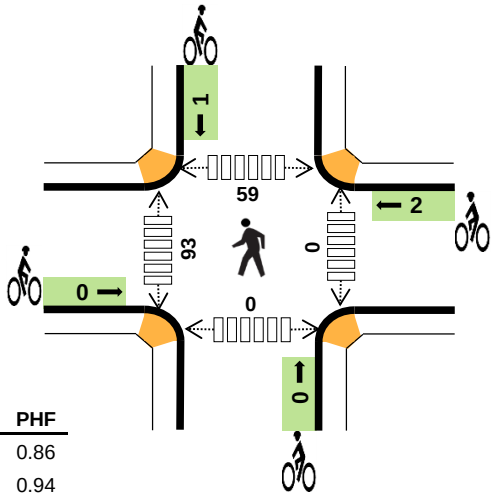
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	2	7	4	0	*13*	0	0	0	0	*0*	1	0	0	0	*1*
3:15 PM	5	6	5	0	*16*	1	0	0	0	*1*	6	0	0	0	*6*
3:30 PM	1	4	4	0	*9*	0	0	0	0	*0*	8	0	0	0	*8*
3:45 PM	0	2	3	0	*5*	0	0	0	0	*0*	9	0	0	0	*9*
4:00 PM	**4**	**5**	**6**	**0**	***15***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	*2*
4:15 PM	**2**	**5**	**5**	**0**	***12***	**1**	**1**	**0**	**0**	***2***	**4**	**0**	**0**	**0**	*4*
4:30 PM	**1**	**4**	**5**	**0**	***10***	**1**	**0**	**0**	**0**	***1***	**5**	**0**	**0**	**0**	*5*
4:45 PM	**1**	**6**	**4**	**0**	***11***	**0**	**2**	**0**	**0**	***2***	**5**	**0**	**0**	**0**	***5***
5:00 PM	1	4	4	0	*9*	0	2	0	0	*2*	20	0	0	0	*20*
5:15 PM	3	2	5	0	*10*	0	0	0	0	*0*	6	0	0	0	*6*
5:30 PM	0	3	5	0	*8*	0	4	0	0	*4*	5	0	0	0	*5*
5:45 PM	1	2	5	0	*8*	1	1	0	0	*2*	4	0	0	0	*4*
Count Total	21	50	55	0	*126*	4	10	0	0	*14*	75	0	0	0	*75*
Peak Hr	**8**	**20**	**20**	**0**	***48***	**2**	**3**	**0**	**0**	***5***	**16**	**0**	**0**	**0**	***16***

80TH AVE SE
N MERCER WAY

Date: Tue, Oct 24, 2017
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	7.3%	0.86
WB	2.5%	0.94
NB	11.3%	0.84
SB	0.0%	0.67
TOTAL	5.0%	0.93

Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				80TH AVE SE Northbound				P&R DRIVEWAY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
8:00 AM	0	2	20	32	0	8	117	7	0	31	4	6	0	1	7	2	237	0
8:15 AM	0	2	37	29	0	9	122	8	0	35	4	11	0	4	6	3	270	0
8:30 AM	0	0	16	34	0	8	129	5	2	28	1	2	0	0	4	0	229	0
8:45 AM	0	3	37	22	0	15	125	9	2	30	3	9	0	2	5	1	263	999
Peak Hour	0	7	110	117	0	40	493	29	4	124	12	28	0	7	22	6	999	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
8:00 AM	4	3	6	0	*13*	0	1	0	0	*1*	0	22	18	0	*40*
8:15 AM	4	1	5	0	*10*	0	1	0	0	*1*	0	32	16	0	*48*
8:30 AM	5	4	4	0	*13*	0	0	0	1	*1*	0	24	11	0	*35*
8:45 AM	4	6	4	0	*14*	0	0	0	0	*0*	0	15	14	0	*29*
Peak Hour	17	14	19	0	*50*	0	2	0	1	*3*	0	93	59	0	*152*

Three-Hour Count Summaries

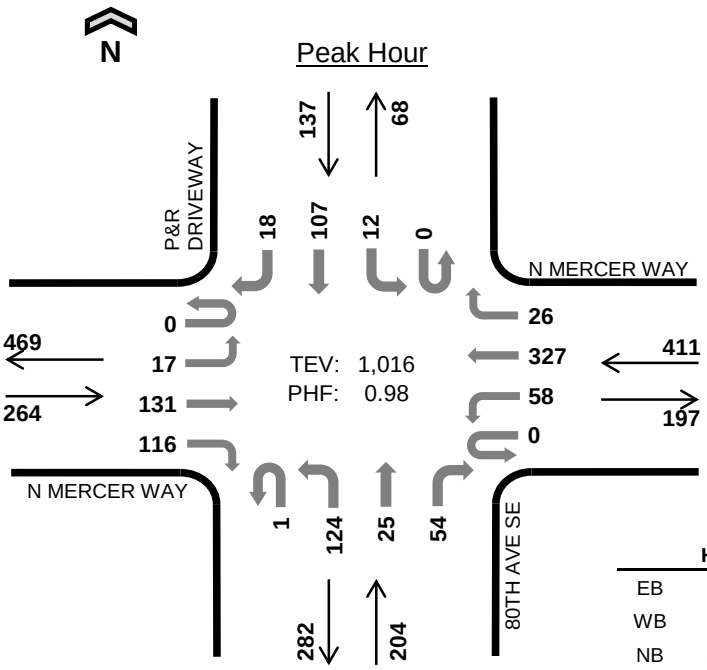
Interval Start	N MERCER WAY				N MERCER WAY				80TH AVE SE				P&R DRIVEWAY				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	7	2	3	0	3	48	25	0	11	8	0	0	1	2	2	112	0
6:15 AM	0	8	3	9	0	1	60	40	0	10	10	1	0	1	1	4	148	0
6:30 AM	0	16	5	6	0	3	75	46	0	22	12	0	0	0	3	4	192	0
6:45 AM	0	12	10	17	0	6	80	51	0	29	24	1	0	0	4	1	235	687
7:00 AM	0	8	14	19	0	13	101	40	0	45	25	3	0	3	23	6	300	875
7:15 AM	0	2	15	26	0	1	95	11	1	37	7	2	0	3	8	6	214	941
7:30 AM	0	1	17	43	0	6	104	5	0	41	5	10	0	4	7	1	244	993
7:45 AM	0	2	21	27	0	7	114	6	0	35	3	16	0	1	4	2	238	996
8:00 AM	**0**	**2**	**20**	**32**	**0**	**8**	**117**	**7**	**0**	**31**	**4**	**6**	**0**	**1**	**7**	**2**	**237**	933
8:15 AM	**0**	**2**	**37**	**29**	**0**	**9**	**122**	**8**	**0**	**35**	**4**	**11**	**0**	**4**	**6**	**3**	**270**	989
8:30 AM	**0**	**0**	**16**	**34**	**0**	**8**	**129**	**5**	**2**	**28**	**1**	**2**	**0**	**0**	**4**	**0**	**229**	974
8:45 AM	**0**	**3**	**37**	**22**	**0**	**15**	**125**	**9**	**2**	**30**	**3**	**9**	**0**	**2**	**5**	**1**	**263**	**999**
Count Total	0	63	197	267	0	80	1,170	253	5	354	106	61	0	20	74	32	2,682	0
Peak Hour	**0**	**7**	**110**	**117**	**0**	**40**	**493**	**29**	**4**	**124**	**12**	**28**	**0**	**7**	**22**	**6**	**999**	**0**

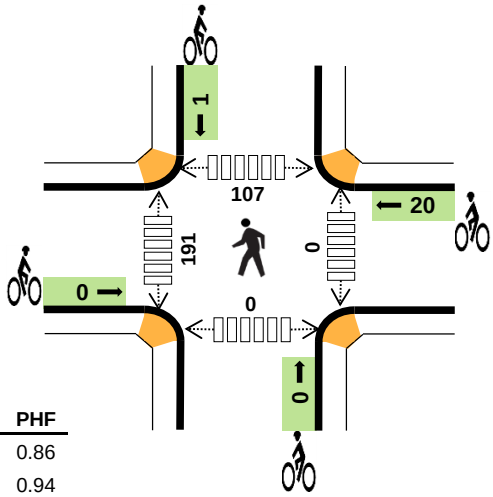
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	1	0	2	0	*3*	0	1	0	0	*1*	0	7	2	0	*9*
6:15 AM	4	2	3	0	*9*	1	1	0	0	*2*	0	8	6	0	*14*
6:30 AM	1	0	6	0	*7*	0	0	0	0	*0*	0	18	7	0	*25*
6:45 AM	4	6	3	0	*13*	0	1	0	0	*1*	0	16	10	0	*26*
7:00 AM	1	2	6	0	*9*	0	0	0	0	*0*	0	22	9	0	*31*
7:15 AM	9	5	4	0	*18*	0	2	0	1	*3*	0	28	16	0	*44*
7:30 AM	6	7	5	0	*18*	2	3	0	0	*5*	0	33	11	0	*44*
7:45 AM	5	7	4	0	*16*	0	3	0	0	*3*	0	23	13	0	*36*
8:00 AM	**4**	**3**	**6**	**0**	***13***	**0**	**1**	**0**	**0**	***1***	**0**	**22**	**18**	**0**	*40*
8:15 AM	**4**	**1**	**5**	**0**	***10***	**0**	**1**	**0**	**0**	***1***	**0**	**32**	**16**	**0**	*48*
8:30 AM	**5**	**4**	**4**	**0**	***13***	**0**	**0**	**0**	**1**	***1***	**0**	**24**	**11**	**0**	*35*
8:45 AM	**4**	**6**	**4**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**15**	**14**	**0**	***29***
Count Total	48	43	52	0	*143*	3	13	0	2	*18*	0	248	133	0	*381*
Peak Hour	**17**	**14**	**19**	**0**	***50***	**0**	**2**	**0**	**1**	***3***	**0**	**93**	**59**	**0**	***152***

80TH AVE SE
N MERCER WAY

Date: Tue, Oct 24, 2017
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	9.5%	0.86
WB	1.2%	0.94
NB	4.9%	0.84
SB	0.0%	0.93
TOTAL	3.9%	0.98

Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				80TH AVE SE Northbound				P&R DRIVEWAY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
5:00 PM	0	3	33	25	0	13	85	8	0	32	6	11	0	3	29	3	251	0
5:15 PM	0	7	35	35	0	16	72	8	1	30	3	14	0	3	29	5	258	0
5:30 PM	0	5	28	17	0	17	87	5	0	35	10	16	0	2	25	8	255	0
5:45 PM	0	2	35	39	0	12	83	5	0	27	6	13	0	4	24	2	252	1,016
Peak Hour	0	17	131	116	0	58	327	26	1	124	25	54	0	12	107	18	1,016	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 PM	6	2	3	0	*11*	0	4	0	0	*4*	0	48	31	0	*79*
5:15 PM	7	1	3	0	*11*	0	7	0	1	*8*	0	46	30	0	*76*
5:30 PM	3	2	2	0	*7*	0	5	0	0	*5*	0	36	17	0	*53*
5:45 PM	9	0	2	0	*11*	0	4	0	0	*4*	0	61	29	0	*90*
Peak Hour	25	5	10	0	*40*	0	20	0	1	*21*	0	191	107	0	*298*

Three-Hour Count Summaries

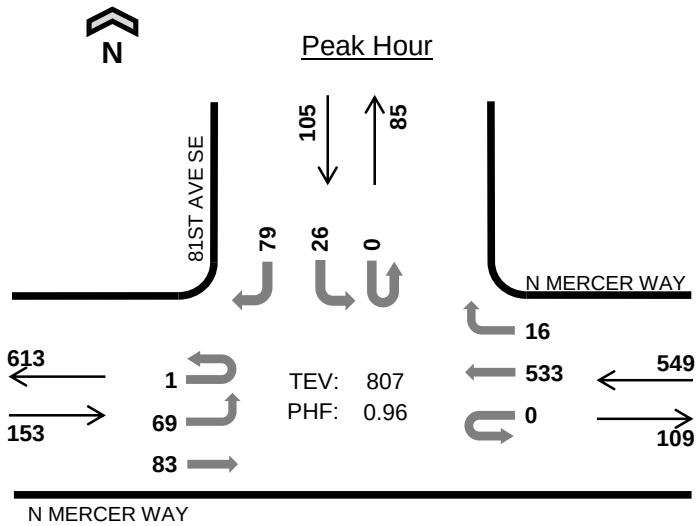
Interval Start	N MERCER WAY				N MERCER WAY				80TH AVE SE				P&R DRIVEWAY				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	2	40	38	0	31	94	7	0	27	0	12	0	0	10	1	262	0
3:15 PM	0	1	36	22	0	16	87	9	1	29	1	9	0	4	26	4	245	0
3:30 PM	0	2	27	32	0	26	75	5	0	29	2	19	0	2	24	0	243	0
3:45 PM	0	2	23	16	0	13	76	2	0	34	0	16	0	3	18	1	204	954
4:00 PM	0	4	28	36	0	17	100	2	1	30	4	11	0	5	34	0	272	964
4:15 PM	0	3	31	25	0	10	84	7	0	27	3	10	0	2	31	4	237	956
4:30 PM	0	7	22	26	0	20	104	3	0	25	5	14	0	5	17	2	250	963
4:45 PM	0	4	28	26	0	24	70	8	1	27	7	13	0	1	21	3	233	992
5:00 PM	**0**	**3**	**33**	**25**	**0**	**13**	**85**	**8**	**0**	**32**	**6**	**11**	**0**	**3**	**29**	**3**	**251**	971
5:15 PM	**0**	**7**	**35**	**35**	**0**	**16**	**72**	**8**	**1**	**30**	**3**	**14**	**0**	**3**	**29**	**5**	**258**	992
5:30 PM	**0**	**5**	**28**	**17**	**0**	**17**	**87**	**5**	**0**	**35**	**10**	**16**	**0**	**2**	**25**	**8**	**255**	997
5:45 PM	**0**	**2**	**35**	**39**	**0**	**12**	**83**	**5**	**0**	**27**	**6**	**13**	**0**	**4**	**24**	**2**	**252**	**1,016**
Count Total	0	42	366	337	0	215	1,017	69	4	352	47	158	0	34	288	33	2,962	0
Peak Hour	**0**	**17**	**131**	**116**	**0**	**58**	**327**	**26**	**1**	**124**	**25**	**54**	**0**	**12**	**107**	**18**	**1,016**	**0**

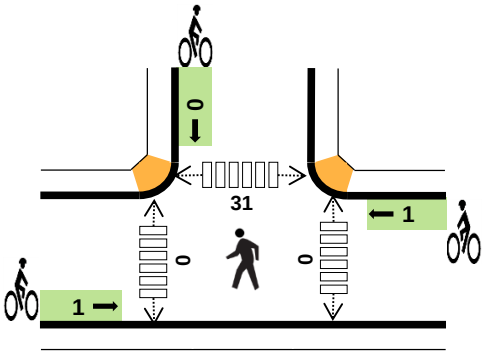
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	2	4	6	0	*12*	0	1	0	0	*1*	0	19	7	0	*26*
3:15 PM	7	4	3	0	*14*	0	0	0	0	*0*	0	20	10	0	*30*
3:30 PM	7	3	3	0	*13*	0	2	1	0	*3*	0	30	10	0	*40*
3:45 PM	3	4	3	0	*10*	0	2	0	1	*3*	0	12	7	0	*19*
4:00 PM	8	0	5	0	*13*	4	0	0	0	*4*	0	43	17	0	*60*
4:15 PM	6	1	2	1	*10*	0	2	2	0	*4*	0	38	14	0	*52*
4:30 PM	6	0	3	0	*9*	1	1	0	0	*2*	0	49	18	0	*67*
4:45 PM	3	1	2	0	*6*	0	2	0	1	*3*	0	22	15	0	*37*
5:00 PM	**6**	**2**	**3**	**0**	***11***	**0**	**4**	**0**	**0**	***4***	**0**	**48**	**31**	**0**	*79*
5:15 PM	**7**	**1**	**3**	**0**	***11***	**0**	**7**	**0**	**1**	***8***	**0**	**46**	**30**	**0**	*76*
5:30 PM	**3**	**2**	**2**	**0**	***7***	**0**	**5**	**0**	**0**	***5***	**0**	**36**	**17**	**0**	*53*
5:45 PM	**9**	**0**	**2**	**0**	***11***	**0**	**4**	**0**	**0**	***4***	**0**	**61**	**29**	**0**	***90***
Count Total	67	22	37	1	*127*	5	30	3	3	*41*	0	424	205	0	*629*
Peak Hour	**25**	**5**	**10**	**0**	***40***	**0**	**20**	**0**	**1**	***21***	**0**	**191**	**107**	**0**	***298***

81ST AVE SE
N MERCER WAY

Date: Tue, Oct 17, 2017
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	3.9%	0.78
WB	3.1%	0.90
NB	-	-
SB	1.0%	0.56
TOTAL	3.0%	0.96

Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				0 Northbound				81ST AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
8:00 AM	0	18	23	0	0	0	144	3	0	0	0	0	0	8	0	14	210	0
8:15 AM	0	12	15	0	0	0	146	6	0	0	0	0	0	1	0	16	196	0
8:30 AM	0	17	19	0	0	0	133	2	0	0	0	0	0	3	0	16	190	0
8:45 AM	1	22	26	0	0	0	110	5	0	0	0	0	0	14	0	33	211	807
Peak Hour	1	69	83	0	0	0	533	16	0	0	0	0	0	26	0	79	807	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
8:00 AM	1	5	0	0	*6*	1	1	0	0	*2*	0	0	9	0	*9*
8:15 AM	2	5	0	0	*7*	0	0	0	0	*0*	0	0	5	0	*5*
8:30 AM	0	3	0	0	*3*	0	0	0	0	*0*	0	0	10	0	*10*
8:45 AM	3	4	0	1	*8*	0	0	0	0	*0*	0	0	7	0	*7*
Peak Hour	6	17	0	1	*24*	1	1	0	0	*2*	0	0	31	0	*31*

Three-Hour Count Summaries

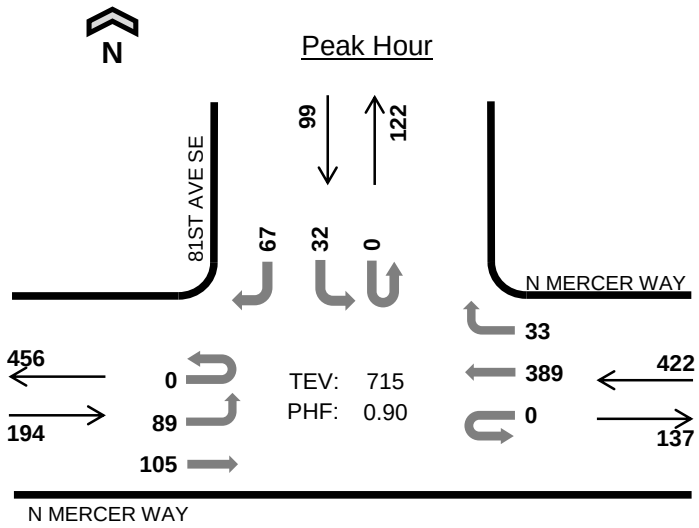
Interval Start	N MERCER WAY				N MERCER WAY				0				81ST AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	1	1	0	0	0	91	0	0	0	0	0	0	1	0	2	96	0
6:15 AM	0	1	2	0	0	0	109	3	0	0	0	0	0	1	0	3	119	0
6:30 AM	0	2	3	0	0	0	123	3	0	0	0	0	0	7	0	11	149	0
6:45 AM	0	2	4	0	0	0	123	7	0	0	0	0	0	5	0	5	146	510
7:00 AM	0	9	7	0	0	0	132	5	0	0	0	0	0	5	0	10	168	582
7:15 AM	1	9	16	0	0	0	122	2	0	0	0	0	0	4	0	5	159	622
7:30 AM	0	6	16	0	0	0	121	6	0	0	0	0	0	11	0	6	166	639
7:45 AM	0	18	18	0	0	0	126	5	0	0	0	0	0	11	0	10	188	681
8:00 AM	**0**	**18**	**23**	**0**	**0**	**0**	**144**	**3**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**14**	**210**	723
8:15 AM	**0**	**12**	**15**	**0**	**0**	**0**	**146**	**6**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**16**	**196**	760
8:30 AM	**0**	**17**	**19**	**0**	**0**	**0**	**133**	**2**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**16**	**190**	784
8:45 AM	**1**	**22**	**26**	**0**	**0**	**0**	**110**	**5**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**33**	**211**	**807**
Count Total	2	117	150	0	0	0	1,480	47	0	0	0	0	0	71	0	131	1,998	0
Peak Hour	**1**	**69**	**83**	**0**	**0**	**0**	**533**	**16**	**0**	**0**	**0**	**0**	**0**	**26**	**0**	**79**	**807**	**0**

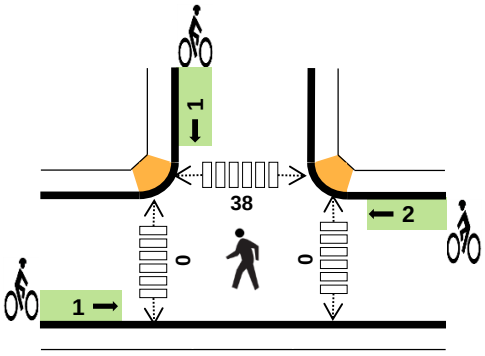
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	1	0	0	*1*	0	1	0	0	*1*	0	0	4	0	*4*
6:15 AM	1	2	0	0	*3*	0	0	0	0	*0*	0	0	1	0	*1*
6:30 AM	0	0	0	0	*0*	0	2	0	0	*2*	0	0	4	0	*4*
6:45 AM	1	1	0	0	*2*	0	0	0	0	*0*	0	0	3	0	*3*
7:00 AM	0	6	0	0	*6*	0	0	0	0	*0*	0	0	8	0	*8*
7:15 AM	3	3	0	0	*6*	0	1	0	0	*1*	0	0	9	0	*9*
7:30 AM	1	8	0	0	*9*	0	1	0	0	*1*	0	0	9	0	*9*
7:45 AM	1	6	0	0	*7*	0	1	0	0	*1*	0	0	8	0	*8*
8:00 AM	**1**	**5**	**0**	**0**	***6***	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**9**	**0**	*9*
8:15 AM	**2**	**5**	**0**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**0**	*5*
8:30 AM	**0**	**3**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**10**	**0**	*10*
8:45 AM	**3**	**4**	**0**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**0**	***7***
Count Total	13	44	0	1	*58*	1	7	0	0	*8*	0	0	77	0	*77*
Peak Hr	**6**	**17**	**0**	**1**	***24***	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**31**	**0**	***31***

81ST AVE SE
N MERCER WAY

Date: Tue, Oct 17, 2017
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	1.0%	0.93
WB	0.7%	0.91
NB	-	-
SB	0.0%	0.75
TOTAL	0.7%	0.90

Three-Hour Count Summaries

Interval Start	N MERCER WAY Eastbound				N MERCER WAY Westbound				0 Northbound				81ST AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
5:00 PM	0	18	32	0	0	0	106	10	0	0	0	0	0	10	0	23	199	0
5:15 PM	0	20	22	0	0	0	94	6	0	0	0	0	0	5	0	19	166	0
5:30 PM	0	29	23	0	0	0	94	7	0	0	0	0	0	6	0	12	171	0
5:45 PM	0	22	28	0	0	0	95	10	0	0	0	0	0	11	0	13	179	715
Peak Hour	0	89	105	0	0	0	389	33	0	0	0	0	0	32	0	67	715	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	7	0	*7*
5:15 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	11	0	*11*
5:30 PM	0	1	0	0	*1*	0	2	0	1	*3*	0	0	13	0	*13*
5:45 PM	1	1	0	0	*2*	1	0	0	0	*1*	0	0	7	0	*7*
Peak Hour	2	3	0	0	*5*	1	2	0	1	*4*	0	0	38	0	*38*

Three-Hour Count Summaries

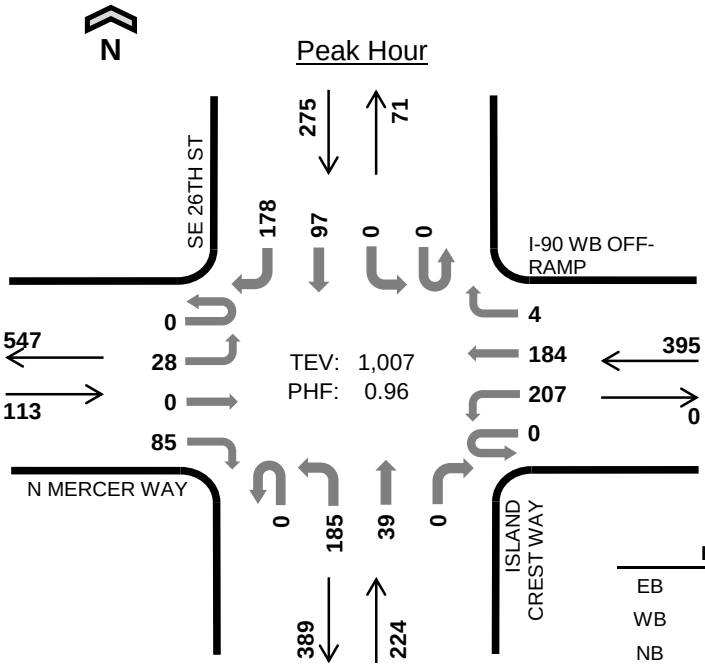
Interval Start	N MERCER WAY				N MERCER WAY				0				81ST AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	15	30	0	0	0	98	8	0	0	0	0	0	10	0	34	195	0
3:15 PM	0	21	32	0	0	0	101	5	0	0	0	0	0	8	0	21	188	0
3:30 PM	0	13	34	0	0	0	80	8	0	0	0	0	0	10	0	14	159	0
3:45 PM	0	14	33	0	0	0	70	7	0	0	0	0	0	2	0	15	141	683
4:00 PM	1	14	31	0	0	0	101	7	0	0	0	0	0	11	0	19	184	672
4:15 PM	0	11	32	0	0	0	100	6	0	0	0	0	0	4	0	23	176	660
4:30 PM	0	21	18	0	0	0	89	2	0	0	0	0	0	8	0	14	152	653
4:45 PM	0	17	26	0	0	0	109	8	0	0	0	0	0	4	0	14	178	690
5:00 PM	**0**	**18**	**32**	**0**	**0**	**0**	**106**	**10**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**23**	**199**	705
5:15 PM	**0**	**20**	**22**	**0**	**0**	**0**	**94**	**6**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**19**	**166**	695
5:30 PM	**0**	**29**	**23**	**0**	**0**	**0**	**94**	**7**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**12**	**171**	714
5:45 PM	**0**	**22**	**28**	**0**	**0**	**0**	**95**	**10**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**13**	**179**	**715**
Count Total	1	215	341	0	0	0	1,137	84	0	0	0	0	0	89	0	221	2,088	0
Peak Hour	**0**	**89**	**105**	**0**	**0**	**0**	**389**	**33**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**67**	**715**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

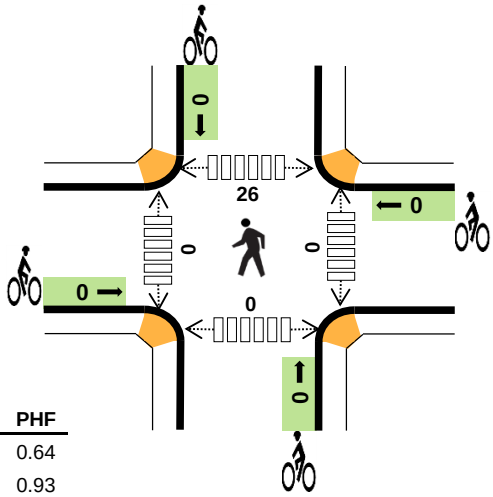
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	3	5	0	1	*9*	0	0	0	0	*0*	0	2	7	0	*9*
3:15 PM	6	3	0	2	*11*	0	0	0	0	*0*	0	0	5	0	*5*
3:30 PM	1	1	0	0	*2*	0	0	0	0	*0*	0	0	5	0	*5*
3:45 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	5	0	*5*
4:00 PM	1	2	0	2	*5*	1	1	0	0	*2*	0	0	9	0	*9*
4:15 PM	1	1	0	0	*2*	1	0	0	0	*1*	0	0	4	0	*4*
4:30 PM	1	0	0	0	*1*	1	0	0	0	*1*	0	0	7	0	*7*
4:45 PM	1	3	0	0	*4*	0	0	0	0	*0*	0	0	11	0	*11*
5:00 PM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**0**	*7*
5:15 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**11**	**0**	*11*
5:30 PM	**0**	**1**	**0**	**0**	***1***	**0**	**2**	**0**	**1**	***3***	**0**	**0**	**13**	**0**	*13*
5:45 PM	**1**	**1**	**0**	**0**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**7**	**0**	***7***
Count Total	16	19	0	5	*40*	4	3	0	1	*8*	0	2	91	0	*93*
Peak Hr	**2**	**3**	**0**	**0**	***5***	**1**	**2**	**0**	**1**	***4***	**0**	**0**	**38**	**0**	***38***

ISLAND CREST WAY
N MERCER WAY

Date: Tue, Oct 17, 2017
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	4.4%	0.64
WB	4.3%	0.93
NB	2.7%	0.92
SB	2.2%	0.93
TOTAL	3.4%	0.96



Three-Hour Count Summaries

Interval Start	N MERCER WAY				I-90 WB OFF-RAMP				ISLAND CREST WAY				SE 26TH ST				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
8:00 AM	0	5	0	28	0	54	41	2	0	50	4	0	0	0	20	54	258	0
8:15 AM	0	4	0	11	0	51	43	1	0	57	4	0	0	0	19	49	239	0
8:30 AM	0	8	0	13	0	55	50	1	0	44	9	0	0	0	22	45	247	0
8:45 AM	0	11	0	33	0	47	50	0	0	34	22	0	0	0	36	30	263	1,007
Peak Hour	0	28	0	85	0	207	184	4	0	185	39	0	0	0	97	178	1,007	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
8:00 AM	1	3	1	3	*8*	0	0	0	0	*0*	0	0	10	0	*10*
8:15 AM	1	4	1	1	*7*	0	0	0	0	*0*	0	0	3	0	*3*
8:30 AM	0	5	2	1	*8*	0	0	0	0	*0*	0	0	8	0	*8*
8:45 AM	3	5	2	1	*11*	0	0	0	0	*0*	0	0	5	0	*5*
Peak Hour	5	17	6	6	*34*	0	0	0	0	*0*	0	0	26	0	*26*

Three-Hour Count Summaries

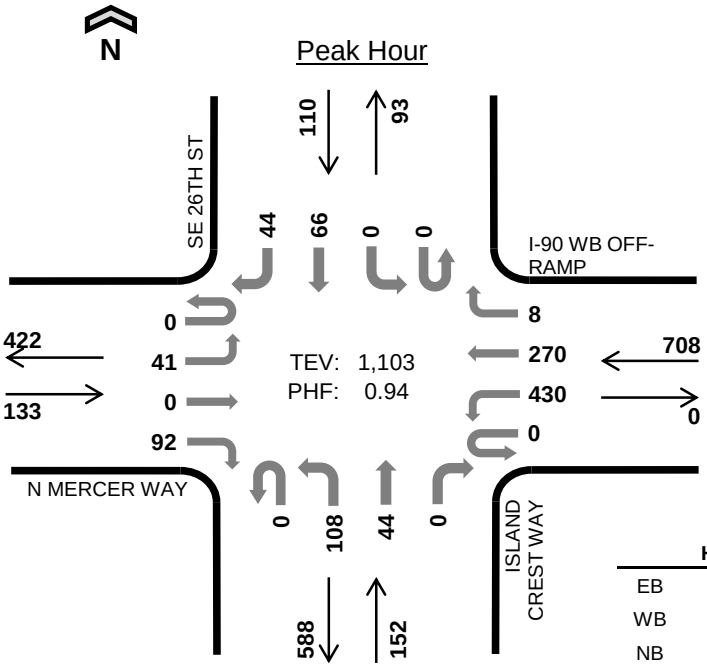
Interval Start	N MERCER WAY				I-90 WB OFF-RAMP				ISLAND CREST WAY				SE 26TH ST				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	1	0	1	0	49	70	0	0	16	0	0	0	0	0	7	144	0
6:15 AM	0	4	0	3	0	52	75	0	0	30	0	0	0	0	1	6	171	0
6:30 AM	0	0	0	10	0	66	89	0	0	34	2	0	0	0	3	8	212	0
6:45 AM	0	3	0	8	0	51	64	2	0	45	4	0	0	0	5	20	202	729
7:00 AM	0	1	0	14	0	66	77	0	0	37	5	0	0	0	8	16	224	809
7:15 AM	0	5	0	19	0	77	54	2	0	55	0	0	0	0	10	16	238	876
7:30 AM	0	2	0	21	0	76	52	0	0	47	9	0	0	0	17	23	247	911
7:45 AM	0	8	0	27	0	41	48	3	0	50	5	0	0	0	13	37	232	941
8:00 AM	**0**	**5**	**0**	**28**	**0**	**54**	**41**	**2**	**0**	**50**	**4**	**0**	**0**	**0**	**20**	**54**	**258**	975
8:15 AM	**0**	**4**	**0**	**11**	**0**	**51**	**43**	**1**	**0**	**57**	**4**	**0**	**0**	**0**	**19**	**49**	**239**	976
8:30 AM	**0**	**8**	**0**	**13**	**0**	**55**	**50**	**1**	**0**	**44**	**9**	**0**	**0**	**0**	**22**	**45**	**247**	976
8:45 AM	**0**	**11**	**0**	**33**	**0**	**47**	**50**	**0**	**0**	**34**	**22**	**0**	**0**	**0**	**36**	**30**	**263**	**1,007**
Count Total	0	52	0	188	0	685	713	11	0	499	64	0	0	0	154	311	2,677	0
Peak Hour	**0**	**28**	**0**	**85**	**0**	**207**	**184**	**4**	**0**	**185**	**39**	**0**	**0**	**0**	**97**	**178**	**1,007**	**0**

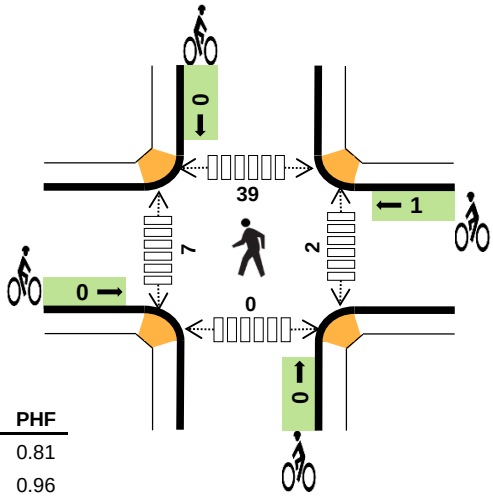
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	2	0	0	*2*	0	1	0	0	*1*	0	1	4	0	*5*
6:15 AM	2	3	1	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
6:30 AM	0	5	0	0	*5*	0	0	0	0	*0*	0	0	8	0	*8*
6:45 AM	1	3	1	0	*5*	0	0	0	0	*0*	0	0	4	0	*4*
7:00 AM	0	9	0	0	*9*	0	0	0	0	*0*	0	1	5	0	*6*
7:15 AM	1	4	1	0	*6*	0	0	0	0	*0*	0	0	8	0	*8*
7:30 AM	1	9	1	2	*13*	0	0	0	0	*0*	0	2	10	0	*12*
7:45 AM	3	3	2	1	*9*	0	0	0	0	*0*	0	3	13	0	*16*
8:00 AM	**1**	**3**	**1**	**3**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**10**	**0**	*10*
8:15 AM	**1**	**4**	**1**	**1**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**3**	**0**	*3*
8:30 AM	**0**	**5**	**2**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**8**	**0**	*8*
8:45 AM	**3**	**5**	**2**	**1**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**0**	***5***
Count Total	13	55	12	9	*89*	0	1	0	0	*1*	0	7	78	0	*85*
Peak Hour	**5**	**17**	**6**	**6**	***34***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**26**	**0**	***26***

ISLAND CREST WAY
N MERCER WAY

Date: Tue, Oct 17, 2017
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	1.5%	0.81
WB	0.3%	0.96
NB	2.0%	0.79
SB	0.0%	0.86
TOTAL	0.6%	0.94

Three-Hour Count Summaries

Interval Start	N MERCER WAY				I-90 WB OFF-RAMP				ISLAND CREST WAY				SE 26TH ST				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
5:00 PM	0	11	0	30	0	90	80	1	0	37	11	0	0	0	15	7	282	0
5:15 PM	0	11	0	16	0	124	57	3	0	23	7	0	0	0	16	10	267	0
5:30 PM	0	14	0	15	0	102	63	3	0	23	11	0	0	0	15	15	261	0
5:45 PM	0	5	0	31	0	114	70	1	0	25	15	0	0	0	20	12	293	1,103
Peak Hour	0	41	0	92	0	430	270	8	0	108	44	0	0	0	66	44	1,103	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 PM	0	1	1	0	*2*	0	0	0	0	*0*	0	5	10	0	*15*
5:15 PM	1	1	0	0	*2*	0	0	0	0	*0*	2	1	11	0	*14*
5:30 PM	0	0	1	0	*1*	0	1	0	0	*1*	0	1	10	0	*11*
5:45 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	8	0	*8*
Peak Hour	2	2	3	0	*7*	0	1	0	0	*1*	2	7	39	0	*48*

Three-Hour Count Summaries

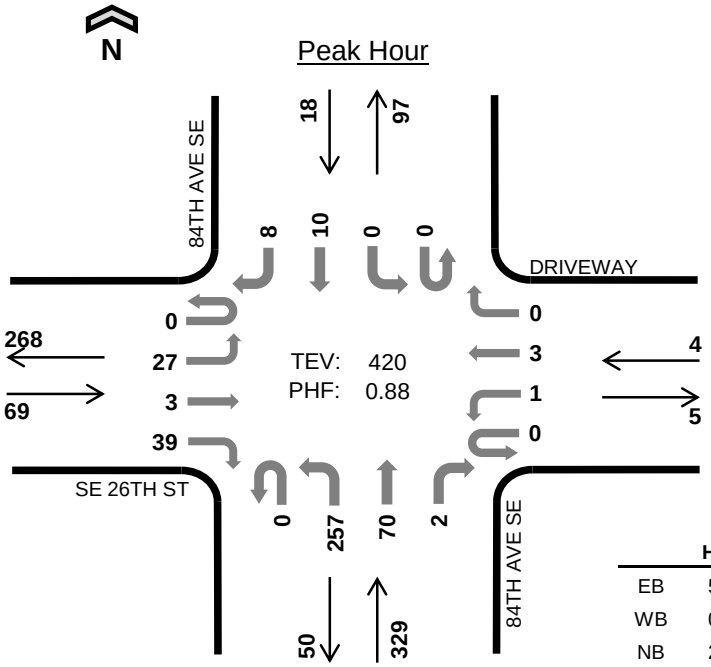
Interval Start	N MERCER WAY				I-90 WB OFF-RAMP				ISLAND CREST WAY				SE 26TH ST				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	9	0	29	0	108	76	3	0	21	5	0	0	0	10	6	267	0
3:15 PM	0	7	0	38	0	116	64	5	0	28	5	0	0	0	14	10	287	0
3:30 PM	0	13	0	30	0	106	57	4	0	22	4	0	0	0	10	9	255	0
3:45 PM	0	14	0	20	0	103	57	4	0	14	10	0	0	0	19	6	247	1,056
4:00 PM	0	5	0	26	0	85	70	0	1	31	12	0	0	0	19	11	260	1,049
4:15 PM	0	11	0	39	0	100	58	5	0	31	13	0	0	0	16	10	283	1,045
4:30 PM	0	6	0	18	0	92	61	4	0	22	10	0	0	0	16	9	238	1,028
4:45 PM	0	8	0	23	0	93	77	3	0	28	13	0	0	0	14	9	268	1,049
5:00 PM	**0**	**11**	**0**	**30**	**0**	**90**	**80**	**1**	**0**	**37**	**11**	**0**	**0**	**0**	**15**	**7**	**282**	1,071
5:15 PM	**0**	**11**	**0**	**16**	**0**	**124**	**57**	**3**	**0**	**23**	**7**	**0**	**0**	**0**	**16**	**10**	**267**	1,055
5:30 PM	**0**	**14**	**0**	**15**	**0**	**102**	**63**	**3**	**0**	**23**	**11**	**0**	**0**	**0**	**15**	**15**	**261**	1,078
5:45 PM	**0**	**5**	**0**	**31**	**0**	**114**	**70**	**1**	**0**	**25**	**15**	**0**	**0**	**0**	**20**	**12**	**293**	**1,103**
Count Total	0	114	0	315	0	1,233	790	36	1	305	116	0	0	0	184	114	3,208	0
Peak Hour	**0**	**41**	**0**	**92**	**0**	**430**	**270**	**8**	**0**	**108**	**44**	**0**	**0**	**0**	**66**	**44**	**1,103**	**0**

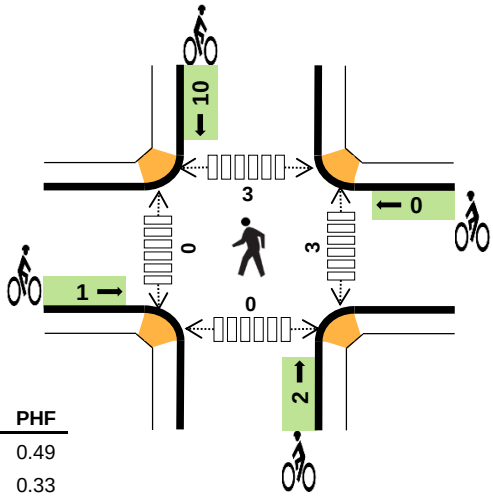
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	4	9	1	1	*15*	0	0	0	0	*0*	0	0	2	0	*2*
3:15 PM	5	3	1	2	*11*	0	0	0	0	*0*	0	0	4	0	*4*
3:30 PM	1	3	1	1	*6*	0	0	0	0	*0*	0	0	4	0	*4*
3:45 PM	0	2	0	1	*3*	0	0	0	0	*0*	0	0	2	0	*2*
4:00 PM	1	2	3	4	*10*	1	0	0	0	*1*	0	1	11	0	*12*
4:15 PM	1	1	0	1	*3*	0	0	0	0	*0*	0	2	4	0	*6*
4:30 PM	1	1	1	0	*3*	0	0	0	0	*0*	0	0	9	0	*9*
4:45 PM	1	0	4	2	*7*	0	1	0	0	*1*	0	0	10	0	*10*
5:00 PM	**0**	**1**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**5**	**10**	**0**	*15*
5:15 PM	**1**	**1**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**2**	**1**	**11**	**0**	*14*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**10**	**0**	*11*
5:45 PM	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**8**	**0**	***8***
Count Total	16	23	14	12	*65*	1	2	0	0	*3*	2	10	85	0	*97*
Peak Hour	**2**	**2**	**3**	**0**	***7***	**0**	**1**	**0**	**0**	***1***	**2**	**7**	**39**	**0**	***48***

84TH AVE SE
SE 26TH ST

Date: Tue, Oct 17, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	5.8%	0.49
WB	0.0%	0.33
NB	2.1%	0.93
SB	5.6%	0.45
TOTAL	2.9%	0.88

Two-Hour Count Summaries

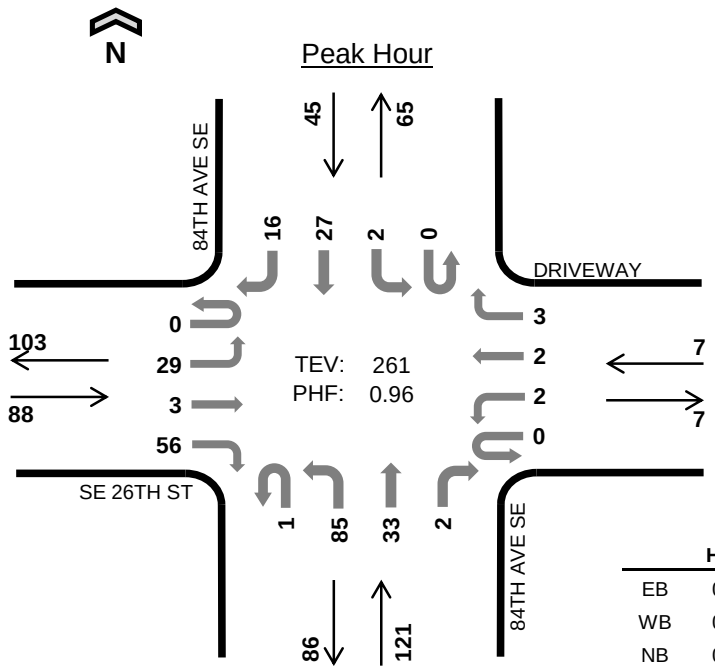
Interval Start	SE 26TH ST				DRIVEWAY				84TH AVE SE				84TH AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	3	0	3	0	0	0	0	0	24	7	0	0	0	0	1	38	0
7:15 AM	0	1	3	2	0	0	0	0	0	30	4	0	0	0	3	1	44	0
7:30 AM	0	10	0	4	0	0	1	0	0	31	3	0	0	0	3	3	55	0
7:45 AM	0	6	1	9	0	0	0	1	0	51	14	0	0	0	6	3	91	228
8:00 AM	**0**	**1**	**2**	**7**	**0**	**0**	**0**	**0**	**0**	**70**	**15**	**0**	**0**	**0**	**3**	**2**	**100**	290
8:15 AM	**0**	**2**	**1**	**6**	**0**	**0**	**1**	**0**	**0**	**61**	**19**	**1**	**0**	**0**	**0**	**2**	**93**	339
8:30 AM	**0**	**7**	**0**	**8**	**0**	**1**	**2**	**0**	**0**	**68**	**19**	**1**	**0**	**0**	**1**	**0**	**107**	391
8:45 AM	**0**	**17**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**58**	**17**	**0**	**0**	**0**	**6**	**4**	**120**	**420**
Count Total	0	47	7	57	0	1	4	1	0	393	98	2	0	0	22	16	648	0
Peak Hour	**0**	**27**	**3**	**39**	**0**	**1**	**3**	**0**	**0**	**257**	**70**	**2**	**0**	**0**	**10**	**8**	**420**	**0**

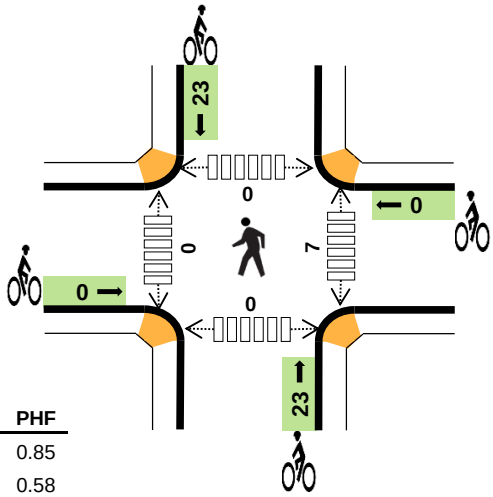
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	1	0	2	5	*8*	0	0	0	0	*0*
7:15 AM	0	0	0	0	*0*	1	0	0	2	*3*	0	0	1	0	*1*
7:30 AM	0	0	2	0	*2*	0	0	1	2	*3*	3	0	0	0	*3*
7:45 AM	1	0	2	1	*4*	0	0	2	2	*4*	0	0	0	0	*0*
8:00 AM	**0**	**0**	**3**	**0**	***3***	**0**	**0**	**0**	**5**	***5***	**1**	**0**	**1**	**0**	*2*
8:15 AM	**1**	**0**	**2**	**0**	***3***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**1**	**0**	*1*
8:30 AM	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**1**	**2**	***3***	**1**	**0**	**0**	**0**	*1*
8:45 AM	**2**	**0**	**1**	**1**	***4***	**1**	**0**	**1**	**2**	***4***	**1**	**0**	**1**	**0**	***2***
Count Total	5	0	11	2	*18*	3	0	7	21	*31*	6	0	4	0	*10*
Peak Hour	**4**	**0**	**7**	**1**	***12***	**1**	**0**	**2**	**10**	***13***	**3**	**0**	**3**	**0**	***6***

84TH AVE SE
SE 26TH ST

Date: Tue, Oct 17, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	0.0%	0.85
WB	0.0%	0.58
NB	0.0%	0.82
SB	0.0%	0.80
TOTAL	0.0%	0.96

Two-Hour Count Summaries

Interval Start	SE 26TH ST				DRIVEWAY				84TH AVE SE				84TH AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	10	0	6	0	1	2	0	0	19	4	0	0	1	5	8	56	0
4:15 PM	0	9	0	19	0	0	1	0	0	17	10	1	0	0	8	5	70	0
4:30 PM	0	5	1	14	0	0	1	0	0	21	4	1	0	0	3	2	52	0
4:45 PM	0	8	1	13	0	0	0	2	0	13	10	0	0	1	9	5	62	240
5:00 PM	**0**	**7**	**1**	**13**	**0**	**0**	**0**	**1**	**1**	**14**	**6**	**0**	**0**	**2**	**8**	**4**	**57**	241
5:15 PM	**0**	**6**	**1**	**14**	**0**	**0**	**1**	**2**	**0**	**20**	**10**	**1**	**0**	**0**	**7**	**6**	**68**	239
5:30 PM	**0**	**6**	**0**	**20**	**0**	**1**	**0**	**0**	**0**	**26**	**6**	**0**	**0**	**0**	**6**	**3**	**68**	255
5:45 PM	**0**	**10**	**1**	**9**	**0**	**1**	**1**	**0**	**0**	**25**	**11**	**1**	**0**	**0**	**6**	**3**	**68**	**261**
Count Total	0	61	5	108	0	3	6	5	1	155	61	4	0	4	52	36	501	0
Peak Hour	**0**	**29**	**3**	**56**	**0**	**2**	**2**	**3**	**1**	**85**	**33**	**2**	**0**	**2**	**27**	**16**	**261**	**0**

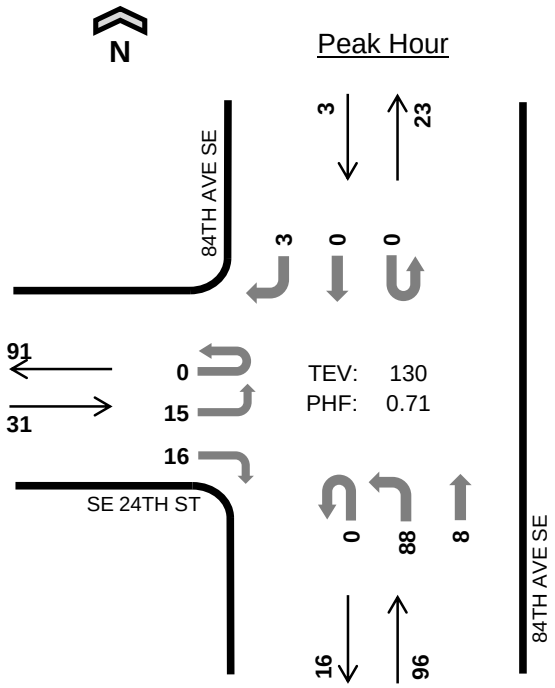
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

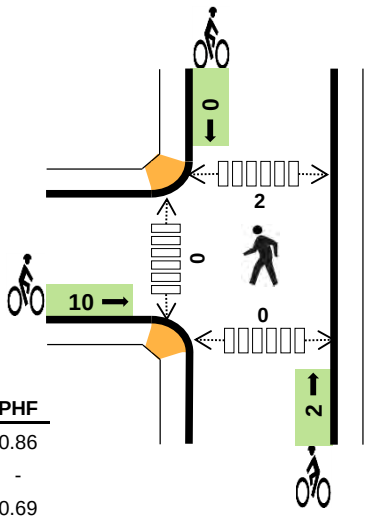
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	2	2	*6*	1	0	2	0	*3*	0	0	1	0	*1*
4:15 PM	0	0	1	0	*1*	0	0	2	0	*2*	1	0	0	0	*1*
4:30 PM	1	0	1	1	*3*	0	0	3	2	*5*	2	0	1	0	*3*
4:45 PM	1	0	1	0	*2*	0	0	6	2	*8*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**5**	**11**	***16***	**5**	**0**	**0**	**0**	*5*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**1**	***8***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**7**	**10**	***17***	**1**	**0**	**0**	**0**	*1*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**4**	**1**	***5***	**1**	**0**	**0**	**0**	***1***
Count Total	4	0	5	3	*12*	1	0	36	27	*64*	10	0	2	0	*12*
Peak Hour	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**23**	**23**	***46***	**7**	**0**	**0**	**0**	***7***

84TH AVE SE
SE 24TH ST

Date: Tue, Oct 17, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM

Peak Hour





	HV %:	PHF
EB	3.2%	0.86
WB	-	-
NB	1.0%	0.69
SB	0.0%	0.38
TOTAL	1.5%	0.71

Two-Hour Count Summaries

Interval Start	SE 24TH ST				0				84TH AVE SE				84TH AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	0	0	0	0	10	0	0	0	0	1	0	12	0
7:15 AM	0	1	0	4	0	0	0	0	0	5	1	0	0	0	0	0	11	0
7:30 AM	0	1	0	4	0	0	0	0	0	12	1	0	0	0	0	1	19	0
7:45 AM	0	1	0	8	0	0	0	0	0	19	3	0	0	0	1	0	32	74
8:00 AM	**0**	**3**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**15**	**1**	**0**	**0**	**0**	**0**	**1**	**24**	86
8:15 AM	**0**	**6**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**20**	**1**	**0**	**0**	**0**	**0**	**0**	**29**	104
8:30 AM	**0**	**6**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**21**	**3**	**0**	**0**	**0**	**0**	**0**	**31**	116
8:45 AM	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**32**	**3**	**0**	**0**	**0**	**0**	**2**	**46**	**130**
Count Total	0	19	0	32	0	0	0	0	0	134	13	0	0	0	2	4	204	0
Peak Hour	**0**	**15**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**88**	**8**	**0**	**0**	**0**	**0**	**3**	**130**	**0**

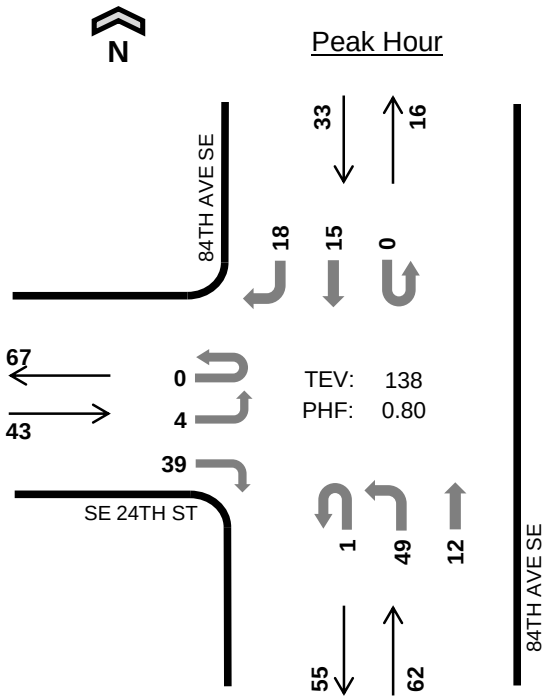
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

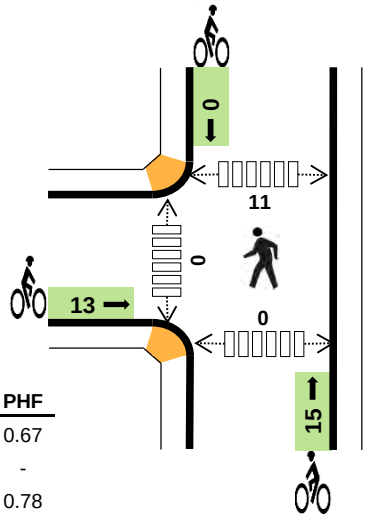
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	0	*0*	5	0	2	0	*7*	0	0	0	0	*0*
7:15 AM	0	0	0	0	*0*	2	0	0	0	*2*	0	0	0	0	*0*
7:30 AM	0	0	0	0	*0*	2	0	1	0	*3*	0	0	0	0	*0*
7:45 AM	1	0	2	0	*3*	2	0	2	0	*4*	0	0	5	1	*6*
8:00 AM	**0**	**0**	**0**	**0**	***0***	**5**	**0**	**0**	**0**	***5***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**1**	**0**	***1***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
8:30 AM	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**1**	**0**	*1*
8:45 AM	**1**	**0**	**0**	**0**	***1***	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**1**	**0**	***1***
Count Total	2	0	3	0	*5*	21	0	7	0	*28*	0	0	7	1	*8*
Peak Hr	**1**	**0**	**1**	**0**	***2***	**10**	**0**	**2**	**0**	***12***	**0**	**0**	**2**	**0**	***2***

84TH AVE SE
SE 24TH ST

Date: Tue, Oct 17, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM

Peak Hour





	HV %:	PHF
EB	2.3%	0.67
WB	-	-
NB	0.0%	0.78
SB	0.0%	0.69
TOTAL	0.7%	0.80

Two-Hour Count Summaries

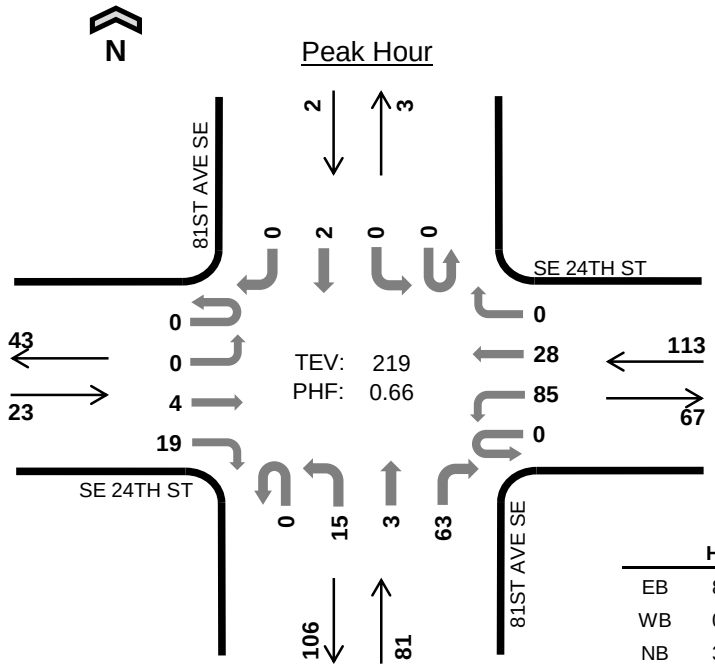
Interval Start	SE 24TH ST				0				84TH AVE SE				84TH AVE SE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	0	7	0	0	0	0	0	9	4	0	0	0	5	5	31	0
4:15 PM	**0**	**1**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**14**	**4**	**0**	**0**	**0**	**5**	**6**	**41**	0
4:30 PM	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**9**	**1**	**0**	**0**	**0**	**2**	**2**	**18**	0
4:45 PM	**0**	**1**	**0**	**10**	**0**	**0**	**0**	**0**	**1**	**16**	**3**	**0**	**0**	**0**	**5**	**7**	**43**	133
5:00 PM	**0**	**2**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**10**	**4**	**0**	**0**	**0**	**3**	**3**	**36**	**138**
5:15 PM	0	0	0	5	0	0	0	0	0	15	2	0	0	0	6	1	29	126
5:30 PM	0	1	0	7	0	0	0	0	0	8	2	0	0	0	1	2	21	129
5:45 PM	0	3	0	4	0	0	0	0	0	18	2	0	0	0	3	1	31	117
Count Total	0	9	0	62	0	0	0	0	1	99	22	0	0	0	30	27	250	0
Peak Hour	**0**	**4**	**0**	**39**	**0**	**0**	**0**	**0**	**1**	**49**	**12**	**0**	**0**	**0**	**15**	**18**	**138**	**0**

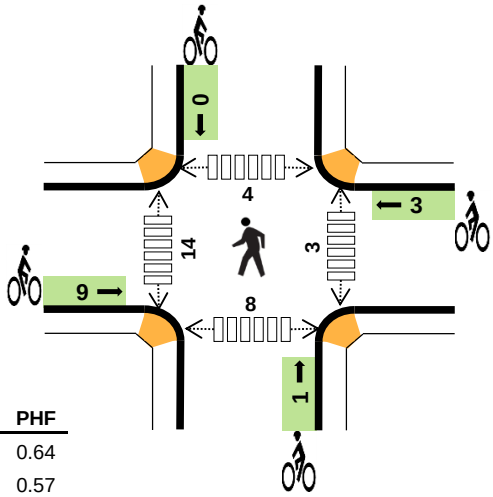
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	1	0	*3*	0	0	1	0	*1*	0	0	2	0	*2*
4:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**1**	**0**	*1*
4:30 PM	**1**	**0**	**0**	**0**	***1***	**2**	**0**	**3**	**0**	***5***	**0**	**0**	**5**	**0**	*5*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**5**	**0**	***7***	**0**	**0**	**2**	**0**	*2*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**9**	**0**	**5**	**0**	***14***	**0**	**0**	**3**	**0**	***3***
5:15 PM	0	0	0	0	*0*	2	0	7	0	*9*	0	0	0	1	*1*
5:30 PM	0	0	0	0	*0*	8	0	7	0	*15*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	1	0	4	0	*5*	0	0	4	0	*4*
Count Total	3	0	1	0	*4*	24	0	34	0	*58*	0	0	17	1	*18*
Peak Hr	**1**	**0**	**0**	**0**	***1***	**13**	**0**	**15**	**0**	***28***	**0**	**0**	**11**	**0**	***11***

81ST AVE SE
SE 24TH ST

Date: Tue, Oct 17, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM





	HV %:	PHF
EB	8.7%	0.64
WB	0.9%	0.57
NB	3.7%	0.78
SB	0.0%	0.50
TOTAL	2.7%	0.66

Two-Hour Count Summaries

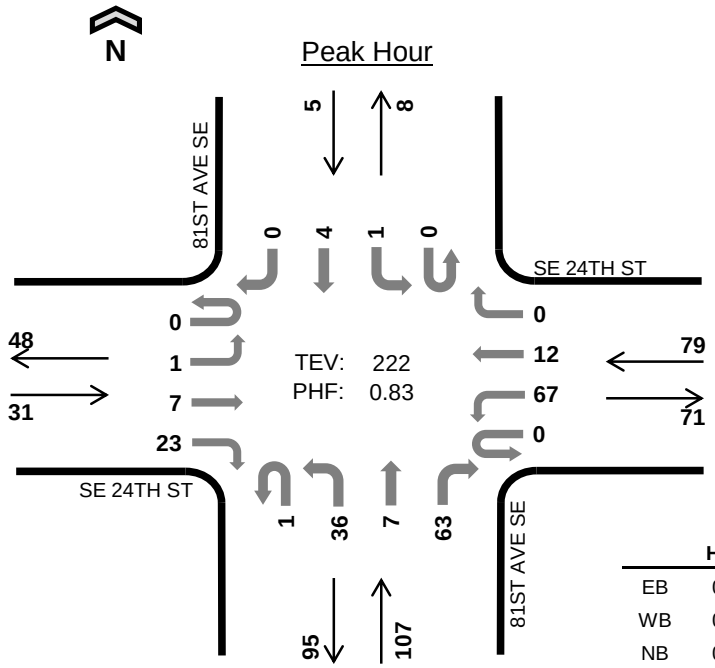
Interval Start	SE 24TH ST Eastbound				SE 24TH ST Westbound				81ST AVE SE Northbound				81ST AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	1	3	0	10	4	0	0	2	0	10	0	0	1	0	31	0
7:15 AM	0	0	3	5	0	2	2	0	0	3	0	6	0	0	2	0	23	0
7:30 AM	0	0	0	6	0	11	2	1	0	4	0	7	0	1	0	0	32	0
7:45 AM	0	1	5	7	0	11	4	0	1	4	0	19	0	1	2	0	55	141
8:00 AM	**0**	**0**	**0**	**9**	**0**	**12**	**5**	**0**	**0**	**4**	**1**	**14**	**0**	**0**	**1**	**0**	**46**	156
8:15 AM	**0**	**0**	**1**	**3**	**0**	**13**	**6**	**0**	**0**	**5**	**2**	**11**	**0**	**0**	**1**	**0**	**42**	175
8:30 AM	**0**	**0**	**1**	**2**	**0**	**18**	**9**	**0**	**0**	**2**	**0**	**16**	**0**	**0**	**0**	**0**	**48**	191
8:45 AM	**0**	**0**	**2**	**5**	**0**	**42**	**8**	**0**	**0**	**4**	**0**	**22**	**0**	**0**	**0**	**0**	**83**	**219**
Count Total	0	1	13	40	0	119	40	1	1	28	3	105	0	2	7	0	360	0
Peak Hour	**0**	**0**	**4**	**19**	**0**	**85**	**28**	**0**	**0**	**15**	**3**	**63**	**0**	**0**	**2**	**0**	**219**	**0**

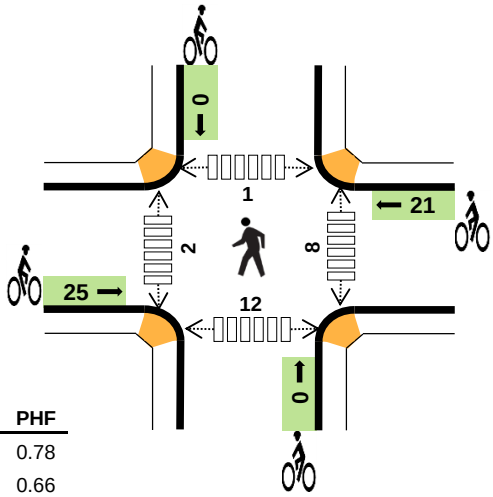
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	0	*1*	5	1	0	0	*6*	0	0	0	1	*1*
7:15 AM	0	0	1	0	*1*	3	0	0	0	*3*	1	0	0	4	*5*
7:30 AM	0	0	1	0	*1*	1	1	0	0	*2*	2	0	0	3	*5*
7:45 AM	1	1	0	0	*2*	2	2	0	0	*4*	0	1	0	2	*3*
8:00 AM	**0**	**0**	**1**	**0**	***1***	**4**	**1**	**0**	**0**	***5***	**2**	**2**	**2**	**3**	*9*
8:15 AM	**0**	**0**	**2**	**0**	***2***	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**2**	*2*
8:30 AM	**0**	**1**	**0**	**0**	***1***	**2**	**1**	**0**	**0**	***3***	**1**	**6**	**2**	**3**	*12*
8:45 AM	**2**	**0**	**0**	**0**	***2***	**2**	**1**	**0**	**0**	***3***	**0**	**6**	**0**	**0**	***6***
Count Total	3	2	6	0	*11*	20	7	1	0	*28*	6	15	4	18	*43*
Peak Hour	**2**	**1**	**3**	**0**	***6***	**9**	**3**	**1**	**0**	***13***	**3**	**14**	**4**	**8**	***29***

81ST AVE SE
SE 24TH ST

Date: Tue, Oct 17, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM





	HV %:	PHF
EB	0.0%	0.78
WB	0.0%	0.66
NB	0.0%	0.89
SB	0.0%	0.42
TOTAL	0.0%	0.83

Two-Hour Count Summaries

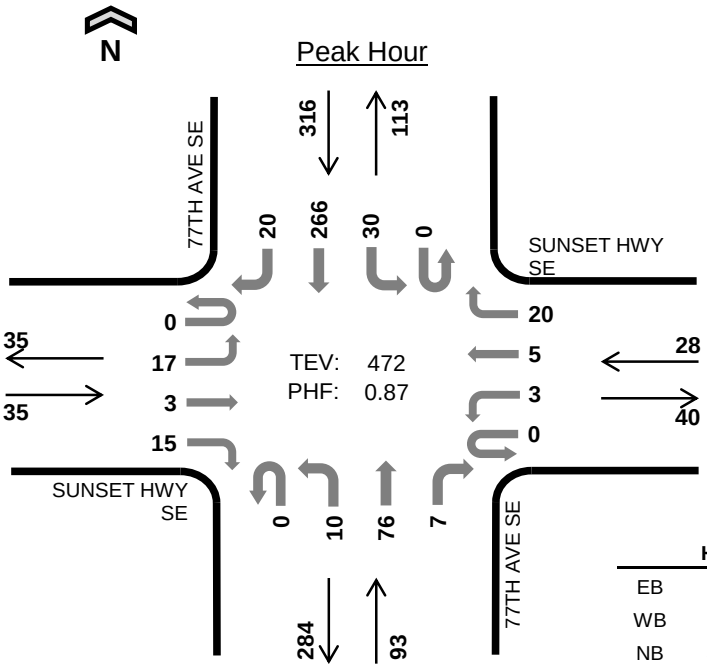
Interval Start	SE 24TH ST Eastbound				SE 24TH ST Westbound				81ST AVE SE Northbound				81ST AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	8	0	20	5	0	1	10	1	6	0	0	3	0	55	0
4:15 PM	0	0	2	2	0	19	6	0	0	6	1	10	0	0	3	0	49	0
4:30 PM	0	0	0	6	0	16	4	0	0	5	1	14	0	0	1	0	47	0
4:45 PM	0	1	0	2	0	17	3	0	0	3	1	17	0	0	0	0	44	195
5:00 PM	**0**	**0**	**3**	**4**	**0**	**27**	**3**	**0**	**1**	**10**	**2**	**16**	**0**	**0**	**1**	**0**	**67**	207
5:15 PM	**0**	**0**	**1**	**9**	**0**	**11**	**3**	**0**	**0**	**7**	**3**	**10**	**0**	**0**	**1**	**0**	**45**	203
5:30 PM	**0**	**0**	**1**	**4**	**0**	**14**	**2**	**0**	**0**	**11**	**1**	**18**	**0**	**0**	**0**	**0**	**51**	207
5:45 PM	**0**	**1**	**2**	**6**	**0**	**15**	**4**	**0**	**0**	**8**	**1**	**19**	**0**	**1**	**2**	**0**	**59**	**222**
Count Total	0	2	10	41	0	139	30	0	2	60	11	110	0	1	11	0	417	0
Peak Hour	**0**	**1**	**7**	**23**	**0**	**67**	**12**	**0**	**1**	**36**	**7**	**63**	**0**	**1**	**4**	**0**	**222**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

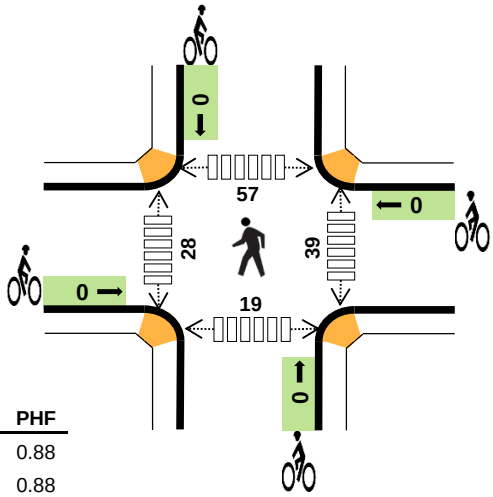
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	1	2	0	*5*	0	1	0	0	*1*	2	0	1	3	*6*
4:15 PM	0	0	0	0	*0*	0	2	0	0	*2*	4	1	3	4	*12*
4:30 PM	0	0	0	0	*0*	4	2	0	0	*6*	4	0	1	7	*12*
4:45 PM	0	0	0	0	*0*	2	5	0	0	*7*	5	2	3	6	*16*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**13**	**7**	**0**	**0**	***20***	**2**	**0**	**0**	**2**	*4*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**2**	**6**	**0**	**0**	***8***	**4**	**0**	**0**	**5**	*9*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**9**	**6**	**0**	**0**	***15***	**0**	**0**	**0**	**1**	*1*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**0**	**0**	***3***	**2**	**2**	**1**	**4**	***9***
Count Total	2	1	2	0	*5*	31	31	0	0	*62*	23	5	9	32	*69*
Peak Hour	**0**	**0**	**0**	**0**	***0***	**25**	**21**	**0**	**0**	***46***	**8**	**2**	**1**	**12**	***23***

77TH AVE SE
SUNSET HWY SE

Date: Tue, Oct 17, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	8.6%	0.88
WB	7.1%	0.88
NB	4.3%	0.83
SB	4.1%	0.78
TOTAL	4.7%	0.87



Two-Hour Count Summaries

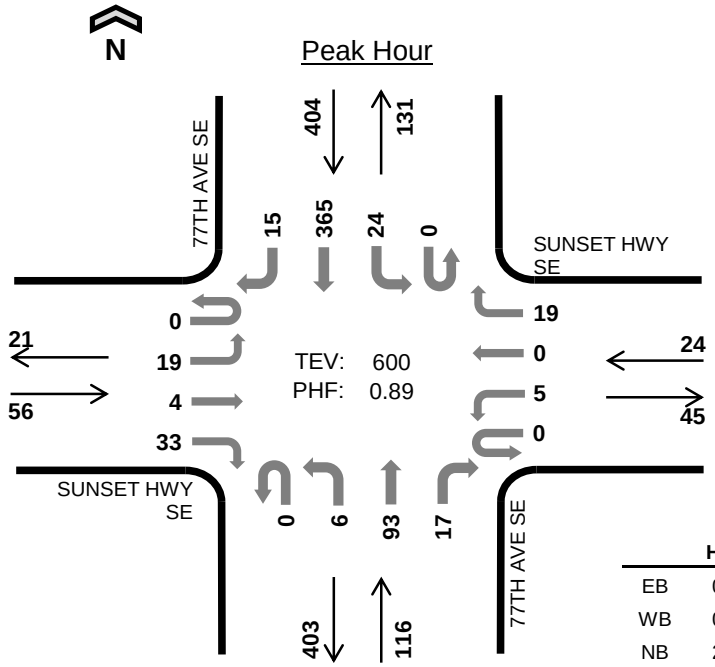
Interval Start	SUNSET HWY SE Eastbound				SUNSET HWY SE Westbound				77TH AVE SE Northbound				77TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	6	1	3	0	0	1	2	0	3	21	0	0	3	51	4	95	0
7:15 AM	0	3	3	4	0	0	1	4	0	2	18	1	0	1	57	5	99	0
7:30 AM	0	5	0	3	0	1	0	5	0	2	22	2	0	3	70	6	119	0
7:45 AM	0	3	0	4	0	2	0	2	0	3	19	1	0	3	60	4	101	414
8:00 AM	**0**	**6**	**1**	**3**	**0**	**0**	**1**	**7**	**0**	**4**	**18**	**2**	**0**	**4**	**52**	**5**	**103**	422
8:15 AM	**0**	**5**	**2**	**2**	**0**	**1**	**0**	**7**	**0**	**3**	**22**	**3**	**0**	**8**	**64**	**3**	**120**	443
8:30 AM	**0**	**2**	**0**	**6**	**0**	**1**	**2**	**1**	**0**	**2**	**19**	**1**	**0**	**7**	**66**	**6**	**113**	437
8:45 AM	**0**	**4**	**0**	**4**	**0**	**1**	**2**	**5**	**0**	**1**	**17**	**1**	**0**	**11**	**84**	**6**	**136**	**472**
Count Total	0	34	7	29	0	6	7	33	0	20	156	11	0	40	504	39	886	0
Peak Hour	**0**	**17**	**3**	**15**	**0**	**3**	**5**	**20**	**0**	**10**	**76**	**7**	**0**	**30**	**266**	**20**	**472**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

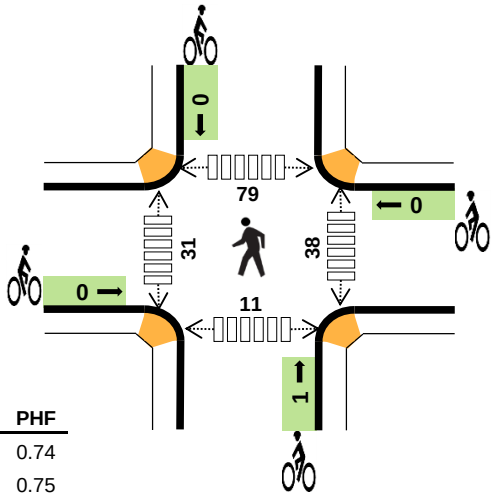
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	3	*4*	0	0	0	0	*0*	6	4	9	2	*21*
7:15 AM	1	1	0	3	*5*	0	0	0	0	*0*	5	5	20	1	*31*
7:30 AM	0	0	1	6	*7*	0	0	0	0	*0*	14	5	18	3	*40*
7:45 AM	0	1	3	6	*10*	0	0	0	0	*0*	14	7	17	1	*39*
8:00 AM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**15**	**11**	**20**	**8**	*54*
8:15 AM	**1**	**0**	**3**	**5**	***9***	**0**	**0**	**0**	**0**	***0***	**10**	**6**	**12**	**7**	*35*
8:30 AM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**8**	**7**	**9**	**3**	*27*
8:45 AM	**2**	**2**	**1**	**6**	***11***	**0**	**0**	**0**	**0**	***0***	**6**	**4**	**16**	**1**	***27***
Count Total	4	4	9	31	*48*	0	0	0	0	*0*	78	49	121	26	*274*
Peak Hour	**3**	**2**	**4**	**13**	***22***	**0**	**0**	**0**	**0**	***0***	**39**	**28**	**57**	**19**	***143***

77TH AVE SE
SUNSET HWY SE

Date: Tue, Oct 17, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	0.0%	0.74
WB	0.0%	0.75
NB	2.6%	0.85
SB	0.5%	0.86
TOTAL	0.8%	0.89



Two-Hour Count Summaries

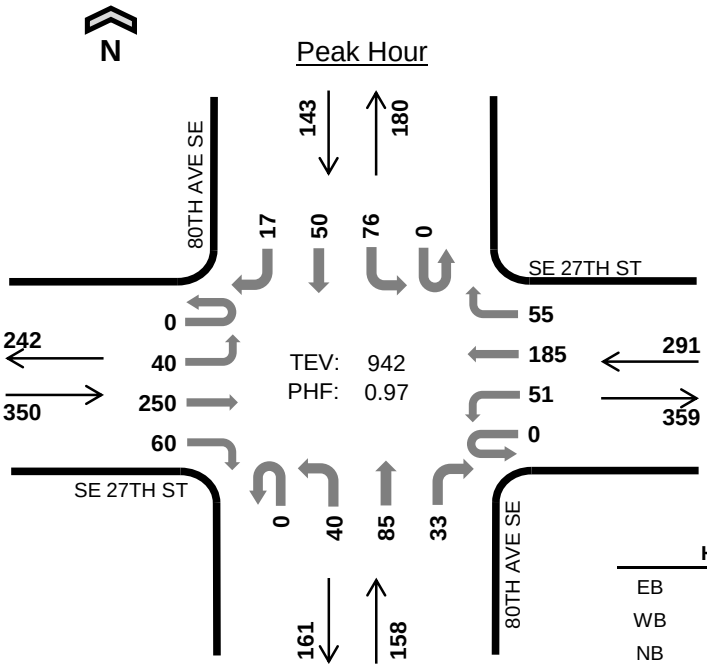
Interval Start	SUNSET HWY SE Eastbound				SUNSET HWY SE Westbound				77TH AVE SE Northbound				77TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	6	2	10	0	2	1	4	0	3	22	4	0	9	76	3	142	0
4:15 PM	0	5	2	12	0	3	0	4	0	0	17	2	0	8	63	8	124	0
4:30 PM	0	5	2	8	0	1	0	5	0	2	33	3	0	7	57	3	126	0
4:45 PM	0	4	1	6	0	1	0	5	0	1	19	1	0	4	97	4	143	535
5:00 PM	**0**	**7**	**0**	**12**	**0**	**0**	**0**	**6**	**0**	**0**	**29**	**2**	**0**	**3**	**82**	**4**	**145**	538
5:15 PM	**0**	**2**	**0**	**6**	**0**	**2**	**0**	**3**	**0**	**1**	**19**	**3**	**0**	**9**	**97**	**5**	**147**	561
5:30 PM	**0**	**5**	**0**	**6**	**0**	**2**	**0**	**6**	**0**	**2**	**25**	**7**	**0**	**4**	**79**	**3**	**139**	574
5:45 PM	**0**	**5**	**4**	**9**	**0**	**1**	**0**	**4**	**0**	**3**	**20**	**5**	**0**	**8**	**107**	**3**	**169**	**600**
Count Total	0	39	11	69	0	12	1	37	0	12	184	27	0	52	658	33	1,135	0
Peak Hour	**0**	**19**	**4**	**33**	**0**	**5**	**0**	**19**	**0**	**6**	**93**	**17**	**0**	**24**	**365**	**15**	**600**	**0**

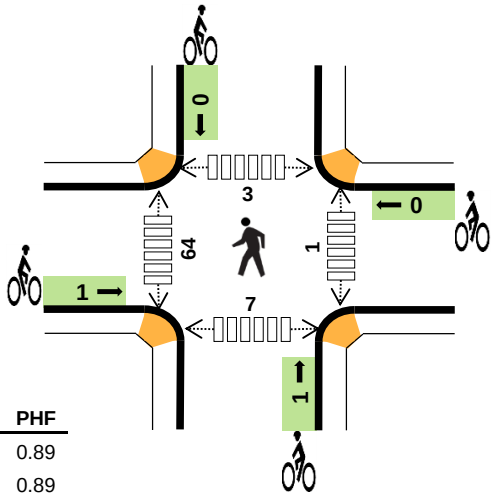
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	2	4	*8*	0	0	0	0	*0*	5	6	15	4	*30*
4:15 PM	0	0	1	1	*2*	0	0	0	0	*0*	6	3	5	6	*20*
4:30 PM	0	0	1	2	*3*	0	0	0	0	*0*	10	4	12	7	*33*
4:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	9	6	11	4	*30*
5:00 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**10**	**8**	**27**	**2**	*47*
5:15 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**1**	**0**	***1***	**11**	**6**	**21**	**4**	*42*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**8**	**7**	**15**	**3**	*33*
5:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**9**	**10**	**16**	**2**	***37***
Count Total	0	2	7	9	*18*	0	0	1	0	*1*	68	50	122	32	*272*
Peak Hour	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**1**	**0**	***1***	**38**	**31**	**79**	**11**	***159***

80TH AVE SE
SE 27TH ST

Date: Tue, Oct 17, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	3.4%	0.89
WB	2.4%	0.89
NB	3.2%	0.86
SB	4.9%	0.89
TOTAL	3.3%	0.97

Two-Hour Count Summaries

Interval Start	SE 27TH ST Eastbound				SE 27TH ST Westbound				80TH AVE SE Northbound				80TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	8	62	13	0	10	35	14	0	4	29	4	0	25	15	8	227	0
7:15 AM	0	9	53	12	0	23	42	20	0	11	13	5	0	15	6	4	213	0
7:30 AM	**0**	**11**	**59**	**12**	**0**	**18**	**53**	**11**	**0**	**7**	**19**	**10**	**0**	**22**	**6**	**5**	**233**	0
7:45 AM	**0**	**14**	**64**	**15**	**0**	**10**	**37**	**12**	**0**	**15**	**24**	**7**	**0**	**16**	**16**	**6**	**236**	909
8:00 AM	**0**	**8**	**56**	**13**	**0**	**10**	**49**	**15**	**0**	**9**	**24**	**6**	**0**	**22**	**14**	**4**	**230**	912
8:15 AM	**0**	**7**	**71**	**20**	**0**	**13**	**46**	**17**	**0**	**9**	**18**	**10**	**0**	**16**	**14**	**2**	**243**	**942**
8:30 AM	0	8	53	11	0	18	37	10	0	10	27	5	0	14	12	4	209	918
8:45 AM	0	7	60	12	0	14	32	10	0	14	26	9	0	10	20	9	223	905
Count Total	0	72	478	108	0	116	331	109	0	79	180	56	0	140	103	42	1,814	0
Peak Hour	**0**	**40**	**250**	**60**	**0**	**51**	**185**	**55**	**0**	**40**	**85**	**33**	**0**	**76**	**50**	**17**	**942**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

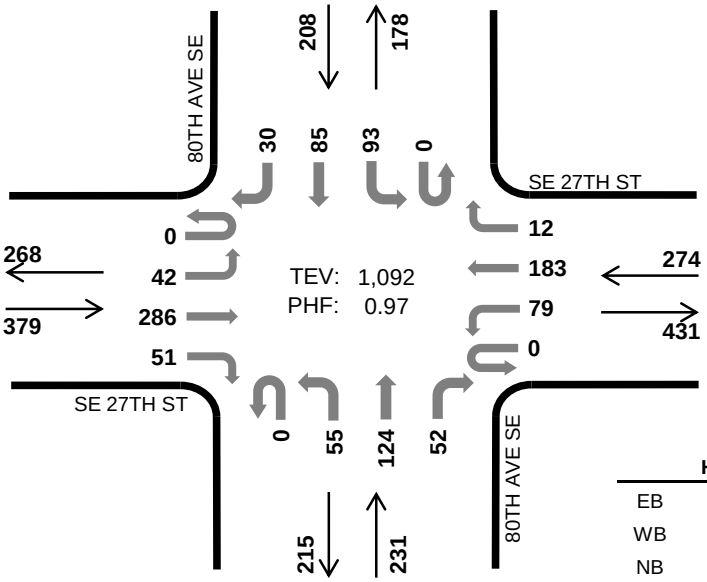
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	2	0	1	*5*	0	0	0	0	*0*	0	7	1	1	*9*
7:15 AM	3	1	1	1	*6*	0	0	0	0	*0*	0	15	4	1	*20*
7:30 AM	**1**	**3**	**2**	**1**	***7***	**1**	**0**	**0**	**0**	***1***	**0**	**17**	**0**	**3**	*20*
7:45 AM	**5**	**2**	**0**	**4**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**14**	**2**	**2**	*18*
8:00 AM	**4**	**0**	**0**	**1**	***5***	**0**	**0**	**1**	**0**	***1***	**0**	**17**	**0**	**2**	*19*
8:15 AM	**2**	**2**	**3**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**1**	**16**	**1**	**0**	***18***
8:30 AM	4	0	1	1	*6*	0	0	0	0	*0*	1	14	2	1	*18*
8:45 AM	6	1	2	1	*10*	0	0	0	0	*0*	1	5	1	0	*7*
Count Total	27	11	9	11	*58*	1	0	1	0	*2*	3	105	11	10	*129*
Peak Hour	**12**	**7**	**5**	**7**	***31***	**1**	**0**	**1**	**0**	***2***	**1**	**64**	**3**	**7**	***75***

80TH AVE SE
SE 27TH ST

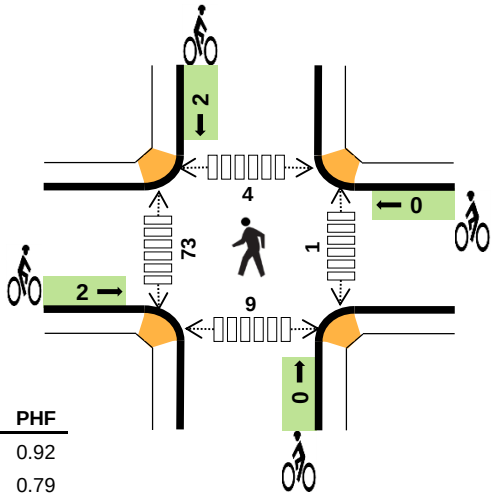
Date: Tue, Oct 17, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM

N

Peak Hour



	HV %:	PHF
EB	1.1%	0.92
WB	0.0%	0.79
NB	0.4%	0.88
SB	1.4%	0.84
TOTAL	0.7%	0.97



Two-Hour Count Summaries

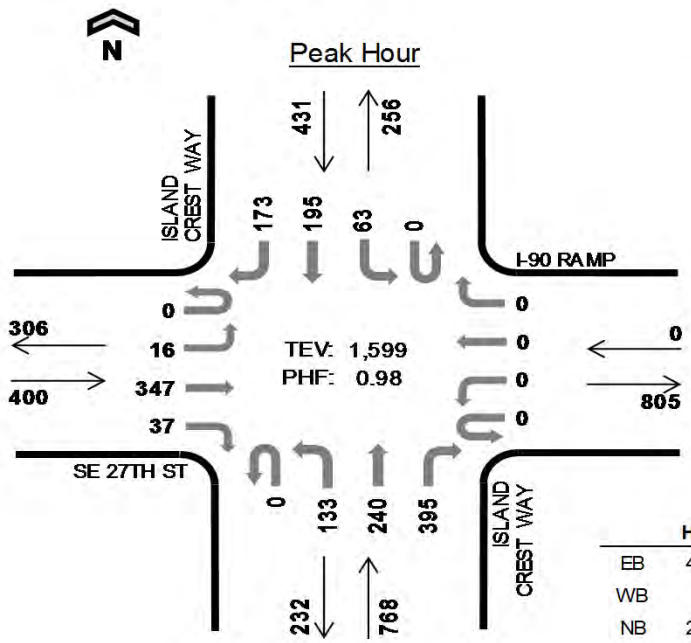
Interval Start	SE 27TH ST Eastbound				SE 27TH ST Westbound				80TH AVE SE Northbound				80TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	14	68	16	0	22	40	12	0	14	36	21	0	27	32	8	310	0
4:15 PM	0	9	73	22	0	23	41	3	0	7	18	15	0	24	15	11	261	0
4:30 PM	0	13	63	15	0	23	31	5	0	10	30	8	0	18	12	5	233	0
4:45 PM	**0**	**8**	**65**	**15**	**0**	**19**	**33**	**1**	**0**	**16**	**37**	**13**	**0**	**37**	**18**	**7**	**269**	1,073
5:00 PM	**0**	**13**	**79**	**11**	**0**	**20**	**38**	**1**	**0**	**14**	**32**	**18**	**0**	**19**	**20**	**8**	**273**	1,036
5:15 PM	**0**	**9**	**66**	**13**	**0**	**17**	**63**	**7**	**0**	**9**	**29**	**11**	**0**	**22**	**25**	**10**	**281**	1,056
5:30 PM	**0**	**12**	**76**	**12**	**0**	**23**	**49**	**3**	**0**	**16**	**26**	**10**	**0**	**15**	**22**	**5**	**269**	**1,092**
5:45 PM	0	16	53	19	0	24	52	4	0	11	25	8	0	20	14	7	253	1,076
Count Total	0	94	543	123	0	171	347	36	0	97	233	104	0	182	158	61	2,149	0
Peak Hour	**0**	**42**	**286**	**51**	**0**	**79**	**183**	**12**	**0**	**55**	**124**	**52**	**0**	**93**	**85**	**30**	**1,092**	**0**

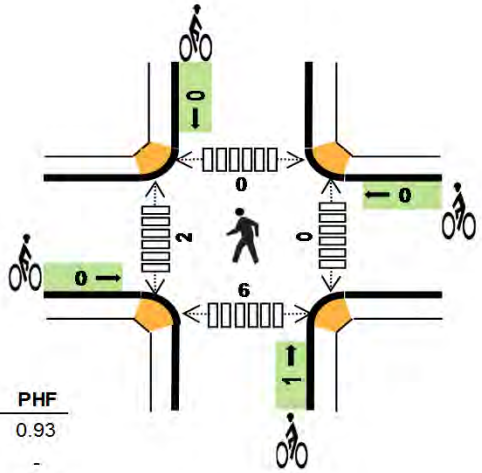
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	3	2	2	*11*	0	1	1	1	*3*	0	10	0	0	*10*
4:15 PM	4	2	1	1	*8*	0	0	0	0	*0*	0	6	3	0	*9*
4:30 PM	2	0	1	1	*4*	0	0	0	0	*0*	0	14	0	2	*16*
4:45 PM	**0**	**0**	**1**	**1**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**21**	**0**	**5**	*26*
5:00 PM	**3**	**0**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**1**	**14**	**3**	**1**	*19*
5:15 PM	**0**	**0**	**0**	**2**	***2***	**1**	**0**	**0**	**1**	***2***	**0**	**19**	**0**	**2**	*21*
5:30 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**1**	***1***	**0**	**19**	**1**	**1**	***21***
5:45 PM	0	0	2	0	*2*	0	0	0	0	*0*	0	8	0	1	*9*
Count Total	14	5	7	7	*33*	2	1	1	3	*7*	1	111	7	12	*131*
Peak Hour	**4**	**0**	**1**	**3**	***8***	**2**	**0**	**0**	**2**	***4***	**1**	**73**	**4**	**9**	***87***

ISLAND CREST WAY
SE 27TH ST

Date: Tue, Oct 03, 2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:45 AM to 8:45 AM





	HV %:	PHF
EB	4.3%	0.93
WB	-	-
NB	2.0%	0.93
SB	6.5%	0.93
TOTAL	3.8%	0.98

Two-Hour Count Summaries

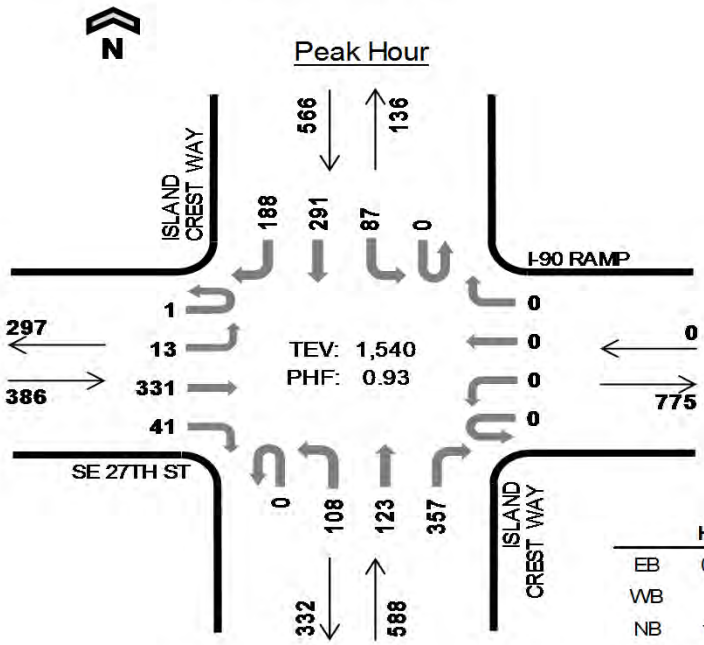
Interval Start	SE 27TH ST Eastbound				I-90 RAMP Westbound				ISLAND CREST WAY Northbound				ISLAND CREST WAY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	74	6	0	0	0	0	0	33	41	60	0	11	34	31	291	0
7:15 AM	0	3	84	6	0	0	0	0	0	35	48	73	0	7	38	26	320	0
7:30 AM	0	1	62	10	0	0	0	0	0	35	53	88	0	13	63	53	378	0
7:45 AM	**0**	**1**	**87**	**12**	**0**	**0**	**0**	**0**	**0**	**32**	**65**	**93**	**0**	**19**	**50**	**31**	**390**	1,379
8:00 AM	**0**	**4**	**78**	**9**	**0**	**0**	**0**	**0**	**0**	**37**	**61**	**108**	**0**	**18**	**47**	**44**	**406**	1,494
8:15 AM	**0**	**7**	**85**	**9**	**0**	**0**	**0**	**0**	**0**	**35**	**67**	**97**	**0**	**13**	**47**	**46**	**406**	1,580
8:30 AM	**0**	**4**	**97**	**7**	**0**	**0**	**0**	**0**	**0**	**29**	**47**	**97**	**0**	**13**	**51**	**52**	**397**	**1,599**
8:45 AM	0	2	68	8	0	0	0	0	0	18	50	81	0	23	66	42	358	1,567
Count Total	0	23	635	67	0	0	0	0	0	254	432	697	0	117	396	325	2,946	0
Peak Hour	**0**	**16**	**347**	**37**	**0**	**0**	**0**	**0**	**0**	**133**	**240**	**395**	**0**	**63**	**195**	**173**	**1,599**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

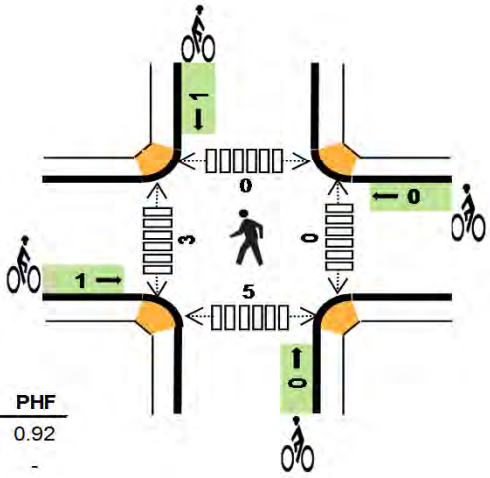
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	0	3	2	***6***	0	0	0	0	***0***	0	0	0	1	***1***
7:15 AM	4	0	2	2	***8***	0	0	1	0	***1***	0	1	0	1	***2***
7:30 AM	2	0	3	6	***11***	0	0	0	0	***0***	0	1	0	2	***3***
7:45 AM	**2**	**0**	**3**	**8**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	***2***
8:00 AM	**4**	**0**	**3**	**8**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***
8:15 AM	**4**	**0**	**5**	**5**	***14***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	***1***
8:30 AM	**7**	**0**	**4**	**7**	***18***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**3**	***4***
8:45 AM	4	0	5	3	***12***	0	0	1	0	***1***	0	0	0	0	***0***
Count Total	28	0	28	41	***97***	0	0	3	0	***3***	0	4	0	10	***14***
Peak Hour	**17**	**0**	**15**	**28**	***60***	**0**	**0**	**1**	**0**	***1***	**0**	**2**	**0**	**6**	***8***

ISLAND CREST WAY
SE 27TH ST

Date: Tue, Oct 03, 2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	0.8%	0.92
WB	-	-
NB	1.2%	0.93
SB	0.9%	0.87
TOTAL	1.0%	0.93



Interval Start	SE 27TH ST				I-90 RAMP				ISLAND CREST WAY				ISLAND CREST WAY				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	4	98	3	0	0	0	0	1	22	34	100	0	23	73	44	402	0
4:15 PM	0	4	73	8	0	0	0	0	0	23	34	103	0	33	64	48	390	0
4:30 PM	0	5	85	16	0	0	0	0	0	19	33	77	0	30	61	59	385	0
4:45 PM	0	9	92	8	0	0	0	0	0	26	33	77	0	15	74	24	358	1,535
5:00 PM	**0**	**5**	**90**	**6**	**0**	**0**	**0**	**0**	**0**	**22**	**35**	**97**	**0**	**23**	**58**	**34**	**370**	1,503
5:15 PM	**0**	**2**	**93**	**10**	**0**	**0**	**0**	**0**	**0**	**32**	**33**	**93**	**0**	**22**	**77**	**54**	**416**	1,529
5:30 PM	**1**	**4**	**70**	**13**	**0**	**0**	**0**	**0**	**0**	**30**	**34**	**92**	**0**	**15**	**77**	**43**	**379**	1,523
5:45 PM	**0**	**2**	**78**	**12**	**0**	**0**	**0**	**0**	**0**	**24**	**21**	**75**	**0**	**27**	**79**	**57**	**375**	**1,540**
Count Total	1	35	679	76	0	0	0	0	1	198	257	714	0	188	563	363	3,075	0
Peak Hour	**1**	**13**	**331**	**41**	**0**	**0**	**0**	**0**	**0**	**108**	**123**	**357**	**0**	**87**	**291**	**188**	**1,540**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	0	4	6	***12***	0	0	0	0	***0***	0	0	0	1	***1***
4:15 PM	1	0	0	2	***3***	0	0	0	0	***0***	0	1	0	0	***1***
4:30 PM	0	0	2	2	***4***	0	0	1	0	***1***	0	0	0	0	***0***
4:45 PM	0	0	1	2	***3***	0	0	0	0	***0***	0	1	0	4	***5***
5:00 PM	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**1**	***2***
5:15 PM	**0**	**0**	**3**	**1**	***4***	**1**	**0**	**0**	**0**	***1***	**0**	**1**	**0**	**2**	***3***
5:30 PM	**1**	**0**	**1**	**3**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
5:45 PM	**1**	**0**	**2**	**1**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**0**	**1**	***2***
Count Total	6	0	14	17	***37***	1	0	1	1	***3***	0	5	0	10	***15***
Peak Hour	**3**	**0**	**7**	**5**	***15***	**1**	**0**	**0**	**1**	***2***	**0**	**3**	**0**	**5**	***8***

Traffic Impact Study

Appendix B. 24-hour Volume Counts Summary

Location: N MERCER WAY E/O 81ST AVE SE
Date Range: 10/14/2017 - 10/20/2017
Site Code: 01

	Saturday			Sunday			Monday			Tuesday			Wednesday			Thursday			Friday					
	10/14/2017			10/15/2017			10/16/2017			10/17/2017			10/18/2017			10/19/2017			10/20/2017			Mid-Week Average		
Time	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	11	51	62	20	48	68	8	15	23	3	20	23	6	17	23	2	18	20	4	17	21	4	18	22
1:00 AM	11	22	33	7	23	30	6	7	13	6	9	15	6	9	15	3	8	11	5	13	18	5	9	14
2:00 AM	10	16	26	4	14	18	2	5	7	2	8	10	6	13	19	2	13	15	3	14	17	3	11	15
3:00 AM	6	9	15	3	7	10	3	4	7	1	8	9	3	8	11	5	6	11	5	11	16	3	7	10
4:00 AM	1	8	9	7	8	15	4	33	37	5	34	39	8	33	41	6	38	44	9	33	42	6	35	41
5:00 AM	4	41	45	3	24	27	10	153	163	9	167	176	13	175	188	9	154	163	8	158	166	10	165	176
6:00 AM	12	60	72	9	50	59	21	461	482	30	465	495	29	477	506	27	424	451	30	421	451	29	455	484
7:00 AM	20	124	144	20	85	105	86	437	523	99	513	612	73	488	561	72	513	585	75	455	530	81	505	586
8:00 AM	44	241	285	45	135	180	111	535	646	109	544	653	114	557	671	158	512	670	106	485	591	127	538	665
9:00 AM	95	310	405	72	247	319	102	388	490	117	487	604	106	421	527	145	516	661	89	450	539	123	475	597
10:00 AM	107	319	426	81	271	352	78	331	409	100	397	497	97	351	448	101	436	537	108	418	526	99	395	494
11:00 AM	144	352	496	107	347	454	113	354	467	99	375	474	131	374	505	106	423	529	100	474	574	112	391	503
12:00 PM	215	372	587	124	370	494	112	353	465	83	383	466	124	334	458	127	459	586	121	426	547	111	392	503
1:00 PM	219	374	593	191	370	561	104	355	459	135	378	513	131	383	514	135	420	555	104	413	517	134	394	527
2:00 PM	254	318	572	159	392	551	115	353	468	108	360	468	119	343	462	119	351	470	112	413	525	115	351	467
3:00 PM	242	349	591	115	377	492	156	419	575	149	380	529	127	382	509	138	390	528	122	412	534	138	384	522
4:00 PM	235	330	565	113	343	456	163	420	583	134	425	559	153	370	523	125	346	471	139	401	540	137	380	518
5:00 PM	142	328	470	103	257	360	145	412	557	141	421	562	140	408	548	121	343	464	163	408	571	134	391	525
6:00 PM	102	334	436	86	295	381	122	385	507	149	367	516	148	392	540	151	356	507	117	336	453	149	372	521
7:00 PM	77	230	307	79	192	271	103	261	364	99	267	366	105	248	353	107	233	340	64	274	338	104	249	353
8:00 PM	61	149	210	58	190	248	55	185	240	57	204	261	54	210	264	82	202	284	68	198	266	64	205	270
9:00 PM	55	171	226	33	114	147	39	148	187	54	176	230	49	154	203	58	178	236	57	189	246	54	169	223
10:00 PM	38	117	155	25	64	89	27	57	84	26	79	105	31	81	112	42	78	120	36	134	170	33	79	112
11:00 PM	25	94	119	6	25	31	13	36	49	7	32	39	11	43	54	19	47	66	24	66	90	12	41	53
Total	**2,130**	**4,719**	**6,849**	**1,470**	**4,248**	**5,718**	**1,698**	**6,107**	**7,805**	**1,722**	**6,499**	**8,221**	**1,784**	**6,271**	**8,055**	**1,860**	**6,464**	**8,324**	**1,669**	**6,619**	**8,288**	**1,789**	**6,411**	**8,200**
Percent	**31%**	**69%**	-	**26%**	**74%**	-	**22%**	**78%**	-	**21%**	**79%**	-	**22%**	**78%**	-	**22%**	**78%**	-	**20%**	**80%**	-	**22%**	**78%**	-

1. Mid-week average includes data between Tuesday and Thursday.

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Traffic Impact Study

Appendix C. WSDOT Signal Timing

MaxTime 1.9.5 Full Default Timing Sheet

Controller Number	704
Controller Name	N Mercer Wy & 80th Ave SE
Main St.	N Mercer Wy
Side St.	80th Ave SE
IP Address	10.17.111.36
NTCIP Receive Port	Automatic
NTCIP Send Port	161
NTCIP Timeout	1000

Unit Parameters	
Extended Mode	Disable
StartUp Flash	0
Auto Ped Clear	Enable
Red Revert	2
Backup Time	600
Startup Clearance Hold Time	3
Green Flash Frequency	60
Yellow Flash Frequency	60
Manual Control Sequence	1
Manual Control Enable	Enable
Start Yellow Override	0
Start Red Override	0
Free Sequence	1
All Red Flash Exit Time	3
Local Flash through CVM	Disable
3-Phase Diamond Seq	
4-Pase Diamond Seq	
Separate Diamond Seq	
Master By TOD	Disable
All Red Local Flash Sense	Disable

Phase Timing Plans, Timing Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Walk	0	10	0	0	0	0	0	10	0	0	0	0	0	0
Ped Clear	0	15	0	0	0	0	0	18	0	0	0	0	0	0
Steady Don't Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Green	3	5	0	5	3	5	3	5	1	1	1	1	1	1
Min Green2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passage	2.5	3	0	3	2.5	3	2.5	3	0	0	0	0	0	0
Max 1	15	40	0	20	15	40	15	20	0	0	0	0	0	0
Max 2	15	45	0	25	15	45	20	25	0	0	0	0	0	0
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conditional Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Change	3.5	3.5	3	3.5	3.5	3.5	3.5	3.5	3	3	3	3	3	3
Red Clear	2	2	0	2	2	2	2	2	0	0	0	0	0	0
Add Red Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Maximum Initial	0	0	0	0	0	25	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Gap	2.5	3	0	3	2.5	3	2.5	3	0	0	0	0	0	0
Dynamic Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advance Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delayed Ped	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Service Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Clearance	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MaxTime 1.9.5 Full Default Timing Sheet

Controller Number	711
Controller Name	Island Crest Wy & N Mercer Wy
Main St.	Island Crest Wy
Side St.	N Mercer Wy / WB I-90 Off-Ramp
IP Address	10.17.111.29
NTCIP Receive Port	Automatic
NTCIP Send Port	161
NTCIP Timeout	1000

Unit Parameters	
Extended Mode	Enable
StartUp Flash	0
Auto Ped Clear	Enable
Red Revert	2
Backup Time	600
Startup Clearance Hold Time	6
Green Flash Frequency	60
Yellow Flash Frequency	60
Manual Control Sequence	1
Manual Control Enable	Enable
Start Yellow Override	0
Start Red Override	0
Free Sequence	1
All Red Flash Exit Time	0
Local Flash through CVM	Disable
3-Phase Diamond Seq	
4-Pase Diamond Seq	
Separate Diamond Seq	
Master By TOD	Disable
All Red Local Flash Sense	Disable

Phase Timing Plans, Timing Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Walk	0	7	0	0	0	0	0	7	0	0	0	0	0	0
Ped Clear	0	14	0	0	0	0	0	14	0	0	0	0	0	0
Steady Don't Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Green	0	7	0	5	0	5	3	5	1	1	1	1	1	1
Min Green2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passage	0	4	0	2	0	2	2.5	2	0	0	0	0	0	0
Max 1	0	50	0	25	0	25	15	20	0	0	0	0	0	0
Max 2	0	50	0	25	0	30	15	20	0	0	0	0	0	0
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conditional Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Change	3	3.6	3	3.5	3	3.5	3.5	3.5	3	3	3	3	3	3
Red Clear	0	2	0	2	0	2	2	2	0	0	0	0	0	0
Add Red Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Gap	0	4	0	2	0	2	2	2	0	0	0	0	0	0
Dynamic Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advance Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delayed Ped	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Service Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Clearance	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MaxTime Full 1.9.3 Default Timing Sheet

Controller Number	712
Controller Name	Island Crest Wy & SE 27th St
Main St.	Island Crest Wy
Side St.	SE 27th St
IP Address	10.17.111.64
NTCIP Receive Port	Automatic
NTCIP Send Port	161
NTCIP Timeout	1000

Unit Parameters	
Extended Mode	Disable
StartUp Flash	0
Auto Ped Clear	Enable
Red Revert	2
Backup Time	600
Startup Clearance Hold Time	6
Green Flash Frequency	60
Yellow Flash Frequency	60
Manual Control Sequence	1
Manual Control Enable	Enable
Start Yellow Override	0
Start Red Override	0
Free Sequence	1
All Red Flash Exit Time	0
Local Flash through CVM	Disable
3-Phase Diamond Seq	
4-Pase Diamond Seq	
Separate Diamond Seq	
Master By TOD	Disable
All Red Local Flash Sense	Disable

Phase Timing Plans, Timing Plan 1

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Walk	0	0	0	0	0	7	0	7	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	18	0	22	0	0	0	0	0	0
Steady Don't Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Green	0	0	3	5	0	5	3	5	1	1	1	1	1	1
Min Green2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passage	0	0	2	2.5	0	3	2	2.5	0	0	0	0	0	0
Max 1	0	0	20	40	0	35	20	40	0	0	0	0	0	0
Max 2	0	0	25	50	0	45	25	50	0	0	0	0	0	0
Max 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conditional Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Change	3	3.5	3.5	3.5	3	3.5	3.5	3.5	3	3	3	3	3	3
Red Clear	0	0	2	2	0	2	2	2	0	0	0	0	0	0
Add Red Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Added Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Gap	0	0	2	2.5	0	3	2	2.5	0	0	0	0	0	0
Dynamic Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dynamic Max Step	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Advance Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delayed Ped	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Ped Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Service Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Clearance	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Impact Study

Appendix D. Synchro Worksheets- Existing Traffic Volume

HCM Signalized Intersection Capacity Analysis
2: 80th/P&R & N Mercer Way

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	110	117	40	544	29	4	124	12	28	7	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.89			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1748		1770	1957			1626	1634			1777
Flt Permitted	0.13	1.00		0.51	1.00			0.66	1.00			0.95
Satd. Flow (perm)	223	1748		949	1957			1128	1634			1707
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	128	136	43	579	31	5	148	14	33	10	33
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	21	0	0	7
Lane Group Flow (vph)	8	228	0	43	608	0	0	153	26	0	0	45
Confl. Peds. (#/hr)						59						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	236	657		517	736			493	614			317
v/s Ratio Prot	0.00	0.13		c0.01	c0.31			c0.04	0.02			
v/s Ratio Perm	0.01			0.03				c0.07				0.03
v/c Ratio	0.03	0.35		0.08	0.83			0.31	0.04			0.14
Uniform Delay, d1	18.8	23.5		15.5	29.6			22.7	20.8			35.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	1.4		0.3	10.3			1.6	0.1			0.9
Delay (s)	19.1	24.9		15.8	39.9			24.3	20.9			36.7
Level of Service	B	C		B	D			C	C			D
Approach Delay (s)		24.8			38.3				23.5			36.7
Approach LOS		C			D				C			D

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	93
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	16	88	8	0	3
Peak Hour Factor	0.86	0.86	0.69	0.69	0.38	0.38
Hourly flow rate (vph)	17	19	128	12	0	8

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	36	139	8
Volume Left (vph)	17	128	0
Volume Right (vph)	19	0	8
Hadj (s)	-0.16	0.20	-0.60
Departure Headway (s)	4.1	4.2	3.5
Degree Utilization, x	0.04	0.16	0.01
Capacity (veh/h)	851	843	1001
Control Delay (s)	7.2	8.0	6.5
Approach Delay (s)	7.2	8.0	6.5
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	4	19	85	28	0	15	3	63	0	2	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.57	0.57	0.57	0.78	0.78	0.78	0.50	0.50	0.50
Hourly flow rate (vph)	0	6	30	149	49	0	19	4	81	0	4	0
Pedestrians		14			3			8			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	53			44			392	380	32	458	395	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	53			44			392	380	32	458	395	67
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			96	99	92	100	99	100
cM capacity (veh/h)	1503			1559			504	491	1025	432	487	985

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	198	104	4
Volume Left	0	149	19	0
Volume Right	30	0	81	0
cSH	1503	1559	832	487
Volume to Capacity	0.00	0.10	0.12	0.01
Queue Length 95th (ft)	0	8	11	1
Control Delay (s)	0.0	5.9	9.9	12.5
Lane LOS		A	A	B
Approach Delay (s)	0.0	5.9	9.9	12.5
Approach LOS			A	B

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations							
Volume (veh/h)	1	69	83	26	79	533	16
Sign Control		Free		Stop		Free	
Grade		0%		0%		0%	
Peak Hour Factor	0.78	0.78	0.78	0.56	0.56	0.90	0.90
Hourly flow rate (vph)	0	88	106	46	141	592	18
Pedestrians				31			
Lane Width (ft)				12.0			
Walking Speed (ft/s)				3.5			
Percent Blockage				3			
Right turn flare (veh)							
Median type		TWLTL				None	
Median storage veh)		2					
Upstream signal (ft)		387				576	
pX, platoon unblocked	0.00	0.94		0.94	0.94		
vC, conflicting volume	0	641		915	632		
vC1, stage 1 conf vol				632			
vC2, stage 2 conf vol				283			
vCu, unblocked vol	0	582		875	573		
tC, single (s)	0.0	4.1		6.4	6.2		
tC, 2 stage (s)				5.4			
tF (s)	0.0	2.2		3.5	3.3		
p0 queue free %	0	90		90	70		
cM capacity (veh/h)	0	892		458	473		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	88	106	188	610
Volume Left	88	0	46	0
Volume Right	0	0	141	18
cSH	892	1700	469	1700
Volume to Capacity	0.10	0.06	0.40	0.36
Queue Length 95th (ft)	8	0	47	0
Control Delay (s)	9.5	0.0	17.7	0.0
Lane LOS	A		C	
Approach Delay (s)	4.3		17.7	0.0
Approach LOS			C	

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	27	3	39	1	3	0	257	70	2	0	10	8
Peak Hour Factor	0.49	0.49	0.49	0.33	0.33	0.33	0.93	0.93	0.93	0.45	0.45	0.45
Hourly flow rate (vph)	55	6	80	3	9	0	276	75	2	0	22	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	141	12	354	40
Volume Left (vph)	55	3	276	0
Volume Right (vph)	80	0	2	18
Hadj (s)	-0.16	0.05	0.19	-0.16
Departure Headway (s)	4.7	5.1	4.5	4.5
Degree Utilization, x	0.18	0.02	0.44	0.05
Capacity (veh/h)	707	638	776	745
Control Delay (s)	8.7	8.2	11.1	7.8
Approach Delay (s)	8.7	8.2	11.1	7.8
Approach LOS	A	A	B	A

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	97	178	28	0	85	207	184	4	185	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5			5.5			5.6		5.5	5.5
Lane Util. Factor	1.00			1.00			1.00		1.00	1.00
Frpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Flpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Frt	0.91			0.90			1.00		1.00	0.85
Flt Protected	0.98			0.99			0.97		0.95	1.00
Satd. Flow (prot)	1670			1621			1777		1752	1568
Flt Permitted	0.98			0.84			0.76		0.20	1.00
Satd. Flow (perm)	1670			1386			1380		369	1568
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	104	191	44	0	133	223	198	4	201	42
RTOR Reduction (vph)	86	0	0	63	0	0	0	0	0	0
Lane Group Flow (vph)	209	0	0	114	0	0	425	0	201	42
Confl. Peds. (#/hr)								26		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot		Perm	NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5			44.5			44.4		29.5	29.5
Effective Green, g (s)	14.5			44.5			44.4		29.5	29.5
Actuated g/C Ratio	0.17			0.52			0.52		0.35	0.35
Clearance Time (s)	5.5			5.5			5.6		5.5	5.5
Lane Grp Cap (vph)	284			725			720		282	544
v/s Ratio Prot	0.12								c0.08	0.03
v/s Ratio Perm				0.08			c0.31		c0.17	
v/c Ratio	0.74			0.16			0.59		0.71	0.08
Uniform Delay, d1	33.4			10.5			14.0		21.8	18.6
Progression Factor	1.00			1.00			1.00		1.00	1.00
Incremental Delay, d2	15.6			0.5			3.5		14.3	0.3
Delay (s)	49.0			11.0			17.5		36.1	18.9
Level of Service	D			B			B		D	B
Approach Delay (s)	49.0			11.0			17.5		33.1	
Approach LOS	D			B			B		C	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	240	56	55	164	52	42	95	30	62	60	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.86	0.86	0.89	0.89	0.89
Hourly flow rate (vph)	34	270	63	62	184	58	49	110	35	70	67	21

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	34	333	62	243	49	145	70	89
Volume Left (vph)	34	0	62	0	49	0	70	0
Volume Right (vph)	0	63	0	58	0	35	0	21
Hadj (s)	0.55	-0.08	0.53	-0.13	0.55	-0.12	0.58	-0.08
Departure Headway (s)	6.6	5.9	6.6	6.0	7.1	6.5	7.2	6.5
Degree Utilization, x	0.06	0.55	0.11	0.40	0.10	0.26	0.14	0.16
Capacity (veh/h)	521	589	517	579	470	518	460	506
Control Delay (s)	8.8	14.6	9.3	11.7	9.7	10.5	10.2	9.6
Approach Delay (s)	14.1		11.2		10.3		9.9	
Approach LOS	B		B		B		A	

Intersection Summary			
Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	17	286	29	0	0	0	87	207	383	49	156	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1797					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1797					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	18	308	31	0	0	0	94	223	412	53	168	198
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	133
Lane Group Flow (vph)	18	336	0	0	0	0	94	223	412	53	168	65
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	591					287	587	1583	276	631	501
v/s Ratio Prot		c0.19					0.05	c0.14		0.03	0.10	0.04
v/s Ratio Perm	0.01								c0.26			
v/c Ratio	0.03	0.57					0.33	0.38	0.26	0.19	0.27	0.13
Uniform Delay, d1	27.3	33.2					44.5	27.6	0.0	43.4	26.4	28.2
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	3.9					3.0	1.9	0.4	1.5	1.0	0.5
Delay (s)	27.4	37.1					47.5	29.5	0.4	45.0	27.4	28.7
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		36.6			0.0		15.4				30.3	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.6%	ICU Level of Service	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	148	15	114	603	90	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.88	0.88	0.86	0.86
Hourly flow rate (vph)	178	18	130	685	105	79
Pedestrians				82		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				9		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.73	
vC, conflicting volume			196		1132	269
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					944	
vCu, unblocked vol			196		999	269
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			90		64	88
cM capacity (veh/h)			1359		294	686

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	196	130	685	105	79
Volume Left	0	130	0	105	0
Volume Right	18	0	0	0	79
cSH	1700	1359	1700	294	686
Volume to Capacity	0.12	0.10	0.40	0.36	0.12
Queue Length 95th (ft)	0	8	0	39	10
Control Delay (s)	0.0	7.9	0.0	23.9	10.9
Lane LOS		A		C	B
Approach Delay (s)	0.0	1.3		18.3	
Approach LOS				C	

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	3	15	3	5	20	10	76	7	30	266	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.78	0.78	0.78
Hourly flow rate (vph)	19	3	17	3	6	23	12	92	8	38	341	26
Pedestrians		28			39			19			57	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			2			5	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	657	622	401	615	630	192	395			139		
vC1, stage 1 conf vol	459	459		159	159							
vC2, stage 2 conf vol	198	163		456	472							
vCu, unblocked vol	657	622	401	615	630	192	395			139		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.2	5.6		6.2	5.6							
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	96	99	97	99	99	97	99			97		
cM capacity (veh/h)	479	487	606	487	480	762	1122			1379		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	32	12	100	38	367
Volume Left	19	3	12	0	38	0
Volume Right	17	23	0	8	0	26
cSH	527	654	1122	1700	1379	1700
Volume to Capacity	0.08	0.05	0.01	0.06	0.03	0.22
Queue Length 95th (ft)	6	4	1	0	2	0
Control Delay (s)	12.4	10.8	8.2	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.4	10.8	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	17	131	116	58	372	26	1	124	25	54	12	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.91	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.90			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1712		1787	1953			1556	1733			1769
Flt Permitted	0.32	1.00		0.48	1.00			0.44	1.00			0.97
Satd. Flow (perm)	559	1712		906	1953			726	1733			1726
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	20	152	135	62	396	28	1	148	30	64	13	115
RTOR Reduction (vph)	0	31	0	0	2	0	0	0	40	0	0	5
Lane Group Flow (vph)	20	256	0	62	422	0	0	149	54	0	0	142
Confl. Peds. (#/hr)						107		191				
Confl. Bikes (#/hr)						20						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	358	644		502	734			387	651			320
v/s Ratio Prot	0.01	0.15		c0.01	c0.22			c0.05	0.03			
v/s Ratio Perm	0.02			0.05				0.09				c0.08
v/c Ratio	0.06	0.40		0.12	0.57			0.39	0.08			0.44
Uniform Delay, d1	16.2	24.0		15.7	26.1			23.4	21.1			37.9
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	1.8		0.5	3.3			2.9	0.3			4.4
Delay (s)	16.5	25.9		16.2	29.3			26.2	21.3			42.4
Level of Service	B	C		B	C			C	C			D
Approach Delay (s)		25.3			27.6				24.3			42.4
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	18
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	19
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	191
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	30	51	10	13	7
Peak Hour Factor	0.67	0.67	0.78	0.78	0.69	0.69
Hourly flow rate (vph)	9	45	65	13	19	10

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	54	78	29
Volume Left (vph)	9	65	0
Volume Right (vph)	45	0	10
Hadj (s)	-0.43	0.17	-0.21
Departure Headway (s)	3.7	4.2	3.9
Degree Utilization, x	0.06	0.09	0.03
Capacity (veh/h)	942	835	908
Control Delay (s)	6.9	7.6	7.0
Approach Delay (s)	6.9	7.6	7.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	7	23	67	12	0	37	7	63	1	4	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.66	0.66	0.66	0.89	0.89	0.89	0.42	0.42	0.42
Hourly flow rate (vph)	1	9	29	102	18	0	42	8	71	2	10	0
Pedestrians		2			8			12			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	19			50			266	260	44	331	275	21
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	19			50			266	260	44	331	275	21
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			93	99	93	100	98	100
cM capacity (veh/h)	1609			1551			633	597	1013	538	586	1059

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	40	120	120	12
Volume Left	1	102	42	2
Volume Right	29	0	71	0
cSH	1609	1551	808	576
Volume to Capacity	0.00	0.07	0.15	0.02
Queue Length 95th (ft)	0	5	13	2
Control Delay (s)	0.2	6.4	10.2	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	6.4	10.2	11.4
Approach LOS			B	B

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	89	105	32	67	389	33
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.75	0.75	0.91	0.91
Hourly flow rate (vph)	96	113	43	89	427	36
Pedestrians			38			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			4			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked	0.98		0.98	0.98		
vC, conflicting volume	502		788	484		
vC1, stage 1 conf vol			484			
vC2, stage 2 conf vol			304			
vCu, unblocked vol	480		772	461		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	91		92	84		
cM capacity (veh/h)	1026		517	570		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	96	113	132	464
Volume Left	96	0	43	0
Volume Right	0	0	89	36
cSH	1026	1700	552	1700
Volume to Capacity	0.09	0.07	0.24	0.27
Queue Length 95th (ft)	8	0	23	0
Control Delay (s)	8.9	0.0	13.6	0.0
Lane LOS	A		B	
Approach Delay (s)	4.1		13.6	0.0
Approach LOS			B	

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	29	3	56	2	2	3	86	33	2	2	27	16
Peak Hour Factor	0.85	0.85	0.85	0.58	0.58	0.58	0.82	0.82	0.82	0.80	0.80	0.80
Hourly flow rate (vph)	34	4	66	3	3	5	105	40	2	2	34	20

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	104	12	148	56
Volume Left (vph)	34	3	105	3
Volume Right (vph)	66	5	2	20
Hadj (s)	-0.32	-0.20	0.13	-0.20
Departure Headway (s)	4.1	4.3	4.3	4.1
Degree Utilization, x	0.12	0.01	0.18	0.06
Capacity (veh/h)	844	785	802	843
Control Delay (s)	7.6	7.3	8.3	7.4
Approach Delay (s)	7.6	7.3	8.3	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	66	44	41	0	92	430	270	8	108	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5			5.5			5.6		5.5	5.5
Lane Util. Factor	1.00			1.00			1.00		1.00	1.00
Frpb, ped/bikes	0.99			1.00			1.00		1.00	1.00
Flpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Frt	0.95			0.91			1.00		1.00	0.85
Flt Protected	0.97			0.98			0.97		0.95	1.00
Satd. Flow (prot)	1722			1663			1839		1770	1583
Flt Permitted	0.97			0.74			0.74		0.49	1.00
Satd. Flow (perm)	1722			1258			1393		912	1583
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	77	51	51	0	114	448	281	8	137	56
RTOR Reduction (vph)	86	0	0	54	0	0	0	0	0	0
Lane Group Flow (vph)	42	0	0	111	0	0	737	0	137	56
Confl. Peds. (#/hr)		7						39		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot		Perm	NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	7
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5			44.5			44.4		29.5	9.5
Effective Green, g (s)	14.5			44.5			44.4		29.5	9.5
Actuated g/C Ratio	0.17			0.52			0.52		0.35	0.11
Clearance Time (s)	5.5			5.5			5.6		5.5	5.5
Lane Grp Cap (vph)	293			658			727		412	176
v/s Ratio Prot	0.02								c0.04	0.04
v/s Ratio Perm				0.09			c0.53		c0.08	
v/c Ratio	0.14			0.17			1.01		0.33	0.32
Uniform Delay, d1	30.0			10.6			20.3		19.8	34.8
Progression Factor	1.00			1.00			1.00		1.00	1.00
Incremental Delay, d2	1.0			0.6			36.7		2.2	4.7
Delay (s)	31.0			11.1			57.0		22.0	39.5
Level of Service	C			B			E		C	D
Approach Delay (s)	31.0			11.1			57.0		27.1	
Approach LOS	C			B			E		C	

Intersection Summary			
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	274	55	84	202	15	50	112	47	76	81	30
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	54	298	60	106	256	19	57	127	53	90	96	36

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	54	358	106	275	57	181	90	132
Volume Left (vph)	54	0	106	0	57	0	90	0
Volume Right (vph)	0	60	0	19	0	53	0	36
Hadj (s)	0.52	-0.10	0.50	-0.05	0.50	-0.21	0.52	-0.17
Departure Headway (s)	7.1	6.5	7.1	6.6	7.6	6.9	7.7	7.0
Degree Utilization, x	0.11	0.64	0.21	0.50	0.12	0.35	0.19	0.26
Capacity (veh/h)	481	531	481	526	440	485	435	478
Control Delay (s)	9.7	19.2	10.8	14.8	10.5	12.4	11.3	11.2
Approach Delay (s)	17.9		13.7		11.9		11.2	
Approach LOS	C		B		B		B	

Intersection Summary			
Delay	14.3		
Level of Service	B		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	13	341	42	0	0	0	113	139	357	92	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1843					1787	1599	1599	1787	1787
Flt Permitted		0.99	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1861	1843					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	14	371	46	0	0	0	122	149	384	106	354
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	15	413	0	0	0	0	122	149	384	106	354
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Effective Green, g (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Actuated g/C Ratio		0.33	0.33					0.16	0.37	1.00	0.16	0.37
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		612	606					290	592	1599	290	662
v/s Ratio Prot			c0.22					c0.07	0.09		0.06	c0.20
v/s Ratio Perm		0.01								0.24		
v/c Ratio		0.02	0.68					0.42	0.25	0.24	0.37	0.53
Uniform Delay, d1		27.2	34.8					45.2	26.2	0.0	44.7	29.6
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	6.1					4.4	1.0	0.4	3.5	3.1
Delay (s)		27.3	40.9					49.6	27.2	0.4	48.3	32.7
Level of Service		C	D					D	C	A	D	C
Approach Delay (s)			40.4			0.0		15.6				33.9
Approach LOS			D			A		B				C

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR
Lane Configurations	
Volume (vph)	188
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	216
RTOR Reduction (vph)	145
Lane Group Flow (vph)	71
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	39.5
Effective Green, g (s)	39.5
Actuated g/C Ratio	0.33
Clearance Time (s)	5.5
Lane Grp Cap (vph)	526
v/s Ratio Prot	0.04
v/s Ratio Perm	
v/c Ratio	0.14
Uniform Delay, d1	28.3
Progression Factor	1.00
Incremental Delay, d2	0.5
Delay (s)	28.8
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	139	5	150	363	91	106
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	176	6	163	395	111	129
Pedestrians				35		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				4		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.90	
vC, conflicting volume			182		900	214
vC1, stage 1 conf vol					179	
vC2, stage 2 conf vol					721	
vCu, unblocked vol			182		834	214
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			88		71	83
cM capacity (veh/h)			1381		388	770

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	182	163	395	111	129
Volume Left	0	163	0	111	0
Volume Right	6	0	0	0	129
cSH	1700	1381	1700	388	770
Volume to Capacity	0.11	0.12	0.23	0.29	0.17
Queue Length 95th (ft)	0	10	0	29	15
Control Delay (s)	0.0	8.0	0.0	18.0	10.6
Lane LOS		A		C	B
Approach Delay (s)	0.0	2.3		14.0	
Approach LOS				B	

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	4	33	5	0	19	6	93	17	24	365	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.75	0.75	0.75	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	26	5	45	7	0	25	7	109	20	28	424	17
Pedestrians		31			38			11			79	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			1			8	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	748	701	475	710	700	236	473			167		
vC1, stage 1 conf vol	520	520		172	172							
vC2, stage 2 conf vol	228	182		539	529							
vCu, unblocked vol	748	701	475	710	700	236	473			167		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	92	98	100	96	99			98		
cM capacity (veh/h)	456	473	570	437	468	720	1052			1371		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	32	7	129	28	442
Volume Left	26	7	7	0	28	0
Volume Right	45	25	0	20	0	17
cSH	519	634	1052	1700	1371	1700
Volume to Capacity	0.15	0.05	0.01	0.08	0.02	0.26
Queue Length 95th (ft)	13	4	1	0	2	0
Control Delay (s)	13.1	11.0	8.4	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.1	11.0	0.4		0.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th/P&R & N Mercer Way

12/8/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	264	43	610	153	47	52
v/c Ratio	0.03	0.38	0.08	0.83	0.31	0.07	0.16
Control Delay	12.7	20.2	13.1	40.7	24.6	10.3	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	20.2	13.1	40.7	24.6	10.3	32.4
Queue Length 50th (ft)	3	97	14	364	70	6	24
Queue Length 95th (ft)	9	156	31	#552	110	27	41
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		150		
Base Capacity (vph)	236	693	516	738	493	635	324
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	0.03	0.38	0.08	0.83	0.31	0.07	0.16

Intersection Summary

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

Lane Group	WBL	SET	NWT	NEL	NER
Lane Group Flow (vph)	295	177	425	201	42
v/c Ratio	0.80	0.22	0.59	0.71	0.08
Control Delay	39.2	4.1	18.2	36.6	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	4.1	18.2	36.6	19.2
Queue Length 50th (ft)	99	11	147	78	15
Queue Length 95th (ft)	#227	18	241	#148	37
Internal Link Dist (ft)	626	496	1094	316	
Turn Bay Length (ft)				119	
Base Capacity (vph)	371	788	721	282	544
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.80	0.22	0.59	0.71	0.08

Intersection Summary

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	18	339	94	223	412	53	168	198
v/c Ratio	0.03	0.57	0.33	0.38	0.26	0.19	0.27	0.31
Control Delay	27.6	37.3	48.1	30.0	0.4	45.6	27.8	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	37.3	48.1	30.0	0.4	45.6	27.8	5.3
Queue Length 50th (ft)	9	213	65	125	0	36	90	0
Queue Length 95th (ft)	27	311	118	195	0	75	146	52
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	594	287	587	1583	276	631	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.57	0.33	0.38	0.26	0.19	0.27	0.31

Intersection Summary

Queues
2: 80th & N Mercer Way

12/8/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	20	287	62	424	149	94	147
v/c Ratio	0.06	0.43	0.12	0.58	0.39	0.14	0.45
Control Delay	12.9	22.2	13.4	29.6	25.7	9.2	41.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	22.2	13.4	29.6	25.7	9.2	41.5
Queue Length 50th (ft)	6	116	20	222	67	13	85
Queue Length 95th (ft)	17	178	41	322	107	41	148
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	359	674	502	737	384	691	325
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.43	0.12	0.58	0.39	0.14	0.45

Intersection Summary

Lane Group	WBL	SET	NWT	NEL	NER
Lane Group Flow (vph)	128	165	737	137	56
v/c Ratio	0.34	0.23	1.01	0.33	0.32
Control Delay	12.3	4.8	59.1	22.2	40.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	4.8	59.1	22.2	40.2
Queue Length 50th (ft)	11	13	~386	51	28
Queue Length 95th (ft)	53	35	#636	81	55
Internal Link Dist (ft)	626	496	1094	316	
Turn Bay Length (ft)				119	
Base Capacity (vph)	380	713	728	412	176
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.23	1.01	0.33	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	15	417	122	149	384	106	354	216
v/c Ratio	0.02	0.68	0.42	0.25	0.24	0.37	0.53	0.32
Control Delay	27.5	41.1	50.3	27.7	0.4	48.9	33.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0
Total Delay	27.5	41.1	50.3	27.7	0.4	48.9	38.1	5.1
Queue Length 50th (ft)	8	275	86	79	0	74	213	0
Queue Length 95th (ft)	24	391	148	132	0	126	296	48
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	612	610	290	592	1599	290	662	671
Starvation Cap Reductn	0	0	0	0	0	0	235	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.68	0.42	0.25	0.24	0.37	0.83	0.32

Intersection Summary

Traffic Impact Study

Appendix E. Synchro Worksheets- Future Traffic Volume

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/14/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	115	122	42	569	30	4	130	13	29	7	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.90			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1748		1770	1957			1626	1634			1777
Flt Permitted	0.10	1.00		0.49	1.00			0.66	1.00			0.95
Satd. Flow (perm)	180	1748		922	1957			1125	1634			1708
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	134	142	45	605	32	5	155	15	35	10	34
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	22	0	0	7
Lane Group Flow (vph)	8	240	0	45	635	0	0	160	28	0	0	46
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	220	657		506	736			492	614			317
v/s Ratio Prot	0.00	0.14		c0.01	c0.32			c0.04	0.02			
v/s Ratio Perm	0.01			0.03				c0.08				0.03
v/c Ratio	0.04	0.37		0.09	0.86			0.33	0.05			0.14
Uniform Delay, d1	19.4	23.7		15.5	30.2			22.8	20.8			35.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	1.6		0.3	12.8			1.8	0.1			1.0
Delay (s)	19.8	25.2		15.9	43.0			24.6	20.9			36.7
Level of Service	B	C		B	D			C	C			D
Approach Delay (s)		25.1			41.2				23.7			36.7
Approach LOS		C			D				C			D

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	16	17	92	8	0	3
Peak Hour Factor	0.86	0.86	0.69	0.69	0.38	0.38
Hourly flow rate (vph)	19	20	133	12	0	8

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	38	145	8
Volume Left (vph)	19	133	0
Volume Right (vph)	20	0	8
Hadj (s)	-0.16	0.20	-0.60
Departure Headway (s)	4.1	4.2	3.5
Degree Utilization, x	0.04	0.17	0.01
Capacity (veh/h)	847	842	997
Control Delay (s)	7.3	8.0	6.6
Approach Delay (s)	7.3	8.0	6.6
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	4	20	89	29	0	16	3	66	0	2	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.57	0.57	0.57	0.78	0.78	0.78	0.50	0.50	0.50
Hourly flow rate (vph)	0	6	31	156	51	0	21	4	85	0	4	0
Pedestrians		15			3			8			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55			46			410	397	33	479	413	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			46			410	397	33	479	413	70
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			96	99	92	100	99	100
cM capacity (veh/h)	1501			1557			488	478	1024	415	474	981

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	207	109	4
Volume Left	0	156	21	0
Volume Right	31	0	85	0
cSH	1501	1557	821	474
Volume to Capacity	0.00	0.10	0.13	0.01
Queue Length 95th (ft)	0	8	11	1
Control Delay (s)	0.0	5.9	10.1	12.7
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.9	10.1	12.7
Approach LOS			B	B

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations							
Volume (veh/h)	1	72	87	27	83	557	17
Sign Control		Free		Stop		Free	
Grade		0%		0%		0%	
Peak Hour Factor	0.78	0.78	0.78	0.56	0.56	0.90	0.90
Hourly flow rate (vph)	0	92	112	48	148	619	19
Pedestrians				32			
Lane Width (ft)				12.0			
Walking Speed (ft/s)				3.5			
Percent Blockage				3			
Right turn flare (veh)							
Median type		TWLTL				None	
Median storage veh)		2					
Upstream signal (ft)		387				576	
pX, platoon unblocked	0.00	0.93		0.93	0.93		
vC, conflicting volume	0	670		956	660		
vC1, stage 1 conf vol				660			
vC2, stage 2 conf vol				296			
vCu, unblocked vol	0	608		916	597		
tC, single (s)	0.0	4.1		6.4	6.2		
tC, 2 stage (s)				5.4			
tF (s)	0.0	2.2		3.5	3.3		
p0 queue free %	0	89		89	67		
cM capacity (veh/h)	0	867		442	455		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	92	112	196	638
Volume Left	92	0	48	0
Volume Right	0	0	148	19
cSH	867	1700	452	1700
Volume to Capacity	0.11	0.07	0.43	0.38
Queue Length 95th (ft)	9	0	54	0
Control Delay (s)	9.6	0.0	19.0	0.0
Lane LOS	A		C	
Approach Delay (s)	4.4		19.0	0.0
Approach LOS			C	

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	28	3	41	1	3	0	269	73	2	0	10	8
Peak Hour Factor	0.49	0.49	0.49	0.33	0.33	0.33	0.93	0.93	0.93	0.45	0.45	0.45
Hourly flow rate (vph)	57	6	84	3	9	0	289	78	2	0	22	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	147	12	370	40
Volume Left (vph)	57	3	289	0
Volume Right (vph)	84	0	2	18
Hadj (s)	-0.16	0.05	0.19	-0.16
Departure Headway (s)	4.7	5.1	4.5	4.6
Degree Utilization, x	0.19	0.02	0.47	0.05
Capacity (veh/h)	700	630	773	737
Control Delay (s)	8.9	8.2	11.4	7.8
Approach Delay (s)	8.9	8.2	11.4	7.8
Approach LOS	A	A	B	A

Intersection Summary			
Delay	10.4		
Level of Service	B		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	101	186	29	0	89	216	192	4	193	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5			5.5			5.6		5.5	5.5
Lane Util. Factor	1.00			1.00			1.00		1.00	1.00
Frpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Flpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Frt	0.91			0.90			1.00		1.00	0.85
Flt Protected	0.98			0.99			0.97		0.95	1.00
Satd. Flow (prot)	1671			1621			1777		1752	1568
Flt Permitted	0.98			0.84			0.75		0.20	1.00
Satd. Flow (perm)	1671			1380			1373		369	1568
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	109	200	45	0	139	232	206	4	210	45
RTOR Reduction (vph)	86	0	0	66	0	0	0	0	0	0
Lane Group Flow (vph)	223	0	0	118	0	0	442	0	210	45
Confl. Peds. (#/hr)								27		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot		Perm	NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5			44.5			44.4		29.5	29.5
Effective Green, g (s)	14.5			44.5			44.4		29.5	29.5
Actuated g/C Ratio	0.17			0.52			0.52		0.35	0.35
Clearance Time (s)	5.5			5.5			5.6		5.5	5.5
Lane Grp Cap (vph)	285			722			717		282	544
v/s Ratio Prot	0.13								c0.08	0.03
v/s Ratio Perm				0.09			c0.32		c0.17	
v/c Ratio	0.78			0.16			0.62		0.74	0.08
Uniform Delay, d1	33.7			10.5			14.3		22.1	18.7
Progression Factor	1.00			1.00			1.00		1.00	1.00
Incremental Delay, d2	18.9			0.5			3.9		16.3	0.3
Delay (s)	52.7			11.0			18.2		38.4	19.0
Level of Service	D			B			B		D	B
Approach Delay (s)	52.7			11.0			18.2		34.9	
Approach LOS	D			B			B		C	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	251	59	58	171	54	44	99	31	65	63	20
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.86	0.86	0.89	0.89	0.89
Hourly flow rate (vph)	35	282	66	65	192	61	51	115	36	73	71	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	35	348	65	253	51	151	73	93
Volume Left (vph)	35	0	65	0	51	0	73	0
Volume Right (vph)	0	66	0	61	0	36	0	22
Hadj (s)	0.55	-0.08	0.53	-0.13	0.55	-0.12	0.58	-0.08
Departure Headway (s)	6.6	6.0	6.7	6.1	7.2	6.6	7.3	6.7
Degree Utilization, x	0.06	0.58	0.12	0.43	0.10	0.28	0.15	0.17
Capacity (veh/h)	514	571	508	569	462	509	453	497
Control Delay (s)	8.9	15.9	9.5	12.3	9.9	10.9	10.4	9.9
Approach Delay (s)	15.2		11.7		10.6		10.1	
Approach LOS	C		B		B		B	

Intersection Summary			
Delay	12.5		
Level of Service	B		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	18	299	30	0	0	0	91	216	400	52	163	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1797					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1797					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	19	322	32	0	0	0	98	232	430	56	175	206
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	138
Lane Group Flow (vph)	19	351	0	0	0	0	98	232	430	56	175	68
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	591					287	587	1583	276	631	501
v/s Ratio Prot		c0.20					0.06	c0.15		0.03	0.10	0.04
v/s Ratio Perm	0.01								c0.27			
v/c Ratio	0.03	0.59					0.34	0.40	0.27	0.20	0.28	0.14
Uniform Delay, d1	27.3	33.6					44.6	27.8	0.0	43.5	26.5	28.3
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	4.4					3.2	2.0	0.4	1.7	1.1	0.6
Delay (s)	27.4	37.9					47.8	29.8	0.4	45.2	27.6	28.8
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		37.4			0.0		15.5				30.4	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	16	119	631	94	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.88	0.88	0.86	0.86
Hourly flow rate (vph)	187	19	135	717	109	83
Pedestrians				86		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				10		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.71	
vC, conflicting volume			206		1184	282
vC1, stage 1 conf vol					196	
vC2, stage 2 conf vol					988	
vCu, unblocked vol			206		1057	282
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			90		60	88
cM capacity (veh/h)			1348		273	671

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	206	135	717	109	83
Volume Left	0	135	0	109	0
Volume Right	19	0	0	0	83
cSH	1700	1348	1700	273	671
Volume to Capacity	0.12	0.10	0.42	0.40	0.12
Queue Length 95th (ft)	0	8	0	46	10
Control Delay (s)	0.0	8.0	0.0	26.8	11.1
Lane LOS		A		D	B
Approach Delay (s)	0.0	1.3		20.0	
Approach LOS				C	

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	3	16	3	5	21	10	79	7	31	278	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.78	0.78	0.78
Hourly flow rate (vph)	20	3	18	3	6	24	12	95	8	40	356	27
Pedestrians		29			41			20			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			2			6	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	684	647	419	640	656	200	412			145		
vC1, stage 1 conf vol	478	478		164	164							
vC2, stage 2 conf vol	206	169		476	492							
vCu, unblocked vol	684	647	419	640	656	200	412			145		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.2	5.6		6.2	5.6							
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	96	99	97	99	99	97	99			97		
cM capacity (veh/h)	465	476	591	472	469	750	1104			1370		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	33	12	104	40	383
Volume Left	20	3	12	0	40	0
Volume Right	18	24	0	8	0	27
cSH	513	644	1104	1700	1370	1700
Volume to Capacity	0.08	0.05	0.01	0.06	0.03	0.23
Queue Length 95th (ft)	7	4	1	0	2	0
Control Delay (s)	12.6	10.9	8.3	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.6	10.9	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	137	121	61	389	27	1	130	26	56	13	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.90			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1713		1787	1952			1719	1732			1764
Flt Permitted	0.30	1.00		0.47	1.00			0.43	1.00			0.97
Satd. Flow (perm)	523	1713		877	1952			780	1732			1718
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	159	141	65	414	29	1	155	31	67	14	120
RTOR Reduction (vph)	0	31	0	0	2	0	0	0	42	0	0	5
Lane Group Flow (vph)	21	269	0	65	441	0	0	156	56	0	0	149
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	345	644		491	734			423	651			319
v/s Ratio Prot	0.01	0.16		c0.01	c0.23			c0.05	0.03			
v/s Ratio Perm	0.02			0.05				0.09				c0.09
v/c Ratio	0.06	0.42		0.13	0.60			0.37	0.09			0.47
Uniform Delay, d1	16.4	24.2		15.8	26.4			23.3	21.1			38.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	2.0		0.6	3.6			2.5	0.3			4.9
Delay (s)	16.7	26.2		16.3	30.0			25.8	21.4			43.0
Level of Service	B	C		B	C			C	C			D
Approach Delay (s)		25.6			28.2				24.1			43.0
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	31	53	10	14	7
Peak Hour Factor	0.67	0.67	0.78	0.78	0.69	0.69
Hourly flow rate (vph)	9	46	68	13	20	10

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	55	81	30
Volume Left (vph)	9	68	0
Volume Right (vph)	46	0	10
Hadj (s)	-0.44	0.17	-0.20
Departure Headway (s)	3.7	4.2	3.9
Degree Utilization, x	0.06	0.09	0.03
Capacity (veh/h)	939	834	904
Control Delay (s)	6.9	7.6	7.0
Approach Delay (s)	6.9	7.6	7.0
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	7	24	70	13	0	39	7	66	1	4	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.66	0.66	0.66	0.89	0.89	0.89	0.42	0.42	0.42
Hourly flow rate (vph)	1	9	31	106	20	0	44	8	74	2	10	0
Pedestrians		2			8			13			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	21			53			279	273	45	346	288	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			53			279	273	45	346	288	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			93	99	93	100	98	100
cM capacity (veh/h)	1607			1547			619	585	1010	522	574	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	126	126	12
Volume Left	1	106	44	2
Volume Right	31	0	74	0
cSH	1607	1547	798	563
Volume to Capacity	0.00	0.07	0.16	0.02
Queue Length 95th (ft)	0	6	14	2
Control Delay (s)	0.2	6.4	10.4	11.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	6.4	10.4	11.5
Approach LOS			B	B

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	93	110	33	70	407	35
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.75	0.75	0.91	0.91
Hourly flow rate (vph)	100	118	44	93	447	38
Pedestrians			40			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			4			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked	0.97		0.97	0.97		
vC, conflicting volume	526		825	506		
vC1, stage 1 conf vol			506			
vC2, stage 2 conf vol			318			
vCu, unblocked vol	500		807	480		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	90		91	83		
cM capacity (veh/h)	1002		501	553		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	100	118	137	486
Volume Left	100	0	44	0
Volume Right	0	0	93	38
cSH	1002	1700	535	1700
Volume to Capacity	0.10	0.07	0.26	0.29
Queue Length 95th (ft)	8	0	25	0
Control Delay (s)	9.0	0.0	14.0	0.0
Lane LOS	A		B	
Approach Delay (s)	4.1		14.0	0.0
Approach LOS			B	

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	3	59	2	2	3	90	35	2	2	28	17
Peak Hour Factor	0.85	0.85	0.85	0.58	0.58	0.58	0.82	0.82	0.82	0.80	0.80	0.80
Hourly flow rate (vph)	35	4	69	3	3	5	110	43	2	2	35	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	108	12	155	59
Volume Left (vph)	35	3	110	3
Volume Right (vph)	69	5	2	21
Hadj (s)	-0.32	-0.20	0.13	-0.21
Departure Headway (s)	4.1	4.3	4.4	4.1
Degree Utilization, x	0.12	0.01	0.19	0.07
Capacity (veh/h)	839	778	799	839
Control Delay (s)	7.6	7.4	8.4	7.4
Approach Delay (s)	7.6	7.4	8.4	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	69	46	43	0	96	450	282	8	113	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5			5.5			5.6		5.5	5.5
Lane Util. Factor	1.00			1.00			1.00		1.00	1.00
Frpb, ped/bikes	0.99			1.00			1.00		1.00	1.00
Flpb, ped/bikes	1.00			1.00			1.00		1.00	1.00
Frt	0.95			0.91			1.00		1.00	0.85
Flt Protected	0.97			0.98			0.97		0.95	1.00
Satd. Flow (prot)	1722			1663			1839		1770	1583
Flt Permitted	0.97			0.74			0.73		0.48	1.00
Satd. Flow (perm)	1722			1246			1387		900	1583
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	80	53	53	0	119	469	294	8	143	58
RTOR Reduction (vph)	86	0	0	57	0	0	0	0	0	0
Lane Group Flow (vph)	47	0	0	115	0	0	771	0	143	58
Confl. Peds. (#/hr)		7						41		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot		Perm	NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5			44.5			44.4		29.5	29.5
Effective Green, g (s)	14.5			44.5			44.4		29.5	29.5
Actuated g/C Ratio	0.17			0.52			0.52		0.35	0.35
Clearance Time (s)	5.5			5.5			5.6		5.5	5.5
Lane Grp Cap (vph)	293			652			724		409	549
v/s Ratio Prot	0.03								c0.04	0.04
v/s Ratio Perm				0.09			c0.56		c0.08	
v/c Ratio	0.16			0.18			1.06		0.35	0.11
Uniform Delay, d1	30.1			10.6			20.3		19.9	18.8
Progression Factor	1.00			1.00			1.00		1.00	1.00
Incremental Delay, d2	1.2			0.6			51.9		2.3	0.4
Delay (s)	31.2			11.2			72.2		22.3	19.2
Level of Service	C			B			E		C	B
Approach Delay (s)	31.2			11.2			72.2		21.4	
Approach LOS	C			B			E		C	

Intersection Summary			
HCM 2000 Control Delay	51.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	287	58	88	211	16	52	117	49	79	85	31
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	57	312	63	111	267	20	59	133	56	94	101	37

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	57	375	111	287	59	189	94	138
Volume Left (vph)	57	0	111	0	59	0	94	0
Volume Right (vph)	0	63	0	20	0	56	0	37
Hadj (s)	0.52	-0.10	0.50	-0.05	0.50	-0.21	0.52	-0.17
Departure Headway (s)	7.2	6.6	7.3	6.7	7.8	7.1	7.9	7.2
Degree Utilization, x	0.11	0.69	0.23	0.54	0.13	0.37	0.21	0.28
Capacity (veh/h)	473	523	472	506	432	476	427	468
Control Delay (s)	10.0	21.9	11.2	16.1	10.8	13.1	11.7	11.7
Approach Delay (s)	20.4		14.7		12.5		11.7	
Approach LOS	C		B		B		B	

Intersection Summary			
Delay	15.6		
Level of Service	C		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	14	357	44	0	0	0	118	145	373	96	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1843					1787	1599	1599	1787	1787
Flt Permitted		0.99	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1861	1843					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	15	388	48	0	0	0	127	156	401	110	370
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	432	0	0	0	0	127	156	401	110	370
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Effective Green, g (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Actuated g/C Ratio		0.33	0.33					0.16	0.37	1.00	0.16	0.37
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		612	606					290	592	1599	290	662
v/s Ratio Prot			c0.23					c0.07	0.10		0.06	c0.21
v/s Ratio Perm		0.01								0.25		
v/c Ratio		0.03	0.71					0.44	0.26	0.25	0.38	0.56
Uniform Delay, d1		27.2	35.3					45.3	26.3	0.0	44.8	30.0
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	7.0					4.7	1.1	0.4	3.7	3.4
Delay (s)		27.3	42.3					50.1	27.4	0.4	48.6	33.3
Level of Service		C	D					D	C	A	D	C
Approach Delay (s)			41.7			0.0		15.8				34.3
Approach LOS			D			A		B				C

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR
Lane Configurations	
Volume (vph)	197
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	226
RTOR Reduction (vph)	152
Lane Group Flow (vph)	74
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	39.5
Effective Green, g (s)	39.5
Actuated g/C Ratio	0.33
Clearance Time (s)	5.5
Lane Grp Cap (vph)	526
v/s Ratio Prot	0.05
v/s Ratio Perm	
v/c Ratio	0.14
Uniform Delay, d1	28.3
Progression Factor	1.00
Incremental Delay, d2	0.6
Delay (s)	28.9
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	145	5	157	380	95	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	184	6	171	413	116	135
Pedestrians				37		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				4		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.89	
vC, conflicting volume			190		941	224
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					754	
vCu, unblocked vol			190		872	224
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			88		69	82
cM capacity (veh/h)			1372		370	759

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	190	171	413	116	135
Volume Left	0	171	0	116	0
Volume Right	6	0	0	0	135
cSH	1700	1372	1700	370	759
Volume to Capacity	0.11	0.12	0.24	0.31	0.18
Queue Length 95th (ft)	0	11	0	33	16
Control Delay (s)	0.0	8.0	0.0	19.1	10.8
Lane LOS		A		C	B
Approach Delay (s)	0.0	2.3		14.6	
Approach LOS				B	

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	4	35	5	0	20	6	97	18	25	382	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.75	0.75	0.75	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	27	5	47	7	0	27	7	114	21	29	444	19
Pedestrians		32			40			12			83	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			1			8	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	782	733	497	743	732	248	495			175		
vC1, stage 1 conf vol	544	544		179	179							
vC2, stage 2 conf vol	238	189		564	553							
vCu, unblocked vol	782	733	497	743	732	248	495			175		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	91	98	100	96	99			98		
cM capacity (veh/h)	441	460	553	419	455	705	1031			1359		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	33	7	135	29	463
Volume Left	27	7	7	0	29	0
Volume Right	47	27	0	21	0	19
cSH	503	620	1031	1700	1359	1700
Volume to Capacity	0.16	0.05	0.01	0.08	0.02	0.27
Queue Length 95th (ft)	14	4	1	0	2	0
Control Delay (s)	13.5	11.1	8.5	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.5	11.1	0.4		0.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

12/5/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	45	637	160	50	53
v/c Ratio	0.04	0.40	0.09	0.86	0.33	0.08	0.16
Control Delay	12.7	20.7	13.1	43.9	24.9	10.3	32.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	20.7	13.1	43.9	24.9	10.3	32.5
Queue Length 50th (ft)	3	104	14	388	73	6	25
Queue Length 95th (ft)	9	164	32	#594	115	28	42
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	219	693	506	737	492	636	324
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	0.04	0.40	0.09	0.86	0.33	0.08	0.16

Intersection Summary

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

Lane Group	WBL	SET	NWT	NEL	NER
Lane Group Flow (vph)	309	184	442	210	45
v/c Ratio	0.83	0.23	0.62	0.74	0.08
Control Delay	43.3	4.1	18.9	39.1	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	4.1	18.9	39.1	19.3
Queue Length 50th (ft)	108	11	156	82	16
Queue Length 95th (ft)	#245	18	256	#160	39
Internal Link Dist (ft)	626	496	1094	316	
Turn Bay Length (ft)				119	
Base Capacity (vph)	371	788	717	282	544
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.23	0.62	0.74	0.08

Intersection Summary

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	19	354	98	232	430	56	175	206
v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.32
Control Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.3
Queue Length 50th (ft)	10	225	68	131	0	38	94	0
Queue Length 95th (ft)	28	328	122	203	0	78	152	53
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	594	287	587	1583	276	631	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.32

Intersection Summary

Queues
2: 80th & N Mercer Way

12/5/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	65	443	156	98	154
v/c Ratio	0.06	0.45	0.13	0.60	0.37	0.14	0.48
Control Delay	12.9	22.8	13.5	30.3	25.3	9.1	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	22.8	13.5	30.3	25.3	9.1	42.3
Queue Length 50th (ft)	7	123	21	235	71	13	89
Queue Length 95th (ft)	18	188	43	339	111	42	155
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	345	674	491	736	423	692	323
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.45	0.13	0.60	0.37	0.14	0.48

Intersection Summary

Lane Group	WBL	SET	NWT	NEL	NER
Lane Group Flow (vph)	133	172	771	143	58
v/c Ratio	0.35	0.24	1.06	0.35	0.11
Control Delay	12.9	4.8	74.3	22.5	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	4.8	74.3	22.5	19.6
Queue Length 50th (ft)	13	13	~461	53	21
Queue Length 95th (ft)	56	36	#680	84	41
Internal Link Dist (ft)	626	496	1094	316	
Turn Bay Length (ft)				119	
Base Capacity (vph)	380	709	725	409	549
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.24	1.06	0.35	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	16	436	127	156	401	110	370	226
v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.56	0.33
Control Delay	27.5	42.5	50.7	27.9	0.4	49.2	33.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.3
Total Delay	27.5	42.5	50.7	27.9	0.4	49.2	39.9	5.5
Queue Length 50th (ft)	8	291	90	83	0	77	226	0
Queue Length 95th (ft)	25	414	153	138	0	129	310	48
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	612	610	290	592	1599	290	662	677
Starvation Cap Reductn	0	0	0	0	0	0	232	139
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.86	0.42

Intersection Summary

Traffic Impact Study

Appendix F. Synchro Worksheets- Detour Configuration I

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	0	237	0	0	0	4	524	43	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5						5.5	5.5			5.5
Lane Util. Factor	1.00	1.00						1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00						1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00						1.00	1.00			1.00
Frt	1.00	0.85						1.00	1.00			0.98
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1687	1610						1626	1826			1795
Flt Permitted	0.76	1.00						0.56	1.00			1.00
Satd. Flow (perm)	1345	1610						964	1826			1795
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	0	276	0	0	0	5	624	51	0	0	45
RTOR Reduction (vph)	0	172	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	8	104	0	0	0	0	0	629	51	0	0	47
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt			pm+pt	pm+pt	NA			NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5						39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5						39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38						0.38	0.38			0.19
Clearance Time (s)	5.5	5.5						5.5	5.5			5.5
Lane Grp Cap (vph)	658	605						454	686			333
v/s Ratio Prot	c0.00	c0.06						c0.19	0.03			0.03
v/s Ratio Perm	0.00							c0.33				
v/c Ratio	0.01	0.17						1.39	0.07			0.14
Uniform Delay, d1	15.0	21.8						31.6	21.0			35.8
Progression Factor	1.00	1.00						1.00	1.00			1.00
Incremental Delay, d2	0.0	0.6						186.7	0.2			0.9
Delay (s)	15.0	22.5						218.3	21.2			36.7
Level of Service	B	C						F	C			D
Approach Delay (s)		22.2			0.0				203.5			36.7
Approach LOS		C			A				F			D

Intersection Summary			
HCM 2000 Control Delay	144.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	16	39	365	8	0	3
Peak Hour Factor	0.86	0.86	0.69	0.69	0.38	0.38
Hourly flow rate (vph)	19	45	529	12	0	8

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	64	541	8
Volume Left (vph)	19	529	0
Volume Right (vph)	45	0	8
Hadj (s)	-0.32	0.21	-0.60
Departure Headway (s)	4.8	4.3	4.0
Degree Utilization, x	0.09	0.64	0.01
Capacity (veh/h)	668	831	846
Control Delay (s)	8.3	14.7	7.1
Approach Delay (s)	8.3	14.7	7.1
Approach LOS	A	B	A

Intersection Summary			
Delay	13.9		
Level of Service	B		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	24	0	0	319	2	0	0	0	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.57	0.57	0.57	0.78	0.78	0.78	0.50	0.50	0.50
Hourly flow rate (vph)	0	38	0	0	560	4	0	0	0	4	0	0
Pedestrians		15			3			8			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	567			46			622	613	48	606	611	580
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			46			622	613	48	606	611	580
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	967			1557			384	401	1004	406	407	508

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	563	0	4
Volume Left	0	0	0	4
Volume Right	0	4	0	0
cSH	967	1557	1700	406
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	14.0
Lane LOS			A	B
Approach Delay (s)	0.0	0.0	0.0	14.0
Approach LOS			A	B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.78	0.78	0.56	0.56	0.90	0.90
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians			32			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			3			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked						
vC, conflicting volume	32		32	32		
vC1, stage 1 conf vol			32			
vC2, stage 2 conf vol			0			
vCu, unblocked vol	32		32	32		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		100	100		
cM capacity (veh/h)	1520		940	1013		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.0	0.0
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	13.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	301	3	41	1	3	0	269	73	2	0	15	25
Peak Hour Factor	0.49	0.49	0.49	0.33	0.33	0.33	0.93	0.93	0.93	0.45	0.45	0.45
Hourly flow rate (vph)	614	6	84	3	9	0	289	78	2	0	33	56

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	704	12	370	89
Volume Left (vph)	614	3	289	0
Volume Right (vph)	84	0	2	56
Hadj (s)	0.21	0.05	0.19	-0.27
Departure Headway (s)	5.6	6.6	6.2	6.3
Degree Utilization, x	1.00	0.02	0.63	0.16
Capacity (veh/h)	704	499	569	550
Control Delay (s)	58.8	9.7	19.3	10.5
Approach Delay (s)	58.8	9.7	19.3	10.5
Approach LOS	F	A	C	B

Intersection Summary			
Delay	42.2		
Level of Service	E		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	304	0	0	0	0	408	0	4	0	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5						5.6			5.5
Lane Util. Factor	1.00						1.00			1.00
Frpb, ped/bikes	1.00						1.00			1.00
Flpb, ped/bikes	1.00						1.00			1.00
Frt	1.00						1.00			0.85
Flt Protected	0.95						0.95			1.00
Satd. Flow (prot)	1770						1737			1568
Flt Permitted	0.95						0.73			1.00
Satd. Flow (perm)	1770						1328			1568
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	327	0	0	0	0	439	0	4	0	341
RTOR Reduction (vph)	0	0	0	0	0	0	49	0	0	0
Lane Group Flow (vph)	327	0	0	0	0	0	394	0	0	341
Confl. Peds. (#/hr)								27		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot					Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5						44.4			29.5
Effective Green, g (s)	14.5						44.4			29.5
Actuated g/C Ratio	0.17						0.52			0.35
Clearance Time (s)	5.5						5.6			5.5
Lane Grp Cap (vph)	301						693			544
v/s Ratio Prot	c0.18									c0.22
v/s Ratio Perm							c0.30			
v/c Ratio	1.09						0.57			0.63
Uniform Delay, d1	35.2						13.8			23.2
Progression Factor	1.00						1.00			1.00
Incremental Delay, d2	76.9						3.4			5.4
Delay (s)	112.1						17.1			28.5
Level of Service	F						B			C
Approach Delay (s)	112.1			0.0			17.1		28.5	
Approach LOS	F			A			B		C	

Intersection Summary			
HCM 2000 Control Delay	48.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	251	59	50	137	449	44	99	31	167	63	40
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.86	0.86	0.89	0.89	0.89
Hourly flow rate (vph)	35	282	66	56	154	504	51	115	36	188	71	45

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	35	348	56	658	51	151	188	116
Volume Left (vph)	35	0	56	0	51	0	188	0
Volume Right (vph)	0	66	0	504	0	36	0	45
Hadj (s)	0.55	-0.08	0.53	-0.50	0.55	-0.12	0.58	-0.19
Departure Headway (s)	7.9	7.2	7.5	6.5	8.6	7.9	8.4	7.6
Degree Utilization, x	0.08	0.70	0.12	1.00	0.12	0.33	0.44	0.24
Capacity (veh/h)	444	483	465	658	404	437	418	457
Control Delay (s)	10.3	24.3	10.3	62.4	11.6	13.6	16.4	11.9
Approach Delay (s)	23.0		58.3		13.1		14.7	
Approach LOS	C		F		B		B	

Intersection Summary			
Delay	35.9		
Level of Service	E		
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	98	304	47	0	0	0	91	216	400	41	127	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1783					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1783					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	105	327	51	0	0	0	98	232	430	44	137	586
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	393
Lane Group Flow (vph)	105	373	0	0	0	0	98	232	430	44	137	193
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	586					287	587	1583	276	631	501
v/s Ratio Prot		c0.21					0.06	c0.15		0.03	0.08	0.13
v/s Ratio Perm	0.06								c0.27			
v/c Ratio	0.17	0.64					0.34	0.40	0.27	0.16	0.22	0.39
Uniform Delay, d1	28.6	34.2					44.6	27.8	0.0	43.2	25.8	30.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	5.2					3.2	2.0	0.4	1.2	0.8	2.2
Delay (s)	29.3	39.4					47.8	29.8	0.4	44.4	26.6	33.2
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		37.2			0.0		15.5				32.6	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	16	119	1025	94	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.88	0.88	0.86	0.86
Hourly flow rate (vph)	187	19	135	1165	109	83
Pedestrians				86		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				10		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.67	
vC, conflicting volume			206		1632	282
vC1, stage 1 conf vol					196	
vC2, stage 2 conf vol					1435	
vCu, unblocked vol			206		1698	282
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			90		15	88
cM capacity (veh/h)			1348		129	671

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	206	135	1165	109	83
Volume Left	0	135	0	109	0
Volume Right	19	0	0	0	83
cSH	1700	1348	1700	129	671
Volume to Capacity	0.12	0.10	0.69	0.85	0.12
Queue Length 95th (ft)	0	8	0	133	10
Control Delay (s)	0.0	8.0	0.0	108.2	11.1
Lane LOS		A		F	B
Approach Delay (s)	0.0	0.8		66.4	
Approach LOS				F	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	3	16	3	5	21	10	79	7	31	278	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.78	0.78	0.78
Hourly flow rate (vph)	20	3	18	3	6	24	12	95	8	40	356	27
Pedestrians		29			41			20			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			2			6	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	684	647	419	640	656	200	412			145		
vC1, stage 1 conf vol	478	478		164	164							
vC2, stage 2 conf vol	206	169		476	492							
vCu, unblocked vol	684	647	419	640	656	200	412			145		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.2	5.6		6.2	5.6							
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	96	99	97	99	99	97	99			97		
cM capacity (veh/h)	465	476	591	472	469	750	1104			1370		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	33	12	104	40	383
Volume Left	20	3	12	0	40	0
Volume Right	18	24	0	8	0	27
cSH	513	644	1104	1700	1370	1700
Volume to Capacity	0.08	0.05	0.01	0.06	0.03	0.23
Queue Length 95th (ft)	7	4	1	0	2	0
Control Delay (s)	12.6	10.9	8.3	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.6	10.9	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	629	51	54
v/c Ratio	0.01	0.27	1.39	0.07	0.16
Control Delay	12.4	0.6	214.5	21.5	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	0.6	214.5	21.5	33.0
Queue Length 50th (ft)	3	0	~564	22	26
Queue Length 95th (ft)	9	0	#709	44	44
Internal Link Dist (ft)		796		663	88
Turn Bay Length (ft)	254		140		
Base Capacity (vph)	658	1031	454	686	339
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.27	1.39	0.07	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	WBL	NWT	NER
Lane Group Flow (vph)	327	443	341
v/c Ratio	1.09	0.60	0.63
Control Delay	113.0	14.5	29.3
Queue Delay	0.0	0.0	0.3
Total Delay	113.0	14.5	29.7
Queue Length 50th (ft)	~198	116	150
Queue Length 95th (ft)	#358	211	242
Internal Link Dist (ft)	626	1094	
Turn Bay Length (ft)			
Base Capacity (vph)	301	742	544
Starvation Cap Reductn	0	0	26
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.09	0.60	0.66

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	105	378	98	232	430	44	137	586
v/c Ratio	0.17	0.64	0.34	0.40	0.27	0.16	0.22	0.66
Control Delay	29.7	39.4	48.4	30.4	0.4	45.0	27.0	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	29.7	39.4	48.4	30.4	0.4	45.0	27.0	6.9
Queue Length 50th (ft)	58	243	68	131	0	30	72	0
Queue Length 95th (ft)	102	352	122	203	0	65	121	90
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	591	287	587	1583	276	631	894
Starvation Cap Reductn	0	0	0	0	0	0	0	82
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.64	0.34	0.40	0.27	0.16	0.22	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	0	258	0	0	0	1	507	53	0	0	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5						5.5	5.5			5.5
Lane Util. Factor	1.00	1.00						1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00						1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00						1.00	1.00			1.00
Frt	1.00	0.85						1.00	1.00			0.98
Flt Protected	0.95	1.00						0.95	1.00			1.00
Satd. Flow (prot)	1477	1409						1547	1737			1595
Flt Permitted	0.76	1.00						0.45	1.00			1.00
Satd. Flow (perm)	1177	1409						730	1737			1595
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	0	300	0	0	0	1	604	63	0	0	134
RTOR Reduction (vph)	0	187	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	21	113	0	0	0	0	0	605	63	0	0	149
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt			pm+pt	pm+pt	NA			NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5						39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5						39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38						0.38	0.38			0.19
Clearance Time (s)	5.5	5.5						5.5	5.5			5.5
Lane Grp Cap (vph)	576	530						387	653			296
v/s Ratio Prot	c0.00	c0.08						c0.22	0.04			0.09
v/s Ratio Perm	0.01							c0.37				
v/c Ratio	0.04	0.21						1.56	0.10			0.50
Uniform Delay, d1	15.1	22.2						30.9	21.2			38.4
Progression Factor	1.00	1.00						1.00	1.00			1.00
Incremental Delay, d2	0.1	0.9						265.8	0.3			6.0
Delay (s)	15.3	23.1						296.7	21.5			44.4
Level of Service	B	C						F	C			D
Approach Delay (s)		22.6			0.0				270.7			44.4
Approach LOS		C			A				F			D

Intersection Summary			
HCM 2000 Control Delay	170.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	59	260	10	14	7
Peak Hour Factor	0.67	0.67	0.78	0.78	0.69	0.69
Hourly flow rate (vph)	9	88	333	13	20	10

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	97	346	30
Volume Left (vph)	9	333	0
Volume Right (vph)	88	0	10
Hadj (s)	-0.49	0.19	-0.20
Departure Headway (s)	4.3	4.3	4.3
Degree Utilization, x	0.11	0.42	0.04
Capacity (veh/h)	771	810	795
Control Delay (s)	7.8	10.4	7.5
Approach Delay (s)	7.8	10.4	7.5
Approach LOS	A	B	A

Intersection Summary			
Delay	9.7		
Level of Service	A		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	31	0	0	212	4	0	0	0	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.66	0.66	0.66	0.89	0.89	0.89	0.42	0.42	0.42
Hourly flow rate (vph)	1	40	0	0	321	6	0	0	0	12	0	0
Pedestrians		2			8			13			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	328			53			382	384	61	376	381	327
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			53			382	384	61	376	381	327
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	98	100	100
cM capacity (veh/h)	1241			1547			566	545	990	574	547	717

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	327	0	12
Volume Left	1	0	0	12
Volume Right	0	6	0	0
cSH	1241	1547	1700	574
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.3	0.0	0.0	11.4
Lane LOS	A		A	B
Approach Delay (s)	0.3	0.0	0.0	11.4
Approach LOS			A	B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.75	0.75	0.91	0.91
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians			40			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			4			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked						
vC, conflicting volume	40		40	40		
vC1, stage 1 conf vol			40			
vC2, stage 2 conf vol			0			
vCu, unblocked vol	40		40	40		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	100		100	100		
cM capacity (veh/h)	1516		927	998		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.0	0.0
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	14.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	237	3	59	2	2	3	90	35	2	2	36	37
Peak Hour Factor	0.85	0.85	0.85	0.58	0.58	0.58	0.82	0.82	0.82	0.80	0.80	0.80
Hourly flow rate (vph)	279	4	69	3	3	5	110	43	2	2	45	46

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	352	12	155	94
Volume Left (vph)	279	3	110	3
Volume Right (vph)	69	5	2	46
Hadj (s)	0.04	-0.20	0.13	-0.29
Departure Headway (s)	4.6	4.8	5.0	4.7
Degree Utilization, x	0.45	0.02	0.22	0.12
Capacity (veh/h)	749	683	666	695
Control Delay (s)	11.3	7.9	9.4	8.4
Approach Delay (s)	11.3	7.9	9.4	8.4
Approach LOS	B	A	A	A

Intersection Summary			
Delay	10.3		
Level of Service	B		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	135	0	0	0	0	732	0	8	0	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5						5.6			5.5
Lane Util. Factor	1.00						1.00			1.00
Frpb, ped/bikes	1.00						1.00			1.00
Flpb, ped/bikes	1.00						1.00			1.00
Frt	1.00						1.00			0.85
Flt Protected	0.95						0.95			1.00
Satd. Flow (prot)	1805						1806			1583
Flt Permitted	0.95						0.73			1.00
Satd. Flow (perm)	1805						1381			1583
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	157	0	0	0	0	762	0	8	0	320
RTOR Reduction (vph)	0	0	0	0	0	0	49	0	0	0
Lane Group Flow (vph)	157	0	0	0	0	0	721	0	0	320
Confl. Peds. (#/hr)		7						41		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot					Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)	14.5						44.4			29.5
Effective Green, g (s)	14.5						44.4			29.5
Actuated g/C Ratio	0.17						0.52			0.35
Clearance Time (s)	5.5						5.6			5.5
Lane Grp Cap (vph)	307						721			549
v/s Ratio Prot	0.09									c0.20
v/s Ratio Perm							c0.52			
v/c Ratio	0.51						1.00			0.58
Uniform Delay, d1	32.0						20.3			22.7
Progression Factor	1.00						1.00			1.00
Incremental Delay, d2	6.0						33.5			4.5
Delay (s)	38.0						53.7			27.2
Level of Service	D						D			C
Approach Delay (s)	38.0			0.0			53.7		27.2	
Approach LOS	D			A			D		C	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	287	58	79	189	364	52	117	49	211	85	49
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	57	312	63	100	239	461	59	133	56	251	101	58

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	57	375	100	700	59	189	251	160
Volume Left (vph)	57	0	100	0	59	0	251	0
Volume Right (vph)	0	63	0	461	0	56	0	58
Hadj (s)	0.52	-0.10	0.50	-0.46	0.50	-0.21	0.52	-0.24
Departure Headway (s)	8.4	7.8	8.2	7.3	9.0	8.3	8.6	7.9
Degree Utilization, x	0.13	0.82	0.23	1.00	0.15	0.44	0.60	0.35
Capacity (veh/h)	415	451	427	700	386	409	408	443
Control Delay (s)	11.5	36.1	12.4	66.2	12.3	16.4	22.7	13.9
Approach Delay (s)	32.8		59.5		15.4		19.3	
Approach LOS	D		F		C		C	

Intersection Summary			
Delay	38.9		
Level of Service	E		
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	108	366	73	0	0	0	118	145	373	81	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.99					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1824					1787	1599	1599	1787	1787
Flt Permitted		0.91	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1708	1824					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	117	398	79	0	0	0	127	156	401	93	313
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	118	471	0	0	0	0	127	156	401	93	313
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Effective Green, g (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Actuated g/C Ratio		0.33	0.33					0.16	0.37	1.00	0.16	0.37
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		562	600					290	592	1599	290	662
v/s Ratio Prot			c0.26					c0.07	0.10		0.05	c0.18
v/s Ratio Perm		0.07								0.25		
v/c Ratio		0.21	0.78					0.44	0.26	0.25	0.32	0.47
Uniform Delay, d1		29.0	36.4					45.3	26.3	0.0	44.4	28.8
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8	9.9					4.7	1.1	0.4	2.9	2.4
Delay (s)		29.9	46.3					50.1	27.4	0.4	47.3	31.2
Level of Service		C	D					D	C	A	D	C
Approach Delay (s)			43.1			0.0		15.8				33.6
Approach LOS			D			A		B				C

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR
Lane Configurations	
Volume (vph)	513
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	590
RTOR Reduction (vph)	396
Lane Group Flow (vph)	194
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	39.5
Effective Green, g (s)	39.5
Actuated g/C Ratio	0.33
Clearance Time (s)	5.5
Lane Grp Cap (vph)	526
v/s Ratio Prot	0.12
v/s Ratio Perm	
v/c Ratio	0.37
Uniform Delay, d1	30.7
Progression Factor	1.00
Incremental Delay, d2	2.0
Delay (s)	32.7
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	145	5	157	757	95	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	184	6	171	823	116	135
Pedestrians				37		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				4		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.69	
vC, conflicting volume			190		1351	224
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					1164	
vCu, unblocked vol			190		1284	224
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			88		41	82
cM capacity (veh/h)			1372		197	759

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	190	171	823	116	135
Volume Left	0	171	0	116	0
Volume Right	6	0	0	0	135
cSH	1700	1372	1700	197	759
Volume to Capacity	0.11	0.12	0.48	0.59	0.18
Queue Length 95th (ft)	0	11	0	81	16
Control Delay (s)	0.0	8.0	0.0	46.7	10.8
Lane LOS		A		E	B
Approach Delay (s)	0.0	1.4		27.3	
Approach LOS				D	

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	4	35	5	0	20	6	97	18	25	382	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.75	0.75	0.75	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	27	5	47	7	0	27	7	114	21	29	444	19
Pedestrians		32			40			12			83	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			1			8	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	782	733	497	743	732	248	495			175		
vC1, stage 1 conf vol	544	544		179	179							
vC2, stage 2 conf vol	238	189		564	553							
vCu, unblocked vol	782	733	497	743	732	248	495			175		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	91	98	100	96	99			98		
cM capacity (veh/h)	441	460	553	419	455	705	1031			1359		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	33	7	135	29	463
Volume Left	27	7	7	0	29	0
Volume Right	47	27	0	21	0	19
cSH	503	620	1031	1700	1359	1700
Volume to Capacity	0.16	0.05	0.01	0.08	0.02	0.27
Queue Length 95th (ft)	14	4	1	0	2	0
Control Delay (s)	13.5	11.1	8.5	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.5	11.1	0.4		0.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	605	63	154
v/c Ratio	0.04	0.33	1.56	0.10	0.51
Control Delay	12.7	1.0	291.5	21.8	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	1.0	291.5	21.8	43.8
Queue Length 50th (ft)	7	0	~577	27	90
Queue Length 95th (ft)	18	0	#720	52	157
Internal Link Dist (ft)		796		663	88
Turn Bay Length (ft)	254		140		
Base Capacity (vph)	576	910	387	653	300
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.33	1.56	0.10	0.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	WBL	NWT	NER
Lane Group Flow (vph)	157	770	320
v/c Ratio	0.51	1.00	0.58
Control Delay	38.7	52.0	27.9
Queue Delay	0.0	0.0	0.3
Total Delay	38.7	52.0	28.2
Queue Length 50th (ft)	77	353	138
Queue Length 95th (ft)	130	#623	186
Internal Link Dist (ft)	626	1094	
Turn Bay Length (ft)			
Base Capacity (vph)	307	771	549
Starvation Cap Reductn	0	0	30
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.51	1.00	0.62

Intersection Summary

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	118	477	127	156	401	93	313	590
v/c Ratio	0.21	0.79	0.44	0.26	0.25	0.32	0.47	0.64
Control Delay	30.3	46.5	50.7	27.9	0.4	47.9	31.7	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.6
Total Delay	30.3	46.5	50.7	27.9	0.4	47.9	34.7	6.6
Queue Length 50th (ft)	66	327	90	83	0	64	183	0
Queue Length 95th (ft)	113	#464	153	138	0	113	258	64
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	562	606	290	592	1599	290	662	922
Starvation Cap Reductn	0	0	0	0	0	0	243	99
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.79	0.44	0.26	0.25	0.32	0.75	0.72

Intersection Summary

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

Traffic Impact Study

Appendix G. Synchro Worksheets- Detour Configuration I with Mitigations

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	629	51	54
v/c Ratio	0.02	0.49	0.69	0.04	0.16
Control Delay	31.3	7.3	14.4	6.3	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	7.3	14.4	6.3	33.0
Queue Length 50th (ft)	4	0	210	11	26
Queue Length 95th (ft)	16	55	273	22	44
Internal Link Dist (ft)				663	88
Turn Bay Length (ft)	254		500		
Base Capacity (vph)	393	563	918	1208	339
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.49	0.69	0.04	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	0	237	0	0	0	4	524	43	0	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5		5.5					5.5	5.5			5.5
Lane Util. Factor	1.00		1.00					1.00	1.00			1.00
Frpb, ped/bikes	1.00		1.00					1.00	1.00			0.97
Flpb, ped/bikes	1.00		1.00					1.00	1.00			1.00
Frt	1.00		0.85					1.00	1.00			0.98
Flt Protected	0.95		1.00					0.95	1.00			1.00
Satd. Flow (prot)	1687		1509					1626	1826			1795
Flt Permitted	0.95		1.00					0.56	1.00			1.00
Satd. Flow (perm)	1687		1509					964	1826			1795
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	0	276	0	0	0	5	624	51	0	0	45
RTOR Reduction (vph)	0	0	212	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	8	0	64	0	0	0	0	629	51	0	0	47
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt		Perm			Perm	pm+pt	pm+pt	NA			NA
Protected Phases	1						7	7	4			8
Permitted Phases	6		6			2	4	4				
Actuated Green, G (s)	24.5		24.5					69.5	69.5			19.5
Effective Green, g (s)	24.5		24.5					69.5	69.5			19.5
Actuated g/C Ratio	0.23		0.23					0.66	0.66			0.19
Clearance Time (s)	5.5		5.5					5.5	5.5			5.5
Lane Grp Cap (vph)	393		352					918	1208			333
v/s Ratio Prot	0.00							c0.29	0.03			0.03
v/s Ratio Perm	0.00		c0.04					c0.16				
v/c Ratio	0.02		0.18					0.69	0.04			0.14
Uniform Delay, d1	31.0		32.2					10.1	6.2			35.8
Progression Factor	1.00		1.00					1.00	1.00			1.00
Incremental Delay, d2	0.1		1.1					4.1	0.1			0.9
Delay (s)	31.1		33.4					14.2	6.2			36.7
Level of Service	C		C					B	A			D
Approach Delay (s)		33.3			0.0				13.6			36.7
Approach LOS		C			A				B			D

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	WBL	NWT	NER
Lane Group Flow (vph)	327	443	341
v/c Ratio	0.53	0.63	0.62
Control Delay	26.1	18.1	28.9
Queue Delay	0.0	0.0	0.4
Total Delay	26.1	18.1	29.3
Queue Length 50th (ft)	138	146	149
Queue Length 95th (ft)	220	247	240
Internal Link Dist (ft)	626	1094	
Turn Bay Length (ft)			
Base Capacity (vph)	614	708	553
Starvation Cap Reductn	0	0	34
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.53	0.63	0.66

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	304	0	0	0	0	408	0	4	0	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5						5.6			5.5
Lane Util. Factor	1.00						1.00			1.00
Frpb, ped/bikes	1.00						1.00			1.00
Flpb, ped/bikes	1.00						1.00			1.00
Frt	1.00						1.00			0.86
Flt Protected	0.95						0.95			1.00
Satd. Flow (prot)	1770						1737			1596
Flt Permitted	0.95						0.73			1.00
Satd. Flow (perm)	1770						1328			1596
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	327	0	0	0	0	439	0	4	0	341
RTOR Reduction (vph)	0	0	0	0	0	0	15	0	0	0
Lane Group Flow (vph)	327	0	0	0	0	0	428	0	0	341
Confl. Peds. (#/hr)								26		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot					Perm	NA			Prot
Protected Phases	8			6			2			4
Permitted Phases	8		6			2				
Actuated Green, G (s)	29.5						44.4			29.5
Effective Green, g (s)	29.5						44.4			29.5
Actuated g/C Ratio	0.35						0.52			0.35
Clearance Time (s)	5.5						5.6			5.5
Lane Grp Cap (vph)	614						693			553
v/s Ratio Prot	0.18									c0.21
v/s Ratio Perm							c0.32			
v/c Ratio	0.53						0.62			0.62
Uniform Delay, d1	22.2						14.3			23.1
Progression Factor	1.00						1.00			1.00
Incremental Delay, d2	3.3						4.1			5.1
Delay (s)	25.5						18.4			28.1
Level of Service	C						B			C
Approach Delay (s)	25.5			0.0			18.4		28.1	
Approach LOS	C			A			B		C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	105	378	98	232	430	44	137	586
v/c Ratio	0.17	0.64	0.34	0.40	0.27	0.16	0.22	0.66
Control Delay	29.7	39.4	48.4	30.4	0.4	45.0	27.0	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	29.7	39.4	48.4	30.4	0.4	45.0	27.0	6.9
Queue Length 50th (ft)	58	243	68	131	0	30	72	0
Queue Length 95th (ft)	102	352	122	203	0	65	121	90
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	591	287	587	1583	276	631	894
Starvation Cap Reductn	0	0	0	0	0	0	0	82
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.64	0.34	0.40	0.27	0.16	0.22	0.72

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	98	304	47	0	0	0	91	216	400	41	127	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1782					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1782					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	105	327	51	0	0	0	98	232	430	44	137	586
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	393
Lane Group Flow (vph)	105	373	0	0	0	0	98	232	430	44	137	193
Confl. Peds. (#/hr)			6									2
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	586					287	587	1583	276	631	501
v/s Ratio Prot		c0.21					0.06	c0.15		0.03	0.08	0.13
v/s Ratio Perm	0.06								c0.27			
v/c Ratio	0.17	0.64					0.34	0.40	0.27	0.16	0.22	0.39
Uniform Delay, d1	28.6	34.2					44.6	27.8	0.0	43.2	25.8	30.9
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	5.2					3.2	2.0	0.4	1.2	0.8	2.2
Delay (s)	29.3	39.4					47.8	29.8	0.4	44.4	26.6	33.2
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		37.2			0.0		15.5				32.6	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	605	63	154
v/c Ratio	0.06	0.56	0.73	0.05	0.51
Control Delay	32.1	8.3	16.3	6.4	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	8.3	16.3	6.4	43.8
Queue Length 50th (ft)	11	0	204	13	90
Queue Length 95th (ft)	30	58	267	26	157
Internal Link Dist (ft)				663	88
Turn Bay Length (ft)	254		500		
Base Capacity (vph)	344	538	829	1149	300
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.56	0.73	0.05	0.51

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	0	258	0	0	0	1	507	53	0	0	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5		5.5					5.5	5.5			5.5
Lane Util. Factor	1.00		1.00					1.00	1.00			1.00
Frpb, ped/bikes	1.00		1.00					1.00	1.00			0.95
Flpb, ped/bikes	1.00		1.00					1.00	1.00			1.00
Frt	1.00		0.85					1.00	1.00			0.98
Flt Protected	0.95		1.00					0.95	1.00			1.00
Satd. Flow (prot)	1477		1321					1547	1737			1595
Flt Permitted	0.95		1.00					0.45	1.00			1.00
Satd. Flow (perm)	1477		1321					730	1737			1595
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	0	300	0	0	0	1	604	63	0	0	134
RTOR Reduction (vph)	0	0	230	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	21	0	70	0	0	0	0	605	63	0	0	149
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt		Perm			Perm	pm+pt	pm+pt	NA			NA
Protected Phases	1						7	7	4			8
Permitted Phases	6		6			2	4	4				
Actuated Green, G (s)	24.5		24.5					69.5	69.5			19.5
Effective Green, g (s)	24.5		24.5					69.5	69.5			19.5
Actuated g/C Ratio	0.23		0.23					0.66	0.66			0.19
Clearance Time (s)	5.5		5.5					5.5	5.5			5.5
Lane Grp Cap (vph)	344		308					829	1149			296
v/s Ratio Prot	0.00							c0.31	0.04			0.09
v/s Ratio Perm	0.01		c0.05					c0.17				
v/c Ratio	0.06		0.23					0.73	0.05			0.50
Uniform Delay, d1	31.3		32.6					10.6	6.2			38.4
Progression Factor	1.00		1.00					1.00	1.00			1.00
Incremental Delay, d2	0.3		1.7					5.6	0.1			6.0
Delay (s)	31.6		34.3					16.2	6.3			44.4
Level of Service	C		C					B	A			D
Approach Delay (s)		34.1			0.0				15.2			44.4
Approach LOS		C			A				B			D

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	WBL	NWT	NER
Lane Group Flow (vph)	157	770	320
v/c Ratio	0.35	0.84	0.81
Control Delay	40.2	25.0	52.8
Queue Delay	0.2	0.0	1.3
Total Delay	40.4	25.0	54.1
Queue Length 50th (ft)	101	404	151
Queue Length 95th (ft)	156	638	181
Internal Link Dist (ft)	626	1094	
Turn Bay Length (ft)			
Base Capacity (vph)	443	922	396
Starvation Cap Reductn	0	0	14
Spillback Cap Reductn	46	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.40	0.84	0.84

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	135	0	0	0	0	732	0	8	0	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5						5.6			5.5
Lane Util. Factor	1.00						1.00			1.00
Frpb, ped/bikes	1.00						1.00			1.00
Flpb, ped/bikes	1.00						1.00			1.00
Frt	1.00						1.00			0.86
Flt Protected	0.95						0.95			1.00
Satd. Flow (prot)	1805						1805			1611
Flt Permitted	0.95						0.73			1.00
Satd. Flow (perm)	1805						1380			1611
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	157	0	0	0	0	762	0	8	0	320
RTOR Reduction (vph)	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	157	0	0	0	0	0	762	0	0	320
Confl. Peds. (#/hr)		7						39		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot					Perm	NA			Prot
Protected Phases	8			6			2			4
Permitted Phases	8		6			2				
Actuated Green, G (s)	29.5						79.4			29.5
Effective Green, g (s)	29.5						79.4			29.5
Actuated g/C Ratio	0.25						0.66			0.25
Clearance Time (s)	5.5						5.6			5.5
Lane Grp Cap (vph)	443						913			396
v/s Ratio Prot	0.09									c0.20
v/s Ratio Perm							c0.55			
v/c Ratio	0.35						0.83			0.81
Uniform Delay, d1	37.4						15.3			42.6
Progression Factor	1.00						1.00			0.84
Incremental Delay, d2	2.2						8.9			16.0
Delay (s)	39.6						24.2			51.8
Level of Service	D						C			D
Approach Delay (s)	39.6			0.0			24.2		51.8	
Approach LOS	D			A			C		D	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	118	477	127	156	401	93	313	590
v/c Ratio	0.15	0.62	0.52	0.30	0.25	0.43	0.58	0.58
Control Delay	22.2	30.8	56.4	32.7	0.4	48.7	47.9	3.7
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	3.5	0.9
Total Delay	22.2	30.8	56.4	32.8	0.4	48.7	51.3	4.6
Queue Length 50th (ft)	56	278	93	91	0	69	249	15
Queue Length 95th (ft)	95	394	158	150	0	m87	m309	56
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	789	773	245	513	1599	215	543	1014
Starvation Cap Reductn	0	0	0	0	0	0	146	191
Spillback Cap Reductn	0	0	0	33	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.62	0.52	0.33	0.25	0.43	0.79	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	108	366	73	0	0	0	118	145	373	81	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.99					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1825					1787	1599	1599	1787	1787
Flt Permitted		1.00	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1876	1825					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	117	398	79	0	0	0	127	156	401	93	313
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	118	471	0	0	0	0	127	156	401	93	313
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		50.5	50.5					16.5	38.5	120.0	14.5	36.5
Effective Green, g (s)		50.5	50.5					16.5	38.5	120.0	14.5	36.5
Actuated g/C Ratio		0.42	0.42					0.14	0.32	1.00	0.12	0.30
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		789	768					245	513	1599	215	543
v/s Ratio Prot			c0.26					c0.07	0.10		0.05	c0.18
v/s Ratio Perm		0.06								c0.25		
v/c Ratio		0.15	0.61					0.52	0.30	0.25	0.43	0.58
Uniform Delay, d1		21.5	27.1					48.1	30.7	0.0	48.9	35.2
Progression Factor		1.00	1.00					1.00	1.00	1.00	0.89	1.25
Incremental Delay, d2		0.4	3.6					7.6	1.5	0.4	4.4	3.1
Delay (s)		21.9	30.8					55.7	32.2	0.4	48.1	47.1
Level of Service		C	C					E	C	A	D	D
Approach Delay (s)			29.0			0.0		17.9				34.4
Approach LOS			C			A		B				C

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

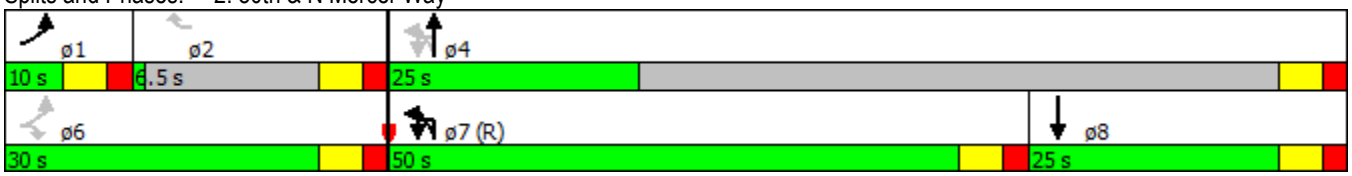
Movement	SWR
Lane Configurations	
Volume (vph)	513
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	590
RTOR Reduction (vph)	342
Lane Group Flow (vph)	248
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	50.5
Effective Green, g (s)	50.5
Actuated g/C Ratio	0.42
Clearance Time (s)	5.5
Lane Grp Cap (vph)	672
v/s Ratio Prot	0.16
v/s Ratio Perm	
v/c Ratio	0.37
Uniform Delay, d1	23.8
Progression Factor	1.02
Incremental Delay, d2	1.1
Delay (s)	25.5
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBR	NBU	NBL	NBT	SBT	ø2
Lane Configurations							
Volume (vph)	7	237	4	524	43	30	
Turn Type	pm+pt	Perm	pm+pt	pm+pt	NA	NA	
Protected Phases	1		7	7	4	8	2
Permitted Phases	6	6	4	4			
Minimum Split (s)	10.0	30.0	50.0	50.0	25.0	20.0	6.5
Total Split (s)	10.0	30.0	50.0	50.0	25.0	25.0	6.5
Total Split (%)	9.5%	28.6%	47.6%	47.6%	23.8%	23.8%	6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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	
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5	
Lead/Lag	Lead		Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes		Yes	Yes

Intersection Summary
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 0 (0%), Referenced to phase 7:NBL, Start of Green
Natural Cycle: 100
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	WBL	NWL	NWT	NER	ø6
Lane Configurations					
Volume (vph)	304	408	0	314	
Turn Type	Prot	Perm	NA	Prot	
Protected Phases	8		2	4	6
Permitted Phases	8	2			
Minimum Split (s)	20.0	44.0	44.0	25.0	6.5
Total Split (s)	35.0	50.0	50.0	35.0	6.5
Total Split (%)	41.2%	58.8%	58.8%	41.2%	8%
Yellow Time (s)	3.5	3.6	3.6	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	
Total Lost Time (s)	5.5		5.6	5.5	
Lead/Lag					
Lead-Lag Optimize?					

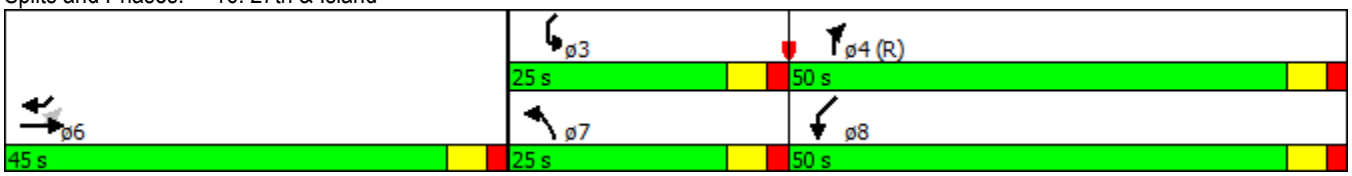
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NWTL, Start of Green
Natural Cycle: 70
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations								
Volume (vph)	98	304	91	216	400	41	127	545
Turn Type	Perm	NA	Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6	7	4		3	8	6
Permitted Phases	6				Free			
Minimum Split (s)	35.0	35.0	20.0	40.0		20.0	40.0	35.0
Total Split (s)	45.0	45.0	25.0	50.0		25.0	50.0	45.0
Total Split (%)	37.5%	37.5%	20.8%	41.7%		20.8%	41.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lead/Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes	Yes		Yes	Yes	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 4:NBR, Start of Green
Natural Cycle: 95
Control Type: Pretimed

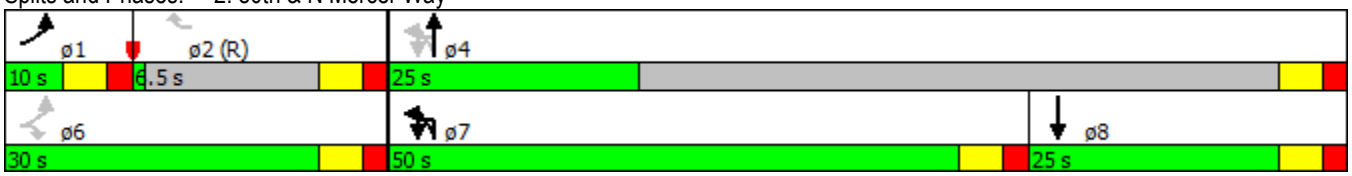
Splits and Phases: 16: 27th & Island



Lane Group	EBL	EBR	NBU	NBL	NBT	SBT	ø2
Lane Configurations							
Volume (vph)	18	258	1	507	53	125	
Turn Type	pm+pt	Perm	pm+pt	pm+pt	NA	NA	
Protected Phases	1		7	7	4	8	2
Permitted Phases	6	6	4	4			
Minimum Split (s)	10.0	30.0	50.0	50.0	25.0	20.0	6.5
Total Split (s)	10.0	30.0	50.0	50.0	25.0	25.0	6.5
Total Split (%)	9.5%	28.6%	47.6%	47.6%	23.8%	23.8%	6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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	
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5	
Lead/Lag	Lead		Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes		Yes	Yes

Intersection Summary
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 0 (0%), Referenced to phase 2:WBR, Start of Green
Natural Cycle: 100
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	WBL	NWL	NWT	NER	ø6
Lane Configurations					
Volume (vph)	135	732	0	253	
Turn Type	Prot	Perm	NA	Prot	
Protected Phases	8		2	4	6
Permitted Phases	8	2			
Minimum Split (s)	20.0	44.0	44.0	25.0	6.5
Total Split (s)	35.0	85.0	85.0	35.0	6.5
Total Split (%)	29.2%	70.8%	70.8%	29.2%	5%
Yellow Time (s)	3.5	3.6	3.6	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	
Total Lost Time (s)	5.5		5.6	5.5	
Lead/Lag					
Lead-Lag Optimize?					

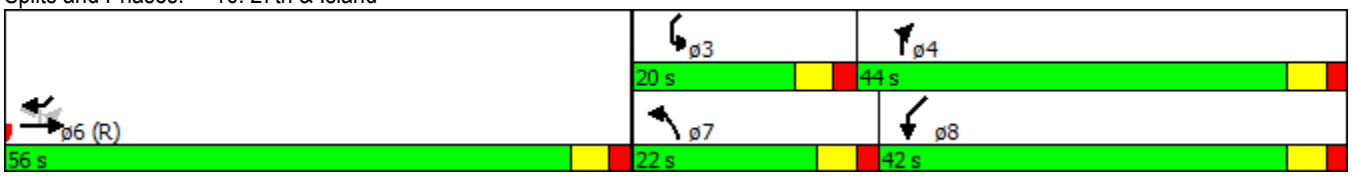
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NWTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBU	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations									
Volume (vph)	1	108	366	118	145	373	81	272	513
Turn Type	Perm	Perm	NA	Prot	Prot	Free	Prot	Prot	Prot
Protected Phases			6	7	4		3	8	6
Permitted Phases	6	6				Free			
Minimum Split (s)	35.0	35.0	35.0	20.0	40.0		20.0	40.0	35.0
Total Split (s)	56.0	56.0	56.0	22.0	44.0		20.0	42.0	56.0
Total Split (%)	46.7%	46.7%	46.7%	18.3%	36.7%		16.7%	35.0%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
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
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lead/Lag				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 11 (9%), Referenced to phase 2: and 6:EBTL, Start of Green
Natural Cycle: 95
Control Type: Pretimed

Splits and Phases: 16: 27th & Island



Traffic Impact Study

Appendix H. Synchro Worksheets- Detour Configuration II

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	115	122	317	454	30	4	268	13	70	7	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.87			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1748		1770	1950			1626	1594			1777
Flt Permitted	0.22	1.00		0.49	1.00			0.66	1.00			0.94
Satd. Flow (perm)	399	1748		922	1950			1125	1594			1695
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	134	142	337	483	32	5	319	15	83	10	34
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	52	0	0	7
Lane Group Flow (vph)	8	240	0	337	513	0	0	324	46	0	0	46
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	302	657		506	733			492	599			314
v/s Ratio Prot	0.00	0.14		c0.06	c0.26			c0.09	0.03			
v/s Ratio Perm	0.01			0.25				c0.16				0.03
v/c Ratio	0.03	0.37		0.67	0.70			0.66	0.08			0.15
Uniform Delay, d1	17.1	23.7		20.3	27.7			26.2	21.0			35.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.2	1.6		6.8	5.5			6.8	0.3			1.0
Delay (s)	17.2	25.2		27.1	33.2			33.0	21.3			36.8
Level of Service	B	C		C	C			C	C			D
Approach Delay (s)		25.0			30.8				30.3			36.8
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	16	64	738	8	0	3
Peak Hour Factor	0.86	0.86	0.69	0.69	0.38	0.38
Hourly flow rate (vph)	19	74	1070	12	0	8

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	93	1081	8
Volume Left (vph)	19	1070	0
Volume Right (vph)	74	0	8
Hadj (s)	-0.39	0.21	-0.60
Departure Headway (s)	5.4	4.4	4.4
Degree Utilization, x	0.14	1.00	0.01
Capacity (veh/h)	663	1081	793
Control Delay (s)	9.3	51.9	7.5
Approach Delay (s)	9.3	51.9	7.5
Approach LOS	A	F	A

Intersection Summary			
Delay	48.2		
Level of Service	E		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	4	20	776	29	0	79	3	118	0	2	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.57	0.57	0.57	0.78	0.78	0.78	0.50	0.50	0.50
Hourly flow rate (vph)	0	6	31	1361	51	0	101	4	151	0	4	0
Pedestrians		15			3			8			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55			46			2821	2808	33	2956	2823	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			46			2821	2808	33	2956	2823	70
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			13			0	0	85	0	0	100
cM capacity (veh/h)	1501			1557			0	2	1024	0	2	981

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	1412	256	4
Volume Left	0	1361	101	0
Volume Right	31	0	151	0
cSH	1501	1557	0	2
Volume to Capacity	0.00	0.87	Err	1.79
Queue Length 95th (ft)	0	337	Err	33
Control Delay (s)	0.0	20.3	Err	2939.2
Lane LOS		C	F	F
Approach Delay (s)	0.0	20.3	Err	2939.2
Approach LOS			F	F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBU	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations							
Volume (veh/h)	1	200	0	0	797	3	4
Sign Control		Free		Stop		Free	
Grade		0%		0%		0%	
Peak Hour Factor	0.78	0.78	0.78	0.56	0.56	0.90	0.90
Hourly flow rate (vph)	0	256	0	0	1423	3	4
Pedestrians				32			
Lane Width (ft)				12.0			
Walking Speed (ft/s)				3.5			
Percent Blockage				3			
Right turn flare (veh)							
Median type		TWLTL				None	
Median storage veh)		2					
Upstream signal (ft)		387				576	
pX, platoon unblocked	0.00						
vC, conflicting volume	0	40		550	38		
vC1, stage 1 conf vol				38			
vC2, stage 2 conf vol				513			
vCu, unblocked vol	0	40		550	38		
tC, single (s)	0.0	4.1		6.4	6.2		
tC, 2 stage (s)				5.4			
tF (s)	0.0	2.2		3.5	3.3		
p0 queue free %	0	83		100	0		
cM capacity (veh/h)	0	1510		486	1006		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	256	0	1423	8
Volume Left	256	0	0	0
Volume Right	0	0	1423	4
cSH	1510	1700	1006	1700
Volume to Capacity	0.17	0.00	1.42	0.00
Queue Length 95th (ft)	15	0	1523	0
Control Delay (s)	7.9	0.0	206.8	0.0
Lane LOS	A		F	
Approach Delay (s)	7.9		206.8	0.0
Approach LOS			F	

Intersection Summary			
Average Delay	175.7		
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	402	3	12	1	0	3	0	342	2	0	65	0
Peak Hour Factor	0.49	0.49	0.49	0.33	0.33	0.33	0.93	0.93	0.93	0.45	0.45	0.45
Hourly flow rate (vph)	820	6	24	3	0	9	0	368	2	0	144	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	851	12	370	144
Volume Left (vph)	820	3	0	0
Volume Right (vph)	24	9	2	0
Hadj (s)	0.28	-0.40	0.03	0.10
Departure Headway (s)	5.8	6.4	6.2	6.7
Degree Utilization, x	1.00	0.02	0.63	0.27
Capacity (veh/h)	851	503	570	523
Control Delay (s)	60.1	9.6	19.2	12.1
Approach Delay (s)	60.1	9.6	19.2	12.1
Approach LOS	F	A	C	B

Intersection Summary			
Delay	43.6		
Level of Service	E		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	0	0	0	412	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.6			
Lane Util. Factor							1.00			
Frpb, ped/bikes							0.93			
Flpb, ped/bikes							1.00			
Frt							0.86			
Flt Protected							1.00			
Satd. Flow (prot)							1464			
Flt Permitted							1.00			
Satd. Flow (perm)							1464			
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	443	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	212	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	231	0	0	0
Confl. Peds. (#/hr)								27		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot						NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)							44.4			
Effective Green, g (s)							44.4			
Actuated g/C Ratio							0.52			
Clearance Time (s)							5.6			
Lane Grp Cap (vph)							764			
v/s Ratio Prot							c0.16			
v/s Ratio Perm										
v/c Ratio							0.30			
Uniform Delay, d1							11.5			
Progression Factor							1.00			
Incremental Delay, d2							1.0			
Delay (s)							12.5			
Level of Service							B			
Approach Delay (s)	0.0			0.0			12.5		0.0	
Approach LOS	A			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	251	59	19	55	233	44	99	31	232	101	132
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.86	0.86	0.89	0.89	0.89
Hourly flow rate (vph)	35	282	66	21	62	262	51	115	36	261	113	148

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	35	348	21	324	51	151	261	262
Volume Left (vph)	35	0	21	0	51	0	261	0
Volume Right (vph)	0	66	0	262	0	36	0	148
Hadj (s)	0.55	-0.08	0.53	-0.53	0.55	-0.12	0.58	-0.31
Departure Headway (s)	7.9	7.3	8.0	6.9	8.4	7.7	7.8	6.9
Degree Utilization, x	0.08	0.70	0.05	0.62	0.12	0.32	0.57	0.50
Capacity (veh/h)	435	477	428	495	400	435	445	492
Control Delay (s)	10.3	24.4	10.2	19.4	11.3	13.1	19.4	15.6
Approach Delay (s)	23.2		18.8		12.7		17.5	
Approach LOS	C		C		B		C	

Intersection Summary			
Delay	18.6		
Level of Service	C		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	0	340	174	0	0	0	307	0	400	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5					5.5		4.0			
Lane Util. Factor		1.00					1.00		1.00			
Frpb, ped/bikes		0.99					1.00		1.00			
Flpb, ped/bikes		1.00					1.00		1.00			
Frt		0.95					1.00		0.85			
Flt Protected		1.00					0.95		1.00			
Satd. Flow (prot)		1717					1770		1583			
Flt Permitted		1.00					0.95		1.00			
Satd. Flow (perm)		1717					1770		1583			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	366	187	0	0	0	330	0	430	0	0	0
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	538	0	0	0	0	330	0	430	0	0	0
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)		39.5					19.5		120.0			
Effective Green, g (s)		39.5					19.5		120.0			
Actuated g/C Ratio		0.33					0.16		1.00			
Clearance Time (s)		5.5					5.5					
Lane Grp Cap (vph)		565					287		1583			
v/s Ratio Prot		c0.31					c0.19					
v/s Ratio Perm									c0.27			
v/c Ratio		0.95					1.15		0.27			
Uniform Delay, d1		39.3					50.2		0.0			
Progression Factor		1.00					1.00		1.00			
Incremental Delay, d2		27.6					99.9		0.4			
Delay (s)		66.9					150.2		0.4			
Level of Service		E					F		A			
Approach Delay (s)		66.9			0.0		65.4				0.0	
Approach LOS		E			A		E				A	

Intersection Summary			
HCM 2000 Control Delay	66.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	16	119	586	94	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.88	0.88	0.86	0.86
Hourly flow rate (vph)	187	19	135	666	109	83
Pedestrians				86		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				10		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.72	
vC, conflicting volume			206		1133	282
vC1, stage 1 conf vol					196	
vC2, stage 2 conf vol					936	
vCu, unblocked vol			206		990	282
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			90		63	88
cM capacity (veh/h)			1348		295	671

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	206	135	666	109	83
Volume Left	0	135	0	109	0
Volume Right	19	0	0	0	83
cSH	1700	1348	1700	295	671
Volume to Capacity	0.12	0.10	0.39	0.37	0.12
Queue Length 95th (ft)	0	8	0	41	10
Control Delay (s)	0.0	8.0	0.0	24.3	11.1
Lane LOS		A		C	B
Approach Delay (s)	0.0	1.3		18.6	
Approach LOS				C	

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	3	16	3	5	21	10	79	7	31	278	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.78	0.78	0.78
Hourly flow rate (vph)	20	3	18	3	6	24	12	95	8	40	356	27
Pedestrians		29			41			20			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			2			6	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	684	647	419	640	656	200	412			145		
vC1, stage 1 conf vol	478	478		164	164							
vC2, stage 2 conf vol	206	169		476	492							
vCu, unblocked vol	684	647	419	640	656	200	412			145		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.2	5.6		6.2	5.6							
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	96	99	97	99	99	97	99			97		
cM capacity (veh/h)	465	476	591	472	469	750	1104			1370		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	33	12	104	40	383
Volume Left	20	3	12	0	40	0
Volume Right	18	24	0	8	0	27
cSH	513	644	1104	1700	1370	1700
Volume to Capacity	0.08	0.05	0.01	0.06	0.03	0.23
Queue Length 95th (ft)	7	4	1	0	2	0
Control Delay (s)	12.6	10.9	8.3	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.6	10.9	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	337	515	324	98	53
v/c Ratio	0.03	0.40	0.67	0.70	0.66	0.15	0.16
Control Delay	12.6	20.7	24.4	33.6	33.3	7.0	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	20.7	24.4	33.6	33.3	7.0	32.6
Queue Length 50th (ft)	3	104	129	287	167	6	25
Queue Length 95th (ft)	9	164	194	411	232	34	42
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	303	693	506	736	492	651	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	0.03	0.40	0.67	0.70	0.66	0.15	0.16

Intersection Summary

Lane Group	NWT
Lane Group Flow (vph)	443
v/c Ratio	0.34
Control Delay	0.7
Queue Delay	0.0
Total Delay	0.7
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	1094
Turn Bay Length (ft)	
Base Capacity (vph)	1285
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.34

Intersection Summary

Lane Group	EBT	NBL	NBR2
Lane Group Flow (vph)	553	330	430
v/c Ratio	0.95	1.15	0.27
Control Delay	65.8	144.8	0.4
Queue Delay	0.0	0.0	0.0
Total Delay	65.8	144.8	0.4
Queue Length 50th (ft)	403	~300	0
Queue Length 95th (ft)	#633	#486	0
Internal Link Dist (ft)	454	372	
Turn Bay Length (ft)		163	
Base Capacity (vph)	580	287	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.95	1.15	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	137	121	519	388	27	1	219	26	102	13	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1713		1787	1952			1719	1700			1764
Flt Permitted	0.30	1.00		0.47	1.00			0.43	1.00			0.96
Satd. Flow (perm)	525	1713		877	1952			780	1700			1710
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	159	141	552	413	29	1	261	31	121	14	120
RTOR Reduction (vph)	0	31	0	0	2	0	0	0	75	0	0	5
Lane Group Flow (vph)	21	269	0	552	440	0	0	262	77	0	0	149
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	345	644		491	734			423	639			317
v/s Ratio Prot	0.01	0.16		c0.10	0.23			c0.09	0.05			
v/s Ratio Perm	0.02			c0.42				c0.15				0.09
v/c Ratio	0.06	0.42		1.12	0.60			0.62	0.12			0.47
Uniform Delay, d1	16.3	24.2		27.2	26.4			25.0	21.4			38.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	2.0		79.3	3.6			6.7	0.4			4.9
Delay (s)	16.7	26.2		106.5	30.0			31.7	21.8			43.1
Level of Service	B	C		F	C			C	C			D
Approach Delay (s)		25.6			72.5				28.0			43.1
Approach LOS		C			E				C			D

Intersection Summary			
HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	65	840	10	14	7
Peak Hour Factor	0.67	0.67	0.78	0.78	0.69	0.69
Hourly flow rate (vph)	9	97	1077	13	20	10

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	106	1090	30
Volume Left (vph)	9	1077	0
Volume Right (vph)	97	0	10
Hadj (s)	-0.50	0.20	-0.20
Departure Headway (s)	5.3	4.4	4.9
Degree Utilization, x	0.16	1.00	0.04
Capacity (veh/h)	670	1090	721
Control Delay (s)	9.3	52.2	8.1
Approach Delay (s)	9.3	52.2	8.1
Approach LOS	A	F	A

Intersection Summary			
Delay	47.4		
Level of Service	E		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	7	24	857	13	0	103	5	129	1	4	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.66	0.66	0.66	0.89	0.89	0.89	0.42	0.42	0.42
Hourly flow rate (vph)	1	9	31	1298	20	0	116	6	145	2	10	0
Pedestrians		2			8			13			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	21			53			2663	2658	45	2800	2673	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			53			2663	2658	45	2800	2673	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			16			0	0	86	0	0	100
cM capacity (veh/h)	1607			1547			0	4	1010	0	4	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	1318	266	12
Volume Left	1	1298	116	2
Volume Right	31	0	145	0
cSH	1607	1547	0	0
Volume to Capacity	0.00	0.84	Err	Err
Queue Length 95th (ft)	0	287	Err	Err
Control Delay (s)	0.2	17.9	Err	Err
Lane LOS	A	C	F	F
Approach Delay (s)	0.2	17.9	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	249	0	0	890	1	4
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.75	0.75	0.91	0.91
Hourly flow rate (vph)	268	0	0	1187	1	4
Pedestrians			40			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			4			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked						
vC, conflicting volume	45		579	43		
vC1, stage 1 conf vol			43			
vC2, stage 2 conf vol			535			
vCu, unblocked vol	45		579	43		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	82		100	0		
cM capacity (veh/h)	1509		472	993		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	268	0	1187	5
Volume Left	268	0	0	0
Volume Right	0	0	1187	4
cSH	1509	1700	993	1700
Volume to Capacity	0.18	0.00	1.19	0.00
Queue Length 95th (ft)	16	0	910	0
Control Delay (s)	7.9	0.0	114.6	0.0
Lane LOS	A		F	
Approach Delay (s)	7.9		114.6	0.0
Approach LOS			F	

Intersection Summary			
Average Delay	94.6		
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	725	3	13	2	0	5	0	125	2	2	79	0
Peak Hour Factor	0.85	0.85	0.85	0.58	0.58	0.58	0.82	0.82	0.82	0.80	0.80	0.80
Hourly flow rate (vph)	853	4	15	3	0	9	0	152	2	2	99	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	872	12	155	101
Volume Left (vph)	853	3	0	3
Volume Right (vph)	15	9	2	0
Hadj (s)	0.19	-0.37	-0.01	0.00
Departure Headway (s)	4.9	5.3	6.0	6.1
Degree Utilization, x	1.00	0.02	0.26	0.17
Capacity (veh/h)	872	633	590	572
Control Delay (s)	54.9	8.4	11.1	10.4
Approach Delay (s)	54.9	8.4	11.1	10.4
Approach LOS	F	A	B	B

Intersection Summary			
Delay	44.5		
Level of Service	E		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	0	0	0	740	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.6			
Lane Util. Factor							1.00			
Frpb, ped/bikes							0.90			
Flpb, ped/bikes							1.00			
Frt							0.86			
Flt Protected							1.00			
Satd. Flow (prot)							1476			
Flt Permitted							1.00			
Satd. Flow (perm)							1476			
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	0	0	0	0	0	0	0	771	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	368	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	403	0	0	0
Confl. Peds. (#/hr)		7						41		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot						NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)							44.4			
Effective Green, g (s)							44.4			
Actuated g/C Ratio							0.52			
Clearance Time (s)							5.6			
Lane Grp Cap (vph)							770			
v/s Ratio Prot							c0.27			
v/s Ratio Perm										
v/c Ratio							0.52			
Uniform Delay, d1							13.3			
Progression Factor							1.00			
Incremental Delay, d2							2.5			
Delay (s)							15.9			
Level of Service							B			
Approach Delay (s)	0.0			0.0			15.9		0.0	
Approach LOS	A			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	287	58	33	79	151	52	117	49	432	135	147
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	57	312	63	42	100	191	59	133	56	514	161	175

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	57	375	42	291	59	189	514	336
Volume Left (vph)	57	0	42	0	59	0	514	0
Volume Right (vph)	0	63	0	191	0	56	0	175
Hadj (s)	0.52	-0.10	0.50	-0.46	0.50	-0.21	0.52	-0.35
Departure Headway (s)	8.5	8.0	8.8	7.8	9.0	8.3	8.2	7.3
Degree Utilization, x	0.13	0.83	0.10	0.63	0.15	0.43	1.00	0.68
Capacity (veh/h)	410	445	398	444	386	420	514	483
Control Delay (s)	11.7	37.9	11.5	22.2	12.3	16.3	70.8	23.6
Approach Delay (s)	34.4		20.9		15.3		52.2	
Approach LOS	D		C		C		F	

Intersection Summary			
Delay	37.6		
Level of Service	E		
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	0	438	330	0	0	0	263	0	373	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5		4.0		
Lane Util. Factor		1.00	1.00					1.00		1.00		
Frpb, ped/bikes		1.00	0.99					1.00		1.00		
Flpb, ped/bikes		1.00	1.00					1.00		1.00		
Frt		1.00	0.94					1.00		0.85		
Flt Protected		0.95	1.00					0.95		1.00		
Satd. Flow (prot)		1787	1735					1787		1599		
Flt Permitted		0.76	1.00					0.95		1.00		
Satd. Flow (perm)		1424	1735					1787		1599		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	0	476	359	0	0	0	283	0	401	0	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	812	0	0	0	0	283	0	401	0	0
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5		120.0		
Effective Green, g (s)		39.5	39.5					19.5		120.0		
Actuated g/C Ratio		0.33	0.33					0.16		1.00		
Clearance Time (s)		5.5	5.5					5.5				
Lane Grp Cap (vph)		468	571					290		1599		
v/s Ratio Prot			c0.47					c0.16				
v/s Ratio Perm		0.00								c0.25		
v/c Ratio		0.00	1.42					0.98		0.25		
Uniform Delay, d1		27.0	40.2					50.0		0.0		
Progression Factor		1.00	1.00					1.00		1.00		
Incremental Delay, d2		0.0	200.2					47.1		0.4		
Delay (s)		27.0	240.4					97.1		0.4		
Level of Service		C	F					F		A		
Approach Delay (s)			240.2			0.0		40.4				0.0
Approach LOS			F			A		D				A

Intersection Summary			
HCM 2000 Control Delay	150.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR
Lane Configurations	
Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	145	5	157	353	95	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	184	6	171	384	116	135
Pedestrians				37		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				4		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked						
vC, conflicting volume			190		912	224
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					725	
vCu, unblocked vol			190		912	224
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			88		70	82
cM capacity (veh/h)			1372		387	759

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	190	171	384	116	135
Volume Left	0	171	0	116	0
Volume Right	6	0	0	0	135
cSH	1700	1372	1700	387	759
Volume to Capacity	0.11	0.12	0.23	0.30	0.18
Queue Length 95th (ft)	0	11	0	31	16
Control Delay (s)	0.0	8.0	0.0	18.2	10.8
Lane LOS		A		C	B
Approach Delay (s)	0.0	2.5		14.2	
Approach LOS				B	

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	4	35	5	0	20	6	97	18	25	382	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.75	0.75	0.75	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	27	5	47	7	0	27	7	114	21	29	444	19
Pedestrians		32			40			12			83	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			1			8	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	782	733	497	743	732	248	495			175		
vC1, stage 1 conf vol	544	544		179	179							
vC2, stage 2 conf vol	238	189		564	553							
vCu, unblocked vol	782	733	497	743	732	248	495			175		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	91	98	100	96	99			98		
cM capacity (veh/h)	441	460	553	419	455	705	1031			1359		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	33	7	135	29	463
Volume Left	27	7	7	0	29	0
Volume Right	47	27	0	21	0	19
cSH	503	620	1031	1700	1359	1700
Volume to Capacity	0.16	0.05	0.01	0.08	0.02	0.27
Queue Length 95th (ft)	14	4	1	0	2	0
Control Delay (s)	13.5	11.1	8.5	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.5	11.1	0.4		0.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	552	442	262	152	154
v/c Ratio	0.06	0.45	1.12	0.60	0.62	0.21	0.48
Control Delay	12.9	22.8	104.0	30.3	31.5	7.1	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	22.8	104.0	30.3	31.5	7.1	42.3
Queue Length 50th (ft)	7	123	~304	234	128	13	90
Queue Length 95th (ft)	18	188	#576	339	182	47	155
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	345	674	491	736	423	715	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	0.06	0.45	1.12	0.60	0.62	0.21	0.48

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	NWT
Lane Group Flow (vph)	771
v/c Ratio	0.60
Control Delay	2.1
Queue Delay	0.0
Total Delay	2.1
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	1094
Turn Bay Length (ft)	
Base Capacity (vph)	1283
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.60

Intersection Summary

Lane Group	EBL	EBT	NBL	NBR2
Lane Group Flow (vph)	1	835	283	401
v/c Ratio	0.00	1.41	0.98	0.25
Control Delay	27.0	224.0	97.5	0.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.0	224.0	97.5	0.4
Queue Length 50th (ft)	1	~855	221	0
Queue Length 95th (ft)	5	#1102	#398	0
Internal Link Dist (ft)		454	372	
Turn Bay Length (ft)	166		163	
Base Capacity (vph)	468	594	290	1599
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.00	1.41	0.98	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Traffic Impact Study

Appendix I. Synchro Worksheets- Detour Configuration II with Mitigations

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	337	515	324	98	53
v/c Ratio	0.03	0.40	0.67	0.70	0.66	0.15	0.16
Control Delay	12.6	20.7	24.4	33.6	33.3	7.0	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	20.7	24.4	33.6	33.3	7.0	32.6
Queue Length 50th (ft)	3	104	129	287	167	6	25
Queue Length 95th (ft)	9	164	194	411	232	34	42
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	303	693	506	736	492	651	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	0.03	0.40	0.67	0.70	0.66	0.15	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	115	122	317	454	30	4	268	13	70	7	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.87			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1748		1770	1950			1626	1594			1777
Flt Permitted	0.22	1.00		0.49	1.00			0.66	1.00			0.94
Satd. Flow (perm)	399	1748		922	1950			1125	1594			1695
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	134	142	337	483	32	5	319	15	83	10	34
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	52	0	0	7
Lane Group Flow (vph)	8	240	0	337	513	0	0	324	46	0	0	46
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	302	657		506	733			492	599			314
v/s Ratio Prot	0.00	0.14		c0.06	c0.26			c0.09	0.03			
v/s Ratio Perm	0.01			0.25				c0.16				0.03
v/c Ratio	0.03	0.37		0.67	0.70			0.66	0.08			0.15
Uniform Delay, d1	17.1	23.7		20.3	27.7			26.2	21.0			35.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.2	1.6		6.8	5.5			6.8	0.3			1.0
Delay (s)	17.2	25.2		27.1	33.2			33.0	21.3			36.8
Level of Service	B	C		C	C			C	C			D
Approach Delay (s)		25.0			30.8				30.3			36.8
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	NWT
Lane Group Flow (vph)	443
v/c Ratio	0.34
Control Delay	0.7
Queue Delay	0.0
Total Delay	0.7
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	1094
Turn Bay Length (ft)	
Base Capacity (vph)	1287
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.34

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	0	0	0	412	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.6			
Lane Util. Factor							1.00			
Frpb, ped/bikes							0.93			
Flpb, ped/bikes							1.00			
Frt							0.86			
Flt Protected							1.00			
Satd. Flow (prot)							1467			
Flt Permitted							1.00			
Satd. Flow (perm)							1467			
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	443	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	212	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	231	0	0	0
Confl. Peds. (#/hr)								26		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot						NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)							44.4			
Effective Green, g (s)							44.4			
Actuated g/C Ratio							0.52			
Clearance Time (s)							5.6			
Lane Grp Cap (vph)							766			
v/s Ratio Prot							c0.16			
v/s Ratio Perm										
v/c Ratio							0.30			
Uniform Delay, d1							11.5			
Progression Factor							1.00			
Incremental Delay, d2							1.0			
Delay (s)							12.5			
Level of Service							B			
Approach Delay (s)	0.0			0.0			12.5		0.0	
Approach LOS	A			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	NBL	NBR2
Lane Group Flow (vph)	553	330	430
v/c Ratio	0.73	0.44	0.27
Control Delay	34.2	26.6	0.4
Queue Delay	0.0	0.0	0.0
Total Delay	34.2	26.6	0.4
Queue Length 50th (ft)	336	177	0
Queue Length 95th (ft)	478	259	0
Internal Link Dist (ft)	454	372	
Turn Bay Length (ft)		163	
Base Capacity (vph)	753	755	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.73	0.44	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	0	340	174	0	0	0	307	0	400	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5					5.5		4.0			
Lane Util. Factor		1.00					1.00		1.00			
Frpb, ped/bikes		0.99					1.00		1.00			
Flpb, ped/bikes		1.00					1.00		1.00			
Frt		0.95					1.00		0.85			
Flt Protected		1.00					0.95		1.00			
Satd. Flow (prot)		1726					1770		1583			
Flt Permitted		1.00					0.95		1.00			
Satd. Flow (perm)		1726					1770		1583			
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	366	187	0	0	0	330	0	430	0	0	0
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	538	0	0	0	0	330	0	430	0	0	0
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type		NA					Prot		Free	Prot	Prot	Prot
Protected Phases		6					7			3	8	6
Permitted Phases									Free			
Actuated Green, G (s)		51.3					51.2		120.0			
Effective Green, g (s)		51.3					51.2		120.0			
Actuated g/C Ratio		0.43					0.43		1.00			
Clearance Time (s)		5.5					5.5					
Lane Grp Cap (vph)		737					755		1583			
v/s Ratio Prot		c0.31					c0.19					
v/s Ratio Perm									c0.27			
v/c Ratio		0.73					0.44		0.27			
Uniform Delay, d1		28.6					24.2		0.0			
Progression Factor		1.00					1.00		1.00			
Incremental Delay, d2		6.3					1.8		0.4			
Delay (s)		34.8					26.1		0.4			
Level of Service		C					C		A			
Approach Delay (s)		34.8			0.0		11.6				0.0	
Approach LOS		C			A		B				A	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	552	442	262	152	154
v/c Ratio	0.09	0.74	0.80	0.44	0.76	0.24	0.62
Control Delay	18.3	50.9	29.7	20.0	48.6	9.2	58.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	50.9	29.7	20.0	48.6	9.2	58.1
Queue Length 50th (ft)	6	194	274	207	162	17	110
Queue Length 95th (ft)	17	281	424	290	225	56	182
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	241	404	693	1000	345	627	250
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	0.09	0.74	0.80	0.44	0.76	0.24	0.62

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	137	121	519	388	27	1	219	26	102	13	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1713		1787	1948			1719	1700			1752
Flt Permitted	0.51	1.00		0.24	1.00			0.36	1.00			0.96
Satd. Flow (perm)	875	1713		451	1948			647	1700			1692
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	159	141	552	413	29	1	261	31	121	14	120
RTOR Reduction (vph)	0	26	0	0	2	0	0	0	82	0	0	4
Lane Group Flow (vph)	21	274	0	552	440	0	0	262	70	0	0	150
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	30.0	26.5		70.5	61.5			38.5	38.5			17.5
Effective Green, g (s)	30.0	26.5		70.5	61.5			38.5	38.5			17.5
Actuated g/C Ratio	0.25	0.22		0.59	0.51			0.32	0.32			0.15
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	241	378		693	998			346	545			246
v/s Ratio Prot	0.00	0.16		c0.26	0.23			c0.10	0.04			
v/s Ratio Perm	0.02			c0.21				c0.15				0.09
v/c Ratio	0.09	0.72		0.80	0.44			0.76	0.13			0.61
Uniform Delay, d1	34.2	43.4		21.1	18.4			33.7	28.9			48.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.7	11.4		9.2	1.4			14.3	0.5			10.7
Delay (s)	34.9	54.8		30.4	19.8			48.0	29.3			58.8
Level of Service	C	D		C	B			D	C			E
Approach Delay (s)		53.5			25.7				41.2			58.8
Approach LOS		D			C				D			E

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	NWT
Lane Group Flow (vph)	771
v/c Ratio	0.60
Control Delay	2.1
Queue Delay	0.0
Total Delay	2.1
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	1094
Turn Bay Length (ft)	
Base Capacity (vph)	1287
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.60

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	0	0	0	740	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)							5.6			
Lane Util. Factor							1.00			
Frpb, ped/bikes							0.90			
Flpb, ped/bikes							1.00			
Frt							0.86			
Flt Protected							1.00			
Satd. Flow (prot)							1482			
Flt Permitted							1.00			
Satd. Flow (perm)							1482			
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	0	0	0	0	0	0	0	771	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	368	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	403	0	0	0
Confl. Peds. (#/hr)		7						39		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot						NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)							44.4			
Effective Green, g (s)							44.4			
Actuated g/C Ratio							0.52			
Clearance Time (s)							5.6			
Lane Grp Cap (vph)							774			
v/s Ratio Prot							c0.27			
v/s Ratio Perm										
v/c Ratio							0.52			
Uniform Delay, d1							13.3			
Progression Factor							1.00			
Incremental Delay, d2							2.5			
Delay (s)							15.8			
Level of Service							B			
Approach Delay (s)	0.0			0.0			15.8		0.0	
Approach LOS	A			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	NBL	NBR2
Lane Group Flow (vph)	1	835	283	401
v/c Ratio	0.00	0.81	0.58	0.25
Control Delay	11.0	26.5	43.0	0.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.0	26.5	43.0	0.4
Queue Length 50th (ft)	0	461	189	0
Queue Length 95th (ft)	3	662	282	0
Internal Link Dist (ft)		454	372	
Turn Bay Length (ft)	166		163	
Base Capacity (vph)	824	1028	491	1599
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.00	0.81	0.58	0.25

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	0	438	330	0	0	0	263	0	373	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5		4.0		
Lane Util. Factor		1.00	1.00					1.00		1.00		
Frpb, ped/bikes		1.00	0.99					1.00		1.00		
Flpb, ped/bikes		1.00	1.00					1.00		1.00		
Frt		1.00	0.94					1.00		0.85		
Flt Protected		0.95	1.00					0.95		1.00		
Satd. Flow (prot)		1787	1735					1787		1599		
Flt Permitted		0.76	1.00					0.95		1.00		
Satd. Flow (perm)		1424	1735					1787		1599		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	0	476	359	0	0	0	283	0	401	0	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	812	0	0	0	0	283	0	401	0	0
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot		Free	Prot	Prot
Protected Phases			6					7			3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		69.5	69.5					33.0		120.0		
Effective Green, g (s)		69.5	69.5					33.0		120.0		
Actuated g/C Ratio		0.58	0.58					0.28		1.00		
Clearance Time (s)		5.5	5.5					5.5				
Lane Grp Cap (vph)		824	1004					491		1599		
v/s Ratio Prot			c0.47					c0.16				
v/s Ratio Perm		0.00								c0.25		
v/c Ratio		0.00	0.81					0.58		0.25		
Uniform Delay, d1		10.6	20.0					37.5		0.0		
Progression Factor		1.00	1.00					1.00		1.00		
Incremental Delay, d2		0.0	7.0					4.9		0.4		
Delay (s)		10.6	27.0					42.3		0.4		
Level of Service		B	C					D		A		
Approach Delay (s)			27.0			0.0		17.7				0.0
Approach LOS			C			A		B				A

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

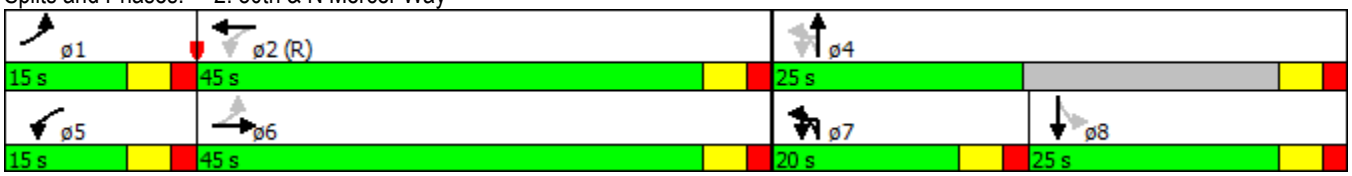
Movement	SWR
Lane Configurations	
Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	7	115	317	454	4	268	13	7	23
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases	1	6	5	2	7	7	4		8
Permitted Phases	6		2		4	4		8	
Minimum Split (s)	15.0	40.0	15.0	40.0	15.0	15.0	20.0	20.0	20.0
Total Split (s)	15.0	45.0	15.0	45.0	20.0	20.0	25.0	25.0	25.0
Total Split (%)	14.3%	42.9%	14.3%	42.9%	19.0%	19.0%	23.8%	23.8%	23.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5		5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes

Intersection Summary
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 8 (8%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	NWT	ø4	ø6	ø7	ø8
Lane Configurations					
Volume (vph)	0				
Turn Type	NA				
Protected Phases	2	4	6	7	8
Permitted Phases					
Minimum Split (s)	50.0	25.0	25.0	15.0	20.0
Total Split (s)	50.0	25.0	30.0	15.0	20.0
Total Split (%)	58.8%	29%	35%	18%	24%
Yellow Time (s)	3.6	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0				
Total Lost Time (s)	5.6				
Lead/Lag				Lead	Lag
Lead-Lag Optimize?				Yes	Yes

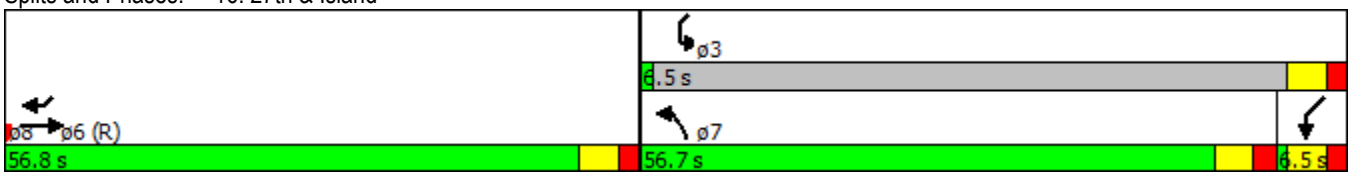
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NWTL, Start of Green
Natural Cycle: 85
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBT	NBL	NBR2	ø3	ø8
Lane Configurations					
Volume (vph)	340	307	400		
Turn Type	NA	Prot	Free		
Protected Phases	6	7		3	8
Permitted Phases			Free		
Minimum Split (s)	35.0	20.0		6.5	6.5
Total Split (s)	56.8	56.7		6.5	6.5
Total Split (%)	47.3%	47.3%		5%	5%
Yellow Time (s)	3.5	3.5		3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0			
Total Lost Time (s)	5.5	5.5			
Lead/Lag		Lead			Lag
Lead-Lag Optimize?		Yes			Yes

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2: and 6:EBT, Start of Green
Natural Cycle: 65
Control Type: Pretimed

Splits and Phases: 16: 27th & Island

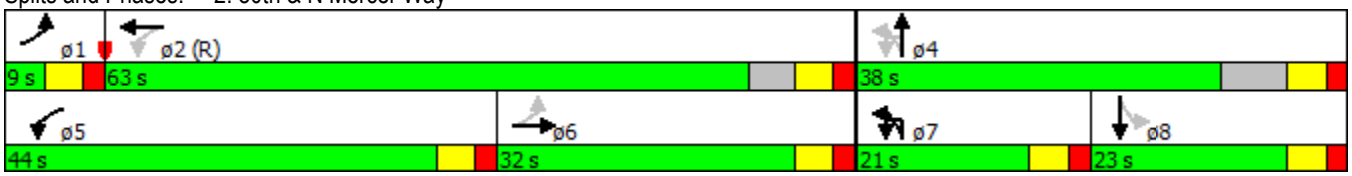


Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	18	137	519	388	1	219	26	13	112
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases	1	6	5	2	7	7	4		8
Permitted Phases	6		2		4	4		8	
Minimum Split (s)	6.5	15.0	15.0	30.0	10.0	10.0	20.0	15.0	15.0
Total Split (s)	9.0	32.0	44.0	63.0	21.0	21.0	38.0	23.0	23.0
Total Split (%)	7.5%	26.7%	36.7%	52.5%	17.5%	17.5%	31.7%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5		5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 80
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	NWT	ø4	ø6	ø7	ø8
Lane Configurations					
Volume (vph)	0				
Turn Type	NA				
Protected Phases	2	4	6	7	8
Permitted Phases					
Minimum Split (s)	50.0	25.0	30.0	15.0	20.0
Total Split (s)	50.0	25.0	30.0	15.0	20.0
Total Split (%)	58.8%	29%	35%	18%	24%
Yellow Time (s)	3.6	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0				
Total Lost Time (s)	5.6				
Lead/Lag				Lead	Lag
Lead-Lag Optimize?				Yes	Yes

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 85
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBU	EBL	EBT	NBL	NBR2	ø3	ø8
Lane Configurations							
Volume (vph)	1	0	438	263	373		
Turn Type	Perm	Perm	NA	Prot	Free		
Protected Phases			6	7		3	8
Permitted Phases	6	6			Free		
Minimum Split (s)	35.0	35.0	35.0	20.0		6.5	6.5
Total Split (s)	75.0	75.0	75.0	38.5		6.5	6.5
Total Split (%)	62.5%	62.5%	62.5%	32.1%		5%	5%
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0			
Total Lost Time (s)		5.5	5.5	5.5			
Lead/Lag				Lead			Lag
Lead-Lag Optimize?				Yes			Yes

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 11 (9%), Referenced to phase 2: and 6:EBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed

Splits and Phases: 16: 27th & Island

Traffic Impact Study

Appendix J. Synchro Worksheets- Detour Configuration III

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	115	122	42	561	30	4	130	13	58	7	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00			0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1728		1770	1957			1626	1601			1777
Flt Permitted	0.11	1.00		0.49	1.00			0.66	1.00			0.95
Satd. Flow (perm)	188	1728		922	1957			1125	1601			1699
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	134	142	45	597	32	5	155	15	69	10	34
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	43	0	0	7
Lane Group Flow (vph)	8	240	0	45	627	0	0	160	41	0	0	46
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	223	650		506	736			492	602			315
v/s Ratio Prot	0.00	0.14		c0.01	c0.32			c0.04	0.03			
v/s Ratio Perm	0.01			0.03				c0.08				0.03
v/c Ratio	0.04	0.37		0.09	0.85			0.33	0.07			0.14
Uniform Delay, d1	19.2	23.7		15.5	30.1			22.8	21.0			35.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	1.6		0.3	11.9			1.8	0.2			1.0
Delay (s)	19.5	25.3		15.9	42.0			24.6	21.2			36.7
Level of Service	B	C		B	D			C	C			D
Approach Delay (s)		25.2			40.3				23.4			36.7
Approach LOS		C			D				C			D

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	16	60	343	8	0	3
Peak Hour Factor	0.86	0.86	0.69	0.69	0.38	0.38
Hourly flow rate (vph)	19	70	497	12	0	8

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	88	509	8
Volume Left (vph)	19	497	0
Volume Right (vph)	70	0	8
Hadj (s)	-0.38	0.21	-0.60
Departure Headway (s)	4.7	4.3	4.1
Degree Utilization, x	0.12	0.61	0.01
Capacity (veh/h)	689	818	833
Control Delay (s)	8.3	14.0	7.1
Approach Delay (s)	8.3	14.0	7.1
Approach LOS	A	B	A

Intersection Summary			
Delay	13.1		
Level of Service	B		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	4	20	368	29	0	16	3	140	0	2	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.57	0.57	0.57	0.78	0.78	0.78	0.50	0.50	0.50
Hourly flow rate (vph)	0	6	31	646	51	0	21	4	179	0	4	0
Pedestrians		15			3			8			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55			46			1389	1376	33	1552	1392	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			46			1389	1376	33	1552	1392	70
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			59			73	95	82	100	95	100
cM capacity (veh/h)	1501			1557			75	83	1024	50	83	981

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	696	204	4
Volume Left	0	646	21	0
Volume Right	31	0	179	0
cSH	1501	1557	413	83
Volume to Capacity	0.00	0.41	0.49	0.05
Queue Length 95th (ft)	0	52	66	4
Control Delay (s)	0.0	8.6	21.9	50.6
Lane LOS		A	C	F
Approach Delay (s)	0.0	8.6	21.9	50.6
Approach LOS			C	F

Intersection Summary			
Average Delay	11.3		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations							
Volume (veh/h)	1	101	87	128	261	371	62
Sign Control		Free		Stop		Free	
Grade		0%		0%		0%	
Peak Hour Factor	0.78	0.78	0.78	0.56	0.56	0.90	0.90
Hourly flow rate (vph)	0	129	112	229	466	412	69
Pedestrians				32			
Lane Width (ft)				12.0			
Walking Speed (ft/s)				3.5			
Percent Blockage				3			
Right turn flare (veh)							
Median type		TWLTL				None	
Median storage veh)		2					
Upstream signal (ft)		387				576	
pX, platoon unblocked	0.00	0.90		0.90	0.90		
vC, conflicting volume	0	513		849	479		
vC1, stage 1 conf vol				479			
vC2, stage 2 conf vol				371			
vCu, unblocked vol	0	408		780	369		
tC, single (s)	0.0	4.1		6.4	6.2		
tC, 2 stage (s)				5.4			
tF (s)	0.0	2.2		3.5	3.3		
p0 queue free %	0	87		53	22		
cM capacity (veh/h)	0	999		489	594		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	129	112	695	481
Volume Left	129	0	229	0
Volume Right	0	0	466	69
cSH	999	1700	555	1700
Volume to Capacity	0.13	0.07	1.25	0.28
Queue Length 95th (ft)	11	0	677	0
Control Delay (s)	9.1	0.0	151.0	0.0
Lane LOS	A		F	
Approach Delay (s)	4.9		151.0	0.0
Approach LOS			F	

Intersection Summary			
Average Delay	74.9		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	0	0	1	0	3	0	342	2	3	58	0
Peak Hour Factor	0.49	0.49	0.49	0.33	0.33	0.33	0.93	0.93	0.93	0.45	0.45	0.45
Hourly flow rate (vph)	14	0	0	3	0	9	0	368	2	7	129	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	14	12	370	136
Volume Left (vph)	14	3	0	7
Volume Right (vph)	0	9	2	0
Hadj (s)	0.30	-0.40	0.03	0.11
Departure Headway (s)	5.3	4.6	4.1	4.4
Degree Utilization, x	0.02	0.02	0.43	0.17
Capacity (veh/h)	608	691	856	784
Control Delay (s)	8.4	7.7	10.2	8.3
Approach Delay (s)	8.4	7.7	10.2	8.3
Approach LOS	A	A	B	A

Intersection Summary			
Delay	9.6		
Level of Service	A		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	219	216	196	0	234	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.5			5.6		5.5	
Lane Util. Factor				1.00			1.00		1.00	
Frpb, ped/bikes				1.00			1.00		1.00	
Flpb, ped/bikes				1.00			1.00		1.00	
Frt				0.86			1.00		1.00	
Flt Protected				1.00			0.97		0.95	
Satd. Flow (prot)				1580			1780		1752	
Flt Permitted				1.00			0.60		0.55	
Satd. Flow (perm)				1580			1105		1013	
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	0	0	0	0	342	232	211	0	254	0
RTOR Reduction (vph)	0	0	0	163	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	179	0	0	443	0	254	0
Confl. Peds. (#/hr)								27		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot			NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)				44.5			44.4		29.5	
Effective Green, g (s)				44.5			44.4		29.5	
Actuated g/C Ratio				0.52			0.52		0.35	
Clearance Time (s)				5.5			5.6		5.5	
Lane Grp Cap (vph)				827			577		434	
v/s Ratio Prot				0.11					c0.07	
v/s Ratio Perm							c0.40		c0.14	
v/c Ratio				0.22			0.77		0.59	
Uniform Delay, d1				10.9			16.2		21.4	
Progression Factor				1.00			1.00		1.00	
Incremental Delay, d2				0.6			9.5		5.7	
Delay (s)				11.5			25.6		27.1	
Level of Service				B			C		C	
Approach Delay (s)	0.0			11.5			25.6		27.1	
Approach LOS	A			B			C		C	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	251	59	58	171	83	44	99	31	65	63	20
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.86	0.86	0.86	0.89	0.89	0.89
Hourly flow rate (vph)	35	282	66	65	192	93	51	115	36	73	71	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	35	348	65	285	51	151	73	93
Volume Left (vph)	35	0	65	0	51	0	73	0
Volume Right (vph)	0	66	0	93	0	36	0	22
Hadj (s)	0.55	-0.08	0.53	-0.19	0.55	-0.12	0.58	-0.08
Departure Headway (s)	6.7	6.1	6.7	6.0	7.3	6.7	7.4	6.8
Degree Utilization, x	0.06	0.59	0.12	0.48	0.10	0.28	0.15	0.18
Capacity (veh/h)	510	564	508	575	456	501	447	489
Control Delay (s)	9.0	16.2	9.5	13.2	10.0	11.0	10.5	10.0
Approach Delay (s)	15.5		12.5		10.8		10.2	
Approach LOS	C		B		B		B	

Intersection Summary			
Delay	12.9		
Level of Service	B		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	18	299	30	0	0	0	91	216	400	52	163	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1797					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1797					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	19	322	32	0	0	0	98	232	430	56	175	238
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	160
Lane Group Flow (vph)	19	351	0	0	0	0	98	232	430	56	175	78
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	591					287	587	1583	276	631	501
v/s Ratio Prot		c0.20					0.06	c0.15		0.03	0.10	0.05
v/s Ratio Perm	0.01								c0.27			
v/c Ratio	0.03	0.59					0.34	0.40	0.27	0.20	0.28	0.16
Uniform Delay, d1	27.3	33.6					44.6	27.8	0.0	43.5	26.5	28.5
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	4.4					3.2	2.0	0.4	1.7	1.1	0.7
Delay (s)	27.4	37.9					47.8	29.8	0.4	45.2	27.6	29.1
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		37.4			0.0		15.5				30.5	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	155	16	119	623	94	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.88	0.88	0.86	0.86
Hourly flow rate (vph)	187	19	135	708	109	83
Pedestrians				86		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				10		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.72	
vC, conflicting volume			206		1175	282
vC1, stage 1 conf vol					196	
vC2, stage 2 conf vol					978	
vCu, unblocked vol			206		1049	282
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			90		61	88
cM capacity (veh/h)			1348		277	671

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	206	135	708	109	83
Volume Left	0	135	0	109	0
Volume Right	19	0	0	0	83
cSH	1700	1348	1700	277	671
Volume to Capacity	0.12	0.10	0.42	0.39	0.12
Queue Length 95th (ft)	0	8	0	45	10
Control Delay (s)	0.0	8.0	0.0	26.2	11.1
Lane LOS		A		D	B
Approach Delay (s)	0.0	1.3		19.7	
Approach LOS				C	

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	3	16	3	5	21	10	79	7	31	278	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.83	0.83	0.83	0.78	0.78	0.78
Hourly flow rate (vph)	20	3	18	3	6	24	12	95	8	40	356	27
Pedestrians		29			41			20			60	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			2			6	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	684	647	419	640	656	200	412			145		
vC1, stage 1 conf vol	478	478		164	164							
vC2, stage 2 conf vol	206	169		476	492							
vCu, unblocked vol	684	647	419	640	656	200	412			145		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.2	5.6		6.2	5.6							
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	96	99	97	99	99	97	99			97		
cM capacity (veh/h)	465	476	591	472	469	750	1104			1370		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	33	12	104	40	383
Volume Left	20	3	12	0	40	0
Volume Right	18	24	0	8	0	27
cSH	513	644	1104	1700	1370	1700
Volume to Capacity	0.08	0.05	0.01	0.06	0.03	0.23
Queue Length 95th (ft)	7	4	1	0	2	0
Control Delay (s)	12.6	10.9	8.3	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.6	10.9	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	45	629	160	84	53
v/c Ratio	0.04	0.40	0.09	0.85	0.33	0.13	0.16
Control Delay	12.7	20.8	13.1	42.9	24.9	7.6	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	20.8	13.1	42.9	24.9	7.6	32.6
Queue Length 50th (ft)	3	104	14	381	73	6	25
Queue Length 95th (ft)	9	164	32	#583	115	33	42
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	223	686	506	737	492	645	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	0.04	0.40	0.09	0.85	0.33	0.13	0.16

Intersection Summary

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

Lane Group	SET	NWT	NEL
Lane Group Flow (vph)	342	443	254
v/c Ratio	0.25	0.77	0.59
Control Delay	0.5	27.3	27.7
Queue Delay	0.0	0.0	0.0
Total Delay	0.5	27.3	27.7
Queue Length 50th (ft)	0	178	102
Queue Length 95th (ft)	0	#352	169
Internal Link Dist (ft)	496	1094	316
Turn Bay Length (ft)			119
Base Capacity (vph)	1347	577	434
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	0.77	0.59

Intersection Summary

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	19	354	98	232	430	56	175	238
v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.36
Control Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.5
Queue Length 50th (ft)	10	225	68	131	0	38	94	0
Queue Length 95th (ft)	28	328	122	203	0	78	152	56
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	594	287	587	1583	276	631	661
Starvation Cap Reductn	0	0	0	0	0	0	0	116
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.44

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: 80th & N Mercer Way

11/15/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	137	121	61	372	27	1	130	26	99	13	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1713		1787	1950			1719	1701			1764
Flt Permitted	0.32	1.00		0.47	1.00			0.43	1.00			0.96
Satd. Flow (perm)	557	1713		877	1950			780	1701			1710
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	159	141	65	396	29	1	155	31	118	14	120
RTOR Reduction (vph)	0	31	0	0	2	0	0	0	74	0	0	5
Lane Group Flow (vph)	21	269	0	65	423	0	0	156	75	0	0	149
Confl. Peds. (#/hr)						112						
Confl. Bikes (#/hr)						21						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	358	644		491	733			423	639			317
v/s Ratio Prot	0.01	0.16		c0.01	c0.22			c0.05	0.04			
v/s Ratio Perm	0.02			0.05				0.09				c0.09
v/c Ratio	0.06	0.42		0.13	0.58			0.37	0.12			0.47
Uniform Delay, d1	16.2	24.2		15.8	26.1			23.3	21.4			38.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	2.0		0.6	3.3			2.5	0.4			4.9
Delay (s)	16.5	26.2		16.3	29.4			25.8	21.8			43.1
Level of Service	B	C		B	C			C	C			D
Approach Delay (s)		25.6			27.6				23.8			43.1
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	200
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	90	121	10	14	7
Peak Hour Factor	0.67	0.67	0.78	0.78	0.69	0.69
Hourly flow rate (vph)	9	134	155	13	20	10

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	143	168	30
Volume Left (vph)	9	155	0
Volume Right (vph)	134	0	10
Hadj (s)	-0.52	0.18	-0.20
Departure Headway (s)	3.8	4.4	4.2
Degree Utilization, x	0.15	0.21	0.04
Capacity (veh/h)	893	786	811
Control Delay (s)	7.5	8.6	7.3
Approach Delay (s)	7.5	8.6	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	7	24	168	13	0	39	7	163	1	4	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.66	0.66	0.66	0.89	0.89	0.89	0.42	0.42	0.42
Hourly flow rate (vph)	1	9	31	255	20	0	44	8	183	2	10	0
Pedestrians		2			8			13			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	21			53			575	570	45	752	585	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			53			575	570	45	752	585	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			84			88	98	82	99	97	100
cM capacity (veh/h)	1607			1547			360	358	1010	227	351	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	274	235	12
Volume Left	1	255	44	2
Volume Right	31	0	183	0
cSH	1607	1547	723	316
Volume to Capacity	0.00	0.16	0.32	0.04
Queue Length 95th (ft)	0	15	35	3
Control Delay (s)	0.2	7.3	12.4	16.8
Lane LOS	A	A	B	C
Approach Delay (s)	0.2	7.3	12.4	16.8
Approach LOS			B	C

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (veh/h)	136	110	102	99	361	89
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.93	0.93	0.75	0.75	0.91	0.91
Hourly flow rate (vph)	146	118	136	132	397	98
Pedestrians			40			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			3.5			
Percent Blockage			4			
Right turn flare (veh)						
Median type	TWLTL				None	
Median storage veh)	2					
Upstream signal (ft)	387				576	
pX, platoon unblocked	0.94		0.94	0.94		
vC, conflicting volume	535		896	486		
vC1, stage 1 conf vol			486			
vC2, stage 2 conf vol			411			
vCu, unblocked vol	471		856	418		
tC, single (s)	4.1		6.4	6.2		
tC, 2 stage (s)			5.4			
tF (s)	2.2		3.5	3.3		
p0 queue free %	85		71	77		
cM capacity (veh/h)	989		465	576		

Direction, Lane #	EB 1	EB 2	SB 1	NW 1
Volume Total	146	118	268	495
Volume Left	146	0	136	0
Volume Right	0	0	132	98
cSH	989	1700	514	1700
Volume to Capacity	0.15	0.07	0.52	0.29
Queue Length 95th (ft)	13	0	74	0
Control Delay (s)	9.3	0.0	19.4	0.0
Lane LOS	A		C	
Approach Delay (s)	5.1		19.4	0.0
Approach LOS			C	

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	0	0	2	0	5	0	125	2	4	102	0
Peak Hour Factor	0.85	0.85	0.85	0.58	0.58	0.58	0.82	0.82	0.82	0.80	0.80	0.80
Hourly flow rate (vph)	7	0	0	3	0	9	0	152	2	5	128	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	7	12	155	133
Volume Left (vph)	7	3	0	5
Volume Right (vph)	0	9	2	0
Hadj (s)	0.20	-0.37	-0.01	0.01
Departure Headway (s)	4.7	4.1	4.1	4.1
Degree Utilization, x	0.01	0.01	0.17	0.15
Capacity (veh/h)	704	798	868	866
Control Delay (s)	7.8	7.2	7.9	7.8
Approach Delay (s)	7.8	7.2	7.9	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	208	450	290	0	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.5			5.6		5.5	
Lane Util. Factor				1.00			1.00		1.00	
Frpb, ped/bikes				1.00			1.00		1.00	
Flpb, ped/bikes				1.00			1.00		1.00	
Frt				0.86			1.00		1.00	
Flt Protected				1.00			0.97		0.95	
Satd. Flow (prot)				1611			1844		1770	
Flt Permitted				1.00			0.65		0.55	
Satd. Flow (perm)				1611			1242		1023	
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	0	0	0	0	257	469	302	0	201	0
RTOR Reduction (vph)	0	0	0	122	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	135	0	0	771	0	201	0
Confl. Peds. (#/hr)		7						41		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type	Prot			NA		Perm	NA		pm+pt	Prot
Protected Phases	8			6			2		7	4
Permitted Phases	8		6			2			4	
Actuated Green, G (s)				44.5			44.4		29.5	
Effective Green, g (s)				44.5			44.4		29.5	
Actuated g/C Ratio				0.52			0.52		0.35	
Clearance Time (s)				5.5			5.6		5.5	
Lane Grp Cap (vph)				843			648		438	
v/s Ratio Prot				0.08					c0.05	
v/s Ratio Perm							c0.62		c0.11	
v/c Ratio				0.16			1.19		0.46	
Uniform Delay, d1				10.5			20.3		20.6	
Progression Factor				1.00			1.00		1.00	
Incremental Delay, d2				0.4			100.3		3.4	
Delay (s)				10.9			120.6		24.1	
Level of Service				B			F		C	
Approach Delay (s)	0.0			10.9			120.6		24.1	
Approach LOS	A			B			F		C	

Intersection Summary			
HCM 2000 Control Delay	81.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	52	287	58	88	211	59	52	117	49	79	85	31
Peak Hour Factor	0.92	0.92	0.92	0.79	0.79	0.79	0.88	0.88	0.88	0.84	0.84	0.84
Hourly flow rate (vph)	57	312	63	111	267	75	59	133	56	94	101	37

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	57	375	111	342	59	189	94	138
Volume Left (vph)	57	0	111	0	59	0	94	0
Volume Right (vph)	0	63	0	75	0	56	0	37
Hadj (s)	0.52	-0.10	0.50	-0.15	0.50	-0.21	0.52	-0.17
Departure Headway (s)	7.4	6.7	7.3	6.7	8.0	7.3	8.0	7.3
Degree Utilization, x	0.12	0.70	0.23	0.63	0.13	0.38	0.21	0.28
Capacity (veh/h)	466	514	471	516	423	455	419	456
Control Delay (s)	10.1	23.0	11.3	19.4	11.0	13.5	11.9	12.0
Approach Delay (s)	21.3		17.4		12.9		12.0	
Approach LOS	C		C		B		B	

Intersection Summary			
Delay	16.9		
Level of Service	C		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	14	357	44	0	0	0	118	145	373	96	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1843					1787	1599	1599	1787	1787
Flt Permitted		0.99	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1859	1843					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	15	388	48	0	0	0	127	156	401	110	370
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	432	0	0	0	0	127	156	401	110	370
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Effective Green, g (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Actuated g/C Ratio		0.33	0.33					0.16	0.37	1.00	0.16	0.37
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		611	606					290	592	1599	290	662
v/s Ratio Prot			c0.23					c0.07	0.10		0.06	c0.21
v/s Ratio Perm		0.01								0.25		
v/c Ratio		0.03	0.71					0.44	0.26	0.25	0.38	0.56
Uniform Delay, d1		27.2	35.3					45.3	26.3	0.0	44.8	30.0
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	7.0					4.7	1.1	0.4	3.7	3.4
Delay (s)		27.3	42.3					50.1	27.4	0.4	48.6	33.3
Level of Service		C	D					D	C	A	D	C
Approach Delay (s)			41.7			0.0		15.8				34.1
Approach LOS			D			A		B				C

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SWR
Lane Configurations	
Volume (vph)	240
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	276
RTOR Reduction (vph)	185
Lane Group Flow (vph)	91
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	39.5
Effective Green, g (s)	39.5
Actuated g/C Ratio	0.33
Clearance Time (s)	5.5
Lane Grp Cap (vph)	526
v/s Ratio Prot	0.06
v/s Ratio Perm	
v/c Ratio	0.17
Uniform Delay, d1	28.6
Progression Factor	1.00
Incremental Delay, d2	0.7
Delay (s)	29.3
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	145	5	157	363	95	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.92	0.92	0.82	0.82
Hourly flow rate (vph)	184	6	171	395	116	135
Pedestrians				37		
Lane Width (ft)				14.0		
Walking Speed (ft/s)				3.5		
Percent Blockage				4		
Right turn flare (veh)						
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (ft)				876		
pX, platoon unblocked					0.91	
vC, conflicting volume			190		923	224
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					736	
vCu, unblocked vol			190		862	224
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			88		69	82
cM capacity (veh/h)			1372		378	759

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	190	171	395	116	135
Volume Left	0	171	0	116	0
Volume Right	6	0	0	0	135
cSH	1700	1372	1700	378	759
Volume to Capacity	0.11	0.12	0.23	0.31	0.18
Queue Length 95th (ft)	0	11	0	32	16
Control Delay (s)	0.0	8.0	0.0	18.7	10.8
Lane LOS		A		C	B
Approach Delay (s)	0.0	2.4		14.4	
Approach LOS				B	

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	4	35	5	0	20	6	97	18	25	382	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.75	0.75	0.75	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	27	5	47	7	0	27	7	114	21	29	444	19
Pedestrians		32			40			12			83	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			4			1			8	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	782	733	497	743	732	248	495			175		
vC1, stage 1 conf vol	544	544		179	179							
vC2, stage 2 conf vol	238	189		564	553							
vCu, unblocked vol	782	733	497	743	732	248	495			175		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	91	98	100	96	99			98		
cM capacity (veh/h)	441	460	553	419	455	705	1031			1359		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	33	7	135	29	463
Volume Left	27	7	7	0	29	0
Volume Right	47	27	0	21	0	19
cSH	503	620	1031	1700	1359	1700
Volume to Capacity	0.16	0.05	0.01	0.08	0.02	0.27
Queue Length 95th (ft)	14	4	1	0	2	0
Control Delay (s)	13.5	11.1	8.5	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.5	11.1	0.4		0.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	65	425	156	149	154
v/c Ratio	0.06	0.45	0.13	0.58	0.37	0.21	0.48
Control Delay	12.9	22.8	13.5	29.7	25.3	7.2	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	22.8	13.5	29.7	25.3	7.2	42.3
Queue Length 50th (ft)	7	123	21	222	71	13	90
Queue Length 95th (ft)	18	188	43	324	111	47	155
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	357	674	491	736	423	713	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	0.06	0.45	0.13	0.58	0.37	0.21	0.48

Intersection Summary

Lane Group	SET	NWT	NEL
Lane Group Flow (vph)	257	771	201
v/c Ratio	0.19	1.19	0.46
Control Delay	0.3	122.4	24.4
Queue Delay	0.0	0.0	0.0
Total Delay	0.3	122.4	24.4
Queue Length 50th (ft)	0	~502	78
Queue Length 95th (ft)	0	#716	114
Internal Link Dist (ft)	496	1094	316
Turn Bay Length (ft)			119
Base Capacity (vph)	1332	649	438
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.19	1.19	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	16	436	127	156	401	110	370	276
v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.56	0.39
Control Delay	27.5	42.5	50.7	27.9	0.4	49.2	33.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.4
Total Delay	27.5	42.5	50.7	27.9	0.4	49.2	39.9	5.5
Queue Length 50th (ft)	8	291	90	83	0	77	226	0
Queue Length 95th (ft)	25	414	153	138	0	129	310	52
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	611	610	290	592	1599	290	662	711
Starvation Cap Reductn	0	0	0	0	0	0	232	133
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.86	0.48

Intersection Summary

Traffic Impact Study

Appendix K. Synchro Worksheets- Detour Configuration III with Mitigations

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	276	45	629	160	84	53
v/c Ratio	0.03	0.35	0.08	0.75	0.33	0.14	0.39
Control Delay	12.4	19.6	12.8	35.4	30.0	8.8	55.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	19.6	12.8	35.4	30.0	8.8	55.4
Queue Length 50th (ft)	3	111	15	401	88	8	34
Queue Length 95th (ft)	9	167	33	549	133	37	55
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	261	782	548	840	491	611	136
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	0.03	0.35	0.08	0.75	0.33	0.14	0.39

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	7	115	122	42	561	30	4	130	13	58	7	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00			0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.92		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			0.99
Satd. Flow (prot)	1687	1748		1770	1955			1626	1601			1768
Flt Permitted	0.17	1.00		0.51	1.00			0.56	1.00			0.92
Satd. Flow (perm)	297	1748		951	1955			951	1601			1641
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.67	0.67
Adj. Flow (vph)	8	134	142	45	597	32	5	155	15	69	10	34
RTOR Reduction (vph)	0	32	0	0	2	0	0	0	45	0	0	6
Lane Group Flow (vph)	8	244	0	45	627	0	0	160	39	0	0	47
Confl. Peds. (#/hr)						62						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	11%	11%	11%	11%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	61.0	51.5		61.0	51.5			42.5	42.5			9.5
Effective Green, g (s)	61.0	51.5		61.0	51.5			42.5	42.5			9.5
Actuated g/C Ratio	0.51	0.43		0.51	0.43			0.35	0.35			0.08
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	261	750		548	839			491	567			129
v/s Ratio Prot	0.00	0.14		c0.01	c0.32			c0.07	0.02			
v/s Ratio Perm	0.01			0.04				c0.04				0.03
v/c Ratio	0.03	0.33		0.08	0.75			0.33	0.07			0.36
Uniform Delay, d1	18.7	22.7		15.1	28.8			28.0	25.7			52.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.2	1.2		0.3	6.0			1.8	0.2			7.7
Delay (s)	18.9	23.9		15.4	34.8			29.7	25.9			60.0
Level of Service	B	C		B	C			C	C			E
Approach Delay (s)		23.7			33.5				28.4			60.0
Approach LOS		C			C				C			E

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	6
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.67
Adj. Flow (vph)	9
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	97
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	SER	NWT	NEL
Lane Group Flow (vph)	342	443	254
v/c Ratio	0.25	0.43	0.54
Control Delay	0.4	11.9	29.9
Queue Delay	0.0	0.0	0.0
Total Delay	0.4	11.9	29.9
Queue Length 50th (ft)	0	123	111
Queue Length 95th (ft)	0	190	184
Internal Link Dist (ft)		1094	316
Turn Bay Length (ft)			119
Base Capacity (vph)	1372	1023	468
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	0.43	0.54

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	219	216	196	0	234	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5		5.6		5.5	
Lane Util. Factor					1.00		1.00		1.00	
Frpb, ped/bikes					1.00		1.00		1.00	
Flpb, ped/bikes					1.00		1.00		1.00	
Frt					0.86		1.00		1.00	
Flt Protected					1.00		0.97		0.95	
Satd. Flow (prot)					1580		1780		1752	
Flt Permitted					1.00		0.97		0.62	
Satd. Flow (perm)					1580		1780		1135	
Peak-hour factor, PHF	0.93	0.93	0.64	0.64	0.64	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	0	0	0	0	342	232	211	0	254	0
RTOR Reduction (vph)	0	0	0	0	145	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	197	0	443	0	254	0
Confl. Peds. (#/hr)								27		
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%	4%	4%	3%	3%
Turn Type	Prot				Perm	Perm	NA		pm+pt	
Protected Phases	8						2		7	
Permitted Phases	8				6	2			4	
Actuated Green, G (s)					49.0		48.9		25.0	
Effective Green, g (s)					49.0		48.9		25.0	
Actuated g/C Ratio					0.58		0.58		0.29	
Clearance Time (s)					5.5		5.6		5.5	
Lane Grp Cap (vph)					910		1024		468	
v/s Ratio Prot									c0.12	
v/s Ratio Perm					0.12		0.25		c0.04	
v/c Ratio					0.22		0.43		0.54	
Uniform Delay, d1					8.7		10.2		24.8	
Progression Factor					1.00		1.00		1.00	
Incremental Delay, d2					0.5		1.3		4.5	
Delay (s)					9.3		11.5		29.3	
Level of Service					A		B		C	
Approach Delay (s)	0.0			9.3			11.5		29.3	
Approach LOS	A			A			B		C	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	19	354	98	232	430	56	175	238
v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.36
Control Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Total Delay	27.6	38.2	48.4	30.4	0.4	45.8	28.0	5.5
Queue Length 50th (ft)	10	225	68	131	0	38	94	0
Queue Length 95th (ft)	28	328	122	203	0	78	152	56
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	601	594	287	587	1583	276	631	661
Starvation Cap Reductn	0	0	0	0	0	0	0	116
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.34	0.40	0.27	0.20	0.28	0.44

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Volume (vph)	18	299	30	0	0	0	91	216	400	52	163	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5					5.5	5.5	4.0	5.5	5.5	5.5
Lane Util. Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99					1.00	0.85	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1736	1797					1770	1583	1583	1703	1703	1524
Flt Permitted	1.00	1.00					0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	1827	1797					1770	1583	1583	1703	1703	1524
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	19	322	32	0	0	0	98	232	430	56	175	238
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	160
Lane Group Flow (vph)	19	351	0	0	0	0	98	232	430	56	175	78
Confl. Peds. (#/hr)			4									2
Confl. Bikes (#/hr)								2				
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA					Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6					7	4		3	8	6
Permitted Phases	6								Free			
Actuated Green, G (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Effective Green, g (s)	39.5	39.5					19.5	44.5	120.0	19.5	44.5	39.5
Actuated g/C Ratio	0.33	0.33					0.16	0.37	1.00	0.16	0.37	0.33
Clearance Time (s)	5.5	5.5					5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)	601	591					287	587	1583	276	631	501
v/s Ratio Prot		c0.20					0.06	c0.15		0.03	0.10	0.05
v/s Ratio Perm	0.01								c0.27			
v/c Ratio	0.03	0.59					0.34	0.40	0.27	0.20	0.28	0.16
Uniform Delay, d1	27.3	33.6					44.6	27.8	0.0	43.5	26.5	28.5
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	4.4					3.2	2.0	0.4	1.7	1.1	0.7
Delay (s)	27.4	37.9					47.8	29.8	0.4	45.2	27.6	29.1
Level of Service	C	D					D	C	A	D	C	C
Approach Delay (s)		37.4			0.0		15.5				30.5	
Approach LOS		D			A		B				C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: 80th & N Mercer Way

11/30/2017

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	21	300	65	425	156	149	154
v/c Ratio	0.06	0.45	0.13	0.58	0.37	0.21	0.48
Control Delay	12.9	22.8	13.5	29.7	25.3	7.2	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	22.8	13.5	29.7	25.3	7.2	42.3
Queue Length 50th (ft)	7	123	21	222	71	13	90
Queue Length 95th (ft)	18	188	43	323	111	47	155
Internal Link Dist (ft)		796		307		663	88
Turn Bay Length (ft)	254		122		140		
Base Capacity (vph)	357	674	491	736	423	713	323
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.45	0.13	0.58	0.37	0.21	0.48

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	18	137	121	61	372	27	1	130	26	99	13	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	14	12	14	12	14	12	12	12
Total Lost time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.98			1.00	1.00			0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Frt	1.00	0.93		1.00	0.99			1.00	0.88			0.98
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00			1.00
Satd. Flow (prot)	1641	1713		1787	1951			1719	1701			1768
Flt Permitted	0.32	1.00		0.47	1.00			0.43	1.00			0.96
Satd. Flow (perm)	557	1713		877	1951			780	1701			1714
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.93	0.93
Adj. Flow (vph)	21	159	141	65	396	29	1	155	31	118	14	120
RTOR Reduction (vph)	0	31	0	0	2	0	0	0	74	0	0	5
Lane Group Flow (vph)	21	269	0	65	423	0	0	156	75	0	0	149
Confl. Peds. (#/hr)						107						
Confl. Bikes (#/hr)						20						
Heavy Vehicles (%)	10%	10%	10%	1%	1%	1%	5%	5%	5%	5%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	pm+pt	NA		Perm	NA
Protected Phases	1	6		5	2		7	7	4			8
Permitted Phases	6			2			4	4			8	
Actuated Green, G (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Effective Green, g (s)	49.0	39.5		49.0	39.5			39.5	39.5			19.5
Actuated g/C Ratio	0.47	0.38		0.47	0.38			0.38	0.38			0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			5.5	5.5			5.5
Lane Grp Cap (vph)	358	644		491	733			423	639			318
v/s Ratio Prot	0.01	0.16		c0.01	c0.22			c0.05	0.04			
v/s Ratio Perm	0.02			0.05				0.09				c0.09
v/c Ratio	0.06	0.42		0.13	0.58			0.37	0.12			0.47
Uniform Delay, d1	16.2	24.2		15.8	26.1			23.3	21.4			38.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00			1.00
Incremental Delay, d2	0.3	2.0		0.6	3.3			2.5	0.4			4.9
Delay (s)	16.5	26.2		16.3	29.4			25.8	21.8			43.0
Level of Service	B	C		B	C			C	C			D
Approach Delay (s)		25.6			27.6				23.8			43.0
Approach LOS		C			C				C			D

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Volume (vph)	19
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	20
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	191
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	SER	NWT	NEL
Lane Group Flow (vph)	257	771	201
v/c Ratio	0.18	0.64	0.54
Control Delay	0.3	11.6	35.9
Queue Delay	0.0	0.0	0.0
Total Delay	0.3	11.6	35.9
Queue Length 50th (ft)	0	213	96
Queue Length 95th (ft)	0	323	140
Internal Link Dist (ft)		1094	316
Turn Bay Length (ft)			119
Base Capacity (vph)	1439	1212	374
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.18	0.64	0.54

Intersection Summary

Movement	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	0	0	0	0	208	450	290	0	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.5		5.6		5.5	
Lane Util. Factor					1.00		1.00		1.00	
Frpb, ped/bikes					1.00		1.00		1.00	
Flpb, ped/bikes					1.00		1.00		1.00	
Frt					0.86		1.00		1.00	
Flt Protected					1.00		0.97		0.95	
Satd. Flow (prot)					1611		1844		1770	
Flt Permitted					1.00		0.97		0.95	
Satd. Flow (perm)					1611		1844		1770	
Peak-hour factor, PHF	0.86	0.86	0.81	0.81	0.81	0.96	0.96	0.96	0.79	0.79
Adj. Flow (vph)	0	0	0	0	257	469	302	0	201	0
RTOR Reduction (vph)	0	0	0	0	85	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	172	0	771	0	201	0
Confl. Peds. (#/hr)		7						41		
Confl. Bikes (#/hr)								1		
Heavy Vehicles (%)	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%
Turn Type		Perm			Perm	Perm	NA		pm+pt	
Protected Phases							2		7	
Permitted Phases		8			6	2			4	
Actuated Green, G (s)					57.0		55.9		18.0	
Effective Green, g (s)					57.0		55.9		18.0	
Actuated g/C Ratio					0.67		0.66		0.21	
Clearance Time (s)					4.5		5.6		5.5	
Lane Grp Cap (vph)					1080		1212		374	
v/s Ratio Prot									c0.07	
v/s Ratio Perm					0.11		0.42		0.04	
v/c Ratio					0.16		0.64		0.54	
Uniform Delay, d1					5.2		8.6		29.8	
Progression Factor					1.00		1.00		1.00	
Incremental Delay, d2					0.3		2.6		5.4	
Delay (s)					5.5		11.1		35.2	
Level of Service					A		B		D	
Approach Delay (s)	0.0			5.5			11.1		35.2	
Approach LOS	A			A			B		D	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.6
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Group Flow (vph)	16	436	127	156	401	110	370	276
v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.56	0.39
Control Delay	27.5	42.5	50.7	27.9	0.4	49.2	33.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.4
Total Delay	27.5	42.5	50.7	27.9	0.4	49.2	39.9	5.5
Queue Length 50th (ft)	8	291	90	83	0	77	226	0
Queue Length 95th (ft)	25	414	153	138	0	129	310	52
Internal Link Dist (ft)		454	372				316	
Turn Bay Length (ft)	166		163			119	119	
Base Capacity (vph)	611	610	290	592	1599	290	662	711
Starvation Cap Reductn	0	0	0	0	0	0	232	133
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.71	0.44	0.26	0.25	0.38	0.86	0.48

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL
Lane Configurations												
Volume (vph)	1	14	357	44	0	0	0	118	145	373	96	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5					5.5	5.5	4.0	5.5	5.5
Lane Util. Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.98					1.00	0.85	0.85	1.00	1.00
Flt Protected		0.95	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (prot)		1787	1843					1787	1599	1599	1787	1787
Flt Permitted		0.99	1.00					0.95	1.00	1.00	0.95	0.95
Satd. Flow (perm)		1859	1843					1787	1599	1599	1787	1787
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87
Adj. Flow (vph)	1	15	388	48	0	0	0	127	156	401	110	370
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	16	432	0	0	0	0	127	156	401	110	370
Confl. Peds. (#/hr)				5								
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA					Prot	Prot	Free	Prot	Prot
Protected Phases			6					7	4		3	8
Permitted Phases	6	6								Free		
Actuated Green, G (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Effective Green, g (s)		39.5	39.5					19.5	44.5	120.0	19.5	44.5
Actuated g/C Ratio		0.33	0.33					0.16	0.37	1.00	0.16	0.37
Clearance Time (s)		5.5	5.5					5.5	5.5		5.5	5.5
Lane Grp Cap (vph)		611	606					290	592	1599	290	662
v/s Ratio Prot			c0.23					c0.07	0.10		0.06	c0.21
v/s Ratio Perm		0.01								0.25		
v/c Ratio		0.03	0.71					0.44	0.26	0.25	0.38	0.56
Uniform Delay, d1		27.2	35.3					45.3	26.3	0.0	44.8	30.0
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	7.0					4.7	1.1	0.4	3.7	3.4
Delay (s)		27.3	42.3					50.1	27.4	0.4	48.6	33.3
Level of Service		C	D					D	C	A	D	C
Approach Delay (s)			41.7			0.0		15.8				34.1
Approach LOS			D			A		B				C

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

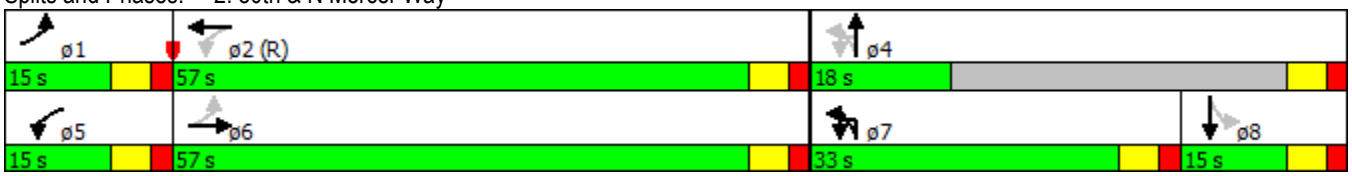
Movement	SWR
Lane Configurations	
Volume (vph)	240
Ideal Flow (vphpl)	1900
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1599
Flt Permitted	1.00
Satd. Flow (perm)	1599
Peak-hour factor, PHF	0.87
Adj. Flow (vph)	276
RTOR Reduction (vph)	185
Lane Group Flow (vph)	91
Confl. Peds. (#/hr)	3
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	1%
Turn Type	Prot
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	39.5
Effective Green, g (s)	39.5
Actuated g/C Ratio	0.33
Clearance Time (s)	5.5
Lane Grp Cap (vph)	526
v/s Ratio Prot	0.06
v/s Ratio Perm	
v/c Ratio	0.17
Uniform Delay, d1	28.6
Progression Factor	1.00
Incremental Delay, d2	0.7
Delay (s)	29.3
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	7	115	42	561	4	130	13	7	23
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases	1	6	5	2	7	7	4		8
Permitted Phases	6		2		4	4		8	
Minimum Split (s)	15.0	40.0	15.0	40.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	15.0	57.0	15.0	57.0	33.0	33.0	18.0	15.0	15.0
Total Split (%)	12.5%	47.5%	12.5%	47.5%	27.5%	27.5%	15.0%	12.5%	12.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5		5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 85
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	SER	NWT	NEL	ø4	ø8
Lane Configurations					
Volume (vph)	219	196	234		
Turn Type	Perm	NA	pm+pt		
Protected Phases		2	7	4	8
Permitted Phases	6		4		
Minimum Split (s)	25.0	50.0	15.0	25.0	6.5
Total Split (s)	54.5	54.5	24.0	30.0	6.5
Total Split (%)	64.1%	64.1%	28.2%	35%	8%
Yellow Time (s)	3.5	3.6	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	5.5	5.6	5.5		
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes

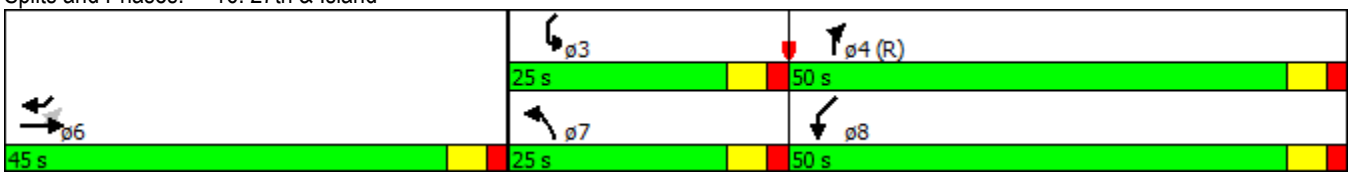
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NWTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations								
Volume (vph)	18	299	91	216	400	52	163	221
Turn Type	Perm	NA	Prot	Prot	Free	Prot	Prot	Prot
Protected Phases		6	7	4		3	8	6
Permitted Phases	6				Free			
Minimum Split (s)	35.0	35.0	20.0	40.0		20.0	40.0	35.0
Total Split (s)	45.0	45.0	25.0	50.0		25.0	50.0	45.0
Total Split (%)	37.5%	37.5%	20.8%	41.7%		20.8%	41.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lead/Lag			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			Yes	Yes		Yes	Yes	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 4:NBR, Start of Green
Natural Cycle: 95
Control Type: Pretimed

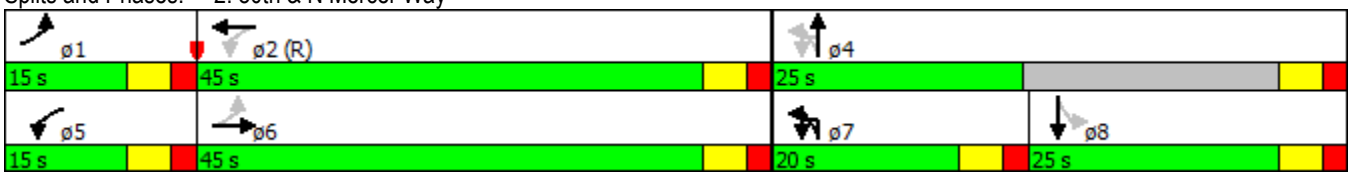
Splits and Phases: 16: 27th & Island



Lane Group	EBL	EBT	WBL	WBT	NBU	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	18	137	61	372	1	130	26	13	112
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	pm+pt	NA	Perm	NA
Protected Phases	1	6	5	2	7	7	4		8
Permitted Phases	6		2		4	4		8	
Minimum Split (s)	15.0	40.0	15.0	40.0	15.0	15.0	20.0	20.0	20.0
Total Split (s)	15.0	45.0	15.0	45.0	20.0	20.0	25.0	25.0	25.0
Total Split (%)	14.3%	42.9%	14.3%	42.9%	19.0%	19.0%	23.8%	23.8%	23.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	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
Total Lost Time (s)	5.5	5.5	5.5	5.5		5.5	5.5		5.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes

Intersection Summary
Cycle Length: 105
Actuated Cycle Length: 105
Offset: 8 (8%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed

Splits and Phases: 2: 80th & N Mercer Way



Lane Group	SER	NWT	NEL	ø4	ø8
Lane Configurations					
Volume (vph)	208	290	159		
Turn Type	Perm	NA	pm+pt		
Protected Phases		2	7	4	8
Permitted Phases	6		4		
Minimum Split (s)	29.5	50.0	15.0	6.5	6.5
Total Split (s)	61.5	61.5	17.0	23.5	6.5
Total Split (%)	72.4%	72.4%	20.0%	28%	8%
Yellow Time (s)	3.5	3.6	3.5	3.5	3.5
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	4.5	5.6	5.5		
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes

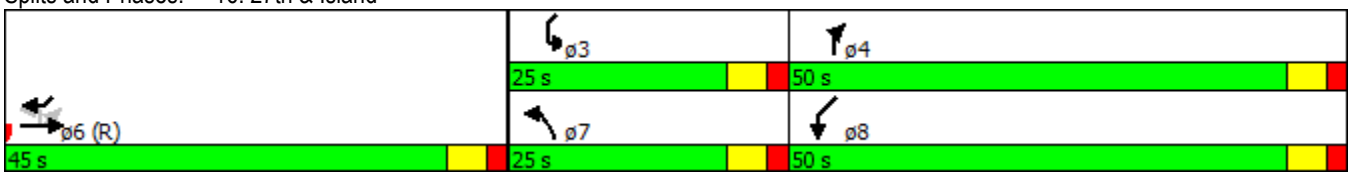
Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SER, Start of Green
Natural Cycle: 75
Control Type: Pretimed

Splits and Phases: 10: Island & N Mercer Way & 26th

Lane Group	EBU	EBL	EBT	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations									
Volume (vph)	1	14	357	118	145	373	96	322	240
Turn Type	Perm	Perm	NA	Prot	Prot	Free	Prot	Prot	Prot
Protected Phases			6	7	4		3	8	6
Permitted Phases	6	6				Free			
Minimum Split (s)	35.0	35.0	35.0	20.0	40.0		20.0	40.0	35.0
Total Split (s)	45.0	45.0	45.0	25.0	50.0		25.0	50.0	45.0
Total Split (%)	37.5%	37.5%	37.5%	20.8%	41.7%		20.8%	41.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
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
Total Lost Time (s)		5.5	5.5	5.5	5.5		5.5	5.5	5.5
Lead/Lag				Lead	Lag		Lead	Lag	
Lead-Lag Optimize?				Yes	Yes		Yes	Yes	

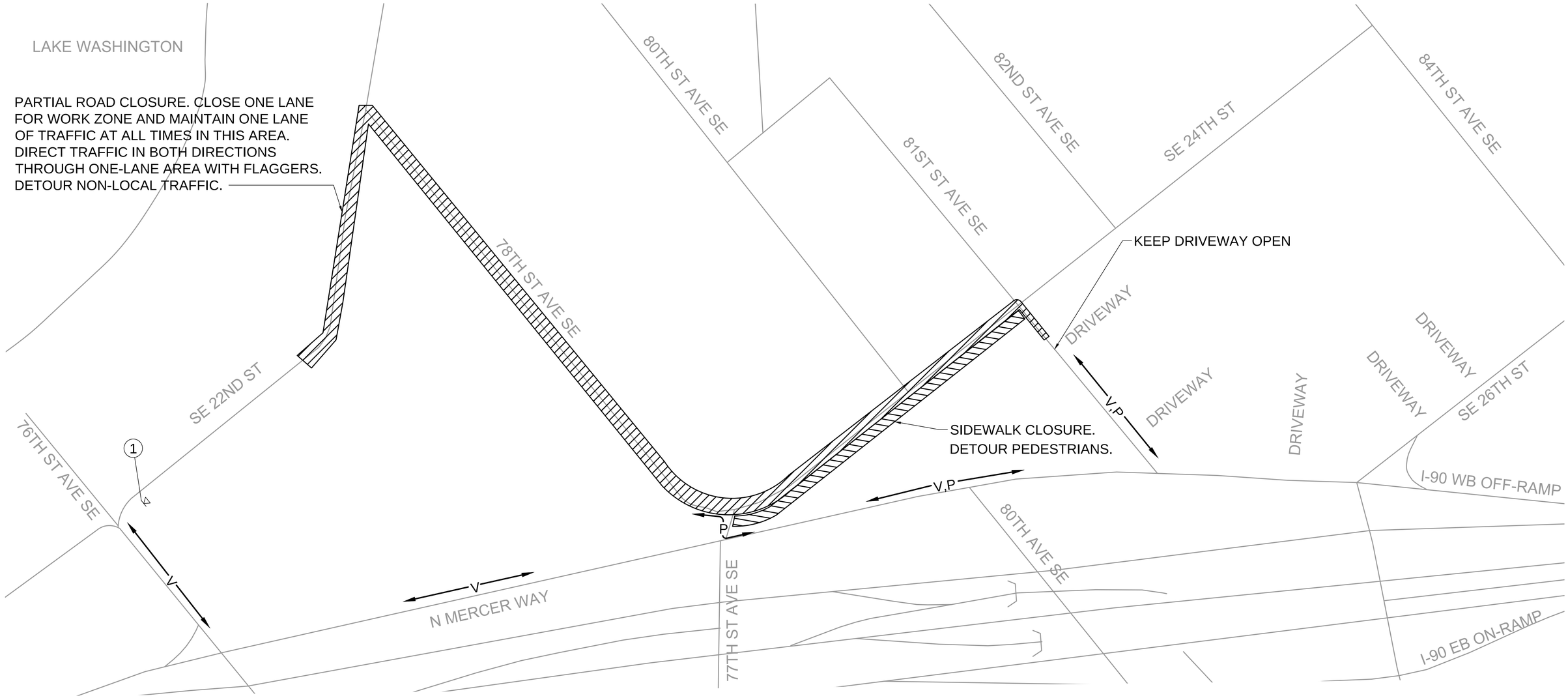
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 11 (9%), Referenced to phase 2: and 6:EBTL, Start of Green
Natural Cycle: 95
Control Type: Pretimed

Splits and Phases: 16: 27th & Island



Transportation Study

Appendix L. Detour Drawings: T100 to T110



60"

ROAD CLOSED
LOCAL TRAFFIC ONLY

30"

R11-3a (MOD)

1

NOTES TO REVIEWER:

1. 60% TRAFFIC DETOUR PLANS ARE CONCEPTUAL AND INTENDED TO DEMONSTRATE THE PROPOSED VEHICLE, PEDESTRIAN, AND BICYCLE DETOURS. FOLLOWING REVIEW BY THE APPROPRIATE AGENCIES (CITY OF MERCER ISLAND, WSDOT, AND/OR CITY OF BELLEVUE) PLANS WILL BE REFINED AND SPECIFIC TRAFFIC CONTROL DETAILS WILL BE ADDED.

LEGEND:

DETOUR ROUTE VEHICLES	← V →
DETOUR ROUTE PEDESTRIANS	← P →
WORK ZONE	
TEMPORARY SIGN LOCATION	

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron
SCALE: NTS
PROJECT ENGINEER: J. CHAE
REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE
FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ
CONTRACT NO: TBD

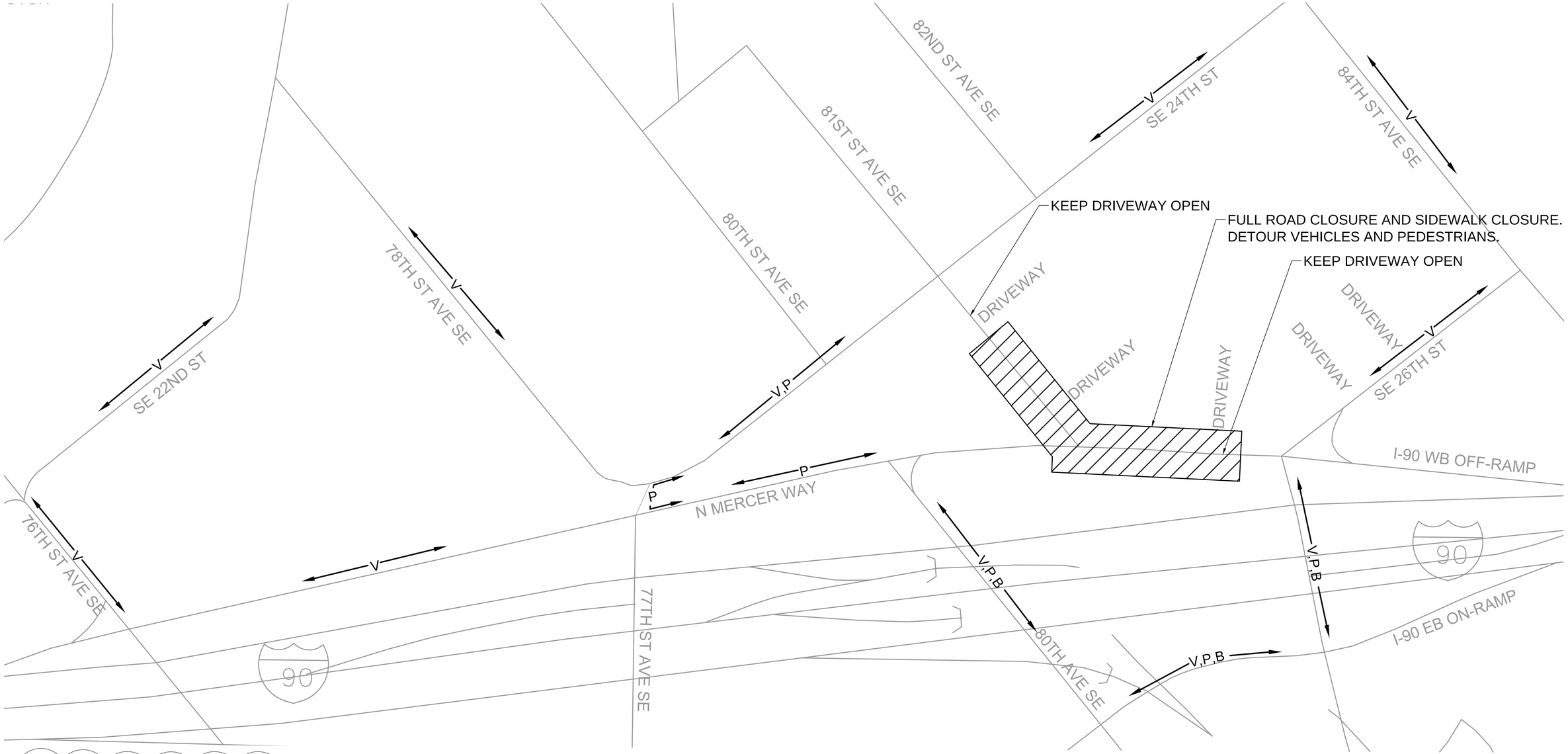
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 1 OF 11

DCN: **TBD**
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T100**
SHT NO / TOTAL: 264 / 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION:P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T100.dwg
PLOT DATE: 5/30/2018 5:54 PM
PLOTTED BY:de Steiguer, Nicholas



NOTES TO REVIEWER:

1. 60% TRAFFIC DETOUR PLANS ARE CONCEPTUAL AND INTENDED TO DEMONSTRATE THE PROPOSED VEHICLE, PEDESTRIAN, AND BICYCLE DETOURS. FOLLOWING REVIEW BY THE APPROPRIATE AGENCIES (CITY OF MERCER ISLAND, WSDOT, AND/OR CITY OF BELLEVUE) PLANS WILL BE REFINED AND SPECIFIC TRAFFIC CONTROL DETAILS WILL BE ADDED.

LEGEND:

DETOUR ROUTE VEHICLES	V
DETOUR ROUTE PEDESTRIANS	P
DETOUR ROUTE BICYCLES	B
WORK ZONE	

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron	SCALE: NTS
PROJECT ENGINEER: J. CHAE	REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE	FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ	CONTRACT NO: TBD

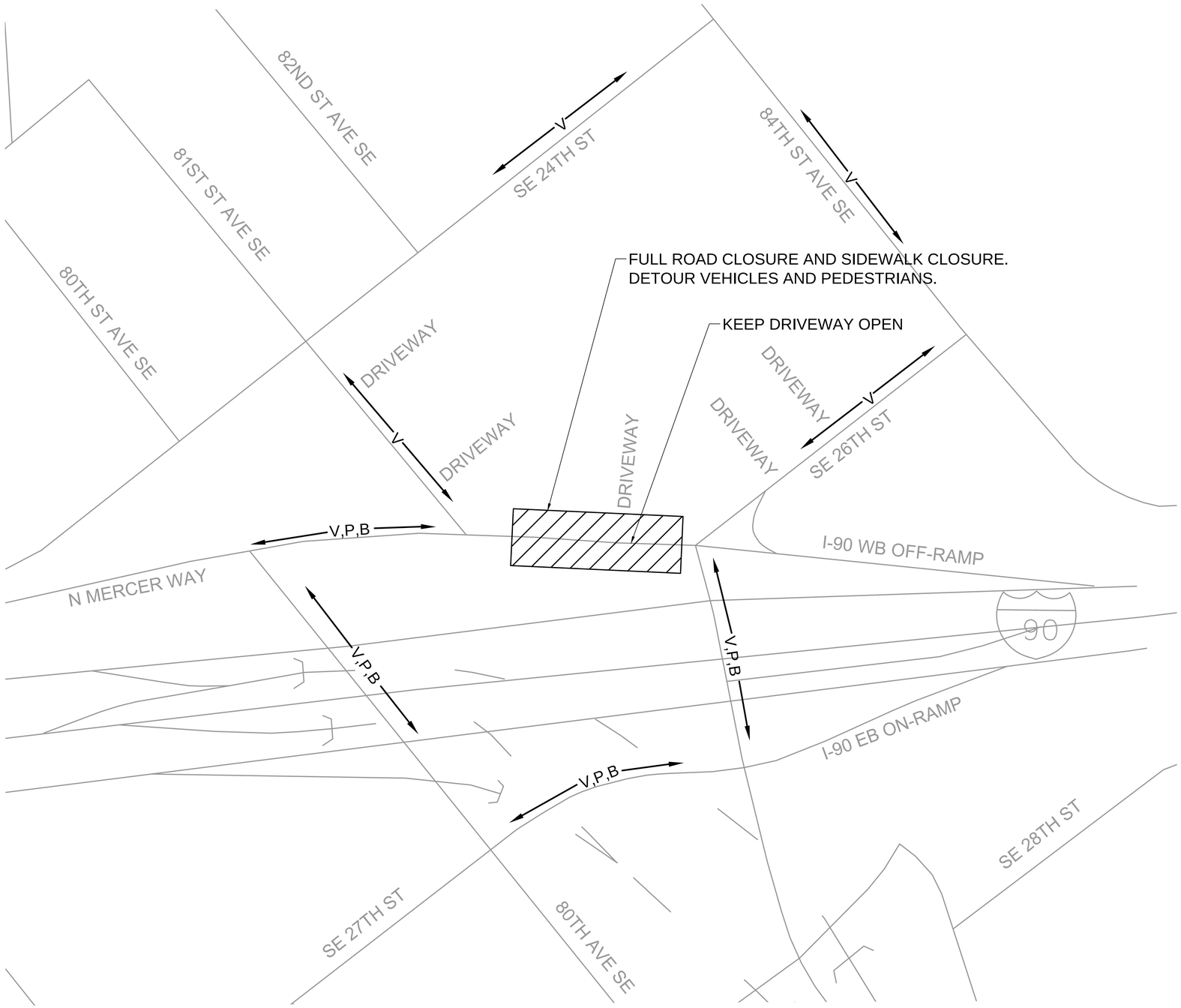
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 2 OF 11

DCN: **TBD**
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T101**
SHT NO 265 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T101.dwg
PLOT DATE: 5/30/2018 5:54 PM
PLOTTED BY: de Steiguer, Nicholas



NOTES TO REVIEWER:

1. 60% TRAFFIC DETOUR PLANS ARE CONCEPTUAL AND INTENDED TO DEMONSTRATE THE PROPOSED VEHICLE, PEDESTRIAN, AND BICYCLE DETOURS. FOLLOWING REVIEW BY THE APPROPRIATE AGENCIES (CITY OF MERCER ISLAND, WSDOT, AND/OR CITY OF BELLEVUE) PLANS WILL BE REFINED AND SPECIFIC TRAFFIC CONTROL DETAILS WILL BE ADDED.

LEGEND:

DETOUR ROUTE VEHICLES	← V →
DETOUR ROUTE PEDESTRIANS	← P →
DETOUR ROUTE BICYCLES	← B →
WORK ZONE	

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron	SCALE: NTS
PROJECT ENGINEER: J. CHAE	REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE	FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ	CONTRACT NO: TBD

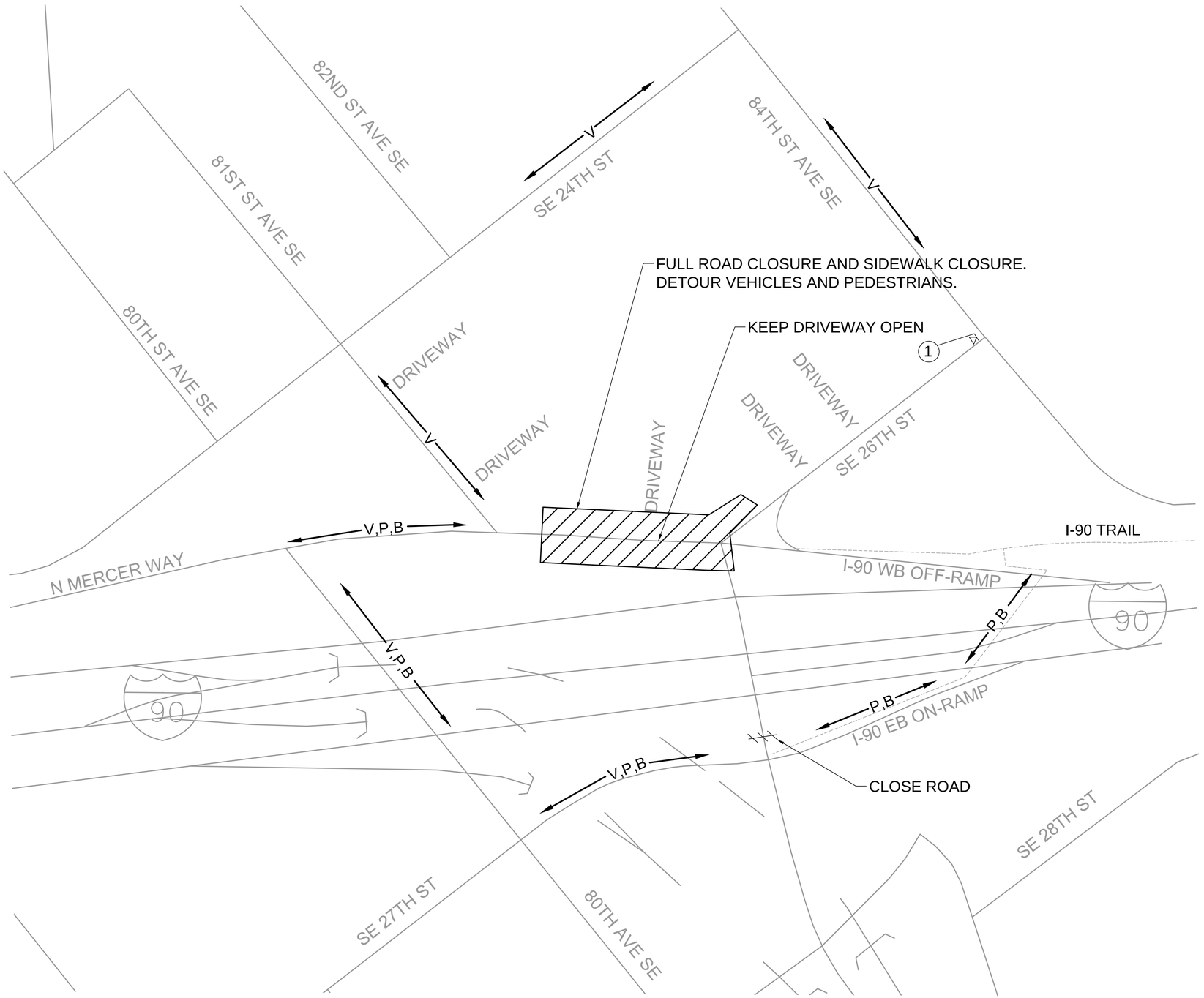
King County

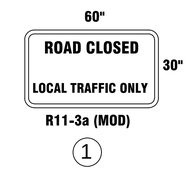
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 3 OF 11

DCN: **TBD**
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T102**
SHT NO 266 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION:P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T102.dwg
PLOT DATE: 5/30/2018 5:55 PM
PLOTTED BY: de Steiguer, Nicholas





NOTES TO REVIEWER:

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LEGEND:

DETOUR ROUTE VEHICLES	V
DETOUR ROUTE PEDESTRIANS	P
DETOUR ROUTE BICYCLES	B
WORK ZONE	
TEMPORARY SIGN LOCATION	

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron	SCALE: AS NOTED
PROJECT ENGINEER: J. CHAE	REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE	FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ	CONTRACT NO: TBD

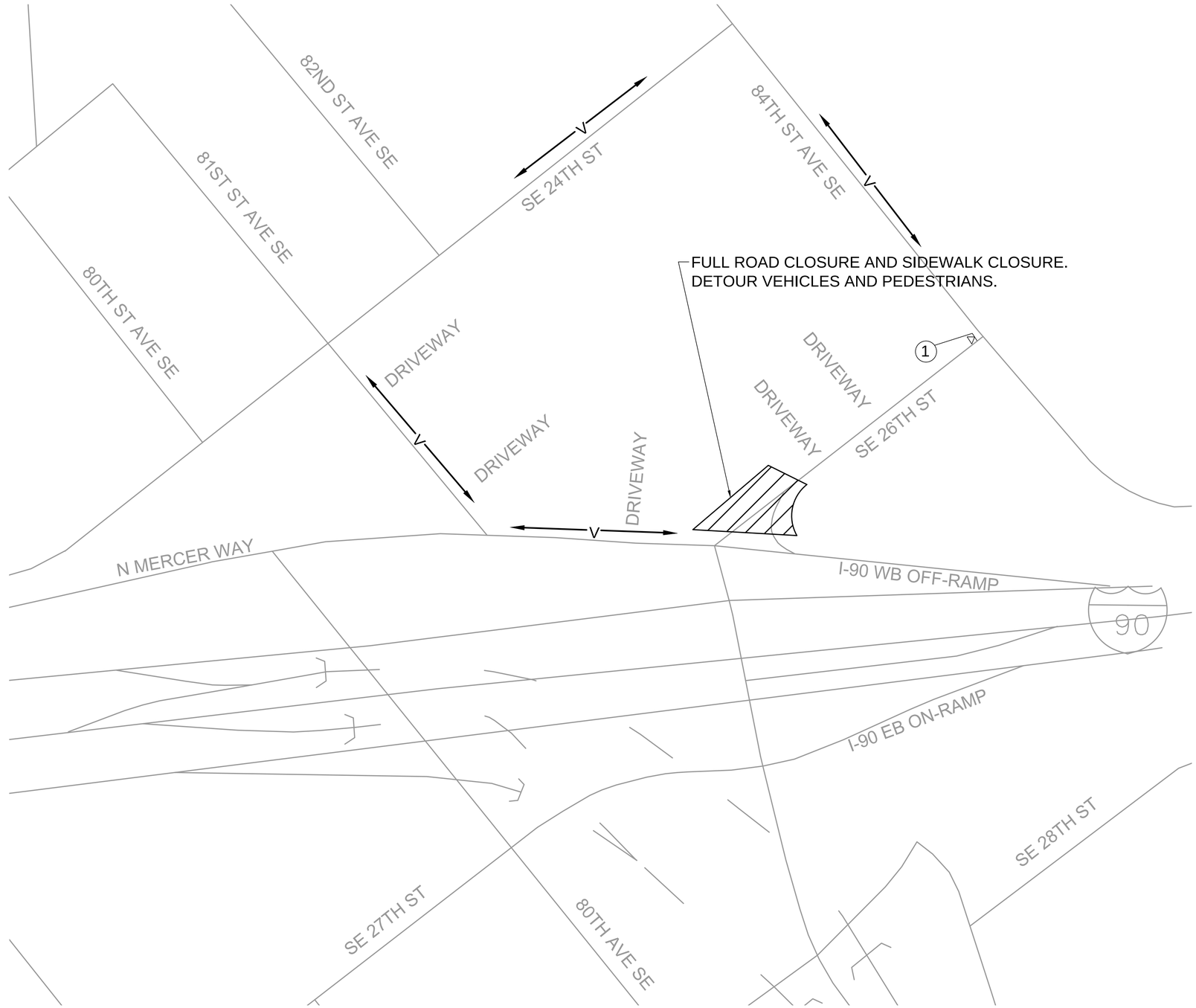
King County

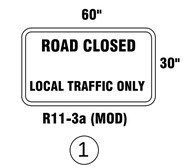
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 4 OF 11

DCN: **TBD**
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T103**
SHT NO 267 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T103.dwg
PLOT DATE: 5/30/2018 5:55 PM
PLOTTED BY: de Steiguer, Nicholas





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LEGEND:

DETOUR ROUTE VEHICLES	← V →
DETOUR ROUTE PEDESTRIANS	← P →
DETOUR ROUTE BICYCLES	← B →
WORK ZONE	
TEMPORARY SIGN LOCATION	

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron
PROJECT ENGINEER: J. CHAE
DESIGN APPROVAL: R. BROWNE
PROJECT ACCEPTANCE: S. YILDIZ
SCALE: NTS
REFERENCE 0 1"
FACILITY NUMBER: TBD
CONTRACT NO: TBD

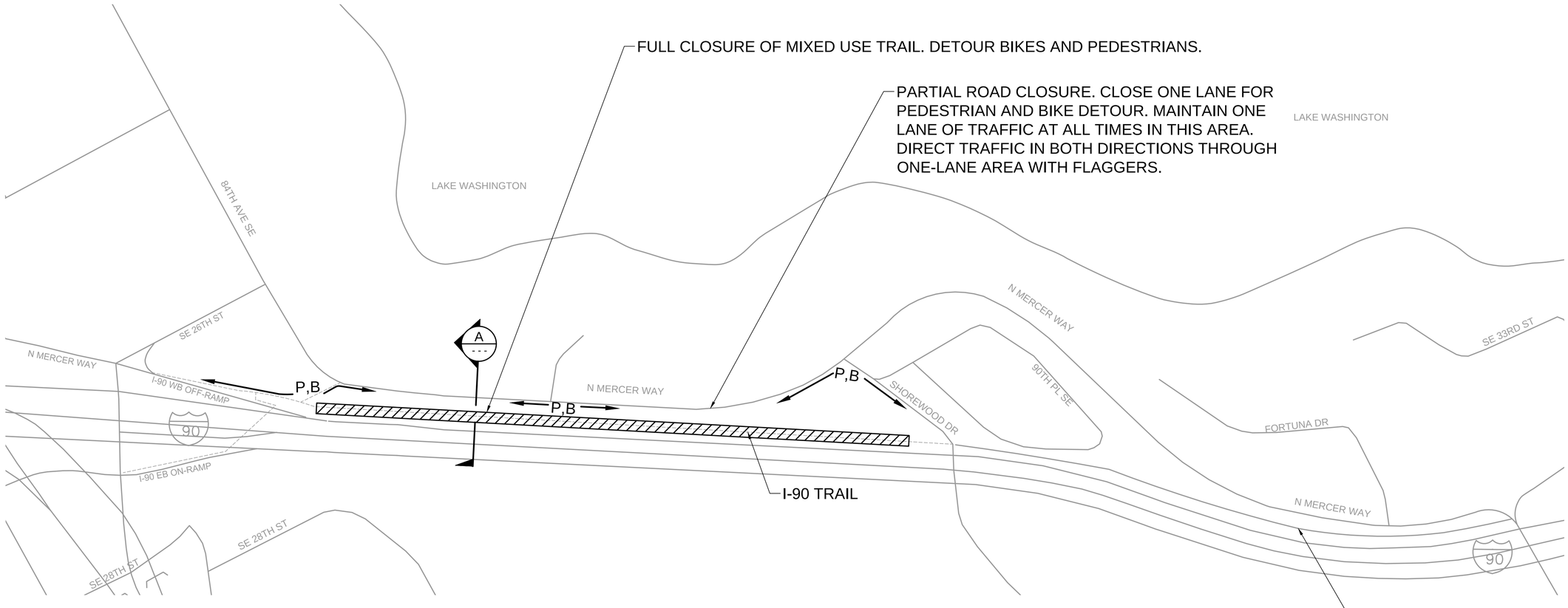
King County

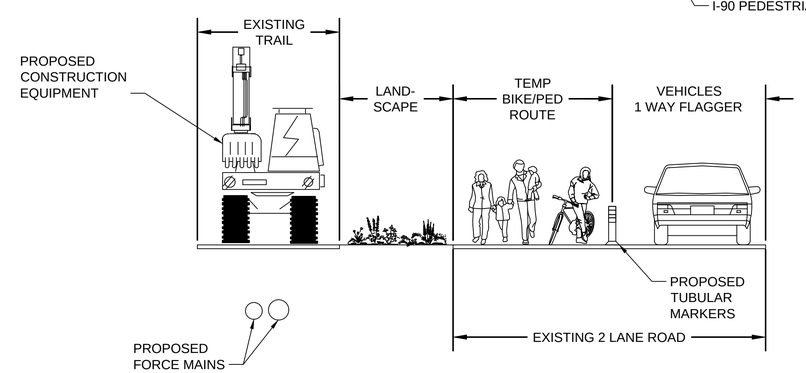
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 5 OF 11

DCN: TBD
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: T104
SHT NO / TOTAL: 268 / 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T104.dwg
PLOT DATE: 5/30/2018 5:56 PM
PLOTTED BY: de Steiguer, Nicholas





TYPICAL SECTION A
SCALE: NTS

LEGEND:

DETOUR ROUTE PEDESTRIANS ← P →

DETOUR ROUTE BICYCLES ← B →

WORK ZONE

NOTES TO REVIEWER:

1. 60% TRAFFIC DETOUR PLANS ARE CONCEPTUAL AND INTENDED TO DEMONSTRATE THE PROPOSED VEHICLE, PEDESTRIAN, AND BICYCLE DETOURS. FOLLOWING REVIEW BY THE APPROPRIATE AGENCIES (CITY OF MERCER ISLAND, WSDOT, AND/OR CITY OF BELLEVUE) PLANS WILL BE REFINED AND SPECIFIC TRAFFIC CONTROL DETAILS WILL BE ADDED.

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron
SCALE: AS NOTED
PROJECT ENGINEER: J. CHAE
REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE
FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ
CONTRACT NO: TBD

King County

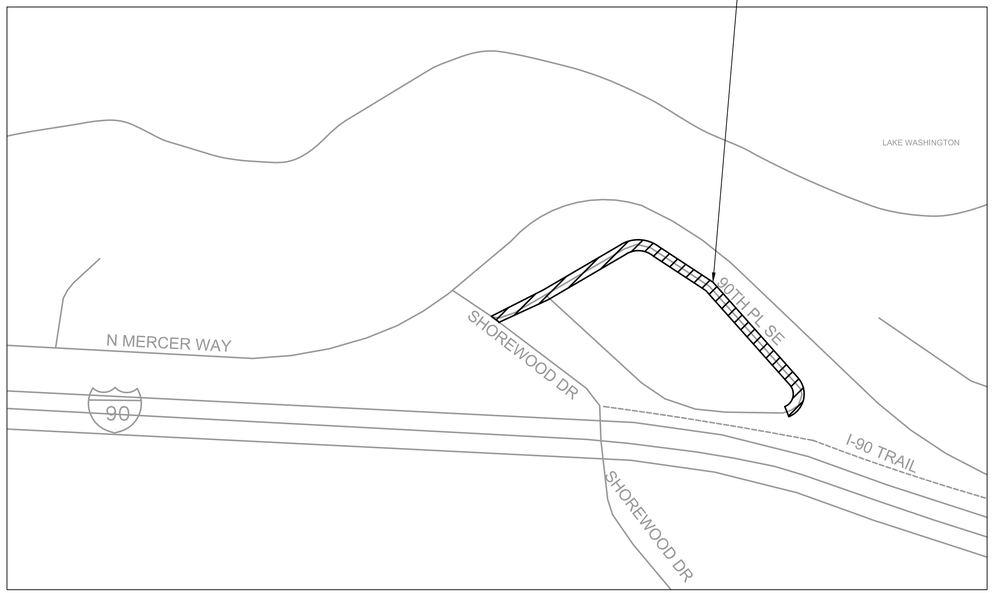
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 6 OF 11

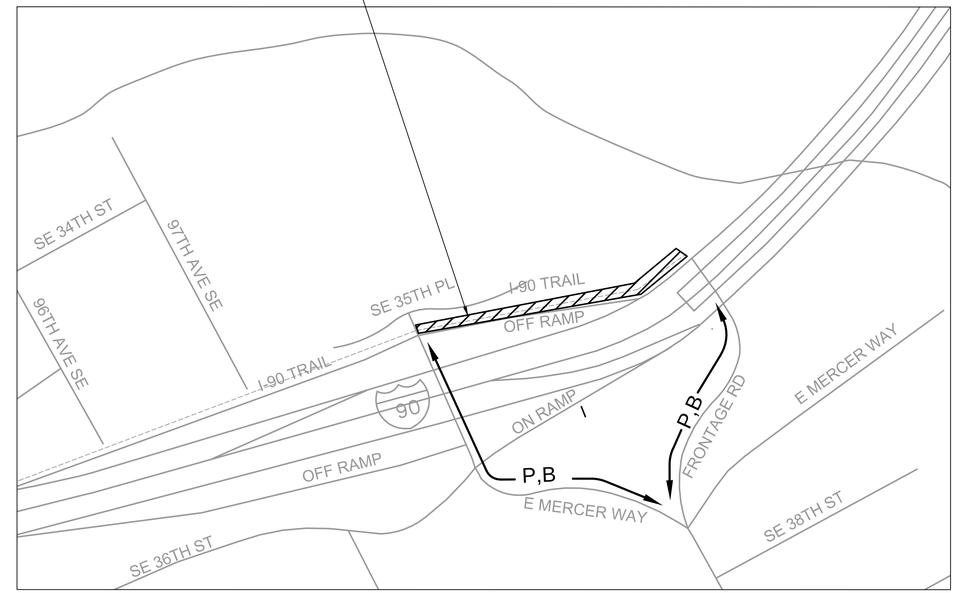
DCN: TBD
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: T105
SHT NO / TOTAL: 269 / 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T105.dwg
PLOT DATE: 5/30/2018 5:56 PM
PLOTTED BY: de Steiguer, Nicholas

PARTIAL ROAD CLOSURE. CLOSE ONE LANE FOR WORK ZONE AND MAINTAIN ONE LANE OF TRAFFIC AT ALL TIMES IN THIS AREA. DIRECT TRAFFIC IN BOTH DIRECTIONS THROUGH ONE-LANE AREA WITH FLAGGERS.



FULL CLOSURE OF MIXED USE TRAIL. DETOUR BIKES AND PEDESTRIANS.



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LEGEND:

DETOUR ROUTE PEDESTRIANS ← P →

DETOUR ROUTE BICYCLES ← B →

WORK ZONE

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH

JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron	SCALE: AS NOTED
PROJECT ENGINEER: J. CHAE	REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE	FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ	CONTRACT NO: TBD

King County

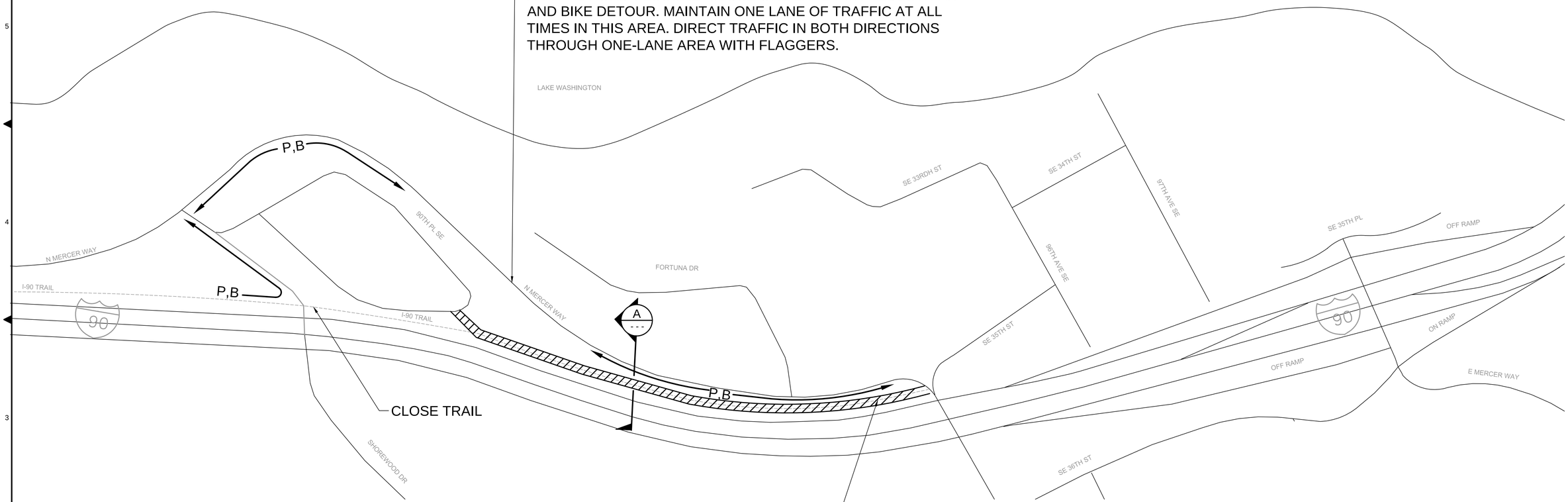
DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 7 OF 11

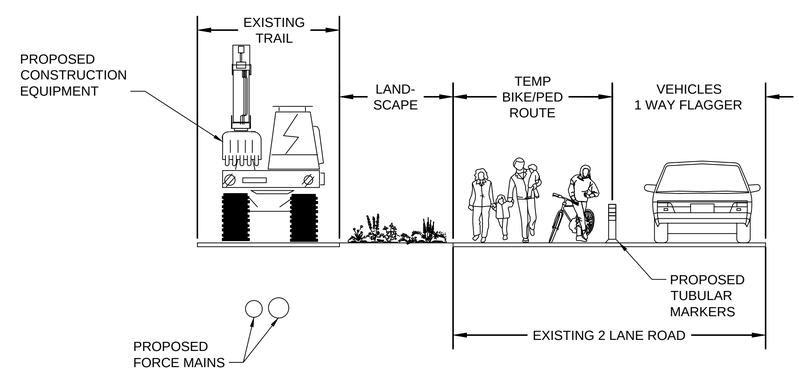
DCN: TBD
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: T106
SHT NO 270 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION:P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T106.dwg
PLOT DATE: 5/30/2018 5:57 PM
PLOTTED BY: de Steiguer, Nicholas

PARTIAL ROAD CLOSURE. CLOSE ONE LANE FOR PEDESTRIAN AND BIKE DETOUR. MAINTAIN ONE LANE OF TRAFFIC AT ALL TIMES IN THIS AREA. DIRECT TRAFFIC IN BOTH DIRECTIONS THROUGH ONE-LANE AREA WITH FLAGGERS.



FULL CLOSURE OF MIXED USE TRAIL.
DETOUR BIKES AND PEDESTRIANS.



TYPICAL SECTION A
SCALE: NTS

LEGEND:

DETOUR ROUTE PEDESTRIANS ← P →
DETOUR ROUTE BICYCLES ← B →
WORK ZONE

NOTES TO REVIEWER:

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NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron
SCALE: NTS
PROJECT ENGINEER: J. CHAE
REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE
FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ
CONTRACT NO: TBD

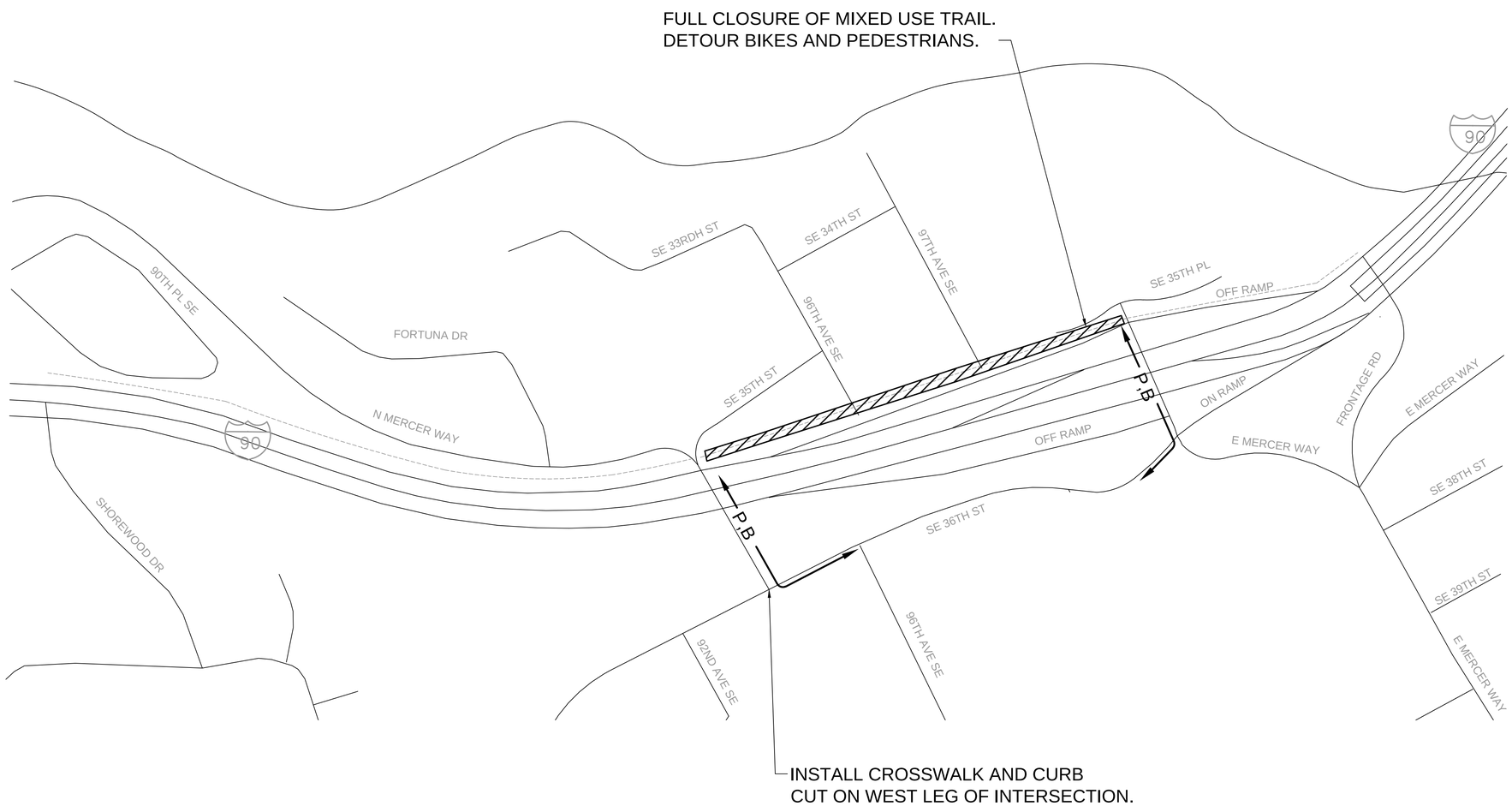
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN SHEET 8 OF 11

DCN: TBD
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: T107
SHT NO 271 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T107.dwg
PLOT DATE: 5/30/2018 5:57 PM
PLOTTED BY: de Steiguer, Nicholas



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LEGEND:

DETOUR ROUTE PEDESTRIANS ← P →

DETOUR ROUTE BICYCLES ← B →

WORK ZONE

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH

JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. Agron
PROJECT ENGINEER: J. CHAE
DESIGN APPROVAL: R. BROWNE
PROJECT ACCEPTANCE: S. YILDIZ
SCALE: NTS
0 REFERENCE 1"
FACILITY NUMBER: TBD
CONTRACT NO: TBD

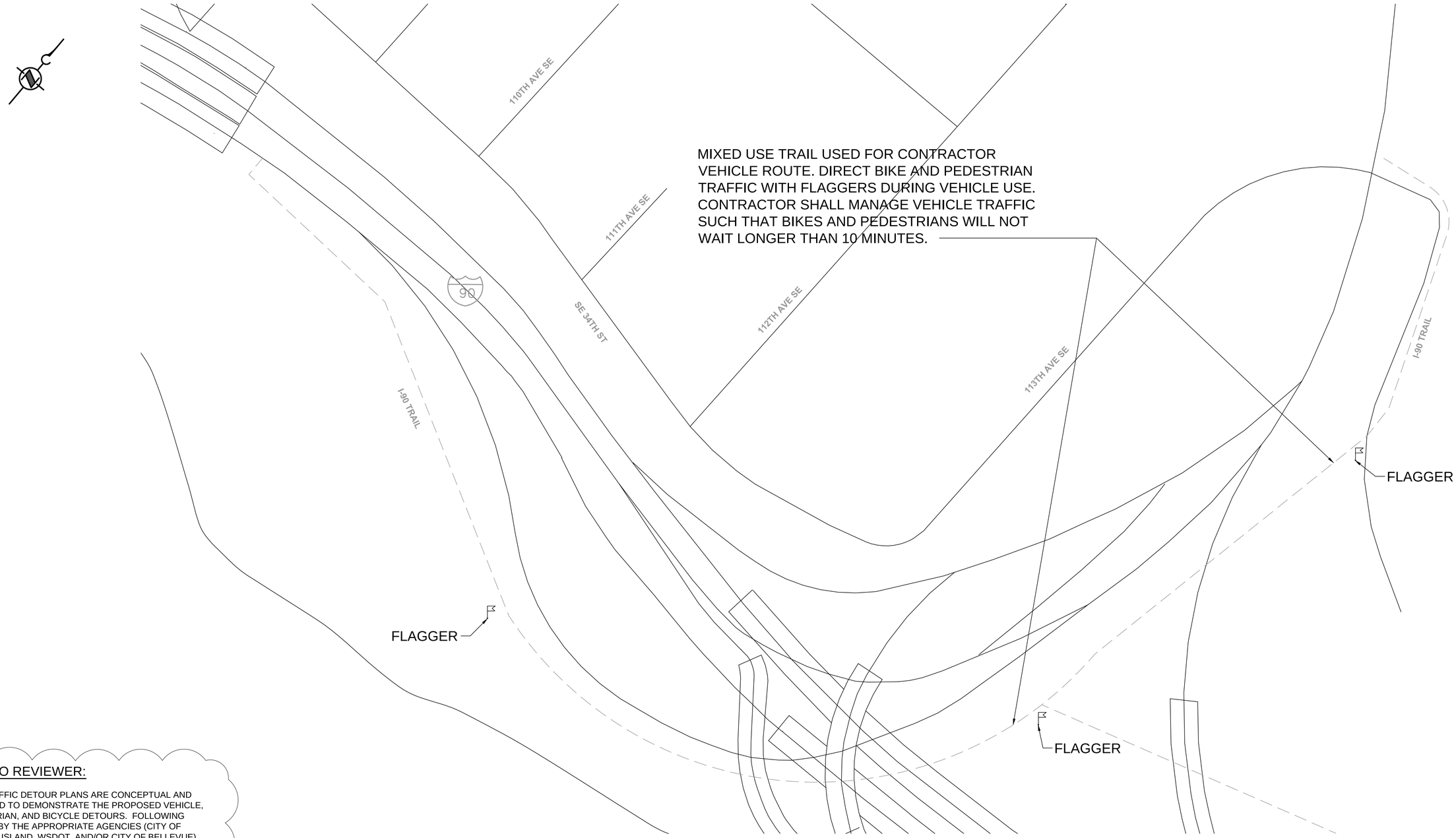
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN
SHEET 9 OF 11

DCN: TBD
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T108**
SHT NO 272 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION:P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T108.dwg
PLOT DATE: 5/30/2018 5:58 PM
PLOTTED BY: de Steiguer, Nicholas



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NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH
JACOBS

PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
60% REVIEW
JUNE 2018

DESIGNED/DRAWN: I. AGRON	SCALE: NTS
PROJECT ENGINEER: J. CHAE	REFERENCE 0 1"
DESIGN APPROVAL: R. BROWNE	FACILITY NUMBER: TBD
PROJECT ACCEPTANCE: S. YILDIZ	CONTRACT NO: TBD

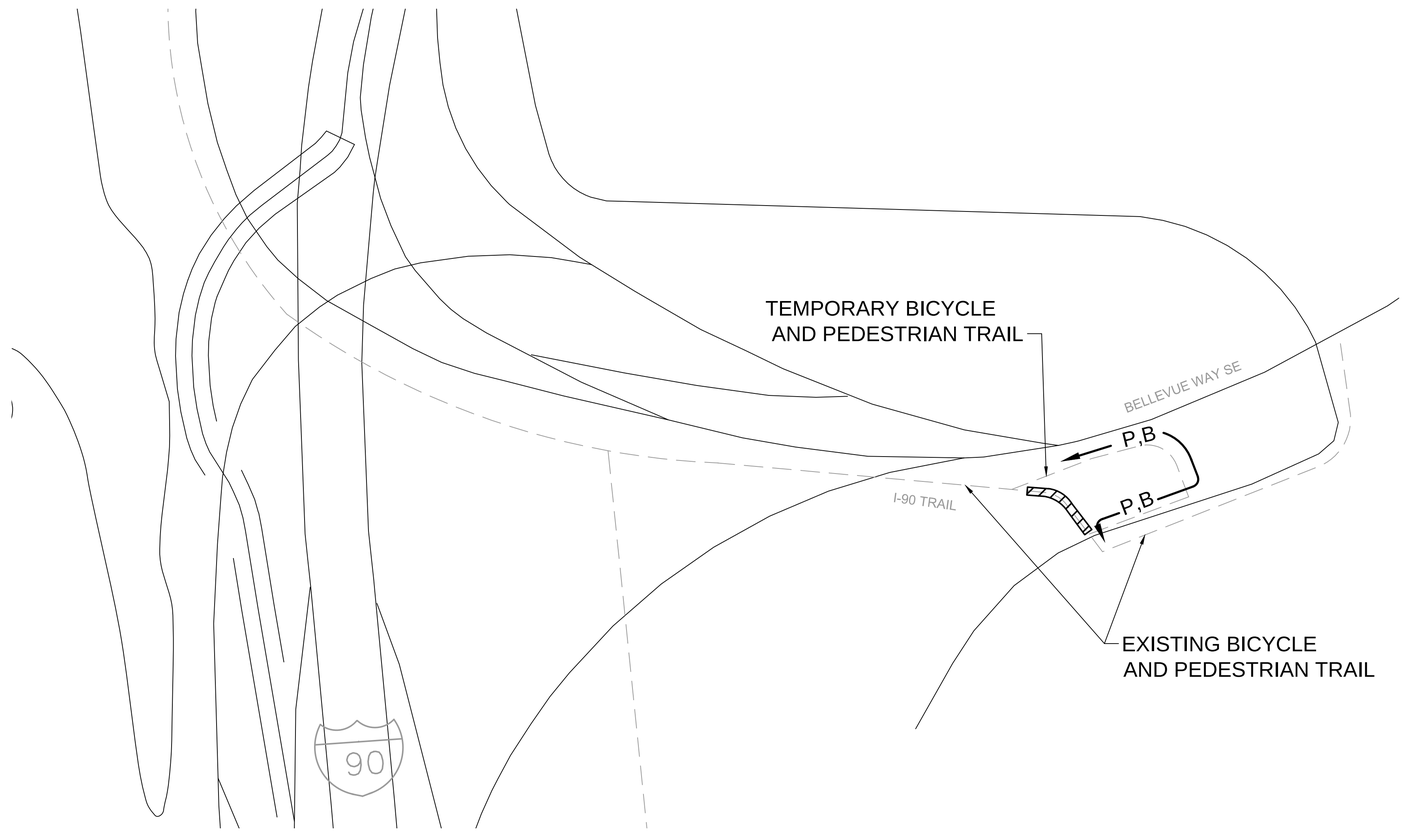
King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
NORTH MERCER ISLAND INTERCEPTOR AND
ENATAI INTERCEPTOR UPGRADE - CONVEYANCE

TRAFFIC DETOUR PLAN
SHEET 10 OF 11

DCN: **TBD**
DATE: JUNE 2018
PROJECT FILE NO: TBD
DRAWING NO: **T109**
SHT NO 273 / TOTAL 330
REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION: P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T109.dwg
PLOT DATE: 5/30/2018 5:58 PM
PLOTTED BY: de Steiguer, Nicholas



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LEGEND:

DETOUR ROUTE PEDESTRIANS ← P →

DETOUR ROUTE BICYCLES ← B →

WORK ZONE

NO	REVISION DESCRIPTION	BY	APVD	DATE

TETRA TECH

JACOBS

PRELIMINARY ISSUE DRAWING

INFORMATION ONLY

60% REVIEW

JUNE 2018

DESIGNED/DRAWN: I. AGRON

SCALE: NTS

PROJECT ENGINEER: J. CHAE

REFERENCE 0 1"

DESIGN APPROVAL: R. BROWNE

FACILITY NUMBER: TBD

PROJECT ACCEPTANCE: S. YILDIZ

CONTRACT NO: TBD

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION

NORTH MERCER ISLAND INTERCEPTOR AND
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TRAFFIC DETOUR PLAN
SHEET 11 OF 11

DCN: **TBD**

DATE: JUNE 2018

PROJECT FILE NO: TBD

DRAWING NO: **T110**

SHT NO 274 / TOTAL 330

REV NO:

BORDER FILE EDITION: KCWTD-2012-Dsize-TB-Border
FILE LOCATION:P:\W3X67200\700CADD\702CIVIL\E00306E13-PIPE-T110.dwg
PLOT DATE: 5/30/2018 5:58 PM
PLOTTED BY: de Steiguer, Nicholas