

WELCH-COMER

208-664-9382
208-664-5946 (fax)

330 E. Lakeside Avenue, Suite 101
Coeur d'Alene, ID 83814

SULLIVAN ROAD CORRIDOR ADVANCED STUDY ADDENDUM

Submitted to the
City of Spokane Valley

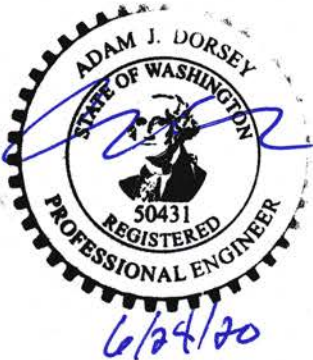
June 2020

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SULLIVAN ROAD CORRIDOR ADVANCED STUDY ADDENDUM

PROJECT NO. 51068

SUBMITTED TO THE:
CITY OF SPOKANE VALLEY



JUNE 2020

PREPARED BY:



330 E. Lakeside Avenue, Suite 101
Coeur d'Alene, ID 83814
208-664-9382 ♦ 208-664-5946 Fax
E-Mail: wc@welchcomer.com

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Executive Summary

Purpose

In October 2018, the City of Spokane Valley procured the services of Welch, Comer & Associates, Inc. to provide an addendum to the June 2015 Sullivan Road Corridor Study by HDR, which studied the Sullivan Road corridor from Indiana Avenue to Wellesley Avenue. The purpose of the study was to verify and revise, if necessary, the original plan, as well as determine the proportional share of future improvement costs caused by the completion of the Bigelow Gulch/Forker Road Improvement Project in Spokane County.

Technical Analysis

Using Synchro 10 and SimTraffic traffic analysis software, a computer-simulated operational model of the existing demand experienced on the Sullivan corridor was created to analyze its current performance. Video traffic counts were utilized along with the existing signal timing to calibrate the existing model to provide the most accurate results. Except for the Wellesley intersection, the existing Sullivan intersections operate at or above the minimum level of service (LOS) of D allowed per City of Spokane Valley standards. The corridor as a whole operates at LOS D.

Once the existing model was calibrated, 3 different future models were built:

- 2040 Sullivan No Build without Bigelow Gulch Project
- 2040 Sullivan No Build with Bigelow Gulch Project
- 2040 Sullivan Buildout with Bigelow Gulch Project

These models were built to help determine not only the performance of the corridor in the future, but also what the proportionate share of improvement costs would be caused by the Bigelow Gulch Project.

These future models were built using volumes projected with growth information provided by SRTC. In addition, Fehr and Peers provided additional insight and analysis from the background of their previous body of work with Spokane Valley.

Based on the analysis, the largest impact will be to the Sullivan and Trent interchanges. The westbound and eastbound ramp intersections operate at LOS D and E, respectively, if Bigelow Gulch is not constructed. However, both intersections degrade to LOS F with the additional traffic generated by the Bigelow Gulch project.

Findings and Recommendations

Multiple alternatives for the improvement of these two intersections were studied, including one signalized option and three roundabout options. The signalized intersection option consisted of a six-lane section, which included the addition of dedicated left turn lanes for the northbound and southbound movements. The “dog

bone” roundabout options consisted of a two-lane roundabout at each of the Trent intersections.

Each option was shown to meet the City’s criteria for level of service. However, after taking into consideration factors such as traffic operation, cost, and constructability, the Dog Bone Roundabout Option 3 was selected as the recommended alternative.

ES-1 Proposed Sullivan Corridor Improvements

Project Number	Project Name	Timeline	Description
1	Transit Stop Improvements	Short Term	Install shelters and benches.
2	Sullivan & Trent Improvements	Short Term	Expanding two bridges over Trent to accommodate a dog bone roundabout configuration.
3	Sidewalk Improvements	Long Term	Upgrade non-standard sidewalk from D Street to B Street
4	Sullivan & Marietta Improvements	Long Term	Build concrete intersection at Marietta
5	Sullivan Widening: Trent to Just North of Upland	Long Term	Widening Sullivan Road to 5 lanes between the Trent and just north of Upland.
6	Shared-Use Path: Euclid to Trent	Long Term	Build shared-use path from Euclid to Trent.
7	Shared-Use Path: Kemira to Sullivan Park & Ped Bridge	Long Term	Build shared-use path and pedestrian bridge over UP railroad.

Two methods for determining the proportionate cost share of the improvements resulting from the Bigelow Gulch project are discussed in the report. A table summarizing the cost share methods and costs can be found in Chapter 5.

The improvements listed in ES 1 will help the City of Spokane Valley maintain positive multimodal traffic operations on Sullivan Road through 2040, even with the addition of traffic volumes produced by the Bigelow Gulch project.

1 INTRODUCTION

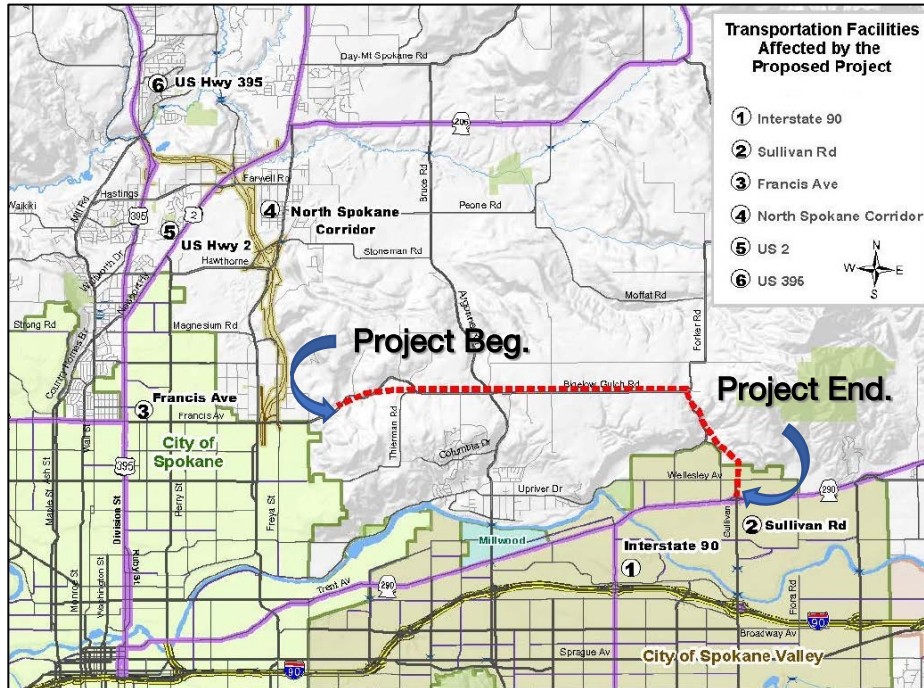
1.1 History

In June 2015, HDR finalized the Sullivan Road Corridor Study for the City of Spokane Valley. This document will serve as an addendum to that study and reflect changes to the corridor since the original publication. Since publishing the original study, multiple recommended projects have been completed along the corridor: the Sullivan Road West Bridge, Sullivan Road and Euclid Avenue Intersection Improvements. The Signal Coordination/ITS improvements and the Sullivan and Wellesley Signalized Intersection listed in the original study will be completed in 2020 and 2021, respectively. Additionally, the original study listed two options for the Sullivan Road & Trent Avenue intersection – a two-lane roundabout option and a two-signal diamond interchange option.

1.2 Purpose

The primary purpose of this addendum is to verify and revise, if necessary, the June 2015 Sullivan Road Corridor Study, as well as determining the proportional share of future improvement costs caused by the completion of the Bigelow Gulch/Forker Road improvement project in Spokane County (Figure 1-1).

Figure 1-1: Overview of Bigelow Gulch project, courtesy of Spokane County.



Synchro 10 and SimTraffic were used to model the operations and analyze the signals throughout the Sullivan Corridor. Models included coordinated signals and timing per the City timing plans to provide the most accurate Level of Service (LOS) possible for the current intersections. Sidra 7.0 software was

used to evaluate roundabout alternatives, per the WSDOT Sidra Policy Settings, dated October 2019.

2 EXISTING CONDITIONS

2.1 Traffic Data Collection

Welch Comer obtained 3-hour peak AM and 3-hour peak PM traffic counts for the 10 major intersections in the study area during October 2018. IDAX Data Solutions provided video traffic counts at the 10 intersections simultaneously. Data was collected in the morning and afternoon to determine the peak hour. The peak hour of 4:30 PM to 5:30 PM was chosen for the operations model as it produced the highest volume of traffic network wide. Completing the counts simultaneously and choosing one specific hour to model provides the most accurate picture of traffic volumes and limits discrepancies between intersections. Raw traffic count data is provided in Appendix A while summarized peak hour data can be found in Table 2-1.

Table 2-1: Raw Traffic Count Peak Hour Summary

Intersection	AM Peak Hour Volume (vph)		PM Peak Hour Volume (vph)	
	Volume	Time	Volume	Time
Sullivan & Wellesley	1440	7:00 – 8:00 AM	1515	5:00 – 6:00 PM
Sullivan & Upland	1140	7:00 – 8:00 AM	1370	4:45 – 5:45 PM
Sullivan & WB Trent	1585	7:00 – 8:00 AM	1840	4:30 – 5:30 PM
Sullivan & EB Trent	1815	7:00 – 8:00 AM	2215	4:45 – 5:45 PM
Sullivan & Kiernan/B St.	1840	7:15 – 8:15 AM	2195	4:30 – 5:30 PM
Sullivan & Euclid	1865	7:00 – 8:00 AM	2245	4:30 – 5:30 PM
Sullivan & Fairview	1690	7:00 – 8:00 AM	2090	4:30 – 5:30 PM
Sullivan & Marietta	2135	7:15 – 8:15 AM	2595	4:30 – 5:30 PM
Sullivan & Indiana	2875	7:15 – 8:15 AM	3900	4:30 – 5:30 PM

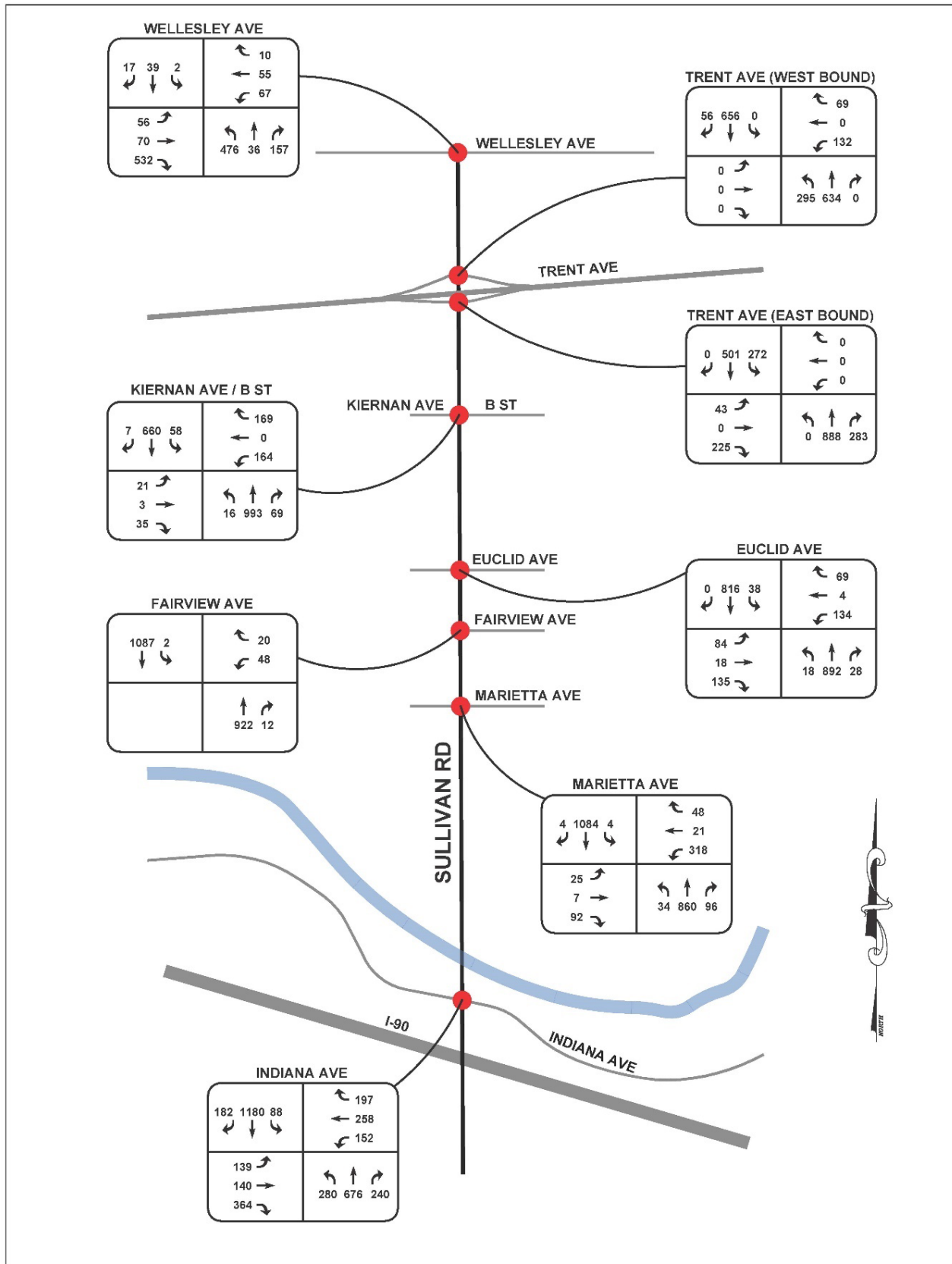
Existing Average Daily Traffic (ADT) volumes were estimated based on PM peak hour volumes and the proportions to daily traffic counts at selected locations along Sullivan Road. This study did not collect 24-hour counts, so volume ratios were taken from the previous study. Table 2-2 summarizes the ADT along Sullivan Road based on 2018 and 2019 counts provided by the City. Figure 2-1 shows the existing PM peak hour volumes at each intersection.

Table 2-2: Average Daily Traffic

Location	Average Daily Traffic (vpd)
Wellesley Ave. to Trent Ave. ¹	13200
Trent Ave. to Euclid Ave. ²	23000
Euclid Ave. to Indiana Ave. ¹	24700

1. Based on 2018 counts provided by the City.
2. Based on 2019 counts provided by the City.

Figure 2-1: Existing Intersection PM Peak Hour Volumes



2.2 Existing Traffic Operations Modelling

The intersections were analyzed using a level of service (LOS) analysis based on the methodologies laid out in the Highway Capacity Manual (HCM) 6th Edition. Table 2-3 and Table 2-4 show the LOS criteria for signalized and unsignalized intersections. Accurate traffic operational modelling was crucial to determining the current level of service. The traffic count videos provided clear evidence of the prevailing driver actions and traffic conditions. The existing signal timing provided by the City, the video counts, and the videos themselves were used to help validate the existing operational model created with the traffic analysis software, Synchro 10 and SimTraffic.

Table 2-3: LOS Criteria for Signalized Intersections

Level of Service	Control Delay Range (second)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80 or v/c > 1.0

1. Highway Capacity Manual 6th Edition, Transportation Research Board

Table 2-4: LOS Criteria for Unsignalized Intersections

Level of Service	Control Delay Range (second)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50 or v/c > 1.0

1. Highway Capacity Manual 6th Edition, Transportation Research Board

Currently, most of the intersections along Sullivan are operating at or above the minimum acceptable level of service (LOS D) based on the HCM 6th Edition methodology. However, the intersection of Sullivan & Wellesley is operating at LOS F (see Table 2-5). Detailed Synchro calculations for the existing AM and PM peak hours are included in Appendix B.

One of the most congested areas of the corridor is the Sullivan & Trent interchange (see Figure 2-2). The proximity of the two ramp intersections make the intersections difficult to time and increase delay and congestion. Both the northbound shared through/left turn at the westbound Trent intersection and the southbound shared through/left turn at the eastbound Trent intersection have "doghouse" signal heads and operate as permitted-protected left turns, allowing through traffic to use the shared left

lane as well. This configuration is not ideal. In fact, the HCM 6th Edition does not support a permitted/protected left-turn from a shared lane. Therefore, the level of service of these intersections are reported using HCM 2000 methodology.

Table 2-5: Existing Intersection Levels of Service

Intersection	Traffic Control Type	AM Peak Hour LOS (Delay, s)		PM Peak Hour LOS (Delay, s)	
		Current	2013 ³	Current	2013 ³
Sullivan & Wellesley	All-Way Stop	E (40)	E	F (57)	F
Sullivan & WB Trent	Signal	C (33) ¹	B	B (20) ¹	B
Sullivan & EB Trent	Signal	D (48) ¹	B	D (47) ¹	B
Sullivan & Kiernan/B St.	Signal	B (11)	B	B (12)	B
Sullivan & Euclid	Signal	B (20)	C	C (22)	D
Sullivan & Marietta	Signal	B (13)	B	C (20)	C
Sullivan & Indiana	Signal	C (29)	B	D (37)	D
Sullivan – Wellesley to Indiana	Corridor LOS	C (26)		C (30)	

1. HCM 6th Edition does not support a permitted/protected left-turn type from a shared lane. LOS reported using HCM 2000 methodology.
2. Reported as the LOS of the minor leg using HCM 6th Edition methodology.
3. LOS provided in the original Sullivan Road Corridor Study

Figure 2-2: Sullivan Road and Trent Avenue Diamond Interchange Overview

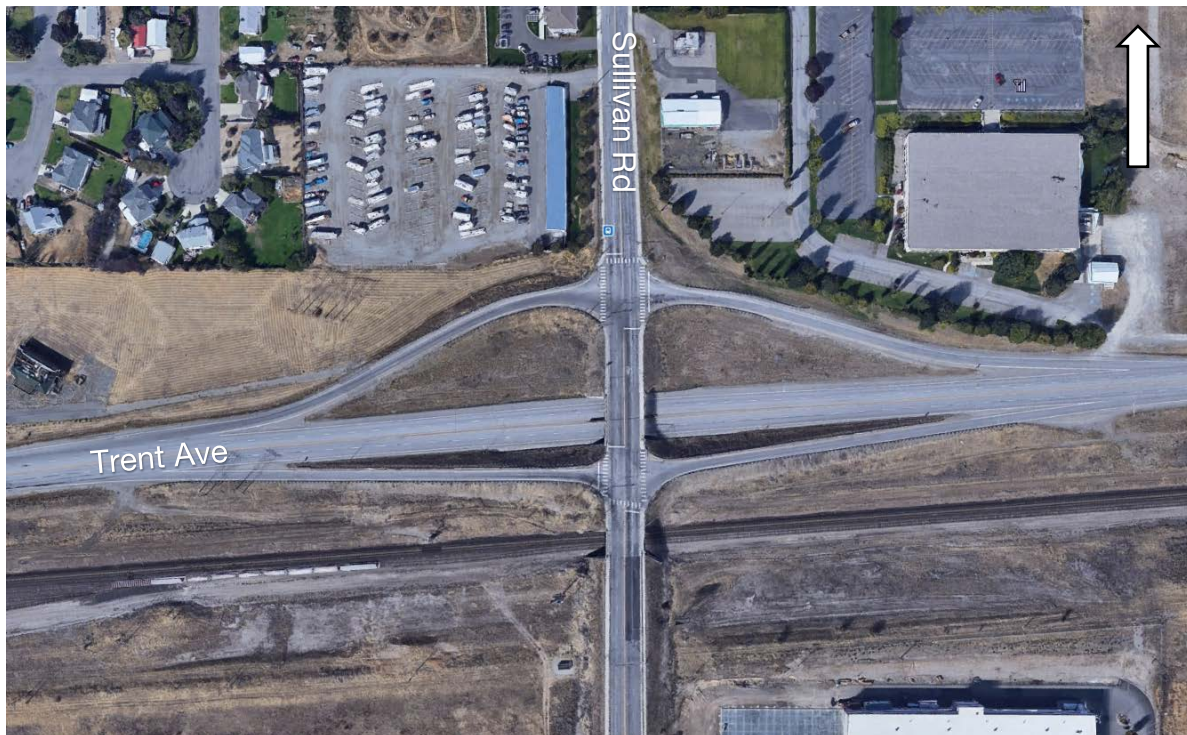


Image from Google Earth

Additionally, these two ramp intersections require additional calibration to produce accurate results in the operational model. Adjustments to several factors were modified in Synchro to increase the queue length being reported to distances that better represented what was seen in the field. First, the Lane Utilization Factor in the northbound and southbound through movements at both ramp intersections were lowered to account for the reduced lane utilization created by the shared left-through lanes. Then, the Left Turn Factor was reduced in the northbound left and southbound left at the northern and southern Trent intersections, respectively. Lastly, the Right Turn Factor was also adjusted for the northbound right turn at the southern Trent intersection.

The corridor LOS was determined using the method described in the City of Spokane Valley Street Standards Section 3.4.3.c. The method involves calculating the volume-weighted average intersection LOS and using the same control delay thresholds shown in Table 2-3. Table 2-5 summarizes the existing corridor LOS.

Table 2-6: Crash Data Summary by Year

Year	Number of Crashes	Percentage
2007	25	19%
2008	35	27%
2009	27	21%
2010	17	13%
2011	26	20%
Total ¹	130	100%
2013	24	17%
2014	20	14%
2015	23	16%
2016	30	21%
2017	45	32%
Total	142	100%
1. Data show from original Sullivan Corridor study for comparison. 2. Data courtesy of City of Spokane Valley.		

2.3 Crash Data Review

In addition to traffic operations, crash data is a major indicator for areas of the corridor which may need improvement. Crash data was provided by City of Spokane Valley between 2013 and 2017. Table 2-6 shows that there 142 total crashes between 2013 and 2017. Data between 2007 – 2011 from the original Sullivan corridor study is provided for comparison.

Table 2-7 shows that of the 142 total crashes, 99 were property damage only. There were no fatalities and only one major injury. There were 41 minor injuries, which includes crashes that had both the Minor injury and

Possible Injury designations. 2017 comprises 32% of the crashes of the 5 years of data reported. Reviewing the data from 2017, it was unclear what caused this increase. That said, the majority of the increase was seen at Indiana, Trent and Wellesley, which account for over 70% of the crashes that year. Each of those three intersections experienced approximately 40% of their crashes of the 5 years reported in 2017.

As volumes increase throughout the Sullivan corridor, crashes are likely to increase as well. The improvement projects found in Chapter 5 may help to reduce the crash rate.

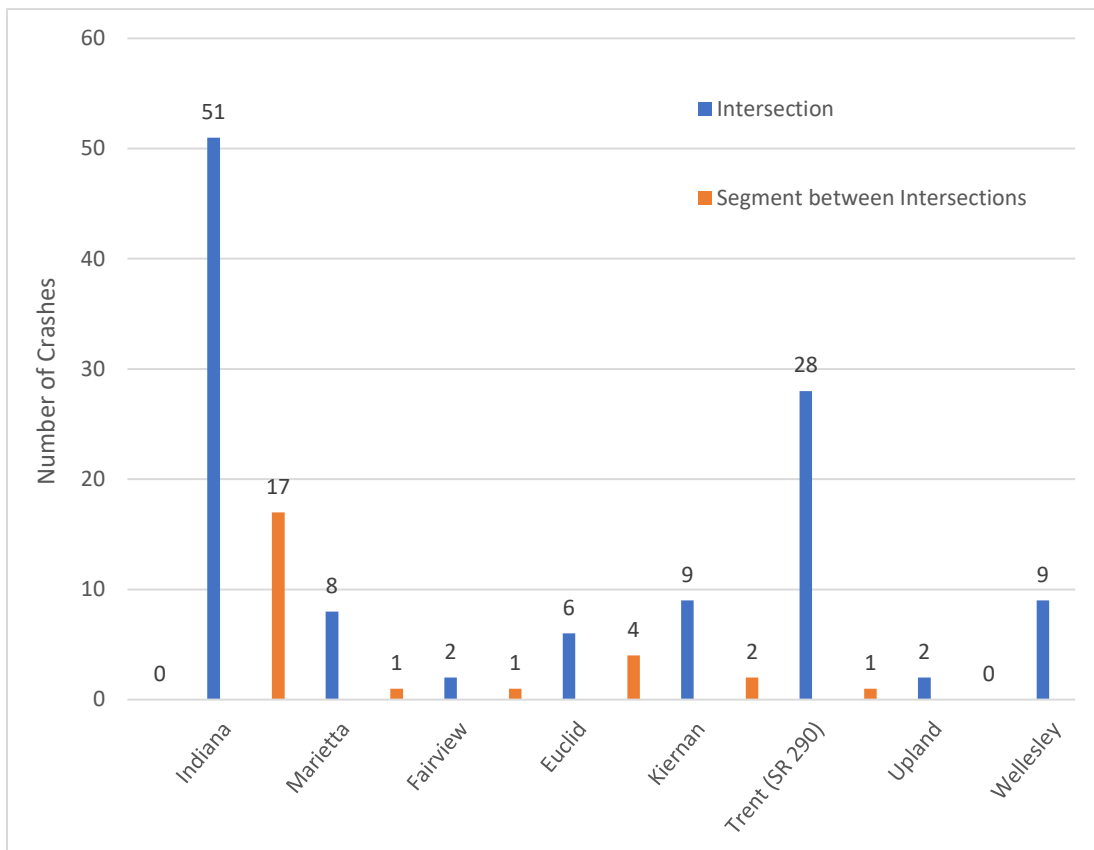
Table 2-7: Crash Data Summary by Severity – 2013-2017

Severity	Number of Crashes	Study Area Percentage
Fatality	0	0%
Major Injury	1	1%
Minor Injury ¹	41	29%
Property Damage Only	99	70%
Other	1	1%
Total	142	100%

1. Includes Suspected Minor and Possible Injuries
2. Data courtesy of City of Spokane Valley, rounding errors present

Figure 2-3 illustrates the spatial distribution of the Sullivan Road crash history. The highest number of crashes takes place at Indiana Avenue with 51 crashes over the 5 years data was gathered. The next highest was Trent Avenue, which includes both the eastbound and westbound intersections, over the same 5 years. Raw crash data is provided in Appendix C.

Figure 2-3: Crash Spatial Distribution along Sullivan Road - 2013-2017



1. Data courtesy of City of Spokane Valley.

Crash rates were calculated for the Sullivan Road corridor in order to compare the current crash rates to the original corridor study. The crash rate for the Sullivan Road corridor was calculated in crashes per million vehicle-miles traveled (VMT). The crash rate for individual intersections were calculated in crashes per million entering vehicles (MEV). Table 2-8 shows the Sullivan Road crash rate has gone up 1.90 crashes per million VMT, compared to 1.69 crashes per million VMT from the original study. Additionally, Table 2-9 shows that the highest crash rate was produced by Sullivan/Indiana at 0.59 between 2013 and 2017.

Table 2-8: Sullivan Road Corridor and Intersection Crash Rates

Intersection	Crashes per Million VMT		Total Number of Crashes	
	2007-2011	2013-2017	2007-2011	2013-2017
Sullivan: Indiana to Wellesley	1.69	1.90	130	142

Table 2-9: Sullivan Road Corridor and Intersection Crash Rates 2013-2017

Intersection	Crashes per MEV	Total Number of Crashes
Sullivan & Indiana	0.59	51
Sullivan & Marietta	0.14	8
Sullivan & Fairview	0.04	2
Sullivan & Euclid	0.13	6
Sullivan & Kiernan	0.19	9
Sullivan & EB Trent	0.32	15
Sullivan & WB Trent	0.33	13
Sullivan & Upland	0.08	2
Sullivan & Wellesley	0.33	9
Crashes per MEV - Average	0.24	

1. Data courtesy of City of Spokane Valley.

The total crashes and crash rate from the original study are provided for comparison. The crashes per MEV from the original were not provided as it was found those rates may contain errors.

Table 2-10: Crash Data Summary by Crash Type

Crash Type	2007-2011		2013-2017	
	Number of Crashes	Percentage	Number of Crashes	Percentage
Rear-End	50	38%	47	33%
Angle	23	18%	29	20%
Left Turn	17	13%	28	20%
Sideswipe	16	12%	19	13%
Fixed Object	8	6%	7	5%
Other	8	6%	4	3%
Right Turn	4	3%	6	4%
Bicycle/Pedestrian	4	3%	2	1%
Total	130	100%	142	100%

1. Data courtesy of City of Spokane Valley, rounding errors present

Table 2-10 summarizes the crash data by crash type. Rear-end crashes had the highest number of crashes at 47 between 2013 and 2017. Angle crashes were the next highest with 29 crashes.

2.4 Original Improvement Plan

The original study offered a list of improvements covering short term and long-term projects. Table 2-11 summarizes the original plan and notes which projects are complete and which have yet to be completed. An updated Improvement Plan is provided in Chapter 5.

Table 2-11: Original Improvement Plan

Alternative	Status
Short Term (0-6 Year)	
1. Sullivan West Bridge	Completed
2. Sullivan and Euclid Intersection Improvements	Completed
3. Signal Coordination and ITS	Completed
4. Sullivan and Wellesley	Planned 2021
5. Shared-Use Path: Marietta to Euclid	Not Completed
6. Sidewalk Improvements	Partially Complete
7. Bridging the Valley – Sullivan/BNSF Grade Separation Improvements	Removed
Long Term (>6 Years)	
1. Sullivan & Marietta Intersection Improvements	Planned
2. Sidewalk Improvements (carryover from short term)	Planned
3. Transit Stop Improvements	Planned
4. Implement Access Management Strategies between Wellesley Avenue and SR290	Planned
5. Continuous Roadway Lighting: Wellesley to SR 290	Planned as Part of #4
6. Park-and-Ride Facility near SR 290	Removed
7. Shared-use Path: SR 290 to Sullivan Road Bridge	Planned

The Bridging the Valley project involved the BNSF adding new tracks to their corridor. At the time of the original report, this required the existing Sullivan bridge over the tracks to be reconstructed, as well as the Trent interchange. Since then, the City's understanding is that BNSF has found a way to meet their goals without reconstructing the bridge. Therefore, this project has been removed from the updated Improvement Plan and the Sullivan & Trent Improvements have been added.

Additionally, the City has confirmed with the Spokane Transit Authority that the proposed park-and-ride is unnecessary. This project has also been removed from the updated Improvement Plan.

3 FUTURE CONDITIONS

3.1 Traffic Projections

In order to project future conditions, Spokane Regional Transportation Council (SRTC) provided 2018 and 2040 travel demand model (TDM) traffic volumes for the study area. The SRTC TDM contains inventories of transportation facilities and land uses in the area, which can be used to estimate existing and future traffic volumes. The SRTC model volumes were utilized to determine growth rates from 2018 to 2040 traffic volumes with and without the Spokane County Bigelow Gulch project (four SRTC model scenarios were provided in total).

Welch Comer completed operational analyses based upon current traffic counts and utilized SRTC modelling data to project the traffic counts to the 2040 design year using a combination of methods from the NCHRP 765, including the Difference and Ratio Methods.

Fehr and Peers provided additional insight into the traffic projection analysis. They reviewed the projected future volumes calculated by Welch Comer and provided feedback based on the background of their previous body of work in Spokane Valley. Additionally, they provided comments on growth of the surrounding area. Fehr and Peers applied the trip rates for Light Industrial (code 110) from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition to the new growth expected on either side of Sullivan Road between Indiana Avenue and Trent Avenue, Traffic Analysis Zone (TAZ) 316 to the west and TAZ 317 to the east (see Figure 3-1 for map of the TAZs).

Figure 3-1: Traffic Analysis Zones.

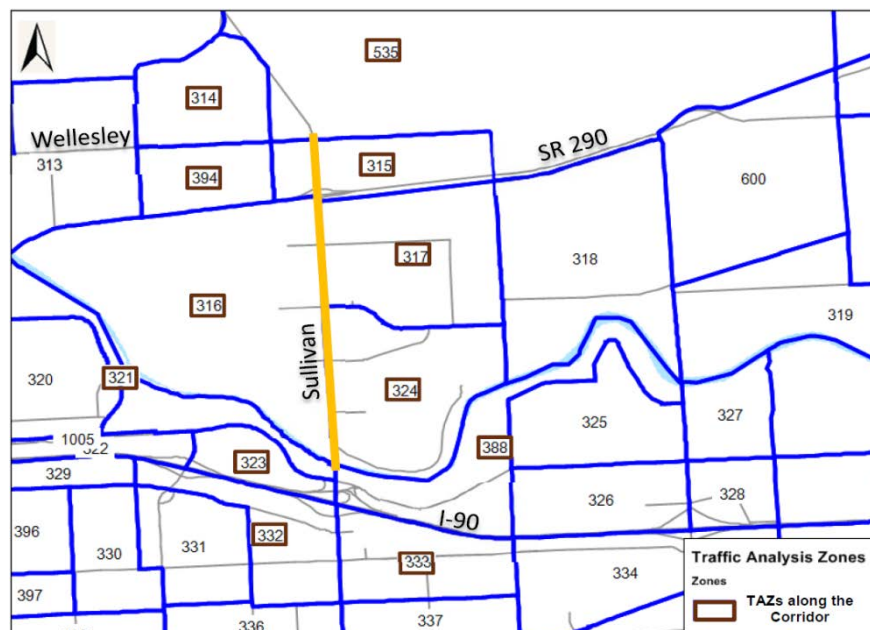
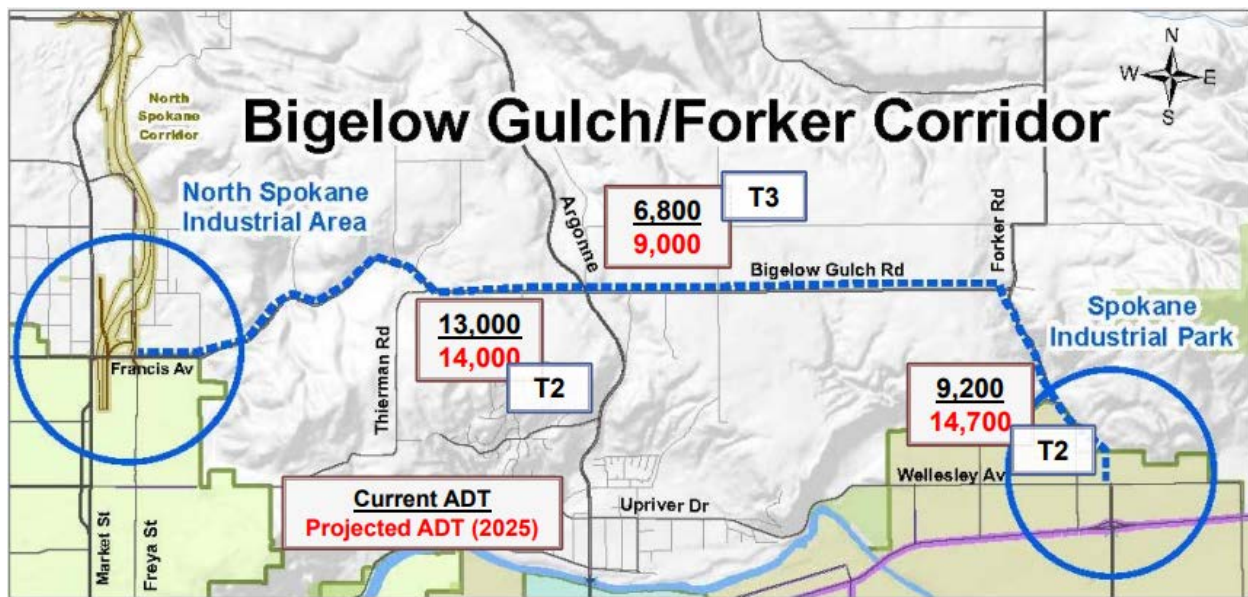


Figure from Original Sullivan Road Corridor Study

Their model forecasts about 1,031 new employees to be added between 2015 and 2040 in these two TAZs. 50% of new trips from TAZ 316 (west of Sullivan) were assumed to load onto Sullivan, with the other 50% loading onto Evergreen or directly to Trent. 100% of new trips from TAZ 317 (east of Sullivan) were loaded onto Sullivan. Based on these assumptions and using the ITE trip rates, about 400 new trips would turn onto, off of, or cross Sullivan during the PM peak hour from these TAZs, with about 300 generated from new land development east of Sullivan and 100 from new land development west of Sullivan.

The land use reanalysis from TAZ 316 led to trips distributed evenly onto Kiernan, Euclid, and Marietta intersections due to the location of available land for development being relatively evenly spaced between the three intersections. Trips from TAZ 317 were distributed between the intersections at the same proportions as existing traffic counts. The 2040 traffic demand model forecasts about a 50/50 split of trips from this area going to or coming from the north toward Bigelow Gulch versus the south toward the freeway, whereas today close to 70% of trips go to or come from the south. Given the model accounts for regional growth patterns and network improvements, such as Bigelow Gulch, a balanced approach between the two patterns was struck by distributing 60% of new trips south and 40% north. Figure 3-2 shows current and projected ADT's for informational purposes.

Figure 3-2: Bigelow Gulch Current & Projected Traffic Volumes.



From 2017 Spokane County Open House

3.2 Traffic Balancing

There can be inconsistencies between the traffic model and traffic counts. In order to reconcile these inconsistencies, the data must be adjusted, or “balanced”. After extrapolating and adjusting the traffic counts to determine future volume projections,

those projections needed to be balanced. To do so, turning movements were adjusted to balance mainline flows between adjacent intersections.

Once the flows were balanced, the design team took a movement-by-movement approach to iterative balancing and compared the “with” and “without” Bigelow Gulch instances together. Figure 3-3 and Figure 3-4 show the balanced volumes for 2040 without the Bigelow Gulch project and with the Bigelow Gulch project, respectively.

Figure 3-3: 2040 Intersection PM Peak Hour Volumes without Bigelow Gulch

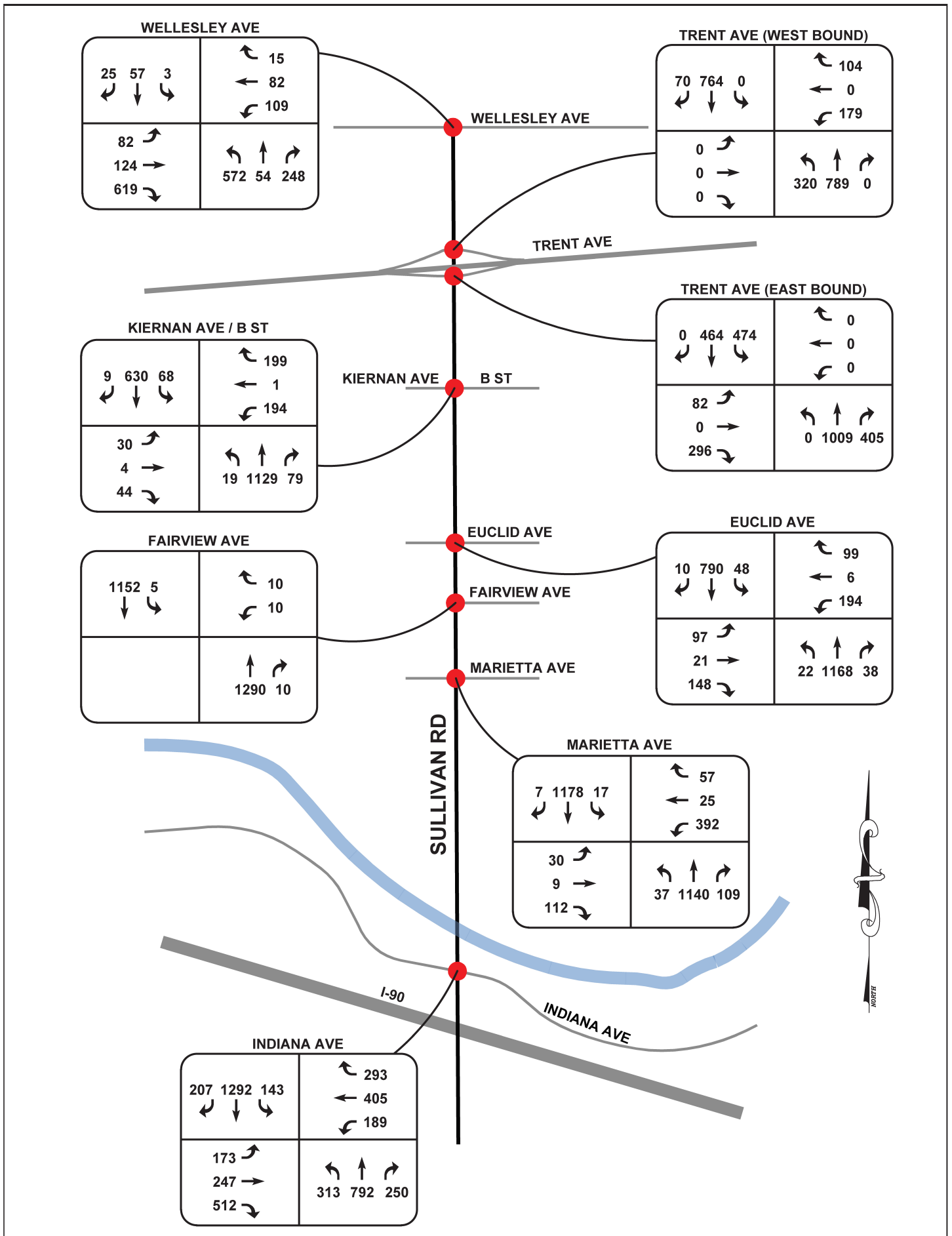
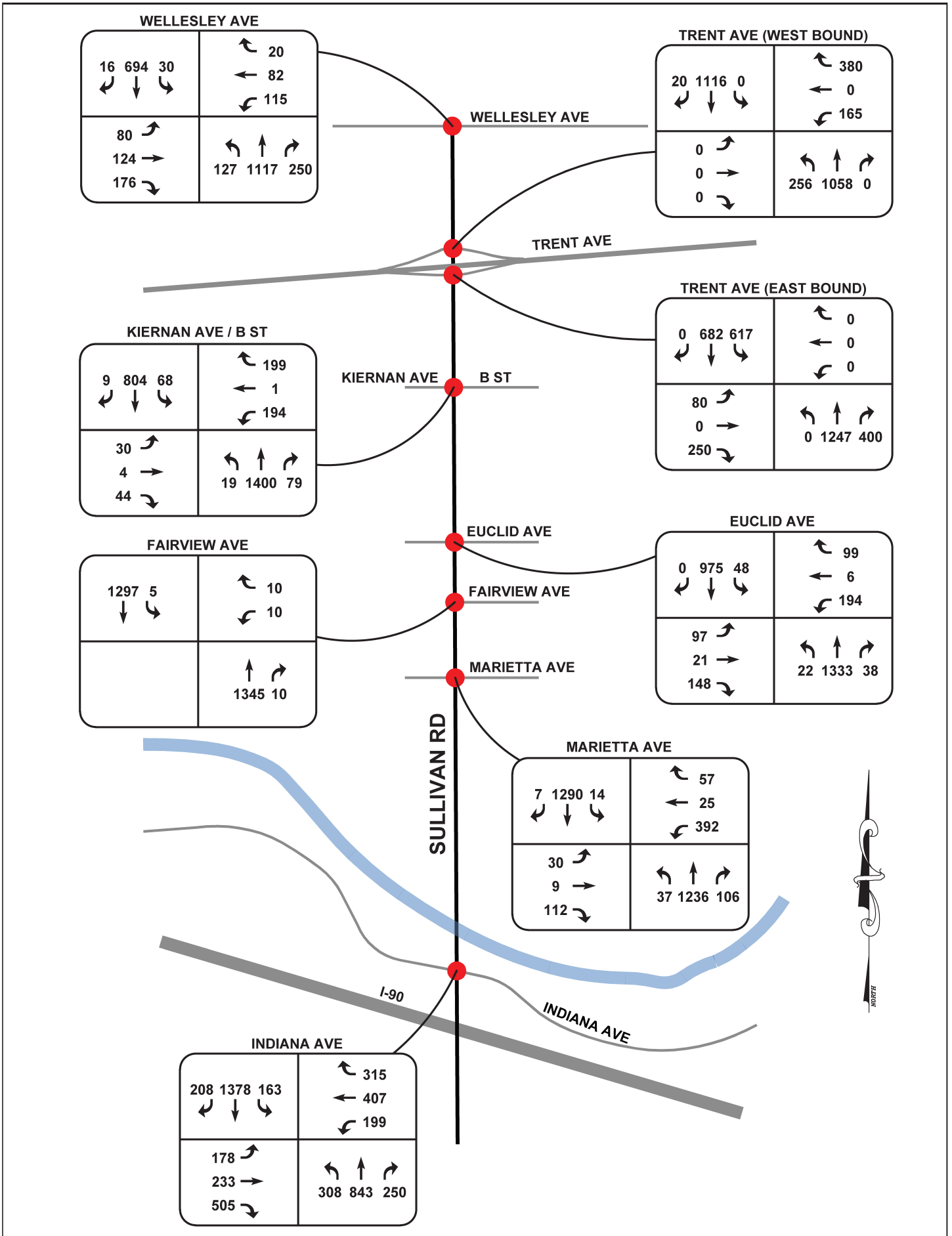


Figure 3-4: 2040 Intersection PM Peak Hour Volumes with Bigelow Gulch



3.3 Bigelow Gulch Project

The County project (Figure 3-5) is described as follows, per the County website:

Spokane County proposes to widen and improve part of Bigelow Gulch Road to make it safer, accommodate more traffic, and allow freight to move through the area more easily.

The proposed action is the expansion of the existing Bigelow Gulch Road in Spokane County, Washington. The corridor improvement focuses on the Bigelow Gulch Road right-of-way (ROW) and is referred to as the "Urban Connector Alignment".

The Urban Connector Alignment project would straighten and widen both the existing Bigelow Gulch Road and Forker Road to meet the objectives of improved safety, reduced congestion, and support of state and regional freight mobility initiatives.

Figure 3-5: Bigelow Gulch Project Overview



From Spokane County

It is anticipated the county project will significantly increase traffic on Sullivan Road. Welch Comer and City staff met with (SRTC) in order to determine the quantity and distribution of traffic growth from 2018 to 2040 with and without the Bigelow Gulch project. SRTC provided macroscopic modelling for the intersections along the Sullivan Advanced Corridor Project study area, including traffic projections and turning movements.

3.4 Trent Avenue Alternative Analysis

Prior to determining which options to analyze in terms of traffic operations, Welch Comer created rough conceptual designs for multiple roundabout and signalized intersection options for the intersection of Sullivan Rd. and Trent Ave. Options considered are a “dog bone” configuration with one bridge, a “dog bone” configuration with two separate bridge spans, a single point urban interchange (SPUI) with one traffic signal, an offset SPUI, a diverging diamond interchange, and a diamond interchange with two signals.

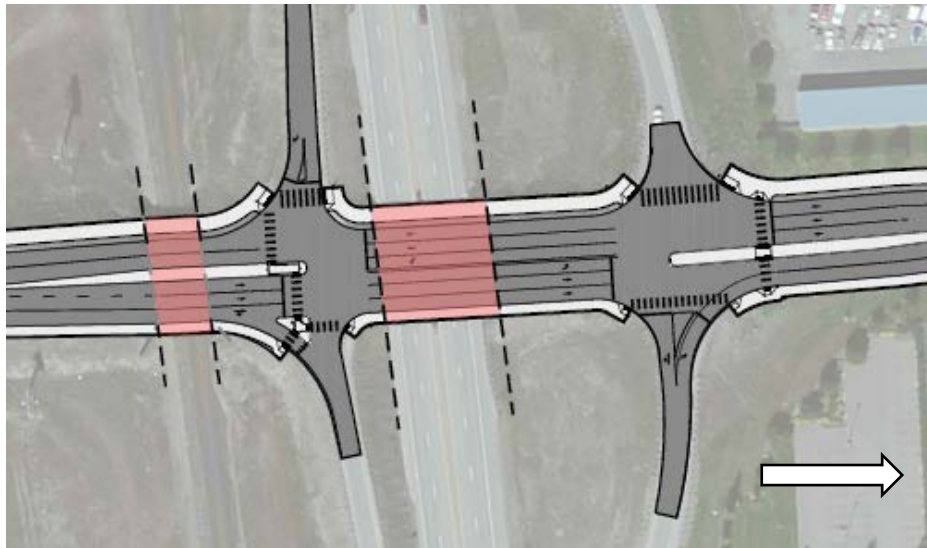
The Washington State Department of Transportation (WSDOT) owns the Trent Avenue right-of-way, as it is part of State Route 290. WSDOT will review and provide input on which design solutions for this intersection would be the most appropriate.

The City requested 30% designs for a two-lane roundabout option and a signal option. The “Dog Bone” Roundabout was chosen due to lower estimated cost, and advantages in constructability over the other options. A diamond interchange was chosen for the signal option for cost reasons as well. The sections below discuss the Trent Avenue alternatives. A cost comparison is provided in Table 3-1. See Chapter 3.5 for additional traffic operations analysis. Detailed intersection analysis reports can be found in Appendix B. See Appendix D for 11x17 concept design exhibits.

3.4.1 Trent Ave Signal Design

Projected traffic levels in 2040 exceed the capacity of the existing geometry at Sullivan and Trent. Additional capacity needs to be added to improve the LOS using signalized intersections. Due to the proximity of the intersections (<300'), both northbound and southbound left turn queues experience spillback into the upstream intersection. The signalized intersection design is shown in Figure 3-6. Dedicated left turn lanes provide the improvement in level of service required to meet the City’s standards. In addition, 3 lanes are required south of the eastbound ramp intersection as well as north of the westbound ramp intersection to provide adequate storage for the left turns. In order to facilitate this additional capacity, two bridges will need to be replaced or upgraded: one over Trent Avenue itself, and one over the BNSF railroad directly south of the eastbound Trent on- and off-ramps.

Figure 3-6: Trent Ave. Six Lane Signal Design



The Trent Ave signal design provides levels of service in 2040 of LOS B and C at westbound and eastbound Trent, respectively, which meet the City’s standards for level of service. The cost for this option is approximately \$18.3 million dollars.

3.4.2 *Trent Avenue Roundabout Design*

Roundabouts generally operate comparably to signals in the peak hour and are often more effective in off-peak hours than signals. As such, the design team investigated whether a roundabout option would operate acceptably in the context of the Sullivan/Trent interchange. Three “dog bone” roundabout options were proposed to the City and discussed in the sections below.

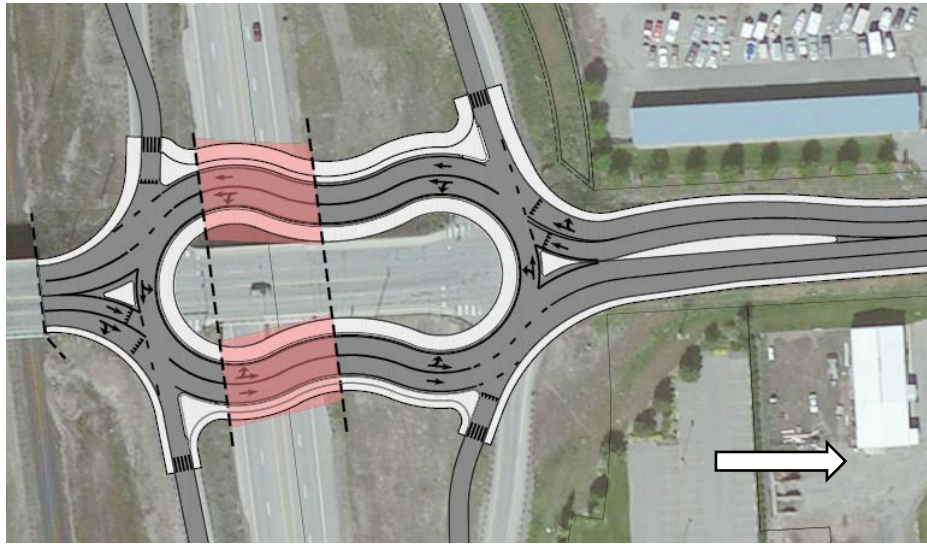
All three designs share general characteristics:

- They merge both intersections into one roundabout
- They force drivers to slow down to navigate the roundabout
- They allow WB109D and WB67 trucks through, and had a 40’ bus as a design vehicle
- Considered safer than signalized intersections.
- Reduces congestion at closely spaced intersections compared to signals

3.4.2.1 *Dog Bone Roundabout Option 1*

This option, shown in Figure 3-7, includes two bridges on either side of the existing bridge over Trent Avenue. This design does not encroach on the bridge over the railroad to the south of the intersections, meaning the bridge does not need to be reconstructed. This drastically reduces cost for this option.

Figure 3-7: Dog Bone Roundabout Option 1



Additionally, this option allows for the existing bridge over Trent Avenue to be used during construction of the two proposed bridges. This will allow for less traffic delays during construction.

In 2040, this option operates at LOS A and B for the westbound and eastbound Trent intersections, respectively. However, the northbound leg experiences a 95% queue length in 2040 of over 400'. This can be greatly improved with the addition of a dedicated northbound right turn lane. Under this option, no leg has a V/C ratio higher than 0.82, which is below the maximum of 0.9 recommended by WSDOT. The cost for this option is approximately \$14.8 million dollars.

3.4.2.2 Dog Bone Roundabout Option 2

This option, shown in Figure 3 8, includes one bridge in place of the existing bridge over Trent Avenue. Its tighter curves help reduce speeds through the roundabout.

Figure 3-8: Dog Bone Roundabout Option 2



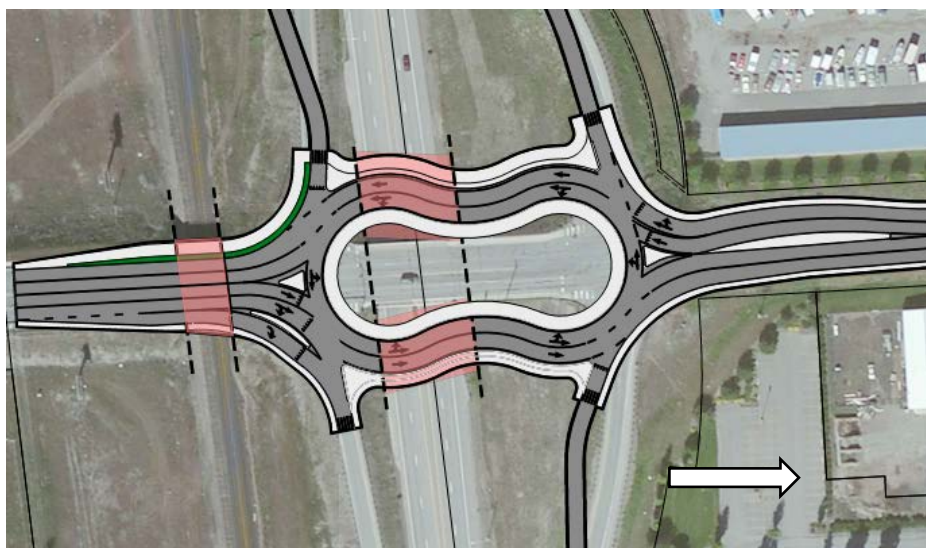
However, this option requires a lane reduction during construction as it was built to maintain traffic on Sullivan Road. This would likely lead to longer delays during construction. An itemized cost estimate for this option was not developed as the geometry was not preferred by the City. However, for this analysis, it is assumed that the cost is comparable to Option 1.

In 2040, this is assumed to have similar operations as Option 1 with LOS A and B for the westbound and eastbound Trent intersections, respectively.

3.4.2.3 Dog Bone Roundabout Option 3

This option is very similar to Option 1 except that it also includes dedicated right turn for the northbound right onto eastbound Trent. See Figure 3-9.

Figure 3-9: Dog Bone Roundabout Option 3



In 2040, this option operates at LOS A for both the westbound and eastbound Trent intersections. This option provides the best performance of the options analyzed. Specifically, this option provides a dedicated northbound right turn. This reduces the northbound 95% queue length in 2040 to under 200', which is much more reasonable than the 400' without the turn lane. Additionally, no leg has a V/C ratio higher than 0.67.

Most of the costs for this option are assumed to be very similar to Option 1. The most significant addition is the reconstruction of the railroad bridge, which would be approximately \$3.8 million dollars based on the price to replace this bridge on the signal option. The cost for this option is approximately \$22.1 million dollars.

3.4.3 Trent Avenue Conclusion

Table 3-1 below summarizes the estimated costs and LOS of the evaluated options. Additional level of service information can be found in Chapter 3.5.

Table 3-1: Trent Avenue Alternative Cost and LOS Comparison

Alternative	Cost	Level of Service (V/C Ratio)	
		EB Trent	WB Trent
Improved Signalized Intersections 2 Bridges: 1 Highway and 1 Railroad	\$18,300,000	B (0.88)	C (0.81)
Roundabout Option 1 2 Highway Bridges	\$14,800,000	A (0.81)	B (0.67)
Roundabout Option 2 Single Large Highway Bridge	\$14,800,000 ¹	A (0.81)	B (0.67)
Roundabout Option 3 3 Bridges: 2 Highway and 1 Railroad	\$22,100,000	A (0.62)	A (0.67)

1. Detailed estimate not completed. Cost for this option is assumed to be comparable to Option 1.

The Dog Bone Roundabout Option 3 is recommended considering factors such as traffic operations, cost, and constructability. However, the City also has the option to select Option 1 in the short term and add the railroad bridge reconstruction and northbound right turn lane from Option 3 in the long term.

3.5 Traffic Analysis

This section explains the traffic operations analysis performed for the Sullivan Corridor in 2040. Analyses were performed for the following scenarios:

- Future Traffic (2040) Sullivan No Build without Bigelow Gulch Project
- Future Traffic (2040) Sullivan No Build with Bigelow Gulch Project
- Future Traffic (2040) Sullivan Buildout with Bigelow Gulch Project

Synchro 10 was used to analyze each scenario, with additional analysis from SIDRA Intersection 7.0 for the analysis of roundabout options at Sullivan/Trent. Table 3-2 shows the comparison of the intersection level of service for each scenario.

3.5.1 Future Traffic (2040) Sullivan No Build without Bigelow Gulch Project

This scenario assumes that the Sullivan/Wellesley traffic signal and the Sullivan ITS projects have been completed. Therefore, the Sullivan/Wellesley LOS improves from the existing LOS of F. No other projects including the Bigelow Gulch project are included. However, the scenario does account for the growth that will be experienced up to 2040. Without the Bigelow Gulch connection to Sullivan, the analysis indicates that the majority of the Sullivan corridor will continue to operate at a Corridor LOS of C per Table 3-2. Though, the table also shows that both Trent intersections degrade in service from 2018 to 2040. The westbound Trent intersection drops from LOS B to LOS D. The eastbound Trent intersection drops from LOS D to LOS E.

Table 3-2: Intersection Levels of Service, PM Peak Hour

Intersection	Future Traffic Control	Level of Service (Delay, s)			
		Existing	2040 No Build, No Bigelow	2040 No Build, with Bigelow	2040 Buildout with Bigelow
Wellesley	Signal	F (57)	C (24)	B (19)	B (19)
WB Trent	Signal	B (20) ¹	D (41) ¹	F (126) ¹	A (6) ²
EB Trent	Signal	D (47) ¹	E (79) ¹	F (141) ¹	A (8) ²
Kiernan/B St.	Signal	B (12)	B (14)	B (16)	B (16)
Euclid	Signal	C (22)	C (23)	C (25)	C (25)
Marietta	Signal	C (20)	C (21)	C (24)	C (24)
Indiana	Signal	D (37)	D (40)	D (44)	D (44)
	Corridor LOS	C (30)	C (35)	E (56)	C (22)

1. HCM 6th Edition does not support a permitted/protected left-turn type from a shared lane. LOS reported using HCM 2000 methodology.
2. Sullivan & Trent intersections are modelled as the Dog Bone Roundabout Option 3
3. Raw data for level of service calculations can be found in Appendix B

3.5.2 Future Traffic (2040) Sullivan No Build with Bigelow Gulch Project

This scenario assumes that the Bigelow Gulch project is completed which includes the proposed traffic signal at the Sullivan/Wellesley intersection. It also assumes the only other improvement completed is the Sullivan ITS project. It also accounts for the growth up to 2040 and the redistribution of traffic due to the Bigelow Gulch project. Under this scenario, the Corridor LOS drops to an E.

Table 3-2 shows that the Sullivan/Wellesley intersection improves from LOS C without the Bigelow Gulch project in 2040 to LOS B with the project in 2040. This is due to the reduced number of northbound left turns that are now northbound through movements headed to Bigelow Gulch. Lastly, the westbound and eastbound Trent ramp intersections both drop to LOS F with the additional traffic generated by the Bigelow Gulch project.

3.5.3 Future Traffic (2040) Sullivan Buildout with Bigelow Gulch Project

This scenario assumes that the Bigelow Gulch project is completed, and the proposed Sullivan improvements are incorporated, which include the intersection improvements at both Trent intersections, the traffic signal at Sullivan/Wellesley, Sullivan ITS, and the addition of a center two-way left turn lane between Trent and just north of Upland (see Chapter 4 Design Recommendations for more information). This scenario also accounts for the growth up to 2040, as well as the redistribution of traffic caused by the Bigelow Gulch project. The scenario provides a Corridor LOS of C.

Table 3-2 shows that, as was the case with the previous scenario, the installation of a traffic signal at Sullivan/Wellesley improves the LOS to a B in 2040 compared to LOS F in 2018. The LOS for the original study is also shown in Table 3-2 for comparison.

The sections below discuss two alternatives for the Trent/Sullivan ramp intersections that were analyzed. See Chapter 3.4 Trent Avenue Alternative Analysis for more detailed analysis for these options. Detailed level of service calculations can be found in Appendix B.

3.5.3.1 Trent Avenue and Sullivan Road Signal Option

Signalized intersections with added lanes were analyzed at the ramp intersections with Sullivan Road. Figure 3-6. The LOS improved to B and C at westbound and eastbound Trent, respectively.

3.5.3.2 Trent Avenue and Sullivan Road Roundabout Option

A “Dog Bone” roundabout was analyzed at Trent and Sullivan in place of the existing signals at the ramp intersections. The design is analyzed as two roundabouts. Per Chapter 3.4.2.3, Option 3 adds a dedicated right turn lane for the northbound right onto eastbound Trent. This provides LOS A at both intersections in 2040. This option provides the best measures of effectiveness (MOE), including V/C ratio, queue length, and LOS. Although this option requires the reconstruction of the railroad bridge south of Trent, Option 3 is the recommended alternative.

4 DESIGN RECOMMENDATIONS

After analyzing the existing and future deficiencies, several improvement measures were identified. The sections below discuss the recommended improvements. An updated improvement plan and opinions of probable cost are provided in Chapter 5. Detailed estimates are included in Appendix E.

4.1 Sullivan and Wellesley Intersection Improvements

The City is currently in the design phase of improvements at the Sullivan & Wellesley intersection. The project includes widening Sullivan on the south leg to accommodate a left turn lane and a 10' path on the west side. In addition, the project will construct a 5-lane section on the north leg with bike lanes and a 10' path that will connect to the Bigelow Gulch project. This project is expected to be built in the of summer 2021.

4.2 Sullivan Road - Trent to Just North of Upland Widening

The original Sullivan Road Corridor Study (Chapter 3.4.2 - Access Management Related Items) analyzed multiple road sections between Trent Avenue and Wellesley Avenue, including the addition of a two-way left turn lane (TWLTL) and a center concrete median.

Both options are generally suited for volumes between 10,000 vpd and 28,000 vpd. Current and projected 2040 volumes indicate that this stretch of Sullivan is a candidate for one of these options. The concrete median is generally unpopular with adjacent property owners due to the reduction in access. The City would likely have difficulty implementing this type of design; therefore, it is not recommended. Although the existing driveway spacing is not ideal, the addition of a TWLTL from Trent to just north of Upland will reduce congestion and could reduce vehicular crashes. The City could consider some driveway consolidation at the time of design. Additionally, the addition of a turn lane at Upland provides a modest improvement to the delay of the stop-controlled leg from 45 seconds to 37 seconds. Guidance regarding the TWLTL was found in NCHRP Report 395: Capacity and Operational Effects of Midblock Left-Turn Lanes.

The TWLTL is recommended. As shown in Figure 4-1, the limits of this project would extend from the northern limits of the proposed Trent Avenue project discussed below to the southern limits of the Sullivan and Wellesley Intersection Improvements discussed above, which are just north of Upland Drive. This project also incorporates the Continuous Roadway Lighting between Trent and Wellesley from the original studies improvement plan as well as conduit for ITS.

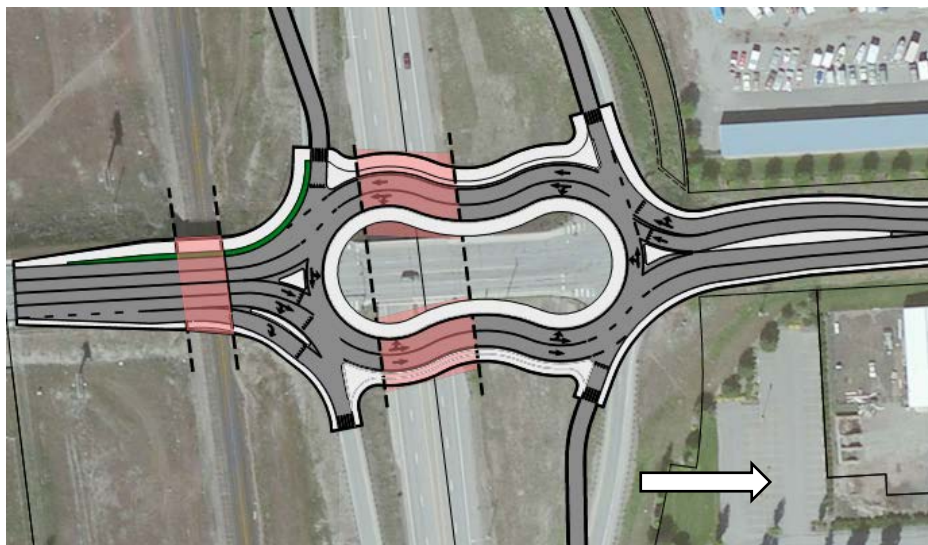
Figure 4-1: Sullivan Road – Trent to Just North of Upland Widening Overview



4.3 Trent Avenue Improvements

As discussed in Chapter 3.4, Welch Comer performed an improvement alternative analysis at the Sullivan/Trent intersection. The alternatives included a signalized option, and three roundabout options. Ultimately, the Dog Bone Roundabout Option 3 was chosen as the recommended option. This will provide a LOS of A for both the westbound and eastbound Trent intersections in 2040.

Figure 4-2: Dog Bone Roundabout Option 3



4.4 Sullivan & Marietta Improvements

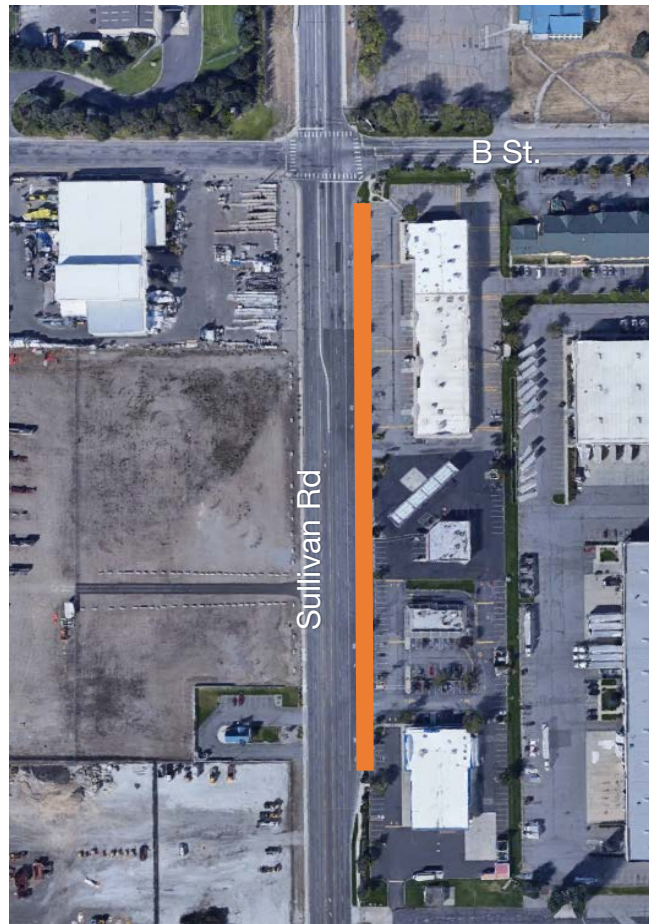
The original study identified building a concrete intersection at Sullivan and Marietta as part of the Sullivan Corridor Improvement Plan. It was also anticipated that an additional westbound left turn lane would be warranted as part of this project. Based on the analysis as part of this update, this does not appear to be the case. The analysis shows that the existing Marietta intersection will operate at LOS C in 2040. The existing westbound left turn should continue to be monitored leading up to the project to confirm that the additional turn lane is not necessary.

4.5 Sidewalk Improvements

The City does not currently have any sidewalk projects proposed on Sullivan Road. However, the original study indicated that the City may wish to update non-standard sidewalk along the corridor.

Figure 4-3: Sullivan Road – Sidewalk Improvements

One such stretch of non-standard sidewalk is located just north of D Street up to B Street on east side, which is shown in Figure 4-3. The pedestrian route through this section consists of the edge of the adjacent parking lot on private property. It may be possible to work with the various property owners to allow this to be converted to an official sidewalk. Cost estimates for this work assume ROW will not be necessary.



4.6 Transit Improvements

The original study identified transit as possible areas for improvement. There are 11 transit stops along the Sullivan corridor. For this update, it was assumed that up to 6 of the 11 locations could be selected for a bus shelter. It was also assumed that the remaining stops would receive benches. The City and Spokane Transit Authority would likely review which locations warranted improvement based on ridership.

4.7 Shared Use Path

The City shows Sullivan Road as a proposed shared-use path location. Some of this path has been completed; however, there are still multiple gaps. The section from Trent to Wellesley will be completed as part of the Sullivan/Wellesley Improvements, Trent to Upland Widening, and Sullivan/Trent Improvements. There are three remaining gaps:

- Sullivan Park to Kemira Water Solutions – Figure 4-4
- Pedestrian Bridge over Union Pacific Railroad – Figure 4-4
- Euclid to Trent – Figure 4-5

These gaps have been estimated as two different projects. The first includes the section from Sullivan Park to Kemira and the pedestrian bridge. The second includes the section from Euclid to Trent.

Figure 4-4: Sullivan Park to Kemira Shared-Use Path and Pedestrian Bridge Overview



Figure 4-5: Euclid to Trent Shared-Use Path Overview



5 IMPROVEMENT PLAN AND COST SHARE

An updated improvement plan for the improvements discussed in Chapter 4 is shown in Table 5-1. Opinions of probable cost are provided in Table 5-2. All costs for projects listed in this report addendum are planning level costs calculated in 2020 dollars and include 3 years of inflation at 4% per year. Costs were based upon bid price data from projects from 2017 to 2020. Actual costs for these projects will vary depending on the current bidding and construction climate. The section below calculates the proportionate share of costs between the City and the County.

5.1 Proportionate Share – Method 1: Cost per Vehicle for Increased Traffic

In this cost-share methodology, the costs of necessary upgrades to infrastructure on Sullivan through 2040 would be shared between the City and the County based upon the increase in traffic anticipated through the subject intersection due to the Bigelow Gulch project compared to the projected traffic without the Bigelow Gulch project.

For instance, Sullivan and Marietta has 3,100 projected vehicles in the peak hour in 2040 without Bigelow Gulch, while it has 3,300 vehicles after accounting for the Bigelow Gulch project. That increase of 200 vehicles is an approximate 6% increase, meaning that the County would reimburse the City for 6% of the costs for improvements at that intersection. As these are planning level costs, numbers have been rounded for simplicity.

Table 5-1: Improvement Plan

	Project	Timeline	Improvement Recommended
1	Transit Stop Improvements	Short Term	Improve select transit stops based on demand.
2	Sullivan & Trent Improvements	Short Term	Construct roundabout interchange.
3	Sidewalk Improvements	Long Term	Build sidewalk on east side of Sullivan from D Street to B Street.
4	Sullivan & Marietta Improvements	Long Term	Install concrete intersection.
5	Sullivan Widening: Trent to Upland	Long Term	Implement center left turn lane.
6	Shared-Use Path: Euclid to Trent	Long Term	Build shared use path
7	Shared-Use Path: Kemira to Sullivan Park & Ped Bridge	Long Term	Build shared use path and pedestrian bridge over UP railroad

Table 5-2: Cost-Share by Project

	Project	Budget-Level Cost Estimate	Traffic Increase Due to County Project	County Responsibility
1	Transit Stop Improvements	\$200,000	N/A ¹	N/A ¹
2	Sullivan & Trent Improvements	\$22,100,000	28%	\$6,200,000
3	Sidewalk Improvements	\$250,000	N/A ¹	N/A ¹
4	Sullivan & Marietta Improvements	\$1,600,000	6%	\$100,000
5	Sullivan Widening: Trent to Just North of Upland	\$2,900,000	49%	\$1,400,000
6	Shared-Use Path: Euclid to Trent	\$700,000	N/A ¹	N/A ¹
7	Shared-Use Path: Kemira to Sullivan Park & Ped Bridge	\$2,200,000	N/A ¹	N/A ¹
	Total	\$29,950,000		\$7,700,000

1. Not applicable to cost share, as this improvement is not impacted by the Bigelow Gulch project.
2. Rounded to nearest \$100,000

The total cost of all recommended improvements is \$29,950,000. The Spokane County project recommended contribution is \$7,700,000. See Appendix E for more detailed cost estimates.

6 CONCLUSION

This study provides an update to the Sullivan Road Corridor Study completed by HDR in 2015. It also determines the anticipated impact of Spokane County's Bigelow Gulch Project on the Sullivan corridor. In addition, methods for determining the proportional share of future improvement costs caused by the Bigelow Gulch are calculated.

The existing Sullivan Road intersections operate at or above the minimum LOS of D allowed per City of Spokane Valley standards. The corridor LOS also operates at a D.

The three different future traffic operations models built helped determine the performance of the corridor in the future and the proportionate share of improvement costs caused by the Bigelow Gulch project.

Based on the analysis, it was shown that the largest impact will be to the Sullivan and Trent interchange. Both ramp intersections will degrade to LOS F with the additional traffic generated by the Bigelow Gulch project if no improvements are made.

After analyzing multiple alternatives for the Sullivan and Trent intersection it was recommended that the Dog Bone Roundabout Option 3 be implemented. This option provided the best performance of the options evaluated, however, does require the reconstruction of the railroad bridge south of Trent Avenue. To lower costs upfront, the City could implement the Dog Bone Roundabout Option 1, which does not include the dedicated right turn that triggers the bridge reconstruction. The right turn could be implemented in the future when operations or condition of the railroad bridge require reconstruction.

The updated improvement plan included in Chapter 5 showcases the remaining Sullivan corridor projects. The method for the proportionate cost share of the improvements required due to the Bigelow Gulch project will help the City fund these critical projects.

Implementing the improvements discussed in this study will help maintain positive multimodal traffic operations on Sullivan Road through 2040.

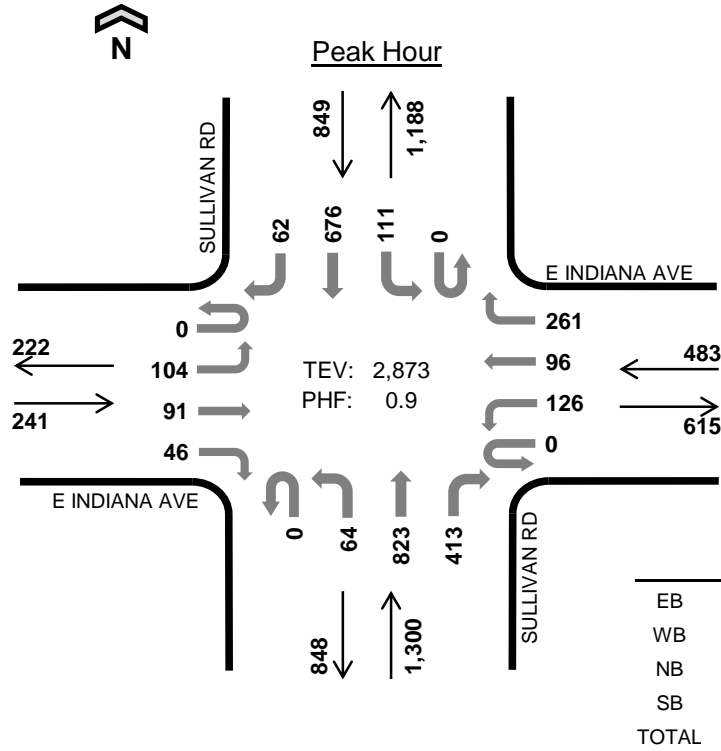
7 APPENDICES



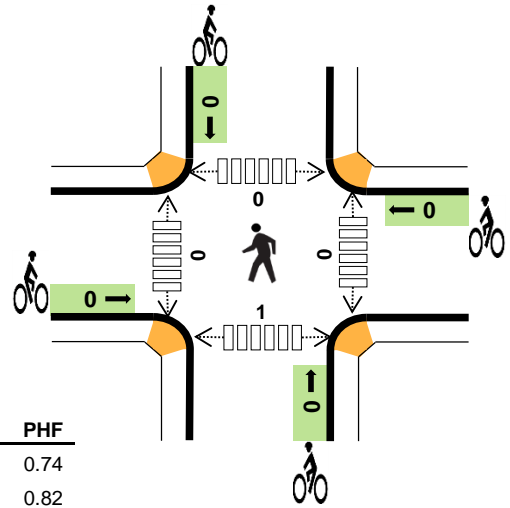
Appendix A

Raw Traffic Count Data

SULLIVAN RD E INDIANA AVE



Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	5.0%	0.74
WB	3.5%	0.82
NB	5.1%	0.99
SB	18.1%	0.87
TOTAL	8.7%	0.90

Three-Hour Count Summaries

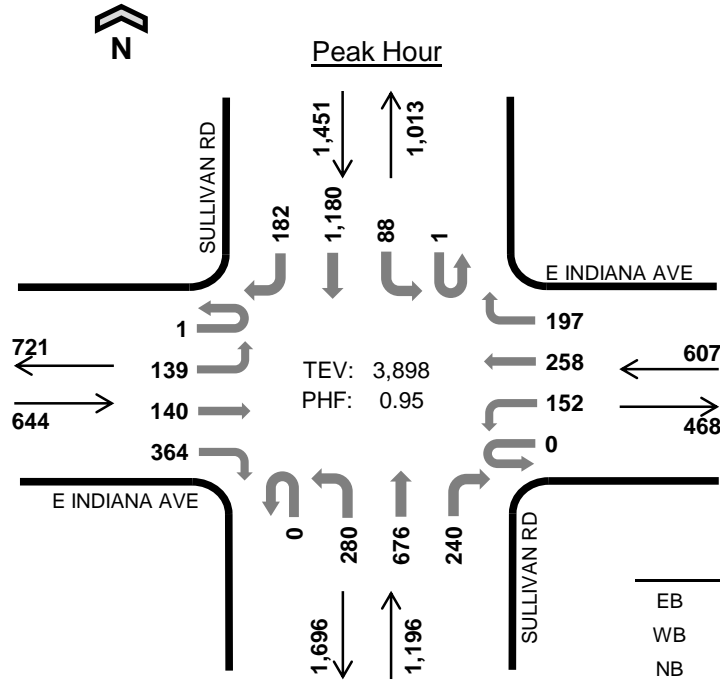
Interval Start	E INDIANA AVE				E INDIANA AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:15 AM	0	25	17	7	0	17	20	67	0	17	210	92	0	26	155	13	666	0
7:30 AM	0	25	28	15	0	36	25	62	0	11	206	107	0	28	163	17	723	0
7:45 AM	0	35	33	13	0	45	24	78	0	22	204	103	0	29	199	16	801	0
8:00 AM	0	19	13	11	0	28	27	54	0	14	203	111	0	28	159	16	683	2,873
Peak Hour	0	104	91	46	0	126	96	261	0	64	823	413	0	111	676	62	2,873	0

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

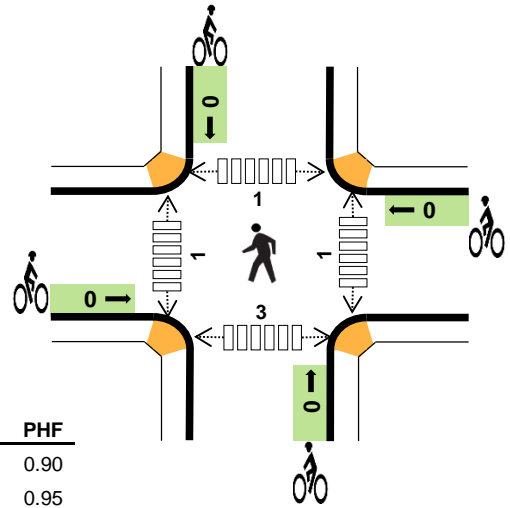
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:15 AM	2	2	16	45	65	0	0	0	0	0	0	0	0	1	1
7:30 AM	4	3	13	39	59	0	0	0	0	0	0	0	0	0	0
7:45 AM	4	8	14	39	65	0	0	0	0	0	0	0	0	0	0
8:00 AM	2	4	23	31	60	0	0	0	0	0	0	0	0	0	0
Peak Hour	12	17	66	154	249	0	0	0	0	0	0	0	0	1	1

Three-Hour Count Summaries																		
Interval Start	E INDIANA AVE				E INDIANA AVE				SULLIVAN RD				SULLIVAN RD				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	6	5	4	0	4	2	34	0	8	128	15	0	2	73	8	289	0
6:15 AM	0	17	5	7	0	10	13	69	0	12	142	32	0	11	83	4	405	0
6:30 AM	0	11	7	2	0	14	10	62	1	17	210	48	0	12	99	13	506	0
6:45 AM	0	28	17	7	0	18	21	62	0	15	219	70	0	23	135	16	631	1,831
7:00 AM	0	19	19	6	0	19	26	51	0	16	186	52	0	27	173	13	607	2,149
7:15 AM	0	25	17	7	0	17	20	67	0	17	210	92	0	26	155	13	666	2,410
7:30 AM	0	25	28	15	0	36	25	62	0	11	206	107	0	28	163	17	723	2,627
7:45 AM	0	35	33	13	0	45	24	78	0	22	204	103	0	29	199	16	801	2,797
8:00 AM	0	19	13	11	0	28	27	54	0	14	203	111	0	28	159	16	683	2,873
8:15 AM	0	14	8	9	0	24	23	57	0	20	141	83	0	25	139	8	551	2,758
8:30 AM	0	16	19	17	0	32	32	40	1	24	137	70	0	21	146	17	572	2,607
8:45 AM	0	13	17	19	0	28	37	34	0	34	125	77	0	11	132	14	541	2,347
Count Total	0	228	188	117	0	275	260	670	2	210	2,111	860	0	243	1,656	155	6,975	0
Peak Hour	0	104	91	46	0	126	96	261	0	64	823	413	0	111	676	62	2,873	0
<i>Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.</i>																		
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	1	4	20	26	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	4	0	5	17	26	0	0	0	0	0	0	0	2	0	2	0	0	2
6:30 AM	1	1	11	26	39	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	3	2	13	29	47	0	0	0	0	0	0	0	1	0	1	0	0	1
7:00 AM	3	8	13	41	65	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	2	2	16	45	65	0	0	0	0	0	0	0	0	0	1	1	1	1
7:30 AM	4	3	13	39	59	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	4	8	14	39	65	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	2	4	23	31	60	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	3	2	18	35	58	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	4	8	18	32	62	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	4	27	36	68	0	0	0	0	0	0	0	1	1	2	0	0	2
Count Total	32	43	175	390	640	0	0	0	0	0	0	0	0	0	4	2	6	6
Peak Hour	12	17	66	154	249	0	0	0	0	0	0	0	0	0	0	1	1	1

SULLIVAN RD E INDIANA AVE



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	1.2%	0.90
WB	2.8%	0.95
NB	6.6%	0.93
SB	2.6%	0.89
TOTAL	3.6%	0.95

Three-Hour Count Summaries

Interval Start	E INDIANA AVE				E INDIANA AVE				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	20	23	86	0	44	61	48	0	73	164	57	0	24	307	32	939	0
4:45 PM	0	42	43	93	0	38	56	45	0	73	149	61	1	21	266	46	934	0
5:00 PM	0	33	42	92	0	35	72	52	0	72	171	54	0	22	329	55	1,029	0
5:15 PM	1	44	32	93	0	35	69	52	0	62	192	68	0	21	278	49	996	3,898
Peak Hour	1	139	140	364	0	152	258	197	0	280	676	240	1	88	1,180	182	3,898	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
4:30 PM	1	4	20	9	34	0	0	0	0	0	0	1	0	0	1
4:45 PM	2	4	12	8	26	0	0	0	0	0	0	0	0	0	0
5:00 PM	3	3	22	8	36	0	0	0	0	0	1	0	1	2	4
5:15 PM	2	6	25	13	46	0	0	0	0	0	0	0	0	1	1
Peak Hour	8	17	79	38	142	0	0	0	0	0	1	1	1	3	6

Three-Hour Count Summaries

Interval Start	E INDIANA AVE				E INDIANA AVE				SULLIVAN RD				SULLIVAN RD				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	30	39	88	0	36	47	39	0	58	155	66	1	17	225	33	834	0
3:15 PM	0	44	26	74	0	39	53	67	0	54	120	42	0	10	205	35	769	0
3:30 PM	1	35	31	93	0	47	64	70	0	83	139	48	0	19	270	50	950	0
3:45 PM	0	29	35	75	0	51	68	62	0	64	136	55	0	16	291	46	928	3,481
4:00 PM	0	39	34	102	0	36	53	50	0	70	157	49	0	28	279	38	935	3,582
4:15 PM	0	30	22	102	0	41	64	50	1	75	148	55	0	17	250	25	880	3,693
4:30 PM	0	20	23	86	0	44	61	48	0	73	164	57	0	24	307	32	939	3,682
4:45 PM	0	42	43	93	0	38	56	45	0	73	149	61	1	21	266	46	934	3,688
5:00 PM	0	33	42	92	0	35	72	52	0	72	171	54	0	22	329	55	1,029	3,782
5:15 PM	1	44	32	93	0	35	69	52	0	62	192	68	0	21	278	49	996	3,898
5:30 PM	0	40	40	90	0	30	58	41	1	68	171	48	0	20	216	42	865	3,824
5:45 PM	0	29	23	97	0	33	59	44	0	64	134	50	0	16	189	36	774	3,664
Count Total	2	415	390	1,085	0	465	724	620	2	816	1,836	653	2	231	3,105	487	10,833	0
Peak Hour	1	139	140	364	0	152	258	197	0	280	676	240	1	88	1,180	182	3,898	0

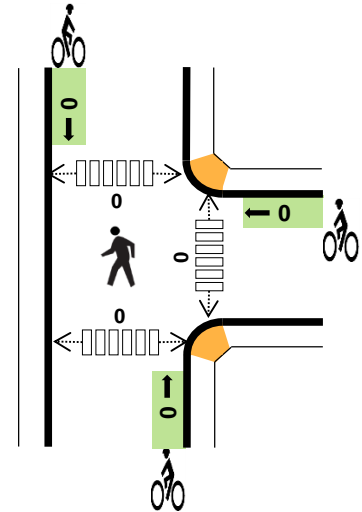
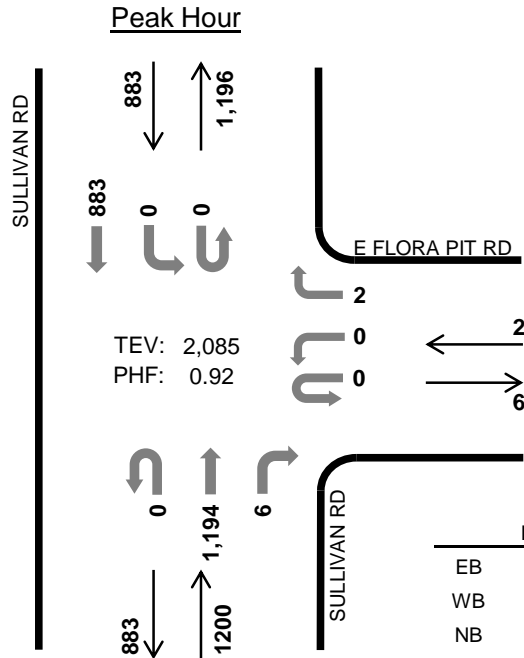
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	19	22	50	0	0	0	0	0	1	0	2	2	5
3:15 PM	1	6	23	14	44	0	0	0	0	0	0	0	0	1	1
3:30 PM	3	5	21	17	46	0	0	0	0	0	0	0	0	1	1
3:45 PM	3	11	20	29	63	0	0	0	0	0	0	0	0	0	0
4:00 PM	4	3	31	25	63	0	0	0	0	0	1	0	1	0	2
4:15 PM	4	4	20	19	47	0	0	0	0	0	1	0	0	0	1
4:30 PM	1	4	20	9	34	0	0	0	0	0	0	1	0	0	1
4:45 PM	2	4	12	8	26	0	0	0	0	0	0	0	0	0	0
5:00 PM	3	3	22	8	36	0	0	0	0	0	1	0	1	2	4
5:15 PM	2	6	25	13	46	0	0	0	0	0	0	0	0	1	1
5:30 PM	4	3	25	6	38	0	1	0	0	1	0	0	0	0	0
5:45 PM	1	2	21	7	31	0	0	0	0	0	2	0	1	0	3
Count Total	30	58	259	177	524	0	1	0	0	1	6	1	5	7	19
Peak Hour	8	17	79	38	142	0	0	0	0	0	1	1	1	3	6

SULLIVAN RD E FLORA PIT RD



Date: Tue, Oct 30, 2018
 Count Period: 6:00 AM to 9:00 AM
 Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	-	-
WB	0.0%	0.50
NB	6.6%	0.93
SB	17.6%	0.92
TOTAL	11.2%	0.92

Three-Hour Count Summaries

Interval Start	0				E FLORA PIT RD				SULLIVAN RD				SULLIVAN RD				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		
7:15 AM	0	0	0	0	0	0	0	0	0	0	297	1	0	0	207	0	505	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	268	2	0	0	224	0	494	0
7:45 AM	0	0	0	0	0	0	0	1	0	0	324	0	0	0	240	0	565	0
8:00 AM	0	0	0	0	0	0	0	1	0	0	305	3	0	0	212	0	521	2,085
Peak Hour	0	0	0	0	0	0	0	2	0	0	1,194	6	0	0	883	0	2,085	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
7:15 AM	0	0	16	46	62	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	16	41	57	0	0	0	0	0	0	2	0	0	2
7:45 AM	0	0	21	37	58	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	26	31	57	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	79	155	234	0	0	0	0	0	0	2	0	0	2

Three-Hour Count Summaries																		
Interval Start	0				E FLORA PIT RD				SULLIVAN RD				SULLIVAN RD				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	0	0	0	0	0	0	0	0	178	0	0	0	84	0	262	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	210	0	0	0	100	0	310	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	294	0	0	0	137	0	431	0
6:45 AM	0	0	0	0	0	0	0	1	0	0	291	1	0	0	180	0	473	1,476
7:00 AM	0	0	0	0	0	0	0	2	0	0	270	3	0	0	209	0	484	1,698
7:15 AM	0	0	0	0	0	0	0	0	0	0	297	1	0	0	207	0	505	1,893
7:30 AM	0	0	0	0	0	0	0	0	0	0	268	2	0	0	224	0	494	1,956
7:45 AM	0	0	0	0	0	0	0	1	0	0	324	0	0	0	240	0	565	2,048
8:00 AM	0	0	0	0	0	0	0	1	0	0	305	3	0	0	212	0	521	2,085
8:15 AM	0	0	0	0	0	0	0	0	0	0	215	0	0	0	186	0	401	1,981
8:30 AM	0	0	0	0	0	0	0	1	0	0	184	1	0	0	189	0	375	1,862
8:45 AM	0	0	0	0	0	0	0	0	0	0	176	2	0	0	165	0	343	1,640
Count Total	0	0	0	0	0	0	0	6	0	0	3,012	13	0	0	2,133	0	5,164	0
Peak Hour	0	0	0	0	0	0	0	2	0	0	1,194	6	0	0	883	0	2,085	0

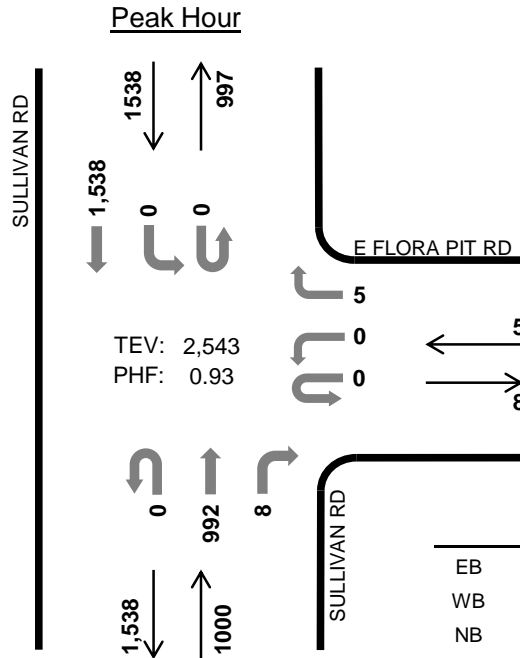
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	0	3	20	23	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	4	15	19	0	0	0	0	0	1	0	0	0	1
6:30 AM	0	0	8	26	34	0	0	0	0	0	1	0	0	0	1
6:45 AM	0	0	14	30	44	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	19	42	61	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	16	46	62	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	16	41	57	0	0	0	0	0	0	2	0	0	2
7:45 AM	0	0	21	37	58	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	26	31	57	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	16	38	54	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	25	31	56	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	23	33	56	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	191	390	581	0	0	0	0	0	2	2	0	0	4
Peak Hr	0	0	79	155	234	0	0	0	0	0	0	2	0	0	2

SULLIVAN RD E FLORA PIT RD

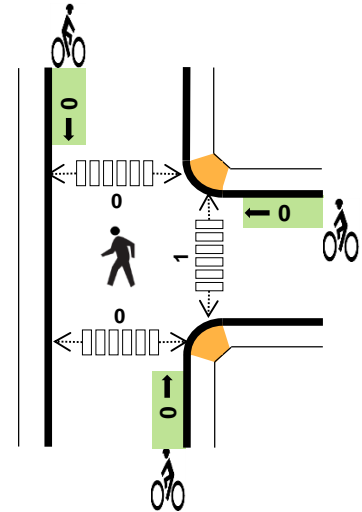


Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM



TEV: 2,543
 PHF: 0.93

	HV %:	PHF
EB	-	-
WB	0.0%	0.63
NB	8.5%	0.87
SB	2.3%	0.90
TOTAL	4.7%	0.93



Three-Hour Count Summaries

Interval Start	0				E FLORA PIT RD				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	0	0	0	0	0	0	0	0	0	225	2	0	0	399	0	626	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	229	2	0	0	346	0	578	0
5:00 PM	0	0	0	0	0	0	0	2	0	0	253	2	0	0	426	0	683	0
5:15 PM	0	0	0	0	0	0	0	2	0	0	285	2	0	0	367	0	656	2,543
Peak Hour	0	0	0	0	0	0	0	5	0	0	992	8	0	0	1,538	0	2,543	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
4:30 PM	0	0	18	8	26	0	0	0	0	0	0	2	0	0	2
4:45 PM	0	0	15	8	23	0	0	0	0	0	1	1	0	0	2
5:00 PM	0	0	23	7	30	0	0	0	0	0	0	2	0	0	2
5:15 PM	0	0	29	12	41	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	85	35	120	0	0	0	0	0	1	5	0	0	6

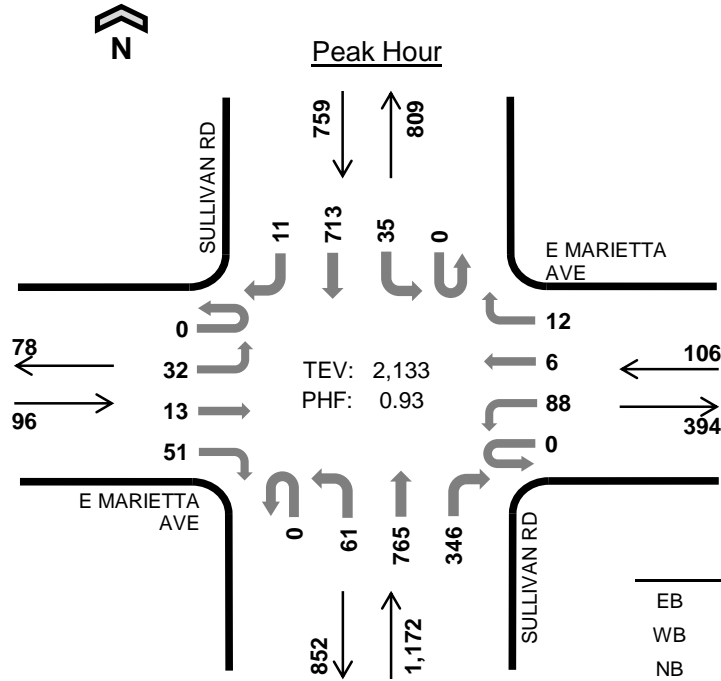
Three-Hour Count Summaries																		
Interval Start	0				E FLORA PIT RD				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	1	0	0	213	4	0	0	286	0	504	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	235	1	0	0	268	0	504	0
3:30 PM	0	0	0	0	0	0	0	1	0	0	244	3	0	0	367	0	615	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	221	1	0	0	344	0	566	2,189
4:00 PM	0	0	0	0	0	0	0	0	0	0	229	5	0	0	371	0	605	2,290
4:15 PM	0	0	0	0	0	0	0	0	0	0	239	0	0	0	315	0	554	2,340
4:30 PM	0	0	0	0	0	0	0	0	0	0	225	2	0	0	399	0	626	2,351
4:45 PM	0	0	0	0	0	0	0	1	0	0	229	2	0	0	346	0	578	2,363
5:00 PM	0	0	0	0	0	0	0	2	0	0	253	2	0	0	426	0	683	2,441
5:15 PM	0	0	0	0	0	0	0	2	0	0	285	2	0	0	367	0	656	2,543
5:30 PM	0	0	0	0	0	0	0	0	0	0	245	6	0	0	274	0	525	2,442
5:45 PM	0	0	0	0	0	0	0	2	0	0	207	1	0	0	246	0	456	2,320
Count Total	0	0	0	0	0	0	0	9	0	0	2,825	29	0	0	4,009	0	6,872	0
Peak Hour	0	0	0	0	0	0	0	5	0	0	992	8	0	0	1,538	0	2,543	0

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

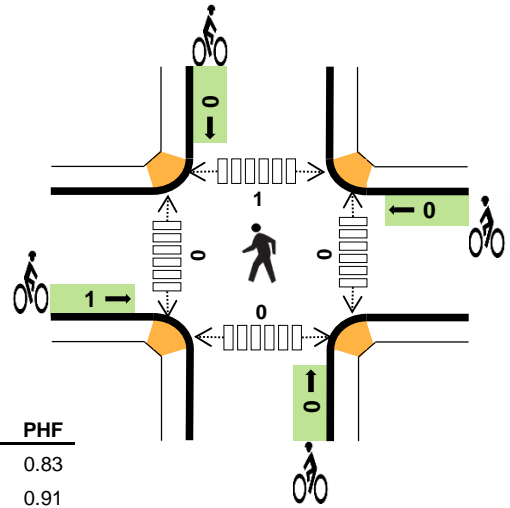
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	0	21	21	42	0	0	0	0	0	1	0	0	0	1
3:15 PM	0	0	24	16	40	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	27	20	47	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	31	25	56	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	30	22	52	0	0	0	0	0	0	3	0	0	3
4:15 PM	0	0	22	21	43	0	0	0	0	0	1	0	0	0	1
4:30 PM	0	0	18	8	26	0	0	0	0	0	0	2	0	0	2
4:45 PM	0	0	15	8	23	0	0	0	0	0	1	1	0	0	2
5:00 PM	0	0	23	7	30	0	0	0	0	0	0	2	0	0	2
5:15 PM	0	0	29	12	41	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	30	7	37	0	0	0	0	0	0	1	0	0	1
5:45 PM	0	0	19	8	27	0	0	0	0	0	0	1	0	0	1
Count Total	0	0	289	175	464	0	0	0	0	0	3	10	0	0	13
Peak Hr	0	0	85	35	120	0	0	0	0	0	1	5	0	0	6



SULLIVAN RD E MARIETTA AVE



Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	28.1%	0.83
WB	37.7%	0.91
NB	4.8%	0.94
SB	10.7%	0.90
TOTAL	9.6%	0.93

Three-Hour Count Summaries

Interval Start	E MARIETTA AVE				E MARIETTA AVE				SULLIVAN RD				SULLIVAN RD				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		
7:15 AM	0	7	1	13	0	23	2	2	0	11	205	63	0	7	163	0	497	0
7:30 AM	0	9	3	11	0	22	1	1	0	7	195	77	0	8	188	4	526	0
7:45 AM	0	9	5	15	0	21	2	6	0	21	188	93	0	15	190	6	571	0
8:00 AM	0	7	4	12	0	22	1	3	0	22	177	113	0	5	172	1	539	2,133
Peak Hour	0	32	13	51	0	88	6	12	0	61	765	346	0	35	713	11	2,133	0

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

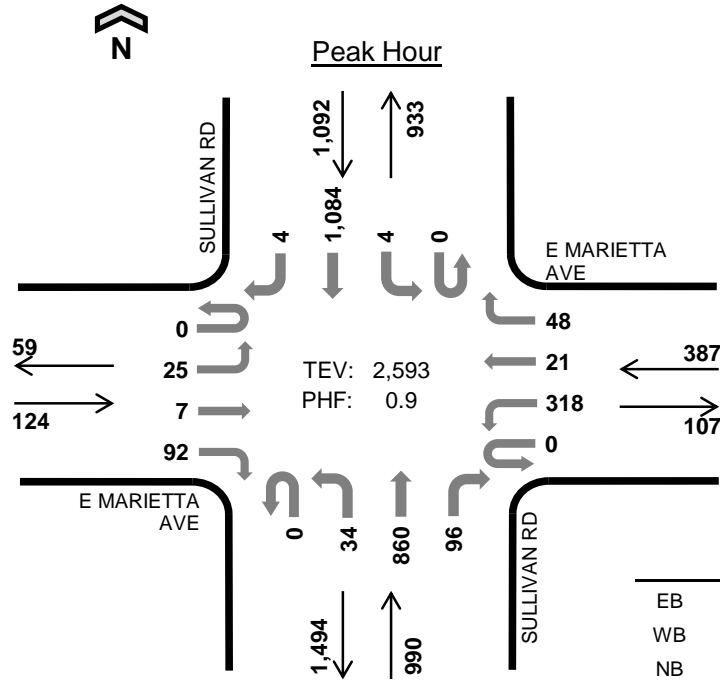
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:15 AM	7	15	14	26	62	0	0	0	0	0	0	0	0	0	0
7:30 AM	9	7	14	25	55	1	0	0	0	1	0	0	0	0	0
7:45 AM	7	11	14	15	47	0	0	0	0	0	0	0	1	0	1
8:00 AM	4	7	14	15	40	0	0	0	0	0	0	0	0	0	0
Peak Hour	27	40	56	81	204	1	0	0	0	1	0	0	1	0	1

Three-Hour Count Summaries																		
Interval Start	E MARIETTA AVE				E MARIETTA AVE				SULLIVAN RD				SULLIVAN RD				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	2	3	10	0	8	2	0	0	10	96	52	0	6	77	1	267	0
6:15 AM	0	3	7	8	0	7	1	0	0	12	131	57	0	7	85	3	321	0
6:30 AM	0	4	8	11	0	6	5	2	0	14	186	63	0	6	121	3	429	0
6:45 AM	0	7	6	12	0	27	3	0	0	15	177	94	0	9	125	1	476	1,493
7:00 AM	0	4	3	12	0	29	2	1	0	9	198	60	0	5	169	2	494	1,720
7:15 AM	0	7	1	13	0	23	2	2	0	11	205	63	0	7	163	0	497	1,896
7:30 AM	0	9	3	11	0	22	1	1	0	7	195	77	0	8	188	4	526	1,993
7:45 AM	0	9	5	15	0	21	2	6	0	21	188	93	0	15	190	6	571	2,088
8:00 AM	0	7	4	12	0	22	1	3	0	22	177	113	0	5	172	1	539	2,133
8:15 AM	0	6	2	14	0	16	4	2	0	11	140	51	0	2	136	5	389	2,025
8:30 AM	0	8	3	18	0	20	4	1	0	9	129	37	0	5	141	0	375	1,874
8:45 AM	0	3	1	9	0	18	2	3	0	10	120	43	0	2	135	4	350	1,653
Count Total	0	69	46	145	0	219	29	21	0	151	1,942	803	0	77	1,702	30	5,234	0
Peak Hour	0	32	13	51	0	88	6	12	0	61	765	346	0	35	713	11	2,133	0

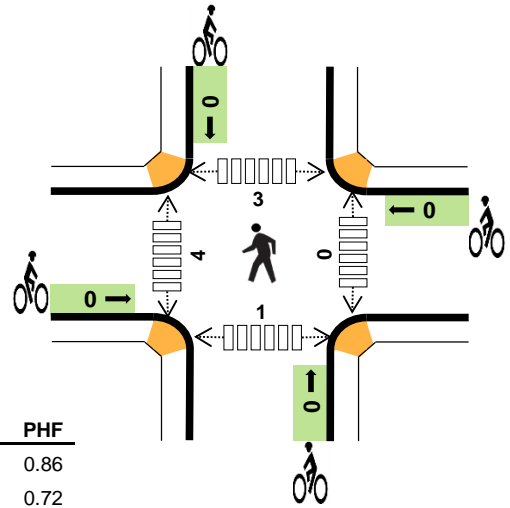
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	2	4	4	15	25	0	0	0	0	0	0	1	1	0	2
6:15 AM	1	5	4	12	22	1	0	0	0	1	0	0	0	0	0
6:30 AM	2	4	7	16	29	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	13	16	12	41	1	0	0	0	1	1	0	0	0	1
7:00 AM	1	18	17	23	59	0	0	0	0	0	0	1	1	0	2
7:15 AM	7	15	14	26	62	0	0	0	0	0	0	0	0	0	0
7:30 AM	9	7	14	25	55	1	0	0	0	1	0	0	0	0	0
7:45 AM	7	11	14	15	47	0	0	0	0	0	0	0	1	0	1
8:00 AM	4	7	14	15	40	0	0	0	0	0	0	0	0	0	0
8:15 AM	4	7	12	26	49	0	0	0	0	0	0	0	0	0	0
8:30 AM	12	8	23	28	71	0	0	0	0	0	1	0	0	0	1
8:45 AM	4	7	22	23	56	0	0	0	0	0	0	0	0	0	0
Count Total	53	106	161	236	556	3	0	0	0	3	2	2	3	0	7
Peak Hour	27	40	56	81	204	1	0	0	0	1	0	0	1	0	1

SULLIVAN RD E MARIETTA AVE



Date: Tue, Oct 30, 2018
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	3.2%	0.86
WB	1.0%	0.72
NB	9.0%	0.87
SB	3.1%	0.91
TOTAL	5.1%	0.90

Three-Hour Count Summaries

Interval Start	E MARIETTA AVE				E MARIETTA AVE				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	7	2	24	0	90	10	8	0	8	205	18	0	2	280	0	654	0
4:45 PM	0	4	2	19	0	51	1	7	0	7	194	22	0	2	253	1	563	0
5:00 PM	0	7	1	28	0	102	9	24	0	7	214	31	0	0	296	3	722	0
5:15 PM	0	7	2	21	0	75	1	9	0	12	247	25	0	0	255	0	654	2,593
Peak Hour	0	25	7	92	0	318	21	48	0	34	860	96	0	4	1,084	4	2,593	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
4:30 PM	2	0	19	9	30	0	0	0	0	0	0	3	3	0	6
4:45 PM	2	1	16	7	26	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	2	25	6	33	0	0	0	0	0	0	0	0	1	1
5:15 PM	0	1	29	12	42	0	0	0	0	0	0	1	0	0	1
Peak Hour	4	4	89	34	131	0	0	0	0	0	0	4	3	1	8

Three-Hour Count Summaries																		
Interval Start	E MARIETTA AVE				E MARIETTA AVE				SULLIVAN RD				SULLIVAN RD				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	8	0	15	0	56	7	9	0	11	172	30	0	4	228	3	543	0
3:15 PM	0	2	5	19	0	45	5	0	0	11	203	20	0	3	188	4	505	0
3:30 PM	0	7	1	23	0	89	13	6	0	14	215	25	0	1	266	3	663	0
3:45 PM	0	6	1	16	0	72	3	9	0	11	175	20	0	3	235	1	552	2,263
4:00 PM	0	6	2	20	0	90	5	17	0	6	183	26	0	0	237	1	593	2,313
4:15 PM	0	5	1	11	0	78	6	9	0	12	199	29	0	2	227	3	582	2,390
4:30 PM	0	7	2	24	0	90	10	8	0	8	205	18	0	2	280	0	654	2,381
4:45 PM	0	4	2	19	0	51	1	7	0	7	194	22	0	2	253	1	563	2,392
5:00 PM	0	7	1	28	0	102	9	24	0	7	214	31	0	0	296	3	722	2,521
5:15 PM	0	7	2	21	0	75	1	9	0	12	247	25	0	0	255	0	654	2,593
5:30 PM	0	9	2	13	0	45	3	2	0	8	234	19	0	1	209	0	545	2,484
5:45 PM	0	4	0	11	0	21	0	0	0	8	179	14	0	0	202	1	440	2,361
Count Total	0	72	19	220	0	814	63	100	0	115	2,420	279	0	18	2,876	20	7,016	0
Peak Hour	0	25	7	92	0	318	21	48	0	34	860	96	0	4	1,084	4	2,593	0

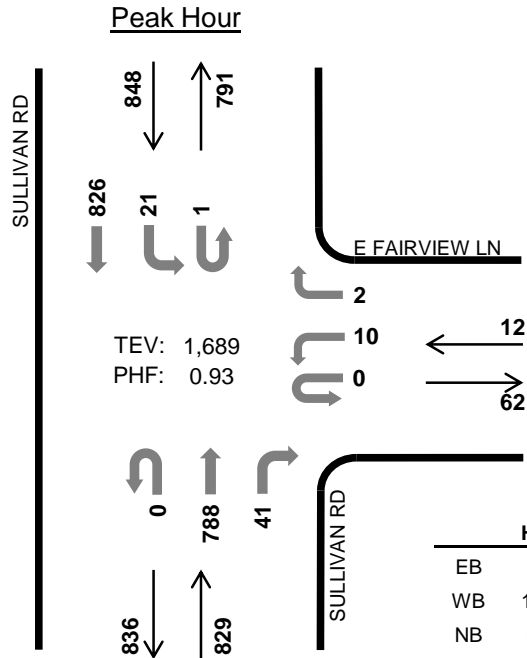
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	2	21	17	42	0	0	0	0	0	0	0	2	0	2
3:15 PM	2	2	29	15	48	0	0	0	0	0	0	0	0	0	0
3:30 PM	2	3	24	19	48	0	0	0	0	0	0	0	0	0	
3:45 PM	3	3	24	20	50	0	0	0	0	0	0	2	3	0	5
4:00 PM	3	3	25	14	45	0	0	0	0	0	0	2	4	0	6
4:15 PM	2	6	23	12	43	0	0	0	0	0	0	0	0	0	0
4:30 PM	2	0	19	9	30	0	0	0	0	0	0	3	3	0	6
4:45 PM	2	1	16	7	26	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	2	25	6	33	0	0	0	0	0	0	0	0	1	1
5:15 PM	0	1	29	12	42	0	0	0	0	0	0	1	0	0	1
5:30 PM	0	1	23	4	28	0	0	0	0	0	0	1	1	0	2
5:45 PM	2	0	22	9	33	0	0	0	0	0	0	1	1	0	2
Count Total	20	24	280	144	468	0	0	0	0	0	0	10	14	1	25
Peak Hour	4	4	89	34	131	0	0	0	0	0	0	4	3	1	8

SULLIVAN RD E FAIRVIEW LN

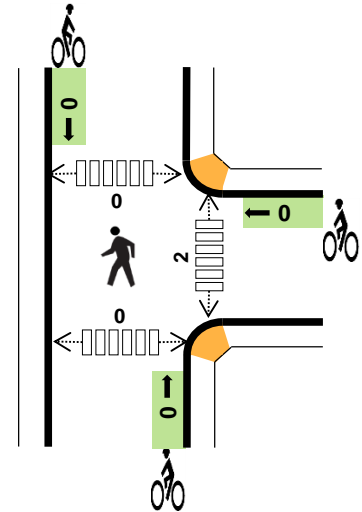


Date: Tue, Oct 30, 2018
 Count Period: 6:00 AM to 9:00 AM
 Peak Hour: 7:00 AM to 8:00 AM



TEV: 1,689
 PHF: 0.93

	HV %:	PHF
EB	-	-
WB	16.7%	0.75
NB	6.3%	0.99
SB	11.7%	0.89
TOTAL	9.1%	0.93



Three-Hour Count Summaries

Interval Start	0				E FAIRVIEW LN				SULLIVAN RD				SULLIVAN RD				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	0	0	0	0	2	0	1	0	0	190	11	0	4	186	0	394	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	201	9	1	5	179	0	396	0
7:30 AM	0	0	0	0	0	4	0	0	0	0	200	9	0	5	234	0	452	0
7:45 AM	0	0	0	0	0	4	0	0	0	0	197	12	0	7	227	0	447	1,689
Peak Hour	0	0	0	0	0	10	0	2	0	0	788	41	1	21	826	0	1,689	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
7:00 AM	0	2	11	19	32	0	0	0	0	0	1	0	0	0	1
7:15 AM	0	0	14	29	43	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	11	29	40	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	16	22	38	0	0	0	0	0	1	0	0	0	1
Peak Hour	0	2	52	99	153	0	0	0	0	0	2	0	0	0	2

Three-Hour Count Summaries																		
Interval Start	0				E FAIRVIEW LN				SULLIVAN RD				SULLIVAN RD				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	0	0	0	4	0	1	0	0	95	3	0	5	92	0	200	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	134	3	0	0	104	0	241	0
6:30 AM	0	0	0	0	0	2	0	0	0	0	199	3	0	5	145	0	354	0
6:45 AM	0	0	0	0	0	1	0	1	0	0	180	9	0	7	139	0	337	1,132
7:00 AM	0	0	0	0	0	2	0	1	0	0	190	11	0	4	186	0	394	1,326
7:15 AM	0	0	0	0	0	0	0	1	0	0	201	9	1	5	179	0	396	1,481
7:30 AM	0	0	0	0	0	4	0	0	0	0	200	9	0	5	234	0	452	1,579
7:45 AM	0	0	0	0	0	4	0	0	0	0	197	12	0	7	227	0	447	1,689
8:00 AM	0	0	0	0	0	1	0	2	0	0	175	16	0	7	181	0	382	1,677
8:15 AM	0	0	0	0	0	4	0	1	0	0	135	14	0	2	159	0	315	1,596
8:30 AM	0	0	0	0	0	1	0	1	0	0	131	12	0	6	151	0	302	1,446
8:45 AM	0	0	0	0	0	5	0	0	0	0	124	4	0	1	141	0	275	1,274
Count Total	0	0	0	0	0	28	0	8	0	0	1,961	105	1	54	1,938	0	4,095	0
Peak Hour	0	0	0	0	0	10	0	2	0	0	788	41	1	21	826	0	1,689	0

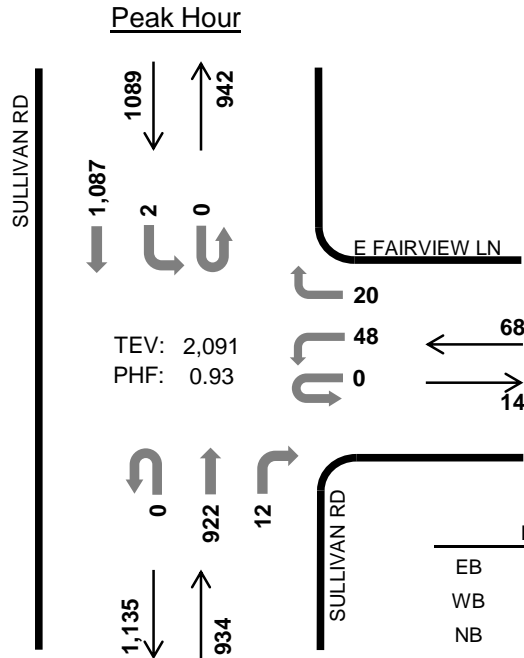
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	12	17	0	0	0	0	0	1	0	0	0	1
6:15 AM	0	0	3	14	17	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	2	9	15	26	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	1	8	12	21	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	2	11	19	32	0	0	0	0	0	1	0	0	0	1
7:15 AM	0	0	14	29	43	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	11	29	40	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	16	22	38	0	0	0	0	0	1	0	0	0	1
8:00 AM	0	0	7	20	27	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	9	32	42	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	20	30	50	0	0	0	0	0	1	0	0	0	1
8:45 AM	0	0	14	20	34	0	0	0	0	0	0	0	0	0	0
Count Total	0	9	124	254	387	0	0	0	0	0	4	0	0	0	4
Peak Hr	0	2	52	99	153	0	0	0	0	0	2	0	0	0	2

SULLIVAN RD E FAIRVIEW LN

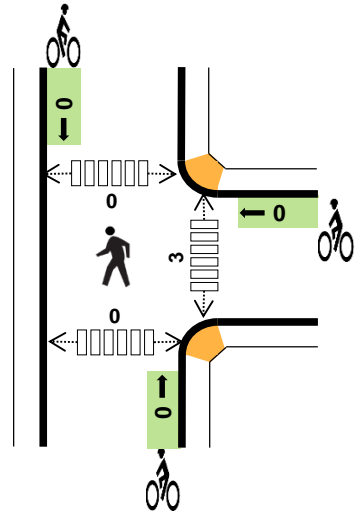


Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM



TEV: 2,091
 PHF: 0.93

	HV %:	PHF
EB	-	-
WB	1.5%	0.89
NB	5.1%	0.87
SB	2.9%	0.89
TOTAL	3.9%	0.93



Three-Hour Count Summaries

Interval Start	0				E FAIRVIEW LN				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	0	0	0	0	14	0	5	0	0	214	5	0	0	293	0	531	0
4:45 PM	0	0	0	0	0	9	0	4	0	0	202	4	0	1	242	0	462	0
5:00 PM	0	0	0	0	0	15	0	4	0	0	241	0	0	1	304	0	565	0
5:15 PM	0	0	0	0	0	10	0	7	0	0	265	3	0	0	248	0	533	2,091
Peak Hour	0	0	0	0	0	48	0	20	0	0	922	12	0	2	1,087	0	2,091	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
4:30 PM	0	0	10	10	20	0	0	0	0	0	2	0	0	0	2
4:45 PM	0	0	8	5	13	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	0	12	8	20	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	18	9	28	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	1	48	32	81	0	0	0	0	0	3	0	0	0	3

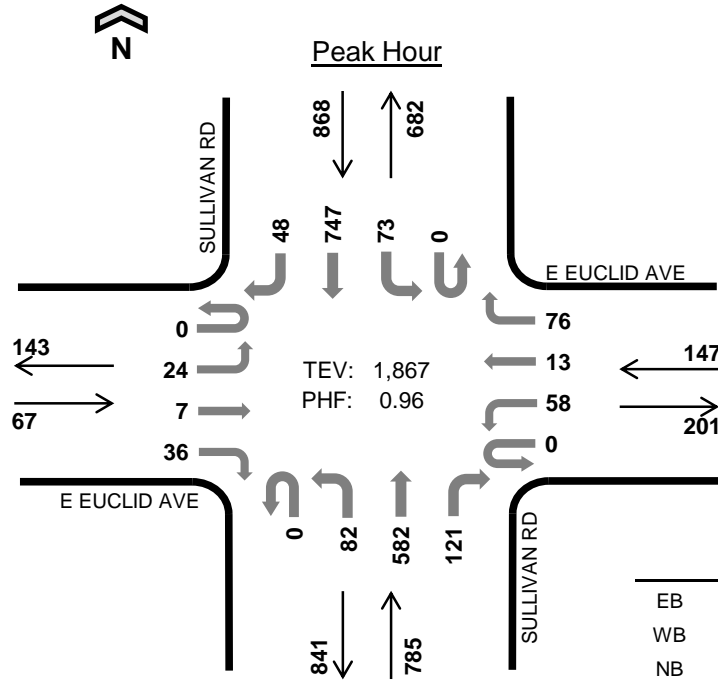
Three-Hour Count Summaries																		
Interval Start	0				E FAIRVIEW LN				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	6	0	4	0	0	190	6	0	3	231	0	440	0
3:15 PM	0	0	0	0	0	3	0	2	0	0	200	7	0	0	204	0	416	0
3:30 PM	0	0	0	0	0	8	0	3	0	0	230	1	0	0	277	0	519	0
3:45 PM	0	0	0	0	0	9	0	2	0	0	184	9	0	1	225	0	430	1,805
4:00 PM	0	0	0	0	0	8	0	6	0	0	211	6	0	1	254	0	486	1,851
4:15 PM	0	0	0	0	0	10	0	7	0	0	207	7	0	0	209	0	440	1,875
4:30 PM	0	0	0	0	0	14	0	5	0	0	214	5	0	0	293	0	531	1,887
4:45 PM	0	0	0	0	0	9	0	4	0	0	202	4	0	1	242	0	462	1,919
5:00 PM	0	0	0	0	0	15	0	4	0	0	241	0	0	1	304	0	565	1,998
5:15 PM	0	0	0	0	0	10	0	7	0	0	265	3	0	0	248	0	533	2,091
5:30 PM	0	0	0	0	0	6	0	2	0	0	242	5	0	1	218	0	474	2,034
5:45 PM	0	0	0	0	0	7	0	1	0	0	182	0	0	2	209	0	401	1,973
Count Total	0	0	0	0	0	105	0	47	0	0	2,568	53	0	10	2,914	0	5,697	0
Peak Hour	0	0	0	0	0	48	0	20	0	0	922	12	0	2	1,087	0	2,091	0

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

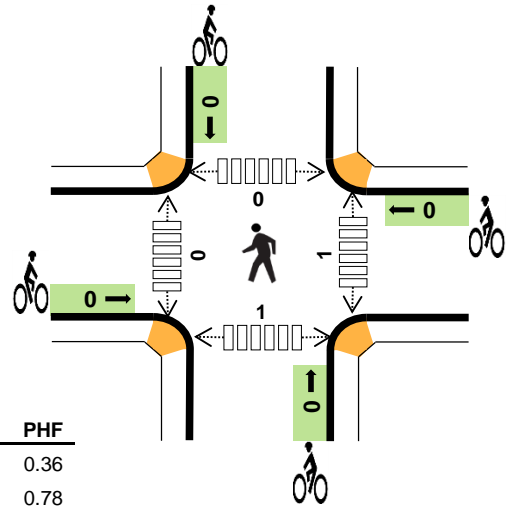
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	0	18	17	35	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	22	17	39	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	17	17	34	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	14	23	37	0	0	0	0	0	3	0	0	0	3
4:00 PM	0	2	16	17	35	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	0	14	14	28	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	10	10	20	0	0	0	0	0	2	0	0	0	2
4:45 PM	0	0	8	5	13	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	0	12	8	20	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	18	9	28	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	14	8	22	0	0	0	0	0	2	0	0	0	2
5:45 PM	0	0	13	9	22	0	0	0	0	0	1	0	0	0	1
Count Total	0	3	176	154	333	0	0	0	0	0	10	0	0	0	10
Peak Hr	0	1	48	32	81	0	0	0	0	0	3	0	0	0	3



SULLIVAN RD E EUCLID AVE



Date: Tue, Oct 30, 2018
 Count Period: 6:00 AM to 9:00 AM
 Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	7.5%	0.36
WB	32.7%	0.78
NB	6.4%	0.96
SB	8.2%	0.86
TOTAL	9.3%	0.96

Three-Hour Count Summaries

Interval Start	E EUCLID AVE				E EUCLID AVE				SULLIVAN RD				SULLIVAN RD				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	17	2	27	0	10	2	21	0	21	132	29	0	22	157	14	454	0
7:15 AM	0	2	3	3	0	21	4	22	0	24	146	32	0	19	149	17	442	0
7:30 AM	0	3	0	5	0	12	1	20	0	17	162	26	0	10	219	8	483	0
7:45 AM	0	2	2	1	0	15	6	13	0	20	142	34	0	22	222	9	488	1,867
Peak Hour	0	24	7	36	0	58	13	76	0	82	582	121	0	73	747	48	1,867	0

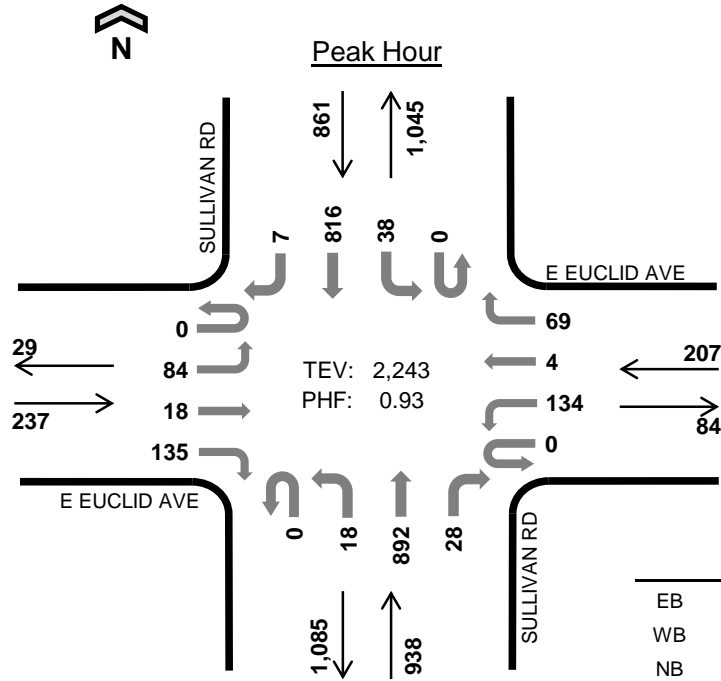
Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total	
7:00 AM	3	10	11	16	40	0	0	0	0	0	0	0	0	0	1	1
7:15 AM	2	21	13	14	50	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	7	10	25	42	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	10	16	16	42	0	0	0	0	0	1	0	0	0	1	
Peak Hour	5	48	50	71	174	0	0	0	0	0	1	0	0	1	2	

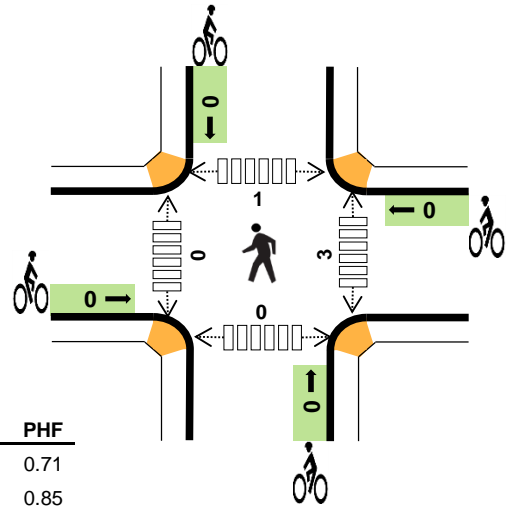
Three-Hour Count Summaries																		
Interval Start	E EUCLID AVE				E EUCLID AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
6:00 AM	0	2	1	3	0	10	1	4	0	29	47	22	0	11	81	14	225	0
6:15 AM	0	2	1	5	0	7	5	3	0	34	84	11	0	9	100	31	292	0
6:30 AM	0	5	1	13	0	7	1	10	0	59	113	30	0	15	128	27	409	0
6:45 AM	0	2	1	3	0	8	6	12	0	28	114	41	0	18	135	18	386	1,312
7:00 AM	0	17	2	27	0	10	2	21	0	21	132	29	0	22	157	14	454	1,541
7:15 AM	0	2	3	3	0	21	4	22	0	24	146	32	0	19	149	17	442	1,691
7:30 AM	0	3	0	5	0	12	1	20	0	17	162	26	0	10	219	8	483	1,765
7:45 AM	0	2	2	1	0	15	6	13	0	20	142	34	0	22	222	9	488	1,867
8:00 AM	0	1	1	4	0	12	3	7	0	22	133	25	0	17	169	5	399	1,812
8:15 AM	0	1	0	4	0	15	2	14	0	9	101	19	0	23	137	2	327	1,697
8:30 AM	0	3	3	4	0	17	2	17	0	11	109	17	0	12	134	4	333	1,547
8:45 AM	0	0	3	4	0	18	2	11	0	8	100	12	0	13	119	2	292	1,351
Count Total	0	40	18	76	0	152	35	154	0	282	1,383	298	0	191	1,750	151	4,530	0
Peak Hour	0	24	7	36	0	58	13	76	0	82	582	121	0	73	747	48	1,867	0
<i>Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.</i>																		
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	2	4	2	9	17	0	0	0	0	0	1	0	0	0	1			
6:15 AM	4	5	2	10	21	0	0	0	0	0	0	0	0	0	0			
6:30 AM	5	7	10	6	28	0	0	0	0	0	0	0	0	0	0			
6:45 AM	3	7	9	9	28	0	0	0	0	0	0	0	0	0	0			
7:00 AM	3	10	11	16	40	0	0	0	0	0	0	0	0	1	1			
7:15 AM	2	21	13	14	50	0	0	0	0	0	0	0	0	0	0			
7:30 AM	0	7	10	25	42	0	0	0	0	0	0	0	0	0	0			
7:45 AM	0	10	16	16	42	0	0	0	0	0	1	0	0	0	1			
8:00 AM	2	5	9	16	32	0	0	0	0	0	0	0	0	0	0			
8:15 AM	0	10	9	32	51	0	0	0	0	0	0	0	0	0	0			
8:30 AM	3	13	20	21	57	0	0	0	0	0	0	0	0	0	0			
8:45 AM	2	11	12	13	38	0	0	0	0	0	0	0	0	0	0			
Count Total	26	110	123	187	446	0	0	0	0	0	2	0	0	1	3			
Peak Hour	5	48	50	71	174	0	0	0	0	0	1	0	0	1	2			



SULLIVAN RD E EUCLID AVE



Date: Tue, Oct 30, 2018
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	2.1%	0.71
WB	4.8%	0.85
NB	5.0%	0.91
SB	3.5%	0.91
TOTAL	4.1%	0.93

Three-Hour Count Summaries

Interval Start	E EUCLID AVE				E EUCLID AVE				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	36	8	39	0	36	1	24	0	5	216	6	0	12	215	2	600	0
4:45 PM	0	27	5	32	0	25	1	14	0	3	191	5	0	8	187	3	501	0
5:00 PM	0	10	3	36	0	36	2	19	0	2	243	8	0	6	230	0	595	0
5:15 PM	0	11	2	28	0	37	0	12	0	8	242	9	0	12	184	2	547	2,243
Peak Hour	0	84	18	135	0	134	4	69	0	18	892	28	0	38	816	7	2,243	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
4:30 PM	0	1	10	10	21	0	0	0	0	0	2	0	0	0	2
4:45 PM	4	1	8	7	20	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	2	13	7	22	0	0	0	0	0	0	0	1	0	1
5:15 PM	1	6	16	6	29	0	0	0	0	0	0	0	0	0	0
Peak Hour	5	10	47	30	92	0	0	0	0	0	3	0	1	0	4

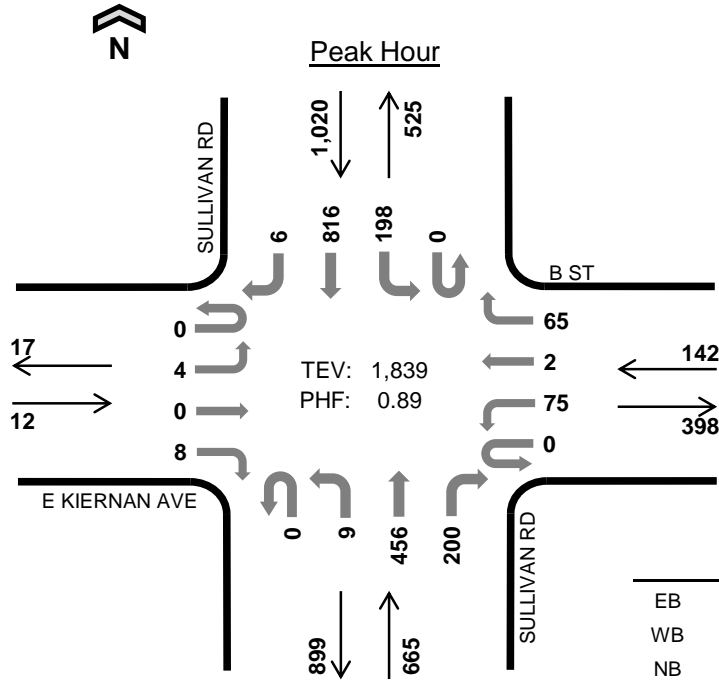
Three-Hour Count Summaries																		
Interval Start	E EUCLID AVE				E EUCLID AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	18	5	25	0	36	4	25	0	3	175	9	0	4	173	2	479	0
3:15 PM	0	17	1	16	0	22	3	8	0	3	192	19	0	13	158	7	459	0
3:30 PM	0	48	5	15	0	59	1	14	0	2	205	13	0	8	201	3	574	0
3:45 PM	0	22	0	14	0	31	2	11	0	5	187	5	0	10	171	1	459	1,971
4:00 PM	0	17	0	24	0	35	1	5	0	5	192	14	0	10	198	4	505	1,997
4:15 PM	0	26	5	17	0	29	2	9	0	6	201	9	0	12	152	4	472	2,010
4:30 PM	0	36	8	39	0	36	1	24	0	5	216	6	0	12	215	2	600	2,036
4:45 PM	0	27	5	32	0	25	1	14	0	3	191	5	0	8	187	3	501	2,078
5:00 PM	0	10	3	36	0	36	2	19	0	2	243	8	0	6	230	0	595	2,168
5:15 PM	0	11	2	28	0	37	0	12	0	8	242	9	0	12	184	2	547	2,243
5:30 PM	0	7	1	18	0	23	2	15	0	6	237	10	0	8	171	5	503	2,146
5:45 PM	0	8	1	3	0	15	0	7	0	5	170	9	0	2	187	2	409	2,054
Count Total	0	247	36	267	0	384	19	163	0	53	2,451	116	0	105	2,227	35	6,103	0
Peak Hour	0	84	18	135	0	134	4	69	0	18	892	28	0	38	816	7	2,243	0

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

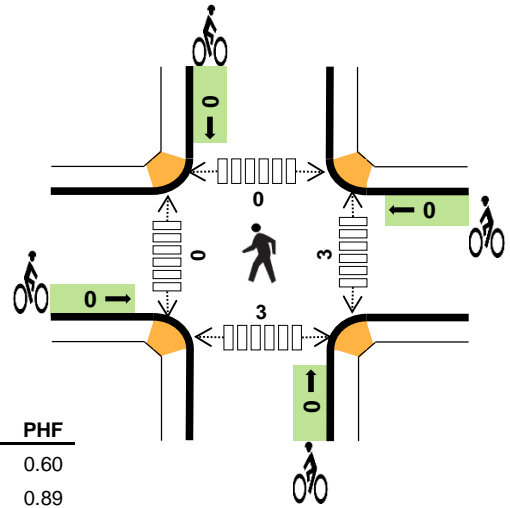
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	2	5	16	11	34	0	0	0	0	0	0	0	0	0	0
3:15 PM	3	7	22	16	48	0	0	0	0	0	0	0	0	0	0
3:30 PM	5	6	17	13	41	0	0	0	0	0	1	0	0	0	1
3:45 PM	3	11	13	19	46	0	0	0	0	0	1	0	0	0	1
4:00 PM	2	4	16	15	37	0	0	0	0	0	1	0	0	0	1
4:15 PM	4	5	14	9	32	0	0	0	0	0	0	0	0	1	1
4:30 PM	0	1	10	10	21	0	0	0	0	0	2	0	0	0	2
4:45 PM	4	1	8	7	20	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	2	13	7	22	0	0	0	0	0	0	0	1	0	1
5:15 PM	1	6	16	6	29	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	2	15	11	28	0	0	0	0	0	1	0	1	0	2
5:45 PM	1	1	11	7	20	0	0	0	0	0	2	0	3	0	5
Count Total	25	51	171	131	378	0	0	0	0	0	9	0	5	1	15
Peak Hour	5	10	47	30	92	0	0	0	0	0	3	0	1	0	4



SULLIVAN RD E KIERNAN AVE



Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	25.0%	0.60
WB	34.5%	0.89
NB	7.7%	0.85
SB	7.3%	0.86
TOTAL	9.6%	0.89

Three-Hour Count Summaries

Interval Start	E KIERNAN AVE				B ST				SULLIVAN RD				SULLIVAN RD				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		
7:15 AM	0	1	0	0	0	13	0	15	0	1	123	46	0	30	179	3	411	0
7:30 AM	0	0	0	5	0	21	0	15	0	3	142	50	0	46	234	1	517	0
7:45 AM	0	2	0	2	0	22	1	15	0	3	106	52	0	77	220	1	501	0
8:00 AM	0	1	0	1	0	19	1	20	0	2	85	52	0	45	183	1	410	1,839
Peak Hour	0	4	0	8	0	75	2	65	0	9	456	200	0	198	816	6	1,839	0

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

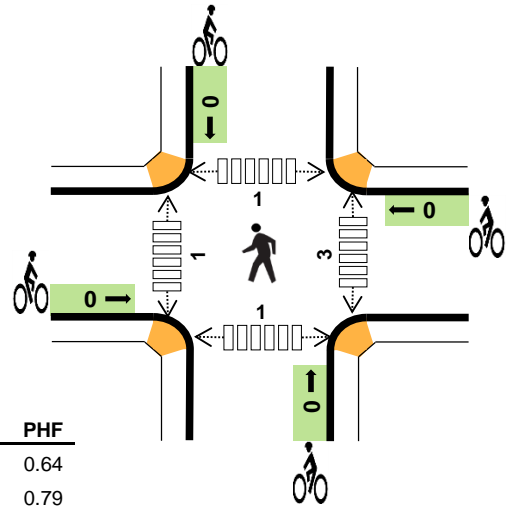
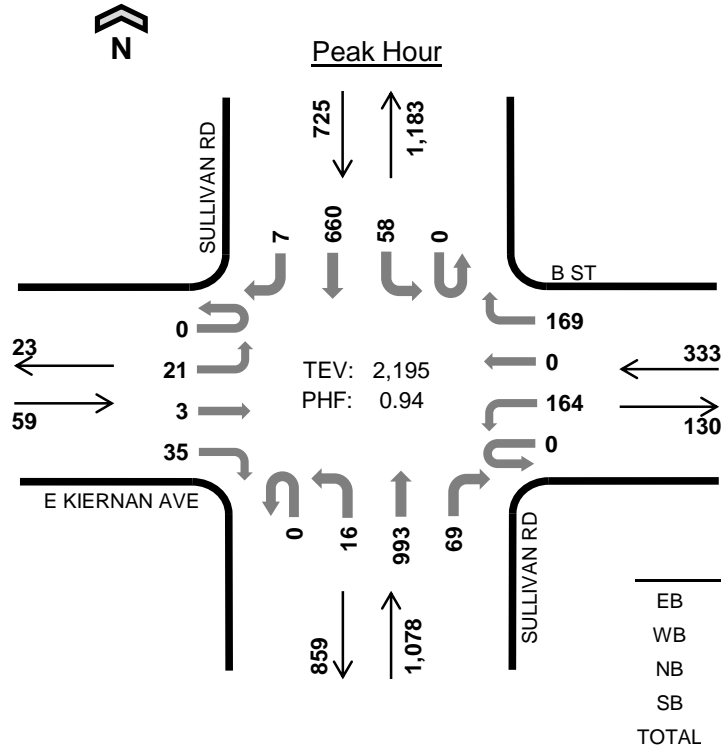
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:15 AM	0	9	15	16	40	0	0	0	0	0	0	0	0	0	0
7:30 AM	1	9	10	23	43	0	0	0	0	0	3	0	0	0	3
7:45 AM	1	13	14	17	45	0	0	0	0	0	0	0	0	3	3
8:00 AM	1	18	12	18	49	0	0	0	0	0	0	0	0	0	0
Peak Hour	3	49	51	74	177	0	0	0	0	0	3	0	0	3	6

Three-Hour Count Summaries																		
Interval Start	E KIERNAN AVE				B ST				SULLIVAN RD				SULLIVAN RD				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	1	0	0	19	0	19	0	0	46	20	0	27	94	2	228	0
6:15 AM	0	0	0	1	0	15	1	9	0	2	52	31	0	33	133	1	278	0
6:30 AM	0	0	0	1	0	8	0	10	1	1	77	42	0	38	181	1	360	0
6:45 AM	0	1	0	1	0	14	0	9	0	6	70	55	0	65	182	3	406	1,272
7:00 AM	0	0	0	0	0	13	0	9	0	7	105	42	0	33	183	4	396	1,440
7:15 AM	0	1	0	0	0	13	0	15	0	1	123	46	0	30	179	3	411	1,573
7:30 AM	0	0	0	5	0	21	0	15	0	3	142	50	0	46	234	1	517	1,730
7:45 AM	0	2	0	2	0	22	1	15	0	3	106	52	0	77	220	1	501	1,825
8:00 AM	0	1	0	1	0	19	1	20	0	2	85	52	0	45	183	1	410	1,839
8:15 AM	0	1	0	2	0	22	0	11	0	5	85	38	0	24	146	4	338	1,766
8:30 AM	0	2	0	9	0	22	0	11	0	10	97	20	0	21	126	7	325	1,574
8:45 AM	0	5	0	9	0	19	1	12	0	6	73	23	0	20	104	7	279	1,352
Count Total	0	13	1	31	0	207	4	155	1	46	1,061	471	0	459	1,965	35	4,449	0
Peak Hour	0	4	0	8	0	75	2	65	0	9	456	200	0	198	816	6	1,839	0
<i>Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.</i>																		
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	8	5	7	21	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	17	3	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	1	8	9	3	21	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	1	11	12	7	31	0	0	0	0	0	0	0	1	1	0	0	2	0
7:00 AM	0	6	16	12	34	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	9	15	16	40	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	1	9	10	23	43	0	0	0	0	0	3	0	0	0	0	0	3	0
7:45 AM	1	13	14	17	45	0	0	0	0	0	0	0	0	0	0	0	3	3
8:00 AM	1	18	12	18	49	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	1	13	10	29	53	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	2	10	18	20	50	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	11	7	9	28	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	10	133	131	165	439	0	0	0	0	0	3	1	1	3	8	0	0	0
Peak Hour	3	49	51	74	177	0	0	0	0	0	3	0	0	3	6	0	0	0

SULLIVAN RD E KIERNAN AVE



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	11.9%	0.64
WB	2.1%	0.79
NB	3.9%	0.93
SB	7.3%	0.95
TOTAL	5.0%	0.94

Three-Hour Count Summaries

Interval Start	E KIERNAN AVE				B ST				SULLIVAN RD				SULLIVAN RD				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		
4:30 PM	0	6	1	14	0	51	0	54	0	12	245	13	0	15	166	4	581	0
4:45 PM	0	5	0	8	0	37	0	41	0	4	232	13	0	15	158	2	515	0
5:00 PM	0	9	1	13	0	39	0	48	0	0	244	26	0	13	177	1	571	0
5:15 PM	0	1	1	0	0	37	0	26	0	0	272	17	0	15	159	0	528	2,195
Peak Hour	0	21	3	35	0	164	0	169	0	16	993	69	0	58	660	7	2,195	0

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

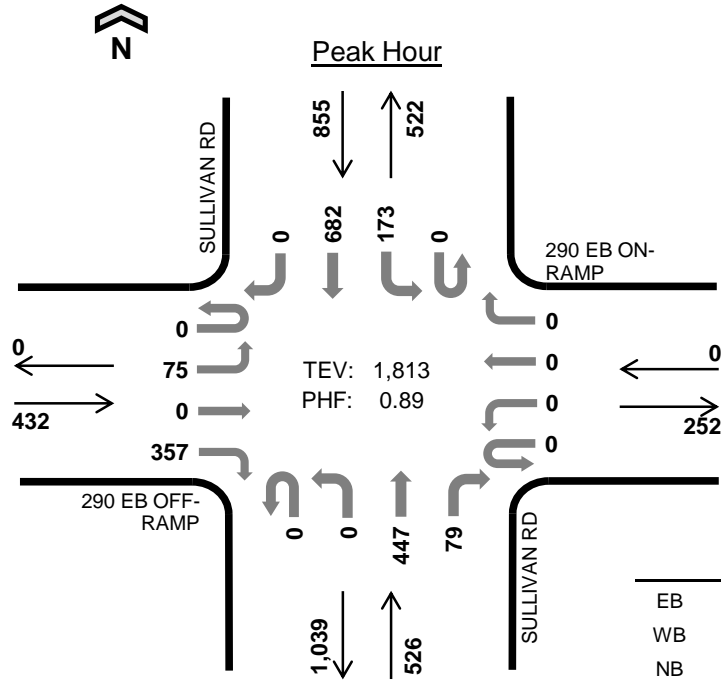
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total	
4:30 PM	2	1	9	19	31	0	0	0	0	0	0	0	0	0	1	1
4:45 PM	2	0	11	12	25	0	0	0	0	0	3	1	0	0	4	
5:00 PM	2	3	9	10	24	0	0	0	0	0	0	0	1	0	1	
5:15 PM	1	3	13	12	29	0	0	0	0	0	0	0	0	0	0	
Peak Hour	7	7	42	53	109	0	0	0	0	0	3	1	1	1	6	

Three-Hour Count Summaries																		
Interval Start	E KIERNAN AVE				B ST				SULLIVAN RD				SULLIVAN RD				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	1	16	0	39	0	33	0	19	179	14	0	16	119	6	451	0
3:15 PM	0	6	0	18	0	26	0	35	0	16	172	17	0	18	129	8	445	0
3:30 PM	0	5	0	15	0	53	0	68	0	12	234	22	0	16	158	8	591	0
3:45 PM	0	5	1	23	0	30	0	36	1	19	218	22	0	15	128	9	507	1,994
4:00 PM	0	8	0	15	0	48	1	49	0	5	191	17	0	10	146	4	494	2,037
4:15 PM	0	4	0	10	0	30	1	23	0	4	226	19	0	14	143	4	478	2,070
4:30 PM	0	6	1	14	0	51	0	54	0	12	245	13	0	15	166	4	581	2,060
4:45 PM	0	5	0	8	0	37	0	41	0	4	232	13	0	15	158	2	515	2,068
5:00 PM	0	9	1	13	0	39	0	48	0	0	244	26	0	13	177	1	571	2,145
5:15 PM	0	1	1	0	0	37	0	26	0	0	272	17	0	15	159	0	528	2,195
5:30 PM	0	2	0	1	0	28	0	21	0	0	244	19	0	9	168	0	492	2,106
5:45 PM	0	0	0	3	0	28	0	18	0	0	194	20	0	10	150	0	423	2,014
Count Total	0	60	5	136	0	446	2	452	1	91	2,651	219	0	166	1,801	46	6,076	0
Peak Hour	0	21	3	35	0	164	0	169	0	16	993	69	0	58	660	7	2,195	0

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

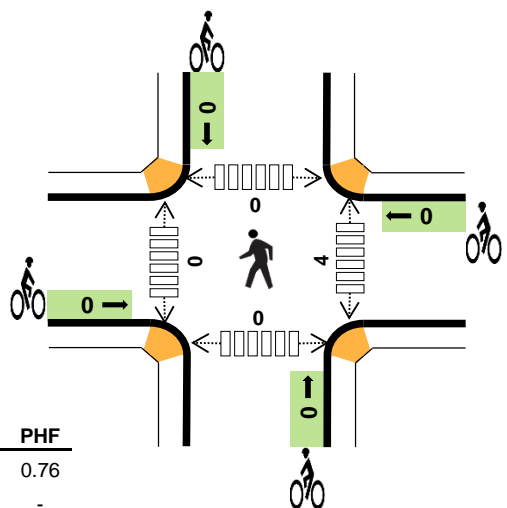
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	1	5	15	17	38	0	0	0	0	0	0	0	0	0	0
3:15 PM	1	1	14	26	42	0	0	0	0	0	0	0	0	0	0
3:30 PM	3	4	12	17	36	0	0	0	0	0	0	0	0	1	1
3:45 PM	2	3	18	20	43	0	0	0	0	0	0	0	0	0	0
4:00 PM	5	3	13	12	33	0	0	0	0	0	1	0	0	1	2
4:15 PM	1	3	18	14	36	0	0	0	0	0	1	0	0	1	2
4:30 PM	2	1	9	19	31	0	0	0	0	0	0	0	0	1	1
4:45 PM	2	0	11	12	25	0	0	0	0	0	3	1	0	0	4
5:00 PM	2	3	9	10	24	0	0	0	0	0	0	0	1	0	1
5:15 PM	1	3	13	12	29	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	4	13	10	27	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	7	12	20	0	0	0	0	0	1	1	0	1	3
Count Total	20	31	152	181	384	0	0	0	0	0	6	2	1	5	14
Peak Hour	7	7	42	53	109	0	0	0	0	0	3	1	1	1	6

SULLIVAN RD 290 EB OFF-RAMP



Date: Tue, Oct 30, 2018
 Count Period: 6:00 AM to 9:00 AM
 Peak Hour: 7:00 AM to 8:00 AM

	HV %:	PHF
EB	6.5%	0.76
WB	-	-
NB	9.9%	0.87
SB	5.6%	0.82
TOTAL	7.1%	0.89



Three-Hour Count Summaries

Interval Start	290 EB OFF-RAMP				290 EB ON-RAMP				SULLIVAN RD				SULLIVAN RD				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	12	0	58	0	0	0	0	0	0	89	21	0	41	163	0	384	0
7:15 AM	0	17	0	75	0	0	0	0	0	0	124	19	0	32	147	0	414	0
7:30 AM	0	32	0	110	0	0	0	0	0	0	129	23	0	45	165	0	504	0
7:45 AM	0	14	0	114	0	0	0	0	0	0	105	16	0	55	207	0	511	1,813
Peak Hour	0	75	0	357	0	0	0	0	0	0	447	79	0	173	682	0	1,813	0

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

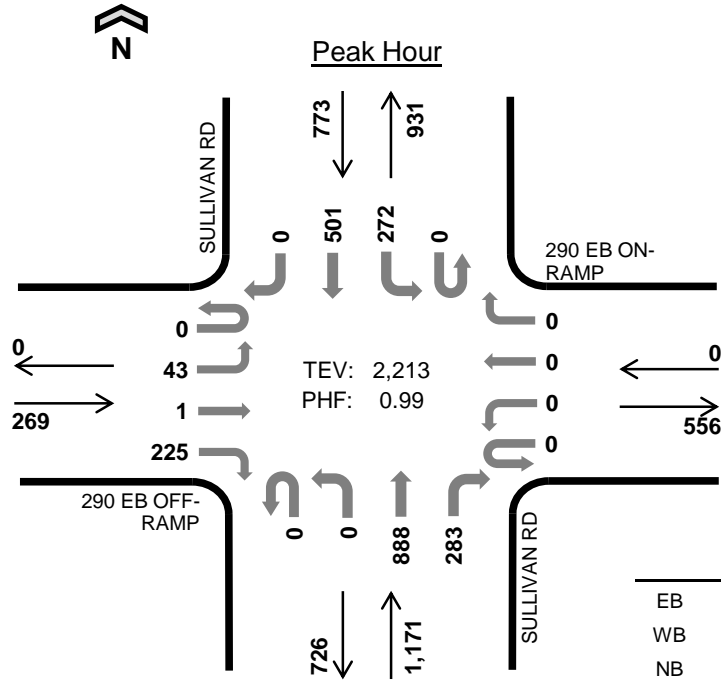
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	5	0	15	7	27	0	0	0	0	0	0	0	0	0	0
7:15 AM	8	0	13	11	32	0	0	0	0	0	0	0	0	0	0
7:30 AM	10	0	12	17	39	0	0	0	0	0	4	0	0	0	4
7:45 AM	5	0	12	13	30	0	0	0	0	0	0	0	0	0	0
Peak Hour	28	0	52	48	128	0	0	0	0	0	4	0	0	0	4

Three-Hour Count Summaries																		
Interval Start	290 EB OFF-RAMP				290 EB ON-RAMP				SULLIVAN RD				SULLIVAN RD				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	1	36	0	0	0	0	0	0	51	13	0	24	89	0	214	0
6:15 AM	0	5	0	40	0	0	0	0	0	0	54	8	0	44	132	0	283	0
6:30 AM	0	7	0	46	0	0	0	0	0	0	70	12	0	48	176	0	359	0
6:45 AM	0	8	0	85	0	0	0	0	0	0	74	11	0	41	172	0	391	1,247
7:00 AM	0	12	0	58	0	0	0	0	0	0	89	21	0	41	163	0	384	1,417
7:15 AM	0	17	0	75	0	0	0	0	0	0	124	19	0	32	147	0	414	1,548
7:30 AM	0	32	0	110	0	0	0	0	0	0	129	23	0	45	165	0	504	1,693
7:45 AM	0	14	0	114	0	0	0	0	0	0	105	16	0	55	207	0	511	1,813
8:00 AM	0	3	0	60	0	0	0	0	0	0	90	18	0	48	151	0	370	1,799
8:15 AM	0	5	1	63	0	0	0	0	0	0	79	20	0	34	118	0	320	1,705
8:30 AM	0	5	0	57	0	0	0	0	0	0	95	17	0	34	94	0	302	1,503
8:45 AM	0	8	0	41	0	0	0	0	0	0	73	14	0	32	97	0	265	1,257
Count Total	0	116	2	785	0	0	0	0	0	0	1,033	192	0	478	1,711	0	4,317	0
Peak Hour	0	75	0	357	0	0	0	0	0	0	447	79	0	173	682	0	1,813	0

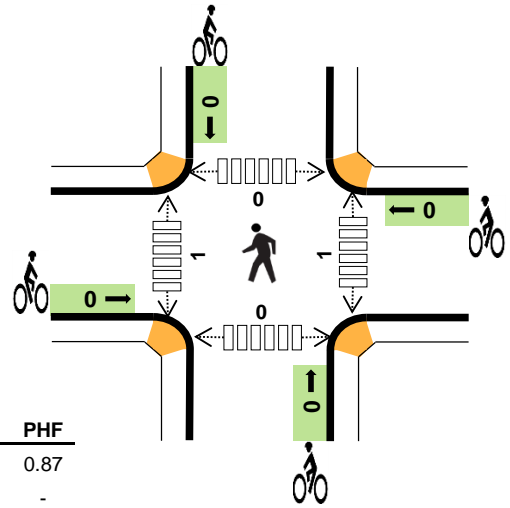
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	4	0	9	4	17	0	0	0	0	0	0	0	0	0	0
6:15 AM	2	0	9	2	13	0	0	0	0	0	0	0	0	0	0
6:30 AM	1	0	11	3	15	0	0	0	0	0	0	0	0	0	0
6:45 AM	2	0	12	6	20	0	0	0	0	0	0	0	0	0	0
7:00 AM	5	0	15	7	27	0	0	0	0	0	0	0	0	0	0
7:15 AM	8	0	13	11	32	0	0	0	0	0	0	0	0	0	0
7:30 AM	10	0	12	17	39	0	0	0	0	0	4	0	0	0	4
7:45 AM	5	0	12	13	30	0	0	0	0	0	0	0	0	0	0
8:00 AM	10	0	23	13	46	0	0	0	0	0	0	0	0	0	0
8:15 AM	16	0	11	14	41	0	0	0	0	0	0	0	0	0	0
8:30 AM	13	0	18	14	45	0	0	0	0	0	0	0	0	0	0
8:45 AM	7	0	9	10	26	0	0	0	0	0	0	0	0	0	0
Count Total	83	0	154	114	351	0	0	0	0	0	4	0	0	0	4
Peak Hour	28	0	52	48	128	0	0	0	0	0	4	0	0	0	4

SULLIVAN RD 290 EB OFF-RAMP



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:45 PM to 5:45 PM



	HV %:	PHF
EB	8.2%	0.87
WB	-	-
NB	1.8%	0.98
SB	3.8%	0.96
TOTAL	3.3%	0.99

Three-Hour Count Summaries

Interval Start	290 EB OFF-RAMP				290 EB ON-RAMP				SULLIVAN RD				SULLIVAN RD				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		
4:45 PM	0	11	0	56	0	0	0	0	0	0	230	69	0	63	125	0	554	0
5:00 PM	0	5	0	56	0	0	0	0	0	0	237	61	0	68	134	0	561	0
5:15 PM	0	11	0	53	0	0	0	0	0	0	204	76	0	69	129	0	542	0
5:30 PM	0	16	1	60	0	0	0	0	0	0	217	77	0	72	113	0	556	2,213
Peak Hour	0	43	1	225	0	0	0	0	0	0	888	283	0	272	501	0	2,213	0

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

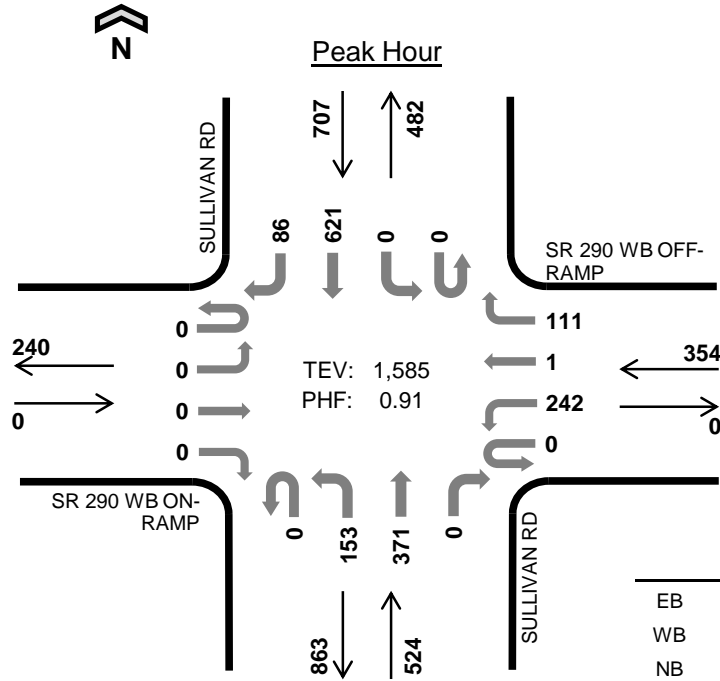
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:45 PM	4	0	6	9	19	0	0	0	0	0	1	0	0	0	1
5:00 PM	4	0	3	7	14	0	0	0	0	0	0	1	0	0	1
5:15 PM	7	0	8	7	22	0	0	0	0	0	0	0	0	0	0
5:30 PM	7	0	4	6	17	0	0	0	0	0	0	0	0	0	0
Peak Hour	22	0	21	29	72	0	0	0	0	0	1	1	0	0	2

Three-Hour Count Summaries																		
Interval Start	290 EB OFF-RAMP				290 EB ON-RAMP				SULLIVAN RD				SULLIVAN RD				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	7	0	48	0	0	0	0	0	0	179	48	0	29	97	0	408	0
3:15 PM	0	4	1	67	0	0	0	0	0	0	180	40	0	40	87	0	419	0
3:30 PM	0	4	0	64	0	0	0	0	0	0	183	50	0	41	121	0	463	0
3:45 PM	0	9	0	51	0	0	0	0	0	0	226	50	0	36	96	0	468	1,758
4:00 PM	0	3	0	56	0	0	0	0	0	0	233	62	0	58	113	0	525	1,875
4:15 PM	0	8	0	53	0	0	0	0	0	0	200	53	0	60	106	0	480	1,936
4:30 PM	0	7	0	51	0	0	0	0	0	0	216	56	0	67	133	0	530	2,003
4:45 PM	0	11	0	56	0	0	0	0	0	0	230	69	0	63	125	0	554	2,089
5:00 PM	0	5	0	56	0	0	0	0	0	0	237	61	0	68	134	0	561	2,125
5:15 PM	0	11	0	53	0	0	0	0	0	0	204	76	0	69	129	0	542	2,187
5:30 PM	0	16	1	60	0	0	0	0	0	0	217	77	0	72	113	0	556	2,213
5:45 PM	0	15	0	40	0	0	0	0	0	0	162	37	0	66	117	0	437	2,096
Count Total	0	100	2	655	0	0	0	0	0	0	2,467	679	0	669	1,371	0	5,943	0
Peak Hour	0	43	1	225	0	0	0	0	0	0	888	283	0	272	501	0	2,213	0

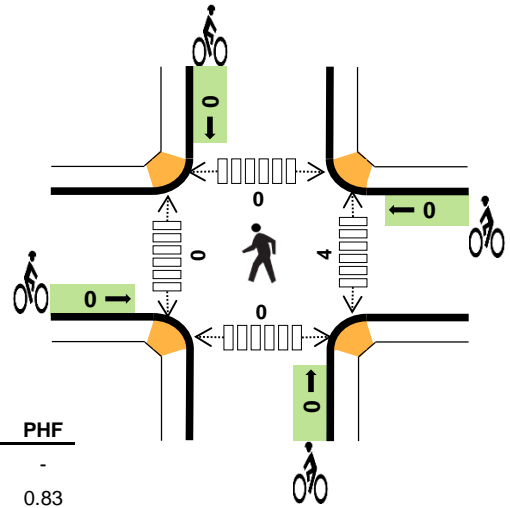
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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	9	0	16	8	33	0	0	0	0	0	0	0	0	0	0
3:15 PM	13	0	6	12	31	0	0	0	0	0	0	0	0	0	0
3:30 PM	4	0	10	13	27	0	0	0	0	0	0	0	0	0	0
3:45 PM	11	0	11	11	33	0	0	0	0	0	0	1	0	0	1
4:00 PM	4	0	14	10	28	0	0	0	0	0	0	0	0	0	0
4:15 PM	4	0	12	14	30	0	0	0	0	0	0	0	0	0	0
4:30 PM	9	0	5	11	25	0	0	0	0	0	0	0	0	0	0
4:45 PM	4	0	6	9	19	0	0	0	0	0	1	0	0	0	1
5:00 PM	4	0	3	7	14	0	0	0	0	0	0	1	0	0	1
5:15 PM	7	0	8	7	22	0	0	0	0	0	0	0	0	0	0
5:30 PM	7	0	4	6	17	0	0	0	0	0	0	0	0	0	0
5:45 PM	2	0	2	10	14	0	0	0	0	0	0	2	0	0	2
Count Total	78	0	97	118	293	0	0	0	0	0	1	4	0	0	5
Peak Hour	22	0	21	29	72	0	0	0	0	0	1	1	0	0	2

SULLIVAN RD SR 290 WB ON-RAMP



Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	-	-
WB	9.0%	0.83
NB	8.2%	0.81
SB	3.7%	0.79
TOTAL	6.4%	0.91

Three-Hour Count Summaries

Interval Start	SR 290 WB ON-RAMP				SR 290 WB OFF-RAMP				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound		Westbound		Northbound		Southbound		UT		LT		TH		RT			
7:00 AM	0	0	0	0	0	46	0	22	0	24	79	0	0	0	162	13	346	0
7:15 AM	0	0	0	0	0	59	0	33	0	46	93	0	0	0	122	21	374	0
7:30 AM	0	0	0	0	0	73	0	34	0	42	120	0	0	0	137	28	434	0
7:45 AM	0	0	0	0	0	64	1	22	0	41	79	0	0	0	200	24	431	1,585
Peak Hour	0	0	0	0	0	242	1	111	0	153	371	0	0	0	621	86	1,585	0

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

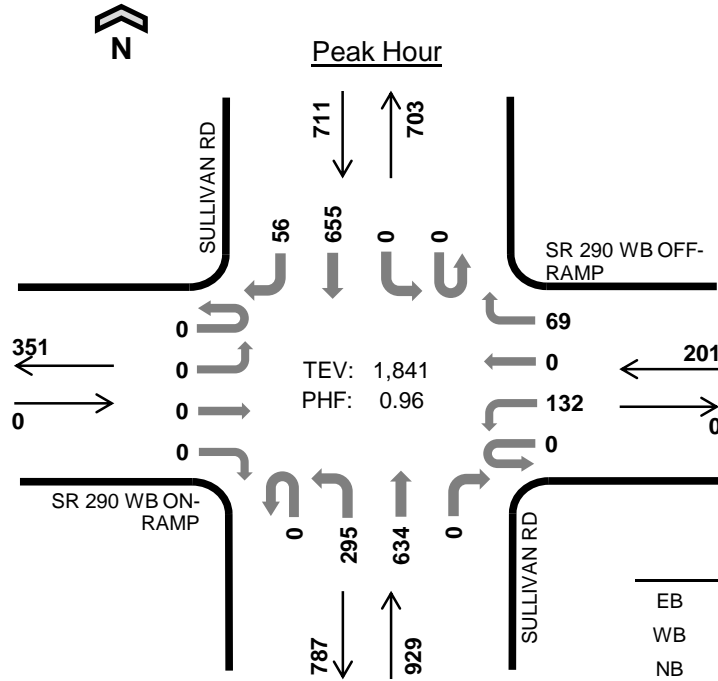
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	6	11	3	20	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	6	13	5	24	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	9	9	13	31	0	0	0	0	0	4	0	0	0	4
7:45 AM	0	11	10	5	26	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	32	43	26	101	0	0	0	0	0	4	0	0	0	4

Three-Hour Count Summaries																		
Interval Start	SR 290 WB ON-RAMP				SR 290 WB OFF-RAMP				SULLIVAN RD				SULLIVAN RD				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	0	0	0	25	0	10	0	16	35	0	0	0	90	5	181	0
6:15 AM	0	0	0	0	0	39	0	12	0	19	38	0	0	0	140	7	255	0
6:30 AM	0	0	0	0	0	55	0	21	0	25	53	0	0	0	167	14	335	0
6:45 AM	0	0	0	0	0	40	0	18	0	31	51	0	0	0	170	9	319	1,090
7:00 AM	0	0	0	0	0	46	0	22	0	24	79	0	0	0	162	13	346	1,255
7:15 AM	0	0	0	0	0	59	0	33	0	46	93	0	0	0	122	21	374	1,374
7:30 AM	0	0	0	0	0	73	0	34	0	42	120	0	0	0	137	28	434	1,473
7:45 AM	0	0	0	0	0	64	1	22	0	41	79	0	0	0	200	24	431	1,585
8:00 AM	0	0	0	0	0	28	0	8	0	47	45	0	0	0	165	6	299	1,538
8:15 AM	0	0	0	0	0	36	0	14	0	33	49	0	0	0	120	7	259	1,423
8:30 AM	0	0	0	0	0	38	0	7	0	43	56	0	0	0	87	10	241	1,230
8:45 AM	0	0	0	0	0	26	1	3	0	39	40	0	0	0	111	10	230	1,029
Count Total	0	0	0	0	0	529	2	204	0	406	738	0	0	0	1,671	154	3,704	0
Peak Hour	0	0	0	0	0	242	1	111	0	153	371	0	0	0	621	86	1,585	0

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

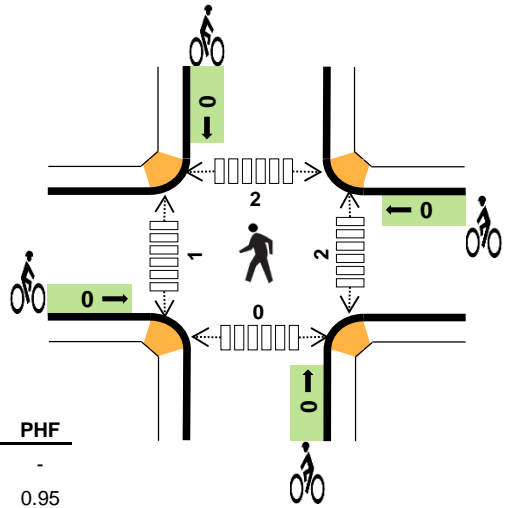
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
6:00 AM	0	4	7	0	11	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	1	7	3	11	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	9	3	13	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	3	8	2	13	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	6	11	3	20	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	6	13	5	24	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	9	9	13	31	0	0	0	0	0	4	0	0	0	4
7:45 AM	0	11	10	5	26	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	5	22	6	33	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	14	9	2	25	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	8	16	5	29	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	5	7	5	17	0	0	0	0	0	0	0	0	0	0
Count Total	0	73	128	52	253	0	0	0	0	0	4	0	0	0	4
Peak Hour	0	32	43	26	101	0	0	0	0	0	4	0	0	0	4

SULLIVAN RD SR 290 WB ON-RAMP



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:30 PM to 5:30 PM

	HV %:	PHF
EB	-	-
WB	7.0%	0.95
NB	1.6%	0.92
SB	2.7%	0.96
TOTAL	2.6%	0.96



Three-Hour Count Summaries

Interval Start	SR 290 WB ON-RAMP				SR 290 WB OFF-RAMP				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound		Westbound		Northbound		Southbound		UT		LT		TH		RT			
4:30 PM	0	0	0	0	0	35	0	14	0	70	154	0	0	0	167	18	458	0
4:45 PM	0	0	0	0	0	30	0	19	0	81	155	0	0	0	162	17	464	0
5:00 PM	0	0	0	0	0	32	0	18	0	84	168	0	0	0	166	12	480	0
5:15 PM	0	0	0	0	0	35	0	18	0	60	157	0	0	0	160	9	439	1,841
Peak Hour	0	0	0	0	0	132	0	69	0	295	634	0	0	0	655	56	1,841	0

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

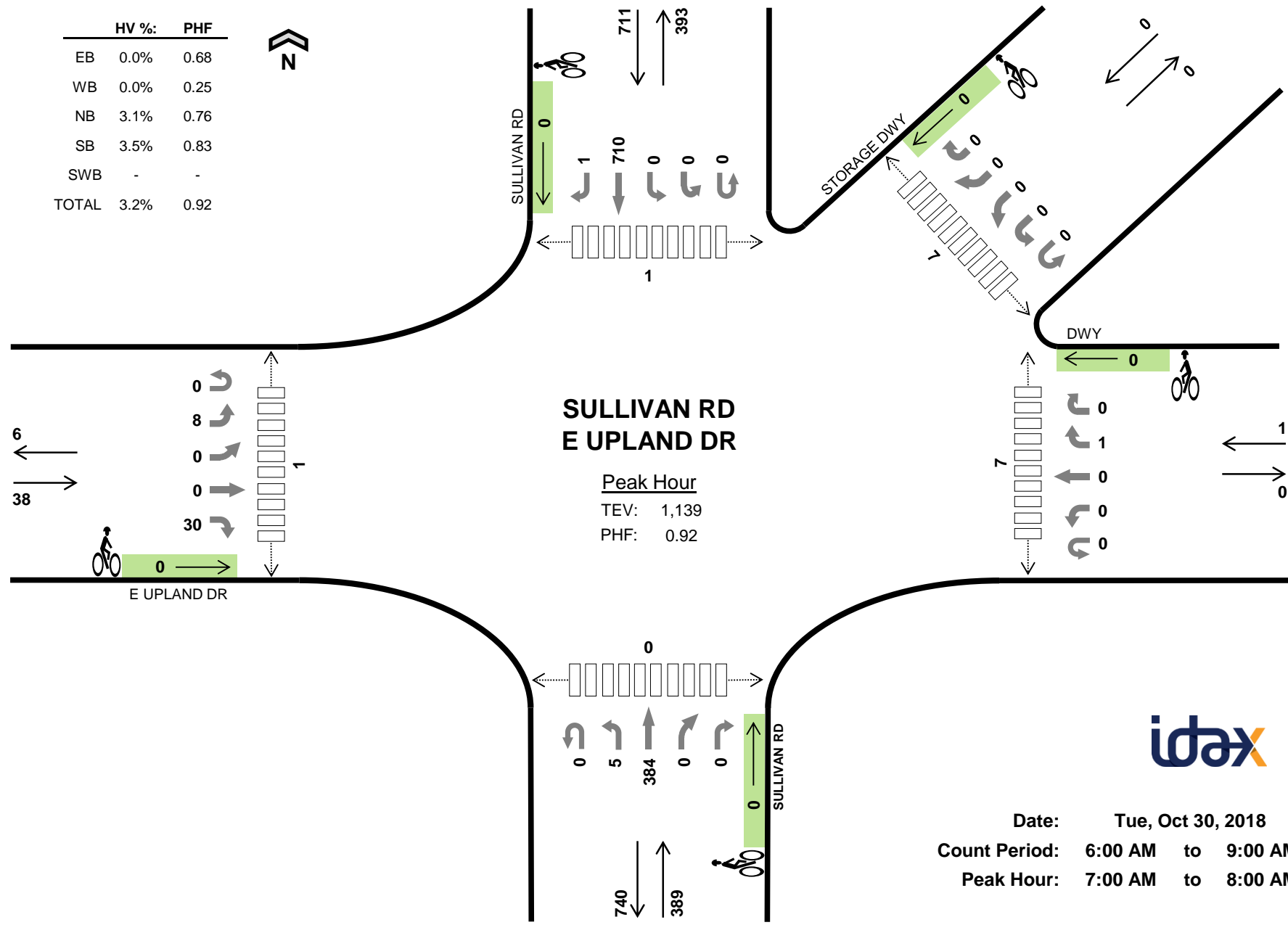
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:30 PM	0	6	5	5	16	0	0	0	0	0	0	0	1	0	1
4:45 PM	0	3	2	6	11	0	0	0	0	0	1	0	1	0	2
5:00 PM	0	1	3	6	10	0	0	0	0	0	1	1	0	0	2
5:15 PM	0	4	5	2	11	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	14	15	19	48	0	0	0	0	0	2	1	2	0	5

Three-Hour Count Summaries																		
Interval Start	SR 290 WB ON-RAMP				SR 290 WB OFF-RAMP				SULLIVAN RD				SULLIVAN RD				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	0	0	0	22	0	11	0	77	111	0	0	0	104	10	335	0
3:15 PM	0	0	0	0	0	24	0	26	0	74	113	0	0	0	99	6	342	0
3:30 PM	0	0	0	0	0	42	0	14	0	77	109	0	0	0	125	13	380	0
3:45 PM	0	0	0	0	0	26	0	19	0	69	166	0	0	0	107	11	398	1,455
4:00 PM	0	0	0	0	0	33	0	20	0	74	167	0	0	0	135	9	438	1,558
4:15 PM	0	0	0	0	0	25	0	16	0	77	134	0	0	0	139	11	402	1,618
4:30 PM	0	0	0	0	0	35	0	14	0	70	154	0	0	0	167	18	458	1,696
4:45 PM	0	0	0	0	0	30	0	19	0	81	155	0	0	0	162	17	464	1,762
5:00 PM	0	0	0	0	0	32	0	18	0	84	168	0	0	0	166	12	480	1,804
5:15 PM	0	0	0	0	0	35	0	18	0	60	157	0	0	0	160	9	439	1,841
5:30 PM	0	0	0	0	0	25	0	25	0	70	166	0	0	0	164	6	456	1,839
5:45 PM	0	0	0	0	0	27	0	20	0	57	121	0	0	0	156	9	390	1,765
Count Total	0	0	0	0	0	356	0	220	0	870	1,721	0	0	0	1,684	131	4,982	0
Peak Hour	0	0	0	0	0	132	0	69	0	295	634	0	0	0	655	56	1,841	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	0	5	14	5	24	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	7	4	4	15	0	0	0	0	0	0	1	0	0	1
3:30 PM	0	9	7	5	21	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	4	10	8	22	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	6	9	3	18	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	6	6	8	20	0	0	0	0	0	1	0	0	0	1
4:30 PM	0	6	5	5	16	0	0	0	0	0	0	0	1	0	1
4:45 PM	0	3	2	6	11	0	0	0	0	0	1	0	1	0	2
5:00 PM	0	1	3	6	10	0	0	0	0	0	1	1	0	0	2
5:15 PM	0	4	5	2	11	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	5	2	2	9	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	5	2	4	11	0	0	0	0	0	0	2	0	0	2
Count Total	0	61	69	58	188	0	0	0	0	0	4	4	2	0	10
Peak Hour	0	14	15	19	48	0	0	0	0	0	2	1	2	0	5

	HV %:	PHF
EB	0.0%	0.68
WB	0.0%	0.25
NB	3.1%	0.76
SB	3.5%	0.83
SWB	-	-
TOTAL	3.2%	0.92



Date: Tue, Oct 30, 2018
Count Period: 6:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM

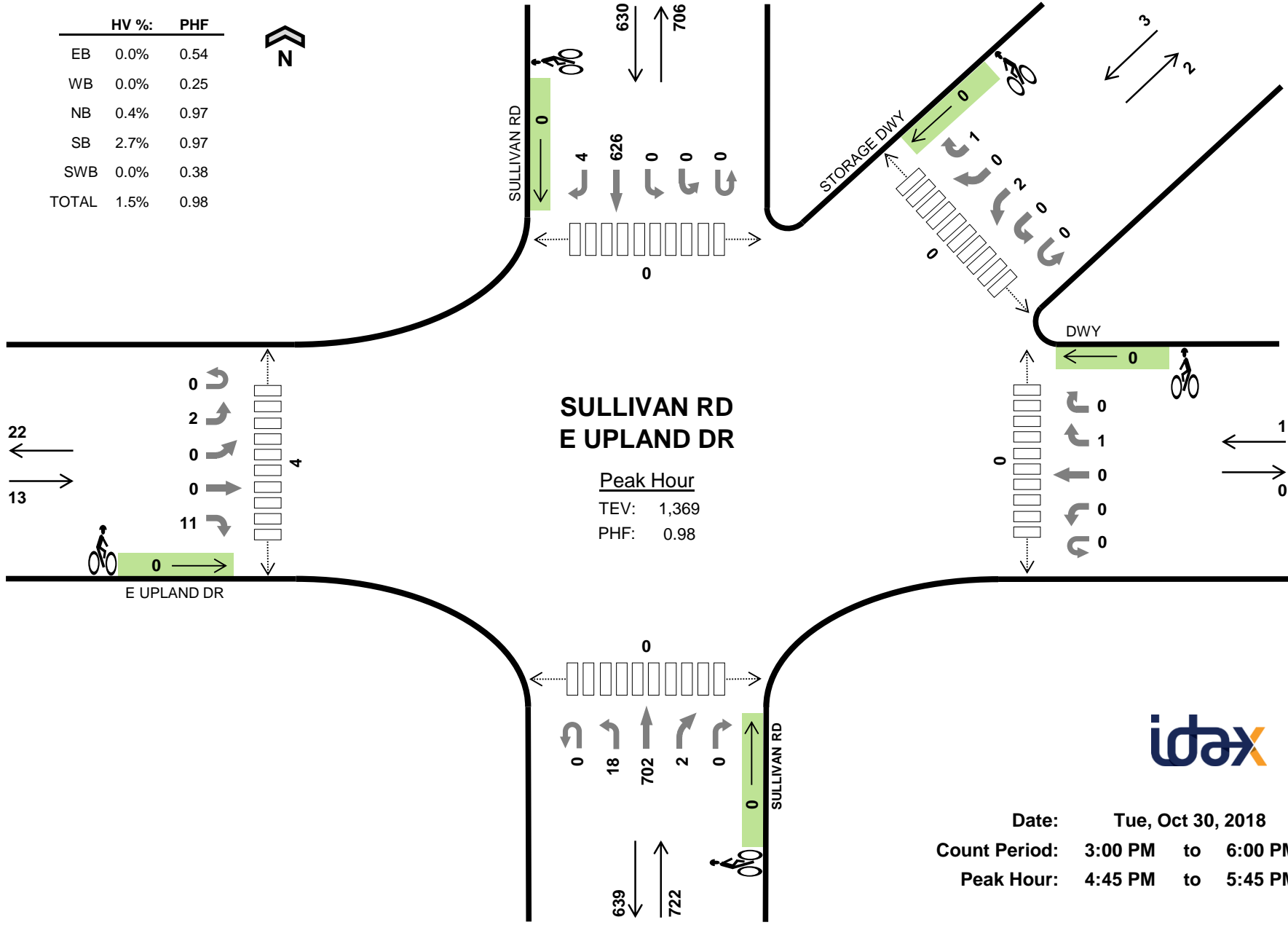
Three-Hour Count Summaries

Interval Start	E UPLAND DR Eastbound					DWY Westbound					SULLIVAN RD Northbound					SULLIVAN RD Southbound					STORAGE DWY Southwestbound					15-min Total	Rolling One Hour
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
	6:00 AM	0	0	0	0	2	0	0	0	0	0	0	1	45	0	0	0	0	0	94	0	0	0	1	0		
6:15 AM	0	2	0	0	3	0	0	0	0	0	0	1	42	2	0	0	0	0	146	0	0	0	0	0	1	197	0
6:30 AM	0	0	0	0	3	0	1	0	0	0	0	0	67	0	0	0	1	0	176	0	0	0	0	0	0	248	0
6:45 AM	0	0	0	0	4	0	0	0	0	0	0	1	55	0	0	0	0	0	180	0	0	0	1	0	0	241	829
7:00 AM	0	1	0	0	9	0	0	0	0	0	0	0	89	0	0	0	0	0	181	0	0	0	0	0	0	280	966
7:15 AM	0	0	0	0	3	0	0	0	1	0	0	1	88	0	0	0	0	0	149	0	0	0	0	0	0	242	1,011
7:30 AM	0	4	0	0	10	0	0	0	0	0	0	4	124	0	0	0	0	0	165	1	0	0	0	0	0	308	1,071
7:45 AM	0	3	0	0	8	0	0	0	0	0	0	0	83	0	0	0	0	0	215	0	0	0	0	0	0	309	1,139
8:00 AM	0	1	0	0	7	0	0	0	0	0	0	0	45	0	0	0	0	0	172	0	0	0	0	0	0	225	1,084
8:15 AM	0	0	0	0	2	0	0	0	0	0	0	2	53	0	0	0	0	0	118	0	0	0	0	0	0	175	1,017
8:30 AM	0	0	0	0	3	0	0	0	0	0	0	2	56	1	0	0	0	0	94	0	0	0	0	0	0	156	865
8:45 AM	0	1	0	0	3	0	0	0	0	0	0	1	35	0	0	0	0	0	125	0	0	0	0	0	0	165	721
Count Total	0	12	0	0	57	0	1	0	1	0	0	13	782	3	0	0	1	0	1,815	1	0	0	2	0	1	2,689	0
Peak Hour	0	8	0	0	30	0	0	0	1	0	0	5	384	0	0	0	0	0	710	1	0	0	0	0	0	1,139	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	SWB	Total	EB	WB	NB	SB	SWB	Total	East	West	North	South	Northeast	Total									
6:00 AM	0	0	3	0	0	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	3	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	5	2	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	5	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
7:30 AM	0	0	3	13	0	16	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	14	14
7:45 AM	0	0	3	5	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
8:00 AM	0	0	1	6	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	5	2	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	1	0	3	4	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	2	5	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	1	0	29	47	0	77	0	0	0	1	0	1	0	0	0	0	0	0	7	1	1	0	0	7	16	16	16
Peak Hr	0	0	12	25	0	37	0	0	0	0	0	0	0	0	0	0	0	0	7	1	1	0	7	16	16	16	16

	HV %:	PHF
EB	0.0%	0.54
WB	0.0%	0.25
NB	0.4%	0.97
SB	2.7%	0.97
SWB	0.0%	0.38
TOTAL	1.5%	0.98



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 4:45 PM to 5:45 PM

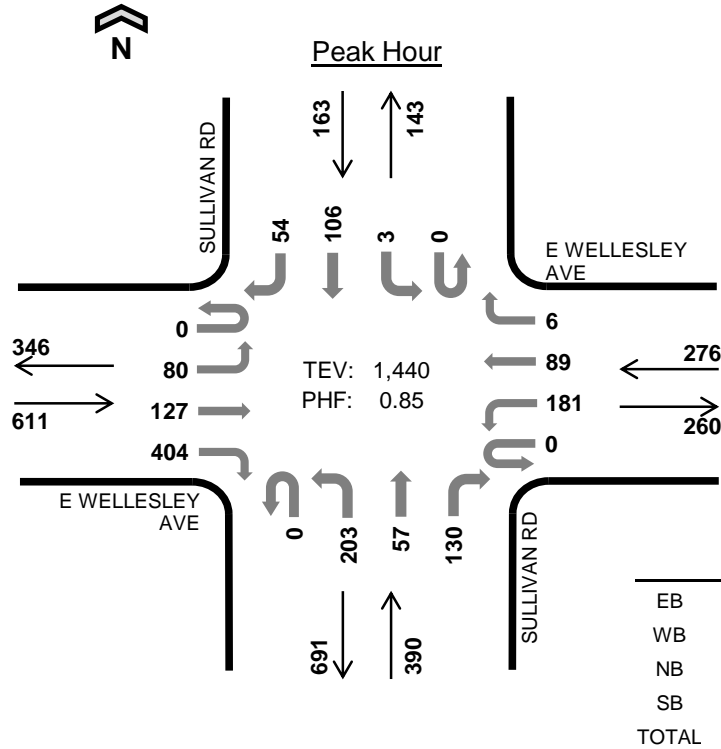
Three-Hour Count Summaries

Interval Start	E UPLAND DR Eastbound					DWY Westbound					SULLIVAN RD Northbound					SULLIVAN RD Southbound					STORAGE DWY Southwestbound					15-min Total	Rolling One Hour
	UT	LT	BL	TH	RT	UT	LT	TH	RT	HR	UT	LT	TH	BR	RT	UT	HL	LT	TH	RT	UT	HL	BL	BR	HR		
	3:00 PM	0	0	0	0	1	0	0	0	0	0	0	3	117	0	0	0	1	0	105	1	0	0	0	0		
3:15 PM	0	0	0	0	2	0	0	0	1	0	0	3	134	0	0	0	0	0	101	1	0	0	0	0	242	0	
3:30 PM	0	0	0	0	4	0	1	0	0	0	0	8	119	0	0	0	0	0	130	0	0	0	0	0	262	0	
3:45 PM	0	1	0	0	4	0	0	0	0	0	0	2	177	1	0	0	0	0	102	1	0	0	1	0	289	1,021	
4:00 PM	0	0	0	0	6	0	0	0	0	0	0	4	180	0	0	0	0	0	128	2	0	0	0	2	322	1,115	
4:15 PM	0	0	0	0	5	0	0	0	0	0	0	4	162	1	0	0	0	0	140	1	0	0	0	1	314	1,187	
4:30 PM	0	0	0	0	5	0	0	0	0	0	0	6	164	0	0	0	1	0	141	1	0	0	0	0	318	1,243	
4:45 PM	0	1	0	0	5	0	0	0	1	0	0	4	165	1	0	0	0	0	154	1	0	0	1	0	334	1,288	
5:00 PM	0	1	0	0	1	0	0	0	0	0	0	2	184	1	0	0	0	0	156	0	0	0	0	0	345	1,311	
5:15 PM	0	0	0	0	3	0	0	0	0	0	0	7	173	0	0	0	0	0	155	1	0	0	1	0	340	1,337	
5:30 PM	0	0	0	0	2	0	0	0	0	0	0	5	180	0	0	0	0	0	161	2	0	0	0	0	350	1,369	
5:45 PM	0	1	0	0	4	0	0	0	0	0	0	7	136	0	0	0	0	0	164	1	0	0	0	0	313	1,348	
Count Total	0	4	0	0	42	0	1	0	2	0	0	55	1,891	4	0	0	2	0	1,637	12	0	0	3	0	4	3,657	0
Peak Hour	0	2	0	0	11	0	0	0	1	0	0	18	702	2	0	0	0	0	626	4	0	0	2	0	1	1,369	0

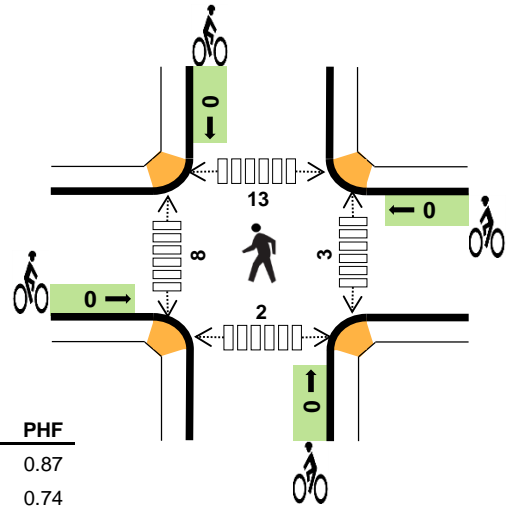
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles					Pedestrians (Crossing Leg)										
	EB	WB	NB	SB	SWB	Total	EB	WB	NB	SB	SWB	Total	East	West	North	South	Northeast	Total				
3:00 PM	0	0	3	5	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	2	5	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	1	0	3	4	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	6	6	0	12	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
4:00 PM	0	0	4	3	0	7	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	3
4:15 PM	0	0	4	10	0	14	0	0	0	0	0	0	0	0	3	0	2	0	0	5	0	10
4:30 PM	0	0	1	5	0	6	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	6
4:45 PM	0	0	1	6	0	7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
5:00 PM	0	0	0	6	0	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
5:15 PM	0	0	2	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
5:45 PM	0	0	0	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	1	0	26	60	0	87	0	0	0	0	0	0	0	0	7	5	2	0	0	10	0	24
Peak Hr	0	0	3	17	0	20	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4

SULLIVAN RD E WELLESLEY AVE



Date: Tue, Oct 30, 2018
 Count Period: 6:00 AM to 9:00 AM
 Peak Hour: 7:00 AM to 8:00 AM



Three-Hour Count Summaries

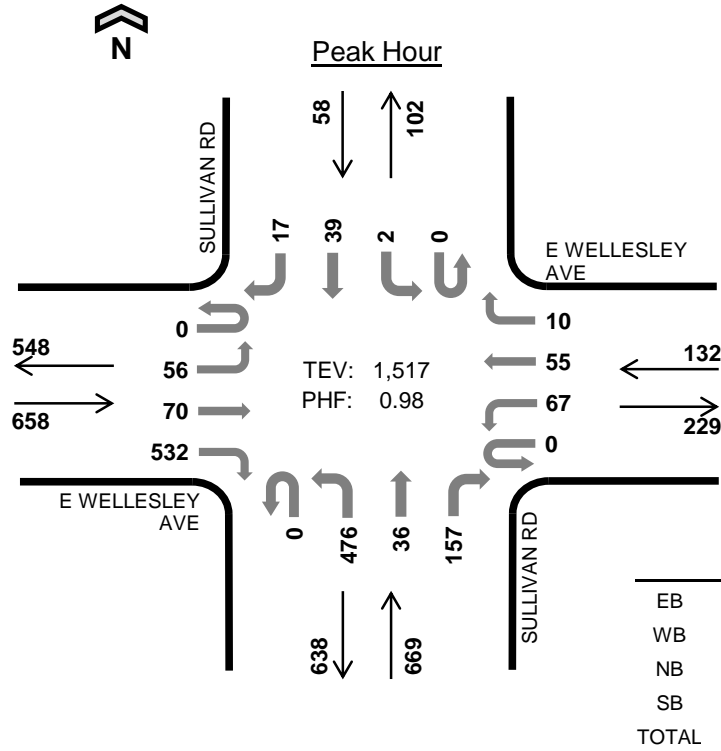
Interval Start	E WELLESLEY AVE				E WELLESLEY AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	7	23	125	0	34	16	0	0	56	8	28	0	2	12	3	314	0
7:15 AM	0	13	25	95	0	32	18	2	0	42	10	26	0	0	18	21	302	0
7:30 AM	0	24	45	79	0	54	25	2	0	60	18	48	0	1	30	16	402	0
7:45 AM	0	36	34	105	0	61	30	2	0	45	21	28	0	0	46	14	422	1,440
Peak Hour	0	80	127	404	0	181	89	6	0	203	57	130	0	3	106	54	1,440	0

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

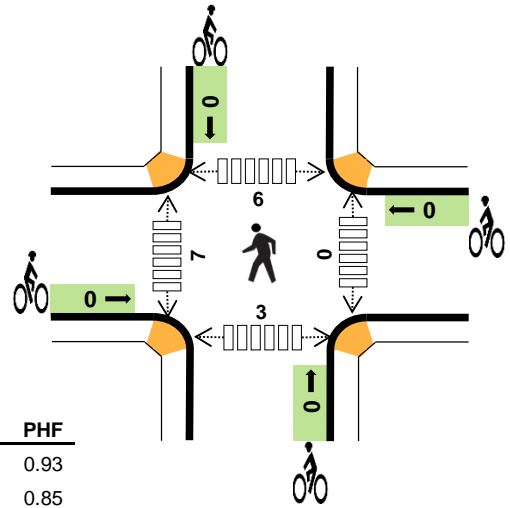
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	1	5	1	8	0	0	0	0	0	0	0	1	0	1
7:15 AM	9	0	1	13	23	0	0	0	0	0	0	5	7	0	12
7:30 AM	10	7	3	8	28	0	0	0	0	0	3	1	5	2	11
7:45 AM	3	1	3	4	11	0	0	0	0	0	0	2	0	0	2
Peak Hour	23	9	12	26	70	0	0	0	0	0	3	8	13	2	26

Three-Hour Count Summaries																		
Interval Start	E WELLESLEY AVE				E WELLESLEY AVE				SULLIVAN RD				SULLIVAN RD				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	3	79	0	13	4	0	0	33	0	6	0	0	3	0	142	0
6:15 AM	0	0	7	121	0	20	3	0	0	35	2	7	0	0	3	2	200	0
6:30 AM	0	5	10	144	0	22	7	0	0	41	6	16	0	0	11	2	264	0
6:45 AM	0	6	20	143	0	22	8	2	0	36	6	13	0	1	13	2	272	878
7:00 AM	0	7	23	125	0	34	16	0	0	56	8	28	0	2	12	3	314	1,050
7:15 AM	0	13	25	95	0	32	18	2	0	42	10	26	0	0	18	21	302	1,152
7:30 AM	0	24	45	79	0	54	25	2	0	60	18	48	0	1	30	16	402	1,290
7:45 AM	0	36	34	105	0	61	30	2	0	45	21	28	0	0	46	14	422	1,440
8:00 AM	0	8	5	124	0	28	17	0	0	33	5	8	0	0	15	5	248	1,374
8:15 AM	0	2	5	100	1	14	6	0	0	44	1	4	0	1	3	0	181	1,253
8:30 AM	0	3	7	73	0	17	7	0	0	51	1	11	0	1	3	0	174	1,025
8:45 AM	0	4	11	94	0	21	14	1	0	25	2	9	0	0	7	5	193	796
Count Total	0	109	195	1,282	1	338	155	9	0	501	80	204	0	6	164	70	3,114	0
Peak Hour	0	80	127	404	0	181	89	6	0	203	57	130	0	3	106	54	1,440	0
<i>Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.</i>																		
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	0	3	0	3	1	0	0	0	1	0	1	0	0	1			
6:15 AM	1	1	4	0	6	0	0	0	0	0	0	0	0	0	0			
6:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1			
6:45 AM	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0			
7:00 AM	1	1	5	1	8	0	0	0	0	0	0	0	1	0	1			
7:15 AM	9	0	1	13	23	0	0	0	0	0	0	5	7	0	12			
7:30 AM	10	7	3	8	28	0	0	0	0	0	3	1	5	2	11			
7:45 AM	3	1	3	4	11	0	0	0	0	0	0	2	0	0	2			
8:00 AM	5	0	1	2	8	0	0	0	0	0	0	0	0	0	0			
8:15 AM	4	1	5	0	10	0	0	0	0	0	0	0	0	0	0			
8:30 AM	6	0	3	0	9	0	0	0	0	0	0	1	1	3	5			
8:45 AM	3	1	1	4	9	0	0	0	0	0	0	0	0	0	0			
Count Total	45	13	29	32	119	1	0	0	0	1	3	10	15	5	33			
Peak Hour	23	9	12	26	70	0	0	0	0	0	3	8	13	2	26			

SULLIVAN RD E WELLESLEY AVE



Date: Tue, Oct 30, 2018
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 5:00 PM to 6:00 PM



Three-Hour Count Summaries

Interval Start	E WELLESLEY AVE				E WELLESLEY AVE				SULLIVAN RD				SULLIVAN RD				15-min Total	Rolling One Hour
	Eastbound		Westbound		Northbound		Southbound		UT		LT		TH		RT			
5:00 PM	0	9	14	133	0	17	18	4	0	140	1	35	0	0	8	9	388	0
5:15 PM	0	7	20	130	0	12	17	0	0	137	7	38	0	0	13	3	384	0
5:30 PM	0	15	20	141	0	17	9	3	0	104	8	45	0	1	9	3	375	0
5:45 PM	0	25	16	128	0	21	11	3	0	95	20	39	0	1	9	2	370	1,517
Peak Hour	0	56	70	532	0	67	55	10	0	476	36	157	0	2	39	17	1,517	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	1	0	0	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0
5:30 PM	5	1	0	0	6	0	0	0	0	0	0	4	3	3	10
5:45 PM	5	0	0	0	5	0	0	0	0	0	0	3	3	0	6
Peak Hour	18	2	2	0	22	0	0	0	0	0	0	7	6	3	16

Three-Hour Count Summaries																		
Interval Start	E WELLESLEY AVE				E WELLESLEY AVE				SULLIVAN RD				SULLIVAN RD				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	1	13	79	0	28	14	0	0	92	2	20	0	0	3	3	255	0
3:15 PM	0	1	9	79	0	13	15	0	0	100	3	23	0	0	6	3	252	0
3:30 PM	0	4	16	100	0	21	8	0	0	107	4	13	0	0	9	4	286	0
3:45 PM	0	2	13	74	0	19	9	0	0	138	3	29	0	0	10	3	300	1,093
4:00 PM	0	4	16	110	0	17	15	0	0	145	2	35	0	0	5	4	353	1,191
4:15 PM	0	2	11	118	0	15	13	0	1	143	2	27	0	0	5	3	340	1,279
4:30 PM	0	5	9	120	0	16	14	0	0	122	10	26	0	0	10	3	335	1,328
4:45 PM	0	9	17	121	0	11	14	0	0	138	4	31	0	0	14	1	360	1,388
5:00 PM	0	9	14	133	0	17	18	4	0	140	1	35	0	0	8	9	388	1,423
5:15 PM	0	7	20	130	0	12	17	0	0	137	7	38	0	0	13	3	384	1,467
5:30 PM	0	15	20	141	0	17	9	3	0	104	8	45	0	1	9	3	375	1,507
5:45 PM	0	25	16	128	0	21	11	3	0	95	20	39	0	1	9	2	370	1,517
Count Total	0	84	174	1,333	0	207	157	10	1	1,461	66	361	0	2	101	41	3,998	0
Peak Hour	0	56	70	532	0	67	55	10	0	476	36	157	0	2	39	17	1,517	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	1	3	0	8	0	0	0	0	0	0	1	2	0	3
3:15 PM	6	0	2	0	8	0	0	0	0	0	0	0	0	0	0
3:30 PM	5	0	2	0	7	0	0	0	0	0	0	0	0	2	2
3:45 PM	7	1	5	0	13	0	0	0	0	0	0	0	0	0	0
4:00 PM	3	0	5	1	9	0	0	0	0	0	0	2	2	0	4
4:15 PM	11	1	5	0	17	0	0	0	0	0	3	0	1	0	4
4:30 PM	7	0	0	0	7	0	0	0	0	0	2	0	0	1	3
4:45 PM	4	0	2	0	6	0	0	0	0	0	0	0	0	1	1
5:00 PM	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0
5:30 PM	5	1	0	0	6	0	0	0	0	0	0	4	3	3	10
5:45 PM	5	0	0	0	5	0	0	0	0	0	0	3	3	0	6
Count Total	65	5	26	1	97	0	0	0	0	0	5	10	11	7	33
Peak Hour	18	2	2	0	22	0	0	0	0	0	0	7	6	3	16

Appendix B

Level of Service Reports

Intersection	
Intersection Delay, s/veh	39.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗		↖	↗		↔	
Traffic Vol, veh/h	80	127	404	181	89	6	203	57	130	3	106	54
Future Vol, veh/h	80	127	404	181	89	6	203	57	130	3	106	54
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	4	4	4	3	3	3	3	3	3	16	16	16
Mvmt Flow	94	149	475	213	105	7	239	67	153	4	125	64
Number of Lanes	0	1	1	0	1	1	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	51.5	39.1	28.8	22.1
HCM LOS	F	E	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	78%	0%	39%	0%	67%	0%	2%
Vol Thru, %	22%	0%	61%	0%	33%	0%	65%
Vol Right, %	0%	100%	0%	100%	0%	100%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	130	207	404	270	6	163
LT Vol	203	0	80	0	181	0	3
Through Vol	57	0	127	0	89	0	106
RT Vol	0	130	0	404	0	6	54
Lane Flow Rate	306	153	244	475	318	7	192
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.766	0.335	0.571	0.992	0.8	0.016	0.508
Departure Headway (Hd)	9.014	7.883	8.441	7.514	9.067	7.988	9.534
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	401	456	429	485	400	448	378
Service Time	6.762	5.631	6.194	5.267	6.819	5.74	7.596
HCM Lane V/C Ratio	0.763	0.336	0.569	0.979	0.795	0.016	0.508
HCM Control Delay	35.9	14.6	21.9	66.6	39.7	10.9	22.1
HCM Lane LOS	E	B	C	F	E	B	C
HCM 95th-tile Q	6.4	1.5	3.5	13.1	7	0	2.8

HCM 6th Signalized Intersection Summary

2: Sullivan & Indiana

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	91	46	126	96	261	64	823	413	111	676	62
Future Volume (veh/h)	104	91	46	126	96	261	64	823	413	111	676	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1682	1682	1682	1695	1695	1695	1682	1682	1682	1504	1504	1504
Adj Flow Rate, veh/h	116	101	-82	140	107	212	71	914	0	123	751	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	4	4	4	5	5	5	18	18	18
Cap, veh/h	177	181	77	170	176	298	131	1738		147	1728	771
Arrive On Green	0.06	0.05	0.00	0.11	0.10	0.10	0.04	0.54	0.00	0.10	0.60	0.60
Sat Flow, veh/h	3203	3364	1425	1615	1695	2874	3107	3279	0	1433	2858	1275
Grp Volume(v), veh/h	116	101	-82	140	107	212	71	914	0	123	751	2
Grp Sat Flow(s),veh/h/ln	1602	1682	1425	1615	1695	1437	1554	1598	0	1433	1429	1275
Q Serve(g_s), s	3.7	3.0	0.0	8.7	6.2	7.4	2.3	18.8	0.0	8.7	14.5	0.1
Cycle Q Clear(g_c), s	3.7	3.0	0.0	8.7	6.2	7.4	2.3	18.8	0.0	8.7	14.5	0.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	181	77	170	176	298	131	1738		147	1728	771
V/C Ratio(X)	0.65	0.56	-1.07	0.82	0.61	0.71	0.54	0.53		0.83	0.43	0.00
Avail Cap(c_a), veh/h	622	751	318	423	494	837	664	1738		334	1728	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	47.5	0.0	45.1	44.1	44.7	48.3	15.0	0.0	45.3	10.9	8.1
Incr Delay (d2), s/veh	4.0	2.7	0.0	9.5	3.4	3.1	3.4	1.1	0.0	11.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	2.4	0.0	7.0	4.9	4.9	1.7	10.9	0.0	6.3	7.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	50.2	0.0	54.6	47.5	47.8	51.8	16.2	0.0	56.9	11.7	8.1
LnGrp LOS	D	D	A	D	D	D	D	B		E	B	A
Approach Vol, veh/h		135			459			985	A		876	
Approach Delay, s/veh		82.0			49.8			18.7			18.1	
Approach LOS		F			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.6	61.0	15.8	10.5	9.3	67.2	10.7	15.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	24.0	56.0	27.0	23.0	22.0	58.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	10.7	20.8	10.7	5.0	4.3	16.5	5.7	9.4				
Green Ext Time (p_c), s	0.2	7.5	0.3	0.4	0.2	6.1	0.3	1.3				

Intersection Summary

HCM 6th Ctrl Delay	27.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
154: Sullivan & Marietta

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↑↑	↗	↖	↑↔	
Traffic Volume (veh/h)	32	13	51	88	6	12	61	765	346	35	713	11
Future Volume (veh/h)	32	13	51	88	6	12	61	765	346	35	713	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1368	1368	1368	1231	1231	1231	1682	1682	1682	1600	1600	1600
Adj Flow Rate, veh/h	34	14	55	95	6	13	66	823	340	38	767	12
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	28	28	28	38	38	38	5	5	5	11	11	11
Cap, veh/h	141	36	91	300	50	108	79	1244	555	259	1689	26
Arrive On Green	0.14	0.14	0.12	0.14	0.14	0.12	0.05	0.39	0.39	0.17	0.55	0.51
Sat Flow, veh/h	299	253	632	952	346	750	1602	3195	1425	1524	3063	48
Grp Volume(v), veh/h	103	0	0	95	0	19	66	823	340	38	381	398
Grp Sat Flow(s),veh/h/ln	1183	0	0	952	0	1096	1602	1598	1425	1524	1520	1591
Q Serve(g_s), s	2.4	0.0	0.0	0.0	0.0	0.7	2.0	10.4	9.4	1.0	7.3	7.4
Cycle Q Clear(g_c), s	4.0	0.0	0.0	3.8	0.0	0.7	2.0	10.4	9.4	1.0	7.3	7.4
Prop In Lane	0.33		0.53	1.00		0.68	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	269	0	0	300	0	158	79	1244	555	259	838	877
V/C Ratio(X)	0.38	0.00	0.00	0.32	0.00	0.12	0.84	0.66	0.61	0.15	0.45	0.45
Avail Cap(c_a), veh/h	838	0	0	765	0	694	327	1761	786	622	838	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	0.0	19.6	0.0	18.5	23.1	12.3	12.0	17.3	6.6	6.6
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.6	0.0	0.3	19.9	0.6	1.1	0.3	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	0.0	0.0	1.7	0.0	0.3	2.0	5.4	4.5	0.6	3.5	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	0.0	20.2	0.0	18.9	43.0	12.9	13.1	17.5	8.4	8.3
LnGrp LOS	C	A	A	C	A	B	D	B	B	B	A	A
Approach Vol, veh/h		103			114			1229				817
Approach Delay, s/veh		20.7			20.0			14.6				8.8
Approach LOS		C			B			B				A
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	31.0		11.6	14.3	23.1		11.6				
Change Period (Y+Rc), s	4.0	6.0		5.5	6.0	* 6		5.5				
Max Green Setting (Gmax), s	10.0	25.0		30.0	20.0	* 25		30.0				
Max Q Clear Time (g_c+I1), s	4.0	9.4		6.0	3.0	12.4		5.8				
Green Ext Time (p_c), s	0.1	2.9		0.4	0.1	4.7		0.6				

Intersection Summary

HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3024: Sullivan & Kiernan

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗	↖	↑↑	↗	↖	↗	
Traffic Volume (veh/h)	4	0	8	75	2	65	9	456	220	198	816	6
Future Volume (veh/h)	4	0	8	75	2	65	9	456	220	198	816	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1409	1409	1409	1286	1286	1286	1641	1641	1641	1654	1654	1654
Adj Flow Rate, veh/h	4	0	9	84	2	11	10	512	247	222	917	7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	25	25	25	34	34	34	8	8	8	7	7	7
Cap, veh/h	209	0	149	283	3	136	16	1319	588	283	1893	14
Arrive On Green	0.12	0.00	0.10	0.12	0.12	0.12	0.01	0.42	0.42	0.18	0.59	0.55
Sat Flow, veh/h	1146	0	1194	973	23	1090	1563	3118	1391	1576	3197	24
Grp Volume(v), veh/h	4	0	9	86	0	11	10	512	247	222	451	473
Grp Sat Flow(s),veh/h/ln	1146	0	1194	996	0	1090	1563	1559	1391	1576	1572	1650
Q Serve(g_s), s	0.1	0.0	0.3	3.4	0.0	0.4	0.3	5.0	5.5	5.9	7.2	7.2
Cycle Q Clear(g_c), s	3.9	0.0	0.3	3.7	0.0	0.4	0.3	5.0	5.5	5.9	7.2	7.2
Prop In Lane	1.00		1.00	0.98		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	209	0	149	286	0	136	16	1319	588	283	930	977
V/C Ratio(X)	0.02	0.00	0.06	0.30	0.00	0.08	0.61	0.39	0.42	0.79	0.48	0.48
Avail Cap(c_a), veh/h	797	0	761	827	0	695	605	1845	823	610	930	977
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	17.4	18.6	0.0	17.0	21.6	8.7	8.9	17.2	5.1	5.1
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.6	0.0	0.3	31.7	0.2	0.5	4.8	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.1	1.4	0.0	0.2	0.4	2.2	2.2	3.8	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	17.6	19.2	0.0	17.3	53.4	8.9	9.4	22.0	6.9	6.9
LnGrp LOS	C	A	B	B	A	B	D	A	A	C	A	A
Approach Vol, veh/h		13			97			769			1146	
Approach Delay, s/veh		18.4			19.0			9.7			9.8	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	30.0		9.5	11.9	22.6		9.5				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	17.0	24.0		27.0	17.0	24.0		27.0				
Max Q Clear Time (g_c+I1), s	2.3	9.2		5.9	7.9	7.5		5.7				
Green Ext Time (p_c), s	0.0	3.5		0.0	0.5	3.2		0.3				

Intersection Summary

HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
3025: Sullivan & Euclid

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↖	↗	↖	↕	↗	↖	↕	↕
Traffic Volume (veh/h)	24	7	36	58	13	76	82	582	121	73	747	48
Future Volume (veh/h)	24	7	36	58	13	76	82	582	121	73	747	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1641	1641	1641	1300	1300	1300	1668	1668	1668	1641	1641	1641
Adj Flow Rate, veh/h	25	7	-9	60	14	79	85	606	126	76	778	50
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	8	8	33	33	33	6	6	6	8	8	8
Cap, veh/h	33	0	260	155	131	138	312	1625	725	95	1026	66
Arrive On Green	0.02	0.02	0.00	0.12	0.10	0.12	0.20	0.51	0.51	0.06	0.34	0.31
Sat Flow, veh/h	1563	1641	0	1238	1300	1101	1589	3169	1414	1563	2974	191
Grp Volume(v), veh/h	25	-2	-2	60	14	79	85	606	126	76	408	420
Grp Sat Flow(s),veh/h/ln	1563	1641	1391	1238	1300	1101	1589	1585	1414	1563	1559	1606
Q Serve(g_s), s	1.0	0.0	0.0	2.8	0.6	4.2	2.8	7.2	3.0	3.0	14.5	14.5
Cycle Q Clear(g_c), s	1.0	0.0	0.0	2.8	0.6	4.2	2.8	7.2	3.0	3.0	14.5	14.5
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	33	0	0	155	131	138	312	1625	725	95	538	554
V/C Ratio(X)	0.76	0.00	0.00	0.39	0.11	0.57	0.27	0.37	0.17	0.80	0.76	0.76
Avail Cap(c_a), veh/h	589	0	0	546	542	485	637	1625	725	501	799	824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	0.0	25.1	25.5	25.7	21.3	9.2	8.1	28.9	18.1	18.2
Incr Delay (d2), s/veh	29.3	0.0	0.0	1.6	0.4	3.7	0.5	0.7	0.5	14.4	2.4	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.1	0.0	0.0	1.5	0.3	2.1	1.8	3.9	1.5	2.6	8.5	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.7	0.0	0.0	26.7	25.8	29.5	21.7	9.8	8.6	43.3	20.5	20.6
LnGrp LOS	E	A	A	C	C	C	C	A	A	D	C	C
Approach Vol, veh/h		21			153			817			904	
Approach Delay, s/veh		71.0			28.0			10.9			22.5	
Approach LOS		E			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.3	25.5		6.8	7.8	36.0		11.8				
Change Period (Y+Rc), s	6.0	* 6		5.5	4.0	6.0		5.5				
Max Green Setting (Gmax), s	25.0	* 30		23.5	20.0	30.0		26.0				
Max Q Clear Time (g_c+I1), s	4.8	16.5		3.0	5.0	9.2		6.2				
Green Ext Time (p_c), s	0.2	3.0		0.0	0.2	3.4		0.6				

Intersection Summary

HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 1.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 5.

HCM Signalized Intersection Capacity Analysis

3304: Sullivan & EB Trent

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Volume (vph)	75	0	357	0	0	0	0	447	79	173	682	0
Future Volume (vph)	75	0	357	0	0	0	0	447	79	173	682	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.0						5.0			5.0	
Lane Util. Factor		1.00						*0.70			*0.70	
Frt		0.89						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1454						1893			2080	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1454						1893			1156	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	84	0	401	0	0	0	0	502	89	194	766	0
RTOR Reduction (vph)	0	185	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	300	0	0	0	0	0	580	0	0	960	0
Heavy Vehicles (%)	6%	6%	6%	0%	0%	0%	10%	10%	10%	6%	6%	6%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Actuated Green, G (s)		19.2						34.8			54.8	
Effective Green, g (s)		19.2						34.8			54.8	
Actuated g/C Ratio		0.23						0.41			0.65	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		332						784			919	
v/s Ratio Prot								0.31			c0.19	
v/s Ratio Perm		0.21									c0.50	
v/c Ratio		0.90						0.74			1.04	
Uniform Delay, d1		31.5						20.8			14.6	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		26.4						6.2			42.0	
Delay (s)		57.9						27.0			56.6	
Level of Service		E						C			E	
Approach Delay (s)		57.9			0.0			27.0			56.6	
Approach LOS		E			A			C			E	

Intersection Summary

HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3302: Sullivan & WB Trent

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Volume (vph)	0	0	0	242	1	111	153	371	0	0	621	86
Future Volume (vph)	0	0	0	242	1	111	153	371	0	0	621	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					5.0			5.0			5.0	
Lane Util. Factor					1.00			*0.70			0.95	
Frt					0.96			1.00			0.98	
Flt Protected					0.97			0.90			1.00	
Satd. Flow (prot)					1487			2042			3138	
Flt Permitted					0.97			0.50			1.00	
Satd. Flow (perm)					1487			1134			3138	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	266	1	122	168	408	0	0	682	95
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	370	0	0	576	0	0	765	0
Heavy Vehicles (%)	0%	0%	0%	9%	9%	9%	8%	8%	8%	4%	4%	4%
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					8		1	6			2	
Permitted Phases				8			6					
Actuated Green, G (s)					26.1			53.9			28.9	
Effective Green, g (s)					26.1			53.9			28.9	
Actuated g/C Ratio					0.29			0.60			0.32	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					431			880			1007	
v/s Ratio Prot								c0.15			c0.24	
v/s Ratio Perm					0.25			0.25				
v/c Ratio					0.86			0.65			0.76	
Uniform Delay, d1					30.2			11.9			27.4	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					15.5			1.8			5.4	
Delay (s)					45.7			13.7			32.8	
Level of Service					D			B			C	
Approach Delay (s)		0.0			45.7			13.7			32.8	
Approach LOS		A			D			B			C	

Intersection Summary

HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	8	30	5	384	710	1
Future Vol, veh/h	8	30	5	384	710	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	3	4	4
Mvmt Flow	9	33	5	417	772	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	992	387	773	0	0
Stage 1	773	-	-	-	-
Stage 2	219	-	-	-	-
Critical Hdwy	6.8	6.9	4.16	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.23	-	-
Pot Cap-1 Maneuver	246	617	832	-	-
Stage 1	421	-	-	-	-
Stage 2	802	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	244	617	832	-	-
Mov Cap-2 Maneuver	244	-	-	-	-
Stage 1	418	-	-	-	-
Stage 2	802	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	832	-	467	-	-
HCM Lane V/C Ratio	0.007	-	0.088	-	-
HCM Control Delay (s)	9.4	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑↑	↑↑↑			↑↑
Traffic Vol, veh/h	0	2	1194	6	0	883
Future Vol, veh/h	0	2	1194	6	0	883
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	7	7	18	18
Mvmt Flow	0	2	1298	7	0	960

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	653	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-
Pot Cap-1 Maneuver	0	355	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	355	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	355
HCM Lane V/C Ratio	-	-	0.006
HCM Control Delay (s)	-	-	15.2
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0

HCM 6th TWSC
8: Sullivan & Fairview

03/31/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑↑	↗	↘	↑↑
Traffic Vol, veh/h	10	2	788	41	21	826
Future Vol, veh/h	10	2	788	41	21	826
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	17	17	6	6	12	12
Mvmt Flow	11	2	847	44	23	888

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1337	424	0	0	891
Stage 1	847	-	-	-	-
Stage 2	490	-	-	-	-
Critical Hdwy	7.14	7.24	-	-	4.34
Critical Hdwy Stg 1	6.14	-	-	-	-
Critical Hdwy Stg 2	6.14	-	-	-	-
Follow-up Hdwy	3.67	3.47	-	-	2.32
Pot Cap-1 Maneuver	127	539	-	-	697
Stage 1	345	-	-	-	-
Stage 2	540	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	123	539	-	-	697
Mov Cap-2 Maneuver	123	-	-	-	-
Stage 1	345	-	-	-	-
Stage 2	522	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.1	0	0.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	141	697
HCM Lane V/C Ratio	-	-	0.092	0.032
HCM Control Delay (s)	-	-	33.1	10.3
HCM Lane LOS	-	-	D	B
HCM 95th %tile Q(veh)	-	-	0.3	0.1

Intersection	
Intersection Delay, s/veh	56.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔		↔	↔		↔	
Traffic Vol, veh/h	56	70	532	67	55	10	476	36	157	2	39	17
Future Vol, veh/h	56	70	532	67	55	10	476	36	157	2	39	17
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	71	543	68	56	10	486	37	160	2	40	17
Number of Lanes	0	1	1	0	1	1	0	1	1	0	1	0
























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	47.8	14.5	77.2	12.7
HCM LOS	E	B	F	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	93%	0%	44%	0%	55%	0%	3%
Vol Thru, %	7%	0%	56%	0%	45%	0%	67%
Vol Right, %	0%	100%	0%	100%	0%	100%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	512	157	126	532	122	10	58
LT Vol	476	0	56	0	67	0	2
Through Vol	36	0	70	0	55	0	39
RT Vol	0	157	0	532	0	10	17
Lane Flow Rate	522	160	129	543	124	10	59
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	1.097	0.284	0.261	0.965	0.286	0.021	0.133
Departure Headway (Hd)	7.562	6.377	7.641	6.695	8.673	7.659	8.454
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	481	562	473	548	417	470	427
Service Time	5.322	4.136	5.341	4.395	6.373	5.359	6.454
HCM Lane V/C Ratio	1.085	0.285	0.273	0.991	0.297	0.021	0.138
HCM Control Delay	97.3	11.7	13	56	14.8	10.5	12.7
HCM Lane LOS	F	B	B	F	B	B	B
HCM 95th-tile Q	17.1	1.2	1	12.8	1.2	0.1	0.5

HCM 6th Signalized Intersection Summary

2: Sullivan & Indiana

05/21/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	140	364	152	258	197	280	676	240	88	1180	182
Future Volume (veh/h)	139	140	364	152	258	197	280	676	240	88	1180	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1736	1736	1736	1627	1627	1627	1709	1709	1709
Adj Flow Rate, veh/h	146	147	257	160	272	133	295	712	0	93	1242	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	1	1	1	9	9	9	3	3	3
Cap, veh/h	205	195	331	188	574	243	356	1648		116	1578	704
Arrive On Green	0.06	0.11	0.11	0.11	0.17	0.17	0.12	0.53	0.00	0.07	0.49	0.49
Sat Flow, veh/h	3255	1709	2897	1654	3473	1471	3006	3173	0	1628	3247	1448
Grp Volume(v), veh/h	146	147	257	160	272	133	295	712	0	93	1242	129
Grp Sat Flow(s),veh/h/ln	1628	1709	1448	1654	1736	1471	1503	1546	0	1628	1624	1448
Q Serve(g_s), s	5.3	9.9	10.3	11.3	8.5	9.9	11.5	16.7	0.0	6.7	38.0	6.0
Cycle Q Clear(g_c), s	5.3	9.9	10.3	11.3	8.5	9.9	11.5	16.7	0.0	6.7	38.0	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	205	195	331	188	574	243	356	1648		116	1578	704
V/C Ratio(X)	0.71	0.75	0.78	0.85	0.47	0.55	0.83	0.43		0.80	0.79	0.18
Avail Cap(c_a), veh/h	545	329	558	374	873	370	554	1648		327	1578	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.9	51.2	51.4	51.9	45.1	45.7	51.4	16.9	0.0	54.6	25.5	17.3
Incr Delay (d2), s/veh	4.5	5.7	3.9	10.2	0.6	1.9	6.1	0.8	0.0	12.1	4.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	8.0	7.0	8.9	6.6	6.7	8.1	9.9	0.0	5.6	21.2	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	56.9	55.3	62.0	45.7	47.6	57.5	17.7	0.0	66.8	29.6	17.9
LnGrp LOS	E	E	E	E	D	D	E	B		E	C	B
Approach Vol, veh/h		550			565			1007	A		1464	
Approach Delay, s/veh		56.8			50.8			29.4			30.9	
Approach LOS		E			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.5	68.6	18.6	18.7	19.1	63.0	12.5	24.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	24.0	56.0	27.0	23.0	22.0	58.0	20.0	30.0				
Max Q Clear Time (g_c+I1), s	8.7	18.7	13.3	12.3	13.5	40.0	7.3	11.9				
Green Ext Time (p_c), s	0.2	5.5	0.3	1.4	0.7	9.0	0.3	2.0				

Intersection Summary

HCM 6th Ctrl Delay	37.6
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
154: Sullivan & Marietta

05/21/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↑↑	↗	↖	↕	
Traffic Volume (veh/h)	25	7	92	318	21	48	34	860	96	4	1084	4
Future Volume (veh/h)	25	7	92	318	21	48	34	860	96	4	1084	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1736	1736	1736	1627	1627	1627	1709	1709	1709
Adj Flow Rate, veh/h	28	8	102	353	23	53	38	956	74	4	1204	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	1	1	1	9	9	9	3	3	3
Cap, veh/h	133	63	341	555	148	340	49	1222	545	57	1438	5
Arrive On Green	0.32	0.32	0.30	0.32	0.32	0.30	0.03	0.40	0.40	0.03	0.43	0.40
Sat Flow, veh/h	180	201	1079	1293	467	1076	1550	3092	1379	1628	3320	11
Grp Volume(v), veh/h	138	0	0	353	0	76	38	956	74	4	589	619
Grp Sat Flow(s),veh/h/ln	1460	0	0	1293	0	1543	1550	1546	1379	1628	1624	1707
Q Serve(g_s), s	0.0	0.0	0.0	9.4	0.0	2.1	1.4	15.5	2.0	0.1	18.4	18.4
Cycle Q Clear(g_c), s	4.0	0.0	0.0	13.4	0.0	2.1	1.4	15.5	2.0	0.1	18.4	18.4
Prop In Lane	0.20		0.74	1.00		0.70	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	538	0	0	555	0	488	49	1222	545	57	704	740
V/C Ratio(X)	0.26	0.00	0.00	0.64	0.00	0.16	0.77	0.78	0.14	0.07	0.84	0.84
Avail Cap(c_a), veh/h	862	0	0	848	0	837	271	1461	652	570	767	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	0.0	17.7	0.0	14.3	27.5	15.1	11.0	26.7	14.4	14.4
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.2	0.0	0.1	22.2	2.4	0.1	0.5	7.6	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.0	0.0	6.9	0.0	1.2	1.4	8.5	0.9	0.1	11.2	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	0.0	18.9	0.0	14.5	49.6	17.5	11.1	27.2	22.0	21.6
LnGrp LOS	B	A	A	B	A	B	D	B	B	C	C	C
Approach Vol, veh/h		138			429			1068			1212	
Approach Delay, s/veh		15.3			18.1			18.2			21.8	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	28.8		22.6	8.0	26.6		22.6				
Change Period (Y+Rc), s	4.0	6.0		5.5	6.0	* 6		5.5				
Max Green Setting (Gmax), s	10.0	25.0		30.0	20.0	* 25		30.0				
Max Q Clear Time (g_c+I1), s	3.4	20.4		6.0	2.1	17.5		15.4				
Green Ext Time (p_c), s	0.0	2.3		0.5	0.0	3.1		1.6				

Intersection Summary

HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3024: Sullivan & Kiernan

05/21/2020


























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	3	35	164	0	169	16	993	69	58	660	7
Future Volume (veh/h)	21	3	35	164	0	169	16	993	69	58	660	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1723	1723	1723	1695	1695	1695	1654	1654	1654
Adj Flow Rate, veh/h	22	3	37	174	0	121	17	1056	73	62	702	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	12	2	2	2	4	4	4	7	7	7
Cap, veh/h	239	23	279	415	0	324	27	1581	705	74	1661	17
Arrive On Green	0.22	0.22	0.20	0.22	0.00	0.22	0.02	0.49	0.49	0.05	0.52	0.48
Sat Flow, veh/h	1170	102	1258	1219	0	1460	1615	3221	1437	1576	3189	32
Grp Volume(v), veh/h	22	0	40	174	0	121	17	1056	73	62	346	363
Grp Sat Flow(s),veh/h/ln	1170	0	1360	1219	0	1460	1615	1611	1437	1576	1572	1649
Q Serve(g_s), s	0.9	0.0	1.2	5.8	0.0	3.5	0.5	12.4	1.4	1.9	6.8	6.8
Cycle Q Clear(g_c), s	7.9	0.0	1.2	7.0	0.0	3.5	0.5	12.4	1.4	1.9	6.8	6.8
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	239	0	302	415	0	324	27	1581	705	74	819	859
V/C Ratio(X)	0.09	0.00	0.13	0.42	0.00	0.37	0.63	0.67	0.10	0.84	0.42	0.42
Avail Cap(c_a), veh/h	635	0	763	878	0	819	550	1678	748	537	819	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	15.9	18.4	0.0	16.5	24.4	9.6	6.8	23.6	7.3	7.4
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.7	0.0	0.7	21.2	1.0	0.1	21.2	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.0	0.6	3.1	0.0	2.0	0.6	5.8	0.6	1.9	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	0.0	16.1	19.1	0.0	17.2	45.6	10.6	6.9	44.8	8.9	8.9
LnGrp LOS	C	A	B	B	A	B	D	B	A	D	A	A
Approach Vol, veh/h		62			295			1146			771	
Approach Delay, s/veh		18.1			18.3			10.9			11.8	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.8	30.0		15.1	6.3	28.5		15.1				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	17.0	24.0		27.0	17.0	24.0		27.0				
Max Q Clear Time (g_c+I1), s	2.5	8.8		9.9	3.9	14.4		9.0				
Green Ext Time (p_c), s	0.0	2.6		0.2	0.1	4.0		1.1				

Intersection Summary

HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
 3025: Sullivan & Euclid

05/21/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	18	135	134	4	69	18	892	28	38	816	0
Future Volume (veh/h)	84	18	135	134	4	69	18	892	28	38	816	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1695	1695	0
Adj Flow Rate, veh/h	90	19	97	144	4	74	19	959	30	41	877	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	4	4	0
Cap, veh/h	184	28	140	231	206	206	183	1471	656	51	1124	0
Arrive On Green	0.11	0.11	0.11	0.14	0.12	0.14	0.11	0.46	0.46	0.03	0.35	0.00
Sat Flow, veh/h	1641	245	1252	1602	1682	1425	1602	3195	1425	1615	3306	0
Grp Volume(v), veh/h	90	0	116	144	4	74	19	959	30	41	877	0
Grp Sat Flow(s),veh/h/ln	1641	0	1497	1602	1682	1425	1602	1598	1425	1615	1611	0
Q Serve(g_s), s	3.6	0.0	5.2	5.9	0.1	3.3	0.7	16.1	0.8	1.8	16.9	0.0
Cycle Q Clear(g_c), s	3.6	0.0	5.2	5.9	0.1	3.3	0.7	16.1	0.8	1.8	16.9	0.0
Prop In Lane	1.00		0.84	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	184	0	168	231	206	206	183	1471	656	51	1124	0
V/C Ratio(X)	0.49	0.00	0.69	0.62	0.02	0.36	0.10	0.65	0.05	0.81	0.78	0.00
Avail Cap(c_a), veh/h	555	0	506	634	629	564	576	1471	656	465	1483	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.0	0.0	29.7	28.0	26.8	26.8	27.6	14.5	10.3	33.5	20.2	0.0
Incr Delay (d2), s/veh	2.0	0.0	5.0	2.7	0.0	1.1	0.2	2.3	0.1	24.9	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	0.0	3.6	4.1	0.1	2.0	0.5	9.3	0.4	1.8	10.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	34.7	30.7	26.9	27.9	27.8	16.7	10.5	58.3	22.3	0.0
LnGrp LOS	C	A	C	C	C	C	C	B	B	E	C	A
Approach Vol, veh/h		206			222			1008			918	
Approach Delay, s/veh		33.1			29.7			16.7			23.9	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.9	28.3		13.3	6.2	36.0		14.0				
Change Period (Y+Rc), s	6.0	* 6		5.5	4.0	6.0		5.5				
Max Green Setting (Gmax), s	25.0	* 30		23.5	20.0	30.0		26.0				
Max Q Clear Time (g_c+I1), s	2.7	18.9		7.2	3.8	18.1		7.9				
Green Ext Time (p_c), s	0.0	3.3		0.8	0.1	3.9		0.8				

Intersection Summary												
HCM 6th Ctrl Delay				22.2								
HCM 6th LOS				C								

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 1.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 5.

HCM Signalized Intersection Capacity Analysis

3304: Sullivan & EB Trent

05/21/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Volume (vph)	43	0	225	0	0	0	0	888	283	272	501	0
Future Volume (vph)	43	0	225	0	0	0	0	888	283	272	501	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.0						5.0			5.0	
Lane Util. Factor		1.00						*0.70			*0.70	
Frt		0.89						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1425						2042			2120	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1425						2042			1178	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	43	0	227	0	0	0	0	897	286	275	506	0
RTOR Reduction (vph)	0	200	0	0	0	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	0	0	0	1166	0	0	781	0
Heavy Vehicles (%)	8%	8%	8%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Actuated Green, G (s)		9.9						44.1			64.1	
Effective Green, g (s)		9.9						44.1			64.1	
Actuated g/C Ratio		0.12						0.53			0.76	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		167						1072			1067	
v/s Ratio Prot								c0.57			c0.13	
v/s Ratio Perm		0.05									0.43	
v/c Ratio		0.42						1.09			0.73	
Uniform Delay, d1		34.4						19.9			5.3	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		1.7						54.5			2.6	
Delay (s)		36.1						74.4			8.0	
Level of Service		D						E			A	
Approach Delay (s)		36.1			0.0			74.4			8.0	
Approach LOS		D			A			E			A	

Intersection Summary

HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3302: Sullivan & WB Trent

05/21/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	132	0	69	295	634	0	0	656	56
Future Volume (vph)	0	0	0	132	0	69	295	634	0	0	656	56
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					5.0			5.0			5.0	
Lane Util. Factor					1.00			*0.70			0.95	
Frt					0.95			1.00			0.99	
Flt Protected					0.97			0.90			1.00	
Satd. Flow (prot)					1510			2162			3190	
Flt Permitted					0.97			0.50			1.00	
Satd. Flow (perm)					1510			1201			3190	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	138	0	72	307	660	0	0	683	58
RTOR Reduction (vph)	0	0	0	0	73	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	137	0	0	967	0	0	736	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					8		1	6			2	
Permitted Phases				8			6					
Actuated Green, G (s)					13.2			66.8			41.8	
Effective Green, g (s)					13.2			66.8			41.8	
Actuated g/C Ratio					0.15			0.74			0.46	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					221			1104			1481	
v/s Ratio Prot								c0.19			0.23	
v/s Ratio Perm					0.09			c0.46				
v/c Ratio					0.62			0.88			0.50	
Uniform Delay, d1					36.1			8.5			16.8	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					5.4			8.0			1.2	
Delay (s)					41.4			16.5			18.0	
Level of Service					D			B			B	
Approach Delay (s)		0.0			41.4			16.5			18.0	
Approach LOS		A			D			B			B	

Intersection Summary

HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM 6th TWSC
5: Sullivan & Upland

03/31/2020

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	2	11	18	702	626	4
Future Vol, veh/h	2	11	18	702	626	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	11	18	716	639	4

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1035	322	643	0	0
Stage 1	641	-	-	-	-
Stage 2	394	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	228	674	938	-	-
Stage 1	487	-	-	-	-
Stage 2	650	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	221	674	938	-	-
Mov Cap-2 Maneuver	221	-	-	-	-
Stage 1	471	-	-	-	-
Stage 2	650	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	938	-	512	-	-
HCM Lane V/C Ratio	0.02	-	0.026	-	-
HCM Control Delay (s)	8.9	0.1	12.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↑↑↑	↗ ↑↑↑			↗ ↑↑
Traffic Vol, veh/h	0	5	992	8	0	1538
Future Vol, veh/h	0	5	992	8	0	1538
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	1067	9	0	1654

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	538	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-
Pot Cap-1 Maneuver	0	417	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	417	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	417
HCM Lane V/C Ratio	-	-	0.013
HCM Control Delay (s)	-	-	13.7
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

HCM 6th TWSC
8: Sullivan & Fairview

03/31/2020

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑	↑	↑	↑↑
Traffic Vol, veh/h	48	20	922	12	2	1087
Future Vol, veh/h	48	20	922	12	2	1087
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	22	991	13	2	1169

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1580	496	0	0	1004
Stage 1	991	-	-	-	-
Stage 2	589	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	100	519	-	-	686
Stage 1	320	-	-	-	-
Stage 2	517	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	100	519	-	-	686
Mov Cap-2 Maneuver	100	-	-	-	-
Stage 1	320	-	-	-	-
Stage 2	515	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	62.6	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	131	686
HCM Lane V/C Ratio	-	-	0.558	0.003
HCM Control Delay (s)	-	-	62.6	10.3
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	2.7	0

HCM 6th Signalized Intersection Summary

2: Sullivan & Indiana

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗↘	↑↓	↗	↘	↑↓	↗	↗↘	↑↓		↘	↑↑	↗
Traffic Volume (veh/h)	173	247	512	189	405	293	313	792	250	143	1292	207
Future Volume (veh/h)	173	247	512	189	405	293	313	792	250	143	1292	207
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1709	1709	1709	1654	1654	1654	1723	1723	1723
Adj Flow Rate, veh/h	173	247	362	189	405	193	313	792	0	143	1292	132
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	3	3	3	7	7	7	2	2	2
Cap, veh/h	242	299	507	211	781	331	327	1328		176	1382	617
Arrive On Green	0.07	0.17	0.17	0.13	0.23	0.23	0.11	0.42	0.00	0.11	0.42	0.42
Sat Flow, veh/h	3307	1736	2943	1628	3418	1448	3057	3226	0	1641	3273	1460
Grp Volume(v), veh/h	173	247	362	189	405	193	313	792	0	143	1292	132
Grp Sat Flow(s),veh/h/ln	1654	1736	1471	1628	1709	1448	1528	1572	0	1641	1637	1460
Q Serve(g_s), s	4.5	12.2	10.3	10.2	9.2	10.5	9.0	17.3	0.0	7.6	33.4	5.1
Cycle Q Clear(g_c), s	4.5	12.2	10.3	10.2	9.2	10.5	9.0	17.3	0.0	7.6	33.4	5.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	242	299	507	211	781	331	327	1328		176	1382	617
V/C Ratio(X)	0.71	0.83	0.71	0.90	0.52	0.58	0.96	0.60		0.81	0.93	0.21
Avail Cap(c_a), veh/h	242	323	547	211	828	351	327	1328		176	1382	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	35.5	34.7	38.1	30.0	30.5	39.4	19.8	0.0	38.8	24.5	16.3
Incr Delay (d2), s/veh	9.6	15.2	4.0	35.3	0.5	2.2	38.3	2.0	0.0	24.7	12.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	6.3	3.9	6.0	3.8	3.8	5.0	6.3	0.0	4.1	14.2	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	50.6	38.7	73.3	30.5	32.7	77.8	21.8	0.0	63.4	37.4	17.1
LnGrp LOS	D	D	D	E	C	C	E	C		E	D	B
Approach Vol, veh/h		782			787			1105	A		1567	
Approach Delay, s/veh		44.9			41.3			37.6			38.1	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	41.5	15.0	19.3	13.0	41.5	10.0	24.3				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	9.0	37.0	11.0	16.0	9.0	37.0	6.0	21.0				
Max Q Clear Time (g_c+I1), s	9.6	19.3	12.2	14.2	11.0	35.4	6.5	12.5				
Green Ext Time (p_c), s	0.0	5.1	0.0	0.6	0.0	1.2	0.0	2.2				

Intersection Summary

HCM 6th Ctrl Delay	39.8
HCM 6th LOS	D

Notes

- User approved volume balancing among the lanes for turning movement.
- Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 154: Sullivan & Marietta

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↘		↗	↕	↘	↗	↕	↘
Traffic Volume (veh/h)	30	9	112	392	25	57	37	1140	109	17	1178	7
Future Volume (veh/h)	30	9	112	392	25	57	37	1140	109	17	1178	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1736	1736	1736	1627	1627	1627	1709	1709	1709
Adj Flow Rate, veh/h	30	9	82	392	25	57	37	1140	79	17	1178	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	1	1	1	9	9	9	3	3	3
Cap, veh/h	154	69	323	562	155	352	46	1362	607	26	1514	9
Arrive On Green	0.33	0.33	0.31	0.33	0.33	0.31	0.03	0.44	0.44	0.02	0.46	0.43
Sat Flow, veh/h	258	210	984	1316	471	1073	1550	3092	1379	1628	3309	20
Grp Volume(v), veh/h	121	0	0	392	0	82	37	1140	79	17	578	607
Grp Sat Flow(s),veh/h/ln	1452	0	0	1316	0	1543	1550	1546	1379	1628	1624	1706
Q Serve(g_s), s	0.0	0.0	0.0	13.4	0.0	2.5	1.5	21.3	2.2	0.7	19.5	19.5
Cycle Q Clear(g_c), s	3.8	0.0	0.0	17.2	0.0	2.5	1.5	21.3	2.2	0.7	19.5	19.5
Prop In Lane	0.25		0.68	1.00		0.70	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	546	0	0	562	0	507	46	1362	607	26	743	780
V/C Ratio(X)	0.22	0.00	0.00	0.70	0.00	0.16	0.80	0.84	0.13	0.64	0.78	0.78
Avail Cap(c_a), veh/h	668	0	0	675	0	639	95	1518	677	100	797	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	0.0	20.1	0.0	15.8	31.4	16.2	10.8	31.9	14.9	14.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.1	25.6	3.9	0.1	23.1	4.6	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	5.3	0.0	0.8	0.9	7.1	0.6	0.4	7.0	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	0.0	22.6	0.0	15.9	57.1	20.1	10.9	55.0	19.5	19.3
LnGrp LOS	B	A	A	C	A	B	E	C	B	D	B	B
Approach Vol, veh/h		121			474			1256			1202	
Approach Delay, s/veh		16.4			21.5			20.6			19.9	
Approach LOS		B			C			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	33.8		25.4	7.1	32.7		25.4				
Change Period (Y+Rc), s	4.0	6.0		5.0	6.0	* 6		5.0				
Max Green Setting (Gmax), s	4.0	30.0		26.0	4.0	* 30		26.0				
Max Q Clear Time (g_c+I1), s	3.5	21.5		5.8	2.7	23.3		19.2				
Green Ext Time (p_c), s	0.0	3.5		0.4	0.0	3.4		1.2				

Intersection Summary

HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 230: Sullivan & Wellesley

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↕	
Traffic Volume (veh/h)	82	124	619	109	82	15	572	54	248	3	57	25
Future Volume (veh/h)	82	124	619	109	82	15	572	54	248	3	57	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1723	1723	1723	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	82	124	319	109	82	15	572	54	173	3	57	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	2	2	2	0	0	0	0	0	0
Cap, veh/h	623	148	382	304	516	94	657	581	518	214	162	67
Arrive On Green	0.06	0.35	0.34	0.07	0.36	0.36	0.29	0.35	0.34	0.01	0.07	0.06
Sat Flow, veh/h	1628	423	1089	1641	1417	259	1667	1663	1483	1667	2295	947
Grp Volume(v), veh/h	82	0	443	109	0	97	572	54	173	3	40	42
Grp Sat Flow(s),veh/h/ln	1628	0	1513	1641	0	1676	1667	1663	1483	1667	1663	1580
Q Serve(g_s), s	2.0	0.0	17.2	2.6	0.0	2.5	18.5	1.4	5.5	0.1	1.5	1.6
Cycle Q Clear(g_c), s	2.0	0.0	17.2	2.6	0.0	2.5	18.5	1.4	5.5	0.1	1.5	1.6
Prop In Lane	1.00		0.72	1.00		0.15	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	623	0	530	304	0	610	657	581	518	214	117	111
V/C Ratio(X)	0.13	0.00	0.84	0.36	0.00	0.16	0.87	0.09	0.33	0.01	0.34	0.37
Avail Cap(c_a), veh/h	646	0	818	305	0	906	657	847	755	313	482	458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.9	0.0	19.2	14.1	0.0	13.7	18.4	14.0	15.5	27.0	28.2	28.5
Incr Delay (d2), s/veh	0.1	0.0	4.6	0.7	0.0	0.1	12.2	0.1	0.4	0.0	1.7	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	6.1	0.9	0.0	0.9	8.9	0.5	1.7	0.0	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	0.0	23.8	14.8	0.0	13.8	30.7	14.0	15.9	27.0	30.0	30.5
LnGrp LOS	B	A	C	B	A	B	C	B	B	C	C	C
Approach Vol, veh/h		525			206			799				85
Approach Delay, s/veh		22.0			14.4			26.3				30.1
Approach LOS		C			B			C				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.2	25.8	8.0	25.8	22.0	8.0	7.1	26.7				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	32.0	4.0	34.0	18.0	18.0	4.0	34.0				
Max Q Clear Time (g_c+I1), s	2.1	7.5	4.6	19.2	20.5	3.6	4.0	4.5				
Green Ext Time (p_c), s	0.0	1.3	0.0	2.6	0.0	0.3	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			23.6									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

3024: Sullivan & Kiernan

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	4	44	194	1	199	19	1129	79	68	630	9
Future Volume (veh/h)	30	4	44	194	1	199	19	1129	79	68	630	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1723	1723	1723	1695	1695	1695	1654	1654	1654
Adj Flow Rate, veh/h	30	4	44	194	1	129	19	1129	79	68	630	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	12	12	12	2	2	2	4	4	4	7	7	7
Cap, veh/h	253	28	310	446	2	363	30	1461	651	79	1539	22
Arrive On Green	0.25	0.25	0.23	0.25	0.25	0.25	0.02	0.45	0.45	0.05	0.49	0.44
Sat Flow, veh/h	1160	113	1248	1199	6	1460	1615	3221	1437	1576	3173	45
Grp Volume(v), veh/h	30	0	48	195	0	129	19	1129	79	68	312	327
Grp Sat Flow(s),veh/h/ln	1160	0	1362	1205	0	1460	1615	1611	1437	1576	1572	1646
Q Serve(g_s), s	1.2	0.0	1.4	6.3	0.0	3.5	0.6	14.3	1.5	2.1	6.2	6.2
Cycle Q Clear(g_c), s	8.9	0.0	1.4	7.7	0.0	3.5	0.6	14.3	1.5	2.1	6.2	6.2
Prop In Lane	1.00		0.92	0.99		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	253	0	338	448	0	363	30	1461	651	79	763	799
V/C Ratio(X)	0.12	0.00	0.14	0.44	0.00	0.36	0.63	0.77	0.12	0.86	0.41	0.41
Avail Cap(c_a), veh/h	635	0	787	895	0	844	133	1729	771	130	844	884
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	14.5	17.2	0.0	15.0	23.6	11.1	7.7	22.8	8.0	8.0
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.7	0.0	0.6	19.8	1.9	0.1	24.6	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.4	1.8	0.0	1.1	0.4	4.0	0.4	1.2	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	14.7	17.9	0.0	15.6	43.4	13.0	7.7	47.4	8.4	8.4
LnGrp LOS	C	A	B	B	A	B	D	B	A	D	A	A
Approach Vol, veh/h		78			324			1227			707	
Approach Delay, s/veh		17.1			17.0			13.2			12.1	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	27.5		16.0	6.4	26.0		16.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	4.0	24.0		27.0	4.0	24.0		27.0				
Max Q Clear Time (g_c+I1), s	2.6	8.2		10.9	4.1	16.3		9.7				
Green Ext Time (p_c), s	0.0	2.3		0.2	0.0	3.7		1.2				

Intersection Summary

HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary

3025: Sullivan & Euclid

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↖	↖	↖	↖↖	↖	↖	↖↖	
Traffic Volume (veh/h)	97	21	148	194	6	99	22	1168	38	48	790	10
Future Volume (veh/h)	97	21	148	194	6	99	22	1168	38	48	790	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1695	1695	1695
Adj Flow Rate, veh/h	97	21	98	194	6	69	22	1168	38	48	790	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	4	4	4
Cap, veh/h	185	30	139	274	255	244	31	1509	673	58	1505	19
Arrive On Green	0.11	0.11	0.11	0.17	0.15	0.17	0.02	0.47	0.47	0.04	0.46	0.44
Sat Flow, veh/h	1641	265	1236	1602	1682	1425	1602	3195	1425	1615	3257	41
Grp Volume(v), veh/h	97	0	119	194	6	69	22	1168	38	48	391	409
Grp Sat Flow(s),veh/h/ln	1641	0	1500	1602	1682	1425	1602	1598	1425	1615	1611	1688
Q Serve(g_s), s	4.3	0.0	5.9	8.8	0.2	3.2	1.0	23.4	1.1	2.3	13.2	13.2
Cycle Q Clear(g_c), s	4.3	0.0	5.9	8.8	0.2	3.2	1.0	23.4	1.1	2.3	13.2	13.2
Prop In Lane	1.00		0.82	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	185	0	169	274	255	244	31	1509	673	58	744	780
V/C Ratio(X)	0.52	0.00	0.70	0.71	0.02	0.28	0.70	0.77	0.06	0.83	0.52	0.52
Avail Cap(c_a), veh/h	577	0	527	573	569	510	83	1509	673	84	744	780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	32.8	30.0	27.7	27.7	37.4	16.9	11.0	36.8	14.7	14.7
Incr Delay (d2), s/veh	2.3	0.0	5.2	3.4	0.0	0.6	24.9	2.6	0.0	35.1	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	2.3	3.5	0.1	1.1	0.6	8.1	0.3	1.4	4.9	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	0.0	38.1	33.4	27.8	28.4	62.4	19.4	11.0	71.9	17.3	17.2
LnGrp LOS	C	A	D	C	C	C	E	B	B	E	B	B
Approach Vol, veh/h		216			269			1228			848	
Approach Delay, s/veh		36.4			32.0			20.0			20.3	
Approach LOS		D			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	39.5		12.7	6.7	40.3		17.1				
Change Period (Y+Rc), s	6.0	* 6		4.0	4.0	6.0		5.5				
Max Green Setting (Gmax), s	4.0	* 34		27.0	4.0	33.5		26.0				
Max Q Clear Time (g_c+I1), s	3.0	15.2		7.9	4.3	25.4		10.8				
Green Ext Time (p_c), s	0.0	3.1		0.9	0.0	3.9		0.9				

Intersection Summary

HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 1.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 5.

HCM Signalized Intersection Capacity Analysis

3304: Sullivan & EB Trent

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Volume (vph)	82	0	296	0	0	0	0	1009	405	474	464	0
Future Volume (vph)	82	0	296	0	0	0	0	1009	405	474	464	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.0						5.0			5.0	
Lane Util. Factor		1.00						*0.65			*0.75	
Frt		0.89						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1434						1896			2272	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1434						1896			1262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	0	296	0	0	0	0	1009	405	474	464	0
RTOR Reduction (vph)	0	93	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	285	0	0	0	0	0	1399	0	0	938	0
Heavy Vehicles (%)	8%	8%	8%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Actuated Green, G (s)		24.0						92.0			106.0	
Effective Green, g (s)		24.0						92.0			106.0	
Actuated g/C Ratio		0.17						0.66			0.76	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		245						1245			1020	
v/s Ratio Prot								c0.74			c0.06	
v/s Ratio Perm		0.20									0.64	
v/c Ratio		1.16						1.12			0.92	
Uniform Delay, d1		58.0						24.0			13.6	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		109.1						66.6			12.8	
Delay (s)		167.1						90.6			26.4	
Level of Service		F						F			C	
Approach Delay (s)		167.1			0.0			90.6			26.4	
Approach LOS		F			A			F			C	

Intersection Summary

HCM 2000 Control Delay	79.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3302: Sullivan & WB Trent

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	179	0	104	320	789	0	0	764	70
Future Volume (vph)	0	0	0	179	0	104	320	789	0	0	764	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					5.0			5.0			5.0	
Lane Util. Factor					1.00			*0.75			*0.80	
Frt					0.95			1.00			0.99	
Flt Protected					0.97			0.90			1.00	
Satd. Flow (prot)					1507			2316			2684	
Flt Permitted					0.97			0.50			1.00	
Satd. Flow (perm)					1507			1287			2684	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	179	0	104	320	789	0	0	764	70
RTOR Reduction (vph)	0	0	0	0	54	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	229	0	0	1109	0	0	829	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					8		1	6			2	
Permitted Phases				8			6					
Actuated Green, G (s)					19.0			91.0			73.0	
Effective Green, g (s)					19.0			91.0			73.0	
Actuated g/C Ratio					0.16			0.76			0.61	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					238			1087			1632	
v/s Ratio Prot								c0.11			0.31	
v/s Ratio Perm					0.15			c0.66				
v/c Ratio					0.96			1.02			0.51	
Uniform Delay, d1					50.1			14.5			13.3	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					47.6			32.5			1.1	
Delay (s)					97.8			47.0			14.5	
Level of Service					F			D			B	
Approach Delay (s)		0.0			97.8			47.0			14.5	
Approach LOS		A			F			D			B	

Intersection Summary

HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM 6th TWSC
5: Sullivan & Upland

06/22/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	12	51	26	877	780	5
Future Vol, veh/h	12	51	26	877	780	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	3	3
Mvmt Flow	12	51	26	877	780	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1274	393	785	0	-	0
Stage 1	783	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	162	612	843	-	-	-
Stage 1	416	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	152	612	843	-	-	-
Mov Cap-2 Maneuver	152	-	-	-	-	-
Stage 1	391	-	-	-	-	-
Stage 2	586	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	843	-	388	-	-
HCM Lane V/C Ratio	0.031	-	0.162	-	-
HCM Control Delay (s)	9.4	0.3	16.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↑↑↑	↗ ↑↑↑			↗ ↑↑
Traffic Vol, veh/h	0	10	1258	10	0	1672
Future Vol, veh/h	0	10	1258	10	0	1672
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	9	9	2	2
Mvmt Flow	0	10	1258	10	0	1672

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	634	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-
Pot Cap-1 Maneuver	0	365	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	365	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	365
HCM Lane V/C Ratio	-	-	0.027
HCM Control Delay (s)	-	-	15.1
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.1

HCM 6th TWSC
8: Sullivan & Fairview

06/22/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑↑	↗	↘	↑↑
Traffic Vol, veh/h	10	10	1290	10	5	1152
Future Vol, veh/h	10	10	1290	10	5	1152
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	5	5	3	3
Mvmt Flow	10	10	1290	10	5	1152

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1876	645	0	0	1300
Stage 1	1290	-	-	-	-
Stage 2	586	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	63	415	-	-	523
Stage 1	222	-	-	-	-
Stage 2	519	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	62	415	-	-	523
Mov Cap-2 Maneuver	62	-	-	-	-
Stage 1	222	-	-	-	-
Stage 2	514	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.8	0	0.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	108	523
HCM Lane V/C Ratio	-	-	0.185	0.01
HCM Control Delay (s)	-	-	45.8	11.9
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	0.6	0

HCM 6th Signalized Intersection Summary

2: Sullivan & Indiana

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	233	505	199	407	315	308	843	250	163	1378	208
Future Volume (veh/h)	178	233	505	199	407	315	308	843	250	163	1378	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1709	1709	1709	1654	1654	1654	1709	1709	1709
Adj Flow Rate, veh/h	178	233	335	199	419	207	308	843	0	163	1378	138
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	3	3	3	7	7	7	3	3	3
Cap, veh/h	265	289	489	212	741	314	329	1337		175	1381	616
Arrive On Green	0.08	0.17	0.17	0.13	0.22	0.22	0.11	0.43	0.00	0.11	0.43	0.43
Sat Flow, veh/h	3307	1736	2943	1628	3418	1448	3057	3226	0	1628	3247	1448
Grp Volume(v), veh/h	178	233	335	199	419	207	308	843	0	163	1378	138
Grp Sat Flow(s),veh/h/ln	1654	1736	1471	1628	1709	1448	1528	1572	0	1628	1624	1448
Q Serve(g_s), s	4.6	11.4	9.4	10.7	9.6	11.5	8.8	18.6	0.0	8.8	37.3	5.3
Cycle Q Clear(g_c), s	4.6	11.4	9.4	10.7	9.6	11.5	8.8	18.6	0.0	8.8	37.3	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	289	489	212	741	314	329	1337		175	1381	616
V/C Ratio(X)	0.67	0.81	0.68	0.94	0.57	0.66	0.93	0.63		0.93	1.00	0.22
Avail Cap(c_a), veh/h	281	325	551	212	795	337	329	1337		175	1381	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	35.4	34.6	38.0	30.8	31.6	39.0	19.9	0.0	39.0	25.3	16.1
Incr Delay (d2), s/veh	5.7	12.7	3.0	44.4	0.8	4.3	33.1	2.3	0.0	47.9	23.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	5.7	3.5	6.8	4.0	4.3	4.7	6.7	0.0	5.7	17.5	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	48.1	37.6	82.3	31.6	35.8	72.1	22.2	0.0	86.9	48.9	16.9
LnGrp LOS	D	D	D	F	C	D	E	C		F	D	B
Approach Vol, veh/h		746			825			1151	A		1679	
Approach Delay, s/veh		42.7			44.9			35.5			50.0	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	41.5	15.0	18.7	13.0	41.5	10.6	23.1				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	9.0	37.0	11.0	16.0	9.0	37.0	7.0	20.0				
Max Q Clear Time (g_c+I1), s	10.8	20.6	12.7	13.4	10.8	39.3	6.6	13.5				
Green Ext Time (p_c), s	0.0	5.3	0.0	0.8	0.0	0.0	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay	44.0
HCM 6th LOS	D

Notes

- User approved volume balancing among the lanes for turning movement.
- Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
154: Sullivan & Marietta

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↑↑	↔	↔	↑↔	
Traffic Volume (veh/h)	30	9	112	392	25	57	37	1236	106	14	1290	7
Future Volume (veh/h)	30	9	112	392	25	57	37	1236	106	14	1290	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1736	1736	1736	1627	1627	1627	1709	1709	1709
Adj Flow Rate, veh/h	30	9	82	392	25	57	37	1236	76	14	1290	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	1	1	1	9	9	9	3	3	3
Cap, veh/h	149	66	320	542	153	349	45	1434	640	22	1578	9
Arrive On Green	0.33	0.33	0.31	0.33	0.33	0.31	0.03	0.46	0.46	0.01	0.48	0.45
Sat Flow, veh/h	264	203	983	1316	471	1073	1550	3092	1379	1628	3311	18
Grp Volume(v), veh/h	121	0	0	392	0	82	37	1236	76	14	632	665
Grp Sat Flow(s),veh/h/ln	1450	0	0	1316	0	1543	1550	1546	1379	1628	1624	1706
Q Serve(g_s), s	0.0	0.0	0.0	15.2	0.0	2.7	1.7	25.4	2.2	0.6	23.8	23.8
Cycle Q Clear(g_c), s	4.2	0.0	0.0	19.4	0.0	2.7	1.7	25.4	2.2	0.6	23.8	23.8
Prop In Lane	0.25		0.68	1.00		0.70	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	535	0	0	542	0	502	45	1434	640	22	774	813
V/C Ratio(X)	0.23	0.00	0.00	0.72	0.00	0.16	0.82	0.86	0.12	0.63	0.82	0.82
Avail Cap(c_a), veh/h	592	0	0	595	0	564	87	1434	640	92	774	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	0.0	22.5	0.0	17.3	34.3	17.0	10.8	34.9	16.0	16.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	3.9	0.0	0.2	28.7	7.0	0.4	26.2	6.9	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	6.2	0.0	0.9	1.0	9.1	0.7	0.4	9.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	0.0	0.0	26.4	0.0	17.5	63.1	24.0	11.2	61.1	22.8	22.5
LnGrp LOS	B	A	A	C	A	B	E	C	B	E	C	C
Approach Vol, veh/h		121			474			1349				1311
Approach Delay, s/veh		18.0			24.9			24.4				23.1
Approach LOS		B			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	37.9		27.2	7.0	37.0		27.2				
Change Period (Y+Rc), s	4.0	6.0		5.0	6.0	* 6		5.0				
Max Green Setting (Gmax), s	4.0	31.0		25.0	4.0	* 31		25.0				
Max Q Clear Time (g_c+I1), s	3.7	25.8		6.2	2.6	27.4		21.4				
Green Ext Time (p_c), s	0.0	2.8		0.4	0.0	2.2		0.8				

Intersection Summary

HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 230: Sullivan & Wellesley

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↕		↖	↗	
Traffic Volume (veh/h)	80	124	176	115	82	20	127	1117	250	30	694	16
Future Volume (veh/h)	80	124	176	115	82	20	127	1117	250	30	694	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1723	1723	1723	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	80	124	126	115	82	20	127	1117	170	30	694	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	2	2	2	0	0	0	0	0	0
Cap, veh/h	418	156	159	287	284	69	447	1365	207	231	1440	33
Arrive On Green	0.06	0.20	0.19	0.07	0.21	0.20	0.07	0.47	0.46	0.03	0.43	0.43
Sat Flow, veh/h	1628	777	790	1641	1338	326	1667	2894	439	1667	3322	77
Grp Volume(v), veh/h	80	0	250	115	0	102	127	640	647	30	347	363
Grp Sat Flow(s),veh/h/ln	1628	0	1567	1641	0	1664	1667	1663	1671	1667	1663	1736
Q Serve(g_s), s	2.4	0.0	9.6	3.5	0.0	3.3	2.5	20.9	21.1	0.6	9.4	9.5
Cycle Q Clear(g_c), s	2.4	0.0	9.6	3.5	0.0	3.3	2.5	20.9	21.1	0.6	9.4	9.5
Prop In Lane	1.00		0.50	1.00		0.20	1.00		0.26	1.00		0.04
Lane Grp Cap(c), veh/h	418	0	315	287	0	353	447	784	788	231	721	753
V/C Ratio(X)	0.19	0.00	0.79	0.40	0.00	0.29	0.28	0.82	0.82	0.13	0.48	0.48
Avail Cap(c_a), veh/h	436	0	429	287	0	456	499	914	918	293	861	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.1	0.0	24.1	18.8	0.0	20.9	8.9	14.3	14.4	12.1	12.8	12.8
Incr Delay (d2), s/veh	0.2	0.0	7.0	0.9	0.0	0.4	0.3	5.1	5.2	0.3	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	3.9	1.3	0.0	1.2	0.8	7.5	7.7	0.2	3.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.4	0.0	31.1	19.7	0.0	21.4	9.2	19.4	19.7	12.3	13.3	13.3
LnGrp LOS	B	A	C	B	A	C	A	B	B	B	B	B
Approach Vol, veh/h		330			217			1414			740	
Approach Delay, s/veh		28.0			20.5			18.6			13.3	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.6	33.3	8.0	16.2	8.1	30.9	7.3	16.9				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	34.2	4.0	16.8	6.0	32.2	4.0	16.8				
Max Q Clear Time (g_c+I1), s	2.6	23.1	5.5	11.6	4.5	11.5	4.4	5.3				
Green Ext Time (p_c), s	0.0	6.2	0.0	0.6	0.0	4.2	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary

3024: Sullivan & Kiernan

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↖	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (veh/h)	30	4	44	194	1	199	19	1400	79	68	804	9
Future Volume (veh/h)	30	4	44	194	1	199	19	1400	79	68	804	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1723	1723	1723	1695	1695	1695	1654	1654	1654
Adj Flow Rate, veh/h	30	4	34	194	1	139	19	1400	59	68	804	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	12	12	12	2	2	2	4	4	4	7	7	7
Cap, veh/h	207	33	282	402	1	337	29	1676	747	81	1763	20
Arrive On Green	0.23	0.23	0.21	0.23	0.23	0.23	0.02	0.52	0.52	0.05	0.55	0.52
Sat Flow, veh/h	1150	144	1222	1231	6	1460	1615	3221	1437	1576	3184	36
Grp Volume(v), veh/h	30	0	38	195	0	139	19	1400	59	68	397	416
Grp Sat Flow(s),veh/h/ln	1150	0	1366	1238	0	1460	1615	1611	1437	1576	1572	1648
Q Serve(g_s), s	1.5	0.0	1.4	8.0	0.0	4.9	0.7	22.4	1.2	2.6	9.2	9.2
Cycle Q Clear(g_c), s	10.8	0.0	1.4	9.3	0.0	4.9	0.7	22.4	1.2	2.6	9.2	9.2
Prop In Lane	1.00		0.89	0.99		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	207	0	315	404	0	337	29	1676	747	81	870	913
V/C Ratio(X)	0.15	0.00	0.12	0.48	0.00	0.41	0.65	0.84	0.08	0.84	0.46	0.46
Avail Cap(c_a), veh/h	472	0	630	720	0	673	106	1910	852	104	932	977
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	18.9	22.2	0.0	19.9	29.6	12.4	7.3	28.5	8.1	8.1
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.9	0.0	0.8	21.9	3.0	0.0	35.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.4	2.5	0.0	1.6	0.4	6.8	0.3	1.7	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	19.0	23.1	0.0	20.7	51.5	15.4	7.3	63.5	8.5	8.5
LnGrp LOS	C	A	B	C	A	C	D	B	A	E	A	A
Approach Vol, veh/h		68			334			1478			881	
Approach Delay, s/veh		22.5			22.1			15.6			12.7	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	37.6		18.0	7.1	35.6		18.0				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	4.0	34.0		27.0	4.0	34.0		27.0				
Max Q Clear Time (g_c+I1), s	2.7	11.2		12.8	4.6	24.4		11.3				
Green Ext Time (p_c), s	0.0	3.3		0.2	0.0	5.2		1.2				

Intersection Summary

HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary

3025: Sullivan & Euclid

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↖	↖	↖	↖↖	↖	↖	↖↖	
Traffic Volume (veh/h)	97	21	148	194	6	99	22	1333	38	48	975	0
Future Volume (veh/h)	97	21	148	194	6	99	22	1333	38	48	975	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1723	1682	1723	1682	1682	1695	1695	0
Adj Flow Rate, veh/h	97	21	98	194	6	69	22	1333	38	48	975	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	5	2	5	2	5	5	4	4	0
Cap, veh/h	182	29	137	271	259	242	32	1540	687	58	1524	0
Arrive On Green	0.11	0.11	0.11	0.17	0.15	0.17	0.02	0.48	0.48	0.04	0.47	0.00
Sat Flow, veh/h	1641	265	1236	1602	1723	1425	1641	3195	1425	1615	3306	0
Grp Volume(v), veh/h	97	0	119	194	6	69	22	1333	38	48	975	0
Grp Sat Flow(s),veh/h/ln	1641	0	1500	1602	1723	1425	1641	1598	1425	1615	1611	0
Q Serve(g_s), s	4.4	0.0	6.1	9.1	0.2	3.3	1.1	29.4	1.1	2.3	18.1	0.0
Cycle Q Clear(g_c), s	4.4	0.0	6.1	9.1	0.2	3.3	1.1	29.4	1.1	2.3	18.1	0.0
Prop In Lane	1.00		0.82	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	182	0	167	271	259	242	32	1540	687	58	1524	0
V/C Ratio(X)	0.53	0.00	0.71	0.71	0.02	0.29	0.69	0.87	0.06	0.83	0.64	0.00
Avail Cap(c_a), veh/h	517	0	473	556	565	494	83	1540	687	81	1524	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.3	0.0	34.0	31.1	28.7	28.7	38.6	18.3	10.9	38.0	15.8	0.0
Incr Delay (d2), s/veh	2.4	0.0	5.6	3.5	0.0	0.6	23.5	5.5	0.0	36.9	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	2.4	3.6	0.1	1.1	0.6	10.7	0.3	1.5	6.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	0.0	39.6	34.6	28.7	29.4	62.2	23.7	11.0	74.9	17.9	0.0
LnGrp LOS	D	A	D	C	C	C	E	C	B	E	B	A
Approach Vol, veh/h		216			269			1393			1023	
Approach Delay, s/veh		37.8			33.1			24.0			20.5	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	41.5		12.8	6.8	42.2		17.4				
Change Period (Y+Rc), s	6.0	* 6		4.0	4.0	6.0		5.5				
Max Green Setting (Gmax), s	4.0	* 36		25.0	4.0	35.5		26.0				
Max Q Clear Time (g_c+I1), s	3.1	20.1		8.1	4.3	31.4		11.1				
Green Ext Time (p_c), s	0.0	4.4		0.8	0.0	2.6		0.9				

Intersection Summary

HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 1.

HCM 6th Edition methodology does not support a perm + prot left-turn type from a shared lane. Left-turn bay is needed for phases 5.

HCM Signalized Intersection Capacity Analysis

3304: Sullivan & EB Trent

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Volume (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
Future Volume (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.0						5.0			5.0	
Lane Util. Factor		1.00						*0.65			*0.75	
Frt		0.90						0.85			1.00	
Flt Protected		0.99						1.00			0.90	
Satd. Flow (prot)		1437						1896			2272	
Flt Permitted		0.99						1.00			0.50	
Satd. Flow (perm)		1437						1896			1262	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
RTOR Reduction (vph)	0	75	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	255	0	0	0	0	0	1636	0	0	1299	0
Heavy Vehicles (%)	8%	8%	8%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Actuated Green, G (s)		22.0						104.0			118.0	
Effective Green, g (s)		22.0						104.0			118.0	
Actuated g/C Ratio		0.15						0.69			0.79	
Clearance Time (s)		5.0						5.0			5.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		210						1314			1053	
v/s Ratio Prot								0.86			c0.07	
v/s Ratio Perm		0.18									c0.90	
v/c Ratio		1.21						1.25			1.23	
Uniform Delay, d1		64.0						23.0			16.0	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		131.8						116.8			113.5	
Delay (s)		195.8						139.8			129.5	
Level of Service		F						F			F	
Approach Delay (s)		195.8			0.0			139.8			129.5	
Approach LOS		F			A			F			F	

Intersection Summary

HCM 2000 Control Delay	141.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3302: Sullivan & WB Trent

06/22/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Traffic Volume (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
Future Volume (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					5.0			5.0			5.0	
Lane Util. Factor					1.00			*0.75			*0.80	
Frt					0.91			1.00			1.00	
Flt Protected					0.99			0.90			1.00	
Satd. Flow (prot)					1459			2316			2711	
Flt Permitted					0.99			0.50			1.00	
Satd. Flow (perm)					1459			1287			2711	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
RTOR Reduction (vph)	0	0	0	0	83	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	462	0	0	1314	0	0	1135	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					8		1	6			2	
Permitted Phases				8			6					
Actuated Green, G (s)					24.0			66.0			48.0	
Effective Green, g (s)					24.0			66.0			48.0	
Actuated g/C Ratio					0.24			0.66			0.48	
Clearance Time (s)					5.0			5.0			5.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					350			983			1301	
v/s Ratio Prot								c0.17			0.42	
v/s Ratio Perm					0.32			c0.71				
v/c Ratio					1.32			1.34			0.87	
Uniform Delay, d1					38.0			17.0			23.3	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					163.0			158.5			8.3	
Delay (s)					201.0			175.5			31.5	
Level of Service					F			F			C	
Approach Delay (s)		0.0			201.0			175.5			31.5	
Approach LOS		A			F			F			C	

Intersection Summary

HCM 2000 Control Delay	125.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	121.8%	ICU Level of Service	H
Analysis Period (min)	15		
Description: updated			
c Critical Lane Group			

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	20	55	25	1460	1032	2
Future Vol, veh/h	20	55	25	1460	1032	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	3	3
Mvmt Flow	20	55	25	1460	1032	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1813	517	1034	0	-	0
Stage 1	1033	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	71	509	680	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	57	509	680	-	-	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	249	-	-	-	-	-
Stage 2	418	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.6	1.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	680	-	163	-	-
HCM Lane V/C Ratio	0.037	-	0.46	-	-
HCM Control Delay (s)	10.5	1	44.6	-	-
HCM Lane LOS	B	A	E	-	-
HCM 95th %tile Q(veh)	0.1	-	2.1	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↑↑↑	↑↑↑			↑↑
Traffic Vol, veh/h	0	10	1326	10	0	1794
Future Vol, veh/h	0	10	1326	10	0	1794
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	9	9	2	2
Mvmt Flow	0	10	1326	10	0	1794

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	668	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	7.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.9	-
Pot Cap-1 Maneuver	0	347	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	-	347	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	347
HCM Lane V/C Ratio	-	-	0.029
HCM Control Delay (s)	-	-	15.7
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.1

HCM 6th TWSC
8: Sullivan & Fairview

06/22/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑↑	↗	↘	↑↑
Traffic Vol, veh/h	10	10	1345	10	5	1297
Future Vol, veh/h	10	10	1345	10	5	1297
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	5	5	3	3
Mvmt Flow	10	10	1345	10	5	1297

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2004	673	0	0	1355
Stage 1	1345	-	-	-	-
Stage 2	659	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	52	398	-	-	498
Stage 1	207	-	-	-	-
Stage 2	476	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	51	398	-	-	498
Mov Cap-2 Maneuver	51	-	-	-	-
Stage 1	207	-	-	-	-
Stage 2	471	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	56.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	90	498
HCM Lane V/C Ratio	-	-	0.222	0.01
HCM Control Delay (s)	-	-	56.1	12.3
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	0.8	0

HCM 6th Signalized Intersection Summary

2: Sullivan & Indiana

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	233	505	199	407	315	308	843	250	163	1378	208
Future Volume (veh/h)	178	233	505	199	407	315	308	843	250	163	1378	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1709	1709	1709	1654	1654	1654	1709	1709	1709
Adj Flow Rate, veh/h	178	233	330	199	419	207	308	843	0	163	1378	128
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	1	1	3	3	3	7	7	7	3	3	3
Cap, veh/h	265	289	489	212	741	314	329	1337		175	1381	616
Arrive On Green	0.08	0.17	0.17	0.13	0.22	0.22	0.11	0.43	0.00	0.11	0.43	0.43
Sat Flow, veh/h	3307	1736	2943	1628	3418	1448	3057	3226	0	1628	3247	1448
Grp Volume(v), veh/h	178	233	330	199	419	207	308	843	0	163	1378	128
Grp Sat Flow(s),veh/h/ln	1654	1736	1471	1628	1709	1448	1528	1572	0	1628	1624	1448
Q Serve(g_s), s	4.6	11.4	9.3	10.7	9.6	11.5	8.8	18.6	0.0	8.8	37.3	4.9
Cycle Q Clear(g_c), s	4.6	11.4	9.3	10.7	9.6	11.5	8.8	18.6	0.0	8.8	37.3	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	265	289	489	212	741	314	329	1337		175	1381	616
V/C Ratio(X)	0.67	0.81	0.67	0.94	0.57	0.66	0.93	0.63		0.93	1.00	0.21
Avail Cap(c_a), veh/h	281	325	551	212	795	337	329	1337		175	1381	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	35.4	34.5	38.0	30.8	31.6	39.0	19.9	0.0	39.0	25.3	16.0
Incr Delay (d2), s/veh	5.7	12.7	2.8	44.4	0.8	4.3	33.1	2.3	0.0	47.8	23.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	9.7	6.2	11.1	7.2	7.7	8.3	11.0	0.0	9.6	24.4	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	48.1	37.3	82.3	31.6	35.8	72.1	22.1	0.0	86.8	48.9	16.7
LnGrp LOS	D	D	D	F	C	D	E	C		F	D	B
Approach Vol, veh/h		741			825			1151	A		1669	
Approach Delay, s/veh		42.6			44.9			35.5			50.1	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	41.5	15.0	18.6	13.0	41.5	10.5	23.1				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	9.0	37.0	11.0	16.0	9.0	37.0	7.0	20.0				
Max Q Clear Time (g_c+I1), s	10.8	20.6	12.7	13.4	10.8	39.3	6.6	13.5				
Green Ext Time (p_c), s	0.0	5.3	0.0	0.8	0.0	0.0	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay	44.0
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
154: Sullivan & Marietta

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗	↗	↖	↗	↗
Traffic Volume (veh/h)	30	9	112	392	25	57	37	1236	106	14	1290	7
Future Volume (veh/h)	30	9	112	392	25	57	37	1236	106	14	1290	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1736	1736	1736	1627	1627	1627	1709	1709	1709
Adj Flow Rate, veh/h	30	9	82	392	25	57	37	1236	76	14	1290	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	1	1	1	9	9	9	3	3	3
Cap, veh/h	149	66	320	542	153	349	45	1434	640	22	1578	9
Arrive On Green	0.33	0.33	0.31	0.33	0.33	0.31	0.03	0.46	0.46	0.01	0.48	0.45
Sat Flow, veh/h	264	203	983	1316	471	1073	1550	3092	1379	1628	3311	18
Grp Volume(v), veh/h	121	0	0	392	0	82	37	1236	76	14	632	665
Grp Sat Flow(s),veh/h/ln	1450	0	0	1316	0	1543	1550	1546	1379	1628	1624	1706
Q Serve(g_s), s	0.0	0.0	0.0	15.2	0.0	2.7	1.7	25.4	2.2	0.6	23.8	23.8
Cycle Q Clear(g_c), s	4.2	0.0	0.0	19.4	0.0	2.7	1.7	25.4	2.2	0.6	23.8	23.8
Prop In Lane	0.25		0.68	1.00		0.70	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	535	0	0	542	0	502	45	1434	640	22	774	813
V/C Ratio(X)	0.23	0.00	0.00	0.72	0.00	0.16	0.82	0.86	0.12	0.63	0.82	0.82
Avail Cap(c_a), veh/h	592	0	0	595	0	564	87	1434	640	92	774	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	0.0	22.5	0.0	17.3	34.3	17.0	10.8	34.9	16.0	16.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	3.9	0.0	0.2	28.7	7.0	0.4	26.2	6.9	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.5	0.0	0.0	10.3	0.0	1.7	1.7	14.1	1.2	0.7	13.9	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	0.0	0.0	26.4	0.0	17.5	63.1	24.0	11.2	61.1	22.8	22.5
LnGrp LOS	B	A	A	C	A	B	E	C	B	E	C	C
Approach Vol, veh/h		121			474			1349				1311
Approach Delay, s/veh		18.0			24.9			24.4				23.1
Approach LOS		B			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	37.9		27.2	7.0	37.0		27.2				
Change Period (Y+Rc), s	4.0	6.0		5.0	6.0	* 6		5.0				
Max Green Setting (Gmax), s	4.0	31.0		25.0	4.0	* 31		25.0				
Max Q Clear Time (g_c+I1), s	3.7	25.8		6.2	2.6	27.4		21.4				
Green Ext Time (p_c), s	0.0	2.8		0.4	0.0	2.2		0.8				

Intersection Summary

HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

230: Sullivan & Wellesley

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	124	176	115	82	20	127	1117	250	30	694	16
Future Volume (veh/h)	80	124	176	115	82	20	127	1117	250	30	694	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1723	1723	1723	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	80	124	116	115	82	20	127	1117	170	30	694	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	2	2	2	0	0	0	0	0	0
Cap, veh/h	406	157	147	283	272	66	442	1352	205	226	1425	33
Arrive On Green	0.06	0.19	0.19	0.07	0.20	0.20	0.07	0.47	0.46	0.03	0.43	0.42
Sat Flow, veh/h	1628	812	760	1641	1338	326	1667	2894	439	1667	3322	77
Grp Volume(v), veh/h	80	0	240	115	0	102	127	640	647	30	347	363
Grp Sat Flow(s),veh/h/ln	1628	0	1572	1641	0	1664	1667	1663	1671	1667	1663	1736
Q Serve(g_s), s	2.5	0.0	9.3	3.5	0.0	3.3	2.5	21.3	21.5	0.6	9.6	9.6
Cycle Q Clear(g_c), s	2.5	0.0	9.3	3.5	0.0	3.3	2.5	21.3	21.5	0.6	9.6	9.6
Prop In Lane	1.00		0.48	1.00		0.20	1.00		0.26	1.00		0.04
Lane Grp Cap(c), veh/h	406	0	304	283	0	338	442	777	781	226	713	745
V/C Ratio(X)	0.20	0.00	0.79	0.41	0.00	0.30	0.29	0.82	0.83	0.13	0.49	0.49
Avail Cap(c_a), veh/h	421	0	414	283	0	438	491	891	895	287	839	876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	24.6	19.3	0.0	21.6	9.2	14.7	14.8	12.4	13.2	13.2
Incr Delay (d2), s/veh	0.2	0.0	7.0	0.9	0.0	0.5	0.4	5.7	5.8	0.3	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	0.0	6.9	2.4	0.0	2.3	1.4	12.4	12.6	0.4	5.7	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	0.0	31.6	20.3	0.0	22.1	9.5	20.4	20.7	12.7	13.7	13.7
LnGrp LOS	B	A	C	C	A	C	A	C	C	B	B	B
Approach Vol, veh/h		320			217			1414			740	
Approach Delay, s/veh		28.5			21.1			19.5			13.6	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	33.8	8.0	16.4	8.1	31.4	7.4	17.0				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.0	4.5	4.0	4.5				
Max Green Setting (Gmax), s	4.0	33.7	4.0	16.3	6.0	31.7	4.0	16.3				
Max Q Clear Time (g_c+I1), s	2.6	23.5	5.5	11.3	4.5	11.6	4.5	5.3				
Green Ext Time (p_c), s	0.0	5.8	0.0	0.6	0.0	4.2	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary

3024: Sullivan & Kiernan

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	4	44	194	1	199	19	1400	79	68	804	9
Future Volume (veh/h)	30	4	44	194	1	199	19	1400	79	68	804	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1723	1723	1723	1695	1695	1695	1654	1654	1654
Adj Flow Rate, veh/h	30	4	44	194	1	129	19	1400	79	68	804	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	12	12	12	2	2	2	4	4	4	7	7	7
Cap, veh/h	205	27	296	398	1	346	29	1666	743	82	1754	20
Arrive On Green	0.24	0.24	0.22	0.24	0.24	0.24	0.02	0.52	0.52	0.05	0.55	0.52
Sat Flow, veh/h	1160	113	1248	1190	6	1460	1615	3221	1437	1576	3184	36
Grp Volume(v), veh/h	30	0	48	195	0	129	19	1400	79	68	397	416
Grp Sat Flow(s),veh/h/ln	1160	0	1362	1196	0	1460	1615	1611	1437	1576	1572	1648
Q Serve(g_s), s	1.5	0.0	1.8	8.2	0.0	4.6	0.7	23.0	1.7	2.6	9.4	9.4
Cycle Q Clear(g_c), s	11.5	0.0	1.8	10.0	0.0	4.6	0.7	23.0	1.7	2.6	9.4	9.4
Prop In Lane	1.00		0.92	0.99		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	205	0	323	400	0	346	29	1666	743	82	866	908
V/C Ratio(X)	0.15	0.00	0.15	0.49	0.00	0.37	0.65	0.84	0.11	0.83	0.46	0.46
Avail Cap(c_a), veh/h	455	0	616	693	0	661	104	1875	836	102	915	959
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	0.0	19.0	22.6	0.0	19.7	30.2	12.8	7.6	29.1	8.3	8.4
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.9	0.0	0.7	22.1	3.3	0.1	35.8	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	0.0	1.0	4.6	0.0	2.7	0.8	11.4	0.8	3.1	4.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.4	0.0	19.2	23.5	0.0	20.4	52.3	16.0	7.7	64.9	8.7	8.7
LnGrp LOS	C	A	B	C	A	C	D	B	A	E	A	A
Approach Vol, veh/h		78			324			1498			881	
Approach Delay, s/veh		22.4			22.3			16.1			13.1	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	38.1		18.7	7.2	36.0		18.7				
Change Period (Y+Rc), s	4.0	6.0		5.0	4.0	6.0		5.0				
Max Green Setting (Gmax), s	4.0	34.0		27.0	4.0	34.0		27.0				
Max Q Clear Time (g_c+I1), s	2.7	11.4		13.5	4.6	25.0		12.0				
Green Ext Time (p_c), s	0.0	3.3		0.2	0.0	5.0		1.2				

Intersection Summary

HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
 3025: Sullivan & Euclid

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↖	↖	↖	↖↖	↖	↖	↖↖	
Traffic Volume (veh/h)	97	21	148	194	6	99	22	1333	38	48	975	0
Future Volume (veh/h)	97	21	148	194	6	99	22	1333	38	48	975	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1723	1682	1723	1682	1682	1695	1695	0
Adj Flow Rate, veh/h	97	21	98	194	6	69	22	1333	38	48	975	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	5	2	5	2	5	5	4	4	0
Cap, veh/h	182	29	137	271	259	242	32	1540	687	58	1524	0
Arrive On Green	0.11	0.11	0.11	0.17	0.15	0.17	0.02	0.48	0.48	0.04	0.47	0.00
Sat Flow, veh/h	1641	265	1236	1602	1723	1425	1641	3195	1425	1615	3306	0
Grp Volume(v), veh/h	97	0	119	194	6	69	22	1333	38	48	975	0
Grp Sat Flow(s),veh/h/ln	1641	0	1500	1602	1723	1425	1641	1598	1425	1615	1611	0
Q Serve(g_s), s	4.4	0.0	6.1	9.1	0.2	3.3	1.1	29.4	1.1	2.3	18.1	0.0
Cycle Q Clear(g_c), s	4.4	0.0	6.1	9.1	0.2	3.3	1.1	29.4	1.1	2.3	18.1	0.0
Prop In Lane	1.00		0.82	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	182	0	167	271	259	242	32	1540	687	58	1524	0
V/C Ratio(X)	0.53	0.00	0.71	0.71	0.02	0.29	0.69	0.87	0.06	0.83	0.64	0.00
Avail Cap(c_a), veh/h	517	0	473	556	565	494	83	1540	687	81	1524	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.3	0.0	34.0	31.1	28.7	28.7	38.6	18.3	10.9	38.0	15.8	0.0
Incr Delay (d2), s/veh	2.4	0.0	5.6	3.5	0.0	0.6	23.5	5.5	0.0	36.9	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.3	0.0	4.3	6.5	0.2	2.1	1.1	16.0	0.6	2.7	10.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	0.0	39.6	34.6	28.7	29.4	62.2	23.7	11.0	74.9	17.9	0.0
LnGrp LOS	D	A	D	C	C	C	E	C	B	E	B	A
Approach Vol, veh/h		216			269			1393			1023	
Approach Delay, s/veh		37.8			33.1			24.0			20.5	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	41.5		12.8	6.8	42.2		17.4				
Change Period (Y+Rc), s	6.0	* 6		4.0	4.0	6.0		5.5				
Max Green Setting (Gmax), s	4.0	* 36		25.0	4.0	35.5		26.0				
Max Q Clear Time (g_c+I1), s	3.1	20.1		8.1	4.3	31.4		11.1				
Green Ext Time (p_c), s	0.0	4.4		0.8	0.0	2.6		0.9				

Intersection Summary

HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3302: Sullivan & WB Trent

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↖	↗	↘	↙			↕	↗
Traffic Volume (veh/h)	0	0	0	165	0	380	256	1058	0	0	1116	20
Future Volume (veh/h)	0	0	0	165	0	380	256	1058	0	0	1116	20
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1654	1654	1654	1723	1723	0	0	1709	1709
Adj Flow Rate, veh/h				165	0	250	256	1058	0	0	1116	20
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				7	7	7	2	2	0	0	3	3
Cap, veh/h				346	0	308	506	2009	0	0	1495	27
Arrive On Green				0.22	0.00	0.22	0.28	0.82	0.00	0.00	0.32	0.32
Sat Flow, veh/h				1576	0	1402	1641	3359	0	0	4874	85
Grp Volume(v), veh/h				165	0	250	256	1058	0	0	735	401
Grp Sat Flow(s),veh/h/ln				1576	0	1402	1641	1637	0	0	1555	1694
Q Serve(g_s), s				5.5	0.0	10.2	1.3	6.3	0.0	0.0	12.7	12.7
Cycle Q Clear(g_c), s				5.5	0.0	10.2	1.3	6.3	0.0	0.0	12.7	12.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.05
Lane Grp Cap(c), veh/h				346	0	308	506	2009	0	0	985	536
V/C Ratio(X)				0.48	0.00	0.81	0.51	0.53	0.00	0.00	0.75	0.75
Avail Cap(c_a), veh/h				499	0	444	506	2009	0	0	985	536
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.39	0.39	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				20.4	0.0	22.2	16.7	2.7	0.0	0.0	18.3	18.3
Incr Delay (d2), s/veh				1.0	0.0	7.3	0.3	0.4	0.0	0.0	5.2	9.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				3.5	0.0	6.5	4.0	2.0	0.0	0.0	8.2	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				21.4	0.0	29.5	17.0	3.1	0.0	0.0	23.5	27.5
LnGrp LOS				C	A	C	B	A	A	A	C	C
Approach Vol, veh/h					415			1314			1136	
Approach Delay, s/veh					26.3			5.8			24.9	
Approach LOS					C			A			C	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	17.8	24.0				41.8		18.2				
Change Period (Y+Rc), s	5.0	* 5				5.0		5.0				
Max Green Setting (Gmax), s	8.0	* 19				31.0		19.0				
Max Q Clear Time (g_c+I1), s	3.3	14.7				8.3		12.2				
Green Ext Time (p_c), s	0.3	2.6				7.9		1.0				

Intersection Summary

HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3304: Sullivan & EB Trent

04/03/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗					↕↕↕		↘	↕↕	
Traffic Volume (veh/h)	80	0	250	0	0	0	0	1247	400	617	682	0
Future Volume (veh/h)	80	0	250	0	0	0	0	1247	400	617	682	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1641	1641	1641				0	1723	1723	1695	1695	0
Adj Flow Rate, veh/h	80	0	150				0	1247	0	617	682	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	8	8	8				0	2	2	4	4	0
Cap, veh/h	192	0	171				0	1803		719	2557	0
Arrive On Green	0.12	0.00	0.12				0.00	0.38	0.00	0.74	1.00	0.00
Sat Flow, veh/h	1563	0	1391				0	5013	0	1615	3306	0
Grp Volume(v), veh/h	80	0	150				0	1247	0	617	682	0
Grp Sat Flow(s),veh/h/ln	1563	0	1391				0	1568	0	1615	1611	0
Q Serve(g_s), s	5.7	0.0	12.7				0.0	26.7	0.0	12.2	0.0	0.0
Cycle Q Clear(g_c), s	5.7	0.0	12.7				0.0	26.7	0.0	12.2	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	192	0	171				0	1803		719	2557	0
V/C Ratio(X)	0.42	0.00	0.88				0.00	0.69		0.86	0.27	0.00
Avail Cap(c_a), veh/h	195	0	174				0	1803		719	2557	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.52	0.00	0.70	0.70	0.00
Uniform Delay (d), s/veh	48.7	0.0	51.7				0.0	31.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	35.9				0.0	1.2	0.0	7.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	0.0	16.5				0.0	13.8	0.0	9.6	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	87.7				0.0	32.2	0.0	16.8	0.2	0.0
LnGrp LOS	D	A	F				A	C		B	A	A
Approach Vol, veh/h		230						1247	A		1299	
Approach Delay, s/veh		74.6						32.2			8.1	
Approach LOS		E						C			A	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		100.3		19.7	49.3	51.0						
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0						
Max Green Setting (Gmax), s		95.0		15.0	44.0	46.0						
Max Q Clear Time (g_c+I1), s		2.0		14.7	14.2	28.7						
Green Ext Time (p_c), s		5.4		0.0	2.2	8.2						

Intersection Summary

HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM Signalized Intersection Capacity Analysis

3304: Sullivan & EB Trent

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗					↕↕↕		↘	↕↕	
Traffic Volume (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
Future Volume (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
Ideal Flow (vphp)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.0	5.0					5.0		5.0	5.0	
Lane Util. Factor		1.00	1.00					0.91		1.00	0.95	
Frt		1.00	0.85					0.96		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1539	1377					4513		1599	3197	
Flt Permitted		0.95	1.00					1.00		0.07	1.00	
Satd. Flow (perm)		1539	1377					4513		123	3197	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	0	250	0	0	0	0	1247	400	617	682	0
RTOR Reduction (vph)	0	0	226	0	0	0	0	46	0	0	0	0
Lane Group Flow (vph)	0	80	24	0	0	0	0	1601	0	617	682	0
Heavy Vehicles (%)	8%	8%	8%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4		4							2		
Actuated Green, G (s)		11.3	11.3					49.7		98.7	98.7	
Effective Green, g (s)		11.3	11.3					49.7		98.7	98.7	
Actuated g/C Ratio		0.09	0.09					0.41		0.82	0.82	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		144	129					1869		642	2629	
v/s Ratio Prot								0.35		c0.35	0.21	
v/s Ratio Perm		0.05	0.02							c0.44		
v/c Ratio		0.56	0.18					0.86		0.96	0.26	
Uniform Delay, d1		51.9	50.1					31.9		27.6	2.4	
Progression Factor		1.00	1.00					1.00		1.08	0.58	
Incremental Delay, d2		4.6	0.7					5.3		22.5	0.2	
Delay (s)		56.5	50.8					37.2		52.4	1.6	
Level of Service		E	D					D		D	A	
Approach Delay (s)		52.2			0.0			37.2			25.7	
Approach LOS		D			A			D			C	

Intersection Summary		
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.94	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 15.0
Intersection Capacity Utilization	90.3%	ICU Level of Service E
Analysis Period (min)	15	
Description: updated		
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis

3302: Sullivan & WB Trent

03/31/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↖	↑↑			↑↑↑	
Traffic Volume (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
Future Volume (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)					5.0	5.0	4.0	5.0			5.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	
Frt					1.00	0.85	1.00	1.00			1.00	
Flt Protected					0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1554	1390	1630	3260			4626	
Flt Permitted					0.95	1.00	0.18	1.00			1.00	
Satd. Flow (perm)					1554	1390	314	3260			4626	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	165	0	380	256	1058	0	0	1116	20
RTOR Reduction (vph)	0	0	0	0	0	94	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	165	286	256	1058	0	0	1133	0
Heavy Vehicles (%)	0%	0%	0%	7%	7%	7%	2%	2%	2%	3%	3%	3%
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases					8		1	6			2	
Permitted Phases				8		8	6					
Actuated Green, G (s)					15.6	15.6	35.4	34.4			22.4	
Effective Green, g (s)					15.6	15.6	35.4	34.4			22.4	
Actuated g/C Ratio					0.26	0.26	0.59	0.57			0.37	
Clearance Time (s)					5.0	5.0	4.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					404	361	360	1869			1727	
v/s Ratio Prot							c0.09	0.32			0.25	
v/s Ratio Perm					0.11	c0.21	c0.32					
v/c Ratio					0.41	0.79	0.71	0.57			0.66	
Uniform Delay, d1					18.4	20.7	14.1	8.1			15.6	
Progression Factor					1.00	1.00	1.18	1.37			1.00	
Incremental Delay, d2					0.7	11.3	3.5	0.7			2.0	
Delay (s)					19.1	32.0	20.1	11.7			17.6	
Level of Service					B	C	C	B			B	
Approach Delay (s)		0.0			28.1			13.4			17.6	
Approach LOS		A			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Description: updated

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	20	55	25	1460	1032	2
Future Vol, veh/h	20	55	25	1460	1032	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	3	3
Mvmt Flow	20	55	25	1460	1032	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1813	517	1034	0	-	0
Stage 1	1033	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	71	509	680	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	68	509	680	-	-	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	298	-	-	-	-	-
Stage 2	418	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	36.9	0.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	680	-	186	-	-
HCM Lane V/C Ratio	0.037	-	0.403	-	-
HCM Control Delay (s)	10.5	-	36.9	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.8	-	-

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗ ↑↑↑	↗ ↑↑↑			↑↑
Traffic Vol, veh/h	0	10	1326	10	0	1794
Future Vol, veh/h	0	10	1326	10	0	1794
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	9	9	2	2
Mvmt Flow	0	10	1326	10	0	1794

Major/Minor

	Minor1	Major1	Major2		
Conflicting Flow All	-	668	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	7.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.9	-	-	-
Pot Cap-1 Maneuver	0	347	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	347	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach

	WB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt

	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	347
HCM Lane V/C Ratio	-	-	0.029
HCM Control Delay (s)	-	-	15.7
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.1

HCM 6th TWSC
8: Sullivan & Fairview

03/31/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑↑	↗	↘	↑↑
Traffic Vol, veh/h	10	10	1345	10	5	1297
Future Vol, veh/h	10	10	1345	10	5	1297
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	5	5	3	3
Mvmt Flow	10	10	1345	10	5	1297

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2004	673	0	0	1355
Stage 1	1345	-	-	-	-
Stage 2	659	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	52	398	-	-	498
Stage 1	207	-	-	-	-
Stage 2	476	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	51	398	-	-	498
Mov Cap-2 Maneuver	51	-	-	-	-
Stage 1	207	-	-	-	-
Stage 2	471	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	56.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	90	498
HCM Lane V/C Ratio	-	-	0.222	0.01
HCM Control Delay (s)	-	-	56.1	12.3
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	0.8	0

MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent Opt 1&2]

Network: N101 [Network1]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Sullivan													
8	T1	1247	3.0	1247	3.0	0.821	17.6	LOS A	15.3	390.7	0.98	1.31	22.0
18	R2	400	3.0	400	3.0	0.821	16.1	LOS A	15.3	390.7	0.98	1.26	25.5
Approach		1647	3.0	1647	3.0	0.821	17.2	LOS B	15.3	390.7	0.98	1.30	23.0
North: Sullivan													
7	L2	617	3.0	617	3.0	0.413	7.8	LOS A	0.0	0.0	0.00	0.68	29.7
4	T1	682	3.0	682	3.0	0.397	2.5	LOS A	0.0	0.0	0.00	0.35	38.3
Approach		1299	3.0	1299	3.0	0.413	5.0	LOS A	0.0	0.0	0.00	0.51	34.6
West: Trent Off-Ramp													
5	L2	80	3.0	80	3.0	0.405	14.0	LOS A	1.7	44.1	0.62	0.86	23.4
2	T1	1	3.0	1	3.0	0.405	8.2	LOS A	1.7	44.1	0.62	0.86	29.9
12	R2	250	3.0	250	3.0	0.405	8.3	LOS A	1.7	44.1	0.62	0.86	31.2
Approach		331	3.0	331	3.0	0.405	9.7	LOS A	1.7	44.1	0.62	0.86	30.2
All Vehicles		3277	3.0	3277	3.0	0.821	11.6	LOS B	15.3	390.7	0.56	0.94	26.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 101 [Sullivan & EB Trent Opt 3]

Network: N101 [Network1]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Sullivan													
8	T1	1247	3.0	1247	3.0	0.622	10.3	LOS A	6.8	174.7	0.85	0.96	26.1
18	R2	400	3.0	400	3.0	0.327	6.0	LOS A	2.1	54.3	0.65	0.67	30.7
Approach		1647	3.0	1647	3.0	0.622	9.3	LOS A	6.8	174.7	0.80	0.89	27.3
North: Sullivan													
7	L2	617	3.0	617	3.0	0.413	7.8	LOS A	0.0	0.0	0.00	0.68	29.7
4	T1	682	3.0	682	3.0	0.397	2.5	LOS A	0.0	0.0	0.00	0.35	38.3
Approach		1299	3.0	1299	3.0	0.413	5.0	LOS A	0.0	0.0	0.00	0.51	34.6
West: Trent Off-Ramp													
5	L2	80	3.0	80	3.0	0.405	14.0	LOS A	1.7	44.1	0.62	0.86	23.4
2	T1	1	3.0	1	3.0	0.405	8.2	LOS A	1.7	44.1	0.62	0.86	29.9
12	R2	250	3.0	250	3.0	0.405	8.3	LOS A	1.7	44.1	0.62	0.86	31.2
Approach		331	3.0	331	3.0	0.405	9.7	LOS A	1.7	44.1	0.62	0.86	30.2
All Vehicles		3277	3.0	3277	3.0	0.622	7.6	LOS A	6.8	174.7	0.47	0.74	29.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

 Site: 102vv [Sullivan & WB Trent Opt 1&2]

 Network: N101 [Network1]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Sullivan													
3	L2	256	3.0	256	3.0	0.410	7.5	LOS A	0.0	0.0	0.00	0.52	33.7
8	T1	1058	3.0	1058	3.0	0.410	2.0	LOS A	0.0	0.0	0.00	0.36	34.6
Approach		1314	3.0	1314	3.0	0.410	3.1	LOS A	0.0	0.0	0.00	0.39	34.5
East: Trent On-Ramp													
1	L2	165	3.0	165	3.0	0.668	16.7	LOS A	4.2	108.0	0.74	1.00	27.9
6	T1	1	3.0	1	3.0	0.668	10.7	LOS A	4.2	108.0	0.74	1.00	31.3
16	R2	380	3.0	380	3.0	0.668	10.9	LOS A	4.2	108.0	0.74	1.00	32.1
Approach		546	3.0	546	3.0	0.668	12.7	LOS B	4.2	108.0	0.74	1.00	31.2
North: Sullivan													
4	T1	1116	3.0	1116	3.0	0.481	6.2	LOS A	3.6	91.8	0.66	0.61	31.0
14	R2	20	3.0	20	3.0	0.481	5.9	LOS A	3.6	91.8	0.65	0.58	32.7
Approach		1136	3.0	1136	3.0	0.481	6.2	LOS A	3.6	91.8	0.66	0.61	31.1
All Vehicles		2996	3.0	2996	3.0	0.668	6.0	LOS A	4.2	108.0	0.39	0.58	32.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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MOVEMENT SUMMARY

Site: 102vv [Sullivan & WB Trent Opt 3]

Network: N101 [Network1]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Arrival Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Sullivan													
3	L2	256	3.0	256	3.0	0.410	7.5	LOS A	0.0	0.0	0.00	0.52	33.7
8	T1	1058	3.0	1058	3.0	0.410	2.0	LOS A	0.0	0.0	0.00	0.36	34.6
Approach		1314	3.0	1314	3.0	0.410	3.1	LOS A	0.0	0.0	0.00	0.39	34.5
East: Trent Off-Ramp													
1	L2	165	3.0	165	3.0	0.668	16.7	LOS A	4.2	108.0	0.74	1.00	27.9
6	T1	1	3.0	1	3.0	0.668	10.7	LOS A	4.2	108.0	0.74	1.00	31.3
16	R2	380	3.0	380	3.0	0.668	10.9	LOS A	4.2	108.0	0.74	1.00	32.1
Approach		546	3.0	546	3.0	0.668	12.7	LOS B	4.2	108.0	0.74	1.00	31.2
North: Sullivan													
4	T1	1116	3.0	1116	3.0	0.481	6.2	LOS A	3.6	91.8	0.66	0.61	31.0
14	R2	20	3.0	20	3.0	0.481	5.9	LOS A	3.6	91.8	0.65	0.58	32.7
Approach		1136	3.0	1136	3.0	0.481	6.2	LOS A	3.6	91.8	0.66	0.61	31.1
All Vehicles		2996	3.0	2996	3.0	0.668	6.0	LOS A	4.2	108.0	0.39	0.58	32.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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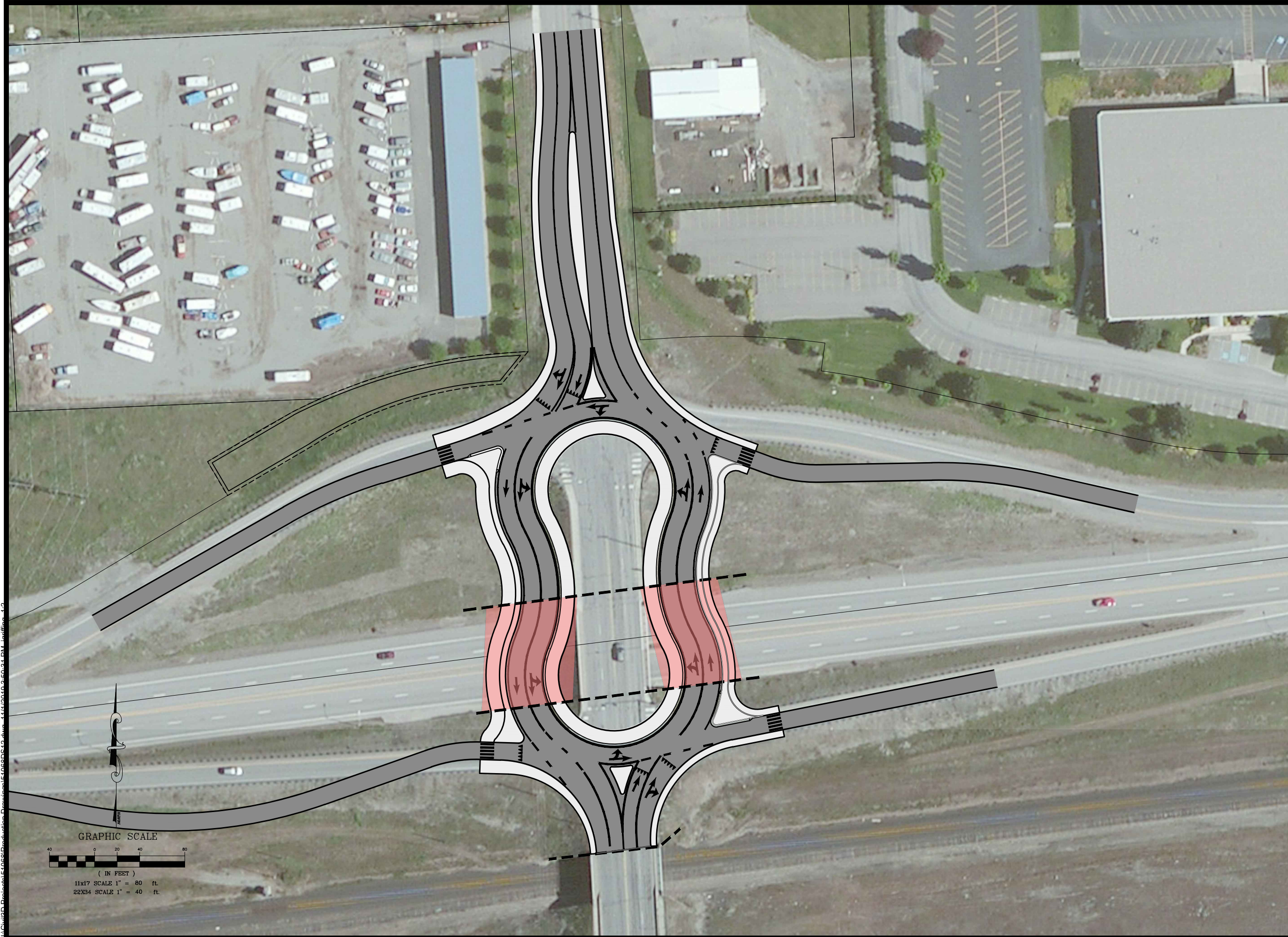
Appendix C

Crash Data

Table with 21 columns: FID, PRIMARY_TR, INTERSECTI, REFERENCE, MILEPOST, REPORT_NUM, DATE, TIME, MOST_SEVER, F_INJ, F_FAT, F_VEH, F_PEDS, F_BIKES, JUNCTION_R, WEATHER, ROADWAY_SU, LIGHTING_C, FIRST_COLL, VEHICLE_11, VEHICLE_21, MV_DRIVER, MV_DRIVER1, MV_DRIVE_1, MV_DRIVE_2. Contains detailed crash data including location, date, time, severity, and vehicle details.

Appendix D

Preliminary Designs



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www.welchcomer.com 208-664-9382
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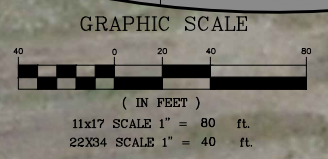
NO.	DATE	REVISION DESCRIPTION	BY

CITY OF SPOKANE VALLEY
**SULLIVAN ROAD CORRIDOR
 AT TRENT AVE**

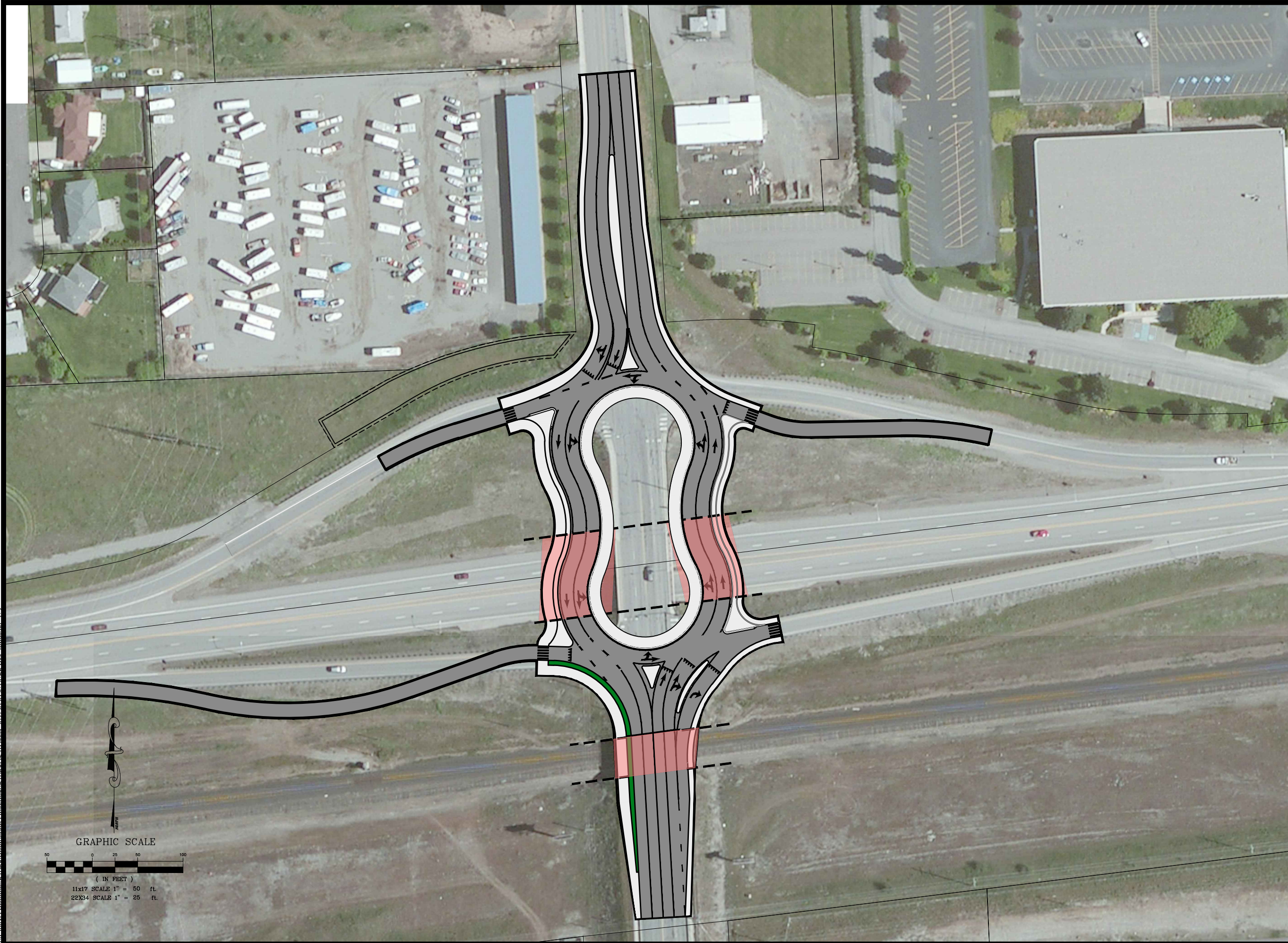
PRELIMINARY DESIGN
 ROUNDABOUT
 OVERVIEW

PROJ NO:	51068
DESIGNED BY:	MRG / JRG
DRAWN BY:	SDS
CHECKED BY:	
DWG NAME:	51068DS12.DWG
DATE:	10-24-2019
SHEET NO:	

RAB 1



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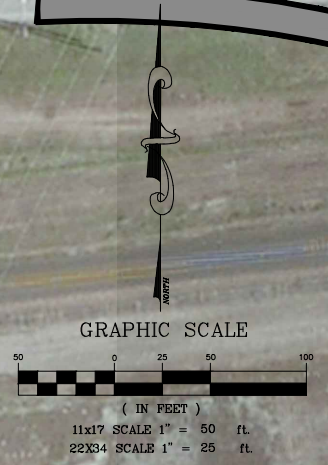
NO.	DATE	REVISION DESCRIPTION	BY

CITY OF SPOKANE VALLEY
**SULLIVAN ROAD CORRIDOR
 AT TRENT AVE**

PRELIMINARY DESIGN
 ROUNDABOUT
 OVERVIEW

PROJ NO:	51068
DESIGNED BY:	MRG / JRG
DRAWN BY:	SDS
CHECKED BY:	
DWG NAME:	51068DS19.DWG
DATE:	04-07-2020
SHEET NO:	

RAB 3



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Appendix E

Preliminary Engineer's Estimates and Cost Share for Improvements

CITY OF SPOKANE VALLEY
SHARED-USE PATH - EUCLID TO TRENT
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Prepared by:	Derek Huff, EIT	Date:	4/4/2020		
Project Manager:	Adam Dorsey, PE				
Item No.	Description	Pay Unit	Estimated Quantity	Unit Price	Total Amount
Base Bid					
Section 1: Preparation					
	MOBILIZATION	LS	1	\$ 36,000.00	\$ 36,000.00
	CLEARING AND GRUBBING	LS	1	\$ 6,000.00	\$ 6,000.00
	REMOVING CONC. CEMENT SIDEWALK	SY	400	\$ 20.00	\$ 8,000.00
Section 2: Grading					
	EXCAVATION INC. HAUL	CY	200	\$ 40.00	\$ 8,000.00
	BORROW	CY	500	\$ 30.00	\$ 15,000.00
Section 9: Surfacing					
	CRUSHED SURFACING TOP COURSE	TON	250	\$ 30.00	\$ 7,500.00
Section 17: Erosion Control and Planting					
	HYDROSEEDING	SY	400	\$ 20.00	\$ 8,000.00
	LANDSCAPING	LS	1	\$ 5,000.00	\$ 5,000.00
Section 18: Traffic					
	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$ 20,000.00	\$ 20,000.00
Section 19: Other Items					
	CEMENT CONC. SIDEWALK	SY	700	\$ 75.00	\$ 52,500.00
	CEMENT CONC. CURB RAMP TYPE PARALLEL A	EA	2	\$ 3,000.00	\$ 6,000.00
	CEMENT CONC. DRIVEWAY ENTRANCE TYPE 1	SY	50	\$ 100.00	\$ 5,000.00
	CEMENT CONC. BLOCK WALL	SF	3000	\$ 50.00	\$ 150,000.00
	PEDESTRIAN SAFETY RAIL	LF	1000	\$ 50.00	\$ 50,000.00
	SITE CONTROL	LS	1	\$ 15,000.00	\$ 15,000.00
				SUBTOTAL	\$390,000
				25% CONTINGENCY	\$100,000
				CONSTRUCTION ENGINEERING	\$60,000.00
				SUBTOTAL	\$550,000.00
				3 YRS INFLATION @ 4%/YR	\$70,000.00
				CONSTRUCTION TOTAL	\$620,000
Assumptions:					
Any necessary relocation of utilities will be paid for by utility company				Construction	\$620,000
Shared-use Path is 10' wide				Design Engineering	\$59,000.00
No land acquisition is required					
Existing curb will remain in place				Project Total	\$679,000

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CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Marietta Concrete Intersection
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Derek Huff, EIT	Date:	February 4, 2020		
Project Manager:	Adam Dorsey, PE	Date:			
Item No.	Description	Unit	Quantity	Unit Price	Total
	Section 1: Preparation				
	MOBILIZATION (10%)	LS	1	\$82,000.00	\$82,000.00
	REMOVING ASPHALT PAVEMENT	SY	3250	\$6.00	\$19,500.00
	SAW CUTTING	LF	1350	\$3.00	\$4,050.00
	Section 2: Grading				
	ROADWAY EXCAVATION INCL HAUL	CY	1450	\$30.00	\$43,500.00
	Section 9: Surfacing				
	CRUSHED SURFACING TOP COURSE	TON	1825	\$25.00	\$45,625.00
	Section 13: Cement Concrete Pavement				
	CEMENT CONCRETE PAVEMENT 12"	CY	1080	\$500.00	\$540,000.00
	Section 17: Erosion Control and Planting				
	STABILIZED CONSTRUCTION ENTRANCE	SY	300	\$25.00	\$7,500.00
	EROSION/WATER POLLUTION CONTROL	EST	1	\$5,000.00	\$5,000.00
	Section 18: Traffic				
	TRAFFIC SIGNAL DETECTION	LS	1	\$25,000.00	\$25,000.00
	PERMANENT STRIPING	LS	1	\$5,000.00	\$5,000.00
	PERMANENT SIGNING	LS	1	\$5,000.00	\$5,000.00
	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$100,000.00	\$100,000.00
	TRAFFIC CONTROL SUPERVISOR	LS	1	\$10,000.00	\$10,000.00
	Section 19: Other Items				
	SPCC PLAN	LS	1	\$1,000.00	\$1,000.00
				SUBTOTAL	\$900,000
				25% CONTINGENCY	\$230,000
				CONSTRUCTION ENGINEERING	\$140,000.00
				SUBTOTAL	\$1,270,000.00
				3 YRS INFLATION @ 4%/YR	\$160,000.00
				CONSTRUCTION TOTAL	\$1,430,000
Assumptions:					
No Right-of-Way is required					
All existing sidewalks and curb/gutters will be left in place					
Concrete cement pavement cost includes reinforcing bar				Construction	\$1,430,000
				Design Engineering	\$140,000.00
				Project Total	\$1,570,000

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CITY OF SPOKANE VALLEY
SHARED USE PATH - KEMIRA to SULLIVAN PARK
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Prepared by:	Derek Huff, EIT		Date:	April 4, 2020	
Project Manager:	Adam Dorsey, PE				
Item No.	Description	Pay Unit	Estimated Quantity	Unit Price	Total Amount
Section 1: Preparation					
	MOBILIZATION	LS	1	\$ 22,000.00	\$ 22,000.00
	CLEARING AND GRUBBING	LS	1	\$ 10,000.00	\$ 10,000.00
	REMOVING ASPHALT CONC. PAVEMENT	SY	375	\$ 15.00	\$ 5,625.00
	REMOVING CEMENT CONC. CURB	LF	650	\$ 12.00	\$ 7,800.00
Section 2: Grading					
	EXCAVATION INC. HAUL	CY	110	\$ 40.00	\$ 4,400.00
	BORROW	CY	505	\$ 25.00	\$ 12,625.00
Section 9: Surfacing					
	CRUSHED SURFACING TOP COURSE	TON	250	\$ 35.00	\$ 8,750.00
Section 17: Erosion Control and Planting					
	HYDROSEEDING	SY	360	\$ 30.00	\$ 10,800.00
Section 18: Traffic					
	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$ 11,000.00	\$ 11,000.00
Section 19: Other Items					
	PEDESTRIAN BRIDGE AT UP RAILROAD	LS	1	\$ 1,000,000.00	\$ 1,000,000.00
	CEMENT CONC. SIDEWALK	SY	800	\$ 75.00	\$ 60,000.00
	CEMENT CONC. CURB RAMP TYPE PARALL	EA	2	\$ 1,800.00	\$ 3,600.00
	CEMENT CONC. DRIVEWAY ENTRANCE TYF	SY	50	\$ 64.00	\$ 3,200.00
	CEMENT CONC. BLOCK WALL - 2' X 300'	SF	600	\$ 50.00	\$ 30,000.00
	PEDESTRIAN SAFETY RAIL	LF	275	\$ 50.00	\$ 13,750.00
	SPCC PLAN	LS	1	\$ 1,000.00	\$ 1,000.00
				SUBTOTAL	\$1,210,000
				25% CONTINGENCY	\$300,000
				RAILROAD COORDINATION	\$100,000
				CONSTRUCTION ENGINEERING	\$180,000.00
				SUBTOTAL	\$1,790,000.00
				3 YRS INFLATION @ 4%/YR	\$220,000.00
				CONSTRUCTION TOTAL	\$2,010,000
				Construction	\$2,010,000
				Design Engineering	\$180,000.00
				Project Total	\$2,190,000

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CITY OF SPOKANE VALLEY

SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan Sidewalk Improvements: D St. to B St.

ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Lynsey Petersen	Date:	February 4, 2020		
Project Manager	Adam Dorsey, P.E.	Date:	February 4, 2020		
Item No.	Description	Unit	Quantity	Unit Price	Total
	Section 1: Preparation				
	MOBILIZATION (10%)	LS	1	\$13,000.00	\$13,000.00
	CLEARING AND GRUBBING	LS	1	\$5,000.00	\$5,000.00
	REMOVAL OF STRUCTURE AND OBSTRUCT	LS	1	\$5,000.00	\$5,000.00
	REMOVING ASPHALT CONC. PAVEMENT	SY	700	\$6.00	\$4,200.00
	Section 2: Grading				
	EXCAVATION INCL HAUL	CY	250	\$30.00	\$7,500.00
	Section 9: Surfacing				
	CRUSHED SURFACING TOP COURSE	TON	150	\$25.00	\$3,750.00
	Section 17: Erosion Control and Planting				
	HYDROSEEDING	SY	500	\$30.00	\$15,000.00
	Section 18: Traffic				
	CEMENT CONC. TRAFFIC CURB AND GUTTE	LF	950	\$25.00	\$23,750.00
	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$5,000.00	\$5,000.00
	Section 19: Other Items				
	CONCRETE SIDEWALK	SY	700	\$75.00	\$52,500.00
				SUBTOTAL	\$135,000
				25% CONTINGENCY	\$30,000
				CONSTRUCTION ENGINEERING	\$17,000.00
				SUBTOTAL	\$182,000.00
				3 YRS INFLATION @ 4%/YR	\$23,000.00
				CONSTRUCTION TOTAL	\$205,000
				Construction	\$205,000
				Design Engineering	\$17,000.00
				Project Total	\$222,000

CITY OF SPOKANE VALLEY

SULLIVAN CORRIDOR ADVANCED STUDY - Transit Stop Improvements

ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Lynsey Petersen	Date:	February 4, 2020		
Project Manager:	Adam Dorsey, P.E.	Date:	February 4, 2020		
Item No.	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	\$10,000.00	\$10,000.00
	Clearing and Grubbing	LS	1	\$5,000.00	\$5,000.00
	Bus Stop Shelters	LS	6	\$15,000.00	\$90,000.00
	Bus Stop Bench	LS	5	\$1,000.00	\$5,000.00
				SUBTOTAL	\$110,000
				25% CONTINGENCY	\$30,000
				CONSTRUCTION ENGINEERING	\$14,000.00
				SUBTOTAL	\$140,000.00
				3 YRS INFLATION @ 4%/YR	\$17,000.00
				CONSTRUCTION TOTAL	\$171,000
				Construction	\$171,000
				Design Engineering	\$14,000.00
				Project Total	\$185,000

CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent Roundabouts Opt 1
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Jack Griffing, EIT	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE	Date:			
Item No.	Description	Unit	Quantity	Unit Price	Total
0001	MOBILIZATION (10%)	LS	1	\$774,000.00	\$774,000.00
0035	CLEARING AND GRUBBING	LS	1	\$5,000.00	\$5,000.00
0050	REMOVAL OF OBSTRUCTIONS	LS	1	\$15,000.00	\$15,000.00
0100	REMOVING CEMENT CONC. SIDEWALK	SY	1500	\$15.00	\$22,500.00
0110	REMOVING CEMENT CONC. CURB	LF	2310	\$10.00	\$23,100.00
0120	REMOVING ASPHALT CONC. PAVEMENT	SY	10000	\$6.00	\$60,000.00
0170	REMOVING GUARDRAIL	LF	3500	\$15.00	\$52,500.00
Section 2: Grading					
0310	ROADWAY EXCAVATION INCL HAUL	CY	20000	\$10.00	\$200,000.00
0350	UNSUITABLE FOUNDATION EXCAVATION INCL HAUL	CY	100	\$30.00	\$3,000.00
	GRAVEL BORROW INCL. HAUL	CY	35000	\$20.00	\$700,000.00
Section 9: Surfacing					
5120	CRUSHED SURFACING TOP COURSE	TON	2000	\$22.00	\$44,000.00
Section 14: Hot Mix Asphalt					
5767	HMA CL. 1/2 IN. PG 64H-28	TON	1312	\$110.00	\$144,291.68
Section 17: Erosion Control and Planting					
8058	LANDSCAPING	LS	1	\$100,000.00	\$100,000.00
6468	STABILIZED CONSTRUCTION ENTRANCE	SY	300	\$25.00	\$7,500.00
6490	EROSION/WATER POLLUTION CONTROL	EST	1	\$7,000.00	\$7,000.00
6403	ESC LEAD	DAY	30	\$100.00	\$3,000.00
6560	SEEDED LAWN INSTALLATION	SY	11000	\$1.00	\$11,000.00
Section 18: Traffic					
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER	LF	4300	\$20.00	\$86,000.00
5625	CEMENT CONC. PAVEMENT	SY	956	\$90.00	\$86,000.00
6751	BEAM GUARDRAIL TYPE 1	LF	3500	\$40.00	\$140,000.00
6889	PERMANENT STRIPING	LS	1	\$10,000.00	\$10,000.00
6890	PERMANENT SIGNING	LS	1	\$10,000.00	\$10,000.00
6971	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$200,000.00	\$200,000.00
6974	TRAFFIC CONTROL SUPERVISOR	LS	1	\$15,000.00	\$15,000.00
Section 19: Other Items					
7055	CEMENT CONC. SIDEWALK	SY	1700	\$55.00	\$93,500.00
7058	CEMENT CONC. CURB RAMP TYPE 1	EA	8	\$2,000.00	\$16,000.00
7736	SPCC PLAN	LS	1	\$1,000.00	\$1,000.00
	TRENT BRIDGES	LS	1	\$5,600,000.00	\$5,600,000.00
	ILLUMINATION	LS	1	\$75,000.00	\$75,000.00
	CONCRETE TRUCK APRON	SY	2500	\$90.00	\$225,000.00
	SPLITTER ISLANDS	SY	210	\$75.00	\$15,750.00
				SUBTOTAL	\$8,745,000
				25% CONTINGENCY	\$2,190,000
				CONSTRUCTION ENGINEERING	\$1,094,000.00

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CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent Roundabouts Opt 1
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Jack Griffing, EIT	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE	Date:			
Item No.	Description	Unit	Quantity	Unit Price	Total
				RAILROAD COORDINATION	\$100,000.00
				SUBTOTAL	\$12,129,000.00
				3 YRS INFLATION @ 4%/YR	\$1,514,000.00
				CONSTRUCTION TOTAL	\$13,643,000
	Right-of-Way Estimate				
	RIGHT-OF-WAY REQUIRED ON NORTH SIDE	SF	1000	\$3.00	\$3,000.00
	RIGHT-OF-WAY CONSULTANT COSTS	EA	4	\$10,000	\$40,000.00
	LANDSCAPING COSTS PER PARCEL	EA	4	\$3,000	\$12,000.00
	TEMPORARY CONSTRUCTION EASEMENTS	SF	1800	\$2.25	\$4,050.00
				30% CONTINGENCY	\$18,000.00
				Construction	\$13,643,000
				Right-of-Way	\$77,050.00
				Design Engineer	\$1,094,000.00
				Project Total	\$14,800,000

CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent Signals Option
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Adam Dorsey, PE	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE				
Item No.	Description	Unit	Quantity	Unit Price	Total
0001	MOBILIZATION (10%)	LS	1	\$984,000.00	\$984,000.00
0035	CLEARING AND GRUBBING	LS	1	\$5,000.00	\$5,000.00
0050	REMOVAL OF STRUCTURE AND OBSTRUCTION	LS	1	\$15,000.00	\$15,000.00
0100	REMOVING CEMENT CONC. SIDEWALK	SY	1500	\$15.00	\$22,500.00
0110	REMOVING CEMENT CONC. CURB	LF	2310	\$10.00	\$23,100.00
0120	REMOVING ASPHALT CONC. PAVEMENT	SY	9250	\$6.00	\$55,500.00
0170	REMOVING GUARDRAIL	LF	3051	\$15.00	\$45,765.00
	Section 2: Grading				
0310	ROADWAY EXCAVATION INCL HAUL	CY	4000	\$30.00	\$120,000.00
0350	UNSUITABLE FOUNDATION EXCAVATION INCL HAUL	CY	100	\$30.00	\$3,000.00
	GRAVEL BORROW INCL. HAUL	CY	8300	\$30.00	\$249,000.00
	Section 9: Surfacing				
5120	CRUSHED SURFACING TOP COURSE	TON	2615	\$25.00	\$65,367.71
	Section 14: Hot Mix Asphalt				
5767	HMA CL. 1/2 IN. PG 64H-28	TON	1103	\$110.00	\$121,378.62
	Shared Use Path				
	ASPHALT	TONS	107	\$110.00	\$11,757.81
	BASE ROCK	TONS	200	\$25.00	\$5,011.88
	Section 17: Erosion Control and Planting				
6468	STABILIZED CONSTRUCTION ENTRANCE	SY	300	\$25.00	\$7,500.00
6490	EROSION/WATER POLLUTION CONTROL	EST	1	\$7,000.00	\$7,000.00
6403	ESC LEAD	DAY	30	\$100.00	\$3,000.00
6560	SEEDED LAWN INSTALLATION	SY	5000	\$1.00	\$5,000.00
	Section 18: Traffic				
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER**	LF	1490	\$30.00	\$44,700.00
6707	CEMENT CONC. PEDESTRIAN CURB	LF	818	\$25.00	\$20,442.50
6751	BEAM GUARDRAIL TYPE 1	LF	902	\$45.00	\$40,590.00
	TRAFFIC SIGNAL - WB TRENT	LS	1	\$300,000.00	\$300,000.00
	TRAFFIC SIGNAL - EB TRENT	LS	1	\$300,000.00	\$300,000.00
6889	PERMANENT STRIPING	LS	1	\$10,000.00	\$10,000.00
6890	PERMANENT SIGNING	LS	1	\$10,000.00	\$10,000.00
6971	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$200,000.00	\$200,000.00
6974	TRAFFIC CONTROL SUPERVISOR	LS	1	\$15,000.00	\$15,000.00
	Section 19: Other Items				
	REMOVE AND RELOCATE CONCRETE BARRIER	LF	500	\$15.00	\$7,500.00
	CONCRETE SIDEWALK	SY	173	\$250.00	\$43,222.22
7058	CEMENT CONC. CURB RAMP TYPE 1	EA	16	\$2,000.00	\$32,000.00

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CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent Signals Option
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Adam Dorsey, PE	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE				
Item No.	Description	Unit	Quantity	Unit Price	Total
7083	CHAIN LINK FENCE TYPE 3	LF	914	\$50.00	\$45,700.00
7736	SPCC PLAN	LS	1	\$1,000.00	\$1,000.00
	RETAINING WALL	SF	500	\$50.00	\$25,000.00
	RAILROAD BRIDGE	LS	1	\$3,800,000.00	\$3,800,000.00
	TRENT BRIDGE	LS	1	\$4,100,000.00	\$4,100,000.00
	ILLUMINATION	LS	1	\$75,000.00	\$75,000.00
				SUBTOTAL	\$10,819,000
				25% CONTINGENCY	\$2,700,000
				RAILROAD COORDINATION	\$100,000
				CONSTRUCTION ENGINEERING	\$1,361,900
				SUBTOTAL	\$14,980,900
				3 YRS INFLATION @ 4%/YR	\$1,871,000
				CONSTRUCTION TOTAL	\$16,851,900
	Right-of-Way Estimate				
	RIGHT-OF-WAY REQUIRED ON NORTH SIDE	SF	2500	\$3.00	\$7,500
	RIGHT-OF-WAY CONSULTANT COSTS	EA	4	\$10,000	\$40,000
	LANDSCAPING COST PER PARCEL	EA	4	\$3,000	\$12,000
	TEMPORARY CONSTRUCTION EASEMENTS	SF	4000	\$2.25	\$9,000
				30% CONTINGENCY	\$21,000
				Construction	\$16,851,900
				Right-of-Way	\$89,500
				Design Engineering	\$1,362,000
				Project Total	\$18,300,000

CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent RAB Option 3
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Jack Griffing, EIT	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE				
Item No.	Description	Unit	Quantity	Unit Price	Total
0001	MOBILIZATION (10%)	LS	1	\$1,154,000.00	\$1,154,000.00
0035	CLEARING AND GRUBBING	LS	1	\$5,000.00	\$5,000.00
0050	REMOVAL OF OBSTRUCTIONS	LS	1	\$15,000.00	\$15,000.00
0100	REMOVING CEMENT CONC. SIDEWALK	SY	1500	\$15.00	\$22,500.00
0110	REMOVING CEMENT CONC. CURB	LF	2310	\$10.00	\$23,100.00
0120	REMOVING ASPHALT CONC. PAVEMENT	SY	10000	\$6.00	\$60,000.00
0170	REMOVING GUARDRAIL	LF	3500	\$15.00	\$52,500.00
	Section 2: Grading				
0310	ROADWAY EXCAVATION INCL HAUL	CY	20000	\$10.00	\$200,000.00
0350	UNSUITABLE FOUNDATION EXCAVATION INCL HAUL	CY	100	\$30.00	\$3,000.00
	GRAVEL BORROW INCL. HAUL	CY	35000	\$20.00	\$700,000.00
	Section 9: Surfacing				
5120	CRUSHED SURFACING TOP COURSE	TON	2000	\$22.00	\$44,000.00
	Section 14: Hot Mix Asphalt				
5767	HMA CL. 1/2 IN. PG 64H-28	TON	1312	\$110.00	\$144,291.68
	Section 17: Erosion Control and Planting				
8058	LANDSCAPING	LS	1	\$100,000.00	\$100,000.00
6468	STABILIZED CONSTRUCTION ENTRANCE	SY	300	\$25.00	\$7,500.00
6490	EROSION/WATER POLLUTION CONTROL	EST	1	\$7,000.00	\$7,000.00
6403	ESC LEAD	DAY	30	\$100.00	\$3,000.00
6560	SEEDED LAWN INSTALLATION	SY	11000	\$1.00	\$11,000.00
	Section 18: Traffic				
6700	CEMENT CONC. TRAFFIC CURB AND GUTTER	LF	4300	\$20.00	\$86,000.00
5625	CEMENT CONC. PAVEMENT	SY	956	\$90.00	\$86,000.00
6751	BEAM GUARDRAIL TYPE 1	LF	3500	\$40.00	\$140,000.00
6889	PERMANENT STRIPING	LS	1	\$10,000.00	\$10,000.00
6890	PERMANENT SIGNING	LS	1	\$10,000.00	\$10,000.00
6971	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$200,000.00	\$200,000.00
6974	TRAFFIC CONTROL SUPERVISOR	LS	1	\$15,000.00	\$15,000.00
	Section 19: Other Items				
7055	CEMENT CONC. SIDEWALK	SY	1700	\$55.00	\$93,500.00
7058	CEMENT CONC. CURB RAMP TYPE 1	EA	8	\$2,000.00	\$16,000.00
7736	SPCC PLAN	LS	1	\$1,000.00	\$1,000.00
	RAILROAD BRIDGE	LS	1	\$3,800,000.00	\$3,800,000.00
	TRENT BRIDGES	LS	1	\$5,600,000.00	\$5,600,000.00
	ILLUMINATION	LS	1	\$75,000.00	\$75,000.00
	CONCRETE TRUCK APRON	SY	2500	\$90.00	\$225,000.00
	SPLITTER ISLANDS	SY	210	\$75.00	\$15,750.00
	ADDITIONAL WORK FOR RT TURN LANE	LS	1	\$200,000.00	\$200,000.00
				SUBTOTAL	\$13,125,000

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CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Sullivan/Trent RAB Option 3
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Jack Griffing, EIT	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE				
Item No.	Description	Unit	Quantity	Unit Price	Total
				25% CONTINGENCY	\$3,280,000
				CONSTRUCTION ENGINEERING	\$1,641,000
				RAILROAD COORDINATION	\$100,000
				SUBTOTAL	\$18,146,000
				3 YRS INFLATION @ 4%/YR	\$2,266,000
				CONSTRUCTION TOTAL	\$20,412,000
	Right-of-Way Estimate				
	RIGHT-OF-WAY REQUIRED ON NORTH SIDE	SF	1000	\$3.00	\$3,000
	RIGHT-OF-WAY CONSULTANT COSTS	EA	4	\$10,000	\$40,000
	LANDSCAPING COSTS PER PARCEL	EA	4	\$3,000	\$12,000
	TEMPORARY CONSTRUCTION EASEMENTS	SF	1800	\$2.25	\$4,050
				30% CONTINGENCY	\$18,000
				Construction	\$20,412,000
				Right-of-Way	\$77,050
				Design Engineering	\$1,641,000
				Project Total	\$22,100,000

CITY OF SPOKANE VALLEY
SULLIVAN CORRIDOR ADVANCED STUDY - Trent to Upland Widening
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Adam Dorsey, PE	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE	Date:			
Item No.	Description	Unit	Quantity	Unit Price	Total
Section 1: Preparation					
	MOBILIZATION (10%)	LS	1	\$139,000.00	\$139,000.00
	CLEARING AND GRUBBING	LS	1	\$15,000.00	\$15,000.00
	REMOVAL OF STRUCTURE AND OBSTRUCTION	LS	1	\$15,000.00	\$15,000.00
	REMOVING CEMENT CONC. SIDEWALK	SY	1500	\$15.00	\$22,500.00
	REMOVING CEMENT CONC. CURB	LF	2200	\$10.00	\$22,000.00
	REMOVING ASPHALT CONC. PAVEMENT	SY	5400	\$6.00	\$32,400.00
Section 2: Grading					
	ROADWAY EXCAVATION INCL HAUL	CY	3700	\$30.00	\$111,000.00
	UNSUITABLE FOUNDATION EXCAVATION INCL HAUL	CY	100	\$30.00	\$3,000.00
Section 5: Storm Sewer					
	STORM PIPE	LF	500	\$60.00	\$30,000.00
	CATCH BASIN TYPE 1	EA	4	\$2,500.00	\$10,000.00
Section 9: Surfacing					
	CRUSHED SURFACING BASE COURSE - 8"	TON	3000	\$20.00	\$60,000.00
	CRUSHED SURFACING TOP COURSE - 4"	TON	2000	\$25.00	\$50,000.00
Section 14: Hot Mix Asphalt					
	HMA CL. 1/2 IN. PG 64H-28 - 6"	TON	2300	\$85.00	\$195,500.00
Section 17: Erosion Control and Planting					
	STABILIZED CONSTRUCTION ENTRANCE	SY	300	\$25.00	\$7,500.00
	EROSION/WATER POLLUTION CONTROL	EST	1	\$7,000.00	\$7,000.00
	ESC LEAD	DAY	30	\$100.00	\$3,000.00
	SEEDED LAWN INSTALLATION	LS	1	\$5,000.00	\$5,000.00
Section 18: Traffic					
	CEMENT CONC. TRAFFIC CURB AND GUTTER	LF	2200	\$20.00	\$44,000.00
	PERMANENT STRIPING	LS	1	\$10,000.00	\$10,000.00
	PERMANENT SIGNING	LS	1	\$10,000.00	\$10,000.00
	PROJECT TEMPORARY TRAFFIC CONTROL	LS	1	\$100,000.00	\$100,000.00
	TRAFFIC CONTROL SUPERVISOR	LS	1	\$15,000.00	\$15,000.00
Section 19: Other Items					
	CONCRETE SIDEWALK	SY	1960	\$250.00	\$490,000.00
	CEMENT CONC. CURB RAMP TYPE 1	EA	2	\$2,000.00	\$4,000.00
	SPCC PLAN	LS	1	\$1,000.00	\$1,000.00
	2" CONDUIT	LF	1100	\$20.00	\$22,000.00
	ILLUMINATION	LS	1	\$100,000.00	\$100,000.00
				SUBTOTAL	\$1,524,000
				25% CONTINGENCY	\$380,000
				CONSTRUCTION ENGINEERING	\$230,000.00
				SUBTOTAL	\$2,134,000.00

Welch Comer Engineers

CITY OF SPOKANE VALLEY

**SULLIVAN CORRIDOR ADVANCED STUDY - Trent to Upland Widening
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS**

Prepared By:	Adam Dorsey, PE	Date:	April 4, 2020		
Project Manager:	Matt Gillis, PE	Date:			
Item No.	Description	Unit	Quantity	Unit Price	Total
				3 YRS INFLATION @ 4%/YR	\$270,000.00
				CONSTRUCTION TOTAL	\$2,404,000
	Right-of-Way Estimate				
	RIGHT-OF-WAY REQUIRED FOR ROADWAY	SF	10300	\$3.00	\$30,900.00
	RIGHT-OF-WAY REQUIRED FOR SWALE	SF	5000	\$3.00	\$15,000.00
	LANDSCAPING PER PARCEL	EA	12	\$3,000.00	\$36,000.00
	RIGHT-OF-WAY CONSULTANT COSTS	EA	12	\$10,000	\$120,000.00
	TEMPORARY CONSTRUCTION EASEMENTS ON NORTH SIDE	SF	4400	\$2.25	\$9,900.00
				30% CONTINGENCY	\$64,000.00
				Construction	\$2,400,000
				Right-of-Way	\$280,000.00
				Design Engineering	\$190,000.00
				Project Total	\$2,870,000